



**MQR Series Metal Foil Low-Resistance Resistor Product Specifications(AEC-Q200)**

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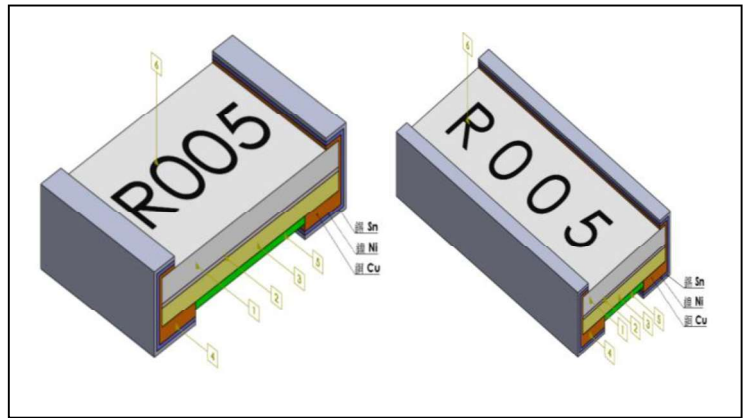
**■ Metal Foil Low Resistance Chip Resistor — MQR Series**

**■ Application**

- In-Vehicle Infotainment system
- Headlight control unit
- Non-safety Automotive electronics unit.

**■ Features**

- Low Resistance / TCR / Inductance
- Excellent long term stability
- RoHs compliant and halogen&Lead free.
- AEC-Q200 Compliant.



**■ Product structure:**

- (1) - Substrate : Alumina Ceramic
- (2) - Adhesive : Epoxy
- (3) - Resistive element : Cu – alloy
- (4) - Terminal electrode : Sn、Ni、Cu
- (5) - Protective coating : Flame-retardant epoxy, meets UL- 94-V0 requirements(green)
- (6) - Marking coating : Flame-retardant epoxy, meets UL- 94-V0 requirements (black)

**■ Parts Number Explanation**

**Example:**

<b>MQR</b>	<b>2512</b>	<b>20</b>	<b>F</b>	<b>R005</b>	<b>M</b>	<b>Z</b>
<b>Product Type</b>	<b>Size (Inch)</b>	<b>Rated Power</b>	<b>Tolerance</b>	<b>Resistance</b>	<b>Material</b>	<b>Optional</b>
	0805 1206 2512 3921 0508 0612 1225 2139	05=0.50W 07=0.75W 10=1.00W 15=1.50W 20=2.00W 30=3.00W 40=4.00W 50=5.00W	D : ±0.5% F : ±1.0% G : ±2.0%	2M50=2.5mR R005=5.0mR R020=020mR R150=150mR	N : CuNi44 M : CuMn12Ni S : CuMn7Sn	



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■ **Standard Electrical Specifications**

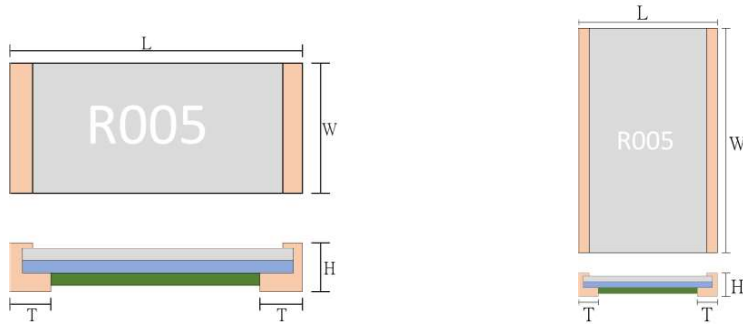
Short Terminal Type	Rating Power at 70°C	T.C.R. (ppm/°C)	Max. Rating Current	Max. Overload Current	Resistance Range (mΩ)		Material	Operating Temperature Range (°C)
					0.5% (D)	1.0% (F)		
MQR0805	0.5W	±75	10.00A	15.81A	-	5~9	R005~R006 : CuMn7Sn R007~R009 : CuMn12Ni R010~R065 : CuNi44	-55°C~155°C  (CuNi44 : -55°C~170°C)
		±50	7.07A	11.18A	10~65			
MQR1206	1W	±75	14.14A	22.36A	-	5~9	R005~R008 : CuMn7Sn R009 : CuMn12Ni R010~R090 : CuNi44	
		±50	10.00A	15.81A	10~90			
MQR2512	2W	±75	20.00A	31.62A	-	5~9	R005~R007 : CuMn7Sn R008~R009 : CuMn12Ni R010~R090 : CuNi44	
		±50	14.14A	22.36A	10~90			
MQR3921	3W	±100	24.49A	38.73A	-	5~9	R005~R007 : CuMn7Sn R008~R009 : CuMn12Ni R010~R050 : CuNi44	
		±50	17.32A	27.38A	10~50			
Wide Terminal Type	Rating Power at 70°C	T.C.R. (ppm/°C)	Max. Rating Current	Max. Overload Current	Resistance Range (mΩ)		Material	Operating Temperature Range (°C)
MQR0508	1W	±100	14.14A	22.36A	5~9		R005~R062 : CuNi44	-55°C~170°C
		±50	10.00A	15.81A	10~62			
MQR0612	1.5W	±100	17.32A	27.38A	5~9		R005~R062 : CuNi44	
		±50	12.24A	19.36A	10~62			
MQR1225	3W	±100	24.49A	38.72A	5~9		R005~R068 : CuNi44	
		±50	17.32A	27.38A	10~68			
MQR2139	4W	±100	28.28A	44.72A	5~9		R005~R047 : CuNi44	
		±50	20.00A	31.62A	10~47			



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■ **Type Dimension**



■ **Dimension**

Unit : mm

	<b>Power Rating</b>	<b>Resistance Range</b>	<b>L</b>	<b>W</b>	<b>H</b>	<b>T</b>
MQR0805	0.5W	5mΩ~65mΩ	2.00±0.25	1.20±0.25	0.65±0.20	0.50±0.20
MQR1206	1W	5mΩ~90mΩ	3.20±0.25	1.60±0.25	0.65±0.20	0.68±0.30
MQR2512	2W	5mΩ~90mΩ	6.40±0.30	3.20±0.30	0.65±0.20	1.05±0.30
MQR3921	3W	5mΩ~50mΩ	11.10±0.40	5.10±0.30	0.65±0.30	2.36±0.30
MQR0508	1W	5mΩ~62mΩ	1.20±0.25	2.00±0.25	0.65±0.20	0.43±0.20
MQR0612	1.5W	5mΩ~62mΩ	1.60±0.25	3.20±0.25	0.65±0.20	0.40±0.20
MQR1225	3W	5mΩ~68mΩ	3.20±0.30	6.40±0.30	0.65±0.20	0.60±0.20
MQR2139	4W	5mΩ~47mΩ	5.10±0.30	11.10±0.40	0.65±0.30	0.90±0.30



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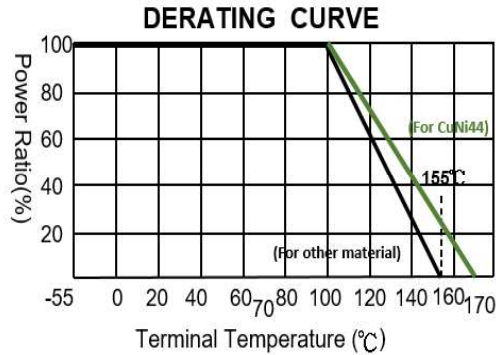
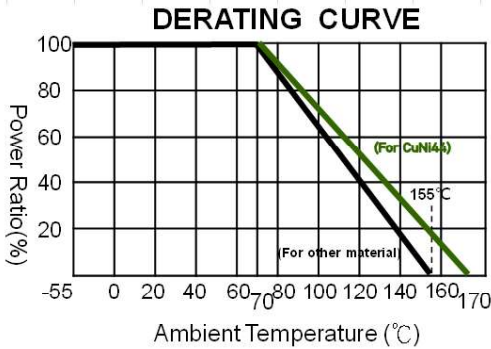
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**Performance Characteristics**

**Power Derating Curve**

The Operating Temperature Range: -55°C ~+155°C (CuNi44 material : -55°C ~+170°C).

For resistors operated in ambient temperatures above 70°C, power rating must be derated in accordance with the curve below (Terminal temperature derating from above 100°C )



**Rating Current**

The following equation may be used to determine the DC (Direct Current) or AC (Alternating Current) (RMS, root mean square value) of normal rated power. However, if the result value exceeds the highest current of regulated standards (paragraph 5), the highest normal rated power is to be used

$$I = \sqrt{P/R}$$

I = Rating current (A)  
 P= Rating Power (W)  
 R= Resistance(Ω)

**Reliability Test and Requirement**

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS-C-5201-1 4.8 IEC-60115-1 4.8	At 25°C /+125°C, 25°C is the reference temperature	As Spec
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	The number of rated power are as follows: 2.5 times of rated power for 5 seconds.	±1.0%+0.5mΩ
Leaching	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1	260±5°C for 30 seconds.	Individual leaching area ≤5% Total leaching area ≤ 10%
Resistance to Soldering Heat	JIS-C-5201-1 4.18 IEC-60115-1 4.18	260±5°C for 10 seconds.	±1.0%+0.5mΩ
Insulation Resistance	JIS-C-5201-1 4.6 IEC-60115-1 4.6	Apply 100VDC for 1 minute.	≥ 10GΩ
Temperature Cycling	JESD22 Method JA-104	1000 Cycles (-55°C to +125°C) Measurement at 24±4 hours after test conclusion. 30min maximum dwell time at each temperature extreme.	±2.0%+0.5mΩ



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Resistance to Solvent	MIL-STD-202 Method 215	Add Aqueous wash chemical - OKEM Clean or equivalent.	±2.0%+0.5mΩ
Biased Humidity	MIL-STD-202 Method 103	1,000 hours; 85°C / 85% RH, 10% of operating power. Measurement at 24±4 hours after test conclusion.	±2.0%+0.5mΩ
High Temperature Exposure (Storage)	MIL-STD-202 Method 108	1000 hrs. @ T=155°C. Unpowered. Measurement at 24±4 hours after test conclusion.	±2.0%+0.5mΩ
Operational Life	MIL-STD-202 Method 108	Condition D Steady State TA=125°C at derated power.Measurement at 24±4 hours after test conclusion.	±2.0%+0.5mΩ
External Visual	MIL-STD-883 Method 2009	Electrical test not required. Inspect device construction, marking and workmanship.	—
Mechanical Shock	MIL-STD-202 Method 213	)Test ½ Sine Pulse, Peak value: 100g, normal duration: 6ms, Velocity change:12.3ft/sec.	±2.0%+0.5mΩ
Vibration	MIL-STD-202 Method 204	5 g's for 20 min., 12 cycles each of 3 orientations. Note: Test from 10-2000 Hz	±2.0%+0.5mΩ
ESD	AEC-Q200- 002 or ISO/DIS 10605	Human body model 0805 and above : 2KV	±3.0%+0.5mΩ
Solderability	J-STD-002	(1) 4 hrs 155°C dry heat (2) 245±5°C 3 sec.	The covered area >95%
Terminal Strength (SMD)	AEC Q200-006	Pressurizing force for 60 seconds 0805 and above : 17.7N	No broken
Board Flex	AEC Q200-005	Beading once for 60 seconds all sizes:2mm	±2.0%+0.5mΩ

**■ Marking Format:**

- 0805 type products marking are 3 or 4 digits.
  - “R” designates the decimal location in ohms
  - e.g. 3 digits
    - 50mΩ the product marking is 050.
    - 500mΩ the product marking is 500.
  - e.g. 4 digits
    - 20mΩ the product marking is R020.
  - “M” designates the decimal location in milli-ohms
  - e.g. 5.5mΩ the product marking is 5M50.
  
- 1206 and above type products marking are 4 digits.
  - “R” designates the decimal location in ohms
  - e.g. 1mΩ the product marking is R001.
  - 20mΩ the product marking is R020.
  - “M” designates the decimal location in milli-ohms
  - e.g. 5.5mΩ the product marking is 5M50.
- The criteria to distinguishing the mark on the surface of products are that characters can be identified.



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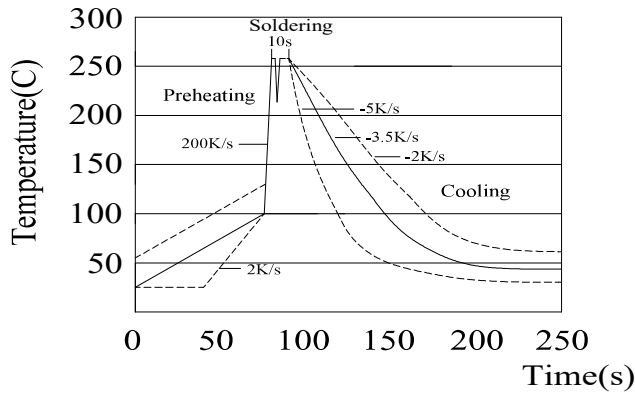
● Recommended Customer Soldering Parameters

■ Wave solder Temperature condition

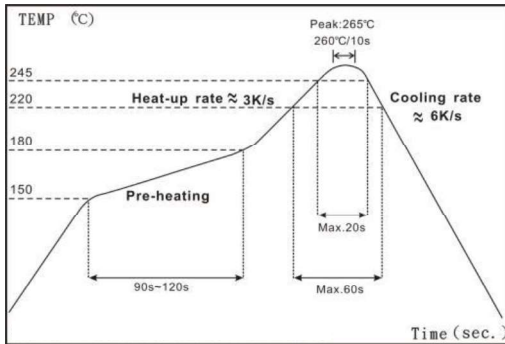
Preheating : 100°C~130°C, max.100 sec.

Soldering: 250°C~265°C max. 10 sec.

Maximum temperature : 260±5°C, max. 10sec.



■ Solder reflow Temperature condition



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

■ Recommended reflow methods

IR, vapor phase oven, hot air oven

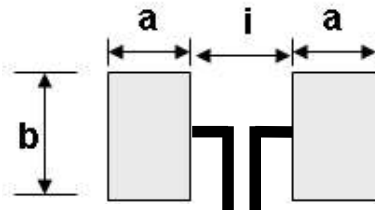
If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.



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■ **Recommend Land Pattern Design**



■ **Dimension**

Unit: mm

TYPE	Resistance Range	a	b	i
MQR0805 – 0.5W	5mΩ~65mΩ	1.40	1.44	0.80
MQR1206 – 1W	5mΩ~90mΩ	1.80	1.84	1.20
MQR2512 – 2W	5mΩ~90mΩ	3.10	3.57	3.10
MQR3921 – 3W	5mΩ~50mΩ	4.50	5.75	5.00

■ **Dimension**

Unit: mm

TYPE	Resistance Range	a	b	i
MQR0508–1W	5mΩ~62mΩ	1.10	2.30	0.60
MQR0612 – 1.5W	5mΩ~62mΩ	1.30	3.68	0.60
MQR1225 – 3W	5mΩ~68mΩ	2.35	7.25	1.40
MQR2139 – 4W	5mΩ~47mΩ	2.80	12.65	2.40

■ **Packing Quantity**

TYPE	PCS /Reel
MQR0805 / MQR0508	5000
MQR1206 / MQR0612	5000
MQR2512 / MQR1225	4000
MQR3921/ MQR2139	2000



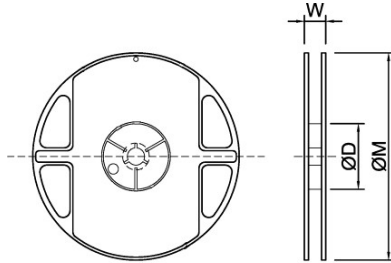
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**Appendix For SMD Chip Resistor**

**● Packaging Information**

**■ Reel Dimensions**

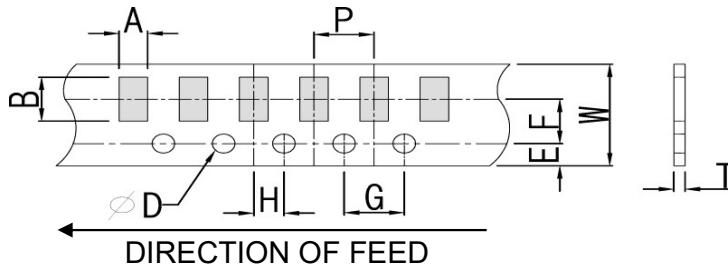


**■ Dimension**

**Unit: mm**

TYPE	$\phi D$	W	$\phi M$
MQR0805 / MQR1206 MQR0508 / MQR0612	60±2	9.0±1	178±5
MQR2512 / MQR1225		13±1	
MQR3921 / MQR2139		24.5±1	

**■ Carrier Dimensions**



**■ Dimension**

**Unit: mm**

Item	W	P	E	F	$\phi D$	G	H	A	Bo	T
MQR0805	8.0±0.30	4.0±0.10	1.75±0.10	3.5±0.10	1.50 <sup>+0.1</sup> <sub>0</sub>	4.0±0.10	2.0±0.10	1.68±0.20	2.38±0.20	0.87±0.20
MQR0508										
MQR1206								2.05±0.20	3.65±0.20	0.87±0.10
MQR0612										

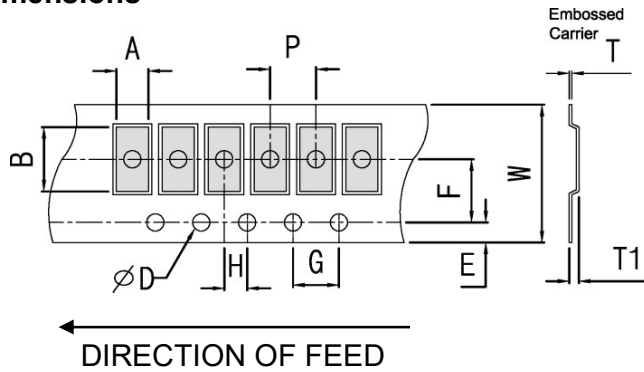




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**■ Embossed Dimensions**



**■ Dimension**

**Unit: mm**

Item	W	P	E	F	$\phi D$	G	H	A	B	T1	T
MQR2512	12.0±0.30	4.0±0.10	1.75±0.10	5.5±0.10	1.50 <sup>+0.1</sup> <sub>-0</sub>	4.0±0.10	2.0±0.10	3.40±0.20	6.75±0.20	1.00±0.20	0.25±0.10
MQR1225											
MQR3921	24.0±0.30	8.0±0.10	1.75±0.10	11.5±0.10	1.50 <sup>+0.1</sup> <sub>-0</sub>	4.0±0.10	2.0±0.10	5.50±0.20	11.5±0.20	0.90±0.20	0.30±0.10
MQR2139											

**■ Peeling Strength of Seal Tape**

Peeling Strength: 0.1 – 1.0N (10 - 100gf )

**■ Storage Temperature**

Temperature : 25±5°C, Humidity : 60±20%