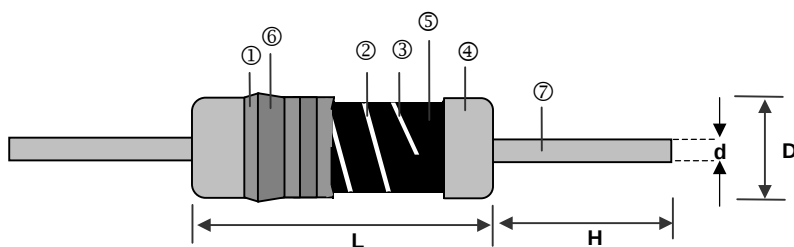


Metal Film Leaded Precision Resistor—MFR Series

Construction



① Insulation Coating (Expose resin)	⑤ Resistor Layer (Nickel alloy)
② Trimming Line	⑥ Marking (Expose)
③ Ceramic Rod (Alumina ceramic)	⑦ Lead Wire (Tinned annealed copper wire)
④ Electrode Cap (Tinned iron cap)	

Features

- Excellent overall stability
- Very tight tolerance down to $\pm 0.05\%$
- Extremely low TCR down to $\pm 5 \text{ PPM}/^{\circ}\text{C}$
- High power rating up to 3 Watts
- Excellent ohmic contact

Applications

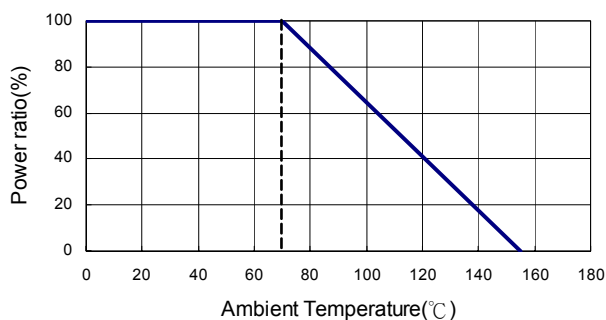
- Automotive
- Telecommunication
- Medical Equipment

Dimensions

Unit: mm

Type	L	D	H	d	Weight (g) (1000pcs)
MFR0318	3.3 $\pm$ 0.7/-0.2	1.8 $\pm$ 0.30	29 $\pm$ 2.0	0.45 $\pm$ 0.03	90
MFR0623	6.3 $\pm$ 0.5	2.3 $\pm$ 0.30	28 $\pm$ 2.0	0.55 $\pm$ 0.03	150
MFR0932	9.0 $\pm$ 0.5	3.2 $\pm$ 0.50	26 $\pm$ 2.0	0.65 $\pm$ 0.03	350
MFR1145	11.5 $\pm$ 1.0	4.5 $\pm$ 0.50	35 $\pm$ 2.0	0.78 $\pm$ 0.03	770
MFR1550	15.5 $\pm$ 1.0	5.0 $\pm$ 0.50	32 $\pm$ 2.0	0.78 $\pm$ 0.03	1040

Derating Curve



Part Numbering

MFR	0318	B	T	N		1001	MA
Product Type	Dimensions (L×D)	Resistance Tolerance	Packaging Code	TCR (PPM/°C)	Power Rating	Resistance	Special
	0318: 3.3x1.8 0623: 6.3x2.3 0932: 9.0x3.2 1145: 11.5x4.5 1550: 15.5x5.0	A: $\pm 0.05\%$ B: $\pm 0.1\%$ C: $\pm 0.25\%$ D: $\pm 0.5\%$ F: $\pm 1\%$	A: Ammo B: Bulk T: Taping Reel	S: ± 5 B: ± 10 N: ± 15 C: ± 25 D: ± 50 E: ± 100	: Standard R: 3W S: 2W T: 1W U: 1/2W V: 1/4W F: 3/5W G: 2/5W W: 1/8W	R100: 0.1 Ω 0010: 1 Ω 1000: 100 Ω 2201: 2200 Ω 1001: 1K Ω 1004: 1M Ω	: Standard MA: MA-type MB: MB-type MC: MC-type FA: FA-type FB: FB-type FC: FC-type

Standard Electrical Specifications

Item Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range					TCR (PPM/°C)
					±0.05%	±0.1%	±0.25%	±0.5%	±1%	
0318	1/8W	-55 ~ +155°C	200V	400V	-	10Ω-1MΩ		10Ω-4.99MΩ		±15
						10Ω-1MΩ		10Ω-10MΩ		±25 ±50
					-		1Ω-1MΩ	1Ω-10MΩ	0.1Ω-10MΩ	±100
0623	1/4W	-55 ~ +155°C	250V	500V	10Ω-1MΩ					±5 ±10
					10Ω-1MΩ			10Ω-10MΩ		±15 ±25
					-	10Ω-1MΩ		10Ω-10MΩ		±50
					-		1Ω-1MΩ	1Ω-10MΩ	0.1Ω-10MΩ	±100
0932	1/2W	-55 ~ +155°C	350V	700V	10Ω-1MΩ					±5 ±10
					10Ω-1MΩ			10Ω-10MΩ		±15 ±25
					-	10Ω-1MΩ		10Ω-10MΩ		±50
					-		1Ω-1MΩ	1Ω-10MΩ	0.1Ω-10MΩ	±100
1145	1W	-55 ~ +155°C	450V	1000V	-	10Ω-1MΩ		10Ω-4.99MΩ		±15
						10Ω-1MΩ		10Ω-10MΩ		±25 ±50
					-		1Ω-1MΩ	1Ω-10MΩ	0.1Ω-10MΩ	±100
1550	2W	-55 ~ +155°C	500V	1000V	-	10Ω-1MΩ		10Ω-4.99MΩ		±15
						10Ω-1MΩ		10Ω-10MΩ		±25 ±50
					-		1Ω-1MΩ	1Ω-10MΩ	0.1Ω-10MΩ	±100

High Power & Ultra High Power Rating Electrical Specifications

Item Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range					TCR (PPM/°C)
					±0.05%	±0.1%	±0.25%	±0.5%	±1%	
0318	1/4W	-55 ~ +155°C	200V	400V	-	10Ω-1MΩ		10Ω-4.99MΩ		±15
						10Ω-1MΩ		10Ω-10MΩ		±25 ±50
					-		1Ω-1MΩ	1Ω-10MΩ	0.1Ω-10MΩ	±100
0623	2/5W	-55 ~ +155°C	250V	500V	-	10Ω-1MΩ		10Ω-4.99MΩ		±15
						10Ω-1MΩ		10Ω-10MΩ		±25 ±50
					-		1Ω-1MΩ	1Ω-10MΩ	0.1Ω-10MΩ	±100
					10Ω-1MΩ					±5 ±10
0623	1/2W	-55 ~ +155°C	300V	600V	10Ω-1MΩ			10Ω-10MΩ		±15 ±25
					-	10Ω-1MΩ		10Ω-10MΩ		±50
					-		1Ω-1MΩ	1Ω-10MΩ	0.1Ω-10MΩ	±100
					10Ω-1MΩ					±5 ±10
	3/5W	-55 ~ +155°C	350V	700V	-	10Ω-1MΩ		10Ω-4.99MΩ		±15
						10Ω-1MΩ		10Ω-10MΩ		±25
					-		1Ω-1MΩ	1Ω-10MΩ	0.1Ω-10MΩ	±50
					-		1Ω-1MΩ	1Ω-10MΩ	0.1Ω-10MΩ	±100

High Power & Ultra High Power Rating Electrical Specifications

Type \ Item	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range					TCR (PPM/°C)
					±0.05%	±0.1%	±0.25%	±0.5%	±1%	
0932	1W	-55 ~ +155°C	400V	800V	10Ω-1MΩ					±5 ±10
					10Ω-1MΩ			10Ω-10MΩ		±15 ±25
					-	10Ω-1MΩ		10Ω-10MΩ		±50
					-		1Ω-1MΩ	1Ω-10MΩ	0.1Ω-10MΩ	±100
1145	2W	-55 ~ +155°C	500V	1000V	-	10Ω-1MΩ		10Ω-4.99MΩ		±15
						10Ω-1MΩ		10Ω-10MΩ		±25 ±50
					-		1Ω-1MΩ	1Ω-10MΩ	0.1Ω-10MΩ	±100
1550	3W	-55 ~ +155°C	500V	1000V	-	10Ω-1MΩ		10Ω-4.99MΩ		±15
						10Ω-1MΩ		10Ω-10MΩ		±25 ±50
					-		1Ω-1MΩ	1Ω-10MΩ	0.1Ω-10MΩ	±100

Environmental Characteristics

Item	Requirement	Test Method
Short Time Overload	±0.25%	RCWV*2.5 or Max. overload voltage for 5 seconds
Insulation Resistance	> 1000MΩ	Apply 100V _{DC} for 1 minute
Endurance	±0.2%	70±2°C, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Damp Heat with Load	±0.3%	40±2°C, 90~95% R.H. Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Solderability	90% min. Coverage	245±5°C for 3 seconds
Temperature Coefficient	By Type	Resistance value at room temperature and room temperature+100°C
Pulse Overload	±0.75%	4 times RCWV for 10000 cycles with 1 second "ON" and 25 seconds "OFF"
Resistance To Solvent	No deterioration of coatings and markings	Trichroethane for 1 min. with ultrasonic
Terminal Strength	Tensile: ≥ 2.5kg	Direct Load for 10 sec. In the direction off the terminal leads
Shelf life	△R=±0.1%	12 months at room temperature 25±3°C, 80%RH Max.

■ Reference Standards: MIL-STD-202, JIS-C 5201-1

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