

Low-Resistance Metal Film Chip Resistor

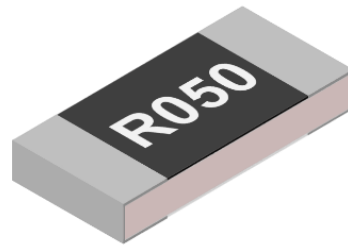
AMFR Series

PROSEMI offers AEC-Q200 qualified Current Sensing Resistor



Applications

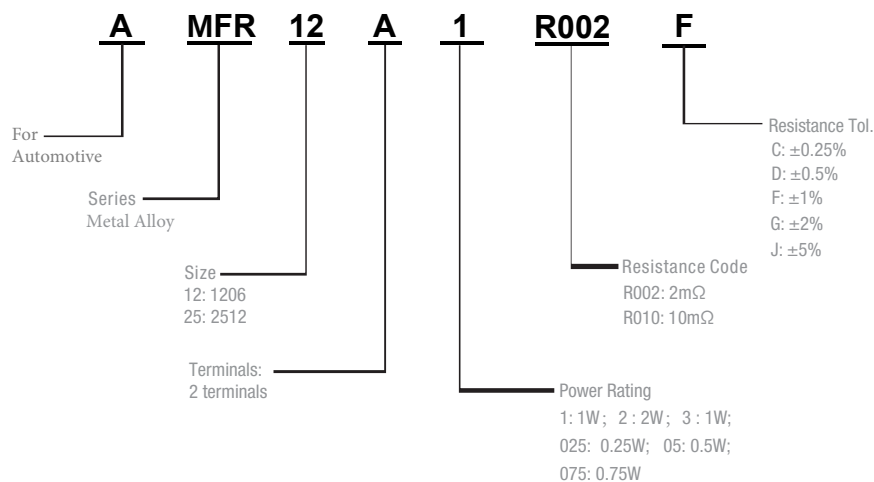
- Consumer electronics
- Computer & relative products
- Communication devices
- Measuring instrument
- Industrial / Power supply
- Battery management system



Features

- Low Resistance / TCR / Inductance($\leq 5\text{NH}$)
- Excellent long-term stability
- High precision current sensing
- High power capability
- Halogen free and lead free
- RoHS compliant
- AEC-Q200 compliant

Part Numbering System



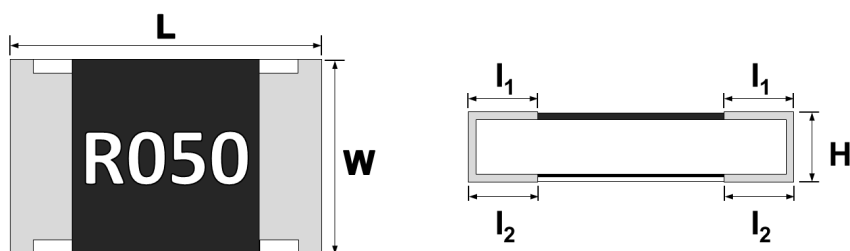
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AMFR Series

Type	Rating Power at 70°C	T.C.R. (ppm/°C)	Resistance Range(mΩ)		Material	Operating Temperature(°C)
			C: 0.25%	D: 0.5%, F: 1.0%, G: 2.0%, J: 5.0%		
AMFR12	0.25W, 0.75W 0.5W, 1W	±150	-	$39\text{m}\Omega \leq R < 50\text{m}\Omega$	Metal Alloy	-55~+155°C
		±100	-	$50\text{m}\Omega \leq R < 100\text{m}\Omega$		
		±50	$470\text{m}\Omega \leq R \leq 10\Omega$	$100\text{m}\Omega \leq R \leq 10\Omega$		
AMFR25	1W, 2W 3W	±50	$470\text{m}\Omega \leq R \leq 10\Omega$	$100\text{m}\Omega \leq R \leq 10\Omega$		

Type	Rating Power at 70°C	T.C.R. (ppm/°C)	Resistance Range(mΩ) F: 1.0%, G: 2.0%, J: 5.0%	Material	Operating Temperature(°C)
AMFR12	0.25W 0.5W	±200	$10\text{m}\Omega \leq R < 39\text{m}\Omega$	Metal Alloy	-55~+155°C

Construction

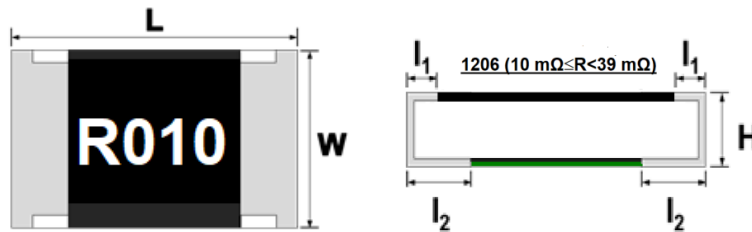


Unit: mm

Type	L	W	H	L ₁	L ₂
AMFR12	3.1 ±0.1	1.6 ±0.1	0.55 ±0.1	0.4 ±0.2	0.45 ±0.2
AMFR25	6.3 ±0.2	3.2 ±0.2	0.55 ±0.1	0.65 ±0.25	0.65 ±0.25
AMFR25 3W			0.7 ±0.15		

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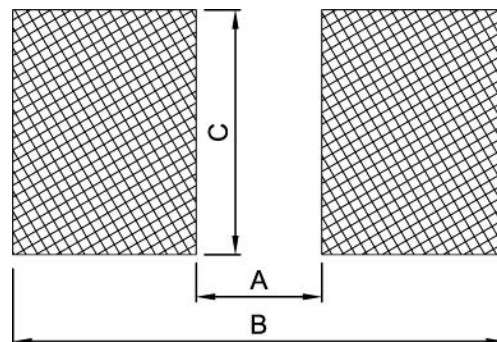
AMFR Series



Unit: mm

Type	L	W	H	l ₁	l ₂
AMFR12 (10mΩ ≤ R < 39mΩ)	3.3 ±0.2	1.7 ±0.2	0.65 ±0.2	0.2 ±0.15	0.68 ±0.2

Recommended land pattern



Unit: mm

Type	A	B	C
AMFR12	2.2	4.2	1.8
AMFR12 (10mΩ ≤ R < 39mΩ)	1.2	4.8	1.84
AMFR25	4.9	8.1	3.4

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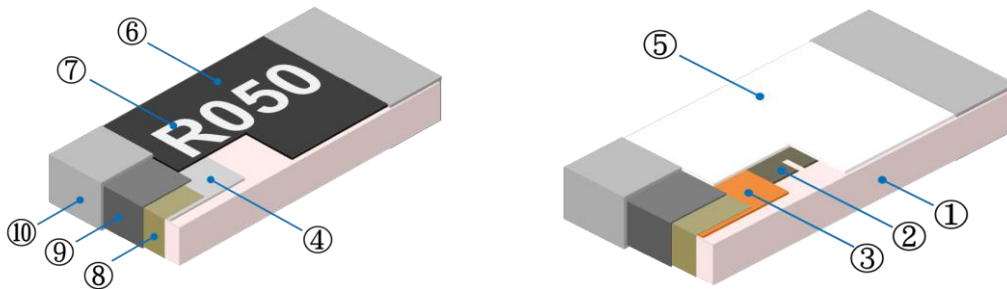
Product Characteristics

Item	Test condition/ Methods	Limited
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
Short time Overload	Standard power: 6.25 times rated power whichever is less for 5 seconds. High power (2X/4X) and wide terminal type: 5 times rated power whichever is less for 5 seconds.	$\pm(1.0\%+0.001\Omega)$
Resistance to Soldering Heat	260 $\pm$ 5 °C for 10 seconds.	$\pm(1.0\%+0.001\Omega)$ No Visual damage
Temperature Cycling	-55 °C to +155 °C , 300 cycles	$\pm(1.0\%+0.001\Omega)$ No Visual damage
High Temperature Exposure	At 155 $\pm$ 5 °C for 1000 hours.	$\pm(1.0\%+0.001\Omega)$
Bias Humidity	1,000 hours; 85°C / 85% RH, 10% of operating power. Measurement at 24 $\pm$ 4 hours after test conclusion.	$\pm(0.5\%+0.05\Omega)$
Leaching	260 $\pm$ 5 °C for 30 seconds.	>95% Coverage No Visual damage
Insulation Resistance	Apply 100VDC for 1 minute.	$\geq 10G\Omega$
Damp Heat with Load	40 $\pm$ 2 °C , 90~95% R.H. RCWV or Max. working current whichever is less for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"	$\pm(1.0\%+0.001\Omega)$
Solderability	245 $\pm$ 5°C for 3 seconds.	>95% Coverage No Visual damage
Load Life (Endurance)	70 $\pm$ 2°C, Rated power, or Max. working current whichever is less for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF" .	$\pm(0.5\%+0.05\Omega)$
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.	$\pm(1.0\%+0.001\Omega)$ No Visual damage
Bending Strength	Bending once for 5 seconds D: 1206 = 3mm 2512 = 2mm	$\pm(1.0\%+0.001\Omega)$ No Visual damage

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Construction

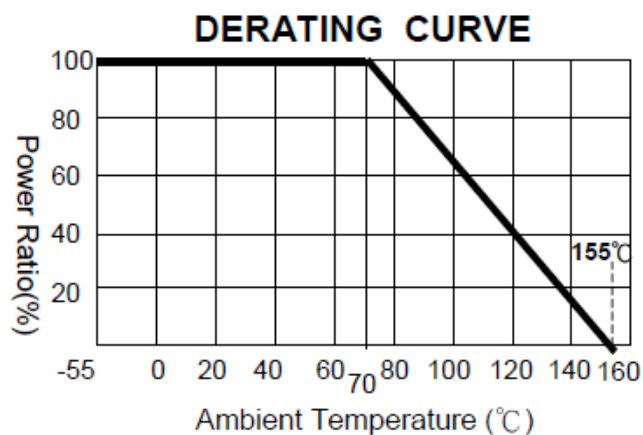


①	Alumina Substrate	⑥	Top Protective Overcoat
②	Resistive Layer	⑦	Marking
③	Bottom Inner Electrode (Cu)	⑧	Side Inner Electrode
④	Top Inner Electrode	⑨	Barrier Layer (Ni)
⑤	Bottom Protective Overcoat White($\geq 39\text{m}\Omega$) Green($<39\text{m}\Omega$)	⑩	Solder coating (Sn)

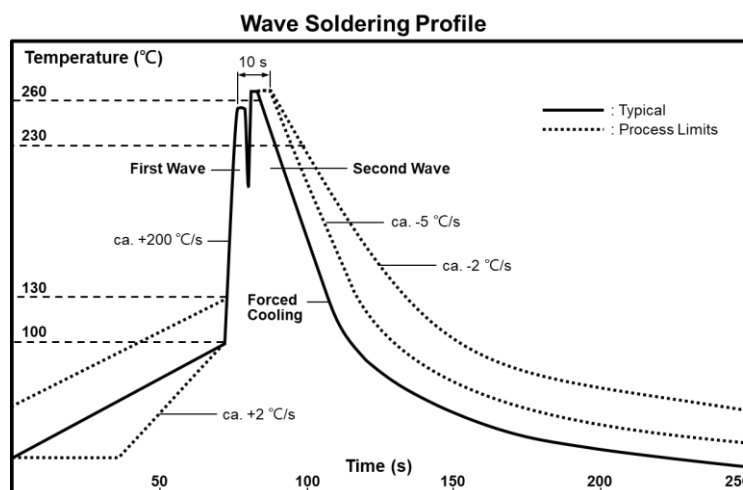
Power Derating Curve

The Operating Temperature Range: $-55^{\circ}\text{C} \sim +155^{\circ}\text{C}$.

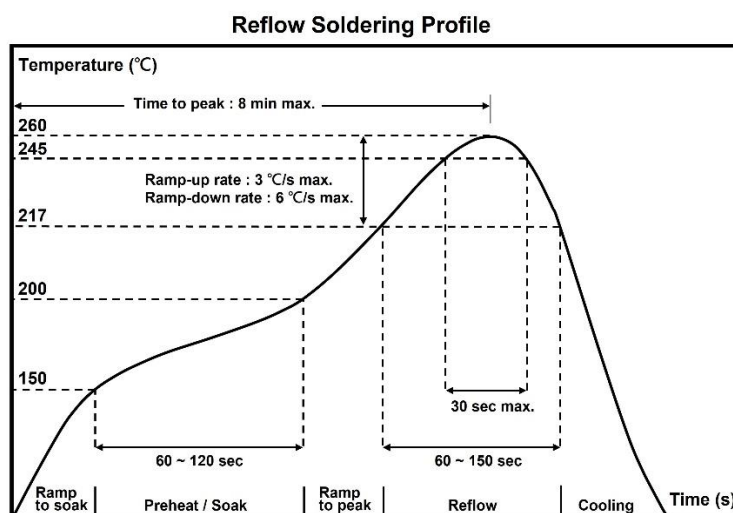
Power rating or current rating is in the case based on continuous full-load at ambient temperature of 70°C . For operation at ambient temperature in excess of 70°C , the load should be derated in accordance with figure of derating Curve.



Wave solder Temperature condition



Solder reflow Temperature condition



- **Rework temperature (hot air equipment) : 350°C, 3~5seconds**
- **Recommended reflow methods**

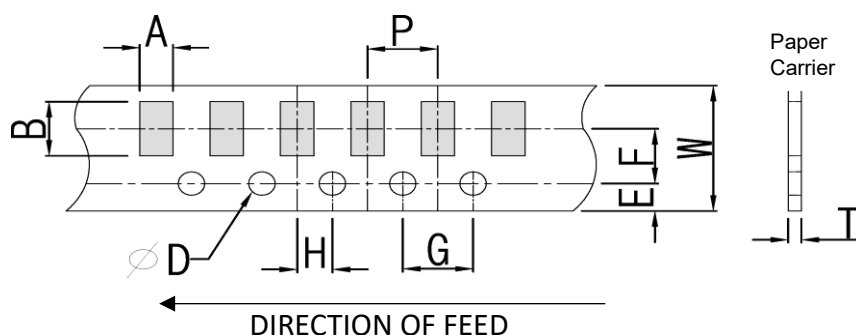
IR, vapor phase oven, hot air oven

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

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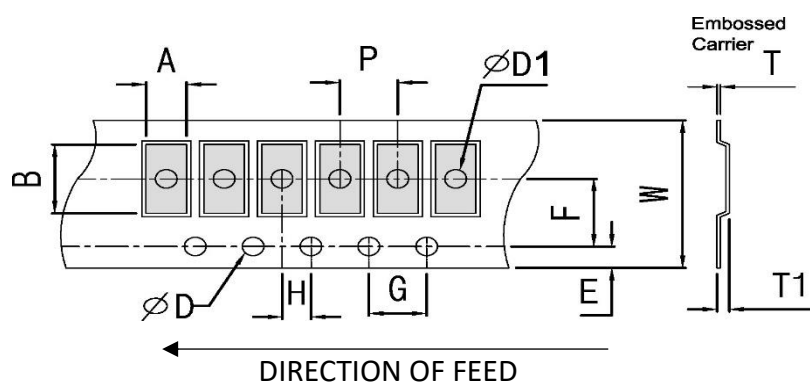
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Tapping & Package



Unit: mm

Type	A ±0.2	B ±0.2	W +0.2	E ±0.05	F ±0.05	G ±0.1	H ±0.05	T ±0.1	D ±0.1	P ±0.1
1206	1.9	3.05	8.0	1.75	3.5	4.0	2.0	0.75	1.50 ^{+0.1} ₀	4.0



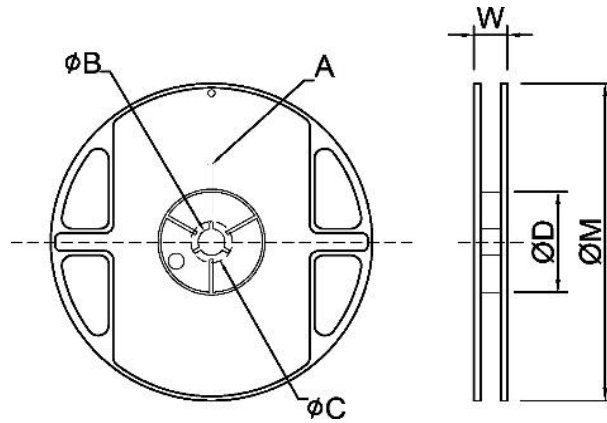
Unit: mm

Type	A ±0.2	B ±0.2	W +0.1	E ±0.1	F ±0.05	G ±0.1	H ±0.05	T ±0.1	D ±0.1	D1 ±0.1	T1 ±0.15	P ±0.1
2512	3.4	6.7	12.0	1.75	5.5	4.0	2.0	0.23	1.50 ^{+0.1} ₀	1.5	0.85	4.0

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Reel Specification



Unit: mm

Type	Quantity (pcs)	A	B	C	D	W	M
1206	5, 000	2.0±0.5	13.5±1	21±1	60±1	11.5±2	178±2
2512	4, 000					16.0±2	

- Storage Data :**

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