FOSAN TECHNOLOGY 富捷科技

Product Datasheet
产品规格说明书

FRA Series
Thick Film Chip Resistor Array
厚膜片式排列电阻器

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厚膜片式排列电阻器

Thick Film Chip Resistor Array

FRA Series

■ 特点 (Features)

- 体积小，重量轻
- 可靠性，高质量
- 节省空间
- 符合 RoHS

- Small size and light weight
- Reliability, high quality
- Saving of PCB space
- RoHS compliant

■ 应用 (Application)

- SDRAM 和 DDRAM 终端
- 计算机应用
- 消费电子设备：PDA；PND
- 手机，电信等

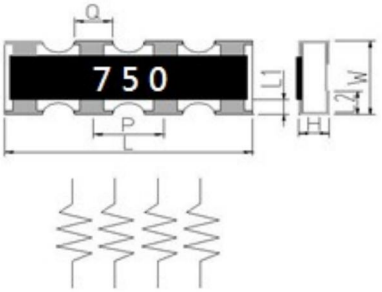
- Terminal for SDRAM and DDRAM
- Computer applications ： laptop；desktop
- Consume electronic equipment ： PDA；PND
- Mobile phone telecom…

■ 产品料号 (Parts Number Explanation)

示例(Example)：FRA064RJ103TS

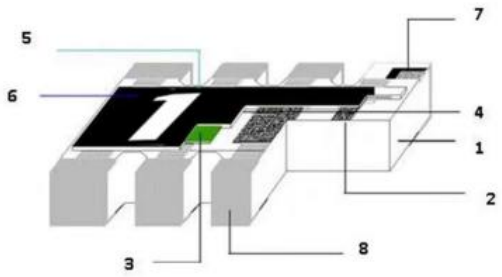
F 公司	R 产品别	A 功能别	064R 尺寸	J 公差	103 字码	T 包装别	S 端电极	特殊
FOJAN	R:Resistor C:Capacitor L: Inductor D:Diode A:Audion Q:Automotive	C:Normal P:Hi-Power L:Lowohmic A:Array S:Surge H:Hi-Precision V:Hi-Voltage Q:Auto-motive R:Anti-sulfur M:Metal D: (LED)	064R： 0603X4 044R： 0402X4	B:±0.1% C:±0.25% D:±0.5% F:±1% J:±5% P: Jumper	±5%:E24 3-digits+blank 103=10KΩ 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	Blank ：none N: Normal D： LED
Company	Type	Functional	Size	Tolerance	Resistance	Packaging	Termination	Special

▪ 尺寸(Dimension):

尺寸 dimension	 单位（unit）：mm

型别（Type）	L	W	H	L1	Q	P	L2
064R	3.20±0.20	1.60±0.15	0.50±0.10	0.30±0.20	0.50±0.15	0.80±0.20	0.30±0.20
044R	2.00±0.10	1.00±0.10	0.40±0.10	0.20±0.10	0.30±0.10	0.50±0.10	0.20±0.10

▪ 电阻结构（Construction）

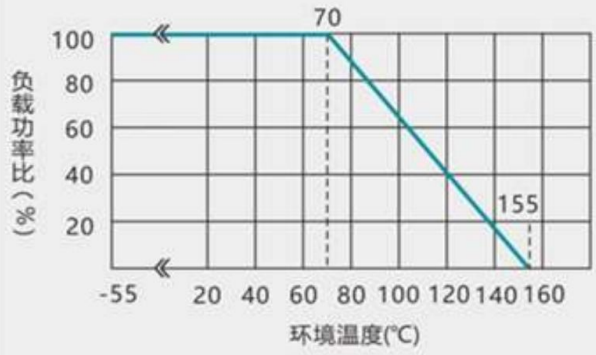


NO.	结构 construction	主要材料 Major material
1	陶瓷基板 Ceramic substrate	三氧化二铝 Al_2O_3
2	银电极 Conductive layer	银 Ag
3	阻体层 Resistive layer	氧化钌+玻璃 RuO_2 + glass
4	内保护层 Inner protective layer	玻璃 Glass
5	外保护层 Outer Protective layer	环氧树脂 Epoxy
6	文字 Marking	环氧树脂 Epoxy
7	镍电极 Ni plating layer	镍 Ni
8	锡电极 Sn plating layer	锡 Matte Tin

▪ 功率衰减曲线（Derating Curve）

-55℃～+155℃

周围温度若超过70℃至155℃之间，功率可照下图曲线予以修订



▪ 阻值范围（Resistance range）

型别 Type	阻值范围 Resistance Range	
	F (±1%)	J (±5%)
064R	1Ω~1MΩ	1Ω~1MΩ
044R	1Ω~1MΩ	1Ω~1MΩ

▪ 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	绝缘耐压 Dielectric With standing Voltage	T.C.R. (PPM/℃)	阻值范围 Resistance Range
064R	1/10W	50V	100V	100V	± 200	1Ω~1MΩ
044R	1/16W	25V	50V	100V	± 250	1Ω~10Ω
					± 200	10Ω~1MΩ

性能 (Performance Specifications)

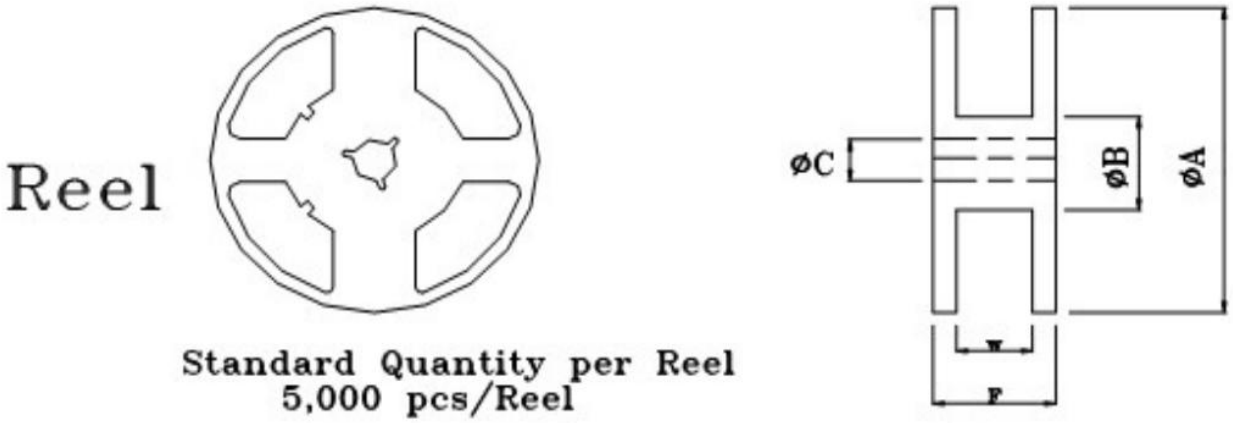
内容 Item	测试方法 Test Methods	测试条件 Test Conditions	规格 Specification
短时间过负荷 Short-time overload	JIS C 5201 4.13	加载 2.5 倍的额定电压，时间 5 秒后测量试验前后的阻值变化率。 Applied 2.5 times of rated voltage for 5 second. Measure the variation of resistance.	±1%: (1.0% +0.05Ω) ±5%: (2.0% +0.05Ω)
温度系数 Temperature Coefficient	JIS C 5201 4.8	TCR= (R-R0) / (t-t0) R0 ×10^6 (ppm) R0 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℃) t0 室温(room temperature) t 测试温度（test temperature 125℃ or -55℃)	1Ω≦R≦10Ω: ±400 PPM/℃ 10Ω<R≦10MΩ:±200PPM/℃
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	MIL-STD-202 METHOD 210	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%: (0.5% +0.05Ω) ±5%: (1.0% +0.05Ω)
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
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，弯曲 5+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. 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
温度循环 Temperature Cycling	JESD22 METHOD JA-104	-55℃~+ 155℃， 循环 1000 次，在每一个极限温度持续时间不超过 30 分钟，且温度转换时间不超过 1 分钟，试验结束 24±4 小时后进行测试. 1000 Cycles (-55℃ to +155℃) Measurement at 24±4 hours after test conclusion. 30min maximum dwell time at each temperature extreme. 1min. maximum transition time.	±1%: (0.5% +0.05Ω) ±5%: (1.0% +0.05Ω)
耐湿特性 Humidity	MIL-STD-202 METHOD 103	加载 10%额定功率，85℃/85%RH, 持续通电 1000H,试验结束 24±4 小时后进行测试 1000 hours 85℃/85%RH. Note: Specified conditions: 10% of operating power. Measurement at 24±4 hours after test conclusion.	±1%: (1.0% +0.05Ω) ±5%: (3.0% +0.05Ω)
负荷寿命 Load life	MIL-STD-202 METHOD 108	电阻放入恒温箱中，温度 125±2℃， ON TIME:1.5H ，OFF TIME:0.5H，通电额定电压 1000 $^{+24}/_{-0}$ 小时，量测试验前后阻值变化率. Put the specimen in a chamber at 125±2℃ temperature, ON TIME:1.5H , OFF TIME:0.5H, and applied rated voltage for 1000 $^{+24}/_{-0}$H. Measure the variation of resistance.	±1%: (1.0% +0.05Ω) ±5%: (3.0% +0.05Ω)
温湿循环 Moisture resistance	MIL-STD-202 METHOD 106	25℃~65℃,90~100%RH,2.5 小时； 65℃ 90~100%RH,3 小时； 65℃~25℃,80~100%RH,2.5 小时，10 个循环，试验结束 24±4 小时后进行测试. 25℃~65℃,90~100%RH,2.5H;65℃ 90~100%RH,3H;65℃~25℃ 80~100%RH,2.5H,10 cycles, Measurement at 24±4 hours after test conclusion.	±(2.00%+0.05Ω)

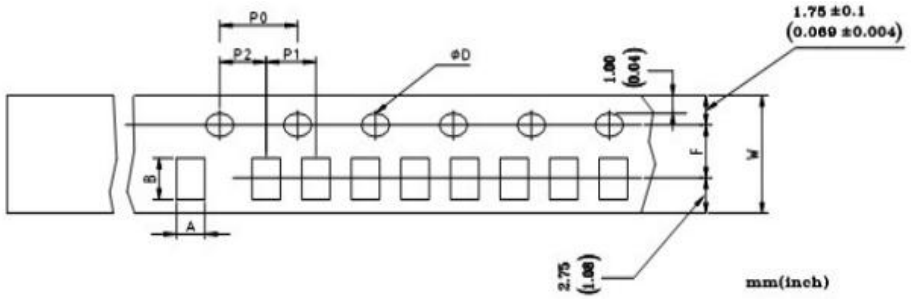
▪包装规格（Tapping Specification）

-卷盘尺寸（Reel dimension）

Type	Size		Unit	A	B	C	F	W
064R/044R	7”	5K/Reel	mm	178±2.0	60.0±1.0	13.5±0.5	11.4±0.1	9.00±0.3



-包装尺寸（packing dimension）



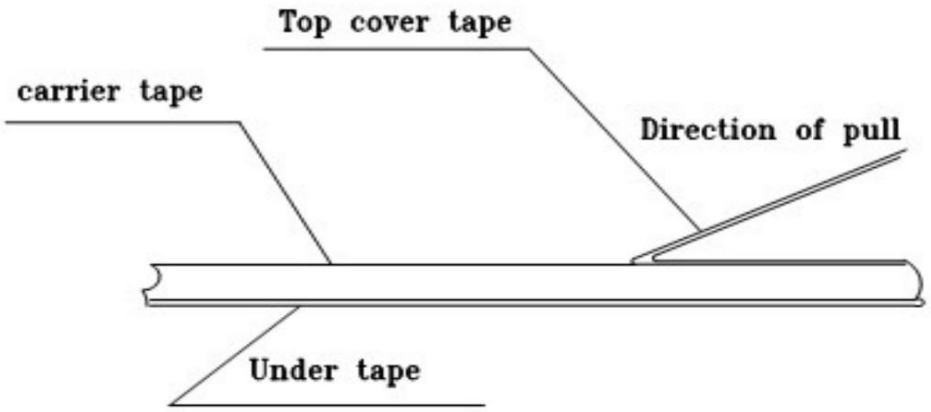
Unit: mm

Dimensions	A	B	D		F	P0	P1	P2	W
044R	1.20±0.20	2.20±0.20	1.50±	0.1 0.0	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	8.00±0.20
064R	1.90±0.20	3.50±0.20	1.50±	0.1 0.0	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	8.00±0.20

▪上胶带剥离力测试（Peel force of top cover tape）

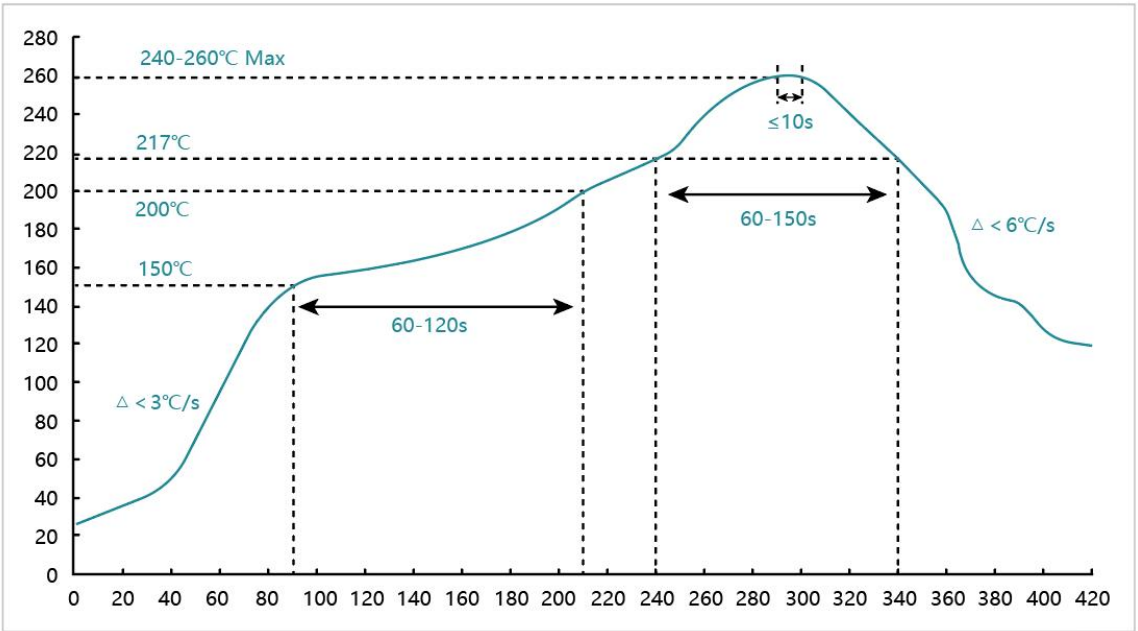
上胶带以 200mm/分钟的速度，沿 165∽180 度角的方向进行剥离，如下图所示。纸带的剥离力范围为 10g∽70g； 载带的剥离力范围为 30∽100g。

The top cover tape is pulled at a speed of 200 mm/min with the angle between the tape during peel and the direction of unreeling maintained at 165 to 180 degree as following picture. The peel force of paper carrier tape shall be 0.1N to 0.7N(10 to 70 g), the peel force of plastic carrier tape shall be 0.3N to 1N (30 to 100 g)

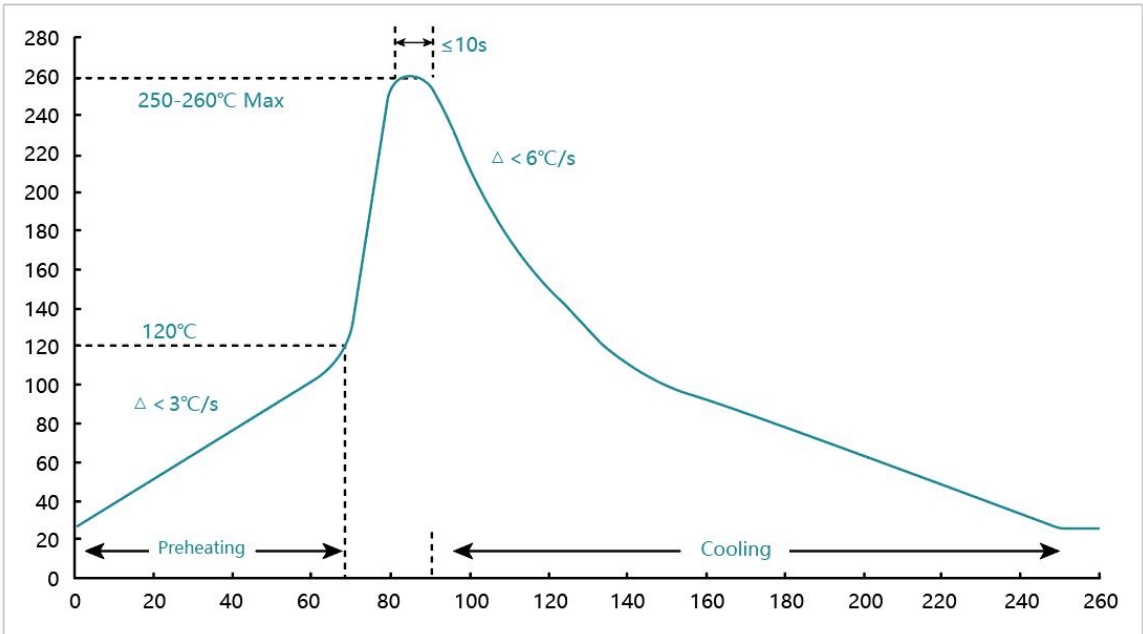


▪ 焊接（soldering）

- 建议回流焊曲线（Recommend reflow soldering profile）



- **建议波峰焊曲线（Recommend wave soldering profile）**



- **手工焊温度（hand soldering temperature）**

烙铁温度 350±10℃ 3 秒之内，避免烙铁接触电阻本体

The iron temperature is 350±10℃, hand soldering time less than 3S. Avoid solder iron tip direct touch the components body

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修订履历 (Revision History)

版本 Version	修订日期 Revision Date	修订内容 Revision Description	版本确认 Version Checked
FJ-JS-3001-V1.0	2020.12.01	原版 The original version	魏效振 Xiaozhen Wei
FJ-JS-3001-V2.0	2025.12.30	版本及格式修订 Version and format revision	魏效振 Xiaozhen Wei