

信昌電子陶瓷股份有限公司
Prosperity Dielectrics Co., Ltd.

No.566-1, Gaoshi Rd., Lujhu, Yangmei Dist., Taoyuan City 32668, Taiwan, R.O.C.
Tel. : +886-3-4753355 Fax : +886-3-4854959

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

SPECIFICATION FOR APPROVAL

DATE :

CUSTOMER : _____

PART NAME : _____ Thick Film Wide Terminal High Power Chip Resistor

CUSTOMER'S DWG. NO. : _____

CUSTOMER'S PART NO. : _____

PDC PART NO. : **WPF 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

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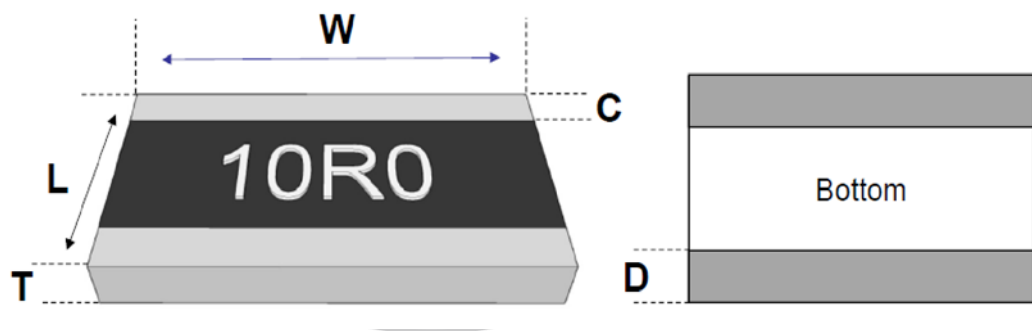
1. Features

- High power rating to 3W and compact size.
- High reliability and high precision (1%).
- Compatible with wave and reflow soldering.
- Suitable for lead free soldering.
- Meet AEC-Q200, RoHS compliant & Halogen Free.

2. Applications

- Power supply.
- Industry controller.
- Digital meter, Consumer electronics, M/B.
- LED Lighting.
- Automotive devices.

3. Dimension and Construction

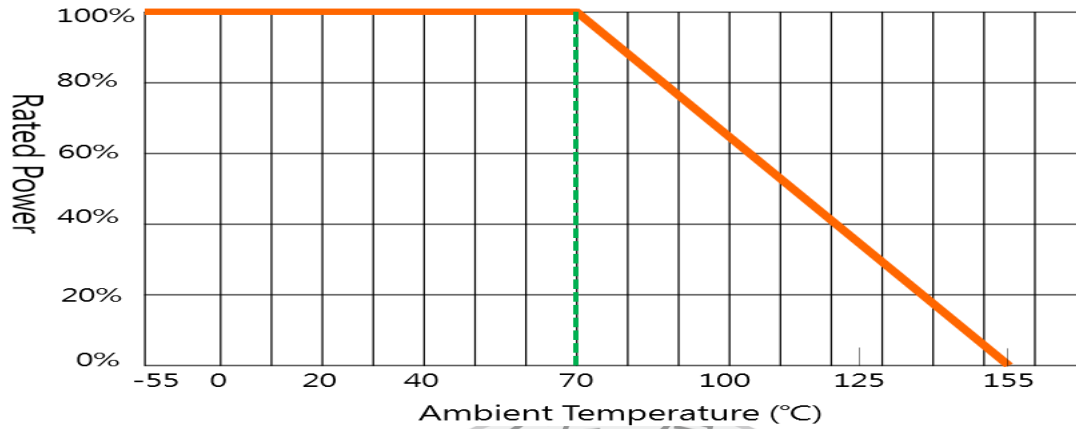


Unit : mm

Type	L	W	C	D	T
WPF06	1.60±0.20	3.20±0.20	0.25±0.20	0.40±0.20	0.60±0.15
WPF25	3.10±0.20	6.30±0.20	0.45±0.20	0.75±0.20	0.60±0.15

4. Power Derating Curve

Operating Temperature Range: -55 to +155°C



5. Rating

Type	Size	Power Rating at 70°C	Max. RCWV	Max. Overload Voltage	Resistance Tolerance	Temperature Coefficient 25~155°C (ppm/°C)	Resistance Range		Standard Resistance Values
							Min. (Ω)	Max. (Ω)	
WPF06	0612	1.5W	200V	400V	±1%(F)	±200	1	4.64	E96/E24
					±1%(F)	±100	4.7	1 M	E96/E24
					±5%(J)	±200	1	4.3	E24
					±5%(J)	±100	4.7	1 M	E24
WPF25	1225	3W	200V	400V	±1%(F)	±200	1	4.64	E96/E24
					±1%(F)	±100	4.7	1 M	E96/E24
					±5%(J)	±200	1	4.3	E24
					±5%(J)	±100	4.7	1 M	E24

Notes:

- (i) RCWV is the Rated Voltage, $V = \sqrt{P * R}$ or Max. Working Voltage whichever is lower
- (ii) E : Working Voltage(V) , P : Rated Power (W) , R : Resistance Value(Ω)
- (iii) Solder-pad and trace size influences should be evaluated, and board surface temperature should keep not exceed 105°C when working.
- (iv) TCR 25 ~ -55°C: Below 4.7 ohm is ±250ppm, ≥4.7 ohm is ±100ppm.

WPF series. (AEC-Q200) High Power Wide Side Termination Thick-film Lead Free Chip Resistors

6. Part Number

Type	Size	Tolerance	Packing	Watt	R Codes	TCR	Special Code
WPF	06 0612 25 1225	F ±1% J ±5%	Paper: 0612 T 5Kpcs Plastic:1225 P 4Kpcs	I 1.5W K 3W	XXXX XXX ±1% 4 digits ±5% 3 digits	L 200 N 100	M Meet AEC-Q200

Example :

WPF06FPK10R0NM

→0612 size, tolerance 1%, paper tape, 1.5W, 10Ω, 100ppm, AEC-Q200.

WPF25JPK101 NM

→1225 size, tolerance 5%, plastic tape, 3W, 100Ω, 100ppm, AEC-Q200.

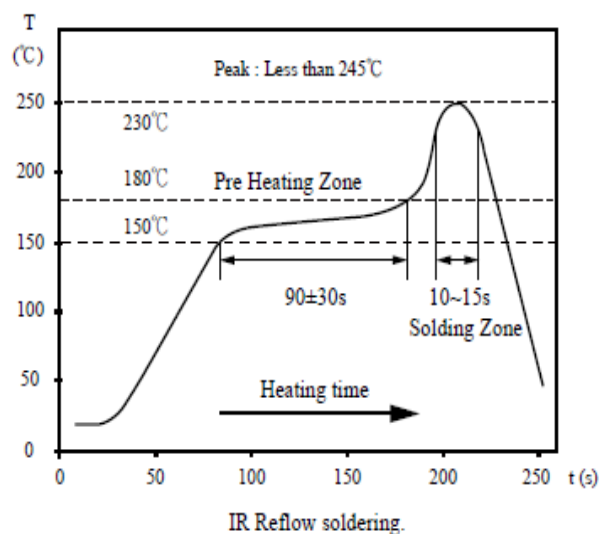
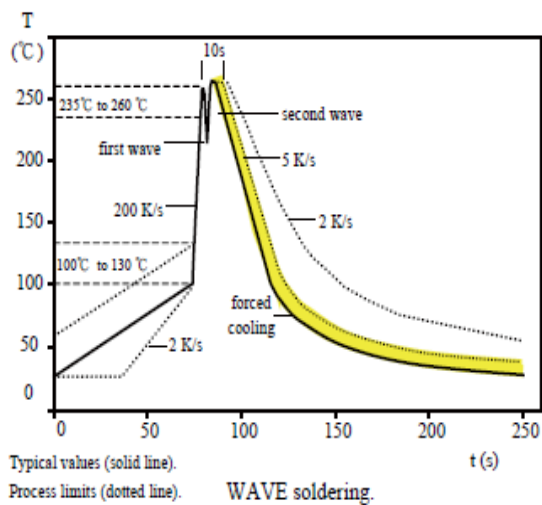
7. Marking/Soldering

Resistance value identify :

4 Digits marking to identify the resistance value

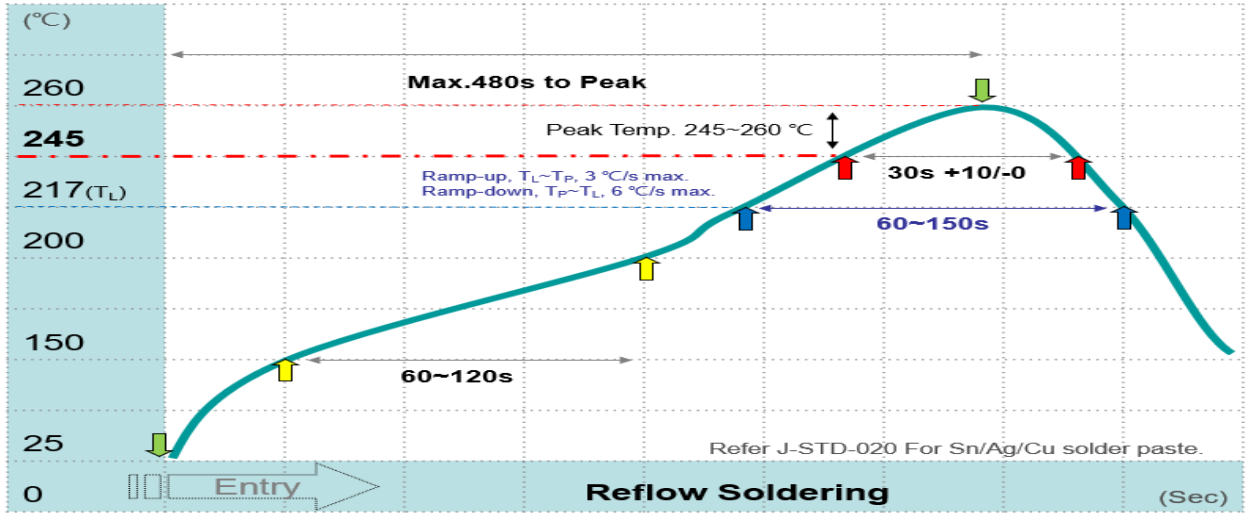
Example : **1000** → $100 \times 10^0 = 100\Omega$ **4R70** → $4.7 \times 10^0 = 4.7\Omega$

Soldering Reference : Compatible for most industrial soldering request.



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J-STD-020



Recommend Solder Pad Dimensions :

Product Size	W	D	L	Unit. mm
0612	3.50	1.00	2.60	
1225	6.80	2.00	5.50	

8. Reliability Performance

AEC-Q200 ¹	Specification ²	Refer Methods
Initial Limits (D.C. Resistance)	J : $\pm 5\%$ F : $\pm 1\%$	AEC-Q200 TABLE 7.1 IEC 60115-1 / JIS C 5201-1, Clause 4.5 Measure the resistance within specified tolerance.
High Temperature Exposure (storage)	J : $\Delta R \leq \pm(3\%+0.1\Omega)$ F : $\Delta R \leq \pm(1\%+0.1\Omega)$	AEC-Q200 TABLE 7.3 Max. operating temperature, 1000 hours, Unpowered. Measure at 24 \pm 4 hours after test end.
Temperature Cycling	$\Delta R \leq \pm(1\%+0.1\Omega)$ No mechanical damage.	AEC-Q200 TABLE 7.4 Unpowered. -55°C to Max. operating temperature but shall not exceed 155°C. 1000 Cycles. Min. dwell time 15 mins, transition time: Max. 1 min. Measure at least 24 hours after test end.
Humidity Bias	J : $\Delta R \leq \pm(3\%+0.1\Omega)$ F : $\Delta R \leq \pm(1\%+0.1\Omega)$	AEC-Q200 TABLE 7.7 1000 hours 85°C /85%RH, 10% of operating power. Measure at 24 \pm 2 hours after test end. (for components with specified operating voltages higher or equal to 500V, 10% of operating voltage)
High Temperature Operating Life	J : $\Delta R \leq \pm(3\%+0.1\Omega)$ F : $\Delta R \leq \pm(1\%+0.1\Omega)$	AEC-Q200 TABLE 7.8 1000 hours. Power shall be applied 90 mins ON and 30 mins OFF intermittently. Max. specified operating temperature at 100% rated power without derating. Measurement at 24 \pm 2 hours after test end.
External Visual	No visual damage and refer PDC marking code.	AEC-Q200 TABLE 7.9 Inspect construction, marking and workmanship.
Physical Dimension	Within the spec.	AEC-Q200 TABLE 7.10 Verify physical dimensions to the applicable component specification.
Resistance to Solvents	Marking must remain legible	AEC-Q200 TABLE 7.12 In addition to the Method 215 solvents, add an Aqueous wash chemical.

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AEC-Q200 ¹	Specification ²	Refer Methods
Mechanical Shock	$\Delta R \leq \pm(1\%+0.1\Omega)$ No mechanical damage.	AEC-Q200 TABLE 7.13 Condition C, Peak value: 100g's, Wave: Half-sine, Duration: 6ms, Velocity change: 12.3ft/sec. Three shocks in each direction, total 18 shocks.
Vibration	$\Delta R \leq \pm(1\%+0.1\Omega)$ No mechanical damage.	AEC-Q200 TABLE 7.14 5 g's for 20 min., 12 cycles each of 3 orientations. Test from 10 Hz-2000 Hz.
Resistance to Solder Heat	$\Delta R \leq \pm(1\%+0.1\Omega)$ No mechanical damage.	AEC-Q200 TABLE 7.15 SMD: Condition K. Infrared/convection reflow soldering and time above 217°C, 60~150 sec.
ESD	$\Delta R \leq \pm(1\%+0.1\Omega)$ No mechanical damage.	AEC-Q200 TABLE 7.17 AEC-Q200-002, 1C, Direct contact, min.1KV.
Solderability	95% coverage min. good tinning, no visible damage.	AEC-Q200 TABLE 7.18 SMD, J-STD-002, Coating durability category 2. B1: Baking 155°C 4H, dipping 245±5°C 5+0/-0.5s D: Baking 155°C 4H, dipping 260±5°C 30+0/-0.5s
Flammability	Refer UL-94.	AEC-Q200 TABLE 7.20 UL-94 V-0 or V-1 are acceptable.
Board Flex (SMD)	J : $\Delta R \leq \pm(1\%+0.1\Omega)$ F : $\Delta R \leq \pm(0.5\%+0.1\Omega)$ No mechanical damage.	AEC-Q200 TABLE 7.21 AEC-Q200-005, 1.6±0.2 mm FR4 PCB board. Bending min. 2mm, 60+5/-0 sec.
Terminal Strength (SMD)	No mechanical damage.	AEC-Q200 TABLE 7.22 AEC-Q200-006, component mounted on a PCB. Force 17.7N(1.8Kg) for 60 seconds.

Electrical	Specification ²	Refer Methods
Short Time Overload	J : $\Delta R \leq \pm(2\%+0.1\Omega)$ F : $\Delta R \leq \pm(1\%+0.1\Omega)$	IEC 60115-1, Clause 4.13 5 × Rated power for 5 seconds
Temperature Coefficient of Resistance	Within the spec.	IEC 60115-1, Clause 4.8 Test temperature : (T ₁) 25°C~ (T ₂) 155°C $TCR(\text{ppm}/^\circ\text{C}) = (R_2-R_1)/R_1 \times 1 / (T_2-T_1) \times 10^6$

Remarks 1: Refer AEC - Q200 - Rev E March 20, 2023

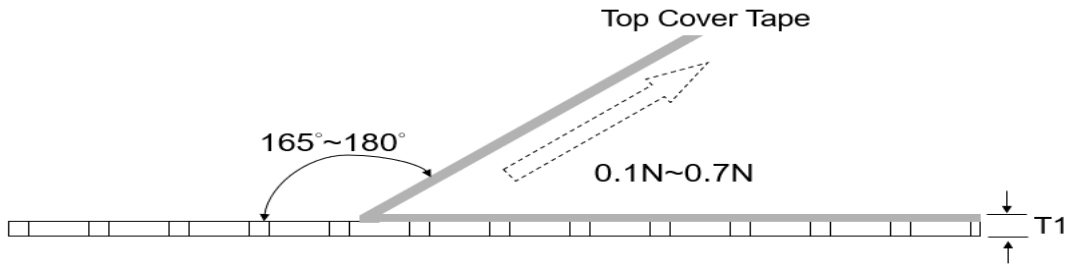
Remarks 2: Specifications with +xΩ is not applicable when the resistance below 1KΩ.



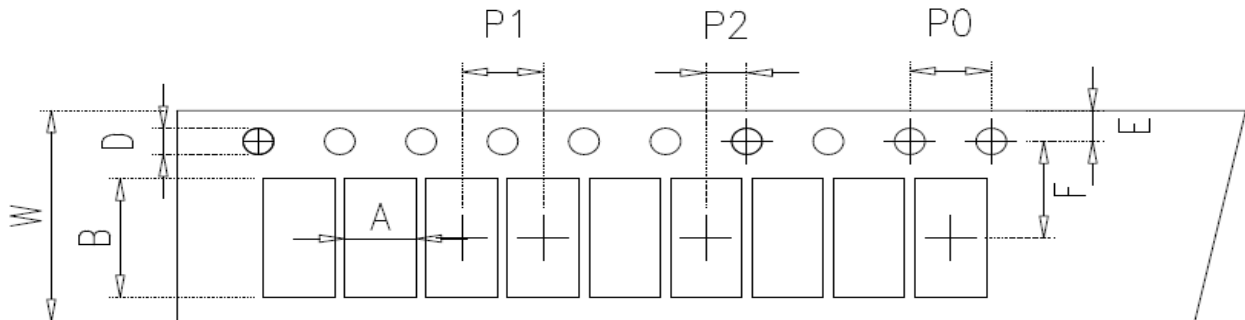
9. PACKAGING

9.1 Peel Strength of Top Cover Tape

The peel speed shall be about 300 mm/min and peel force of top cover tape shall between 0.1 to 0.7N.



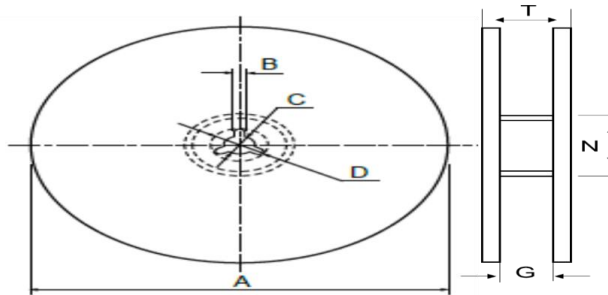
9.2 Tape Packaging Dimensions (unit:mm)



Size	A	B	W	F	E	P1	P2	P0	D
0612	2.00±0.20	3.60±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
1225	3.50±0.20	6.70±0.20	12.00±0.30	5.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0

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9.3 Reel Dimensions (unit.mm)



Size	Packaging pcs/Reel	A	N	C	D	B	G	T
0612	5kpcs/Reel	178.0±2.0	60.0±0.5	13.0±0.5	20(Min.)	2.0±0.5	10.0±1.5	14.9max.
	10kpcs/Reel	254.0±2.0	100.0±0.5	13.0±0.5	20(Min.)	2.0±0.5	10.0±1.5	14.9max.
	20kpcs/Reel	330.0±2.0	100.0±1.5	13.0±0.5	20(Min.)	2.0±0.5	10.0±1.5	14.9max.
1225	4 kpcs/Reel	178.0±2.0	60.0±0.5	13.0±0.5	20(Min.)	2.0±0.5	13.8±1.5	16.7max.
	8 kpcs/Reel	254.0±2.0	100.0±0.5	13.0±0.5	20(Min.)	2.0±0.5	13.8±1.5	20.0max.
	16 kpcs/Reel	330.0±2.0	100.0±1.5	13.0±0.5	20(Min.)	2.0±0.5	13.8±1.5	20.0max.

10. Storage & Handling

... Products are recommended to be used up within one year to ensure shelf life.

Check solder ability in case shelf life extension is needed.

... To store products with the following conditions:

Temperature: 5 to 40°C ; Humidity: 20 to 70% relative humidity.

... Moisture Sensitivity Levels: MSL=1

Precaution for use :

The AEC-Q200 series resistors is mainly used on general automotive equipment without safety considerations. Please contact our company in advanced if you intend to use resistor for designing the equipment which may damage itself and the safety of third party. If necessary, please consider to add the protect circuit in devising process and obtaining fully safety evaluation. The contents of the acknowledgment is only used for our parent company, marketing subsidiaries and official marketing agents who purchase our products. Not applicable for the other nonofficial channels.

※ All product specification and data are subject to change without notice.

