

常规厚膜片式电阻器 (Thick Film Chip Resistor)



■应用 (Application)

- Entertainment: Stereo, TV tuners, Tape recorder
- Appliance: Air conditioner, Refrigerator
- Computer & relative products: Main board, PDA
- Communication equipment: Cell phone, Fax machine
- Power equipment: Power supply, II Lumination equipment
- Measuring instrument: Electric meter, Navigation equipment
- 娱乐: 立体声、电视调谐器、录音机
- 电器: 空调、冰箱
- 电脑及相关产品: 主板、PDA
- 通讯设备: 手机、传真机
- 电源设备: 电源、二级照明设备
- 测量仪器: 电表、导航设备

■特点 (Features)

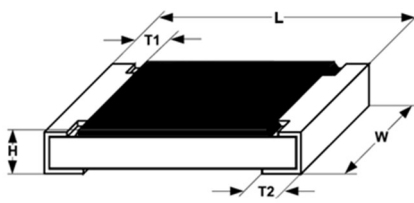
- small size and light weight
- Reliability, high quality
- 体积小、重量轻
- 可靠性, 高质量

■产品料号 (Parts Number Explanation)

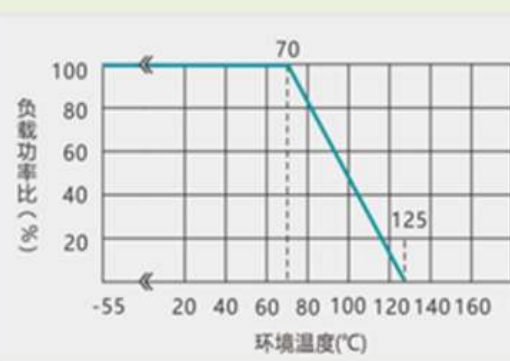
示例 (Example): FRC01005F1001TS

<u>F</u> 公司名	<u>R</u> 产品别	<u>C</u> 功能别	<u>01005</u> 尺寸	<u>F</u> 公差	<u>1001</u> 阻值代码	<u>T</u> 包装别	<u>S</u> 端电极	特殊码
FOJAN	R: Resistor	C: Normal	01005	D: $\pm 0.5\%$ F: $\pm 1\%$ J: $\pm 5\%$ P: Jumper	$\pm 5\%$: E24 3-digits+blank 102=1K Ω 1R0=1 Ω $\pm 1\%$ &Below: E24+E96: 4-digits 1001=1K Ω 1R00=1 Ω	T: 7 inch reel	S: Sn	Blank: none
Company code	Type code	Functional code	Size code	Tolerance code	Resistance code	Packaging code	Termination code	Special Case

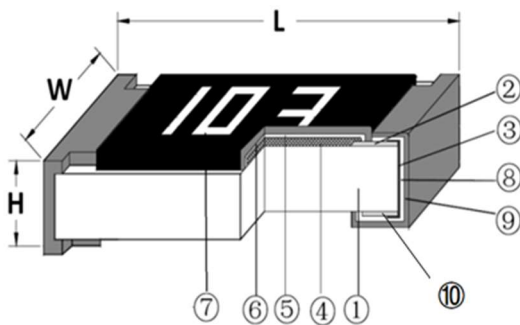
■ 尺寸(Dimension):

尺寸 dimension						单位 (unit) : mm
型别 (Type)	L	W	H	T1	T2	
01005	0.40±0.02	0.20±0.02	0.13±0.03	0.10±0.03	0.10±0.03	

■ 功率衰减曲线 (Derating Curve)

使用 温度范围	-55~+125℃
说明	周围温度若超过70℃至125℃之间，功率可照下图曲线予以修订
功率 衰减 曲线 图	

■ 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 (Top)	银 Ag
3	侧电极 Side conductive layer	镍铬合金 NiCr
4	阻体层 Resistive layer	氧化钨+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
8	镍电极 Ni plating layer	镍 Ni
9	锡电极 Sn plating layer	锡 Matte Tin
10	银电极 Conductive layer (Back)	银 Ag

■ 电气特性 (Electrical characteristics)

型别 Type	01005
额定功率 Rated power	1/32W
最大工作电压 Max Working Voltage	15V
最大过负荷电压 Max Overload Voltage	30V
T.C.R. (PPM/°C)	10Ω≤R<100 Ω : 300ppm
	100Ω≤R≤1MΩ: 250ppm

备注 (remark) : 额定电压计算公式 (The rated voltage is calculated by the following formula):

$$E = \sqrt{RP}$$

E: 额定电压 (Rated Voltage) (V)

P: 额定功率 (Rated Power) (W)

R: 电阻阻值 (Resistance) (ohm)

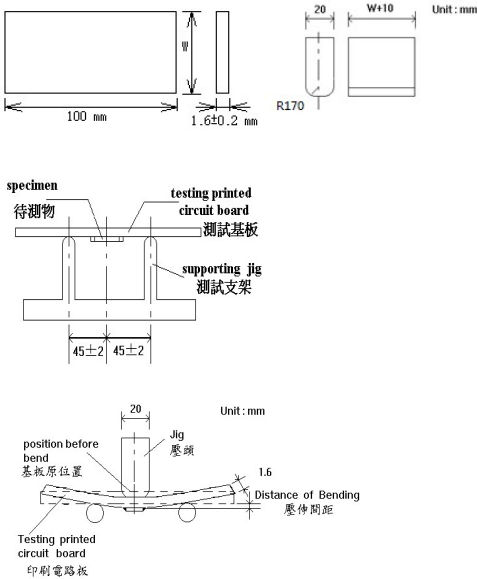
如果计算出的电压超过此型别的最大工作电压, 则此型别的最大工作电压为此电阻的额定电压。

In case the value calculated by the formula exceed the maximum working voltage as above table 8, the maximum working

voltage shall be regarded as rated voltage.

■ 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 IEC60115-1-4.8	$TCR = (R - R_0) / (t - t_0) R_0 \times 10^6$ (ppm) R_0 电阻在室温下的阻值(resistance at room temperature) R 电阻在 125 °C 或 -55 °C 下的阻值 (resistance at 125 °C or -55 °C) t_0 室温(room temperature) t 测试温度 (test temperature 125 °C or -55 °C)	As SPEC
短时间过负荷 Short-time overload	JIS C 5201 4.13 IEC60115-1-4.13	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.	$\Delta R \leq \pm(2.0\% + 0.05\Omega)$
焊锡性 Solderability	JIS C 5201 4.17 IEC60115-1-4.17	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% coverage)
抗焊锡热 Resist to soldering heat	JIS C 5201 4.18 IEC 60115-1-4.18	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.	$\Delta R \leq \pm(1.00\% + 0.05\Omega)$
绝缘电阻 Insulation resistance	JIS C 5201 4.6 IEC60115-1-4.6	在电极与电阻本体上加载 $100\text{V} \pm 15\text{V}$ 直流电压, 保持 60 ± 5 秒后, 测量绝缘电阻。 Applied DC $100\text{V} \pm 15\text{V}$ between substrate and terminations for $60 \pm 5\text{seconds}$. Then measure insulation resistance.	> $1000\text{M}\Omega$

内容 Item	测试方法 Test Methods	测试条件 Test Conditions	规格 Specification
绝缘耐压 Dielectric withstanding voltage	JIS C 5201 4.7 IEC60115-1-4.7	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 IEC60115-1-4.33	电阻焊接在测试板上进行弯折,弯折保持时 间 20±1 秒, 弯曲 3+0.2/0 mm;量测试前 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 3+0.2/0 mm for resistors . 测试板 (test board) 压头 (jig)  position before bend 基板原位置 Jig 压头 Testing printed circuit board 印刷电路板 Distance of Bending 压伸间距	$\Delta R \leq \pm(1.00\% + 0.05\Omega)$
温度快速变化 Rapid temperature changes	JIS C 5201 4.19 IEC60115-1-4.19	电阻放入温度循环机中, T1 温度: -55 ±3°C; T2 温度: 125±3°C, 放置 30 分 钟, 共 300 个循环。量测试前后阻值 变化率。 Put specimen in a chamber which temperature can be T1: -55±3°C; T2: 125±3°C, 30min, repeated 300 cycles. Measure the variation of resistance.	$\Delta R \leq \pm(1.0\% + 0.05\Omega)$

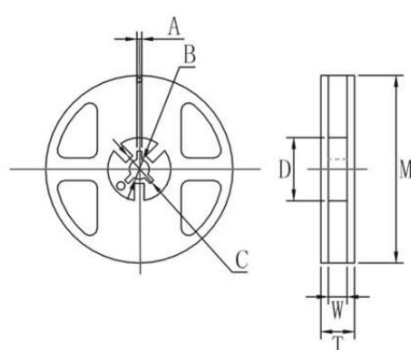
内容 Item	测试方法 Test Methods	测试条件 Test Conditions	规格 Specification
耐湿特性 Humidity	JIS C 5201 4.24 IEC60115-1-4.24	电阻放入恒温恒湿箱，温度 $40\pm 2^{\circ}\text{C}$ ，湿度 90~95 %RH;通电额定电压 1.5 小时，断电 0.5 小时；重复通断电至试验时间 $1000^{+48}/_{-0}$ 小时。量测试验前后阻值变化率。 Put the specimen in a chamber at $40\pm 2^{\circ}\text{C}$ temperature and 90~95% relative humidity, then applied rated voltage for 1.5H and rested for 0.5H repeatedly till total test time is $1000^{+48}/_{-0}$ H. Measure the variation of resistance.	$\Delta R \leq \pm(3.0\%+0.05\Omega)$
负荷寿命 Load life	JIS C 5201 4.25.1 IEC 60115-1-4.25.1	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 $1000^{+24}/_{-0}$ 小时，量测试验前后阻值变化率。 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 $1000^{+24}/_{-0}$ H. Measure the variation of resistance.	$\Delta R \leq \pm(3.0\%+0.05\Omega)$
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 ± 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 ± 4 hours after test conclusion.	$\Delta R \leq \pm(3.0\%+0.05\Omega)$

■ 包装规格 (Tapping Specification)

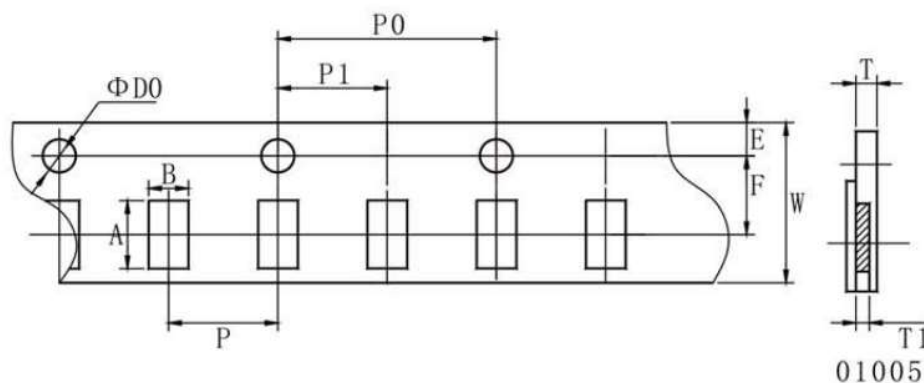
-卷盘尺寸 (Reel dimension)

单位 unit: mm

Type	Size		Unit	M	W	T	A	B	C	D
01005	7"	20K/Reel	mm	178±20	9.50±1.0	12.5±1.5	2.0±0.5	13.0±0.5	21.0±0.5	58.0±2.0



-包装尺寸 (packing dimension)



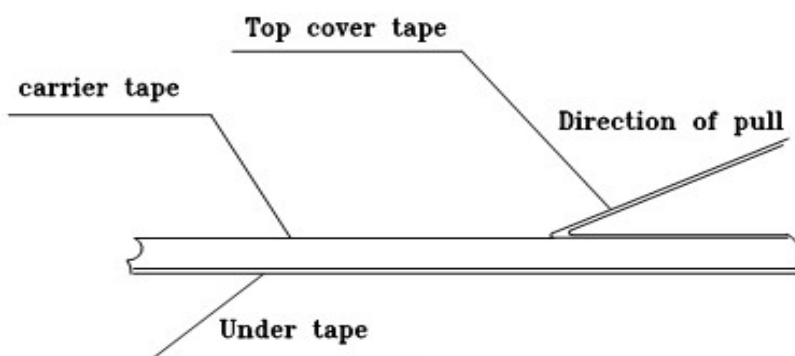
Unit: mm

Dimensions	A	B	Φ D0	F	P0	P
01005	0.45±0.02	0.25±0.02	1.55±0.05	3.50±0.05	4.00±0.10	2.00±0.05
Dimensions	E	T1	T	P1	W	
01005	1.75±0.05	0.17±0.02	0.31±0.02	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。

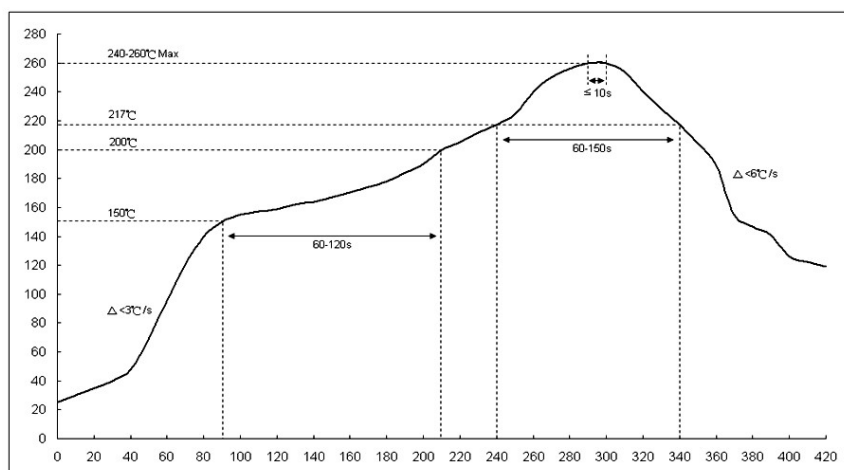
The top cover tape is pulled at a speed of 200 mm/min with the angle between the tape during peel and the direction of unreeling maintained at 165 to 180 degree as following picture. The peel force of paper carrier tape shall be 0.1N to 0.7N(10 to 70 g),



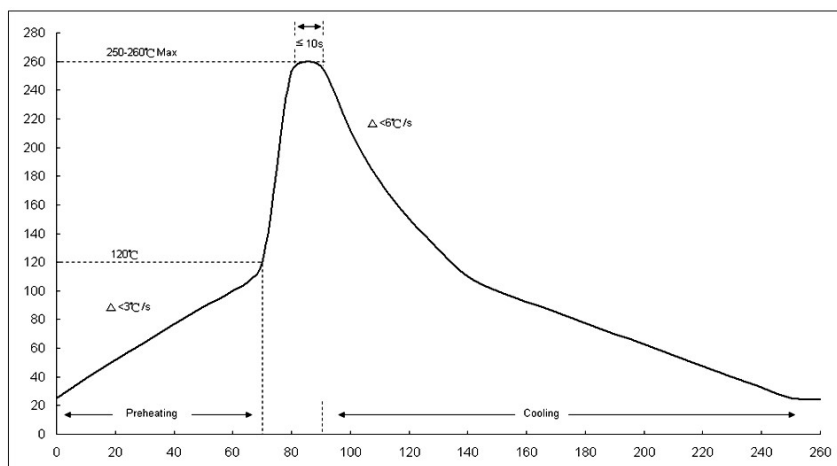
■ 焊接 (soldering) :

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-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 $350 \pm 10^{\circ}\text{C}$ 3 秒之内, 避免烙铁接触电阻本体

The iron temperature is $350 \pm 10^{\circ}\text{C}$, hand soldering time less than 3S. Avoid solder iron tip direct touch the components body

■ 厚膜电阻器使用说明 (Chip Resistor Instructions for use)

- 本产品在以下特殊环境下应用, 性能可能会收到影响 (Application of the products in a special environment can deteriorate product performance) :
 1. 高温;
High temperature
 2. 有海风或腐蚀性气体, 包括氯气, 硫化氢, 氨气, 二氧化硫, 二氧化氮等;
Near the sea ,or corrosive gas, such as $\text{Cl}_2, \text{H}_2\text{S}, \text{NH}_3, \text{SO}_2, \text{and NO}_2, \text{etc};$
 3. 各种类型的液体, 包括水, 油, 化学品, 有机溶剂的使用;
Unverified liquids, such as water,oil,chenical or organic solvent;
 4. 在用树脂或其他涂层材料密封产品的情况下使用;
Unverified resin or paint to cover products;
 5. 焊接后使用不洁焊剂或使用水或水溶性清洁剂清洗产品

Products should be washed with soluble cleaner even if non cleaning flux.

- 储存 / 搬运条件 (STORAGE / CARRY CONDITIONS)

- | | |
|--|---------------------------------------|
| 6. 储存温度 $25\pm5^{\circ}\text{C}$ | Temperature: $25\pm5^{\circ}\text{C}$ |
| 7. 湿度 30~70%RH | Humidity: 30~70%RH |
| 8. 储存期限: 先进先出, 2 年 | Storage life: 2years FIFO |
| 9. 存放和搬运时, 请保持盒子的正确方向。严禁跌落在箱体上, 否则可能损坏产品电极或本体 | |
| Please hold box correct orientation when storing and carrying. It is strictly prohibited to fall on the box. otherwise the product electrode or body may be damaged. | |