Pulse Withstanding Chip Resistors

Token (PWR) Pulse Withstanding Chip Resistors Provide 50 Percent Increase in Power Dissipation

Preview

As electronic design engineers have increased the power density of their equipment, the demand for smaller surface mount single-chip circuit protection resistors has also increased. Token developed the PWR Series resistors to provide an economical alternative to bulky molded wirewound components or multi-chip solutions while saving both PC board space and manufacturing costs.

To meet the increased demand for the PWR Series resistors, Token has developed a series of pulse withstanding chip resistors with improved power ratings in reduced surface mounted sizes. Designated the PWR Series, the chip resistors deliver up to 50 percent higher power ratings than conventional surface mount resistors - up to 1.5W in a standard 2512 size chip.

Token is able to boost this power rating up to 50 percent through a combination of proprietary power film materials and advanced manufacturing processes. The PWR Series Resistors are available in four standard sizes (0805, 1206, 2010 and 2512) with power ratings from 0.125W to 1.5W, and maximum operating voltage ratings for 100V to 500V. Resistance range is from 10 Ω to 20 MΩ, with tolerance tight to 0.5 percent. The PWR meets restriction of hazardous substances RoHS directive and RoHS compliance.



Along with the increased power ratings, the PWR Series resistors also feature high surge and high voltage ratings, making them extremely stable in demanding surge and pulse environments. The PWR Series chip resistors are specified for use in power supplies, circuit protection devices, portable battery chargers, motor controls and line-powered equipment.

Token will also produce devices outside these specifications to meet specific customer requirements, please contact our sales for more information.

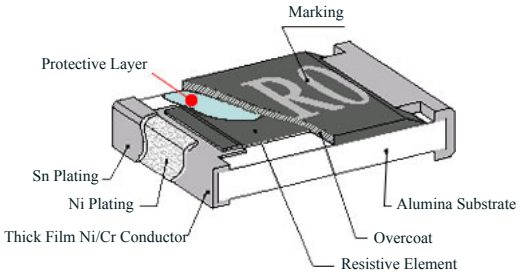
Features

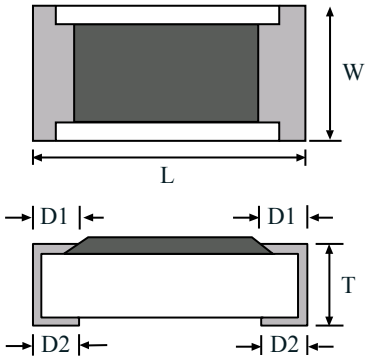
- High Power Rating .
- Tolerance from ±0.5%~5%.
- Improved Working Voltage Ratings.
- Excellent Pulse Withstanding Performance.
- Standard Package sizes of 0805, 1206, 2010, and 2512.

Applications

- Power Supplies, Diagnostic Equipment.
- Industrial Controls, LCD Video Monitors.
- Portable Battery Chargers, Medical Devices.
- Motor Controls and Line-Powered Equipment.
- Metering (Testing/Measurement), Circuit Protection Devices .

Dimensions (Unit: mm)



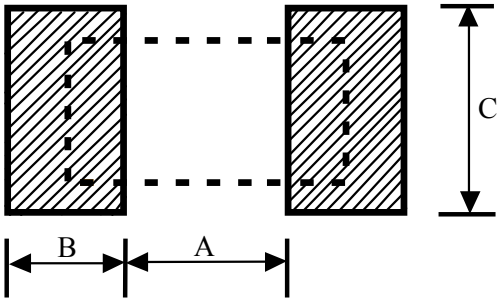


Codes	L	W	T	D1	D2
PWR05 (0805)	2.00±0.15	1.25±0.15	0.55±0.10	0.30±0.20	0.40±0.25
PWR06 (1206)	3.05±0.15	1.55±0.15	0.55±0.10	0.50±0.30	0.40±0.25
PWR10 (2010)	5.00±0.20	2.45±0.15	0.60±0.15	0.60±0.30	0.50±0.25
PWR12 (2512)	6.30±0.15	3.10±0.15	0.55±0.10	0.60±0.30	0.50±0.25

Standard Electrical Specifications

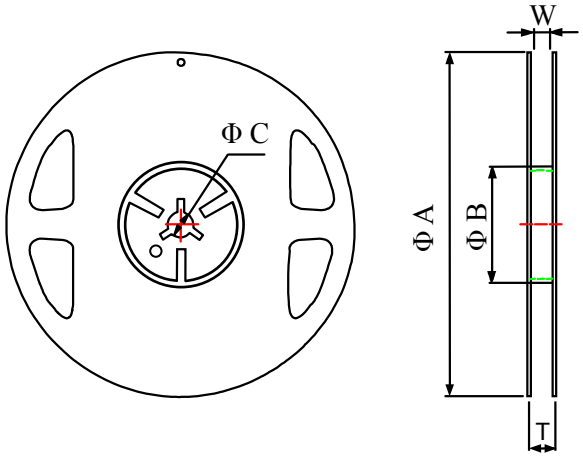
Type	Power Ratingat 70°C	Operating Temp. Range	Max Operating Voltage	Resistance Tolerance	Resistance Range	TCR
PWR05 (0805)	0.125W	-55 ~ +155°C	150V	±0.5% ±1.0% ±2.0% ±3.0% ±5.0%	300Ω~20MΩ	±100PPM / °C
PWR06 (1206)	0.33W	-55 ~ +155°C	200V		10Ω~299Ω	±200PPM / °C
PWR10 (2010)	0.75W	-55 ~ +155°C	400V	±0.5% ±1.0% ±2.0% ±3.0% ±5.0%	20.1Ω~10MΩ	±100PPM / °C
PWR12 (2512)	1.5W	-55 ~ +155°C	500V		10Ω~20Ω	±200PPM / °C

Recommend Land Pattern (Unit: mm)



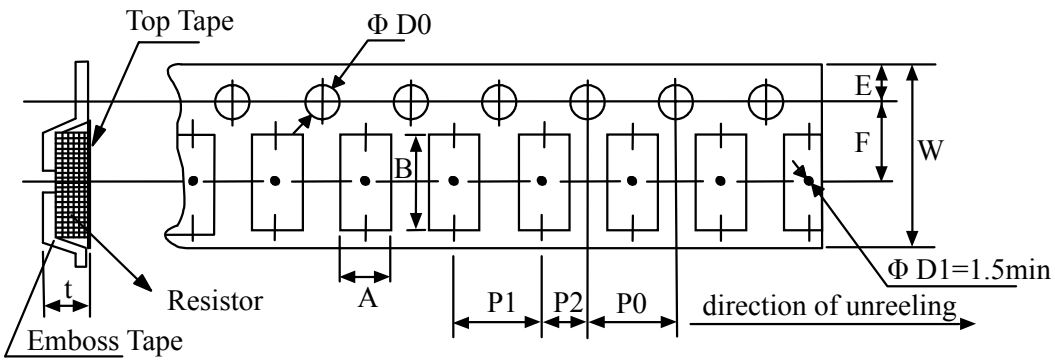
Codes	A	B	C
PWR05 (0805)	1.00	1.00	1.35±0.2
PWR06 (1206)	2.00	1.15	1.70±0.2
PWR10 (2010)	3.60	1.40	2.50±0.2
PWR12 (2512)	4.90	1.60	3.10±0.2

Packaging Quantity & Reel Specifications (Unit: mm)



Codes	ΦA	ΦB	ΦC	W	T	Paper Tape (PCS)	Emboss Plastic Tape (PCS)
PWR05 (0805)	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
PWR06 (1206)	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
PWR10 (2010)	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000
PWR12 (2512)	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000

Emboss Plastic Tape Specifications (Unit: mm)



Codes	A±0.10	B±0.10	W±0.10	E±0.10	F±0.05	P0±0.05	P1±0.10	P2±0.05	ΦD0+0.10	T±0.20
PWR10 (2010)	2.85	5.45	12.0	1.75	5.5	4.00	4.00	2.00	1.50	1.00
PWR12 (2512)	3.40	6.65	12.0	1.75	5.5	4.00	4.00	2.00	1.50	1.00

Application & Soldering Notes

Today's electronic devices are becoming smaller and smaller. The requirement, in particular, for pulse withstand capability is growing due to the need to protect sensitive modern electronic systems.

To meet this demand Token Electronics have designed a Pulse Withstanding Chip Resistor (PWR Series). The enhanced performance of the chips is made possible by the precise use of the best resistance inks and a closely controlled production process.

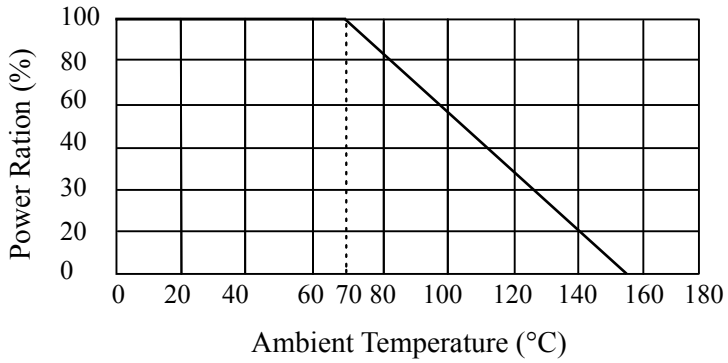
Application Notes:

- Applications vary from line protection for telecommunications to surge withstanding resistors for use in circuit breakers. Details of a typical telecomm and power supply application are given below.
- Telephone lines can be subjected to a large range of voltage disturbances, many of which can damage switching equipment. This has led to the need for circuit protection against both high voltage transients, usually of short duration caused by lighting strikes and overloads of longer duration, due to direct connection to mains power lines.
- These two faults are separated into primary and secondary protection.
  - Primary protection handles the high voltage transients, and is usually located within the exchange.
  - Secondary protection is usually built into the equipment to be protected, and deals with both current and voltage limiting.
- Voltage limiting prevents damage to the equipment and shock hazards, and current limiting prevents damage to wiring.
- To determine the suitability of a PWC series chip resistors for your application refer to the pulse withstanding data as given lighting surge performance using both 1.2/50μs and 10/700μs pulse shapes.

Soldering Notes:

- Electrical connection to a ceramic substrate or to a printed circuit board can be made by reflow or wave soldering of wrap-around terminations.
- Wrap-around terminations provide good leach properties and ensure reliable contact.
- Due to the robust construction, the PWR can be immersed in the solder bath for 30 seconds at 260°C.
- This enables the resistor to be mounted on one side of a printed circuit board and wire-leaded components applied on the other side.
- PWR resistors themselves can operate at a maximum temperature of 155°C.
- For soldered resistors, the joint temperature should not exceed 110°C.
- This condition is met when the stated power levels at 70°C and recommended pad and trace areas are used.
- Allowance should be made if smaller areas of copper are used.

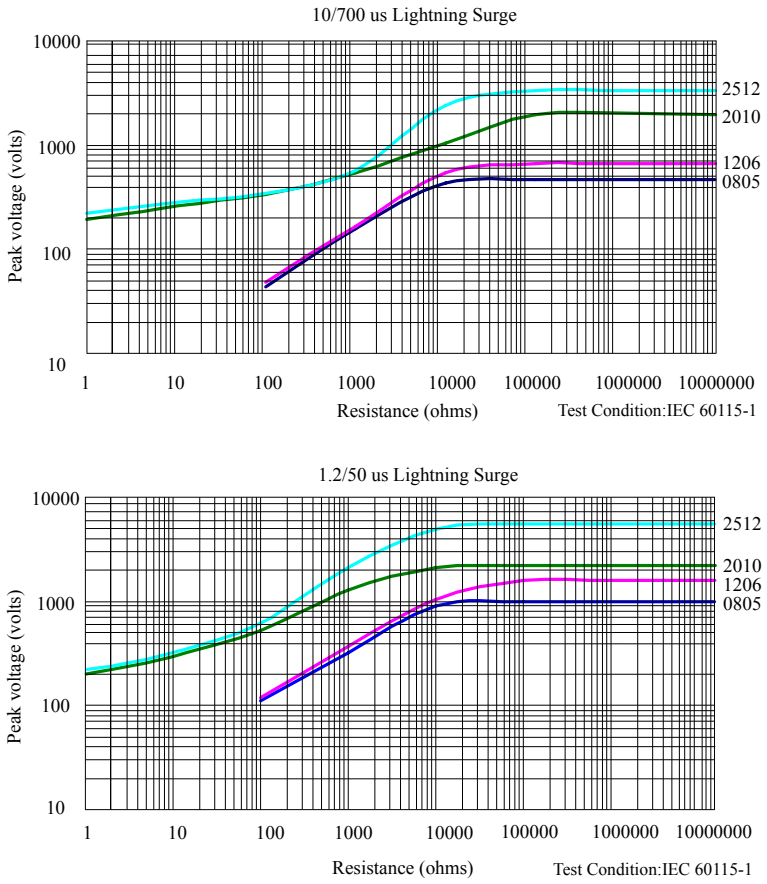
Environmental Characteristics



Test Item	Specification	Test Method
Short Time Overload	±0.5%	JIS-C-5202-5.5 RCWV*2.5 or Max Overloading Voltage, 5 seconds
Thermal Shock	±0.5%	MIL-STD-202F Method 107G -55°C~150°C, 100 cycles
Temperature Coefficient of Resistance	As Spec.	MIL-STD-202F Method 304 +25/-55/+25/+125/+25°C
Load Life	±1%	MIL-STD-202F Method 108A RCWV, 70°C, 1.5 hours ON, 0.5 hours OFF, total 1000~1048 hours
Humidity (Steady State)	±0.5%	MIL-STD-202F Method 103B 40°C, 90~95%RH, RCWV 1.5 hours ON, 0.5 hours OFF, total 1000~1048 hours
Resistance to Dry Heat	±0.5%	JIS-C-5202-7.2 96 hours @ +155°C without load
Low Temperature Operation	±0.5%	JIS-C-5202-7.1 1hour,-65°C followed by 45 minutes of RCWV
Bending Strength	As Spec.	JIS-C-5202-6.1.4 Bending Amplitude 3mm for 10 seconds
Resistance to Soldering Heat	±0.5%	MIL-STD-202F Method 210E 260±5°C, 10±1seconds
Solderability	95% min coverage	MIL-STD-202F Method 208H 245°C±5°C, 3±0.5(sec)
Dielectric Withstand Voltage	As Spec.	MIL-STD-202F Method 301 Apply Max Overload Voltage for l minute
Insulation Resistance	>1000MΩ	MIL-STD-202F Method 302 Apply 100VDC for 1minute

Note: Storage Temperature: 25±3°C; Humidity: <80%RH

Lightning Surge



Note: Lightning Surge Resistors are tested in accordance with IEC 60 115-1 using both 1.2/50us and 10/700 pulse.shapes. The limit of acceptance is a shift in resistance of less than 1% from the initial value.

How to Order

PWR	05	D	TR	C1	W	10R0	10R0
❶	❷	❸	❹	❺	❻	❼	❽

❶ Product Type

❷ Dimensions(L×W)

Code	Dimensions(L×W)	EIA
05	2.00×1.25mm	0805
06	3.05×1.55mm	1206
10	5.00×2.45mm	2010
12	6.30×3.10mm	2512

❸ Resistance Tolerance

Code	Resistance Tolerance
D	±0.50%
F	±1%
G	±2%
H	±3%
J	±5%

❹ Packaging

Code	Packaging
TR	Taping Reel
P	Bulk

❺ TCR

Code	TCR
C1	±100ppm
C	±200ppm

❻ Power Rating

Code	Power Rating
A	1.5W
O	1/3W
Q	3/4W
T	1W
U	1/2W
V	1/4W
W	1/8W

❼ Resistance

Code	Resistance
1000	100Ω
2201	2200Ω
1002	10000Ω
1003	100000Ω

❽ Marking

Code	Marking
	Standard Marking for E96/E24
N	No Marking

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