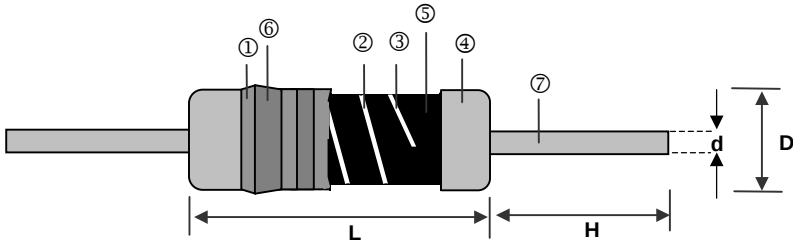
Metal Film Leaded Precision Resistor－MFR Series

■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 ±0.05%
－Extremely low TCR down to ±5 PPM/°C
－High power rating up to 3 Watts
－Excellent ohmic contact

■Applications

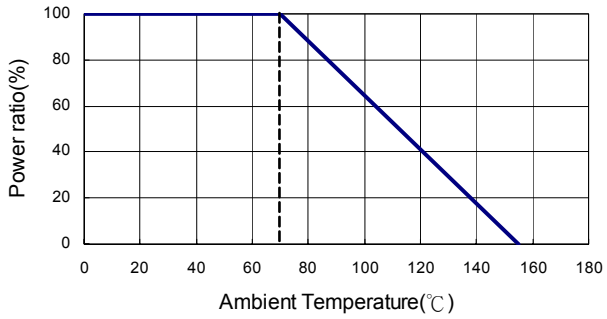
－Automotive
－Telecommunication
－Medical Equipment

■Dimensions

Unit: mm

Type	L	D	H	d	Weight (g) (1000pcs)
MFR0318	3.3+0.7/-0.2	1.8±0.30	29±2.0	0.45±0.03	90
MFR0623	6.3±0.5	2.3±0.30	28±2.0	0.55±0.03	150
MFR0932	9.0±0.5	3.2±0.50	26±2.0	0.65±0.03	350
MFR1145	11.5±1.0	4.5±0.50	35±2.0	0.78±0.03	770
MFR1550	15.5±1.0	5.0±0.50	32±2.0	0.78±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: ±0.05% B: ±0.1% C: ±0.25% D: ±0.5% F: ±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: 0.1Ω 0010: 1Ω 1000: 100Ω 2201: 2200Ω 1001: 1KΩ 1004: 1MΩ	: 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 ±0.05%	±0.1%	±0.25%	±0.5%	±1%	TCR (PPM/°C)
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			10Ω10MΩ		±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 ±0.05%	±0.1%	±0.25%	±0.5%	±1%	TCR (PPM/°C)
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
	2/5W		250V	500V	-	10Ω-1MΩ		10Ω-4.99MΩ		±15
						10Ω-1MΩ		10Ω-10MΩ		±25 ±50
					-		1Ω-1MΩ	1Ω-10MΩ	0.1Ω-10MΩ	±100
0623	1/2W	-55 ~ +155°C	300V	600V	10Ω-1MΩ					±5 ±10
					10Ω-1MΩ			10Ω-10MΩ		±15 ±25
					-	10Ω-1MΩ		10Ω-10MΩ		±50
					-		1Ω-1MΩ	1Ω-10MΩ	0.1Ω-10MΩ	±100
	3/5W		350V	700V	-	10Ω-1MΩ		10Ω-4.99MΩ		±15
						10Ω-1MΩ		10Ω-10MΩ		±25
						10Ω-1MΩ		10Ω-10MΩ	1Ω-10MΩ	±50
					-		1Ω-1MΩ	1Ω-10MΩ	0.1Ω-10MΩ	±100

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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
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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**