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Date:

APPROVAL SHEET

Product Name : AUTOMOTIVE Multilayer Ceramic Chip Capacitors
Part No. : MT General Series
Description : Size 0402 to 1812 , X7R , 6.3Vdc to 630Vdc, RoHS Compliant

| PREPARED BY | APPROVED BY |
|-------------|-------------|
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SPECIFICATION FOR
AUTOMOTIVE MULTILAYER CERAMIC CHIP CAPACITORS

Part No. : MT General Series

Description : Size 0402 to 1812 , X7R , 6.3Vdc to 630Vdc, RoHS
Compliant

| <u>DRAWN BY</u> | <u>CHECKED BY</u> | <u>APPROVED BY</u> |
|-----------------|-------------------|--------------------|
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1. INTRODUCTION

MLCC consists of a conducting material and electrodes. To manufacture a chip-type SMT and achieve miniaturization, high density and high efficiency, ceramic condensers are used.

PDC's MT General series MLCC is made by ,X7R dielectrics and which provides product with high electrical precision, stability and reliability. Besides, MT General series MLCC is tighten controlling in quality in line to assure quality performance in automotive applications and qualified to AEC-Q200.

2. FEATURES

- A wide selection of sizes is available (0402 to 1812).
- High capacitance in given case size.
- Capacitor with lead-free termination (pure Tin).
- The MT series meet AEC-Q200 requirement.
- RoHS Compliant.

3. APPLICATIONS

- For Navigation & Information equipments.
- For entertainment equipments
- For comfortable equipments.
- For Automotive electronic equipment.

4. HOW TO ORDER

| <u>MT</u> | <u>18</u> | <u>X</u> | <u>102</u> | <u>K</u> | <u>500</u> | <u>P</u> | <u>S</u> | <u>G</u> |
|------------------------------|-----------------|----------|--------------------------------------|----------|------------------------------|---------------------------------|-------------------|-------------------|
| MT= Automotive AEC-Q200 meet | 18= 0603 (1608) | X= X7R | 102= 10x10 ² =1000pF =1nF | K= ±10 % | 500= 50x10 ⁰ =50V | P= Tape and 7" Reel, Paper Tape | S= 0.80 ± 0.70 mm | G= RoHS Compliant |
| Table1. | Table2 | Table3 | Table4 | Table5 | Table6 | Table7 | Table8 | Table9 |

| Table 1 | PDC family | |
|---------|--------------------------|--|
| Code | Description | |
| MT | Automotive AEC-Q200 meet | |

| Table 2 | General Purpose | | | | | |
|---------|-----------------|------|-------------|------|-------------|--|
| Code | Description | Code | Description | Code | Description | |
| 15 | 0402 (1005) | 32 | 1210 (3225) | 52 | 2220 (5750) | |
| 18 | 0603 (1608) | 42 | 1808 (4520) | 55 | 2220 (5750) | |
| 21 | 0805 (2012) | 43 | 1812 (4532) | 56 | 2225 (5763) | |
| 31 | 1206 (3216) | 46 | 1825 (4563) | | | |

| Table 3 | Dielectric Material Characteristics | | | |
|---------|-------------------------------------|------|-------------|--|
| Code | Description | Code | Description | |
| N | C0G | X | X7R | |
| B | X5R | F | Y5V | |

| Table 4 | Table 4 Capacitance Rule Code | | | |
|---------|-------------------------------|------|--------------------------------|--|
| Code | Description | Code | Description | |
| R47 | 0.47pF | 102 | 102=10x10 ² =1000pF | |
| 0R5 | 0.5pF | 104 | 104=10x10 ⁴ =100nF | |
| 100 | 100=10x10 ⁰ =10pF | 106 | 106=10x10 ⁶ =10μF | |

| Table 5 | Tolerance | | | | | |
|---------|-------------|------|-------------|------|-------------|--|
| Code | Description | Code | Description | Code | Description | |
| A | ±0.05 pF | H | ±3 % | N | -5% ~ +10% | |
| B | ±0.10 pF | I | -10% ~ 0% | P | ±0.02 pF | |
| C | ±0.25 pF | J | ±5 % | Q | ±0.03 pF | |
| D | ±0.50 pF | K | ±10 % | Z | -20% ~ 80% | |
| F | ±1 % | L | 0% ~ +10% | | | |
| G | ±2 % | M | ±20 % | | | |

| Table 6 | Rated voltage | | | | | |
|---------|---------------|------|-------------|------|-------------|--|
| Code | Description | Code | Description | Code | Description | |
| 6R3 | 6.3VDC | 201 | 200VDC | 152 | 1500VDC | |
| 100 | 10VDC | 251 | 250VDC | 202 | 2000VDC | |
| 160 | 16VDC | 401 | 400VDC | 302 | 3000VDC | |
| 250 | 25VDC | 501 | 500VDC | 402 | 4000VDC | |
| 500 | 50VDC | 631 | 630VDC | 502 | 5000VDC | |
| 101 | 100VDC | 102 | 1000VDC | 602 | 6000VDC | |

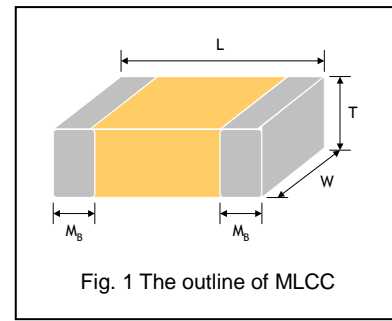
| Table 7 | Packaging Type | | | |
|---------|----------------------------------|------|-------------------------------|--|
| Code | Description | Code | Description | |
| B | Bulk | T | Tray package | |
| E | Tape and 7" Reel, Embossed Tape | P | Tape and 7" Reel, Paper Tape | |
| K | Tape and 10" Reel, Embossed Tape | D | Tape and 10" Reel, Paper Tape | |
| L | Tape and 13" Reel, Embossed Tape | G | Tape and 13" Reel, Paper Tape | |

| Table 8 | Thickness Description | | | | | |
|---------|-----------------------|------|--------------------|------|---------------------|--|
| Code | Description | Code | Description | Code | Description | |
| A | 0.60 ± 0.10 mm | I | 1.25 ± 0.20 mm | Q | 0.50 +0.02/-0.05 mm | |
| B | 0.8 + 0.15/-0.10 mm | J | 1.15 ± 0.15 mm | R | 3.10 ± 0.30 mm | |
| C | 1.25 ± 0.10 mm | K | 0.50 ± 0.20 mm | S | 0.80 ± 0.07 mm | |
| D | 1.40 ± 0.15 mm | L | 0.30 ± 0.03 mm | T | 0.85 ± 0.10 mm | |
| E | 1.60 ± 0.20 mm | M | 0.95 ± 0.10 mm | U | 0.50 ± 0.10 mm | |
| F | 2.00 ± 0.20 mm | N | 0.50 ± 0.05 mm | V | 0.20 ± 0.02 mm | |
| G | 2.50 ± 0.30 mm | O | 3.50 ± 0.20 mm | X | 0.80 ± 0.10 mm | |
| H | 2.80 ± 0.30 mm | P | 1.60 +0.3/-0.10 mm | Z | 0.25 ± 0.03 mm | |

| Table 9 | Special Control Code | |
|---------|----------------------|--|
| Code | Description | |
| G | RoHS Compliant | |

5. EXTERNAL DIMENSIONS

| Size Inch (mm) | L (mm) | W (mm) | T(mm) | T Code | M _B (mm) |
|-------------------|-----------------|-----------------|-----------------|-----------------|---------------------|
| 0402 (1005) | 1.00±0.05 | 0.50±0.05 | 0.50±0.05 | N | 0.25 +0.05/-0.10 |
| 0603 (1608) | 1.60±0.10 | 0.80±0.10 | 0.80±0.07 | S | 0.40±0.15 |
| | 1.60+0.15/-0.10 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | B | |
| 0805 (2012) | 2.00±0.15 | 1.25±0.10 | 0.60±0.10 | A | 0.50±0.20 |
| | | | 0.80±0.10 | X | |
| | | | 1.25±0.10 | C | |
| | 2.00±0.20 | 1.25±0.20 | 1.25±0.20 | I | |
| 1206 (3216) | 3.30±0.15 | 1.60±0.15 | 0.80±0.10 | X | 0.60±0.20 |
| | | | 0.95±0.10 | M | |
| | | | 1.25±0.10 | C | |
| | 3.30±0.20 | 1.60±0.20 | 1.15±0.15 | J | |
| | | | 1.60±0.20 | E | |
| | | | 3.20+0.30/-0.10 | 1.60+0.30/-0.10 | |
| 1210 (3225) | 3.20±0.30 | 2.50±0.20 | 0.95±0.10 | M | 0.75±0.25 |
| | | | 1.25±0.10 | C | |
| | 3.20±0.40 | 2.50±0.30 | 1.60±0.20 | E | |
| | | | 2.00±0.20 | F | |
| | | | 2.50±0.30 | G | |
| 1808 (4520) | 4.50±0.40 | 2.03±0.25 | 1.25±0.10 | C | 0.75±0.25 |
| | | | 1.40±0.15 | D | |
| | | | 1.60±0.20 | E | |
| | | | 2.00±0.20 | F | |
| 1812 (4532) | 4.60±0.50 | 3.20±0.30 | 1.25±0.10 | C | 0.75±0.25 |
| | | | 1.60±0.20 | E | |
| | | | 2.00±0.20 | F | |
| | | 3.20±0.40 | 2.50±0.30 | G | |
| | 2.80±0.30 | | H | | |



6. GENERAL ELECTRICAL DATA

| | |
|---|--|
| Dielectric | X7R |
| Size | 0402, 0603, 0805, 1206, 1210, 1808, 1812 |
| Capacitance range* | 100pF to 47μF |
| Capacitance tolerance** | J (±5%), K (±10%), M (±20%) |
| Rated voltage (WVDC) | 10V, 16V, 25V, 50V, 100V, 200V, 250V, 500V, 630V, |
| Insulation resistance at U_r | ≥10GΩ or R _x C≥500Ω×F whichever is smaller (to see the table for exception items in #8) |
| Operating temperature | -55 to +125°C |
| Capacitance characteristic | ±15% |
| Termination | Cu/Ni/Sn (lead-free termination) |

* Measured at the condition of 30~70% related humidity.

Measured at 1.0±0.2V_{rms}, 1.0kHz±10% for C≤10μF; 30~70% related humidity, 25°C ambient temperature for X7R.

** Preconditioning for Class2 MLCC: Perform a heat treatment at 150±10°C for 1 hour, then leave in ambient condition for 24±2 hours before measurement.

7. CAPACITANCE RANGE (X7R Dielectric)

7-1 X7R Dielectric 0402,0603 Sizes

| DIELECTRIC | | X7R | | | | | | | | | | | | |
|---------------|---------------|------|----|----|----|----|------|----|----|----|----|-----|-----|-----|
| SIZE | | 0402 | | | | | 0603 | | | | | | | |
| RATED VOLTAGE | | 6.3 | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 35 | 50 | 100 | 200 | 250 |
| Capacitance | 100pF (101) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 120pF (121) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 150pF (151) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 180pF (181) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 220pF (221) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 270pF (271) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 330pF (331) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 390pF (391) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 470pF (471) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 560pF (561) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 680pF (681) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 820pF (821) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 1,000pF (102) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 1,200pF (122) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 1,500pF (152) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 1,800pF (182) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 2,200pF (222) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 2,700pF (272) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 3,300pF (332) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 3,900pF (392) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 4,700pF (472) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 5,600pF (562) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 6,800pF (682) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 8,200pF (822) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 0.010μF (103) | | N | N | N | N | S | S | S | | S | S | B | B |
| | 0.012μF (123) | | | | | | S | S | S | | S | S | | |
| | 0.015μF (153) | | | | | | S | S | S | | S | S | | |
| | 0.018μF (183) | | | | | | S | S | S | | S | S | | |
| | 0.022μF (223) | | | N | | N | S | S | S | | S | S | | |
| | 0.027μF (273) | | | | | | S | S | S | | S | | | |
| | 0.033μF (333) | | | | | | S | S | S | | B | B | | |
| | 0.039μF (393) | | | | | | S | S | S | | B | | | |
| | 0.047μF (473) | | | N | | N | S | S | S | S | B | | | |
| 0.056μF (563) | | | | | | S | S | S | | B | | | | |
| 0.068μF (683) | | | | | | S | S | S | | B | | | | |
| 0.082μF (823) | | | | | | S | S | S | | B | | | | |
| 0.10μF (104) | | N | N | N | N | S | S | S | S | B | B | | | |
| 0.22μF (224) | N | N | N | | | S | S | S | S | | | | | |
| 0.47μF (474) | N | | | | | S | S | S | S | | | | | |
| 1.0μF (105) | | | | | | S | S | S | S | | | | | |

7. CAPACITANCE RANGE (X7R Dielectric)

7-1 X7R Dielectric 0805 Sizes

| DIELECTRIC SIZE | X7R | | | | | | | | | | | |
|--------------------|---------------|-----|----|----|----|----|----|-----|-----|-----|-----|-----|
| | 0805 | | | | | | | | | | | |
| | RATED VOLTAGE | 6.3 | 10 | 16 | 25 | 35 | 50 | 100 | 200 | 250 | 500 | 630 |
| 100pF (101) | | X | X | X | | | X | X | X | X | X | X |
| 120pF (121) | | X | X | X | | | X | X | X | X | X | X |
| 150pF (151) | | X | X | X | | | X | X | X | X | X | X |
| 180pF (181) | | X | X | X | | | X | X | X | X | X | X |
| 220pF (221) | | X | X | X | | | X | X | X | X | X | X |
| 270pF (271) | | X | X | X | | | X | X | X | X | X | X |
| 330pF (331) | | X | X | X | | | X | X | X | X | X | X |
| 390pF (391) | | X | X | X | | | X | X | X | X | X | X |
| 470pF (471) | | X | X | X | | | X | X | X | X | X | X |
| 560pF (561) | | X | X | X | | | X | X | X | X | X | X |
| 680pF (681) | | X | X | X | | | X | X | X | X | X | X |
| 820pF (821) | | X | X | X | | | X | X | X | X | X | X |
| 1,000pF (102) | | X | X | X | | | X | X | X | X | X | X |
| 1,200pF (122) | | X | X | X | | | X | X | X | X | X | X |
| 1,500pF (152) | | X | X | X | | | X | X | X | X | X | X |
| 1,800pF (182) | | X | X | X | | | X | X | X | X | X | X |
| 2,200pF (222) | | X | X | X | | | X | X | X | X | X | X |
| 2,700pF (272) | | X | X | X | | | X | X | X | X | X | X |
| 3,300pF (332) | | X | X | X | | | X | X | X | X | X | X |
| 3,900pF (392) | | X | X | X | | | X | X | X | X | C | C |
| 4,700pF (472) | | X | X | X | | | X | X | X | X | C | C |
| 5,600pF (562) | | X | X | X | | | X | X | X | X | C | C |
| 6,800pF (682) | | X | X | X | | | X | X | X | X | C | C |
| 8,200pF (822) | | X | X | X | | | X | X | X | X | C | C |
| 0.010μF (103) | | X | X | X | | | X | X | C | C | C | C |
| 0.012μF (123) | | X | X | X | | | X | X | C | C | | |
| 0.015μF (153) | | X | X | X | | | X | X | C | C | | |
| 0.018μF (183) | | X | X | X | | | X | X | C | C | | |
| 0.022μF (223) | | X | X | X | | | X | X | C | C | | |
| 0.027μF (273) | | X | X | X | | | X | M | C | C | | |
| 0.033μF (333) | | X | X | X | | | X | M | C | C | | |
| 0.039μF (393) | | X | X | X | | | X | M | | | | |
| 0.047μF (473) | | X | X | X | X | | X | M | | | | |
| 0.056μF (563) | | X | X | X | | | X | M | | | | |
| 0.068μF (683) | | X | X | X | | | X | M | | | | |
| 0.082μF (823) | | X | X | X | | | X | M | | | | |
| 0.10μF (104) | | X | X | X | X | | X | C | | | | |
| 0.12μF (124) | | C | C | C | | | X | C | | | | |
| 0.15μF (154) | | C | C | C | | | X | C | | | | |
| 0.18μF (184) | | C | C | C | | | X | C | | | | |
| 0.22μF (224) | | C | C | C | C | | C | C | | | | |
| 0.27μF (274) | | C | C | C | | | | | | | | |
| 0.33μF (334) | | C | C | C | | | | | | | | |
| 0.39μF (394) | | C | C | C | | | | | | | | |
| 0.47μF (474) | | C | C | C | C | | | | | | | |
| 0.56μF (564) | | C | C | C | | | | | | | | |
| 0.68μF (684) | | C | C | C | | | | | | | | |
| 0.82μF (824) | | C | C | C | | | | | | | | |
| 1.0μF (105) | | C | C | C | C | C | | | | | | |
| 2.2μF (225) | | C | C | C | | | | | | | | |
| 4.7μF (475) | | C | C | | | | | | | | | |
| 10μF (106) | C | | | | | | | | | | | |

7. CAPACITANCE RANGE (X7R Dielectric)

7-1 X7R Dielectric 1206 Sizes

| DIELECTRIC SIZE | X7R | | | | | | | | | | | |
|--------------------|---------------|-----|----|----|----|----|----|-----|-----|-----|-----|-----|
| | 1206 | | | | | | | | | | | |
| | RATED VOLTAGE | 6.3 | 10 | 16 | 25 | 35 | 50 | 100 | 200 | 250 | 500 | 630 |
| Capacitance | 100pF (101) | | | | | | | | C | C | C | C |
| | 120pF (121) | | | | | | | | C | C | C | C |
| | 150pF (151) | | X | X | X | | X | X | C | C | C | C |
| | 180pF (181) | | X | X | X | | X | X | C | C | C | C |
| | 220pF (221) | | X | X | X | | X | X | C | C | C | C |
| | 270pF (271) | | X | X | X | | X | X | C | C | C | C |
| | 330pF (331) | | X | X | X | | X | X | C | C | C | C |
| | 390pF (391) | | X | X | X | | X | X | C | C | C | C |
| | 470pF (471) | | X | X | X | | X | X | C | C | C | C |
| | 560pF (561) | | X | X | X | | X | X | C | C | C | C |
| | 680pF (681) | | X | X | X | | X | X | C | C | C | C |
| | 820pF (821) | | X | X | X | | X | X | C | C | C | C |
| | 1,000pF (102) | | X | X | X | | X | X | C | C | C | C |
| | 1,200pF (122) | | X | X | X | | X | X | C | C | C | C |
| | 1,500pF (152) | | X | X | X | | X | X | C | C | C | C |
| | 1,800pF (182) | | X | X | X | | X | X | C | C | C | C |
| | 2,200pF (222) | | X | X | X | | X | X | C | C | C | C |
| | 2,700pF (272) | | X | X | X | | X | X | C | C | C | C |
| | 3,300pF (332) | | X | X | X | | X | X | C | C | C | C |
| | 3,900pF (392) | | X | X | X | | X | X | C | C | C | C |
| | 4,700pF (472) | | X | X | X | | X | X | C | C | C | C |
| | 5,600pF (562) | | X | X | X | | X | X | C | C | C | C |
| | 6,800pF (682) | | X | X | X | | X | X | C | C | C | C |
| | 8,200pF (822) | | X | X | X | | X | X | C | C | C | C |
| | 0.010μF (103) | | X | X | X | | X | X | C | C | C | C |
| | 0.012μF (123) | | X | X | X | | X | X | C | C | | |
| | 0.015μF (153) | | X | X | X | | X | X | C | C | | |
| | 0.018μF (183) | | X | X | X | | X | X | C | C | | |
| | 0.022μF (223) | | X | X | X | | X | X | C | C | | E |
| | 0.027μF (273) | | X | X | X | | X | C | E | E | | |
| | 0.033μF (333) | | X | X | X | | X | C | E | E | | |
| | 0.039μF (393) | | X | X | X | | X | C | E | E | | |
| 0.047μF (473) | | X | X | X | | X | C | E | E | | | |
| 0.056μF (563) | | X | X | X | | X | C | E | E | | | |
| 0.068μF (683) | | X | X | X | | X | C | E | E | | | |
| 0.082μF (823) | | X | X | X | | X | C | E | E | | | |
| 0.10μF (104) | | X | X | X | | X | C | E | E | | | |
| 0.22μF (224) | | M | M | M | | M | E | | | | | |
| 0.33μF (334) | | M | M | M | | C | P | | | | | |
| 0.47μF (474) | | J | J | J | | E | P | | | | | |
| 0.68μF (684) | | J | J | J | | P | P | | | | | |
| 1.0μF (105) | | J | J | J | E | P | P | | | | | |
| 2.2μF (225) | | | E | E | E | P | | | | | | |
| 4.7μF (475) | | E | E | E | E | | | | | | | |
| 10μF (106) | E | E | E | E | | | | | | | | |
| 22μF (226) | E | | | | | | | | | | | |

7. CAPACITANCE RANGE (X7R Dielectric)

7-1 X7R Dielectric 1210 Sizes

| DIELECTRIC SIZE | X7R | | | | | | | | | |
|--------------------|---------------|-----|----|----|----|----|----|-----|-----|-----|
| | 1210 | | | | | | | | | |
| | RATED VOLTAGE | 6.3 | 10 | 16 | 25 | 35 | 50 | 100 | 200 | 250 |
| 220pF (221) | | | | | | C | C | C | C | |
| 270pF (271) | | | | | | C | C | C | C | |
| 330pF (331) | | | | | | C | C | C | C | |
| 390pF (391) | | | | | | C | C | C | C | |
| 470pF (471) | | | | | | C | C | C | C | |
| 560pF (561) | | | | | | C | C | C | C | |
| 680pF (681) | | | | | | C | C | C | C | |
| 820pF (821) | | | | | | C | C | C | C | |
| 1,000pF (102) | | | | | | C | C | C | C | |
| 1,200pF (122) | | | | | | C | C | C | C | |
| 1,500pF (152) | | | | | | C | C | C | C | |
| 1,800pF (182) | | | | | | C | C | C | C | |
| 2,200pF (222) | | | | | | C | C | C | C | |
| 2,700pF (272) | | | | | | C | C | C | C | |
| 3,300pF (332) | | | | | | C | C | C | C | |
| 3,900pF (392) | | | | | | C | C | C | C | |
| 4,700pF (472) | | | | | | C | C | C | C | |
| 5,600pF (562) | | | | | | C | C | C | C | |
| 6,800pF (682) | | | | | | C | C | C | C | |
| 8,200pF (822) | | | | | | C | C | C | C | |
| 0.010μF (103) | | | | | | C | C | C | C | |
| 0.012μF (123) | | | | | | C | C | C | C | |
| 0.015μF (153) | | | | | | C | C | C | C | |
| 0.018μF (183) | | | | | | C | C | C | C | |
| 0.022μF (223) | | | | | | C | C | C | C | F |
| 0.027μF (273) | | | | | | C | C | E | E | |
| 0.033μF (333) | | | | | | C | C | E | E | F |
| 0.039μF (393) | | | | | | C | C | E | E | |
| 0.047μF (473) | | | | | | C | C | E | E | F |
| 0.056μF (563) | | | | | | C | C | E | E | |
| 0.068μF (683) | | | | | | C | C | E | E | |
| 0.082μF (823) | | | | | | C | C | E | E | |
| 0.10μF (104) | | | | | | C | E | E | E | |
| 0.12μF (124) | | | | | | C | E | E | E | |
| 0.15μF (154) | | | | | | C | E | E | E | |
| 0.18μF (184) | | | | | | C | E | E | E | |
| 0.22μF (224) | | | | | | C | E | E | E | |
| 0.27μF (274) | | | | | | C | E | E | E | |
| 0.33μF (334) | | | | | | C | E | F | F | |
| 0.39μF (394) | | | | | | C | E | | | |
| 0.47μF (474) | | | | | | C | G | | | |
| 0.56μF (564) | | | | | | C | G | | | |
| 0.68μF (684) | | | | | | C | G | | | |
| 0.82μF (824) | | | | | | C | G | | | |
| 1.0μF (105) | | | | | | C | G | | | |
| 2.2μF (225) | | | | | F | | G | | | |
| 3.3μF (335) | | | | | | | | | | |
| 4.7μF (475) | | | | F | G | G | | | | |
| 10μF (106) | | | F | G | G | G | | | | |
| 22μF (226) | G | G | G | G | | | | | | |
| 47μF (476) | G | | | | | | | | | |

7. CAPACITANCE RANGE (X7R Dielectric)

7-1 X7R Dielectric 1808,1812 Sizes

| DIELECTRIC | X7R | | | | | | | | | |
|--------------|---------------|-------|----|-----|-----|------|----|-----|-----|-----|
| | SIZE | 1808 | | | | 1812 | | | | |
| | | RATED | 50 | 100 | 200 | 250 | 50 | 100 | 200 | 250 |
| Capacitance | 220pF (221) | C | C | C | C | | | | | |
| | 270pF (271) | C | C | C | C | | | | | |
| | 330pF (331) | C | C | C | C | C | C | C | C | |
| | 390pF (391) | C | C | C | C | C | C | C | C | |
| | 470pF (471) | C | C | C | C | C | C | C | C | |
| | 560pF (561) | C | C | C | C | C | C | C | C | |
| | 680pF (681) | C | C | C | C | C | C | C | C | |
| | 820pF (821) | C | C | C | C | C | C | C | C | |
| | 1,000pF (102) | C | C | C | C | C | C | E | E | |
| | 1,200pF (122) | C | C | C | C | C | C | E | E | |
| | 1,500pF (152) | C | C | C | C | C | C | E | E | |
| | 1,800pF (182) | C | C | C | C | C | C | E | E | |
| | 2,200pF (222) | C | C | C | C | C | C | E | E | |
| | 2,700pF (272) | C | C | C | C | C | C | E | E | |
| | 3,300pF (332) | C | C | C | C | C | C | E | E | |
| | 3,900pF (392) | C | C | C | C | C | C | E | E | |
| | 4,700pF (472) | C | C | C | C | C | C | E | E | |
| | 5,600pF (562) | C | C | C | C | C | C | E | E | |
| | 6,800pF (682) | C | C | C | C | C | C | E | E | |
| | 8,200pF (822) | C | C | C | C | C | C | E | E | |
| | 0.010μF (103) | C | C | C | C | C | C | E | E | |
| | 0.012μF (123) | E | E | E | E | C | C | E | E | |
| | 0.015μF (153) | E | E | E | E | C | C | E | E | |
| | 0.018μF (183) | E | E | E | E | C | C | E | E | |
| | 0.022μF (223) | E | E | E | E | C | C | E | E | |
| | 0.027μF (273) | E | E | E | E | C | C | E | E | |
| | 0.033μF (333) | E | E | E | E | C | C | E | E | |
| | 0.039μF (393) | E | E | E | E | C | C | E | E | |
| | 0.047μF (473) | E | E | E | E | C | C | E | E | G |
| | 0.056μF (563) | E | E | E | E | C | C | E | E | |
| | 0.068μF (683) | E | E | E | E | C | C | E | E | G |
| | 0.082μF (823) | E | E | E | E | C | C | E | E | |
| 0.10μF (104) | E | E | E | E | C | C | F | F | G | |
| 0.12μF (124) | E | E | | | C | C | F | F | | |
| 0.15μF (154) | E | E | | | C | C | F | F | | |
| 0.18μF (184) | E | E | | | C | C | F | F | | |
| 0.22μF (224) | E | E | | | E | C | F | F | | |
| 0.27μF (274) | | | | | E | C | F | F | | |
| 0.33μF (334) | | | | | E | C | F | F | | |
| 0.39μF (394) | | | | | E | C | | | | |
| 0.47μF (474) | | | | | F | C | | M | | |
| 0.56μF (564) | | | | | F | C | | | | |
| 0.68μF (684) | | | | | F | C | | | | |
| 0.82μF (824) | | | | | F | C | | | | |
| 1.0μF (105) | | | | | F | F | | | | |
| 2.2μF (225) | | | | | | G | | | | |

1. The letter in cell is expressed the symbol of product thickness.

2. For more information about products with special capacitance or other data, please contact PDC local representative.

8. RELIABILITY TEST CONDITIONS AND REQUIREMENTS

| No. | AEC-Q200 Test Item | AEC-Q200 Test Condition | Requirements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|--|---------------------|---------------------|-------------------|--------------------|-------------------|--|---|----------|-------------|-------------|---|-------------|---------------|-----------------|-------------|-------------|------|-------------|------|-------------|------|-------------|------|-------------|----------|---|------------|-----------------|---------|-------------|------|---------|-----|------|---|------------|-----------------|-------------|---------|-------------|---------|-------------|---------|-------------|---------|------|-------------|------|-------------|------|-------------|---------|-------------|---|---------|---------|---------|---------|---------|--------|---------|--------|---|---------|---------|---------|------|---------|------|---------|------|---------|---------|---------|---------|------|---------|------|---------|------|---------|---------|---------|---------|---------|------|---------|------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|---------|---------|---------|---------|---------|---------|------|---------|----------|---------|---------|----------|----------|---------|---------|---------|---------|------|---------|------|---------|---------|------|---------|-----|------|------|----------|------|---------|---------|---------|---------|---------|---------|-------|---------|------|---------|---------|---------|---------|--|--|--|------|------|---------|------|---------|----------|------|---------|------|---------|------|---------|------|---------|---------|------|---------|--|------|------|------|------|---------|---------|---------|---------|---------|------|---------|------|------|---------|------|--------|---------|------|---------|------|---------|------|---------|------|------|---------|------|--------|--|--|--|--|------|------|---------|--|--|--|--|--|--|----|------|-----|-----|-----|--|--|--|--|--|
| 1. | Pre-and Post-Stress Electrical Test | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. | Electrical Characterization | * Capacitance * D.F. (Dissipation Factor) | * Capacitance within the specified tolerance. * D.F. value: X7R: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | <table border="1"> <thead> <tr> <th>Class</th> <th>Capacitance</th> <th>Measuring Frequency</th> <th>Measuring Voltage</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Class2</td> <td>≤ 10 uF</td> <td>1KHz±10%</td> <td>1.0±0.2Vrms</td> </tr> <tr> <td>> 10 uF</td> <td>120Hz±20%</td> <td>0.5±0.2Vrms</td> </tr> </tbody> </table> | Class | Capacitance | Measuring Frequency | Measuring Voltage | Class2 | ≤ 10 uF | 1KHz±10% | 1.0±0.2Vrms | > 10 uF | 120Hz±20% | 0.5±0.2Vrms | <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th rowspan="2">Standard D.F.</th> <th colspan="8">Exception Items</th> </tr> <tr> <th>D.F.</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td rowspan="3">≥50V</td> <td rowspan="3">≤2.5%</td> <td>≤3%</td> <td>0201</td> <td>All</td> <td>0603</td> <td>≥0.047uF</td> <td>0805</td> <td>≥0.15uF</td> <td>1206</td> <td>≥0.47uF</td> </tr> <tr> <td>≤5%</td> <td>1210</td> <td>≥4.70uF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤10%</td> <td>0402</td> <td>≥0.10uF</td> <td>0603</td> <td>≥1.00uF</td> <td>0805</td> <td>≥1.00uF</td> <td>1206</td> <td>≥2.20uF</td> </tr> <tr> <td rowspan="3">35V</td> <td rowspan="3">≤3.5%</td> <td>≤10%</td> <td>0603</td> <td>≥1.00uF</td> <td>0805</td> <td>≥2.20uF</td> <td>1210</td> <td>≥10.0uF</td> <td></td> <td></td> </tr> <tr> <td>≤5%</td> <td>0201</td> <td>≥0.01uF</td> <td>0805</td> <td>≥1.00uF</td> <td>1210</td> <td>≥10.0uF</td> <td></td> <td></td> </tr> <tr> <td>≤7%</td> <td>0603</td> <td>≥0.33uF</td> <td>1206</td> <td>≥4.70uF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">≤3.5%</td> <td>≤10%</td> <td>0402</td> <td>≥0.10uF</td> <td>0603</td> <td>≥0.47uF</td> <td>0805</td> <td>≥2.20uF</td> <td>1206</td> <td>≥6.80uF</td> </tr> <tr> <td>≤5%</td> <td>1210</td> <td>≥22.0uF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤10%</td> <td>0201</td> <td>≥0.01uF</td> <td>0402</td> <td>≥0.033uF</td> <td>0603</td> <td>≥0.15uF</td> <td>0805</td> <td>≥0.68uF</td> </tr> <tr> <td rowspan="3">16V</td> <td rowspan="3">≤3.5%</td> <td>≤5%</td> <td>1206</td> <td>≥2.20uF</td> <td>1210</td> <td>≥4.70uF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤10%</td> <td>0201</td> <td>≥0.10uF</td> <td>0402</td> <td>≥0.22uF</td> <td>0603</td> <td>≥0.68uF</td> <td>0805</td> <td>≥2.20uF</td> </tr> <tr> <td>≤10%</td> <td>1206</td> <td>≥4.70uF</td> <td>1210</td> <td>≥22.0uF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">10V</td> <td rowspan="3">≤5.0%</td> <td>≤10%</td> <td>0201</td> <td>≥0.012uF</td> <td>0402</td> <td>≥0.33uF</td> <td>0603</td> <td>≥0.33uF</td> <td>0805</td> <td>≥2.20uF</td> </tr> <tr> <td>≤15%</td> <td>1206</td> <td>≥2.20uF</td> <td>1210</td> <td>≥22.0uF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤15%</td> <td>0201</td> <td>≥0.10uF</td> <td>0402</td> <td>≥1.00uF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">6.3V</td> <td rowspan="3">≤10%</td> <td>≤15%</td> <td>0201</td> <td>≥0.10uF</td> <td>0402</td> <td>≥1.00uF</td> <td>0603</td> <td>≥10.0uF</td> <td>0805</td> <td>≥4.70uF</td> </tr> <tr> <td>≤20%</td> <td>1206</td> <td>≥4.70uF</td> <td>1210</td> <td>≥100uF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤20%</td> <td>0402</td> <td>≥2.20uF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4V</td> <td>≤15%</td> <td>---</td> <td>---</td> <td>---</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | Rated vol. | Standard D.F. | Exception Items | | | | | | | | D.F. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | ≥50V | ≤2.5% | ≤3% | 0201 | All | 0603 | ≥0.047uF | 0805 | ≥0.15uF | 1206 | ≥0.47uF | ≤5% | 1210 | ≥4.70uF | | | | | | | ≤10% | 0402 | ≥0.10uF | 0603 | ≥1.00uF | 0805 | ≥1.00uF | 1206 | ≥2.20uF | 35V | ≤3.5% | ≤10% | 0603 | ≥1.00uF | 0805 | ≥2.20uF | 1210 | ≥10.0uF | | | ≤5% | 0201 | ≥0.01uF | 0805 | ≥1.00uF | 1210 | ≥10.0uF | | | ≤7% | 0603 | ≥0.33uF | 1206 | ≥4.70uF | | | | | 25V | ≤3.5% | ≤10% | 0402 | ≥0.10uF | 0603 | ≥0.47uF | 0805 | ≥2.20uF | 1206 | ≥6.80uF | ≤5% | 1210 | ≥22.0uF | | | | | | | ≤10% | 0201 | ≥0.01uF | 0402 | ≥0.033uF | 0603 | ≥0.15uF | 0805 | ≥0.68uF | 16V | ≤3.5% | ≤5% | 1206 | ≥2.20uF | 1210 | ≥4.70uF | | | | | ≤10% | 0201 | ≥0.10uF | 0402 | ≥0.22uF | 0603 | ≥0.68uF | 0805 | ≥2.20uF | ≤10% | 1206 | ≥4.70uF | 1210 | ≥22.0uF | | | | | 10V | ≤5.0% | ≤10% | 0201 | ≥0.012uF | 0402 | ≥0.33uF | 0603 | ≥0.33uF | 0805 | ≥2.20uF | ≤15% | 1206 | ≥2.20uF | 1210 | ≥22.0uF | | | | | ≤15% | 0201 | ≥0.10uF | 0402 | ≥1.00uF | | | | | 6.3V | ≤10% | ≤15% | 0201 | ≥0.10uF | 0402 | ≥1.00uF | 0603 | ≥10.0uF | 0805 | ≥4.70uF | ≤20% | 1206 | ≥4.70uF | 1210 | ≥100uF | | | | | ≤20% | 0402 | ≥2.20uF | | | | | | | 4V | ≤15% | --- | --- | --- | | | | | |
| | | Class | Capacitance | Measuring Frequency | Measuring Voltage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Class2 | ≤ 10 uF | 1KHz±10% | 1.0±0.2Vrms | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| > 10 uF | 120Hz±20% | | 0.5±0.2Vrms | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Standard D.F. | Exception Items | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | D.F. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥50V | ≤2.5% | ≤3% | 0201 | All | 0603 | ≥0.047uF | 0805 | ≥0.15uF | 1206 | ≥0.47uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤5% | 1210 | ≥4.70uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0402 | ≥0.10uF | 0603 | ≥1.00uF | 0805 | ≥1.00uF | 1206 | ≥2.20uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | ≤3.5% | ≤10% | 0603 | ≥1.00uF | 0805 | ≥2.20uF | 1210 | ≥10.0uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤5% | 0201 | ≥0.01uF | 0805 | ≥1.00uF | 1210 | ≥10.0uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤7% | 0603 | ≥0.33uF | 1206 | ≥4.70uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | ≤3.5% | ≤10% | 0402 | ≥0.10uF | 0603 | ≥0.47uF | 0805 | ≥2.20uF | 1206 | ≥6.80uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤5% | 1210 | ≥22.0uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0201 | ≥0.01uF | 0402 | ≥0.033uF | 0603 | ≥0.15uF | 0805 | ≥0.68uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | ≤3.5% | ≤5% | 1206 | ≥2.20uF | 1210 | ≥4.70uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0201 | ≥0.10uF | 0402 | ≥0.22uF | 0603 | ≥0.68uF | 0805 | ≥2.20uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 1206 | ≥4.70uF | 1210 | ≥22.0uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | ≤5.0% | ≤10% | 0201 | ≥0.012uF | 0402 | ≥0.33uF | 0603 | ≥0.33uF | 0805 | ≥2.20uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 1206 | ≥2.20uF | 1210 | ≥22.0uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 0201 | ≥0.10uF | 0402 | ≥1.00uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | ≤10% | ≤15% | 0201 | ≥0.10uF | 0402 | ≥1.00uF | 0603 | ≥10.0uF | 0805 | ≥4.70uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 1206 | ≥4.70uF | 1210 | ≥100uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 0402 | ≥2.20uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | ≤15% | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * Insulation Resistance To apply rated voltage for max. 120 sec. | * I.R.: Class2 (X7R) : | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th rowspan="2">Class</th> <th>Rated Voltage</th> <th>Apply Voltage</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Class2</td> <td>R.V. ≤ 100V</td> <td>2.5*Rated voltage</td> </tr> <tr> <td>100V < R.V. ≤ 630V</td> <td>1.5*Rated voltage</td> </tr> </tbody> </table> | Class | Rated Voltage | Apply Voltage | Class2 | R.V. ≤ 100V | 2.5*Rated voltage | 100V < R.V. ≤ 630V | 1.5*Rated voltage | <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="8">Standard</th> <th rowspan="2">I.R.</th> </tr> <tr> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>All</td> <td>All</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>≥10GΩ or RxC ≥ 500Ω-F whichever is smaller.</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="8">Exception Items</th> <th rowspan="2">I.R.</th> </tr> <tr> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td>50V</td> <td>0603</td> <td>≥1.00uF</td> <td>0805</td> <td>≥1.00uF</td> <td>1206</td> <td>≥4.7uF</td> <td>1210</td> <td>≥4.7uF</td> <td rowspan="10">≥10GΩ or RxC ≥ 100Ω-F whichever is smaller.</td> </tr> <tr> <td>35V</td> <td>0805</td> <td>≥2.20uF</td> <td>1210</td> <td>≥10.0uF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">25V</td> <td>0402</td> <td>≥1.00uF</td> <td>0603</td> <td>≥2.20uF</td> <td>0805</td> <td>≥2.20uF</td> <td>1206</td> <td>≥10.0uF</td> </tr> <tr> <td>1210</td> <td>≥10.0uF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">16V</td> <td>0201</td> <td>≥0.10uF</td> <td>0402</td> <td>≥0.22uF</td> <td>0603</td> <td>≥1.00uF</td> <td>0805</td> <td>≥2.20uF</td> </tr> <tr> <td>1206</td> <td>≥10.0uF</td> <td>1210</td> <td>≥4.70uF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">10V</td> <td>0201</td> <td>≥0.047uF</td> <td>0402</td> <td>≥0.47uF</td> <td>0603</td> <td>≥0.47uF</td> <td>0603</td> <td>≥2.20uF</td> </tr> <tr> <td>1206</td> <td>≥4.70uF</td> <td>1210</td> <td>≥4.70uF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>6.3V</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td></td> </tr> <tr> <td>4V</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td></td> </tr> </tbody> </table> | Rated vol. | Standard | | | | | | | | I.R. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | All | All | All | --- | --- | --- | --- | --- | --- | --- | ≥10GΩ or RxC ≥ 500Ω-F whichever is smaller. | Rated vol. | Exception Items | | | | | | | | I.R. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | 50V | 0603 | ≥1.00uF | 0805 | ≥1.00uF | 1206 | ≥4.7uF | 1210 | ≥4.7uF | ≥10GΩ or RxC ≥ 100Ω-F whichever is smaller. | 35V | 0805 | ≥2.20uF | 1210 | ≥10.0uF | | | | | 25V | 0402 | ≥1.00uF | 0603 | ≥2.20uF | 0805 | ≥2.20uF | 1206 | ≥10.0uF | 1210 | ≥10.0uF | | | | | | | 16V | 0201 | ≥0.10uF | 0402 | ≥0.22uF | 0603 | ≥1.00uF | 0805 | ≥2.20uF | 1206 | ≥10.0uF | 1210 | ≥4.70uF | | | | | 10V | 0201 | ≥0.047uF | 0402 | ≥0.47uF | 0603 | ≥0.47uF | 0603 | ≥2.20uF | 1206 | ≥4.70uF | 1210 | ≥4.70uF | | | | | 6.3V | --- | --- | --- | --- | --- | --- | --- | | 4V | --- | --- | --- | --- | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class | | Rated Voltage | Apply Voltage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Class2 | R.V. ≤ 100V | 2.5*Rated voltage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100V < R.V. ≤ 630V | | 1.5*Rated voltage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Standard | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| All | All | All | --- | --- | --- | --- | --- | --- | --- | ≥10GΩ or RxC ≥ 500Ω-F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Exception Items | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50V | 0603 | ≥1.00uF | 0805 | ≥1.00uF | 1206 | ≥4.7uF | 1210 | ≥4.7uF | ≥10GΩ or RxC ≥ 100Ω-F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | 0805 | ≥2.20uF | 1210 | ≥10.0uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | 0402 | ≥1.00uF | 0603 | ≥2.20uF | 0805 | ≥2.20uF | 1206 | ≥10.0uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1210 | ≥10.0uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | 0201 | ≥0.10uF | 0402 | ≥0.22uF | 0603 | ≥1.00uF | 0805 | ≥2.20uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1206 | ≥10.0uF | 1210 | ≥4.70uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | 0201 | ≥0.047uF | 0402 | ≥0.47uF | 0603 | ≥0.47uF | 0603 | ≥2.20uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1206 | ≥4.70uF | 1210 | ≥4.70uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | --- | --- | --- | --- | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | --- | --- | --- | --- | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * Dielectric Strength | * Dielectric strength No evidence of damage or flash over during test. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Class</th> <th>Rated Voltage</th> <th>Apply Voltage</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Class2</td> <td>R.V. ≤ 100V</td> <td>2.5*Rated voltage</td> </tr> <tr> <td>100V < R.V. ≤ 630V</td> <td>1.5*Rated voltage</td> </tr> </tbody> </table> | Class | Rated Voltage | Apply Voltage | Class2 | R.V. ≤ 100V | 2.5*Rated voltage | 100V < R.V. ≤ 630V | 1.5*Rated voltage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class | Rated Voltage | Apply Voltage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class2 | R.V. ≤ 100V | 2.5*Rated voltage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 100V < R.V. ≤ 630V | 1.5*Rated voltage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DC Voltage shall be applied for duration 1~5sec. Charge and | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * Temperature Coefficient (with no electrical load) Operation temperature: -55~125°C at 25°C | * Temperature Coefficient Capacitance Change: X7R: Within ±15% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. | High Temperature Exposure (Storage) MIL-STD-202 Method 108 | * Test temp.: 150±3°C * Unpowered. * Test time: 1000+24/-0 hrs. * Measurement to be made after keeping at room temp. for 24±2 hrs. | * No remarkable damage. * Cap change : X7R: within ±10.00%. * D.F. value: X7R: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th rowspan="2">Standard D.F.</th> <th colspan="8">Exception Items</th> </tr> <tr> <th>D.F.</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td rowspan="3">≥50V</td> <td rowspan="3">≤3%</td> <td>≤6%</td> <td>0201</td> <td>All</td> <td>0603</td> <td>≥0.047uF</td> <td>0805</td> <td>≥0.15uF</td> <td>1206</td> <td>≥0.47uF</td> </tr> <tr> <td>≤10%</td> <td>1210</td> <td>≥4.70uF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤20%</td> <td>0402</td> <td>≥0.10uF</td> <td>0603</td> <td>≥1.00uF</td> <td>0805</td> <td>≥1.00uF</td> <td>1206</td> <td>≥2.20uF</td> </tr> <tr> <td rowspan="3">35V</td> <td rowspan="3">≤5%</td> <td>≤10%</td> <td>0603</td> <td>≥1.00uF</td> <td>0805</td> <td>≥2.20uF</td> <td>1210</td> <td>≥10.0uF</td> <td></td> <td></td> </tr> <tr> <td>≤10%</td> <td>0201</td> <td>≥0.01uF</td> <td>0805</td> <td>≥1.00uF</td> <td>1210</td> <td>≥10.0uF</td> <td></td> <td></td> </tr> <tr> <td>≤14%</td> <td>0603</td> <td>≥0.33uF</td> <td>1206</td> <td>≥4.70uF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">≤5%</td> <td>≤15%</td> <td>0402</td> <td>≥0.10uF</td> <td>0603</td> <td>≥0.47uF</td> <td>0805</td> <td>≥2.20uF</td> <td>1206</td> <td>≥6.80uF</td> </tr> <tr> <td>≤10%</td> <td>1210</td> <td>≥22.0uF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤5%</td> <td>0603</td> <td>≥0.15uF</td> <td>0805</td> <td>≥0.68uF</td> <td>1206</td> <td>≥2.20uF</td> <td>1210</td> <td>≥4.70uF</td> </tr> <tr> <td rowspan="3">16V</td> <td rowspan="3">≤5%</td> <td>≤15%</td> <td>0201</td> <td>≥0.01uF</td> <td>0402</td> <td>≥0.033uF</td> <td>0603</td> <td>≥0.68uF</td> <td>0805</td> <td>≥2.20uF</td> </tr> <tr> <td>≤15%</td> <td>1206</td> <td>≥4.70uF</td> <td>1210</td> <td>≥22.0uF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤15%</td> <td>0201</td> <td>≥0.012uF</td> <td>0402</td> <td>≥0.33uF</td> <td>0603</td> <td>≥0.33uF</td> <td>0805</td> <td>≥2.20uF</td> </tr> <tr> <td rowspan="3">10V</td> <td rowspan="3">≤7.5%</td> <td>≤15%</td> <td>1206</td> <td>≥2.20uF</td> <td>1210</td> <td>≥22.0uF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤20%</td> <td>0201</td> <td>≥0.10uF</td> <td>0402</td> <td>≥1.00uF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤20%</td> <td>0201</td> <td>≥0.10uF</td> <td>0402</td> <td>≥1.00uF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">6.3V</td> <td rowspan="2">≤15%</td> <td>≤30%</td> <td>0201</td> <td>≥0.10uF</td> <td>0402</td> <td>≥1.00uF</td> <td>0603</td> <td>≥10.0uF</td> <td>0805</td> <td>≥4.70uF</td> </tr> <tr> <td>≤20%</td> <td>1206</td> <td>≥4.70uF</td> <td>1210</td> <td>≥100uF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4V</td> <td>≤20%</td> <td>---</td> <td>---</td> <td>---</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | Rated vol. | Standard D.F. | Exception Items | | | | | | | | D.F. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | ≥50V | ≤3% | ≤6% | 0201 | All | 0603 | ≥0.047uF | 0805 | ≥0.15uF | 1206 | ≥0.47uF | ≤10% | 1210 | ≥4.70uF | | | | | | | ≤20% | 0402 | ≥0.10uF | 0603 | ≥1.00uF | 0805 | ≥1.00uF | 1206 | ≥2.20uF | 35V | ≤5% | ≤10% | 0603 | ≥1.00uF | 0805 | ≥2.20uF | 1210 | ≥10.0uF | | | ≤10% | 0201 | ≥0.01uF | 0805 | ≥1.00uF | 1210 | ≥10.0uF | | | ≤14% | 0603 | ≥0.33uF | 1206 | ≥4.70uF | | | | | 25V | ≤5% | ≤15% | 0402 | ≥0.10uF | 0603 | ≥0.47uF | 0805 | ≥2.20uF | 1206 | ≥6.80uF | ≤10% | 1210 | ≥22.0uF | | | | | | | ≤5% | 0603 | ≥0.15uF | 0805 | ≥0.68uF | 1206 | ≥2.20uF | 1210 | ≥4.70uF | 16V | ≤5% | ≤15% | 0201 | ≥0.01uF | 0402 | ≥0.033uF | 0603 | ≥0.68uF | 0805 | ≥2.20uF | ≤15% | 1206 | ≥4.70uF | 1210 | ≥22.0uF | | | | | ≤15% | 0201 | ≥0.012uF | 0402 | ≥0.33uF | 0603 | ≥0.33uF | 0805 | ≥2.20uF | 10V | ≤7.5% | ≤15% | 1206 | ≥2.20uF | 1210 | ≥22.0uF | | | | | ≤20% | 0201 | ≥0.10uF | 0402 | ≥1.00uF | | | | | ≤20% | 0201 | ≥0.10uF | 0402 | ≥1.00uF | | | | | 6.3V | ≤15% | ≤30% | 0201 | ≥0.10uF | 0402 | ≥1.00uF | 0603 | ≥10.0uF | 0805 | ≥4.70uF | ≤20% | 1206 | ≥4.70uF | 1210 | ≥100uF | | | | | 4V | ≤20% | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Rated vol. | | | Standard D.F. | Exception Items | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | D.F. | Size | | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥50V | ≤3% | ≤6% | 0201 | All | 0603 | ≥0.047uF | 0805 | ≥0.15uF | 1206 | ≥0.47uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 1210 | ≥4.70uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 0402 | ≥0.10uF | 0603 | ≥1.00uF | 0805 | ≥1.00uF | 1206 | ≥2.20uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | ≤5% | ≤10% | 0603 | ≥1.00uF | 0805 | ≥2.20uF | 1210 | ≥10.0uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0201 | ≥0.01uF | 0805 | ≥1.00uF | 1210 | ≥10.0uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤14% | 0603 | ≥0.33uF | 1206 | ≥4.70uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | ≤5% | ≤15% | 0402 | ≥0.10uF | 0603 | ≥0.47uF | 0805 | ≥2.20uF | 1206 | ≥6.80uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 1210 | ≥22.0uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤5% | 0603 | ≥0.15uF | 0805 | ≥0.68uF | 1206 | ≥2.20uF | 1210 | ≥4.70uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | ≤5% | ≤15% | 0201 | ≥0.01uF | 0402 | ≥0.033uF | 0603 | ≥0.68uF | 0805 | ≥2.20uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 1206 | ≥4.70uF | 1210 | ≥22.0uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 0201 | ≥0.012uF | 0402 | ≥0.33uF | 0603 | ≥0.33uF | 0805 | ≥2.20uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | ≤7.5% | ≤15% | 1206 | ≥2.20uF | 1210 | ≥22.0uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 0201 | ≥0.10uF | 0402 | ≥1.00uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 0201 | ≥0.10uF | 0402 | ≥1.00uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | ≤15% | ≤30% | 0201 | ≥0.10uF | 0402 | ≥1.00uF | 0603 | ≥10.0uF | 0805 | ≥4.70uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 1206 | ≥4.70uF | 1210 | ≥100uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | ≤20% | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * I.R.: Class2 (X7R) : | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="8">Standard</th> <th rowspan="2">I.R.</th> </tr> <tr> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>All</td> <td>All</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>≥10GΩ or RxC ≥ 500Ω-F whichever is smaller.</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="8">Exception Items</th> <th rowspan="2">I.R.</th> </tr> <tr> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td>50V</td> <td>0603</td> <td>≥1.00uF</td> <td>0805</td> <td>≥1.00uF</td> <td>1206</td> <td>≥4.7uF</td> <td>1210</td> <td>≥4.7uF</td> <td rowspan="10">≥10GΩ or RxC ≥ 100Ω-F whichever is smaller.</td> </tr> <tr> <td>35V</td> <td>0805</td> <td>≥2.20uF</td> <td>1210</td> <td>≥10.0uF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">25V</td> <td>0402</td> <td>≥1.00uF</td> <td>0603</td> <td>≥2.20uF</td> <td>0805</td> <td>≥2.20uF</td> <td>1206</td> <td>≥10.0uF</td> </tr> <tr> <td>1210</td> <td>≥10.0uF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">16V</td> <td>0201</td> <td>≥0.10uF</td> <td>0402</td> <td>≥0.22uF</td> <td>0603</td> <td>≥1.00uF</td> <td>0805</td> <td>≥2.20uF</td> </tr> <tr> <td>1206</td> <td>≥10.0uF</td> <td>1210</td> <td>≥4.70uF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">10V</td> <td>0201</td> <td>≥0.047uF</td> <td>0402</td> <td>≥0.47uF</td> <td>0603</td> <td>≥0.47uF</td> <td>0603</td> <td>≥2.20uF</td> </tr> <tr> <td>1206</td> <td>≥4.70uF</td> <td>1210</td> <td>≥4.70uF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>6.3V</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td></td> </tr> <tr> <td>4V</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td></td> </tr> </tbody> </table> | Rated vol. | Standard | | | | | | | | I.R. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | All | All | All | --- | --- | --- | --- | --- | --- | --- | ≥10GΩ or RxC ≥ 500Ω-F whichever is smaller. | Rated vol. | Exception Items | | | | | | | | I.R. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | 50V | 0603 | ≥1.00uF | 0805 | ≥1.00uF | 1206 | ≥4.7uF | 1210 | ≥4.7uF | ≥10GΩ or RxC ≥ 100Ω-F whichever is smaller. | 35V | 0805 | ≥2.20uF | 1210 | ≥10.0uF | | | | | 25V | 0402 | ≥1.00uF | 0603 | ≥2.20uF | 0805 | ≥2.20uF | 1206 | ≥10.0uF | 1210 | ≥10.0uF | | | | | | | 16V | 0201 | ≥0.10uF | 0402 | ≥0.22uF | 0603 | ≥1.00uF | 0805 | ≥2.20uF | 1206 | ≥10.0uF | 1210 | ≥4.70uF | | | | | 10V | 0201 | ≥0.047uF | 0402 | ≥0.47uF | 0603 | ≥0.47uF | 0603 | ≥2.20uF | 1206 | ≥4.70uF | 1210 | ≥4.70uF | | | | | 6.3V | --- | --- | --- | --- | --- | --- | --- | | 4V | --- | --- | --- | --- | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | | Standard | | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| All | All | All | --- | --- | --- | --- | --- | --- | --- | ≥10GΩ or RxC ≥ 500Ω-F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Exception Items | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50V | 0603 | ≥1.00uF | 0805 | ≥1.00uF | 1206 | ≥4.7uF | 1210 | ≥4.7uF | ≥10GΩ or RxC ≥ 100Ω-F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | 0805 | ≥2.20uF | 1210 | ≥10.0uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | 0402 | ≥1.00uF | 0603 | ≥2.20uF | 0805 | ≥2.20uF | 1206 | ≥10.0uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1210 | ≥10.0uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | 0201 | ≥0.10uF | 0402 | ≥0.22uF | 0603 | ≥1.00uF | 0805 | ≥2.20uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1206 | ≥10.0uF | 1210 | ≥4.70uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | 0201 | ≥0.047uF | 0402 | ≥0.47uF | 0603 | ≥0.47uF | 0603 | ≥2.20uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1206 | ≥4.70uF | 1210 | ≥4.70uF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | --- | --- | --- | --- | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | --- | --- | --- | --- | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

8. RELIABILITY TEST CONDITIONS AND REQUIREMENTS

| No. | AEC-Q200 Test Item | AEC-Q200 Test Condition | Requirements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|---|--|--|-------------|-------------|-------------|-----------------|-------------|--|--------------|-----|--|------------|----------|------|-----------------|------|-------------|------|-------------|------|-------------|------|-------------|------|------|-------------|------|-------------|------|-------------|------|-------------|------|---------|------|------|---------|------|----------|------|---------|------|---------|------|------|---------|------|---------|------|---------|------|---------|------|------|---------|------|---------|------|---------|------|---------|-----|-----|------|------|---------|------|---------|------|---------|--|--|------|------|---------|------|---------|------|---------|--|--|------|------|---------|------|---------|------|---------|------|---------|------|---------|------|------|---------|------|---------|------|---------|------|---------|------|------|---------|------|---------|------|---------|------|---------|------|------|---------|------|----------|------|---------|------|---------|------|---------|------|------|----------|------|---------|------|---------|------|---------|------|------|---------|------|---------|--|--|--|--|------|-------|---------|------|---------|------|---------|--|--|-----|-------|------|------|---------|------|---------|--|--|--|--|------|------|---------|------|---------|------|---------|------|---------|------|------|---------|------|---------|------|---------|------|---------|------|------|------|------|---------|------|--------|-----|-----|-----|-----|------------|----------|-----|-----|-----|-----|-----|-----|-----|------------|----------|-------------|------|-------------|------|-------------|------|-------------|------|------|-------------|------|-------------|------|-------------|------|-------------|--|------------|-----------------|-----|-----|-----|-----|-----|-----|--|------------|-----------------|-------------|------|-------------|------|-------------|------|-------------|------|------|-------------|------|-------------|------|-------------|------|-------------|--|------|---------|---------|---------|---------|--------|------|--------|--|------|---------|---------|---------|---------|---------|------|---------|-----|------|---------|------|---------|------|---------|------|---------|------|---------|---------|---------|------|---------|------|---------|-----|------|---------|------|---------|------|---------|------|---------|------|----------|---------|---------|---------|---------|------|---------|-----|------|----------|------|---------|------|---------|------|---------|------|------|---------|------|---------|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4. | Destructive Physical Analysis EIA-469 | Per EIA-469 | No defects or abnormalities | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. | Temperature Cycling JESD22 Method JA-104 | <p>* Conduct 1000 cycles according to the temperatures and time.</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Temp. (°C)</th> <th>Time (min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55°C +0/-3</td> <td>5±1</td> </tr> <tr> <td>2</td> <td>+125°C +3/-0</td> <td>5±1</td> </tr> </tbody> </table> <p>* Before initial measurement (Class2 only): Perform 150+0/-10°C for 1 hr and then set for 24±2 hrs at room temp. * Measurement to be made after keeping at room temp. for 24±2 hrs.</p> | Step | Temp. (°C) | Time (min.) | 1 | -55°C +0/-3 | 5±1 | 2 | +125°C +3/-0 | 5±1 | <p>* No remarkable damage. * Cap change : X7R: within ±10.00%. * D.F. value: X7R:</p> <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="2">Standard</th> <th colspan="8">Exception Items</th> </tr> <tr> <th>D.F.</th> <th>D.F.</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td rowspan="3">≥50V</td> <td rowspan="3">≤3%</td> <td>≤6%</td> <td>0201</td> <td>All</td> <td>0603</td> <td>≥0.047µF</td> <td>0805</td> <td>≥0.18µF</td> <td>1206</td> <td>≥0.47µF</td> </tr> <tr> <td>≤10%</td> <td>1210</td> <td>≥4.70µF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤20%</td> <td>0402</td> <td>≥0.10µF</td> <td>0603</td> <td>≥1.00µF</td> <td>0805</td> <td>≥1.00µF</td> <td>1206</td> <td>≥2.20µF</td> </tr> <tr> <td rowspan="3">35V</td> <td rowspan="3">≤5%</td> <td>≤20%</td> <td>0603</td> <td>≥1.00µF</td> <td>0805</td> <td>≥2.20µF</td> <td>1210</td> <td>≥10.0µF</td> <td></td> <td></td> </tr> <tr> <td>≤10%</td> <td>0201</td> <td>≥0.01µF</td> <td>0805</td> <td>≥1.00µF</td> <td>1210</td> <td>≥10.0µF</td> <td></td> <td></td> </tr> <tr> <td>≤14%</td> <td>0603</td> <td>≥0.33µF</td> <td>1206</td> <td>≥4.70µF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">≤5%</td> <td>≤15%</td> <td>0402</td> <td>≥0.10µF</td> <td>0603</td> <td>≥0.47µF</td> <td>0805</td> <td>≥2.20µF</td> <td>1206</td> <td>≥6.80µF</td> </tr> <tr> <td>≤10%</td> <td>0603</td> <td>≥0.15µF</td> <td>0805</td> <td>≥0.68µF</td> <td>1206</td> <td>≥2.20µF</td> <td>1210</td> <td>≥4.70µF</td> </tr> <tr> <td>≤15%</td> <td>1206</td> <td>≥4.70µF</td> <td>1210</td> <td>≥22.0µF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">16V</td> <td rowspan="3">≤5%</td> <td>≤10%</td> <td>0201</td> <td>≥0.012µF</td> <td>0402</td> <td>≥0.33µF</td> <td>0603</td> <td>≥0.33µF</td> <td>0805</td> <td>≥2.20µF</td> </tr> <tr> <td>≤15%</td> <td>1206</td> <td>≥2.20µF</td> <td>1210</td> <td>≥22.0µF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤20%</td> <td>0201</td> <td>≥0.10µF</td> <td>0402</td> <td>≥1.00µF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">10V</td> <td rowspan="3">≤7.5%</td> <td>≤15%</td> <td>1206</td> <td>≥2.20µF</td> <td>1210</td> <td>≥22.0µF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤30%</td> <td>0201</td> <td>≥0.10µF</td> <td>0402</td> <td>≥1.00µF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤15%</td> <td>0201</td> <td>≥0.10µF</td> <td>0402</td> <td>≥1.00µF</td> <td>0603</td> <td>≥10.0µF</td> <td>0805</td> <td>≥4.70µF</td> </tr> <tr> <td>6.3V</td> <td>≤15%</td> <td>≤30%</td> <td>1206</td> <td>≥47.0µF</td> <td>1210</td> <td>≥100µF</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4V</td> <td>≤20%</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> </tr> </tbody> </table> <p>* I.R.: Class2 (X7R) :</p> <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="8">Standard</th> <th rowspan="2">I.R.</th> </tr> <tr> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>All</td> <td>All</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>≥10GΩ or RxC ≥500Ω-F whichever is smaller.</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="8">Exception Items</th> <th rowspan="2">I.R.</th> </tr> <tr> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td>50V</td> <td>0603</td> <td>≥1.00µF</td> <td>0805</td> 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0603 | ≥0.15µF | 0805 | ≥0.68µF | 1206 | ≥2.20µF | 1210 | ≥4.70µF | ≤15% | 1206 | ≥4.70µF | 1210 | ≥22.0µF | | | | | 16V | ≤5% | ≤10% | 0201 | ≥0.012µF | 0402 | ≥0.33µF | 0603 | ≥0.33µF | 0805 | ≥2.20µF | ≤15% | 1206 | ≥2.20µF | 1210 | ≥22.0µF | | | | | ≤20% | 0201 | ≥0.10µF | 0402 | ≥1.00µF | | | | | 10V | ≤7.5% | ≤15% | 1206 | ≥2.20µF | 1210 | ≥22.0µF | | | | | ≤30% | 0201 | ≥0.10µF | 0402 | ≥1.00µF | | | | | ≤15% | 0201 | ≥0.10µF | 0402 | ≥1.00µF | 0603 | ≥10.0µF | 0805 | ≥4.70µF | 6.3V | ≤15% | ≤30% | 1206 | ≥47.0µF | 1210 | ≥100µF | | | | 4V | ≤20% | --- | --- | --- | --- | --- | --- | --- | --- | Rated vol. | Standard | | | | | | | | I.R. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | All | All | All | --- | --- | --- | --- | --- | --- | ≥10GΩ or RxC ≥500Ω-F whichever is smaller. | Rated vol. | Exception Items | | | | | | | | I.R. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | 50V | 0603 | ≥1.00µF | 0805 | ≥1.00µF | 1206 | ≥4.7µF | 1210 | ≥4.7µF | ≥1GΩ or RxC ≥10Q-F whichever is smaller. | 35V | 0805 | ≥2.20µF | 1210 | ≥10.0µF | | | | | 0402 | ≥1.00µF | 0603 | ≥2.20µF | 0805 | ≥2.20µF | 1206 | ≥10.0µF | 25V | 1210 | ≥10.0µF | | | | | | | 0201 | ≥0.10µF | 0402 | ≥0.22µF | 0603 | ≥1.00µF | 0805 | ≥2.20µF | 16V | 1206 | ≥10.0µF | 1210 | ≥47.0µF | | | | | 0201 | ≥0.047µF | 0402 | ≥0.47µF | 0603 | ≥0.47µF | 0603 | ≥2.20µF | 10V | 1206 | ≥4.70µF | 1210 | ≥4.70µF | | | | | 6.3V | --- | --- | --- | --- | --- | --- | --- | --- | 4V | --- | --- | --- | --- | --- | --- | --- | --- |
| Step | Temp. (°C) | Time (min.) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | -55°C +0/-3 | 5±1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | +125°C +3/-0 | 5±1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Standard | | Exception Items | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | D.F. | D.F. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥50V | ≤3% | ≤6% | 0201 | All | 0603 | ≥0.047µF | 0805 | ≥0.18µF | 1206 | ≥0.47µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 1210 | ≥4.70µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 0402 | ≥0.10µF | 0603 | ≥1.00µF | 0805 | ≥1.00µF | 1206 | ≥2.20µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | ≤5% | ≤20% | 0603 | ≥1.00µF | 0805 | ≥2.20µF | 1210 | ≥10.0µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0201 | ≥0.01µF | 0805 | ≥1.00µF | 1210 | ≥10.0µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤14% | 0603 | ≥0.33µF | 1206 | ≥4.70µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | ≤5% | ≤15% | 0402 | ≥0.10µF | 0603 | ≥0.47µF | 0805 | ≥2.20µF | 1206 | ≥6.80µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0603 | ≥0.15µF | 0805 | ≥0.68µF | 1206 | ≥2.20µF | 1210 | ≥4.70µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 1206 | ≥4.70µF | 1210 | ≥22.0µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | ≤5% | ≤10% | 0201 | ≥0.012µF | 0402 | ≥0.33µF | 0603 | ≥0.33µF | 0805 | ≥2.20µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 1206 | ≥2.20µF | 1210 | ≥22.0µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 0201 | ≥0.10µF | 0402 | ≥1.00µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | ≤7.5% | ≤15% | 1206 | ≥2.20µF | 1210 | ≥22.0µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤30% | 0201 | ≥0.10µF | 0402 | ≥1.00µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 0201 | ≥0.10µF | 0402 | ≥1.00µF | 0603 | ≥10.0µF | 0805 | ≥4.70µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | ≤15% | ≤30% | 1206 | ≥47.0µF | 1210 | ≥100µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | ≤20% | --- | --- | --- | --- | --- | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Standard | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| All | All | All | --- | --- | --- | --- | --- | --- | ≥10GΩ or RxC ≥500Ω-F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Exception Items | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50V | 0603 | ≥1.00µF | 0805 | ≥1.00µF | 1206 | ≥4.7µF | 1210 | ≥4.7µF | ≥1GΩ or RxC ≥10Q-F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | 0805 | ≥2.20µF | 1210 | ≥10.0µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0402 | ≥1.00µF | 0603 | ≥2.20µF | 0805 | ≥2.20µF | 1206 | ≥10.0µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | 1210 | ≥10.0µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0201 | ≥0.10µF | 0402 | ≥0.22µF | 0603 | ≥1.00µF | 0805 | ≥2.20µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | 1206 | ≥10.0µF | 1210 | ≥47.0µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0201 | ≥0.047µF | 0402 | ≥0.47µF | 0603 | ≥0.47µF | 0603 | ≥2.20µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | 1206 | ≥4.70µF | 1210 | ≥4.70µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | --- | --- | --- | --- | --- | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | --- | --- | --- | --- | --- | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. | Moisture Resistance MIL-STD-202 Method 106 | <p>* Reflow solder the capacitors on PCB before test. * Test temp.: 40±2°C * Humidity: 90-95% RH * Test time: 500hrs * Measurement to be made after keeping at room temp. for 24±2 hrs.</p> | <p>* No remarkable damage. * Cap change : X7R: within ±12.50%. * D.F. value: X7R:</p> <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="2">Standard</th> <th colspan="8">Exception Items</th> </tr> <tr> <th>D.F.</th> <th>D.F.</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td rowspan="3">≥50V</td> <td rowspan="3">≤3%</td> <td>≤6%</td> <td>0201</td> <td>All</td> <td>0603</td> <td>≥0.047µF</td> <td>0805</td> <td>≥0.18µF</td> <td>1206</td> <td>≥0.47µF</td> </tr> <tr> <td>≤10%</td> <td>1210</td> <td>≥4.70µF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤20%</td> 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1210 | ≥10.0µF | | | ≤14% | 0603 | ≥0.33µF | 1206 | ≥4.70µF | | | | | 25V | ≤5% | ≤15% | 0402 | ≥0.10µF | 0603 | ≥0.47µF | 0805 | ≥2.20µF | 1206 | ≥6.80µF | ≤10% | 0603 | ≥0.15µF | 0805 | ≥0.68µF | 1206 | ≥2.20µF | 1210 | ≥4.70µF | ≤15% | 1206 | ≥4.70µF | 1210 | ≥22.0µF | | | | | 16V | ≤5% | ≤10% | 0201 | ≥0.012µF | 0402 | ≥0.33µF | 0603 | ≥0.33µF | 0805 | ≥2.20µF | ≤15% | 1206 | ≥2.20µF | 1210 | ≥22.0µF | | | | | ≤20% | 0201 | ≥0.10µF | 0402 | ≥1.00µF | | | | | 10V | ≤7.5% | ≤15% | 1206 | ≥2.20µF | 1210 | ≥22.0µF | | | | | ≤30% | 0201 | ≥0.10µF | 0402 | ≥1.00µF | | | | | ≤15% | 0201 | ≥0.10µF | 0402 | ≥1.00µF | 0603 | ≥10.0µF | 0805 | ≥4.70µF | 6.3V | ≤15% | ≤30% | 1206 | ≥47.0µF | 1210 | ≥100µF | | | | 4V | ≤20% | --- | --- | --- | --- | --- | --- | --- | --- | Rated vol. | Standard | | | | | | | | I.R. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | All | All | All | --- | --- | --- | --- | --- | --- | ≥1GΩ or RxC ≥50Ω-F whichever is smaller. | 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| Rated vol. | Standard | | Exception Items | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | D.F. | D.F. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥50V | ≤3% | ≤6% | 0201 | All | 0603 | ≥0.047µF | 0805 | ≥0.18µF | 1206 | ≥0.47µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 1210 | ≥4.70µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 0402 | ≥0.10µF | 0603 | ≥1.00µF | 0805 | ≥1.00µF | 1206 | ≥2.20µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | ≤5% | ≤20% | 0603 | ≥1.00µF | 0805 | ≥2.20µF | 1210 | ≥10.0µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0201 | ≥0.01µF | 0805 | ≥1.00µF | 1210 | ≥10.0µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤14% | 0603 | ≥0.33µF | 1206 | ≥4.70µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | ≤5% | ≤15% | 0402 | ≥0.10µF | 0603 | ≥0.47µF | 0805 | ≥2.20µF | 1206 | ≥6.80µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0603 | ≥0.15µF | 0805 | ≥0.68µF | 1206 | ≥2.20µF | 1210 | ≥4.70µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 1206 | ≥4.70µF | 1210 | ≥22.0µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | ≤5% | ≤10% | 0201 | ≥0.012µF | 0402 | ≥0.33µF | 0603 | ≥0.33µF | 0805 | ≥2.20µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 1206 | ≥2.20µF | 1210 | ≥22.0µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 0201 | ≥0.10µF | 0402 | ≥1.00µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | ≤7.5% | ≤15% | 1206 | ≥2.20µF | 1210 | ≥22.0µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤30% | 0201 | ≥0.10µF | 0402 | ≥1.00µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 0201 | ≥0.10µF | 0402 | ≥1.00µF | 0603 | ≥10.0µF | 0805 | ≥4.70µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | ≤15% | ≤30% | 1206 | ≥47.0µF | 1210 | ≥100µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | ≤20% | --- | --- | --- | --- | --- | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Standard | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| All | All | All | --- | --- | --- | --- | --- | --- | ≥1GΩ or RxC ≥50Ω-F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Exception Items | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50V | 0603 | ≥1.00µF | 0805 | ≥1.00µF | 1206 | ≥4.7µF | 1210 | ≥4.7µF | ≥1GΩ or RxC ≥10Q-F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | 0805 | ≥2.20µF | 1210 | ≥10.0µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0402 | ≥1.00µF | 0603 | ≥2.20µF | 0805 | ≥2.20µF | 1206 | ≥10.0µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | 1210 | ≥10.0µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0201 | ≥0.10µF | 0402 | ≥0.22µF | 0603 | ≥1.00µF | 0805 | ≥2.20µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | 1206 | ≥10.0µF | 1210 | ≥47.0µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0201 | ≥0.047µF | 0402 | ≥0.47µF | 0603 | ≥0.47µF | 0603 | ≥2.20µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | 1206 | ≥4.70µF | 1210 | ≥4.70µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | --- | --- | --- | --- | --- | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | --- | --- | --- | --- | --- | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

8. RELIABILITY TEST CONDITIONS AND REQUIREMENTS

| No. | AEC-Q200 Test Item | AEC-Q200 Test Condition | Requirements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|--|---|--|-------------|----------|-------------|-----------------|-------------|------|--|--|--|--|--|------|------|------|-------------|------|-------------|------|-------------|------|-------------|------|-----|-----|------|-----|------|----------|------|---------|------|---------|------|------|---------|--|--|--|--|--|--|------|------|---------|------|---------|------|---------|------|---------|-----|-----|------|------|---------|------|---------|------|---------|--|--|------|------|---------|------|---------|------|---------|--|--|------|------|---------|------|---------|--|--|--|--|-----|-----|------|------|---------|------|---------|------|---------|------|---------|------|------|---------|--|--|--|--|--|--|------|------|---------|------|---------|------|---------|------|---------|-----|-----|------|------|---------|------|----------|------|---------|------|---------|------|------|---------|------|---------|--|--|--|--|------|------|---------|------|---------|------|---------|------|---------|-----|-------|------|------|----------|------|---------|------|---------|------|---------|------|------|---------|------|---------|--|--|--|--|------|------|---------|------|---------|--|--|--|--|------|------|------|------|---------|------|---------|------|---------|------|---------|------|------|---------|------|--------|--|--|--|--|----|------|-----|-----|-----|--|--|--|--|--|--|-----|-----|-----|--|--|--|--|--|--|------------|----------|--|--|--|--|--|--|--|------|------|-------------|------|-------------|------|-------------|------|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| 7. | Biased Humidity MIL-STD-202 Method 103 | <p>* Reflow solder the capacitors on PCB before test. * Test temp.: 85±3°C * Humidity: 85%RH * Test time: 1000+24/-0 hrs. * To apply voltage : rated voltage (max. 100Vdc) and 1.3~1.5Vdc. (add 100k ohm resistor) * Before initial measurement (Class2 only) : To apply test voltage for 1hr at test temp. and then set for 24±2 hrs at room temp. * Measurement to be made after keeping at room temp. for 24±2 hrs.</p> | <p>* No remarkable damage. * Cap change : X7R: within ±12.50%. * D.F. value: X7R:</p> <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="2">Standard</th> <th colspan="8">Exception Items</th> </tr> <tr> <th>D.F.</th> <th>D.F.</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td rowspan="3">≥50V</td> <td rowspan="3">≤3%</td> <td>≤6%</td> <td>0201</td> <td>All</td> <td>0603</td> <td>≥0.047μF</td> <td>0805</td> <td>≥0.18μF</td> <td>1206</td> <td>≥0.47μF</td> </tr> <tr> <td>≤10%</td> <td>1210</td> <td>≥4.70μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤20%</td> <td>0402</td> <td>≥0.10μF</td> <td>0603</td> <td>≥1.00μF</td> <td>0805</td> <td>≥1.00μF</td> <td>1206</td> <td>≥2.20μF</td> </tr> <tr> <td rowspan="3">35V</td> <td rowspan="3">≤5%</td> <td>≤20%</td> <td>0603</td> <td>≥1.00μF</td> <td>0805</td> <td>≥2.20μF</td> <td>1210</td> <td>≥10.0μF</td> <td></td> <td></td> </tr> <tr> <td>≤10%</td> <td>0201</td> <td>≥0.01μF</td> <td>0805</td> <td>≥1.00μF</td> <td>1210</td> <td>≥10.0μF</td> <td></td> <td></td> </tr> <tr> <td>≤14%</td> <td>0603</td> <td>≥0.33μF</td> <td>1206</td> <td>≥4.70μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">≤5%</td> <td>≤15%</td> <td>0402</td> <td>≥0.10μF</td> <td>0603</td> <td>≥0.47μF</td> <td>0805</td> <td>≥2.20μF</td> <td>1206</td> <td>≥6.80μF</td> </tr> <tr> <td>≤15%</td> <td>1210</td> <td>≥22.0μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤10%</td> <td>0603</td> <td>≥0.15μF</td> <td>0805</td> <td>≥0.68μF</td> <td>1206</td> <td>≥2.20μF</td> <td>1210</td> <td>≥4.70μF</td> </tr> <tr> <td rowspan="3">16V</td> <td rowspan="3">≤5%</td> <td>≤15%</td> <td>0201</td> <td>≥0.01μF</td> <td>0402</td> <td>≥0.033μF</td> <td>0603</td> <td>≥0.68μF</td> <td>0805</td> <td>≥2.20μF</td> </tr> <tr> <td>≤15%</td> <td>1206</td> <td>≥4.70μF</td> <td>1210</td> <td>≥22.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤10%</td> <td>0603</td> <td>≥0.15μF</td> <td>0805</td> <td>≥0.68μF</td> <td>1206</td> <td>≥2.20μF</td> <td>1210</td> <td>≥4.70μF</td> </tr> <tr> <td rowspan="3">10V</td> <td rowspan="3">≤7.5%</td> <td>≤15%</td> <td>0201</td> <td>≥0.012μF</td> <td>0402</td> <td>≥0.33μF</td> <td>0603</td> <td>≥0.33μF</td> <td>0805</td> <td>≥2.20μF</td> </tr> <tr> <td>≤15%</td> <td>1206</td> <td>≥2.20μF</td> <td>1210</td> <td>≥22.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤20%</td> <td>0201</td> <td>≥0.10μF</td> <td>0402</td> <td>≥1.00μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">6.3V</td> <td rowspan="2">≤15%</td> <td>≤30%</td> <td>0201</td> <td>≥0.10μF</td> <td>0402</td> <td>≥1.00μF</td> <td>0603</td> <td>≥10.0μF</td> <td>0805</td> <td>≥4.70μF</td> </tr> <tr> <td>≤20%</td> <td>1206</td> <td>≥4.70μF</td> <td>1210</td> <td>≥100μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">4V</td> <td rowspan="2">≤20%</td> <td>---</td> <td>---</td> <td>---</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>---</td> <td>---</td> <td>---</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>* I.R.: Class2 (X7R) :</p> <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="8">Standard</th> <th rowspan="2">I.R.</th> </tr> <tr> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>All</td> <td>All</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>≥0.5GΩ or RxC ≥25Ω·F whichever is smaller.</td> </tr> </tbody> </table> | Rated vol. | Standard | | Exception Items | | | | | | | | D.F. | D.F. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | ≥50V | ≤3% | ≤6% | 0201 | All | 0603 | ≥0.047μF | 0805 | ≥0.18μF | 1206 | ≥0.47μF | ≤10% | 1210 | ≥4.70μF | | | | | | | ≤20% | 0402 | ≥0.10μF | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥2.20μF | 35V | ≤5% | ≤20% | 0603 | ≥1.00μF | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | ≤10% | 0201 | ≥0.01μF | 0805 | ≥1.00μF | 1210 | ≥10.0μF | | | ≤14% | 0603 | ≥0.33μF | 1206 | ≥4.70μF | | | | | 25V | ≤5% | ≤15% | 0402 | ≥0.10μF | 0603 | ≥0.47μF | 0805 | ≥2.20μF | 1206 | ≥6.80μF | ≤15% | 1210 | ≥22.0μF | | | | | | | ≤10% | 0603 | ≥0.15μF | 0805 | ≥0.68μF | 1206 | ≥2.20μF | 1210 | ≥4.70μF | 16V | ≤5% | ≤15% | 0201 | ≥0.01μF | 0402 | ≥0.033μF | 0603 | ≥0.68μF | 0805 | ≥2.20μF | ≤15% | 1206 | ≥4.70μF | 1210 | ≥22.0μF | | | | | ≤10% | 0603 | ≥0.15μF | 0805 | ≥0.68μF | 1206 | ≥2.20μF | 1210 | ≥4.70μF | 10V | ≤7.5% | ≤15% | 0201 | ≥0.012μF | 0402 | ≥0.33μF | 0603 | ≥0.33μF | 0805 | ≥2.20μF | ≤15% | 1206 | ≥2.20μF | 1210 | ≥22.0μF | | | | | ≤20% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | | | | | 6.3V | ≤15% | ≤30% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | 0603 | ≥10.0μF | 0805 | ≥4.70μF | ≤20% | 1206 | ≥4.70μF | 1210 | ≥100μF | | | | | 4V | ≤20% | --- | --- | --- | | | | | | | --- | --- | --- | | | | | | | Rated vol. | Standard | | | | | | | | I.R. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | All | All | All | --- | --- | --- | --- | --- | --- | --- | ≥0.5GΩ or RxC ≥25Ω·F whichever is smaller. |
| | | | Rated vol. | | Standard | | Exception Items | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D.F. | D.F. | Size | | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥50V | ≤3% | ≤6% | 0201 | All | 0603 | ≥0.047μF | 0805 | ≥0.18μF | 1206 | ≥0.47μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 0402 | ≥0.10μF | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | ≤5% | ≤20% | 0603 | ≥1.00μF | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0201 | ≥0.01μF | 0805 | ≥1.00μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤14% | 0603 | ≥0.33μF | 1206 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | ≤5% | ≤15% | 0402 | ≥0.10μF | 0603 | ≥0.47μF | 0805 | ≥2.20μF | 1206 | ≥6.80μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0603 | ≥0.15μF | 0805 | ≥0.68μF | 1206 | ≥2.20μF | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | ≤5% | ≤15% | 0201 | ≥0.01μF | 0402 | ≥0.033μF | 0603 | ≥0.68μF | 0805 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 1206 | ≥4.70μF | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0603 | ≥0.15μF | 0805 | ≥0.68μF | 1206 | ≥2.20μF | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | ≤7.5% | ≤15% | 0201 | ≥0.012μF | 0402 | ≥0.33μF | 0603 | ≥0.33μF | 0805 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 1206 | ≥2.20μF | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | ≤15% | ≤30% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | 0603 | ≥10.0μF | 0805 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 1206 | ≥4.70μF | 1210 | ≥100μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | ≤20% | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Rated vol. | Standard | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| All | All | All | --- | --- | --- | --- | --- | --- | --- | ≥0.5GΩ or RxC ≥25Ω·F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. | Operational Life MIL-STD-202 Method 108 | <p>* Reflow solder the capacitors on PCB before test. * Test temp.: 125±3°C * To apply voltage: full rated voltage. * Test time: 1000+24/-0 hrs. * Before initial measurement (Class2 only): Apply rated voltage for 1 hr at 125°C. Remove and let set for 24±2 hrs at room temp. * Measurement to be made after keeping at room temp. for 24±2 hrs.</p> | <p>* No remarkable damage. * Cap change : X7R: within ±12.5%. * D.F. value: X7R:</p> <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="2">Standard</th> <th colspan="8">Exception Items</th> </tr> <tr> <th>D.F.</th> <th>D.F.</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td rowspan="3">≥50V</td> <td rowspan="3">≤3%</td> <td>≤6%</td> <td>0201</td> <td>All</td> <td>0603</td> <td>≥0.047μF</td> <td>0805</td> <td>≥0.18μF</td> <td>1206</td> <td>≥0.47μF</td> </tr> <tr> <td>≤10%</td> <td>1210</td> <td>≥4.70μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤20%</td> <td>0402</td> <td>≥0.10μF</td> <td>0603</td> <td>≥1.00μF</td> <td>0805</td> <td>≥1.00μF</td> <td>1206</td> <td>≥2.20μF</td> </tr> <tr> <td rowspan="3">35V</td> <td rowspan="3">≤5%</td> <td>≤20%</td> <td>0603</td> <td>≥1.00μF</td> <td>0805</td> <td>≥2.20μF</td> <td>1210</td> <td>≥10.0μF</td> <td></td> <td></td> </tr> <tr> <td>≤10%</td> <td>0201</td> <td>≥0.01μF</td> <td>0805</td> <td>≥1.00μF</td> <td>1210</td> <td>≥10.0μF</td> <td></td> <td></td> </tr> <tr> <td>≤14%</td> <td>0603</td> <td>≥0.33μF</td> <td>1206</td> <td>≥4.70μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">≤5%</td> <td>≤15%</td> <td>0402</td> <td>≥0.10μF</td> <td>0603</td> <td>≥0.47μF</td> <td>0805</td> <td>≥2.20μF</td> <td>1206</td> <td>≥6.80μF</td> </tr> <tr> <td>≤15%</td> <td>1210</td> <td>≥22.0μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤10%</td> <td>0603</td> <td>≥0.15μF</td> <td>0805</td> <td>≥0.68μF</td> <td>1206</td> <td>≥2.20μF</td> <td>1210</td> <td>≥4.70μF</td> </tr> <tr> <td rowspan="3">16V</td> <td rowspan="3">≤5%</td> <td>≤15%</td> <td>0201</td> <td>≥0.01μF</td> <td>0402</td> <td>≥0.033μF</td> <td>0603</td> <td>≥0.68μF</td> <td>0805</td> <td>≥2.20μF</td> </tr> <tr> <td>≤15%</td> <td>1206</td> <td>≥4.70μF</td> <td>1210</td> <td>≥22.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤10%</td> <td>0603</td> <td>≥0.15μF</td> <td>0805</td> <td>≥0.68μF</td> <td>1206</td> <td>≥2.20μF</td> <td>1210</td> <td>≥4.70μF</td> </tr> <tr> <td rowspan="3">10V</td> <td rowspan="3">≤7.5%</td> <td>≤15%</td> <td>0201</td> <td>≥0.012μF</td> <td>0402</td> <td>≥0.33μF</td> <td>0603</td> <td>≥0.33μF</td> <td>0805</td> <td>≥2.20μF</td> </tr> <tr> <td>≤15%</td> <td>1206</td> <td>≥2.20μF</td> <td>1210</td> <td>≥22.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤20%</td> <td>0201</td> <td>≥0.10μF</td> <td>0402</td> <td>≥1.00μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">6.3V</td> <td rowspan="2">≤15%</td> <td>≤30%</td> <td>0201</td> <td>≥0.10μF</td> <td>0402</td> <td>≥1.00μF</td> <td>0603</td> <td>≥10.0μF</td> <td>0805</td> <td>≥4.70μF</td> </tr> <tr> <td>≤20%</td> <td>1206</td> <td>≥4.70μF</td> <td>1210</td> <td>≥100μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">4V</td> <td rowspan="2">≤20%</td> <td>---</td> <td>---</td> <td>---</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>---</td> <td>---</td> <td>---</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>I.R.: Class2 (X7R) :</p> <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="8">Standard</th> <th rowspan="2">I.R.</th> </tr> <tr> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>All</td> <td>All</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>≥1GΩ or RxC ≥50Ω·F whichever is smaller.</td> </tr> </tbody> </table> | Rated vol. | Standard | | Exception Items | | | | | | | | D.F. | D.F. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | ≥50V | ≤3% | ≤6% | 0201 | All | 0603 | ≥0.047μF | 0805 | ≥0.18μF | 1206 | ≥0.47μF | ≤10% | 1210 | ≥4.70μF | | | | | | | ≤20% | 0402 | ≥0.10μF | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥2.20μF | 35V | ≤5% | ≤20% | 0603 | ≥1.00μF | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | ≤10% | 0201 | ≥0.01μF | 0805 | ≥1.00μF | 1210 | ≥10.0μF | | | ≤14% | 0603 | ≥0.33μF | 1206 | ≥4.70μF | | | | | 25V | ≤5% | ≤15% | 0402 | ≥0.10μF | 0603 | ≥0.47μF | 0805 | ≥2.20μF | 1206 | ≥6.80μF | ≤15% | 1210 | ≥22.0μF | | | | | | | ≤10% | 0603 | ≥0.15μF | 0805 | ≥0.68μF | 1206 | ≥2.20μF | 1210 | ≥4.70μF | 16V | ≤5% | ≤15% | 0201 | ≥0.01μF | 0402 | ≥0.033μF | 0603 | ≥0.68μF | 0805 | ≥2.20μF | ≤15% | 1206 | ≥4.70μF | 1210 | ≥22.0μF | | | | | ≤10% | 0603 | ≥0.15μF | 0805 | ≥0.68μF | 1206 | ≥2.20μF | 1210 | ≥4.70μF | 10V | ≤7.5% | ≤15% | 0201 | ≥0.012μF | 0402 | ≥0.33μF | 0603 | ≥0.33μF | 0805 | ≥2.20μF | ≤15% | 1206 | ≥2.20μF | 1210 | ≥22.0μF | | | | | ≤20% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | | | | | 6.3V | ≤15% | ≤30% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | 0603 | ≥10.0μF | 0805 | ≥4.70μF | ≤20% | 1206 | ≥4.70μF | 1210 | ≥100μF | | | | | 4V | ≤20% | --- | --- | --- | | | | | | | --- | --- | --- | | | | | | | Rated vol. | Standard | | | | | | | | I.R. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | All | All | All | --- | --- | --- | --- | --- | --- | --- | ≥1GΩ or RxC ≥50Ω·F whichever is smaller. |
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| D.F. | D.F. | Size | | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥50V | ≤3% | ≤6% | 0201 | All | 0603 | ≥0.047μF | 0805 | ≥0.18μF | 1206 | ≥0.47μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 0402 | ≥0.10μF | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | ≤5% | ≤20% | 0603 | ≥1.00μF | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0201 | ≥0.01μF | 0805 | ≥1.00μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤14% | 0603 | ≥0.33μF | 1206 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | ≤5% | ≤15% | 0402 | ≥0.10μF | 0603 | ≥0.47μF | 0805 | ≥2.20μF | 1206 | ≥6.80μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0603 | ≥0.15μF | 0805 | ≥0.68μF | 1206 | ≥2.20μF | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | ≤5% | ≤15% | 0201 | ≥0.01μF | 0402 | ≥0.033μF | 0603 | ≥0.68μF | 0805 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 1206 | ≥4.70μF | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0603 | ≥0.15μF | 0805 | ≥0.68μF | 1206 | ≥2.20μF | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | ≤7.5% | ≤15% | 0201 | ≥0.012μF | 0402 | ≥0.33μF | 0603 | ≥0.33μF | 0805 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 1206 | ≥2.20μF | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | ≤15% | ≤30% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | 0603 | ≥10.0μF | 0805 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 1206 | ≥4.70μF | 1210 | ≥100μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | ≤20% | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Standard | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| All | All | All | --- | --- | --- | --- | --- | --- | --- | ≥1GΩ or RxC ≥50Ω·F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9. | External Visual MIL-STD-883 Method 2009 | Visual inspection | No remarkable defect. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10. | Physical Dimension JESD22 Method JB-100 | Using by calipers | Within the specified dimensions | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

8. RELIABILITY TEST CONDITIONS AND REQUIREMENTS

| No. | AEC-Q200 Test Item | AEC-Q200 Test Condition | Requirements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|---|---|---|-------------|----------|-------------|-----------------|-------------|---|--|--|--|--|--|------|------|------|-------------|------|-------------|------|-------------|------|-------------|------|-------|-----|------|-----|------|----------|------|---------|------|---------|-----|------|---------|--|--|--|--|--|--|------|------|---------|------|---------|------|---------|------|---------|-----|-------|------|------|---------|------|---------|------|---------|--|--|-----|------|---------|------|---------|------|---------|--|--|-----|------|---------|------|---------|--|--|--|--|-----|-------|------|------|---------|------|---------|------|---------|------|---------|-----|------|---------|--|--|--|--|--|--|-------|------|---------|------|----------|------|---------|------|---------|-----|-------|------|------|---------|------|---------|--|--|--|--|-----|------|---------|------|---------|------|---------|------|---------|------|------|---------|------|---------|--|--|--|--|-----|-------|------|------|----------|------|---------|------|---------|------|---------|------|------|---------|------|---------|--|--|--|--|------|------|---------|------|---------|--|--|--|--|------|------|------|------|---------|------|---------|------|---------|------|---------|------|------|---------|------|--------|--|--|--|--|------|------|---------|--|--|--|--|--|--|----|------|-----|-----|-----|--|--|--|--|--|------------|----------|--|--|--|--|--|--|--|------|------|-------------|------|-------------|------|-------------|------|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|------------|-----------------|--|--|--|--|--|--|--|------|------|-------------|------|-------------|------|-------------|------|-------------|-----|------|---------|------|---------|------|--------|------|--------|---|-----|------|---------|------|---------|--|--|--|--|-----|------|---------|------|---------|------|---------|------|---------|------|---------|--|--|--|--|--|--|-----|------|---------|------|---------|------|---------|------|---------|------|---------|------|---------|--|--|--|--|-----|------|----------|------|---------|------|---------|------|---------|------|---------|------|---------|--|--|--|--|------|-----|-----|--|--|--|--|--|--|----|-----|-----|--|--|--|
| 11. | Resistance to Solvents MIL-STD-202 Method 215 | * Temperature: 25±5°C * Time: 3+0.5/-0 min. * Solvent: Iso-propyl alcohol. | * No remarkable damage. * Cap change : within the specified tolerance. * D.F. value: X7R: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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<th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td>50V</td> <td>0603</td> <td>≥1.00μF</td> <td>0805</td> <td>≥1.00μF</td> <td>1206</td> <td>≥4.7μF</td> <td>1210</td> <td>≥4.7μF</td> <td rowspan="12">≥10GΩ or RxC ≥1000Ω·F whichever is smaller.</td> </tr> <tr> <td>35V</td> <td>0805</td> <td>≥2.20μF</td> <td>1210</td> <td>≥10.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">25V</td> <td>0402</td> <td>≥1.00μF</td> <td>0603</td> <td>≥2.20μF</td> <td>0805</td> <td>≥2.20μF</td> <td>1206</td> <td>≥10.0μF</td> </tr> <tr> <td>1210</td> <td>≥10.0μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">16V</td> <td>0201</td> <td>≥0.10μF</td> <td>0402</td> <td>≥0.22μF</td> <td>0603</td> <td>≥1.00μF</td> <td>0805</td> <td>≥2.20μF</td> </tr> <tr> <td>1206</td> <td>≥10.0μF</td> <td>1210</td> <td>≥47.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">10V</td> <td>0201</td> <td>≥0.047μF</td> <td>0402</td> <td>≥0.47μF</td> <td>0603</td> <td>≥0.47μF</td> <td>0603</td> <td>≥2.20μF</td> </tr> <tr> <td>1206</td> <td>≥4.70μF</td> <td>1210</td> <td>≥4.70μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>6.3V</td> <td>---</td> <td>---</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4V</td> <td>---</td> <td>---</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | Rated vol. | Standard | | Exception Items | | | | | | | | D.F. | D.F. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | ≥50V | ≤2.5% | ≤3% | 0201 | All | 0603 | ≥0.047μF | 0805 | ≥0.18μF | 1206 | ≥0.47μF | ≤5% | 1210 | ≥4.70μF | | | | | | | ≤10% | 0402 | ≥0.10μF | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥2.20μF | 35V | ≤3.5% | ≤10% | 0603 | ≥1.00μF | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | ≤5% | 0201 | ≥0.01μF | 0805 | ≥1.00μF | 1210 | ≥10.0μF | | | ≤7% | 0603 | ≥0.33μF | 1206 | ≥4.70μF | | | | | 25V | ≤3.5% | ≤10% | 0402 | ≥0.10μF | 0603 | ≥0.47μF | 0805 | ≥2.20μF | 1206 | ≥6.80μF | ≤5% | 1210 | ≥22.0μF | | | | | | | ≤3.5% | 0201 | ≥0.01μF | 0402 | ≥0.033μF | 0603 | ≥0.15μF | 0805 | ≥0.68μF | 16V | ≤3.5% | ≤10% | 1206 | ≥2.20μF | 1210 | ≥4.70μF | | | | | ≤5% | 0201 | ≥0.01μF | 0402 | ≥0.22μF | 0603 | ≥0.68μF | 0805 | ≥2.20μF | ≤10% | 1206 | ≥4.70μF | 1210 | ≥22.0μF | | | | | 10V | ≤5.0% | ≤10% | 0201 | ≥0.012μF | 0402 | ≥0.33μF | 0603 | ≥0.33μF | 0805 | ≥2.20μF | ≤15% | 1206 | ≥2.20μF | 1210 | ≥22.0μF | | | | | ≤10% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | | | | | 6.3V | ≤10% | ≤15% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | 0603 | ≥10.0μF | 0805 | ≥4.70μF | ≤20% | 1206 | ≥47.0μF | 1210 | ≥100μF | | | | | ≤20% | 0402 | ≥2.20μF | | | | | | | 4V | ≤15% | --- | --- | --- | | | | | | Rated vol. | Standard | | | | | | | | I.R. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | All | All | All | --- | --- | --- | --- | --- | --- | --- | ≥10GΩ or RxC ≥500Ω·F whichever is smaller. | Rated vol. | Exception Items | | | | | | | | I.R. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | 50V | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥4.7μF | 1210 | ≥4.7μF | ≥10GΩ or RxC ≥1000Ω·F whichever is smaller. | 35V | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | | | 25V | 0402 | ≥1.00μF | 0603 | ≥2.20μF | 0805 | ≥2.20μF | 1206 | ≥10.0μF | 1210 | ≥10.0μF | | | | | | | 16V | 0201 | ≥0.10μF | 0402 | ≥0.22μF | 0603 | ≥1.00μF | 0805 | ≥2.20μF | 1206 | ≥10.0μF | 1210 | ≥47.0μF | | | | | 10V | 0201 | ≥0.047μF | 0402 | ≥0.47μF | 0603 | ≥0.47μF | 0603 | ≥2.20μF | 1206 | ≥4.70μF | 1210 | ≥4.70μF | | | | | 6.3V | --- | --- | | | | | | | 4V | --- | --- | | | |
| Rated vol. | Standard | | Exception Items | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | D.F. | D.F. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥50V | ≤2.5% | ≤3% | 0201 | All | 0603 | ≥0.047μF | 0805 | ≥0.18μF | 1206 | ≥0.47μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤5% | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0402 | ≥0.10μF | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | ≤3.5% | ≤10% | 0603 | ≥1.00μF | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤5% | 0201 | ≥0.01μF | 0805 | ≥1.00μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤7% | 0603 | ≥0.33μF | 1206 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | ≤3.5% | ≤10% | 0402 | ≥0.10μF | 0603 | ≥0.47μF | 0805 | ≥2.20μF | 1206 | ≥6.80μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤5% | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤3.5% | 0201 | ≥0.01μF | 0402 | ≥0.033μF | 0603 | ≥0.15μF | 0805 | ≥0.68μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | ≤3.5% | ≤10% | 1206 | ≥2.20μF | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤5% | 0201 | ≥0.01μF | 0402 | ≥0.22μF | 0603 | ≥0.68μF | 0805 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 1206 | ≥4.70μF | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | ≤5.0% | ≤10% | 0201 | ≥0.012μF | 0402 | ≥0.33μF | 0603 | ≥0.33μF | 0805 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 1206 | ≥2.20μF | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | ≤10% | ≤15% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | 0603 | ≥10.0μF | 0805 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 1206 | ≥47.0μF | 1210 | ≥100μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 0402 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | ≤15% | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Standard | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| All | All | All | --- | --- | --- | --- | --- | --- | --- | ≥10GΩ or RxC ≥500Ω·F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Exception Items | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50V | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥4.7μF | 1210 | ≥4.7μF | ≥10GΩ or RxC ≥1000Ω·F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | 0402 | ≥1.00μF | 0603 | ≥2.20μF | 0805 | ≥2.20μF | 1206 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | 0201 | ≥0.10μF | 0402 | ≥0.22μF | 0603 | ≥1.00μF | 0805 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1206 | ≥10.0μF | 1210 | ≥47.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | 0201 | ≥0.047μF | 0402 | ≥0.47μF | 0603 | ≥0.47μF | 0603 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1206 | ≥4.70μF | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12. | Mechanical Shock MIL-STD-202 Method 213 | * Peak value: 1500g's. * Wave: 1/2 sine. * Velocity: 15.4 ft/sec * Three shocks in each direction should be applied along 3 mutually perpendicular axes of the test specimen (18 shocks) | * No remarkable damage. * Cap change : within the specified tolerance. * D.F. value: X7R: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | | 25V | ≤3.5% | ≤10% | 0402 | ≥0.10μF | 0603 | ≥0.47μF | 0805 | ≥2.20μF | 1206 | ≥6.80μF | ≤5% | 1210 | ≥22.0μF | | | | | | | ≤3.5% | 0201 | ≥0.01μF | 0402 | ≥0.033μF | 0603 | ≥0.15μF | 0805 | ≥0.68μF | 16V | ≤3.5% | ≤10% | 1206 | ≥2.20μF | 1210 | ≥4.70μF | | | | | ≤5% | 0201 | ≥0.01μF | 0402 | ≥0.22μF | 0603 | ≥0.68μF | 0805 | ≥2.20μF | ≤10% | 1206 | ≥4.70μF | 1210 | ≥22.0μF | | | | | 10V | ≤5.0% | ≤10% | 0201 | ≥0.012μF | 0402 | ≥0.33μF | 0603 | ≥0.33μF | 0805 | ≥2.20μF | ≤15% | 1206 | ≥2.20μF | 1210 | ≥22.0μF | | | | | ≤10% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | | | | | 6.3V | ≤10% | ≤15% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | 0603 | ≥10.0μF | 0805 | ≥4.70μF | ≤20% | 1206 | ≥47.0μF | 1210 | ≥100μF | | | | | ≤20% | 0402 | ≥2.20μF | | | | | | | 4V | ≤15% | --- | --- | --- | | | | | | Rated vol. | Standard | | | | | | | | I.R. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | All | All | All | --- | --- | --- | --- | --- | --- | --- | ≥10GΩ or RxC ≥500Ω·F whichever is smaller. | Rated vol. | Exception Items | | | | | | | | I.R. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | 50V | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥4.7μF | 1210 | ≥4.7μF | ≥10GΩ or RxC ≥1000Ω·F whichever is smaller. | 35V | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | | | 25V | 0402 | ≥1.00μF | 0603 | ≥2.20μF | 0805 | ≥2.20μF | 1206 | ≥10.0μF | 1210 | ≥10.0μF | | | | | | | 16V | 0201 | ≥0.10μF | 0402 | ≥0.22μF | 0603 | ≥1.00μF | 0805 | ≥2.20μF | 1206 | ≥10.0μF | 1210 | ≥47.0μF | | | | | 10V | 0201 | ≥0.047μF | 0402 | ≥0.47μF | 0603 | ≥0.47μF | 0603 | ≥2.20μF | 1206 | ≥4.70μF | 1210 | ≥4.70μF | | | | | 6.3V | --- | --- | | | | | | | 4V | --- | --- | | | |
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| | D.F. | D.F. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥50V | ≤2.5% | ≤3% | 0201 | All | 0603 | ≥0.047μF | 0805 | ≥0.18μF | 1206 | ≥0.47μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤5% | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0402 | ≥0.10μF | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | ≤3.5% | ≤10% | 0603 | ≥1.00μF | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤5% | 0201 | ≥0.01μF | 0805 | ≥1.00μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤7% | 0603 | ≥0.33μF | 1206 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | ≤3.5% | ≤10% | 0402 | ≥0.10μF | 0603 | ≥0.47μF | 0805 | ≥2.20μF | 1206 | ≥6.80μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤5% | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤3.5% | 0201 | ≥0.01μF | 0402 | ≥0.033μF | 0603 | ≥0.15μF | 0805 | ≥0.68μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | ≤3.5% | ≤10% | 1206 | ≥2.20μF | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤5% | 0201 | ≥0.01μF | 0402 | ≥0.22μF | 0603 | ≥0.68μF | 0805 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 1206 | ≥4.70μF | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | ≤5.0% | ≤10% | 0201 | ≥0.012μF | 0402 | ≥0.33μF | 0603 | ≥0.33μF | 0805 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 1206 | ≥2.20μF | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | ≤10% | ≤15% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | 0603 | ≥10.0μF | 0805 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 1206 | ≥47.0μF | 1210 | ≥100μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 0402 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | ≤15% | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Standard | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| All | All | All | --- | --- | --- | --- | --- | --- | --- | ≥10GΩ or RxC ≥500Ω·F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Exception Items | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50V | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥4.7μF | 1210 | ≥4.7μF | ≥10GΩ or RxC ≥1000Ω·F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | 0402 | ≥1.00μF | 0603 | ≥2.20μF | 0805 | ≥2.20μF | 1206 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | 0201 | ≥0.10μF | 0402 | ≥0.22μF | 0603 | ≥1.00μF | 0805 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1206 | ≥10.0μF | 1210 | ≥47.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | 0201 | ≥0.047μF | 0402 | ≥0.47μF | 0603 | ≥0.47μF | 0603 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1206 | ≥4.70μF | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

8. RELIABILITY TEST CONDITIONS AND REQUIREMENTS

| No. | AEC-Q200 Test Item | AEC-Q200 Test Condition | Requirements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|--|---|--|-------------|----------|-------------|-----------------|-------------|--|-------------|--|--|--|--|------|--|------|-------------|------|-------------|------|-------------|------|-------------|------|-------|-----|------|-----|------|----------|------|---------|------|---------|-----|------|---------|--|--|--|--|--|--|------|------|---------|------|---------|------|---------|------|---------|-----|-------|------|------|---------|------|---------|------|---------|--|--|-----|------|---------|------|---------|------|---------|--|--|-----|-------|-----|------|---------|------|---------|--|--|--|--|------|------|---------|------|---------|------|---------|------|---------|------|---------|--|--|--|--|--|--|-----|-------|-----|------|---------|------|----------|------|---------|------|---------|------|------|---------|------|---------|--|--|--|--|------|---------|------|---------|------|---------|------|---------|-----|-------|------|------|---------|------|---------|--|--|--|--|------|------|----------|------|---------|------|---------|------|---------|------|---------|------|---------|--|--|--|--|------|------|------|------|---------|------|---------|------|---------|------|---------|------|------|---------|------|--------|--|--|--|--|----|------|------|---------|--|--|--|--|--|--|------------|----------|--|--|--|--|--|--|--|------|------|-------------|------|-------------|------|-------------|------|-------------|-----|-----|-----|-----|-----|-----|-----|
| 13. | Vibration MIL-STD-202 Method 204 | * Reflow solder the capacitors on PCB before test. * Vibration frequency: 10~2000 Hz/min.(5g's for 20 min) * Total amplitude: 1.5mm * 12 cycles each of 3 orientations (36 times) | * No remarkable damage. * Cap change : within the specified tolerance. * D.F. value: X7R: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="2">Standard</th> <th colspan="8">Exception Items</th> </tr> <tr> <th>D.F.</th> <th></th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td rowspan="3">≥50V</td> <td rowspan="3">≤2.5%</td> <td>≤3%</td> <td>0201</td> <td>All</td> <td>0603</td> <td>≥0.047μF</td> <td>0805</td> <td>≥0.18μF</td> <td>1206</td> <td>≥0.47μF</td> </tr> <tr> <td>≤5%</td> <td>1210</td> <td>≥4.70μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤10%</td> <td>0402</td> <td>≥0.10μF</td> <td>0603</td> <td>≥1.00μF</td> <td>0805</td> <td>≥1.00μF</td> <td>1206</td> <td>≥2.20μF</td> </tr> <tr> <td rowspan="2">35V</td> <td rowspan="2">≤3.5%</td> <td>≤10%</td> <td>0603</td> <td>≥1.00μF</td> <td>0805</td> <td>≥2.20μF</td> <td>1210</td> <td>≥10.0μF</td> <td></td> <td></td> </tr> <tr> <td>≤5%</td> <td>0201</td> <td>≥0.01μF</td> <td>0805</td> <td>≥1.00μF</td> <td>1210</td> <td>≥10.0μF</td> <td></td> <td></td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">≤3.5%</td> <td>≤7%</td> <td>0603</td> <td>≥0.33μF</td> <td>1206</td> <td>≥4.70μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">≤10%</td> <td>0402</td> <td>≥0.10μF</td> <td>0603</td> <td>≥0.47μF</td> <td>0805</td> <td>≥2.20μF</td> <td>1206</td> <td>≥6.80μF</td> </tr> <tr> <td>1210</td> <td>≥22.0μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">16V</td> <td rowspan="3">≤3.5%</td> <td>≤5%</td> <td>0201</td> <td>≥0.01μF</td> <td>0402</td> <td>≥0.033μF</td> <td>0603</td> <td>≥0.15μF</td> <td>0805</td> <td>≥0.68μF</td> </tr> <tr> <td rowspan="2">≤10%</td> <td>1206</td> <td>≥2.20μF</td> <td>1210</td> <td>≥4.70μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>0201</td> <td>≥0.10μF</td> <td>0402</td> <td>≥0.22μF</td> <td>0603</td> <td>≥0.68μF</td> <td>0805</td> <td>≥2.20μF</td> </tr> <tr> <td rowspan="3">10V</td> <td rowspan="3">≤5.0%</td> <td>≤10%</td> <td>1206</td> <td>≥4.70μF</td> <td>1210</td> <td>≥22.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">≤15%</td> <td>0201</td> <td>≥0.012μF</td> <td>0402</td> <td>≥0.33μF</td> <td>0603</td> <td>≥0.33μF</td> <td>0805</td> <td>≥2.20μF</td> </tr> <tr> <td>1206</td> <td>≥2.20μF</td> <td>1210</td> <td>≥22.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">6.3V</td> <td rowspan="2">≤10%</td> <td>≤15%</td> <td>0201</td> <td>≥0.10μF</td> <td>0402</td> <td>≥1.00μF</td> <td>0603</td> <td>≥10.0μF</td> <td>0805</td> <td>≥4.70μF</td> </tr> <tr> <td>≤20%</td> <td>1206</td> <td>≥47.0μF</td> <td>1210</td> <td>≥100μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4V</td> <td>≤15%</td> <td>0402</td> <td>≥2.20μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>* I.R.: Class2 (X7R) :</p> <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="8">Standard</th> <th rowspan="2">I.R.</th> </tr> <tr> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>All</td> <td>All</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>≥10GΩ or RxC ≥500Ω-F whichever is smaller.</td> </tr> </tbody> </table> | Rated vol. | Standard | | Exception Items | | | | | | | | D.F. | | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | ≥50V | ≤2.5% | ≤3% | 0201 | All | 0603 | ≥0.047μF | 0805 | ≥0.18μF | 1206 | ≥0.47μF | ≤5% | 1210 | ≥4.70μF | | | | | | | ≤10% | 0402 | ≥0.10μF | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥2.20μF | 35V | ≤3.5% | ≤10% | 0603 | ≥1.00μF | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | ≤5% | 0201 | ≥0.01μF | 0805 | ≥1.00μF | 1210 | ≥10.0μF | | | 25V | ≤3.5% | ≤7% | 0603 | ≥0.33μF | 1206 | ≥4.70μF | | | | | ≤10% | 0402 | ≥0.10μF | 0603 | ≥0.47μF | 0805 | ≥2.20μF | 1206 | ≥6.80μF | 1210 | ≥22.0μF | | | | | | | 16V | ≤3.5% | ≤5% | 0201 | ≥0.01μF | 0402 | ≥0.033μF | 0603 | ≥0.15μF | 0805 | ≥0.68μF | ≤10% | 1206 | ≥2.20μF | 1210 | ≥4.70μF | | | | | 0201 | ≥0.10μF | 0402 | ≥0.22μF | 0603 | ≥0.68μF | 0805 | ≥2.20μF | 10V | ≤5.0% | ≤10% | 1206 | ≥4.70μF | 1210 | ≥22.0μF | | | | | ≤15% | 0201 | ≥0.012μF | 0402 | ≥0.33μF | 0603 | ≥0.33μF | 0805 | ≥2.20μF | 1206 | ≥2.20μF | 1210 | ≥22.0μF | | | | | 6.3V | ≤10% | ≤15% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | 0603 | ≥10.0μF | 0805 | ≥4.70μF | ≤20% | 1206 | ≥47.0μF | 1210 | ≥100μF | | | | | 4V | ≤15% | 0402 | ≥2.20μF | | | | | | | Rated vol. | Standard | | | | | | | | I.R. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | All | All | All | --- | --- | --- | --- |
| Rated vol. | Standard | | Exception Items | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | D.F. | | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥50V | ≤2.5% | ≤3% | 0201 | All | 0603 | ≥0.047μF | 0805 | ≥0.18μF | 1206 | ≥0.47μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤5% | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0402 | ≥0.10μF | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | ≤3.5% | ≤10% | 0603 | ≥1.00μF | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤5% | 0201 | ≥0.01μF | 0805 | ≥1.00μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | ≤3.5% | ≤7% | 0603 | ≥0.33μF | 1206 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0402 | ≥0.10μF | 0603 | ≥0.47μF | 0805 | ≥2.20μF | 1206 | ≥6.80μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | ≤3.5% | ≤5% | 0201 | ≥0.01μF | 0402 | ≥0.033μF | 0603 | ≥0.15μF | 0805 | ≥0.68μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 1206 | ≥2.20μF | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 0201 | ≥0.10μF | 0402 | ≥0.22μF | 0603 | ≥0.68μF | 0805 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | ≤5.0% | ≤10% | 1206 | ≥4.70μF | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 0201 | ≥0.012μF | 0402 | ≥0.33μF | 0603 | ≥0.33μF | 0805 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1206 | ≥2.20μF | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | ≤10% | ≤15% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | 0603 | ≥10.0μF | 0805 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 1206 | ≥47.0μF | 1210 | ≥100μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | ≤15% | 0402 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Standard | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| All | All | All | --- | --- | --- | --- | --- | --- | ≥10GΩ or RxC ≥500Ω-F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14. | Resistance to Soldering Heat MIL-STD-202 Method 210 | * Solder temperature: 270±5°C * Dipping time: 10±1 sec * Before initial measurement (Class2 only): Perform 150+0/-10°C for 1 hr and then set for 24±2 hrs at room temp. * Measurement to be made after keeping at room temp.for 24±2 hrs. | * No remarkable damage. * Cap change : X7R: within ±7.50%. * D.F. value: X7R: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="2">Standard</th> <th colspan="8">Exception Items</th> </tr> <tr> <th>D.F.</th> <th></th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td rowspan="3">≥50V</td> <td rowspan="3">≤2.5%</td> <td>≤3%</td> <td>0201</td> <td>All</td> <td>0603</td> <td>≥0.047μF</td> <td>0805</td> <td>≥0.18μF</td> <td>1206</td> <td>≥0.47μF</td> </tr> <tr> <td>≤5%</td> <td>1210</td> <td>≥4.70μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤10%</td> <td>0402</td> <td>≥0.10μF</td> <td>0603</td> <td>≥1.00μF</td> <td>0805</td> <td>≥1.00μF</td> <td>1206</td> <td>≥2.20μF</td> </tr> <tr> <td rowspan="2">35V</td> <td rowspan="2">≤3.5%</td> <td>≤10%</td> <td>0603</td> <td>≥1.00μF</td> <td>0805</td> <td>≥2.20μF</td> <td>1210</td> <td>≥10.0μF</td> <td></td> <td></td> </tr> <tr> <td>≤5%</td> <td>0201</td> <td>≥0.01μF</td> <td>0805</td> <td>≥1.00μF</td> <td>1210</td> <td>≥10.0μF</td> <td></td> <td></td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">≤3.5%</td> <td>≤7%</td> <td>0603</td> <td>≥0.33μF</td> <td>1206</td> <td>≥4.70μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">≤10%</td> <td>0402</td> <td>≥0.10μF</td> <td>0603</td> <td>≥0.47μF</td> <td>0805</td> <td>≥2.20μF</td> <td>1206</td> <td>≥6.80μF</td> </tr> <tr> <td>1210</td> <td>≥22.0μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">16V</td> <td rowspan="3">≤3.5%</td> <td>≤5%</td> <td>0201</td> <td>≥0.01μF</td> <td>0402</td> <td>≥0.033μF</td> <td>0603</td> <td>≥0.15μF</td> <td>0805</td> <td>≥0.68μF</td> </tr> <tr> <td rowspan="2">≤10%</td> <td>1206</td> <td>≥2.20μF</td> <td>1210</td> <td>≥4.70μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>0201</td> <td>≥0.10μF</td> <td>0402</td> <td>≥0.22μF</td> <td>0603</td> <td>≥0.68μF</td> <td>0805</td> <td>≥2.20μF</td> </tr> <tr> <td rowspan="3">10V</td> <td rowspan="3">≤5.0%</td> <td>≤10%</td> <td>1206</td> <td>≥4.70μF</td> <td>1210</td> <td>≥22.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">≤15%</td> <td>0201</td> <td>≥0.012μF</td> <td>0402</td> <td>≥0.33μF</td> <td>0603</td> <td>≥0.33μF</td> <td>0805</td> <td>≥2.20μF</td> </tr> <tr> <td>1206</td> <td>≥2.20μF</td> <td>1210</td> <td>≥22.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">6.3V</td> <td rowspan="2">≤10%</td> <td>≤15%</td> <td>0201</td> <td>≥0.10μF</td> <td>0402</td> <td>≥1.00μF</td> <td>0603</td> <td>≥10.0μF</td> <td>0805</td> <td>≥4.70μF</td> </tr> <tr> <td>≤20%</td> <td>1206</td> <td>≥47.0μF</td> <td>1210</td> <td>≥100μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4V</td> <td>≤15%</td> <td>0402</td> <td>≥2.20μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>* I.R.: Class2 (X7R) :</p> <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="8">Standard</th> <th rowspan="2">I.R.</th> </tr> <tr> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>All</td> <td>All</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>≥10GΩ or RxC ≥500Ω-F whichever is smaller.</td> </tr> </tbody> </table> | Rated vol. | Standard | | Exception Items | | | | | | | | D.F. | | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | ≥50V | ≤2.5% | ≤3% | 0201 | All | 0603 | ≥0.047μF | 0805 | ≥0.18μF | 1206 | ≥0.47μF | ≤5% | 1210 | ≥4.70μF | | | | | | | ≤10% | 0402 | ≥0.10μF | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥2.20μF | 35V | ≤3.5% | ≤10% | 0603 | ≥1.00μF | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | ≤5% | 0201 | ≥0.01μF | 0805 | ≥1.00μF | 1210 | ≥10.0μF | | | 25V | ≤3.5% | ≤7% | 0603 | ≥0.33μF | 1206 | ≥4.70μF | | | | | ≤10% | 0402 | ≥0.10μF | 0603 | ≥0.47μF | 0805 | ≥2.20μF | 1206 | ≥6.80μF | 1210 | ≥22.0μF | | | | | | | 16V | ≤3.5% | ≤5% | 0201 | ≥0.01μF | 0402 | ≥0.033μF | 0603 | ≥0.15μF | 0805 | ≥0.68μF | ≤10% | 1206 | ≥2.20μF | 1210 | ≥4.70μF | | | | | 0201 | ≥0.10μF | 0402 | ≥0.22μF | 0603 | ≥0.68μF | 0805 | ≥2.20μF | 10V | ≤5.0% | ≤10% | 1206 | ≥4.70μF | 1210 | ≥22.0μF | | | | | ≤15% | 0201 | ≥0.012μF | 0402 | ≥0.33μF | 0603 | ≥0.33μF | 0805 | ≥2.20μF | 1206 | ≥2.20μF | 1210 | ≥22.0μF | | | | | 6.3V | ≤10% | ≤15% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | 0603 | ≥10.0μF | 0805 | ≥4.70μF | ≤20% | 1206 | ≥47.0μF | 1210 | ≥100μF | | | | | 4V | ≤15% | 0402 | ≥2.20μF | | | | | | | Rated vol. | Standard | | | | | | | | I.R. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | All | All | All | --- | --- | --- | --- |
| Rated vol. | Standard | | Exception Items | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | D.F. | | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥50V | ≤2.5% | ≤3% | 0201 | All | 0603 | ≥0.047μF | 0805 | ≥0.18μF | 1206 | ≥0.47μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤5% | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0402 | ≥0.10μF | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | ≤3.5% | ≤10% | 0603 | ≥1.00μF | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤5% | 0201 | ≥0.01μF | 0805 | ≥1.00μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | ≤3.5% | ≤7% | 0603 | ≥0.33μF | 1206 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0402 | ≥0.10μF | 0603 | ≥0.47μF | 0805 | ≥2.20μF | 1206 | ≥6.80μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | ≤3.5% | ≤5% | 0201 | ≥0.01μF | 0402 | ≥0.033μF | 0603 | ≥0.15μF | 0805 | ≥0.68μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 1206 | ≥2.20μF | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 0201 | ≥0.10μF | 0402 | ≥0.22μF | 0603 | ≥0.68μF | 0805 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | ≤5.0% | ≤10% | 1206 | ≥4.70μF | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 0201 | ≥0.012μF | 0402 | ≥0.33μF | 0603 | ≥0.33μF | 0805 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1206 | ≥2.20μF | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | ≤10% | ≤15% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | 0603 | ≥10.0μF | 0805 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 1206 | ≥47.0μF | 1210 | ≥100μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | ≤15% | 0402 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Standard | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| All | All | All | --- | --- | --- | --- | --- | --- | ≥10GΩ or RxC ≥500Ω-F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

8. RELIABILITY TEST CONDITIONS AND REQUIREMENTS

| No. | AEC-Q200 Test Item | AEC-Q200 Test Condition | Requirements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|---|-------------|-----------------|-------------|-----------------|-------------|--|--|------|--|-------------|------|-------------|------|-------------|-------------|-------------|-------------|------|-------------|------|-------------|------|--------|------|--------|--|--|----------|---------|---------|---------|---------|------|------|---------|-----|------|---------|------|---------|------|---------|------|---------|------|---------|------|---------|------|---------|-----|-------|------|------|---------|------|---------|------|---------|------|---------|------|---------|---------|---------|---------|------|---------|--|-----|------|----------|---------|---------|---------|---------|------|---------|------|---------|-------|---------|------|---------|------|---------|------|---------|------|---------|--|------|---------|--|--|----|-----|-----|--|------|------|---------|------|----------|------|---------|------|---------|-----|-------|------|------|---------|------|----------|------|---------|------|---------|------|------|---------|------|---------|------|---------|------|---------|------|------|----------|------|---------|------|---------|------|---------|-----|-------|------|------|----------|------|---------|------|---------|------|---------|------|------|---------|------|---------|--|--|--|--|------|------|---------|------|---------|------|---------|------|---------|------|------|------|------|---------|------|---------|------|---------|------|---------|------|------|---------|------|--------|--|--|--|--|------|------|---------|-----|-----|--|--|--|--|----|------|-----|-----|-----|-----|--|--|--|--|-----|-----|-----|-----|--|--|--|--|-----|-----|-----|-----|--|--|--|--|--|
| 15. | Thermal Shock MIL-STD-202 Method 107 | * Conduct 300 cycles according to the temperatures and time. | * No remarkable damage. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | <table border="1"> <thead> <tr> <th>Step</th> <th>Temp. (°C)</th> <th>Time (min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55°C +0/-3</td> <td>15±3</td> </tr> <tr> <td>2</td> <td>+125°C +3/-0</td> <td>15±3</td> </tr> </tbody> </table> | Step | Temp. (°C) | Time (min.) | 1 | -55°C +0/-3 | 15±3 | 2 | +125°C +3/-0 | 15±3 | * Cap change : within the specified tolerance. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Step | Temp. (°C) | Time (min.) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1 | -55°C +0/-3 | 15±3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 2 | +125°C +3/-0 | 15±3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | * Max. transfer time: 20 sec. | * D.F. value: X7R: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | * Before initial measurement (Class2 only): | <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="2">Standard</th> <th colspan="8">Exception Items</th> </tr> <tr> <th>D.F.</th> <th></th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td rowspan="3">≥50V</td> <td rowspan="3">≤3%</td> <td>≤6%</td> <td>0201</td> <td>All</td> <td>0603</td> <td>≥0.047μF</td> <td>0805</td> <td>≥0.18μF</td> <td>1206</td> <td>≥0.47μF</td> </tr> <tr> <td>≤10%</td> <td>1210</td> <td>≥4.70μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤20%</td> <td>0402</td> <td>≥0.10μF</td> <td>0603</td> <td>≥1.00μF</td> <td>0805</td> <td>≥1.00μF</td> <td>1206</td> <td>≥2.20μF</td> </tr> <tr> <td rowspan="3">35V</td> <td rowspan="3">≤5%</td> <td>≤20%</td> <td>0603</td> <td>≥1.00μF</td> <td>0805</td> <td>≥2.20μF</td> <td>1210</td> <td>≥10.0μF</td> <td></td> <td></td> </tr> <tr> <td>≤10%</td> <td>0201</td> <td>≥0.01μF</td> <td>0805</td> <td>≥1.00μF</td> <td>1210</td> <td>≥10.0μF</td> <td></td> <td></td> </tr> <tr> <td>≤14%</td> <td>0603</td> <td>≥0.33μF</td> <td>1206</td> <td>≥4.70μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">≤5%</td> <td>≤15%</td> <td>0402</td> <td>≥0.10μF</td> <td>0603</td> <td>≥0.47μF</td> <td>0805</td> <td>≥2.20μF</td> <td>1206</td> <td>≥6.80μF</td> </tr> <tr> <td></td> <td>1210</td> <td>≥22.0μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤10%</td> <td>0603</td> <td>≥0.15μF</td> <td>0805</td> <td>≥0.68μF</td> <td>1206</td> <td>≥2.20μF</td> <td>1210</td> <td>≥4.70μF</td> </tr> <tr> <td rowspan="3">16V</td> <td rowspan="3">≤5%</td> <td>≤15%</td> <td>0201</td> <td>≥0.01μF</td> <td>0402</td> <td>≥0.033μF</td> <td>0603</td> <td>≥0.68μF</td> <td>0805</td> <td>≥2.20μF</td> </tr> <tr> <td>≤15%</td> <td>1206</td> <td>≥4.70μF</td> <td>1210</td> <td>≥22.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤10%</td> <td>0201</td> <td>≥0.012μF</td> <td>0402</td> <td>≥0.33μF</td> <td>0603</td> <td>≥0.33μF</td> <td>0805</td> <td>≥2.20μF</td> </tr> <tr> <td rowspan="3">10V</td> <td rowspan="3">≤7.5%</td> <td>≤15%</td> <td>1206</td> <td>≥2.20μF</td> <td>1210</td> <td>≥22.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤20%</td> <td>0201</td> <td>≥0.10μF</td> <td>0402</td> <td>≥1.00μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤10%</td> <td>0201</td> <td>≥0.10μF</td> <td>0402</td> <td>≥1.00μF</td> <td>0603</td> <td>≥10.0μF</td> <td>0805</td> <td>≥4.70μF</td> </tr> <tr> <td rowspan="3">6.3V</td> <td rowspan="3">≤30%</td> <td>≤15%</td> <td>0201</td> <td>≥0.10μF</td> <td>0402</td> <td>≥1.00μF</td> <td>0603</td> <td>≥10.0μF</td> <td>0805</td> <td>≥4.70μF</td> </tr> <tr> <td>≤20%</td> <td>1206</td> <td>≥4.70μF</td> <td>1210</td> <td>≥100μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤20%</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">4V</td> <td rowspan="3">≤20%</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | Rated vol. | Standard | | Exception Items | | | | | | | | D.F. | | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | ≥50V | ≤3% | ≤6% | 0201 | All | 0603 | ≥0.047μF | 0805 | ≥0.18μF | 1206 | ≥0.47μF | ≤10% | 1210 | ≥4.70μF | | | | | | | ≤20% | 0402 | ≥0.10μF | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥2.20μF | 35V | ≤5% | ≤20% | 0603 | ≥1.00μF | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | ≤10% | 0201 | ≥0.01μF | 0805 | ≥1.00μF | 1210 | ≥10.0μF | | | ≤14% | 0603 | ≥0.33μF | 1206 | ≥4.70μF | | | | | 25V | ≤5% | ≤15% | 0402 | ≥0.10μF | 0603 | ≥0.47μF | 0805 | ≥2.20μF | 1206 | ≥6.80μF | | 1210 | ≥22.0μF | | | | | | | ≤10% | 0603 | ≥0.15μF | 0805 | ≥0.68μF | 1206 | ≥2.20μF | 1210 | ≥4.70μF | 16V | ≤5% | ≤15% | 0201 | ≥0.01μF | 0402 | ≥0.033μF | 0603 | ≥0.68μF | 0805 | ≥2.20μF | ≤15% | 1206 | ≥4.70μF | 1210 | ≥22.0μF | | | | | ≤10% | 0201 | ≥0.012μF | 0402 | ≥0.33μF | 0603 | ≥0.33μF | 0805 | ≥2.20μF | 10V | ≤7.5% | ≤15% | 1206 | ≥2.20μF | 1210 | ≥22.0μF | | | | | ≤20% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | | | | | ≤10% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | 0603 | ≥10.0μF | 0805 | ≥4.70μF | 6.3V | ≤30% | ≤15% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | 0603 | ≥10.0μF | 0805 | ≥4.70μF | ≤20% | 1206 | ≥4.70μF | 1210 | ≥100μF | | | | | ≤20% | --- | --- | --- | --- | | | | | 4V | ≤20% | --- | --- | --- | --- | | | | | --- | --- | --- | --- | | | | | --- | --- | --- | --- | | | | | |
| | | Rated vol. | Standard | | Exception Items | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | D.F. | | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≥50V | ≤3% | ≤6% | 0201 | All | 0603 | ≥0.047μF | 0805 | ≥0.18μF | 1206 | ≥0.47μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≤10% | 1210 | | | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≤20% | 0402 | | | ≥0.10μF | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | ≤5% | ≤20% | 0603 | ≥1.00μF | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0201 | ≥0.01μF | 0805 | ≥1.00μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤14% | 0603 | ≥0.33μF | 1206 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | ≤5% | ≤15% | 0402 | ≥0.10μF | 0603 | ≥0.47μF | 0805 | ≥2.20μF | 1206 | ≥6.80μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0603 | ≥0.15μF | 0805 | ≥0.68μF | 1206 | ≥2.20μF | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | ≤5% | ≤15% | 0201 | ≥0.01μF | 0402 | ≥0.033μF | 0603 | ≥0.68μF | 0805 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤15% | 1206 | ≥4.70μF | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0201 | ≥0.012μF | 0402 | ≥0.33μF | 0603 | ≥0.33μF | 0805 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 6.3V | ≤30% | ≤15% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | 0603 | ≥10.0μF | 0805 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 4V | ≤20% | --- | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| * Perform 150+0/-10°C for 1 hr and then set for 24±2 hrs at room temp. | * I.R.: Class2 (X7R) : | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * Measurement to be made after keeping at room temp. for 24±2 hrs. | <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="8">Standard</th> <th rowspan="2">I.R.</th> </tr> <tr> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>All</td> <td>All</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>≥10GΩ or RxC ≥500Ω-F whichever is smaller.</td> </tr> </tbody> </table> | Rated vol. | Standard | | | | | | | | I.R. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | All | All | All | --- | --- | --- | --- | --- | --- | --- | ≥10GΩ or RxC ≥500Ω-F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Standard | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| All | All | All | --- | --- | --- | --- | --- | --- | --- | ≥10GΩ or RxC ≥500Ω-F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="8">Exception Items</th> <th rowspan="2">I.R.</th> </tr> <tr> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td>50V</td> <td>0603</td> <td>≥1.00μF</td> <td>0805</td> <td>≥1.00μF</td> <td>1206</td> <td>≥4.7μF</td> <td>1210</td> <td>≥4.7μF</td> <td rowspan="10">≥1GΩ or RxC ≥100Ω-F whichever is smaller.</td> </tr> <tr> <td>35V</td> <td>0805</td> <td>≥2.20μF</td> <td>1210</td> <td>≥10.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">25V</td> <td>0402</td> <td>≥1.00μF</td> <td>0603</td> <td>≥2.20μF</td> <td>0805</td> <td>≥2.20μF</td> <td>1206</td> <td>≥10.0μF</td> </tr> <tr> <td>1210</td> <td>≥10.0μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">16V</td> <td>0201</td> <td>≥0.10μF</td> <td>0402</td> <td>≥0.22μF</td> <td>0603</td> <td>≥1.00μF</td> <td>0805</td> <td>≥2.20μF</td> </tr> <tr> <td>1206</td> <td>≥10.0μF</td> <td>1210</td> <td>≥47.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">10V</td> <td>0201</td> <td>≥0.047μF</td> <td>0402</td> <td>≥0.47μF</td> <td>0603</td> <td>≥0.47μF</td> <td>0603</td> <td>≥2.20μF</td> </tr> <tr> <td>1206</td> <td>≥4.70μF</td> <td>1210</td> <td>≥4.70μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>6.3V</td> <td>---</td> <td>---</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4V</td> <td>---</td> <td>---</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | Rated vol. | Exception Items | | | | | | | | I.R. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | 50V | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥4.7μF | 1210 | ≥4.7μF | ≥1GΩ or RxC ≥100Ω-F whichever is smaller. | 35V | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | | | 25V | 0402 | ≥1.00μF | 0603 | ≥2.20μF | 0805 | ≥2.20μF | 1206 | ≥10.0μF | 1210 | ≥10.0μF | | | | | | | 16V | 0201 | ≥0.10μF | 0402 | ≥0.22μF | 0603 | ≥1.00μF | 0805 | ≥2.20μF | 1206 | ≥10.0μF | 1210 | ≥47.0μF | | | | | 10V | 0201 | ≥0.047μF | 0402 | ≥0.47μF | 0603 | ≥0.47μF | 0603 | ≥2.20μF | 1206 | ≥4.70μF | 1210 | ≥4.70μF | | | | | 6.3V | --- | --- | | | | | | | 4V | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Exception Items | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50V | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥4.7μF | 1210 | ≥4.7μF | ≥1GΩ or RxC ≥100Ω-F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | 0402 | ≥1.00μF | 0603 | ≥2.20μF | 0805 | ≥2.20μF | 1206 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | 0201 | ≥0.10μF | 0402 | ≥0.22μF | 0603 | ≥1.00μF | 0805 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1206 | ≥10.0μF | 1210 | ≥47.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | 0201 | ≥0.047μF | 0402 | ≥0.47μF | 0603 | ≥0.47μF | 0603 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1206 | ≥4.70μF | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16. | ESD AEC-Q200-002 | Per AEC-Q200-002 | * No remarkable damage. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | * Cap change : within the specified tolerance. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | * D.F. value: X7R: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="2">Standard</th> <th colspan="8">Exception Items</th> </tr> <tr> <th>D.F.</th> <th></th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td rowspan="3">≥50V</td> <td rowspan="3">≤2.5%</td> <td>≤3%</td> <td>0201</td> <td>All</td> <td>0603</td> <td>≥0.047μF</td> <td>0805</td> <td>≥0.18μF</td> <td>1206</td> <td>≥0.47μF</td> </tr> <tr> <td>≤5%</td> <td>1210</td> <td>≥4.70μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤10%</td> <td>0402</td> <td>≥0.10μF</td> <td>0603</td> <td>≥1.00μF</td> <td>0805</td> <td>≥1.00μF</td> <td>1206</td> <td>≥2.20μF</td> </tr> <tr> <td rowspan="3">35V</td> <td rowspan="3">≤3.5%</td> <td>≤10%</td> <td>0603</td> <td>≥1.00μF</td> <td>0805</td> <td>≥2.20μF</td> <td>1210</td> <td>≥10.0μF</td> <td></td> <td></td> </tr> <tr> <td>≤5%</td> <td>0201</td> <td>≥0.01μF</td> <td>0805</td> <td>≥1.00μF</td> <td>1210</td> <td>≥10.0μF</td> <td></td> <td></td> </tr> <tr> <td>≤7%</td> <td>0603</td> <td>≥0.33μF</td> <td>1206</td> <td>≥4.70μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">≤3.5%</td> <td>≤10%</td> <td>0402</td> <td>≥0.10μF</td> <td>0603</td> <td>≥0.47μF</td> <td>0805</td> <td>≥2.20μF</td> <td>1206</td> <td>≥6.80μF</td> </tr> <tr> <td></td> <td>1210</td> <td>≥22.0μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤5%</td> <td>0201</td> <td>≥0.01μF</td> <td>0402</td> <td>≥0.033μF</td> <td>0603</td> <td>≥0.15μF</td> <td>0805</td> <td>≥0.68μF</td> </tr> <tr> <td rowspan="3">16V</td> <td rowspan="3">≤3.5%</td> <td>≤10%</td> <td>1206</td> <td>≥2.20μF</td> <td>1210</td> <td>≥4.70μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤10%</td> <td>0201</td> <td>≥0.10μF</td> <td>0402</td> <td>≥0.22μF</td> <td>0603</td> <td>≥0.68μF</td> <td>0805</td> <td>≥2.20μF</td> </tr> <tr> <td>≤10%</td> <td>1206</td> <td>≥4.70μF</td> <td>1210</td> <td>≥22.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">10V</td> <td rowspan="3">≤5.0%</td> <td>≤10%</td> <td>0201</td> <td>≥0.012μF</td> <td>0402</td> <td>≥0.33μF</td> <td>0603</td> <td>≥0.33μF</td> <td>0805</td> <td>≥2.20μF</td> </tr> <tr> <td>≤15%</td> <td>1206</td> <td>≥2.20μF</td> <td>1210</td> <td>≥22.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤15%</td> <td>0201</td> <td>≥0.10μF</td> <td>0402</td> <td>≥1.00μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">6.3V</td> <td rowspan="3">≤10%</td> <td>≤15%</td> <td>0201</td> <td>≥0.10μF</td> <td>0402</td> <td>≥1.00μF</td> <td>0603</td> <td>≥10.0μF</td> <td>0805</td> <td>≥4.70μF</td> </tr> <tr> <td>≤20%</td> <td>1206</td> <td>≥4.70μF</td> <td>1210</td> <td>≥100μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>≤20%</td> <td>0402</td> <td>≥2.20μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">4V</td> <td rowspan="3">≤15%</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | Rated vol. | Standard | | Exception Items | | | | | | | | D.F. | | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | ≥50V | ≤2.5% | ≤3% | 0201 | All | 0603 | ≥0.047μF | 0805 | ≥0.18μF | 1206 | ≥0.47μF | ≤5% | 1210 | ≥4.70μF | | | | | | | ≤10% | 0402 | ≥0.10μF | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥2.20μF | 35V | ≤3.5% | ≤10% | 0603 | ≥1.00μF | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | ≤5% | 0201 | ≥0.01μF | 0805 | ≥1.00μF | 1210 | ≥10.0μF | | | ≤7% | 0603 | ≥0.33μF | 1206 | ≥4.70μF | | | | | 25V | ≤3.5% | ≤10% | 0402 | ≥0.10μF | 0603 | ≥0.47μF | 0805 | ≥2.20μF | 1206 | ≥6.80μF | | 1210 | ≥22.0μF | | | | | | | ≤5% | 0201 | ≥0.01μF | 0402 | ≥0.033μF | 0603 | ≥0.15μF | 0805 | ≥0.68μF | 16V | ≤3.5% | ≤10% | 1206 | ≥2.20μF | 1210 | ≥4.70μF | | | | | ≤10% | 0201 | ≥0.10μF | 0402 | ≥0.22μF | 0603 | ≥0.68μF | 0805 | ≥2.20μF | ≤10% | 1206 | ≥4.70μF | 1210 | ≥22.0μF | | | | | 10V | ≤5.0% | ≤10% | 0201 | ≥0.012μF | 0402 | ≥0.33μF | 0603 | ≥0.33μF | 0805 | ≥2.20μF | ≤15% | 1206 | ≥2.20μF | 1210 | ≥22.0μF | | | | | ≤15% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | | | | | 6.3V | ≤10% | ≤15% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | 0603 | ≥10.0μF | 0805 | ≥4.70μF | ≤20% | 1206 | ≥4.70μF | 1210 | ≥100μF | | | | | ≤20% | 0402 | ≥2.20μF | | | | | | | 4V | ≤15% | --- | --- | --- | --- | | | | | --- | --- | --- | --- | | | | | --- | --- | --- | --- | | | | | |
| | | Rated vol. | Standard | | Exception Items | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | D.F. | | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≥50V | ≤2.5% | ≤3% | 0201 | All | 0603 | ≥0.047μF | 0805 | ≥0.18μF | 1206 | ≥0.47μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | ≤5% | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | ≤10% | 0402 | ≥0.10μF | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 35V | ≤3.5% | ≤10% | 0603 | ≥1.00μF | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≤5% | 0201 | | | ≥0.01μF | 0805 | ≥1.00μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≤7% | 0603 | | | ≥0.33μF | 1206 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | ≤3.5% | ≤10% | 0402 | ≥0.10μF | 0603 | ≥0.47μF | 0805 | ≥2.20μF | 1206 | ≥6.80μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤5% | 0201 | ≥0.01μF | 0402 | ≥0.033μF | 0603 | ≥0.15μF | 0805 | ≥0.68μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | ≤3.5% | ≤10% | 1206 | ≥2.20μF | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 0201 | ≥0.10μF | 0402 | ≥0.22μF | 0603 | ≥0.68μF | 0805 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤10% | 1206 | ≥4.70μF | 1210 | ≥22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 6.3V | ≤10% | ≤15% | 0201 | ≥0.10μF | 0402 | ≥1.00μF | 0603 | ≥10.0μF | 0805 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 1206 | ≥4.70μF | 1210 | ≥100μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤20% | 0402 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | ≤15% | --- | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | * I.R.: Class2 (X7R) : | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="8">Standard</th> <th rowspan="2">I.R.</th> </tr> <tr> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>All</td> <td>All</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>≥10GΩ or RxC ≥500Ω-F whichever is smaller.</td> </tr> </tbody> </table> | Rated vol. | Standard | | | | | | | | I.R. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | All | All | All | --- | --- | --- | --- | --- | --- | --- | ≥10GΩ or RxC ≥500Ω-F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Standard | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| All | All | All | --- | --- | --- | --- | --- | --- | --- | ≥10GΩ or RxC ≥500Ω-F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="8">Exception Items</th> <th rowspan="2">I.R.</th> </tr> <tr> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td>50V</td> <td>0603</td> <td>≥1.00μF</td> <td>0805</td> <td>≥1.00μF</td> <td>1206</td> <td>≥4.7μF</td> <td>1210</td> <td>≥4.7μF</td> <td rowspan="10">≥10GΩ or RxC ≥100Ω-F whichever is smaller.</td> </tr> <tr> <td>35V</td> <td>0805</td> <td>≥2.20μF</td> <td>1210</td> <td>≥10.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">25V</td> <td>0402</td> <td>≥1.00μF</td> <td>0603</td> <td>≥2.20μF</td> <td>0805</td> <td>≥2.20μF</td> <td>1206</td> <td>≥10.0μF</td> </tr> <tr> <td>1210</td> <td>≥10.0μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">16V</td> <td>0201</td> <td>≥0.10μF</td> <td>0402</td> <td>≥0.22μF</td> <td>0603</td> <td>≥1.00μF</td> <td>0805</td> <td>≥2.20μF</td> </tr> <tr> <td>1206</td> <td>≥10.0μF</td> <td>1210</td> <td>≥47.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">10V</td> <td>0201</td> <td>≥0.047μF</td> <td>0402</td> <td>≥0.47μF</td> <td>0603</td> <td>≥0.47μF</td> <td>0603</td> <td>≥2.20μF</td> </tr> <tr> <td>1206</td> <td>≥4.70μF</td> <td>1210</td> <td>≥4.70μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>6.3V</td> <td>---</td> <td>---</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4V</td> <td>---</td> <td>---</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | Rated vol. | Exception Items | | | | | | | | I.R. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | 50V | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥4.7μF | 1210 | ≥4.7μF | ≥10GΩ or RxC ≥100Ω-F whichever is smaller. | 35V | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | | | 25V | 0402 | ≥1.00μF | 0603 | ≥2.20μF | 0805 | ≥2.20μF | 1206 | ≥10.0μF | 1210 | ≥10.0μF | | | | | | | 16V | 0201 | ≥0.10μF | 0402 | ≥0.22μF | 0603 | ≥1.00μF | 0805 | ≥2.20μF | 1206 | ≥10.0μF | 1210 | ≥47.0μF | | | | | 10V | 0201 | ≥0.047μF | 0402 | ≥0.47μF | 0603 | ≥0.47μF | 0603 | ≥2.20μF | 1206 | ≥4.70μF | 1210 | ≥4.70μF | | | | | 6.3V | --- | --- | | | | | | | 4V | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Exception Items | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50V | 0603 | ≥1.00μF | 0805 | ≥1.00μF | 1206 | ≥4.7μF | 1210 | ≥4.7μF | ≥10GΩ or RxC ≥100Ω-F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | 0805 | ≥2.20μF | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | 0402 | ≥1.00μF | 0603 | ≥2.20μF | 0805 | ≥2.20μF | 1206 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1210 | ≥10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | 0201 | ≥0.10μF | 0402 | ≥0.22μF | 0603 | ≥1.00μF | 0805 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1206 | ≥10.0μF | 1210 | ≥47.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | 0201 | ≥0.047μF | 0402 | ≥0.47μF | 0603 | ≥0.47μF | 0603 | ≥2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1206 | ≥4.70μF | 1210 | ≥4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

8. RELIABILITY TEST CONDITIONS AND REQUIREMENTS

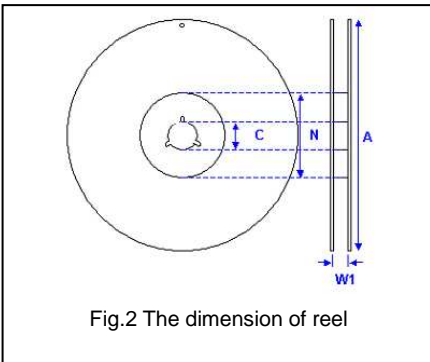
| No. | AEC-Q200 Test Item | AEC-Q200 Test Condition | Requirements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|--|--|--|-------------|----------|-------------|-----------------|-------------|---|--|------|----------|--|--|------|------|------|-------------|------|-------------|------|-------------|------|-------------|-------|--------|------|------|-----|------|-----------|------|----------|------|----------|------|------|----------|------|----------|------|----------|------|----------|-------|------|----------|------|----------|-----|--------|-------|------|----------|------|----------|------|----------|--|--|------|------|----------|------|----------|------|----------|--|--|------|------|----------|------|----------|--|--|--|--|-----|--------|-------|------|----------|------|----------|------|----------|------|----------|------|----------|--|--|--|--|------|----------|------|-----------|------|----------|------|----------|-----|--------|-------|------|----------|------|----------|--|--|--|--|------|----------|------|----------|------|----------|------|----------|------|----------|------|----------|--|--|--|--|-----|--------|-------|------|-----------|------|----------|------|----------|------|----------|------|----------|------|----------|--|--|--|--|------|----------|------|----------|--|--|--|--|------|-------|-------|------|----------|------|----------|------|----------|------|----------|------|----------|------|---------|--|--|--|--|------|----------|--|--|--|--|--|--|----|-------|-----|-----|-----|-----|-----|-----|-----|-----|------------|----------|--|--|--|--|--|--|--|------|------|-------------|------|-------------|------|-------------|------|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|------------|-----------------|--|--|--|--|--|--|--|------|------|-------------|------|-------------|------|-------------|------|-------------|-----|------|----------|------|----------|------|---------|------|---------|---|-----|------|----------|------|----------|--|--|--|--|-----|------|----------|------|----------|------|----------|------|----------|------|----------|--|--|--|--|--|--|-----|------|----------|------|----------|------|----------|------|----------|------|----------|------|----------|--|--|--|--|-----|------|-----------|------|----------|------|----------|------|----------|------|----------|------|----------|--|--|--|--|------|-----|-----|--|--|--|--|--|--|----|-----|-----|--|--|--|--|--|--|
| 17. | Solderability J-STD-002 | * Condition A Un-mounted chips 4hrs / 155°C*dry then completely immersed for 5±0.5 sec in solder bath at 245±5°C. * Condition B Un-mounted chips steam 8 hrs then completely immersed for 10±1sec in solder bath at 220+5/-0°C. * Condition C Un-mounted chips steam 8 hrs then completely immersed for 10±1 sec. in solder bath at 260+0/-5°C. | All terminations shall exhibit a continuous solder coating free from Defects from a minimum of 95% of the critical surface area of any individual termination. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18. | Board Flex AEC-Q200-005 | * The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1 mm per second until the deflection becomes 2mm and then the pressure shall be maintained for 5±1 sec. * Measurement to be made after keeping at room temp. for 24±2 hrs. | * No remarkable damage. * Cap change : $\leq \pm 12.5\%$ (This capacitance change means the change of capacitance under flexure of substrate from the capacitance measured before the last.) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19. | Terminal Strength AEC-Q200-006 | * Pressurizing force : Size < 0603: >2N ; Size \geq 0603: >10N * Test time: 60±1 sec. | * No remarkable damage. * Cap change : within the specified tolerance. * D.F. value: X7R: <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Rated vol.</th> <th colspan="2">Standard</th> <th colspan="8">Exception Items</th> </tr> <tr> <th>D.F.</th> <th>D.F.</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> <th>Size</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td rowspan="3">≥ 50V</td> <td rowspan="3">≤ 2.5%</td> <td>≤ 3%</td> <td>0201</td> <td>All</td> <td>0603</td> <td>≥ 0.047μF</td> <td>0805</td> <td>≥ 0.18μF</td> <td>1206</td> <td>≥ 0.47μF</td> </tr> <tr> <td>≤ 5%</td> <td>1210</td> <td>≥ 4.70μF</td> <td rowspan="2">0603</td> <td rowspan="2">≥ 1.00μF</td> <td rowspan="2">0805</td> <td rowspan="2">≥ 1.00μF</td> <td rowspan="2">1206</td> <td rowspan="2">≥ 2.20μF</td> </tr> <tr> <td>≤ 10%</td> <td>0402</td> <td>≥ 0.10μF</td> <td>1210</td> <td>≥ 10.0μF</td> </tr> <tr> <td rowspan="3">35V</td> <td rowspan="3">≤ 3.5%</td> <td>≤ 10%</td> <td>0603</td> <td>≥ 1.00μF</td> <td>0805</td> <td>≥ 2.20μF</td> <td>1210</td> <td>≥ 10.0μF</td> <td></td> <td></td> </tr> <tr> <td>≤ 5%</td> <td>0201</td> <td>≥ 0.01μF</td> <td>0805</td> <td>≥ 1.00μF</td> <td>1210</td> <td>≥ 10.0μF</td> <td></td> <td></td> </tr> <tr> <td>≤ 7%</td> <td>0603</td> <td>≥ 0.33μF</td> <td>1206</td> <td>≥ 4.70μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">≤ 3.5%</td> <td rowspan="3">≤ 10%</td> <td>0402</td> <td>≥ 0.10μF</td> <td>0603</td> <td>≥ 0.47μF</td> <td>0805</td> <td>≥ 2.20μF</td> <td>1206</td> <td>≥ 6.80μF</td> </tr> <tr> <td>1210</td> <td>≥ 22.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>0201</td> <td>≥ 0.01μF</td> <td>0402</td> <td>≥ 0.033μF</td> <td>0603</td> <td>≥ 0.15μF</td> <td>0805</td> <td>≥ 0.68μF</td> </tr> <tr> <td rowspan="3">16V</td> <td rowspan="3">≤ 3.5%</td> <td rowspan="3">≤ 10%</td> <td>1206</td> <td>≥ 2.20μF</td> <td>1210</td> <td>≥ 4.70μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>0201</td> <td>≥ 0.10μF</td> <td>0402</td> <td>≥ 0.22μF</td> <td>0603</td> <td>≥ 0.68μF</td> <td>0805</td> <td>≥ 2.20μF</td> </tr> <tr> <td>1206</td> <td>≥ 4.70μF</td> <td>1210</td> <td>≥ 22.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">10V</td> <td rowspan="3">≤ 5.0%</td> <td rowspan="3">≤ 10%</td> <td>0201</td> <td>≥ 0.012μF</td> <td>0402</td> <td>≥ 0.33μF</td> <td>0603</td> <td>≥ 0.33μF</td> <td>0805</td> <td>≥ 2.20μF</td> </tr> <tr> <td>1206</td> <td>≥ 2.20μF</td> <td>1210</td> <td>≥ 22.0μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>0201</td> <td>≥ 0.10μF</td> <td>0402</td> <td>≥ 1.00μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">6.3V</td> <td rowspan="3">≤ 10%</td> <td rowspan="3">≤ 15%</td> <td>0201</td> <td>≥ 0.10μF</td> <td>0402</td> <td>≥ 1.00μF</td> <td>0603</td> <td>≥ 10.0μF</td> <td>0805</td> <td>≥ 4.70μF</td> </tr> <tr> <td>1206</td> <td>≥ 47.0μF</td> <td>1210</td> <td>≥ 100μF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>0402</td> <td>≥ 2.20μF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4V</td> <td>≤ 15%</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> </tr> </tbody> </table> * I.R.: Class2 (X7R) : <table border="1" style="width: 100%; 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| | D.F. | D.F. | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥ 50V | ≤ 2.5% | ≤ 3% | 0201 | All | 0603 | ≥ 0.047μF | 0805 | ≥ 0.18μF | 1206 | ≥ 0.47μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤ 5% | 1210 | ≥ 4.70μF | 0603 | ≥ 1.00μF | 0805 | ≥ 1.00μF | 1206 | ≥ 2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤ 10% | 0402 | ≥ 0.10μF | | | | | | | 1210 | ≥ 10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | ≤ 3.5% | ≤ 10% | 0603 | ≥ 1.00μF | 0805 | ≥ 2.20μF | 1210 | ≥ 10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤ 5% | 0201 | ≥ 0.01μF | 0805 | ≥ 1.00μF | 1210 | ≥ 10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤ 7% | 0603 | ≥ 0.33μF | 1206 | ≥ 4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | ≤ 3.5% | ≤ 10% | 0402 | ≥ 0.10μF | 0603 | ≥ 0.47μF | 0805 | ≥ 2.20μF | 1206 | ≥ 6.80μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1210 | ≥ 22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 0201 | ≥ 0.01μF | 0402 | ≥ 0.033μF | 0603 | ≥ 0.15μF | 0805 | ≥ 0.68μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | ≤ 3.5% | ≤ 10% | 1206 | ≥ 2.20μF | 1210 | ≥ 4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 0201 | ≥ 0.10μF | 0402 | ≥ 0.22μF | 0603 | ≥ 0.68μF | 0805 | ≥ 2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1206 | ≥ 4.70μF | 1210 | ≥ 22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | ≤ 5.0% | ≤ 10% | 0201 | ≥ 0.012μF | 0402 | ≥ 0.33μF | 0603 | ≥ 0.33μF | 0805 | ≥ 2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1206 | ≥ 2.20μF | 1210 | ≥ 22.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 0201 | ≥ 0.10μF | 0402 | ≥ 1.00μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | ≤ 10% | ≤ 15% | 0201 | ≥ 0.10μF | 0402 | ≥ 1.00μF | 0603 | ≥ 10.0μF | 0805 | ≥ 4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1206 | ≥ 47.0μF | 1210 | ≥ 100μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 0402 | ≥ 2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | ≤ 15% | --- | --- | --- | --- | --- | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Standard | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| All | All | All | --- | --- | --- | --- | --- | --- | --- | ≥ 10GΩ or RxC ≥ 500Ω·F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated vol. | Exception Items | | | | | | | | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Size | Capacitance | Size | Capacitance | Size | Capacitance | Size | Capacitance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50V | 0603 | ≥ 1.00μF | 0805 | ≥ 1.00μF | 1206 | ≥ 4.7μF | 1210 | ≥ 4.7μF | ≥ 10GΩ or RxC ≥ 1000Ω·F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V | 0805 | ≥ 2.20μF | 1210 | ≥ 10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V | 0402 | ≥ 1.00μF | 0603 | ≥ 2.20μF | 0805 | ≥ 2.20μF | 1206 | ≥ 10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1210 | ≥ 10.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V | 0201 | ≥ 0.10μF | 0402 | ≥ 0.22μF | 0603 | ≥ 1.00μF | 0805 | ≥ 2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1206 | ≥ 10.0μF | 1210 | ≥ 47.0μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V | 0201 | ≥ 0.047μF | 0402 | ≥ 0.47μF | 0603 | ≥ 0.47μF | 0603 | ≥ 2.20μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1206 | ≥ 4.70μF | 1210 | ≥ 4.70μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.3V | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4V | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20. | Beam Load Test AEC-Q200-003 | * Break strength test * Beam speed: 2.5±0.25 mm/sec | The chip endure following force * Chip length \leq 2.5mm: Thickness >0.5mm (20N), \leq 0.5mm (8N) * Chip length \geq 3.2mm: Thickness \geq 1.25mm (54.5N), <1.25mm (15N) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

9. PACKAGING STYLE AND QUANTITY

| Size | Thickness (mm) | Paper tape | | Plastic tape | |
|-------------|-----------------|------------|----------|--------------|----------|
| | | 7" reel | 13" reel | 7" reel | 13" reel |
| 0402 (1005) | 0.50±0.05 | 10k | 50k | - | - |
| 0603 (1608) | 0.80±0.07 | 4k | 15k | - | - |
| | 0.80+0.15/-0.10 | 4k | 15k | - | - |
| 0805 (2012) | 0.60±0.10 | 4k | 15k | - | - |
| | 0.80±0.10 | 4k | 15k | - | - |
| | 1.25±0.10 | - | - | 3k | 10k |
| | 1.25±0.20 | - | - | 3k | 10k |
| 1206 (3216) | 0.80±0.10 | 4k | 15k | - | - |
| | 0.95±0.10 | - | - | 3k | 10k |
| | 1.15±0.15 | - | - | 3K | 10K |
| | 1.25±0.10 | - | - | 3k | 10k |
| | 1.60±0.20 | - | - | 2k | - |
| | 1.60+0.30/-0.10 | - | - | 2k | - |
| 1210 (3225) | 0.95±0.10 | - | - | 3k | 10k |
| | 1.25±0.10 | - | - | 3k | 10k |
| | 1.60±0.20 | - | - | 2k | - |
| | 2.00±0.20 | - | - | 2k | - |
| | 2.50±0.30 | - | - | 1k | - |
| 1808 (4520) | 1.25±0.10 | - | - | 2k | - |
| | 1.40±0.15 | - | - | 2k | - |
| | 1.60±0.20 | - | - | 2k | - |
| | 2.00±0.20 | - | - | 1k | - |
| 1812 (4532) | 1.25±0.10 | - | - | 1k | - |
| | 1.60±0.20 | - | - | 1k | - |
| | 2.00±0.20 | - | - | 1k | - |
| | 2.50±0.30 | - | - | 0.5k | - |

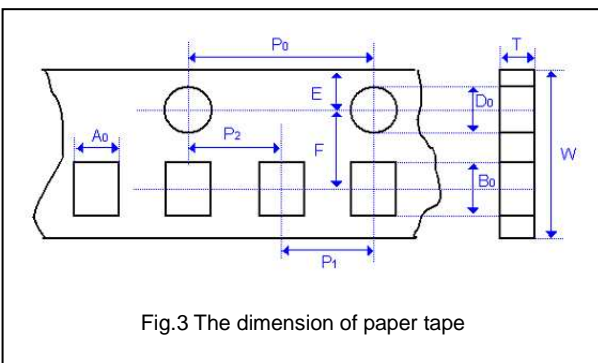
Unit: pieces

9-1 Reel DIMENSIONS

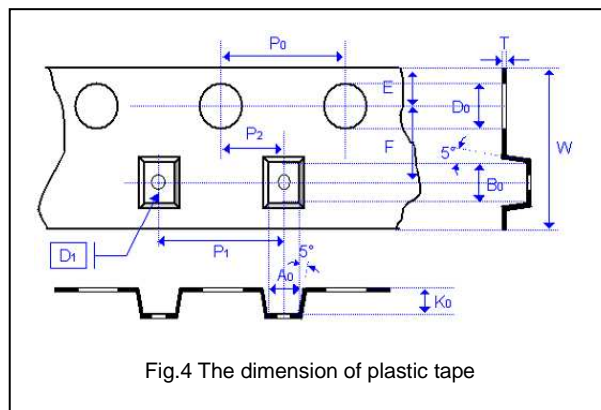


| Size Reel size | 0402, 0603, 0805, 1206, 1210 | | | 1808, 1812 |
|----------------------|------------------------------|---------------|---------------|---------------|
| | 7" | 10" | 13" | 7" |
| C | 13.0+0.5/-0.2 | 13.0+0.5/-0.2 | 13.0+0.5/-0.2 | 13.0+0.5/-0.2 |
| W₁ | 8.4+1.5/-0 | 8.4+1.5/-0 | 8.4+1.5/-0 | 12.4+2.0/-0 |
| A | 178.0±0.10 | 250.0±1.0 | 330.0±1.0 | 178.0±0.10 |
| N | 60.0±1.0/-0 | 100.0±1.0 | 100±1.0 | 80.0±1.0 |

9-1 CARDBOARD TAPE DIMENSIONS



9-2 EMBOSSED TAPE DIMENSIONS



9. PACKAGING STYLE AND QUANTITY

| Size | 0402 | 0603 | | 0805 | | 1206 | | |
|-------------------|------------|-----------------|-----------------|------------|------------------------|------------|------------------------|----------------------------|
| Chip Thickness | 0.50±0.05 | 0.80±0.07 | 0.80+0.15/-0.10 | 0.80±0.10 | 1.25±0.10 1.25±0.20 | 0.80±0.10 | 0.95±0.10 1.25±0.10 | 1.60±0.20 1.60+0.3/-0.1 |
| A ₀ | 0.62±0.05 | 1.00+0.05/-0.10 | 1.02+0.05/-0.10 | 1.50±0.10 | <1.65 | 2.00±0.10 | <2.00 | <2.00 |
| B ₀ | 1.12±0.05 | 1.80±0.10 | 1.80±0.10 | 2.30±0.10 | <2.40 | 3.50±0.10 | <3.60 | <3.70 |
| T | 0.60±0.05 | 0.95±0.05 | 0.97±0.05 | 0.95±0.05 | 0.23±0.05 | 0.95±0.05 | 0.23±0.05 | 0.23±0.05 |
| K ₀ | - | - | - | - | <2.50 | - | <2.50 | <2.50 |
| W | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 |
| P ₀ | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 |
| 10xP ₀ | 40.00±0.20 | 40.00±0.20 | 40.00±0.20 | 40.00±0.20 | 40.00±0.20 | 40.00±0.20 | 40.00±0.20 | 40.00±0.20 |
| P ₁ | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 |
| P ₂ | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 |
| D ₀ | 1.55±0.05 | 1.55±0.05 | 1.55±0.05 | 1.55±0.05 | 1.50±0.10/-0 | 1.55±0.05 | 1.50±0.10/-0 | 1.50±0.10/-0 |
| D ₁ | - | - | - | - | 1.00±0.10 | - | 1.00±0.10 | 1.00±0.10 |
| E | 1.75±0.05 | 1.75±0.05 | 1.75±0.05 | 1.75±0.05 | 1.75±0.10 | 1.75±0.10 | 1.75±0.10 | 1.75±0.10 |
| F | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 |

| Size | 1210 | | 1808 | | 1812 | |
|-------------------|-------------------------------------|--------------|------------------------|--------------|-------------------------------------|--------------|
| Chip Thickness | 0.95±0.10 1.25±0.10 1.60±0.20 | 2.50±0.30 | 1.25±0.10 1.60±0.20 | 2.00±0.20 | 1.25±0.10 1.60±0.20 2.00±0.20 | 2.50±0.30 |
| A ₀ | <3.05 | <3.10 | <2.50 | <2.50 | <3.90 | <3.90 |
| B ₀ | <3.80 | <4.00 | <5.30 | <5.30 | <5.30 | <5.30 |
| T | 0.23±0.05 | 0.23±0.05 | 0.25±0.05 | 0.25±0.05 | 0.25±0.05 | 0.25±0.05 |
| K ₀ | <2.50 | <3.50 | <2.50 | <2.50 | <2.50 | <3.00 |
| W | 8.00±0.10 | 8.00±0.10 | 12.0±0.20 | 12.0±0.20 | 12.0±0.20 | 12.0±0.20 |
| P ₀ | 4.00±0.100 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 |
| 10xP ₀ | 40.00±0.20 | 40.0±0.10 | 40.0±0.20 | 40.0±0.20 | 40.00±0.20 | 40.00±0.20 |
| P ₁ | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 8.00±0.10 | 8.00±0.10 |
| P ₂ | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 |
| D ₀ | 1.50±0.10/-0 | 1.50±0.10/-0 | 1.50±0.10/-0 | 1.50±0.10/-0 | 1.50±0.10/-0 | 1.50±0.10/-0 |
| D ₁ | 1.00±0.10 | 1.00±0.10 | 1.50±0.10 | 1.50±0.10 | 1.50±0.10 | 1.50+/-0.10 |
| E | 1.75±0.10 | 1.75±0.10 | 1.75±0.10 | 1.75±0.10 | 1.75±0.10 | 1.75+/-0.1 |
| F | 3.50±0.05 | 3.50±0.05 | 5.50±0.05 | 5.50±0.05 | 5.50±0.05 | 5.50+/-0.05 |

10.APPLICATION NOTES

STORAGE

To prevent the damage of solderability of terminations, the following storage conditions are recommended:
Indoors under 5 ~ 40°C and 20% ~ 70% RH.

No harmful gases containing sulfuric acid, ammonia, hydrogen sulfide or chlorine.

Packaging should not be opened until the capacitors are required for use. If opened, the pack should be re-sealed as soon as is practicable. Taped product should be stored out of direct sunlight, which might promote deterioration in tape or adhesion performance. The product is recommended to be used within 12 months after shipment and checked the solderability before use.

HANDLING

Chip capacitors are dense, hard, brittle, and abrasive materials. They are liable to suffer mechanical damage, in the form of cracks or chips. Chip Capacitors should be handled with care to avoid contamination or damage. To use vacuum or plastic tweezers to pick up or plastic tweezers is recommended for manual placement. Tape and reeled packages are suitable for automatic pick and placement machine.

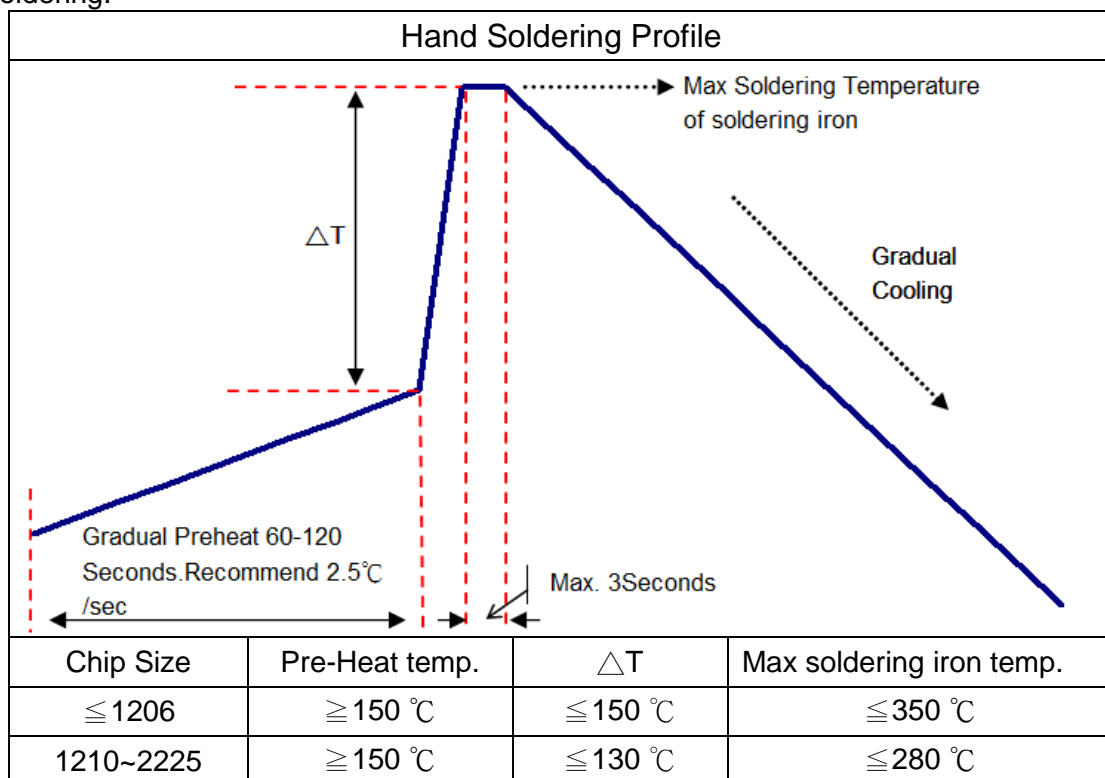
PREHEAT

In order to minimize the risk of thermal shock during soldering, a carefully controlled preheat is required. The rate of preheat should not exceed 3°C per second.

SOLDERING

Use middy activated rosin RA and RMA fluxes do not use activated flux. The amount of solder in each solder joint should be controlled to prevent the damage of chip capacitors caused by the stress between solder, chips, and substrate.

a.) Hand soldering:



*Soldering iron tip diameter $\leq 1.0\text{ mm}$ and wattage max. 20W.

*The Capacitors shall be pre-heated and that the temperature gradient between the devices and the tip of the soldering iron.

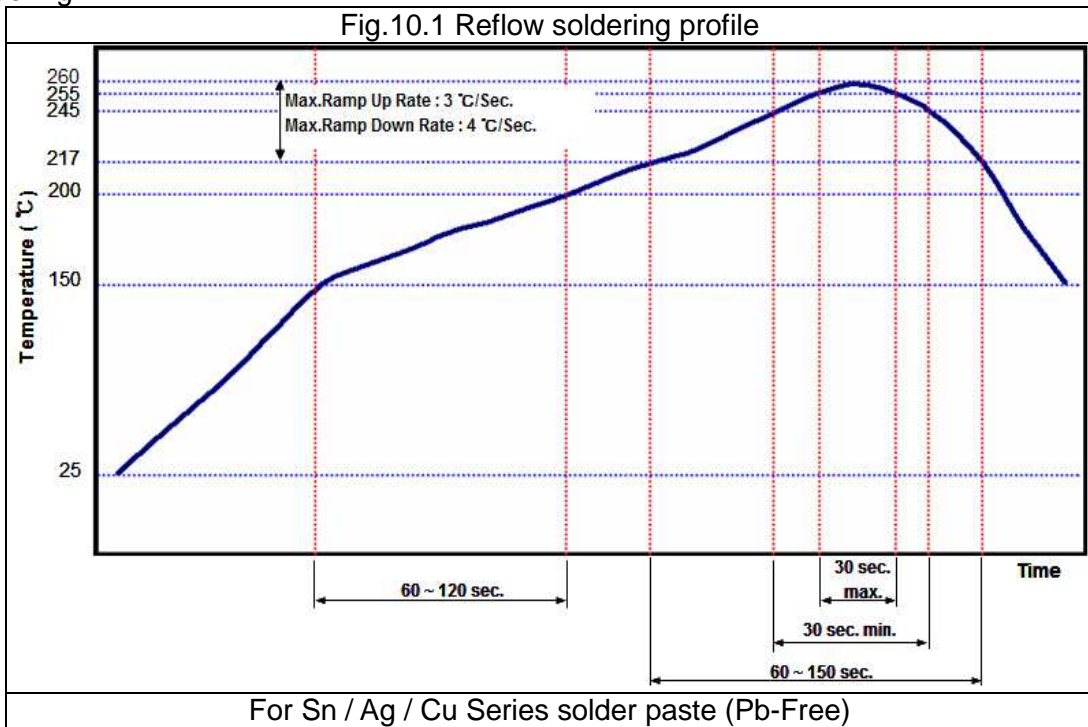
*The required amount of solder shall be melted on the soldering tip.

*The tip of iron should not contact the ceramic body directly.

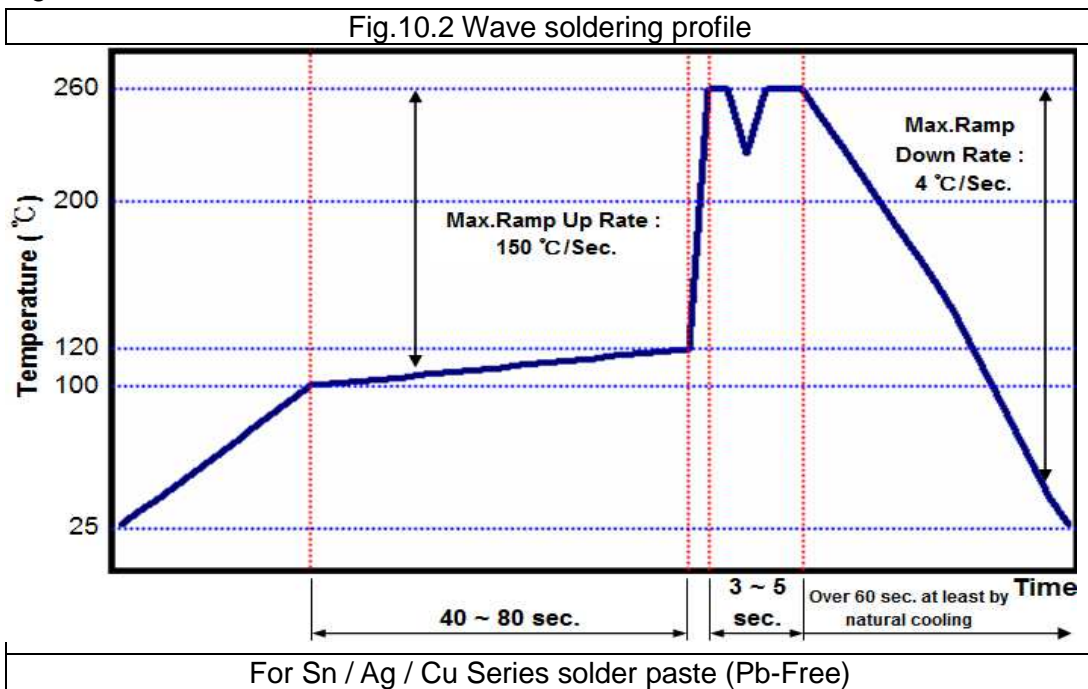
*The Capacitors shall be cooled gradually at room temperature after soldering.

*Forced air cooling is not allowed.

b.) Reflow soldering:



c.) Wave soldering:



Soldering conditions:

| Size Inch (mm) | Temper. Char. | Capacitance | Condition | |
|----------------|---------------|--------------|-----------|--------|
| | | | Wave | Reflow |
| 0402 (1005) | Class2 - X7R | All | X | ○ |
| 0603 (1608) | Class2 - X7R | Cap. < 2.2μF | ○ | ○ |
| | | Cap. ≥ 2.2μF | X | ○ |
| 0805 (2012) | Class2 - X7R | Cap. < 4.7μF | ○ | ○ |
| | | Cap. ≥ 4.7μF | X | ○ |
| 1206 (3216) | Class2 - X7R | Cap. < 4.7μF | ○ | ○ |
| | | Cap. ≥ 4.7μF | X | ○ |
| ≥ 1210 (3225) | Class2 - X7R | All | X | ○ |

Solder climbing:

Prosperity Dielectrics Co., Ltd.

No.220-1, Sec. 2, Nanshan Rd., Lujhu, Taoyuan 33860, Taiwan

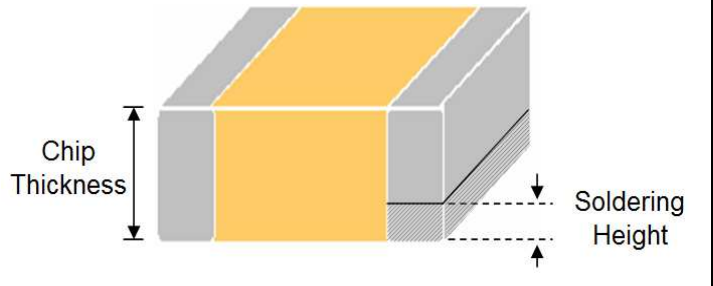
<http://www.pdc.com.tw>

ACS-1097 Rev04



PDC

The solder climbing minimum height is suggesting to 25% of chip thickness or 500um whichever is less.
(Reference from IPC-610E)



COOLING

After soldering, cool the chips and the substrate gradually to room temperature. Natural cooling in air is recommended to minimize stress in the solder joint.

CLEANING

All flux residues must be removed by using suitable electronic-grade vapor-cleaning solvents to eliminate contamination that could cause electrolytic surface corrosion. Good results can be obtained by using ultrasonic cleaning of the solvent. The choice of the proper system is depends upon many factors such as component mix, flux, and solder paste and assembly method. The ability of the cleaning system to remove flux residues and contamination from under the chips is very important.