后芮驷(上海)电子有限公司

Horus International Electronics Co., LTD.

承认书

SPECIFICATION FOR APPROVAL

编号:

品名	DESCRIPTION：	金属膜微电阻
规格	SPEC :	HRS-MQRXXXXXXXXXXXXZ
包装	PACKAGE:	卷装
客户	CUSTOMER：	
客户料号	CUSTOMER P/N:	

APPROVED BY	
CUSTOMER	HORUS

■ Metal Foil Low Resistance Chip Resistor — MQR Series

■ Application

— In-Vehicle Infotainment system

— Headlight control unit

— Non-safety Automotive electronics unit.

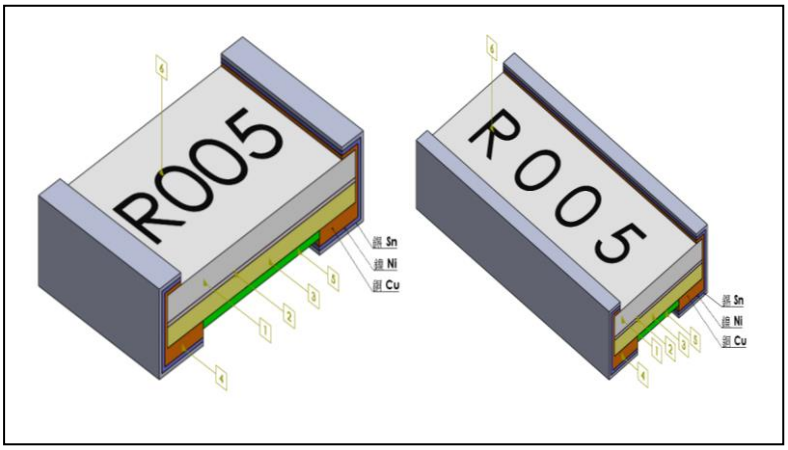
■ Features

— 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:

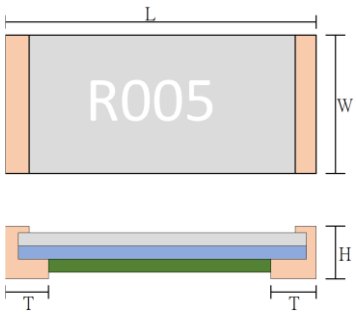
MQR	2512	20	F	R005	M	Z
Product Type	Size (Inch)	Rated Power	Tolerance	Resistance	Material	Optional
	0805 1206 2010 2512 3921 0508 0815 0612 1020 1225 2139	05=0.50W 07=0.75W 10=1.00W 15=1.50W 20=2.00W 30=3.00W 40=4.00W 50=5.00W	D : ±0.5% F : ±1.0% G : ±2.0%	2M50=2.5mR R005=5.0mR R020=020mR R150=150mR	N : CuNi44 M : CuMn12Ni S : CuMn7Sn	

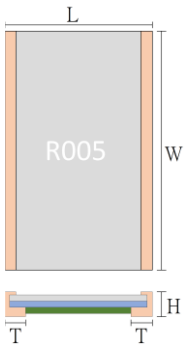
■ Standard Electrical Specifications

Short Terminal Type	Rating Power at 70℃	T.C.R. (ppm/℃)	Max. Rating Current	Max. Overload Current	Resistance Range (mΩ)		Material	Operating Temperature Range (℃)
					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℃~155℃ （CuNi44：-55℃~170℃）
		±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			
MQR2010	1.5W	±75	17.32A	27.38A	-	5~9	R005~R008 : CuMn7Sn R009 : CuMn12Ni R010~R090 : CuNi44	
		±50	12.24A	19.36A	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℃	T.C.R. (ppm/℃	Max. Rating Current	Max. Overload Current	Resistance Range (mΩ)		Material	Operating Temperature Range (℃)
					1.0% (F)	2.0% (G)		
MQR0508	1W	±100	14.14A	22.36A	5~9		R005~R062：CuNi44	-55℃~155℃ （CuNi44：-55℃~170℃）
		±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			
MQR0815	1.5W	±100	17.32A	27.38A	5~9		R005~R020：CuNi44	
		±50	12.24A	19.36A	10~20			
MQR1020	2W	±100	44.72A	70.71A	1~9		R001 : CuMn7Sn R002~R004 : CuMn12Ni R005~R062：CuNi44	
		±50	14.14A	22.36A	10~62			
MQR1225	3W	±100	54.77A	86.60A	1~9		R001 : CuMn7Sn R002~R004 : CuMn12Ni 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			

■ Type Dimension





■ Dimension

Unit：mm

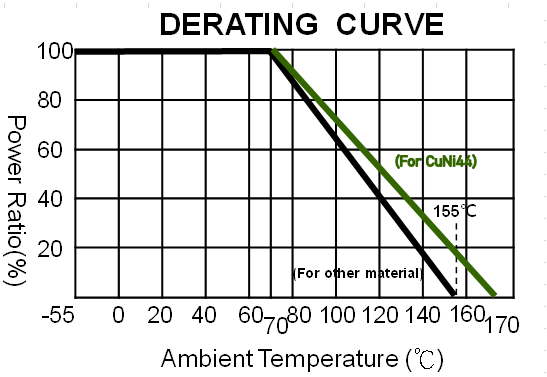
	Power Rating	Resistance Range	L	W	H	T
MQR0805	0.5W	5mΩ~65mΩ	2.00±0.25	1.20±0.25	0.65±0.20	0.50±0.20
MQR1206	1W	5mΩ~90mΩ	3.20±0.25	1.60±0.25	0.65±0.20	0.68±0.30
MQR2010	1.5W	5mΩ~90mΩ	5.08±0.25	2.54±0.25	0.65±0.20	0.70±0.30
MQR2512	2W	5mΩ~90mΩ	6.40±0.30	3.20±0.30	0.65±0.20	1.05±0.30
MQR3921	3W	5mΩ~50mΩ	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
MQR0815	1.5W	5mR~20mR	2.20±0.25	3.80±0.25	0.65±0.20	0.61±0.20
MQR1020	2W	1mΩ~62mΩ	2.50±0.30	5.00±0.30	0.65±0.20	0.65±0.20
MQR1225	3W	1mΩ~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

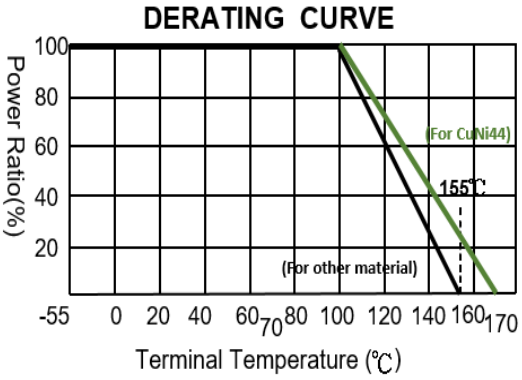
■ Performance Characteristics

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℃ /+125℃, 25℃ 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℃ 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℃ 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

Test Item	Test Method	Procedure	Requirements
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℃ dry heat (2) 245±5℃ 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.

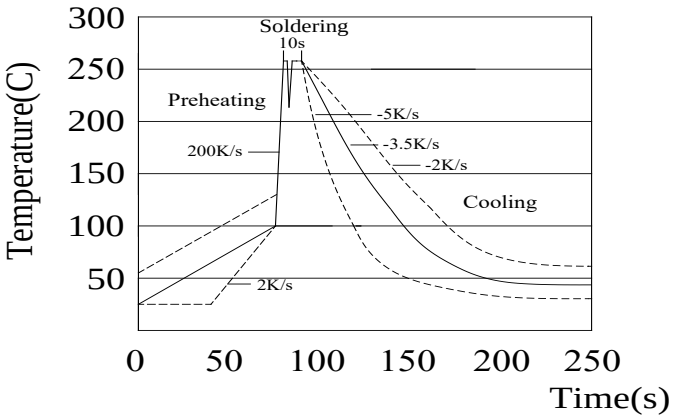
● Recommended Customer Soldering Parameters

■ Wave solder Temperature condition

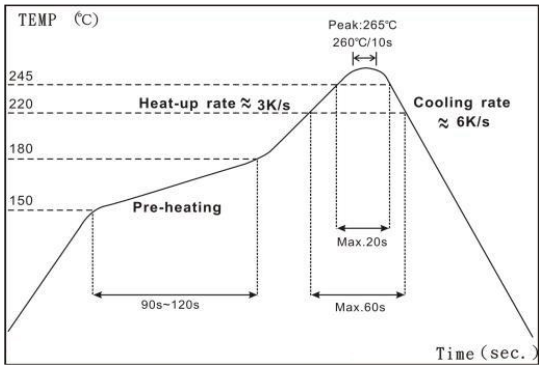
Preheating : 100℃~130℃, max.100 sec.

Soldering: 250℃~265℃ max. 10 sec.

Maximum temperature : 260±5℃, max. 10sec.



■ Solder reflow Temperature condition



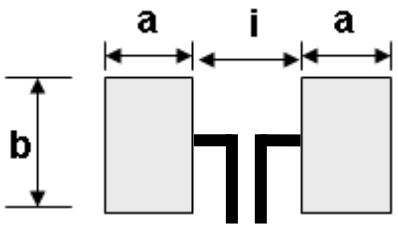
■ Rework temperature（hot air equipment）：350℃, 3~5seconds

■ Recommended reflow methods

IR, vapor phase oven, hot air oven

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

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
MQR2010 – 1.5W	5mΩ~90mΩ	2.65	2.88	2.7
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
MQR0815-1.5W	5mR~20mR	1.40	4.26	0.7
MQR1020 – 2W	1mΩ~62mΩ	2.25	5.75	1.00
MQR1225 – 3W	1mΩ~68mΩ	2.35	7.25	1.40
MQR2139 – 4W	5mΩ~47mΩ	2.80	12.65	2.40

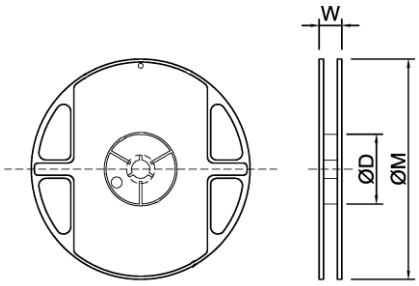
Packing Quantity

Type	PCS /Reel
MQR0805 / MQR0508	5000
MQR1206 / MQR0612	5000
MQR0815 / MQR2010 / MQR2512 / MQR1020 / MQR1225	4000
MQR3921/ MQR2139	2000

■ Appendix For SMD Chip Resistor

● Packaging Information

■ Reel Dimensions

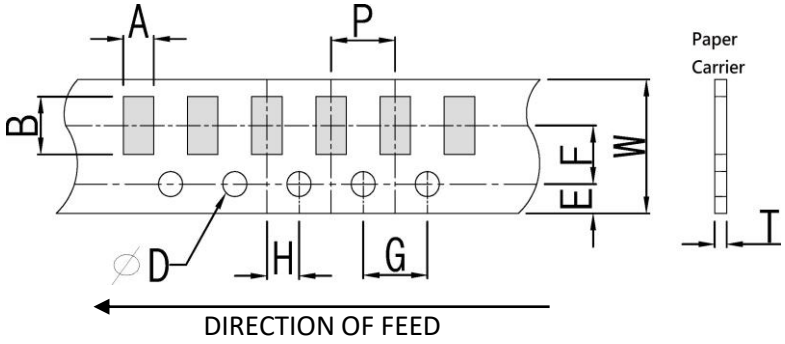


■ Dimension

Unit: mm

Type	⌀D	W	⌀M
MQR0805 / MQR1206 MQR0508 / MQR0612	60±2	9.0±1	178±5
MQR2010 / MQR2512 / MQR0815 / MQR1020 / MQR1225		13±1	
MQR3921 / MQR2139		24.5±1	

■ Carrier Dimensions

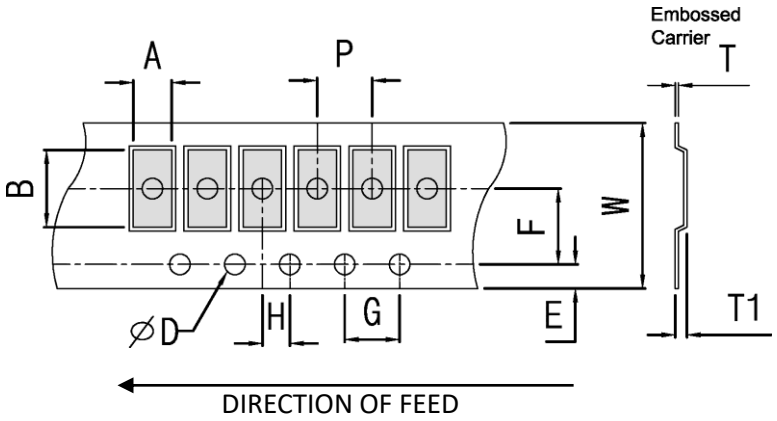


■ Dimension

Unit: mm

Item	W	P	E	F	⌀D	G	H	A	B	T
MQR0805	8.0±0.30	4.0±0.10	1.75±0.10	3.5±0.10	$1.50^{+0.1}_{-0}$	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										

Embossed Dimensions



Dimension

Unit: mm

Item	W	P	E	F	ØD	G	H	A	B	T1	T
MQR0815	12.0±0.40	4.0±0.10	1.75±0.10	5.5±0.10	$1.50^{+0.1}_{-0}$	4.0±0.10	2.0±0.10	2.40±0.20	4.10±0.20	0.75±0.20	0.25±0.10
MQR2010	12.0±0.30	4.0±0.10	1.75±0.10	5.5±0.10		4.0±0.10	2.0±0.10	2.85±0.20	5.45±0.20	0.80±0.20	0.25±0.10
MQR1020											
MQR2512	12.0±0.30	4.0±0.10	1.75±0.10	5.5±0.10		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		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℃, Humidity：60±20%