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**SPECIFICATION FOR APPROVAL**

DATE :

CUSTOMER : \_\_\_\_\_

PART NAME : \_\_\_\_\_ Thin Film Precision Chip Resistor

CUSTOMER'S DWG. NO. : \_\_\_\_\_

CUSTOMER'S PART NO. : \_\_\_\_\_

PDC PART NO. : **FAF SERIES APPROVED** \_\_\_\_\_

DESCRIPTION. : \_\_\_\_\_

ACTION	"V"	CUSTOMER'S SIGNATURE	NOTE
RESULT			
FULL APPROVED			
CONDITIONAL APPROVED			
REJECTED			

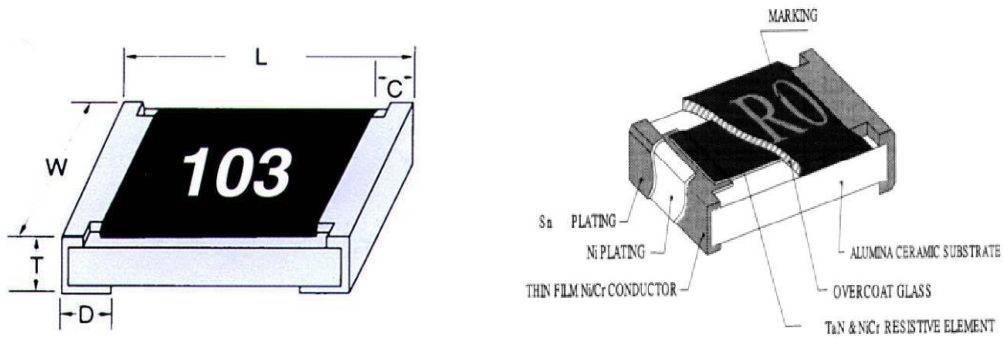
OUR ACTION	SIGNATURE
PREPARED By	<i>Jenny Tseng</i>
CHECKED By	<i>Tony Chou</i>
APPROVED By	<i>Byron Tsai</i>

CUSTOMER SIGNATURE FOR ACCEPTANCE

**\*Features**

Metal Thin Film TaN、Ni/Cr,...etc. Resistive element  
 Tolerance 1%, 0.5%, 0.25%, 0.1%, 0.05%, 0.01%  
 Compatible with both flow soldering and reflow soldering  
 Suitable for Lead Free soldering.  
 RoHS compliant & Halogen Free

**\*Configuration & Dimensions**

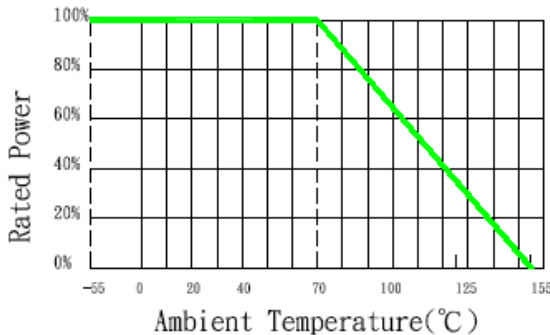


TYPE	L	W	C	D	T
0201	0.60 ± 0.03	0.30 ± 0.03	0.10 ± 0.05	0.15 ± 0.05	0.23 ± 0.03
0402	1.00 ± 0.05	0.50 ± 0.05	0.20 ± 0.10	0.25 ± 0.10	0.35 ± 0.05
0603	1.55 ± 0.10	0.80 ± 0.10	0.25 ± 0.15	0.30 ± 0.15	0.45 ± 0.15
0805	2.00 ± 0.10	1.25 ± 0.10	0.25 ± 0.20	0.40 ± 0.20	0.50 ± 0.15
1206	3.10 ± 0.10	1.60 ± 0.10	0.45 ± 0.20	0.45 ± 0.20	0.60 ± 0.15
1210	3.10 ± 0.10	2.60 ± 0.15	0.50 ± 0.20	0.50 ± 0.20	0.55 ± 0.10
2010	5.00 ± 0.10	2.50 ± 0.15	0.60 ± 0.20	0.50 ± 0.20	0.55 ± 0.10
2512	6.35 ± 0.10	3.20 ± 0.15	0.60 ± 0.20	0.50 ± 0.20	0.55 ± 0.10

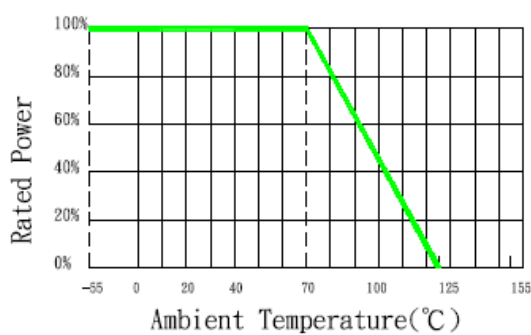
(unit: mm)

**\*Power Derating Curve**

2512, 2010, 1210, 1206, 0805, 0603, 0402



0201



For resistors operated in ambient temperatures above 70°C, power rating must be derated in accordance with the curve above.

R

# FAF SERIES

## Thin Film Lead Free Type

### High Precision Chip Resistors

#### \*Rating

##### Standard Type - General High Precision :

Standard Type	Power Rating @ 70°C	Max. RCWV (V)	Max. Overload Voltage (V)	Temperature Coefficient of Resistance (ppm/°C)	Resistance Tolerance (%)	Resistance Range		Standard Resistance Values
						Min.	Max.	
0201	1/32W	15	30	±25 ±50	±0.01 ±0.05 ±0.10 ±0.50 ±1.00	100Ω	12KΩ	E24 E96
0402	1/16W	50	100		±0.01	10Ω	255KΩ	
0603	1/16W	50	100		±0.02	3.9Ω	1MΩ	
0805	1/10W	100	200		±0.05	4.7Ω	2MΩ	
1206	1/8W	200	400		±0.10	1Ω	2.49MΩ	
1210	1/4W	200	400		±0.25	4.7Ω	2.49MΩ	
2010	1/2W	200	400		±0.50	4.7Ω	3MΩ	
2512	3/4W	200	400		±1.00	1Ω	3MΩ	

##### Function Type - Power High Precision :

Power Enhance Type*	Power Rating @ 70°C	Max. RCWV (V)	Max. Overload Voltage (V)	Temperature Coefficient of Resistance (ppm/°C)	Resistance Tolerance (%)	Resistance Range		Standard Resistance Values	
						Min.	Max.		
0201	1/20W	15	30	±25 ±50	±0.50 ±1.00	27Ω	12KΩ	E24 E96	
0201	1/20W	15	30		±50	±0.50 ±1.00	27Ω		22.1KΩ
0402	1/10W	50	100		±0.01	10Ω	255KΩ		
0603	1/10W	75	150		±0.02	3.9Ω	1MΩ		
0805	1/8W	150	300		±0.05	4.7Ω	2MΩ		
1206	1/4W	200	400		±0.10	1Ω	2.5MΩ		
1210	2/5W	200	400		±0.25	4.7Ω	2.5MΩ		
2010	3/4W	200	400		±0.50	4.7Ω	3MΩ		
2512	1W	200	400	±1.00	1Ω	3MΩ			

##### Function Type - Special TCR High Precision :

Narrow TCR Type*	Power Rating @ 70°C	Max. RCWV (V)	Max. Overload Voltage (V)	Temperature Coefficient of Resistance (ppm/°C)	Resistance Tolerance (%)	Resistance Range		Standard Resistance Values
						Min.	Max.	
0402	1/10W	50	100	±10 ±15	±0.01 ±0.02 ±0.05 ±0.10 ±0.25 ±0.50 ±1.00	10Ω	100KΩ	E24 E96
0603	1/10W	75	150			4.7Ω	200KΩ	
0805	1/8W	150	300			4.7Ω	400KΩ	
1206	1/4W	200	400			4.7Ω	500KΩ	
1210	2/5W	200	400			10Ω	600KΩ	
2010	3/4W	200	400			10Ω	1MΩ	
2512	1W	200	400			10Ω	1.5MΩ	

# FAF<sub>SERIES</sub>

## Thin Film Lead Free Type

### High Precision Chip Resistors

#### \*Rating

##### Function Type - Ultra TCR High Precision :

Narrow TCR Type*	Power Rating @ 70°C	Max. RCWV (V)	Max. Overload Voltage (V)	Temperature Coefficient of Resistance (ppm/°C)	Resistance Tolerance (%)	Resistance Range		Standard Resistance Values
						Min.	Max.	
0402	1/10W	50	100	±5	±0.01	10Ω	10KΩ	E24 E96
0603	1/10W	75	150		±0.02	4.7Ω	50KΩ	
0805	1/8W	150	300		±0.05	4.7Ω	100KΩ	
1206	1/4W	200	400		±0.10	4.7Ω	150KΩ	
1210	2/5W	200	400		±0.25	4.7Ω	150KΩ	
2010	3/4W	200	400		±0.50	4.7Ω	360KΩ	
2512	1W	200	400		±1.00	4.7Ω	600KΩ	
0402	1/10W	50	100	±3	±0.01	10Ω	8KΩ	E24 E96
0603	1/10W	75	150		±0.02	4.7Ω	40KΩ	
0805	1/8W	150	300		±0.05	4.7Ω	80KΩ	
1206	1/4W	200	400		±0.10	4.7Ω	120KΩ	
1210	2/5W	200	400		±0.25	4.7Ω	150KΩ	
2010	3/4W	200	400		±0.50	4.7Ω	360KΩ	
2512	1W	200	400		±1.00	4.7Ω	600KΩ	
0402	1/10W	50	100	±2	±0.01	10Ω	8KΩ	E24 E96
0603	1/10W	75	150		±0.02	4.7Ω	40KΩ	
0805	1/8W	150	300		±0.05	4.7Ω	80KΩ	
1206	1/4W	200	400		±0.10	4.7Ω	120KΩ	
1210	2/5W	200	400		±0.25	4.7Ω	150KΩ	
2010	3/4W	200	400		±0.50	4.7Ω	360KΩ	
2512	1W	200	400		±1.00	4.7Ω	600KΩ	

# FAF<sub>SERIES</sub>

## Thin Film Lead Free Type

### High Precision Chip Resistors

#### \*Part Number

Type	Size	Tolerance	Packing info	Power Code	Marking	TCR Code
FAF	□□	□	□	□	□□□□ □□□	□
Thin Film	01-0201 02-0402 03-0603 05-0805 06-1206 12-1210 20-2010 25-2512	T ±0.01% U ±0.02% A ±0.05% B ±0.10% C ±0.25% D ±0.50% F ±1.00%	0201~1210 : Paper tape: T - 5 Kpcs V - 10Kpcs U - 15Kpcs 2010/2512 : Plastic tape: P - 4Kpcs X - 8Kpcs	Standard type fill in : " - " * Function type fill in : T- 1/20W A- 1/16W B- 1/10W C- 1/8W D- 1/4W E- 1/3W R- 2/5W F- 1/2W G- 3/4W H- 1W	4-Digits 1R00=1Ω 3302=33KΩ 51R0=51Ω 0603 : 3-Digits 01C=1KΩ Refer to. Table 1.	B - 2 ppm C - 3 ppm W - 5 ppm V - 10 ppm S - 15 ppm Q - 25 ppm P - 50 ppm

EX. Standard type, 1206, ±1%, Paper 5Kpcs, 1/8W, 1KΩ, 25ppm.

**FAF06FT-1001Q**

EX. Narrow TCR type, 0603, ±0.1%, Paper 5Kpcs, 1/10W, 1KΩ, 10ppm.

**FAF03BTB01BV**

#### \*Resistance Marking

##### E - 24 SERIES



4 digit marking for 0805, 1206, 1210, 2010, 2512  
examples: 4702       $470 \times 10^2 = 47K\Omega$



3 digit marking for 0603  
examples: 473       $47 \times 10^3 = 47K\Omega$

##### E - 96 SERIES



4 digit marking for 0805, 1206, 1210, 2010, 2512  
examples: 4752       $475 \times 10^2 = 47.5K\Omega$

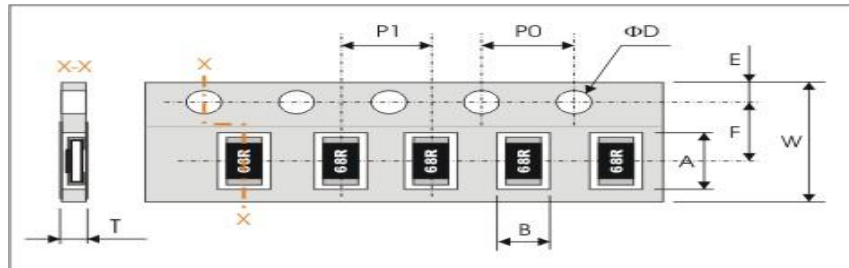


3 digit included two numbers and one letter for 0603  
examples: 02C       $102 \times 10^2 = 10.2K\Omega$

© No marking code for 0402、0201 size

**\*Tape And Reel Package**

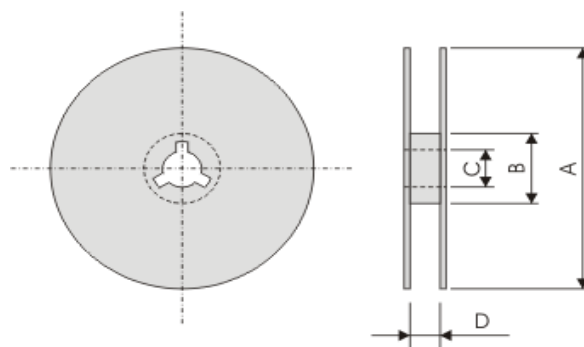
Paper Tape specifications (unit : mm)



Type	A	B	W	F	E	P1	P0	ØD	T
0201	0.37±0.05	0.45±0.03	8.00±0.30	3.50±0.05	1.75±0.10	2.00±0.10	4.00±0.10	Ø 1.50+0.10/-0	0.45±0.05
0402	1.20±0.10	0.7±0.10	8.00±0.30	3.50±0.05	1.75±0.10	2.00±0.10	4.00±0.10	Ø 1.50+0.10/-0	0.40±0.05
0603	1.90±0.20	1.10±0.20	8.00±0.30	3.50±0.20	1.75±0.10	4.00±0.10	4.00±0.10	Ø 1.50+0.10/-0	0.65±0.05
0805	2.40±0.20	1.65±0.20	8.00±0.30	3.50±0.20	1.75±0.10	4.00±0.10	4.00±0.10	Ø 1.50+0.10/-0	Max. 1.0
1206	3.60±0.20	2.00±0.20	8.00±0.30	3.50±0.20	1.75±0.10	4.00±0.10	4.00±0.10	Ø 1.50+0.10/-0	Max. 1.0
1210	3.60±0.20	3.00±0.20	8.00±0.30	3.50±0.20	1.75±0.10	4.00±0.10	4.00±0.10	Ø 1.50+0.10/-0	Max. 1.0
2010	5.50±0.20	2.80±0.20	12.0±0.30	5.50±0.10	1.75±0.10	4.00±0.10	4.00±0.10	Ø 1.50+0.10/-0	Max. 1.2
2512	6.90±0.20	3.60±0.20	12.0±0.30	5.50±0.10	1.75±0.10	4.00±0.10	4.00±0.10	Ø 1.50+0.10/-0	Max. 1.2

(unit: mm)

Reel dimensions



unit: mm

Symbol	A	B	C	D
0201 0402 0603 0805 1206 1210 2010 2512	178.0±2.0	60.0±0.10	13.0±0.2	9.0±0.5

**\*Specification And Test Methods**

ITEM	SPECIFICATION	TEST METHOD
DC Resistance	F: ± 1% , C:±0.25% , D: ±0.5% , B: ±0.1% , A: ±0.05%	<b>JIS C 5202 5.1 / IEC 60115-1 4.5</b> Measure the resistance value.
Short time Overload	F、C、D、B、A: $\Delta R \leq \pm(0.2\% + 0.05\Omega)$ 0201 > 1K $\Omega$ : $\Delta R \leq \pm(0.25\% + 0.05\Omega)$	<b>JIS C 5202 5.5 / IEC 60115-1 4.13</b> 2.5×Rated voltage or Max. Overload Voltage for 5 sec. measure resistance after 30 minutes (0201 2 sec.)
Solderability	Over 95% of termination must be covered with solder	<b>IEC 60115-1 / JIS C 5201-1 , Clause 4.17</b> After immersing flux, dip in the 245±2℃ molten solder bath for 3±0.5 sec
Resistance to Solder Heat	F、C、D、B、A: $\Delta R \leq \pm(0.1\% + 0.05\Omega)$	<b>JIS C 5202 6.4 / IEC 60115-1 4.18</b> With 260±5℃ for 10±1 sec.
Temperature Coefficient of Resistance (TCR)	TCR CODE : B... ± 2 ppm / °C C... ± 3 ppm / °C W... ± 5 ppm / °C V... ±10 ppm / °C S... ±15 ppm / °C Q... ±25 ppm / °C P... ±50 ppm / °C	<b>JIS C 5202 5.2 / IEC 60115-1 4.8.4.2</b> T1 T2 Test temperature: 25℃ → -55℃ 25C → 125C $TCR(ppm/C) = \frac{R2-R1}{R1} \times \frac{1}{T2-T1} \times 10^6$ T1: 25℃ T2: Test temperature R1: Resistance at reference temperature (T1) R2: Resistance at test temperature (T2)
Load Life Humidity	F、C、D、B、A: $\Delta R \leq \pm(0.5\% + 0.05\Omega)$ 0201 > 1K $\Omega$ : $\Delta R \leq \pm(1.0\% + 0.05\Omega)$	<b>JIS C 5202 7.9/ IEC 60115-1 4.24.2</b> Maintain the temperature of the resistor at 40±2℃ and 90~95% RH with the rated voltage applied. Cycle ON for 1.5 hours and OFF for 0.5 hour for 1000+48/-0 hours. After 1~4 hour, measure the resistance value.
Load Life	F、C、D、B、A: $\Delta R \leq \pm(0.5\% + 0.05\Omega)$ 0201 > 1K $\Omega$ : $\Delta R \leq \pm(1.0\% + 0.05\Omega)$	<b>JIS C 5202 7.10/ IEC 60115-1 4.25.1</b> Permanent resistance change after 1000+48/-0 hours (1.5 hours ON, 0.5 hour OFF) at RCWV or Max. Keep the resistor at 70±2℃ ambient
Temperature Cycle	F、C、D、B、A: $\Delta R \leq \pm(0.1\% + 0.05\Omega)$ 0201 > 1K $\Omega$ : $\Delta R \leq \pm(0.25\% + 0.05\Omega)$	<b>JIS C 5202 7.4 / IEC 60115-1 4.19</b> Repeat 5 cycles as follows -55℃ (30 min.)+25℃ (2-3 min.) +155℃ (30 min.)+25℃ (2-3 min.)
Bending Strength	F、C、D、B、A: $\Delta R \leq \pm(0.1\% + 0.05\Omega)$ 0201 > 1K $\Omega$ : $\Delta R \leq \pm(0.25\% + 0.05\Omega)$	<b>IEC 60115-1 4.33</b> Resistance change after bended 3mm on the 90mm PCB.

**\*Appendix.**

**0603 1% Marking Table (Table 1)**

Code	E48	E96	Code	E48	E96	Code	E48	E96	Code	E48	E96
01	100	100	25	178	178	49	316	316	73	562	562
02		102	26		182	50		324	74		576
03	105	105	27	187	187	51	332	332	75	590	590
04		107	28		191	52		340	76		604
05	110	110	29	196	196	53	348	348	77	619	619
06		113	30		200	54		357	78		634
07	115	115	31	205	205	55	365	365	79	649	649
08		118	32		210	56		374	80		665
09	121	121	33	215	215	57	383	383	81	681	681
10		124	34		221	58		392	82		698
11	127	127	35	226	226	59	402	402	83	715	715
12		130	36		232	60		412	84		732
13	133	133	37	237	237	61	422	422	85	750	750
14		137	38		243	62		432	86		768
15	140	140	39	249	249	63	442	442	87	787	787
16		143	40		255	64		453	88		806
17	147	147	41	261	261	65	464	464	89	825	825
18		150	42		267	66		475	90		845
19	154	154	43	274	274	67	487	487	91	866	866
20		158	44		280	68		499	92		887
21	162	162	45	287	287	69	511	511	93	909	909
22		165	46		294	70		523	94		931
23	169	169	47	301	301	71	536	536	95	953	953
24		174	48		309	72		549	96		976

Code	A	B	C	D	E	F	G	H	X	Y	Z
Multiplier	10 <sup>0</sup>	10 <sup>1</sup>	10 <sup>2</sup>	10 <sup>3</sup>	10 <sup>4</sup>	10 <sup>5</sup>	10 <sup>6</sup>	10 <sup>7</sup>	10 <sup>-1</sup>	10 <sup>-2</sup>	10 <sup>-3</sup>

**Standard resistance value**

<b>E3</b>	10				22				47								
<b>E6</b>	10		15		22		33		47		68						
<b>E12</b>	10	12	15	18	22	27	33	39	47	56	68	82					
<b>E24</b>	10	11	12	13	15	16	18	20	22	24	27	30	33	36	39	43	47
	51	56	62	68	75	82	91										
<b>E96</b>	100	102	105	107	110	113	115	118	121	124	127	130	133	137	140	143	147
	150	154	158	162	165	169	174	178	182	187	191	196	200	205	210	215	221
	226	232	237	243	249	255	261	267	274	280	287	294	301	309	316	324	332
	340	348	357	365	374	383	392	402	412	422	432	442	453	464	475	487	499
	511	523	536	549	562	576	590	604	619	634	649	665	681	698	715	732	750
	768	787	806	825	845	866	887	909	931	953	976						

All product specification and data are subject to change without notice