

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)

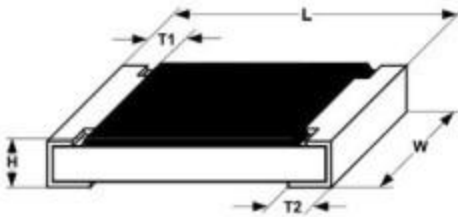
- AEC-Q200 qualified
- Superior resistance against sulfur containing atmosphere
- AEC-Q200 合格
- 优异的抗硫性

■料号说明 (Parts Number Explanation)

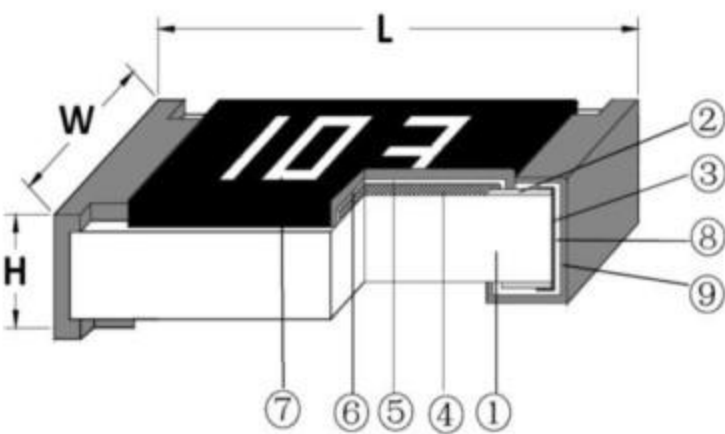
示例 Example: FRR1206J101 TS

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

■尺寸 (Dimension) :

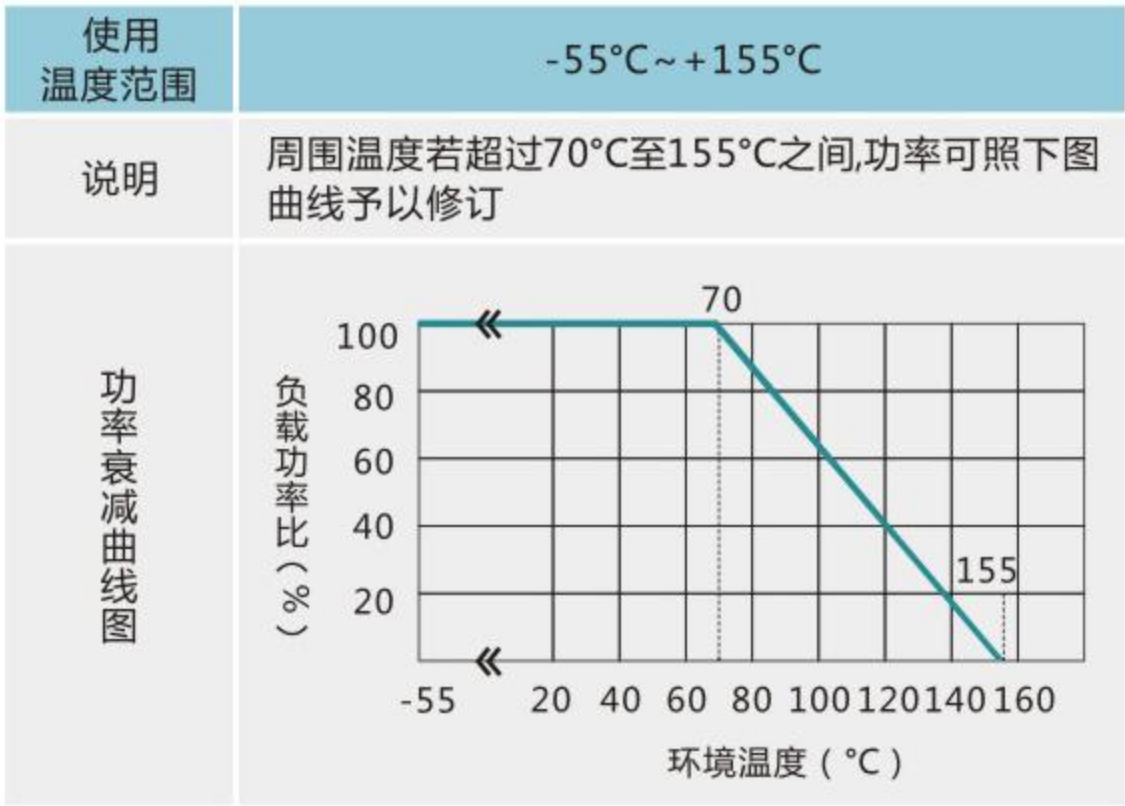
尺寸 dimension					
	单位 (unit) : mm				
型别 (Type)	L	W	H	T1	T2
0402	1.00±0.05	0.50±0.05	0.35±0.05	0.20±0.10	0.25±0.10
0603	1.60±0.10	0.80±0.10	0.45±0.10	0.25±0.15	0.25±0.15
0805	2.00±0.10	1.25±0.10	0.50±0.10	0.35±0.20	0.35±0.20
1206	3.10±0.10	1.60±0.10	0.55±0.10	0.45±0.20	0.40±0.20
1210	3.10±0.10	2.60±0.15	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
				±100 PPM/℃	10 Ω~10M Ω
2010	3/4W	200V	500V	±200 PPM/℃	1Ω~10Ω
				±100 PPM/℃	10 Ω~10M Ω
2512	1W	200V	500V	±200 PPM/℃	1Ω~10Ω
				±100 PPM/℃	10 Ω~10M Ω

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℃)	1Ω<R≤10Ω: ±200 PPM/℃ 10Ω<R≤10MΩ: ±100 PPM/℃ 10MΩ<R≤22MΩ: ±200 PPM/℃
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.	±(1.00% +0.05Ω)
焊锡性 Solderability	JIS C 5201 4.17	沾助焊剂后浸入锡炉, 锡炉温度 245±5℃, 时间 3±0.5 秒。 Dip the terminal in a flux and then dip into a soldering bath at 245±5℃ for 3±0.5sec.	> 95%面积上锡 (> 95% 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±5℃, 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±5℃ for 10±0.5sec. Measure the variation of resistance.	±(1.00% +0.05Ω)

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