

Metal Film Precision Resistor



Features

- Excellent overall stability
- Tight tolerance down to $\pm 0.1\%$
- Extremely low TCR down to ± 10 PPM/ $^{\circ}\text{C}$
- High power rating up to 1 Watt

Applications

- Telecommunication
- Medical Equipment
- Measurement/Testing Equipment

Standard Electrical Specifications

Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range	TCR (PPM/ $^{\circ}\text{C}$)
1/2W	-55°C to +155°C	300V	600V	10 Ω to 1M Ω	± 50

High Power Rating Electrical Specifications

Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range $\pm 0.1\%$	TCR (PPM/ $^{\circ}\text{C}$)
1W	-55°C to +155°C	350V	700V	10 Ω to 1M Ω	± 50

Environmental Characteristics

Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Specification:	JIS-C-5201-1 4.8 IEC-60115-1 4.8 -55°C~+125°C, 25°C is the reference temperature
Short Time Overload	$\pm(0.15\%+0.05\Omega)$	JIS-C-5201-1 4.13 IEC-60115-1 4.13 RCWV*2.5 or Max. Overload Voltage whichever is lower for 5 seconds
Insulation Resistance	$\geq 10\text{G}$	JIS-C-5201-1 4.6 IEC-60115-1 4.6 Max. Overload Voltage for 1 minute
Endurance	$\pm(0.5\%+0.05\Omega)$	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1 70 $\pm 2^{\circ}\text{C}$, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"
Damp Heat with Load	$\pm(1.0\%+0.05\Omega)$	JIS-C-5201-1 4.24 IEC-60115-1 4.24 40 $\pm 2^{\circ}\text{C}$, 90~95% R.H., RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"

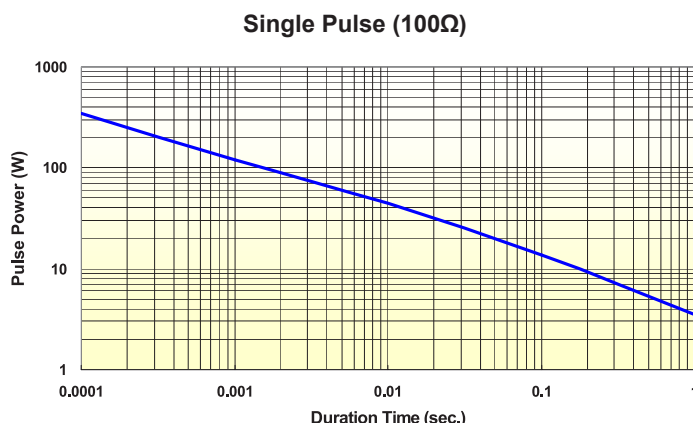
Metal Film Precision Resistor

Item	Requirement	Test Method
Dry Heat	$\pm(1.0\%+0.05\Omega)$	JIS-C-5201-1 4.23 IEC-60115-1 4.23.2 at +155°C for 1000 hrs
Bending Strength	$\pm(0.5\%+0.05\Omega)$	JIS-C-5201-1 4.33 IEC-60115-1 4.33 Bending once for 5 seconds with 2mm
Solderability	95% min. coverage	JIS-C-5201-1 4.17 IEC-60115-1 4.17 245 \pm 5°C for 3 seconds
Resistance to Soldering Heat	$\pm(0.5\%+0.05\Omega)$	JIS-C-5201-1 4.18 IEC-60115-1 4.18 260 \pm 5°C for 10 seconds
Voltage Proof	No breakdown or flashover	JIS-C-5201-1 4.7 IEC-60115-1 4.7 1.42 times Max. Operating Voltage for 1 minute
Leaching	Individual leaching area \leq 5% Total leaching area \leq 10%	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1 260 \pm 5°C for 30 seconds
Rapid Change of Temperature	$\pm(0.5\% +0.05\Omega)$	JIS-C-5201-1 4.19 IEC-60115-1 4.19 -55°C to +155°C, 5 cycles

Storage Temperature : 15°C to 28°C
Humidity : < 80%RH

Pulse withstanding capacity

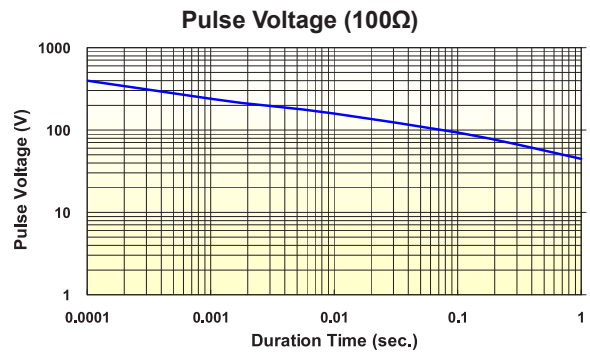
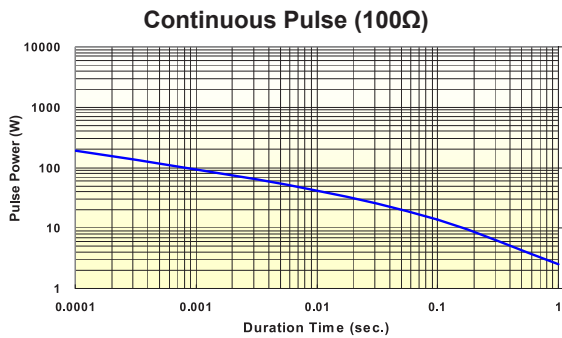
The single impulse graph is the result of 50 impulses of rectangular shape applied at one-minute intervals. The limit of acceptance was a shift in resistance of less than 1% from the initial value. The power applied was subject to the restrictions of the maximum permissible impulse voltage graph shown.



Metal Film Precision Resistor

Continuous Pulse

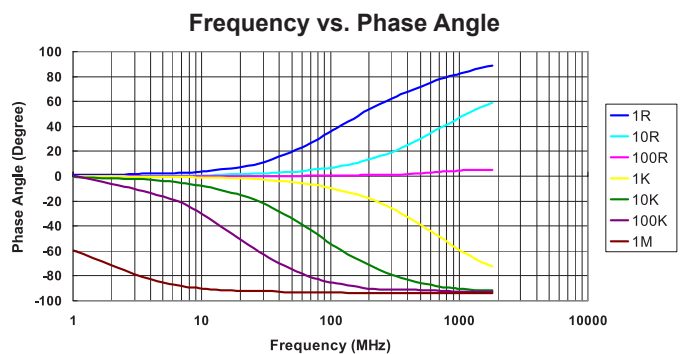
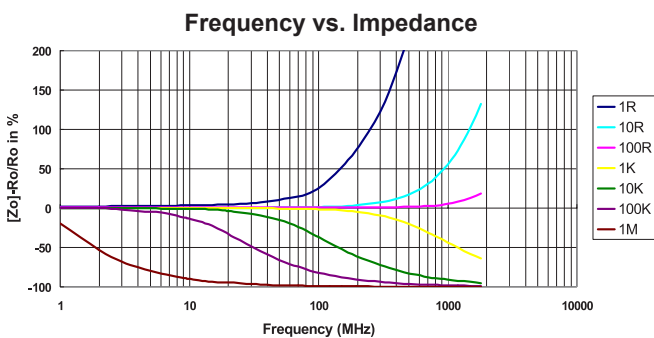
The continuous load graph was obtained by applying repetitive rectangular pulses where the pulse period was adjusted so that the average power dissipated in the resistor was equal to its rated power at 70°C. Again the limit of acceptance was a shift in resistance of less than 1% from the initial value.



Frequency Behaviour

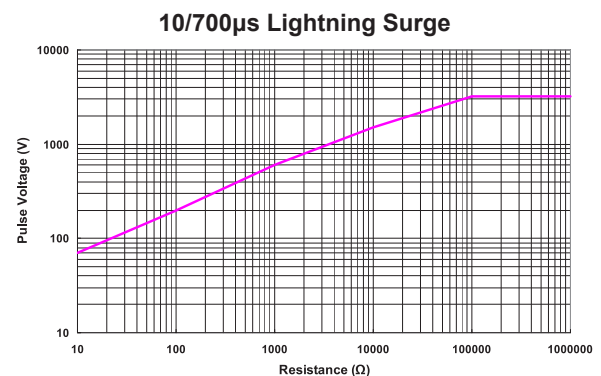
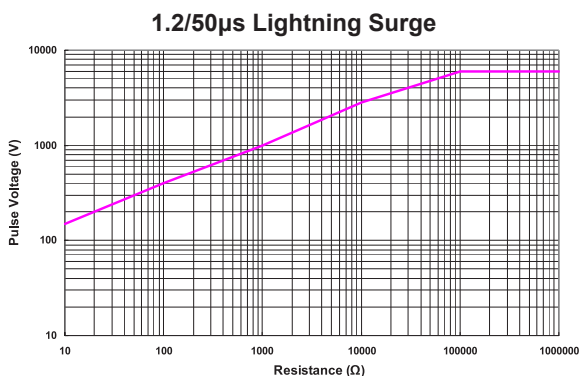
Resistors are designed to function according to ohmic laws. This is basically true of resistors for frequencies up to 100kHz. At higher frequencies, there is an additional contribution to the impedance by an ideal resistor switched in series with a coil and both switched parallel to a capacitor. The values of the capacitance and inductance are mainly determined by the dimensions of the terminations and the conductive path length.

The environment surrounding components has a large influence on the behavior of the component on the printed-circuit board.



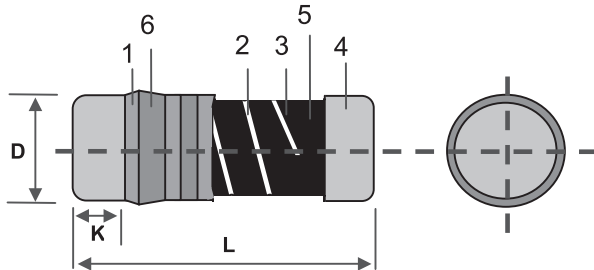
Lightning Surge

Resistors are tested in accordance with IEC 60 115-1 using both 1.2/50us and 10/700us pulse shapes. The limit of acceptance is a shift in resistance of less than 0.5% from the initial value.



Metal Film Precision Resistor

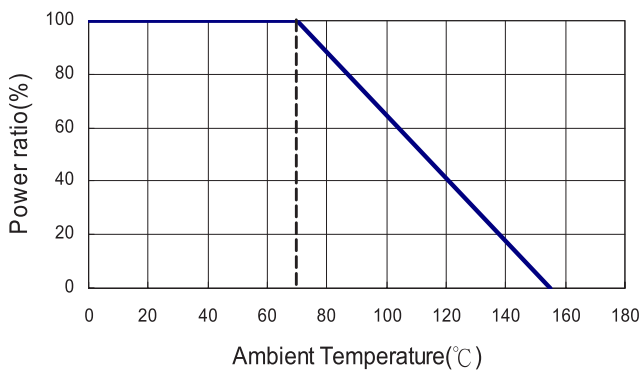
Construction & Dimension



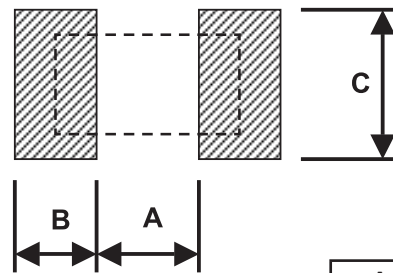
1	Insulation Coating
2	Trimming Line
3	Ceramic Rod
4	Electrode Cap
5	Resistor Layer
6	Marking

L (mm)	D (mm)	K (mm)	Weight 1,000EA (g)
5.9 ±0.2	2.2 ±0.2	1.3 ±0.1	80.9

Derating Curve

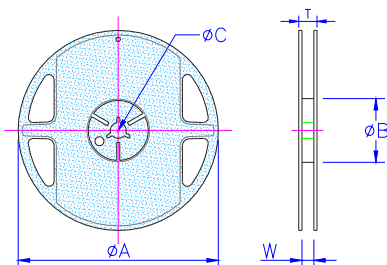


Recommend Land Pattern



A (mm)	B (mm)	C (mm)
3	1.7	2.4

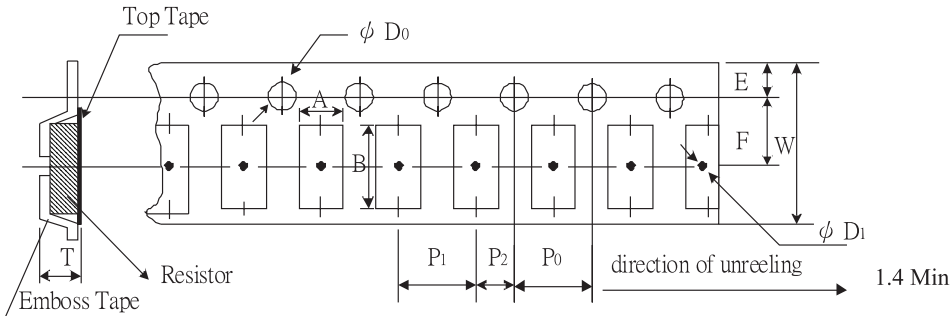
Packaging



Packaging Quantity & Reel Specifications

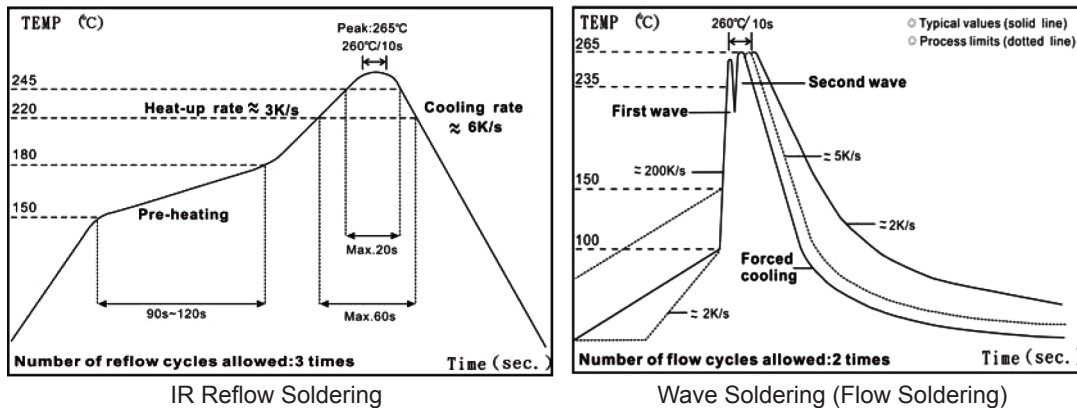
Reel Diameter	A (mm)	B (mm)	C (mm)	W (mm)	T (mm)	Emboss Plastic Tape (EA)
7 inch	178.5 ±1.5	60 +1	13 ±0.5	13 ±0.5	15.5 ±0.5	2,000

Metal Film Precision Resistor



A (mm)	B (mm)	W (mm)	E (mm)	F (mm)	P ₀ (mm)	P ₁ (mm)	P ₂ (mm)	ΦD ₀ (mm)	T (mm)
2.4 ±0.1	6.15 ±0.1	12 ±0.1	1.75 ±0.1	5.5 ±0.05	4 ±0.1	4 ±0.1	2 ±0.05	1.5 +0.1	2.7 ±0.1

Soldering Condition



- (1) Time of IR reflow soldering at maximum temperature point 260°C : 10s
- (2) Time of wave soldering at maximum temperature point 260°C : 10s
- (3) Time of soldering iron at maximum temperature point 410°C : 5s

Part Number Table

Description	Part Number
Surface Mount MELF Resistor, 390kΩ, 300V, 500mW, ±0.1%, MCCSR Series, Metal Film	MCCSR0207BTDU3903

Important Notice : This data sheet and its contents (the "Information") belong to the members of the Premier Farnell group of companies (the "Group") or are licensed to it. No licence is granted for the use of it other than for information purposes in connection with the products to which it relates. No licence of any intellectual property rights is granted. The Information is subject to change without notice and replaces all data sheets previously supplied. The Information supplied is believed to be accurate but the Group assumes no responsibility for its accuracy or completeness, any error in or omission from it or for any use made of it. Users of this data sheet should check for themselves the Information and the suitability of the products for their purpose and not make any assumptions based on information included or omitted. Liability for loss or damage resulting from any reliance on the Information or use of it (including liability resulting from negligence or where the Group was aware of the possibility of such loss or damage arising) is excluded. This will not operate to limit or restrict the Group's liability for death or personal injury resulting from its negligence. Multicomp is the registered trademark of the Group. © Premier Farnell plc 2012.