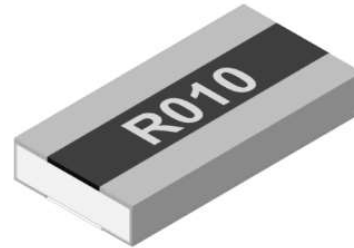


Low-Resistance Metal Film Chip Resistor

MFR ~Series

Description

- Low Resistance / TCR / Inductance(≤ 5 nH)
- Excellent long-term stability
- High precision current sensing
- High power capability
- Halogen free and lead free
- RoHS compliant
- AEC-Q200 compliant



Applications

- Consumer electronics
- Laptops
- Communication devices
- Measuring instrument
- Industrial / Power supply
- Battery pack

Part number

MFR **1225** **A** **3** **R002** **F**
【1】 **【2】** **【3】** **【4】** **【5】** **【6】**

【1】 Series Name: Low-Resistance Metal Film Chip Resistor

【2】 Chip Size: 1225:1225, 1020: 1020, 0612: 0612

【3】 Terminals: A:2 terminals

【4】 Power Rating: 1=1W, 2=2W, 3 =3W

【5】 Resistance Code: R100: 100m Ω , 1R50: 1.5 Ω

【6】 Resistance Precision: D: $\pm 0.5\%$, F: $\pm 1\%$, E: $\pm 2\%$, G: $\pm 5\%$

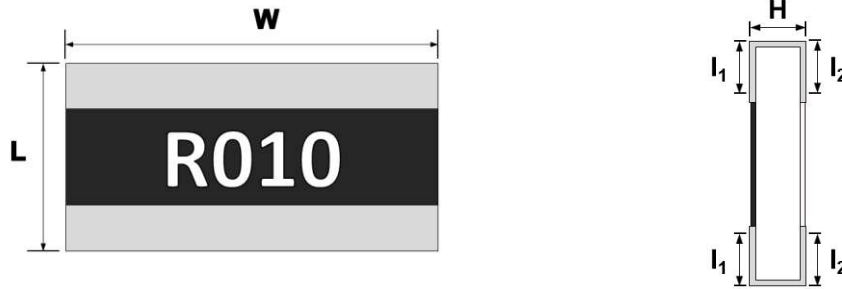
Electrical Characteristics

Part number	Power Rating at 70°C (W)	Resistance Range		TCR (ppm/°C)	Operation Temperature Range
		0.5%	1.0%,2.0%,5.0%		
MFR1225A	3	—	10m Ω $\leq$ R < 20m Ω	± 150	-55°C~+155°C
		100m Ω $\leq$ R < 2 Ω	20m Ω $\leq$ R < 2 Ω	± 100	
MFR1020A	2	—	10m Ω $\leq$ R < 20m Ω	± 150	
MFR0612A	1	100m Ω $\leq$ R < 2 Ω	20m Ω $\leq$ R < 2 Ω	± 100	

Low-Resistance Metal Film Chip Resistor

MFR ~Series

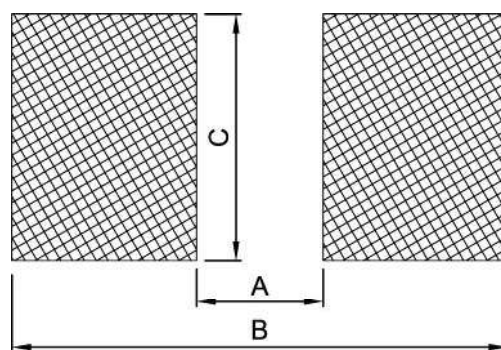
Physical Dimensions



Unit: mm

Part number	L	W	H	I1	I2
MFR1225A	3.20±0.20	6.30±0.20	0.55±0.15	0.60±0.25	0.80±0.25
MFR1020A	2.50±0.15	5.00±0.15	0.55±0.15	0.40±0.20	0.50±0.20
MFR0612A	1.60±0.15	3.20±0.20	0.55±0.15	0.30±0.20	0.50±0.20

Recommended Solder Pad Layout



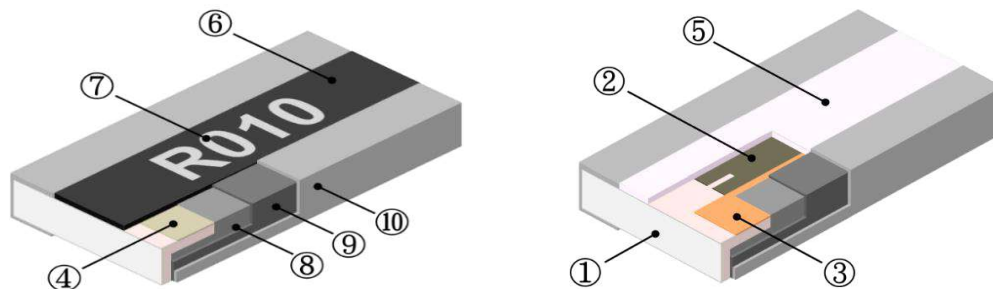
Unit: mm

Part number	A	B	C
MFR1225A	1.20	5.20	7.00
MFR1020A	1.00	4.05	5.50
MFR0612A	0.50	2.60	3.20

Low-Resistance Metal Film Chip Resistor

MFR ~Series

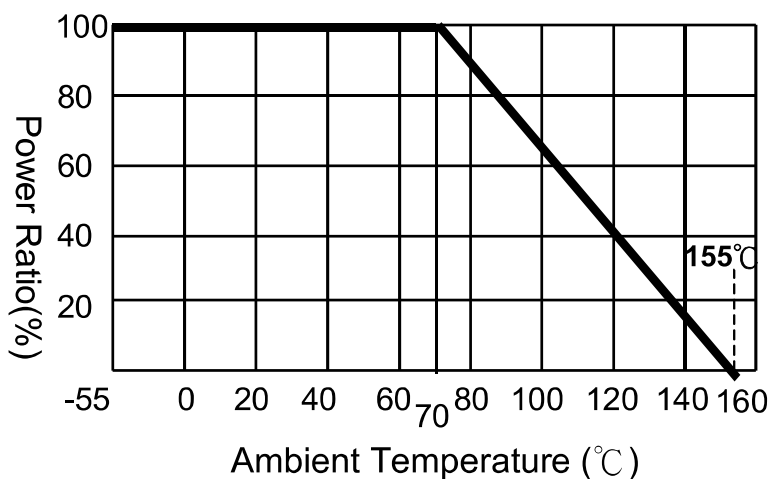
Construction



1	Alumina Substrate
2	Resistive Layer
3	Bottom Inner Electrode (Cu)
4	Top Inner Electrode
5	Bottom Protective Overcoat (White)
6	Top Protective Overcoat
7	Marking
8	Side Inner Electrode
9	Barrier Layer (Ni)
10	Solder coating (Sn)

Power Derating Curve

For resistors operated in ambient temperatures 70°C, power rating shall be derated in according with the curve below:

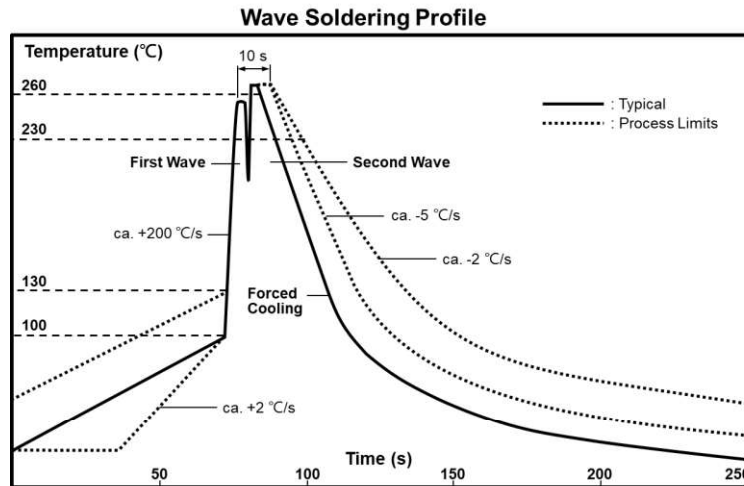


Low-Resistance Metal Film Chip Resistor

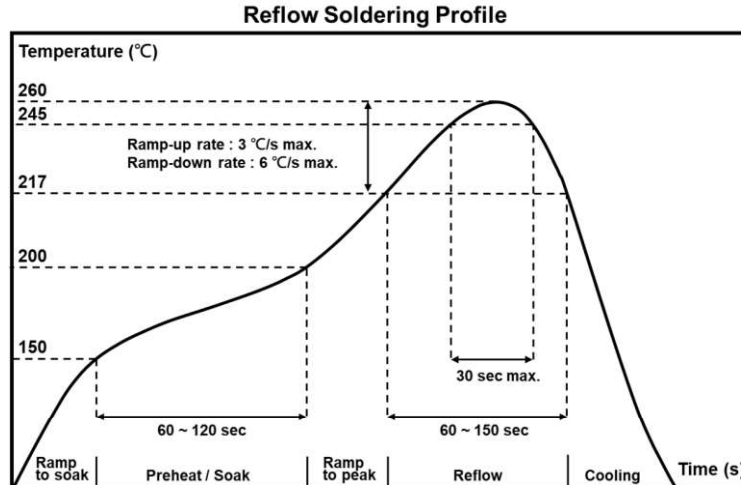
MFR ~Series

Recommended Solder Curve

Wave solder Temperature condition



Solder reflow Temperature condition



Rework temperature (hot air equipment): 350°C, 3~5seconds

Recommended reflow methods: IR, vapor phase oven, hot air oven

If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

Low-Resistance Metal Film Chip Resistor

MFR ~Series

Product Characteristics

Item	Test condition/ Methods	Limited	Standard
Temperature coefficient of resistance	$TCR = (R - R_0) / R_0 (T_2 - T_1) \times 10^6$ R_0 : resistance of room temperature R : resistance of 125°C T_1 : Room temperature T_2 : Temperature at 125°C	Refer to Spec	MIL-STD-202 Method 304
Short time Overload	Standard power: 6.25 times the rated power for 5 seconds High power (2X/4X) and wide terminal type: 5 times the rated power for 5 seconds	$\leq \pm 1.0\%$	IEC60115-1 4.13
Insulation Resistance	100VDC for 1 minute.	$\geq 10G\Omega$	JIS-C-5201-1 4.6 IEC-60115-1 4.6
Core Body Strength	Central part pressurizing force: 10N, 10 seconds	No broken	JIS-C5201-1 4.15
Resistance to Soldering Heat	260°C $\pm$ 5°C time: 10sec	$\leq \pm 1.0\%$ No Visual damage	JIS-C-5201-1 4.18 IEC-60115-1 4.18
Solderability	245°C $\pm$ 5°C time: 3sec	Solder coverage over 95% No Visual damage	IEC60115-1 4.17 JIS-C-5201-1 4.17
Leaching	260°C $\pm$ 5°C time: 30sec	Solder coverage over 95% No Visual damage	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1
Temperature Cycling	-55°C (15min)/+155°C(15min), 300 cycles	$\pm 1.0\%$ No Visual damage	JIS-C-5201-1 4.19 IEC-60115-1 4.19
High Temperature	155 $\pm$ 5°C for 1000hours, No power	$\leq \pm 1.0\%$	IEC60115-1 4.25
Storage Bias Humidity	1000 hours; +85°C, 85% RH, 10% of operating power, Measurement at 24 $\pm$ 4 hours after test conclusion.	$\leq \pm 0.5\%$	MIL-STD-202 Method103
Operational life	70°C $\pm$ 2°C, 1000 hours, at rated power 1.5 hours "ON", 0.5 hours "OFF"	$\leq \pm 1.0\%$	JIS-C-5201-1 4.24 IEC-60115-1 4.24
Damp Heat with Load	40°C $\pm$ 2°C, 90-95% R.H. RCW or Max. 1000 hours, 1.5 hours "ON", 0.5 hours "OFF"	$\leq \pm 1.0\%$	JIS-C-5201-1 4.24 IEC-60115-1 4.24
Resistance to Solvent	The tested resistor be immersed into isopropyl alcohol of 20~25 °C for 60 secs. Then the resistor is left in the room for 48 hrs.	$\leq \pm 1.0\%$	JIS-C-5201-1 4.29
Bending Strength	Bending once for 5 seconds: 1225 / 1020 = 2mm 0612=3mm	$\pm 1.0\%$ No Visual damage	JIS-C-5201-1 4.33 IEC-60115-1 4.33

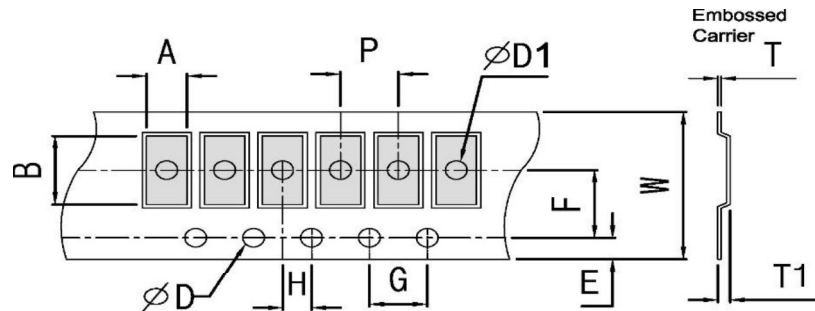
Note : Measurement at 24 $\pm$ 4 hours after test conclusion for all reliability tests-parts.

Low-Resistance Metal Film Chip Resistor

MFR ~Series

Packaging

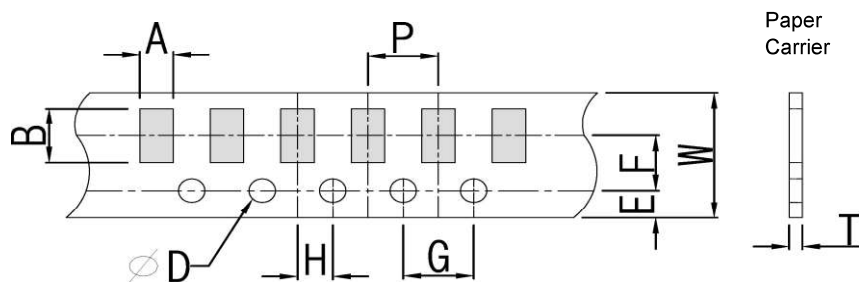
Embossed Dimensions



Unit: mm

Type	A	B	W	E	F	G
MFR1225A	3.40±0.2	6.70±0.2	12.0±0.1	1.75±0.1	5.5±0.05	4.0±0.1
	H	T	D	D1	T1	P
	2.0±0.05	0.23±0.1	1.5+0.1/-0	1.5±0.1	0.85±0.15	4.0±0.1

Type	A	B	W	E	F	G
MFR1020A	2.80±0.2	5.60±0.2	12.0±0.1	1.75±0.1	5.5±0.05	4.0±0.1
	H	T	D	D1	T1	P
	2.0±0.05	0.23±0.1	1.5+0.1/-0	1.5±0.1	0.85±0.15	4.0±0.1



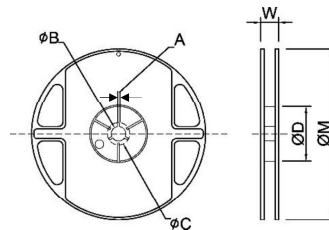
Unit: mm

Type	A	B	W	E	F	G
MFR0612A	2.85±0.2	3.05±0.2	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1
	H	T	D	P		
	2.0±0.05	0.75±0.1	1.5+0.1/-0	4.0±0.1		

Low-Resistance Metal Film Chip Resistor

MFR ~Series

Reel Dimensions



Unit: mm

Type	SIZE	A	B	C	D	W	M
MFR1225A	7 inch reel	2.0±0.5	13.5±1.0	21±1.0	60.0±1.0	16.0±2.0	178±2.0
MFR1020A	7 inch reel	2.0±0.5	13.5±1.0	21±1.0	60.0±1.0	16.0±2.0	178±2.0
MFR0612A	7 inch reel	2.0±0.5	13.5±1.0	21±1.0	60.0±1.0	11.5±2.0	178±2.0

Quantity of Package

Type	MFR1225A	MFR1020A	MFR0612A
Quantity(pcs)	4000	4000	5000

Storage

Storage time at the environment temp: 25±5°C and humidity: 60±20% is valid for one year from the date of deliver