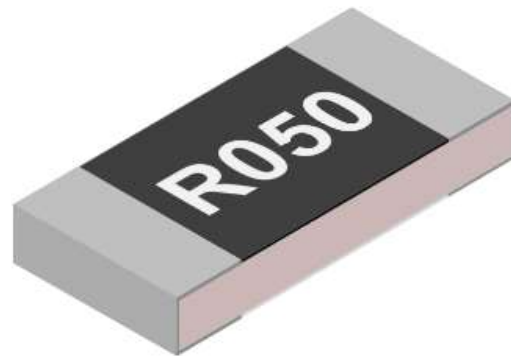


Low-Resistance Metal Film Chip Resistor

MFR20

Description

- Low Resistance / TCR
- Excellent high-frequency characteristics(≤ 2 nH)
- Excellent long-term stability
- High precision current sensing
- Ultra Anti-surge characteristics superior to standard Others metal film resistors
- 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 20 A 1 R100 F

【1】 【2】 【3】 【4】 【5】 【6】

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

【2】 Chip Size: 20: 2010

【3】 Terminals: A:2 terminals , B:4 terminals

【4】 Power Rating: D=0.75W, 1=1.5W

【5】 Resistance Code: R100: 100m Ω

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

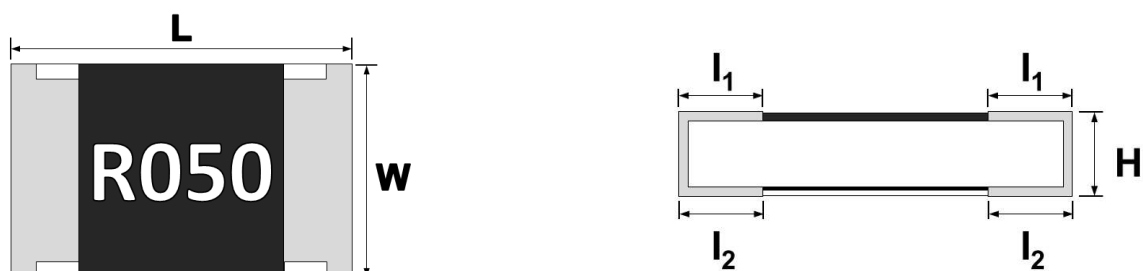
Electrical Characteristics

Part number	Power Rating at 70°C (W)	Resistance Range 0.5%,1.0%,2.0%, 5.0%	TCR (ppm/°C)	Operation Temperature Range
MFR20A	0.75	$100\text{m}\Omega \leq R \leq 10\Omega$	± 50	$-55^{\circ}\text{C} \sim +155^{\circ}\text{C}$
	1.5			

Low-Resistance Metal Film Chip Resistor

MFR20

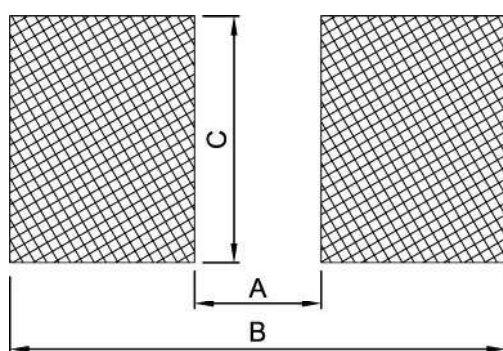
Physical Dimensions



Unit: mm

Part number	Power	L	W	H	l1	l2
MFR20A	0.75W	5.00±0.20	2.50±0.15	0.55±0.10	0.60±0.25	0.60±0.25
	1.5W					

Recommended Solder Pad Layout



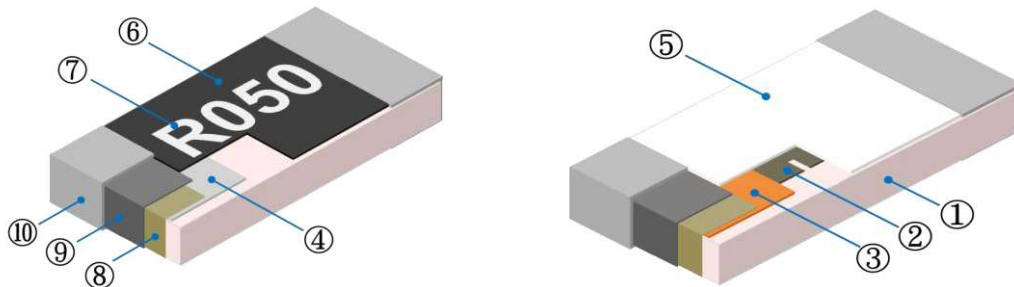
Unit: mm

Part number	A	B	C
MFR20A	3.80	6.60	2.70

Low-Resistance Metal Film Chip Resistor

MFR20

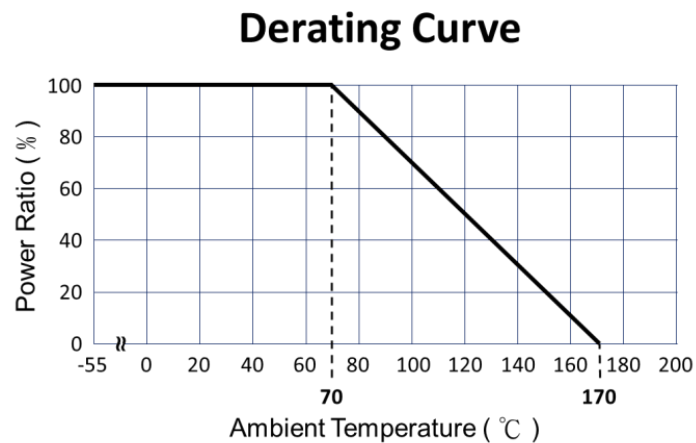
Construction



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:

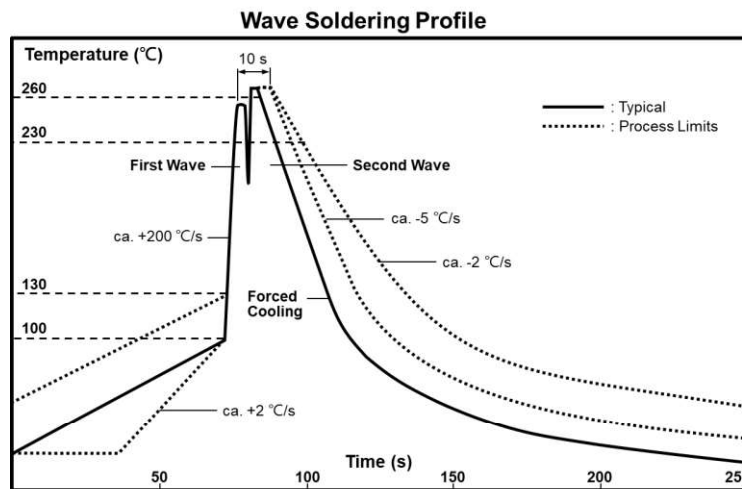


Low-Resistance Metal Film Chip Resistor

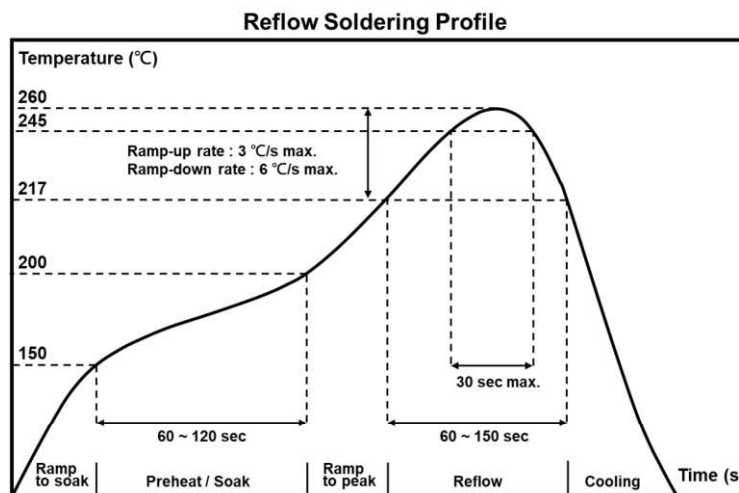
MFR20

Recommended Solder Curve

Wave solder Temperature condition



Solder reflow Temperature condition



- The peak temperature of soldering heat is 260°C for 10s.

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

MFR20

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 rated power whichever is less for 5 seconds.	$\leq \pm 1.0\%$	JIS-C-5201-1 4.13 IEC-60115-1 4.13
	High power (2X/4X) and wide terminal type: 5 times rated power whichever is less for 5 seconds.		
Insulation Resistance	100VDC for 1 minute.	$\geq 10G\Omega$	JIS-C-5201-1 4.6 IEC-60115-1 4.6
Dielectric Withstanding Voltage	Applied 500VAC for 1 minute.	No short or burned on the appearance.	JIS-C5201-1 4.7
Resistance to Soldering Heat	260°C $\pm$ 5°C time: 10sec	$\leq \pm 1.0\%$	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
Rapid Change of Temperature	-55°C to +155°C, 300 cycles.	$\pm 1.0\%$ No Visual damage	JIS-C-5201-1 4.19 IEC-60115-1 4.19
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.	$\pm 1.0\%$ No Visual damage	JIS-C-5201-1 4.29
High Temperature	155 $\pm$ 5°C for 1000hours, No power	$\leq \pm 1.0\%$	IEC60115-1 4.25
Storage Bias Humidity	1,000 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"	$\leq \pm 0.5\%$	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
Terminal Strength (SMD)	Pressurizing force for 10 seconds 2010 : 17.7N	No broken	JIS-C5201-1 4.32 AEC Q200-006
Bending Strength	Bending once for 5 seconds: 2010 = 2mm	$\pm 1.0\%$ No Visual damage	JIS-C-5201-1 4.33 IEC-60115-1 4.33

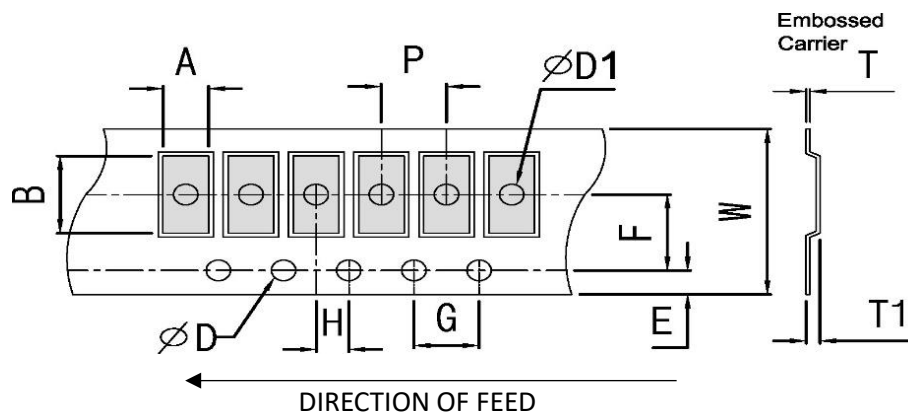
Note : Measurement at 24 $\pm$ 4 hours after test conclusion for all reliability tests-parts.

Low-Resistance Metal Film Chip Resistor

MFR20

Packaging

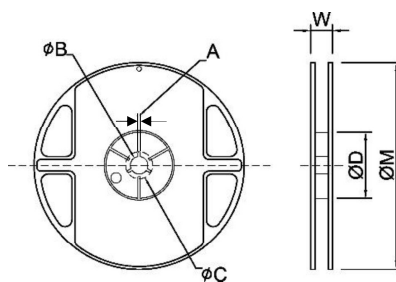
Embossed Dimensions



Unit: mm

Type	A	B	W	E	F	G
MFR20A	2.8±0.2	5.6±0.2	12±0.1	1.75±0.1	5.5±0.05	4±0.1
	H	T	D	D1	T1	P
	2±0.05	0.23±0.1	1.5+0.1/-0	1.5±0.1	0.85±0.15	4±0.1

Reel Dimensions



Unit: mm

Type	SIZE	Quantity (pcs)	A	B	C	D	W	M
MFR20A	7 inch reel	4000	2.0±0.5	13.5±1.0	21±1.0	60.0±1.0	16.0±2.0	178±2.0

Storage

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