

抗硫化厚膜晶片电阻 Anti-Sulfur Thick Film Chip Resistor FRR Series



■应用 (Application)

- Industrial Equipent
- Power Application
- Networking Application
- High-end Computer & Multimedia Electronics in high sulfur environment
- Automotive electronics
- 工业设备
- 电源应用
- 网络应用
- 高硫环境下的高端计算机与多媒体电子
- 汽车电子

■特性 (Features)

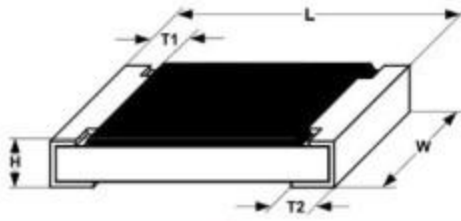
- AEC-Q200 qualified
- Superior resistance against sulfur containing atmosphere
- AEC-Q200 合格
- 优异的抗硫性

■料号说明 (Parts Number Explanation)

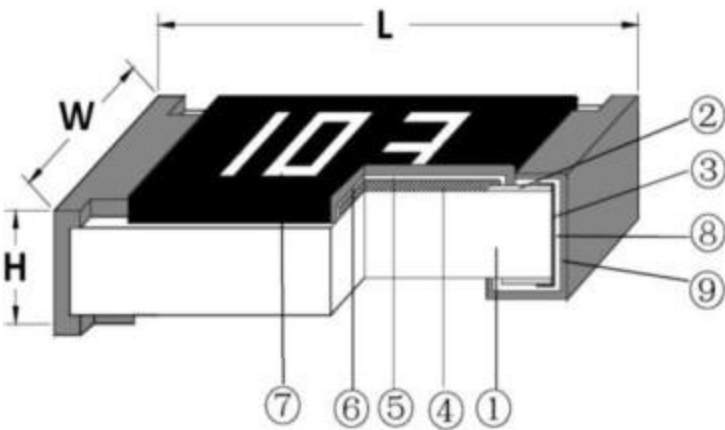
示例 Example: FRR1206J101 TS

F 公司名	R 产品别	R 功能别	1206 尺寸	J 公差	101 字码	T 包装别	S 端电极	特殊码
FOJAN	R:Resistor C:Capacitor L:Inductor D:Diode A:Audion	C:Normal P:Hi-Power L:Lowohmic A:Array S:Surge H:Hi-Precision V:Hi-Voltage Q:Auto-motive R:Anti-sulfur M:Metal D: LED	0201 0402 0603 0805 1206 1210 1218 1812 2010 2512	B:±0.1% C:±0.25% D:±0.5% F:±1% J:±5% P: Jumper	±5%:E24 3-digits+blank 102=1KΩ 1R0=1Ω ±1%&Below : E24+E96 : 4-digits 1001=1KΩ 1R00=1Ω	T: 7 inch reel Q:10 inch reel R:13 inch reel B:Bulk	S : Sn C : Cu A : Au	N:Normal D : LED
Company code	Type code	Functional code	Size code	Tolerance code	Resistance code	Packaging code	Termination code	Special Case

尺寸 (Dimension) :

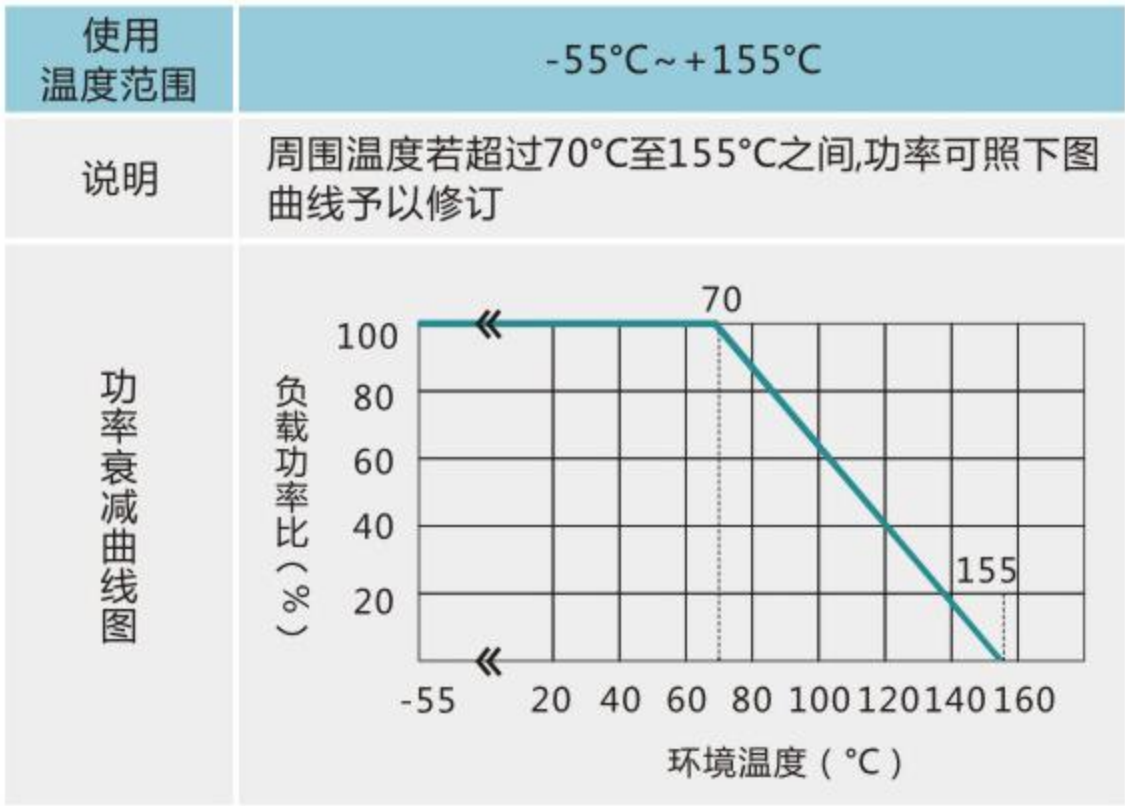
尺寸 dimension					
	单位 (unit) : mm				
型别 (Type)	L	W	H	T1	T2
0402	1.00±0.05	0.50±0.05	0.35±0.05	0.20±0.10	0.25±0.10
0603	1.60±0.10	0.80±0.10	0.45±0.10	0.25±0.15	0.25±0.15
0805	2.00±0.10	1.25±0.10	0.50±0.10	0.35±0.20	0.35±0.20
1206	3.10±0.10	1.60±0.10	0.55±0.10	0.45±0.20	0.40±0.20
1210	3.10±0.10	2.60±0.15	0.55±0.10	0.45±0.15	0.50±0.20
2010	5.00±0.10	2.50±0.15	0.55±0.10	0.45±0.15	0.50±0.20
2512	6.35±0.10	3.10±0.15	0.55±0.10	0.60±0.20	0.50±0.20

电阻结构 (Construction)



NO.	结构 construction	主要材料 Major material
1	陶瓷基板 Ceramic substrate	三氧化二铝 Al ₂ O ₃
2	银电极 Conductive layer	银 Ag
3	侧电极 Side conductive layer	镍铬合金 NiCr
4	阻体层 Resistive layer	氧化钌+玻璃 RuO ₂ + glass
5	内保护层 Inner protective layer	玻璃 Glass
6	外保护层 Outer Protective layer	环氧树脂 Epoxy
7	文字 Marking	环氧树脂 Epoxy
8	镍电极 Ni plating layer	镍 Ni
9	锡电极 Sn plating layer	锡 Matte Tin

功率衰减曲线 (Derating Curve) :



电气特性 (Electrical characteristics) :

型别 Type	0402	0603	0805	1206	1210	2010	2512
绝缘耐压 Dielectric Withstanding Voltage	100V	100V	300V	500V	500V	500V	500V
零欧姆阻值 ±5% Resistance Value of Jumper ±5%	<50mΩ	<50mΩ	<50mΩ	<50mΩ	<50mΩ	<50mΩ	<50mΩ
零欧姆额定电流 Rated Current of Jumper	1A	1A	2A	2A	2A	2A	2A
零欧姆电阻最大电流 Max Current of Jumper	2A	2A	5A	10A	10A	10A	10A

电性规格 (Standard Electrical Specifications)

型别 Type	额定功率 (Power Rating at 70℃)	最高工作电压 Max. RCWV	最大过负荷电压 Max. Overload Voltage	T.C.R. (PPM/℃)	阻值范围 Resistance Range
0402	1/16W	50V	100V	±200 PPM/℃	1Ω~10Ω 10M Ω~22M Ω
				±100 PPM/℃	10 Ω~10M Ω
0603	1/10W	75V	150V	±200 PPM/℃	1Ω~10Ω 10M Ω~22M Ω
				±100 PPM/℃	10 Ω~10M Ω
0805	1/8W	150V	300V	±200 PPM/℃	1Ω~10Ω 10M Ω~22M Ω
				±100 PPM/℃	10 Ω~10M Ω

型别 Type	额定功率 (Power Rating at 70℃)	最高工作电压 Max. RCWV	最大过负荷电压 Max. Overload Voltage	T.C.R. (PPM/℃)	阻值范围 Resistance Range
1206	1/4W	200V	400V	±200 PPM/℃	1Ω~10Ω
					10M Ω~22M Ω
				±100 PPM/℃	10 Ω~10M Ω
1210	1/2W	200V	500V	±200 PPM/℃	1Ω~10Ω
					10 Ω~10M Ω
				±100 PPM/℃	
2010	3/4W	200V	500V	±200 PPM/℃	1Ω~10Ω
					10 Ω~10M Ω
				±100 PPM/℃	
2512	1W	200V	500V	±200 PPM/℃	1Ω~10Ω
					10 Ω~10M Ω
				±100 PPM/℃	

如有非标准品的需求,请联系我们的业务部门 For non-standard parts, please contact our sales dept.

■性能 (Performance Specifications) :

内容 Item	测试方法 Test Methods	测试条件 Test Conditions	规格 Specification
温度系数 Temperature Coefficient	JIS C 5201 4.8	$TCR = (R - R_0) / (t - t_0) R_0 \times 10^6 \text{ (ppm)}$ R_0 电阻在室温下的阻值(resistance at room temperature) R 电阻在 125℃或-55℃下的阻值(resistance at 125℃ or -55℃) t_0 室温(room temperature) t 测试温度 (test temperature 125℃ or -55℃)	$1\Omega < R \leq 10\Omega$: $\pm 200 \text{ PPM/}^\circ\text{C}$ $10\Omega < R \leq 10M\Omega$: $\pm 100 \text{ PPM/}^\circ\text{C}$ $10M\Omega < R \leq 22M\Omega$: $\pm 200 \text{ PPM/}^\circ\text{C}$
短时间过负荷 Short-time overload	JIS C 5201 4.13	加载 2.5 倍的额定电压, 时间 5 秒后测量试验前后的阻值变化率。 Applied 2.5 times of rated voltage for 5 second. Measure the variation of resistance.	$\pm(1.00\% + 0.05\Omega)$
焊锡性 Solderability	JIS C 5201 4.17	沾助焊剂后浸入锡炉, 锡炉温度 $245 \pm 5^\circ\text{C}$, 时间 3 ± 0.5 秒。 Dip the terminal in a flux and then dip into a soldering bath at $245 \pm 5^\circ\text{C}$ for $3 \pm 0.5\text{sec}$.	$> 95\%$ 面积上锡 $(> 95\% \text{ coverage})$
抗焊锡热 Resist to soldering heat	JIS C 5201 4.18	沾助焊剂后浸入锡炉, 锡炉温度 $260 \pm 5^\circ\text{C}$, 时间 10 ± 0.5 秒, 测量试验前后的阻值变化率。 Dip the terminal in a flux and then dip into a soldering bath at $260 \pm 5^\circ\text{C}$ for $10 \pm 0.5\text{sec}$. Measure the variation of resistance.	$\pm(1.00\% + 0.05\Omega)$

内容 Item	测试方法 Test Methods	测试条件 Test Conditions	规格 Specification
绝缘电阻 Insulation resistance	JIS C 5201 4.6	电阻本体上加载绝缘耐压 60±5 秒后，测量绝缘阻抗。 Applied the dielectric withstanding voltage on the center of body for 60±5seconds. Then measure insulation resistance.	>10GΩ
绝缘耐压 Dielectric withstanding voltage	JIS C 5201 4.7	电阻本体上加载绝缘耐压 60±5 秒。 Applied the dielectric withstanding voltage on the center of body for 60±5seconds.	无击穿、飞弧及可见机械性损伤 No evidence of flashover, mechanical damage arcing or insulation breakdown
端子弯曲 Terminal bending	JIS C 5201 4.33	电阻焊接在测试板上进行弯折,弯折保持时间 20±1 秒，1206(含) 以下的尺寸弯曲 5+0.2/0 mm; 1206 以上的尺寸弯曲 2+0.2/0 mm; 量测试验前后阻值变化率 Specimen shall be mounted on test board, then bend the board and maintained for 20±1s. the distance of bending is 5+0.2/0 mm for resistors which size no larger than 1206 or 2+0.2/0 mm which size larger than 1206. Measure the variation of resistance.	±(1.00% +0.05Ω)
温度循环 Temperature Cycling	JIS C 5201 4.19	电阻放入温度循环机中，温度 155±2℃至 -55±3℃，共 5 个循环。量测试验前后阻值变化率。 Put specimen in a chamber which temperature can be changed to 155±2℃ or -55±3℃, repeated 5 times. Measure the variation of resistance.	±(2.00% +0.05Ω)

内容 Item	测试方法 Test Methods	测试条件 Test Conditions	规格 Specification
负荷寿命 Load life	JIS C 5201 4.25.1	电阻放入恒温箱中，温度 $70\pm 2^{\circ}\text{C}$ ，ON TIME:1.5H，OFF TIME:0.5H，通电额定电压 1000 $\pm 24/_{-0}$ 小时，量测试前后阻值变化率。 Put the specimen in a chamber at $70\pm 2^{\circ}\text{C}$ temperature, ON TIME:1.5H，OFF TIME:0.5H， and applied rated voltage for 1000 $\pm 24/_{-0}$ H. Measure the variation of resistance.	$\pm(2.00\% + 0.05\Omega)$
温湿循环 Moisture resistance	MIL-STD-202 METHOD 106	25°C~65°C,90~100%RH, 2.5 小时; 65°C 90~100%RH, 3 小时; 65°C~25°C,80~100%RH,2.5 小时,10 个循环,试 验结束 24 $\pm$ 4 小时后进行测试。 25°C~65°C,90~100%RH, 2.5H; 65°C 90~100%RH, 3H; 65°C~25°C 80~100%RH, 2.5H, 10 cycles, Measurement at 24 $\pm$ 4 hours after test conclusion.	$\pm(2.00\% + 0.05\Omega)$
抗硫化试验 Sulfuration test	ASTM-B-809-95	Sulfur 750 hours at 105°C unpowered	$\pm(4.0\% + 0.05\Omega)$ Max
耐湿特性 Biased Humidity	MIL-STD-202 METHOD 103	加载 10% 额定功率，85°C /85%RH, 持续通电1000H, 试验结束24 $\pm$ 4 小时后进行测试 1000 hours 85°C /85%RH. Note: Specified conditions: 10% of operating power. Measurement at 24 $\pm$ 4 hours after test conclusion.	$\pm(2.00\% + 0.05\Omega)$ Max