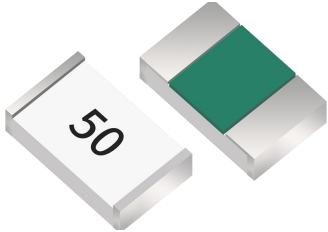
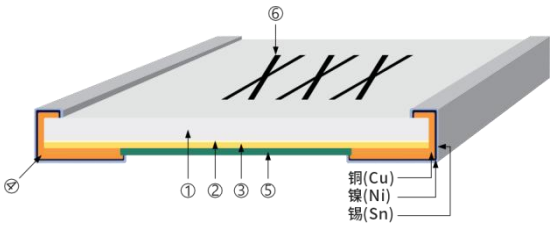


陶瓷合金芯片，封体工艺，焊接性能良好

Ceramic alloy chips, hermetic packaging process, and excellent solderability.

■ 产品图示(product illustration)	■ 产品结构图(product structure diagram)
	

■ 产品特点(Features)	■ 应用领域(Applications)
■ 高可靠性，高过载能力 High reliability, high overload capacity	■ 汽车电子 Automotive electronics
■ 使用温度范围较宽无感型设计 Wide temperature range, contactless design	■ 电流传感器、电源供应器 Current sensor, Power supplies
■ 低电阻温度系数 Low electrical resistance temperature coefficient	■ 充电器 Battery chargers
■ 通过：RoHS REACH 认证 Passed: RoHS REACH certification	■ 手机、电脑、消费性电子 Mobile phones、Computers 、Consumer

■ 料号标识:示例 RC0603FAR010= RC 系列 0603 尺寸 500mW 1% 10mΩ

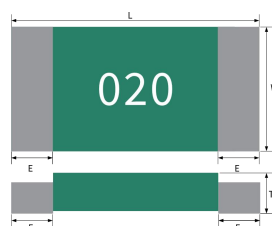
RC	0603	F	A	R010
产品系列 Type	尺寸 Size	公差 Tolerance	额定功率 Rated Power	阻值 Resistance Value
	0603 0805 1206 2512 0805	F:1% G:2% J:5%	A=1/2W B= 3/4W 1=1W 2=2W 3=3W	R50m=0.5mΩ R002=2mΩ R010=10mΩ 1R5m=1.5mΩ

■ 电阻值范围及电气特性(Resistance Range and Electrical Characteristics)

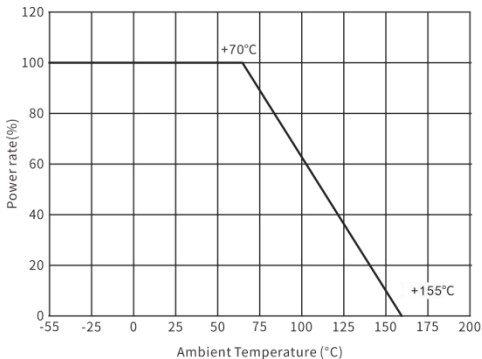
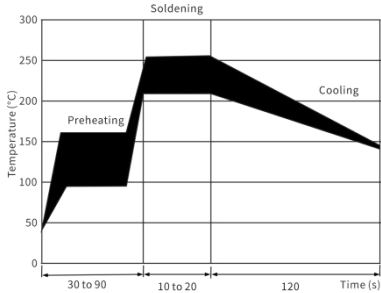
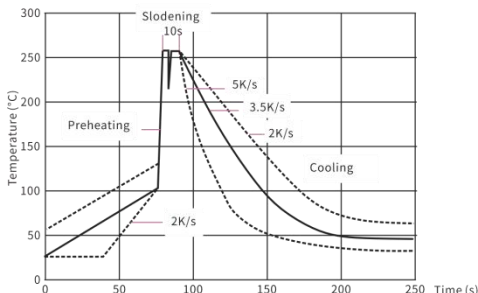
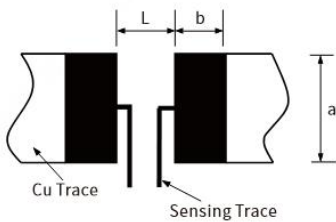
类别 Type	最高额定功率(W) Rated Power	温度系数 TCR (ppm/°C)	阻值范围(mΩ) Resistance Range	阻值精度 Insulation Resistance	工作温度范围
0603	1/2W	±100ppm/°C	2mΩ~9mΩ	±1%	-55°C~+155°C
		±50ppm/°C	10mΩ~75mΩ	±0.5%、±1%	
0805	3/4W	±100ppm/°C	2mΩ~9mΩ	±1%	
		±50ppm/°C	10mΩ~200mΩ	±0.5%、±1%	
1206	1W	±100ppm/°C	3mΩ~9mΩ	±1%	
		±50ppm/°C	10mΩ~500mΩ	±0.5%、±1%	
2010	1.5W	±100ppm/°C	2mΩ~9mΩ	±1%	
		±50ppm/°C	10mΩ~400mΩ	±0.5%、±1%	
2512	2W	±100ppm/°C	2mΩ~9mΩ	±1%	
		±50ppm/°C	10mΩ~400mΩ	±0.5%、±1%	
3921	3W	±100ppm/°C	2mΩ~9mΩ	±1%	
		±50ppm/°C	10mΩ~100mΩ	±0.5%、±1%	

■ 产品尺寸(dimension)

图例 legend



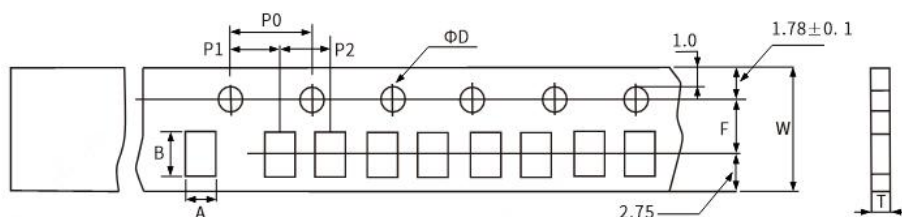
类型 Type	阻值范围 resistance range	长 L(mm)	宽 W(mm)	厚 T(mm)	电极宽 E(mm)
0603	1/2W:2mR~5mR	1.70±0.20	0.90±0.20	0.65±0.20	0.50±0.20
	1/2W:6mR~75mR	1.70±0.20	0.90±0.20	0.65±0.20	0.40±0.20
0805	3/4W:2mR~3mR	2.10±0.20	1.35±0.20	0.65±0.20	0.65±0.20
	3/4W:4mR~200mR	2.10±0.20	1.35±0.20	0.65±0.20	0.50±0.20
1206	1W:2mR~4mR	3.30±0.20	1.70±0.20	0.65±0.2	1.20±0.30
	1W:5mR~500mR	3.30±0.20	1.70±0.20	0.65±0.2	0.68±0.30
2010	1.5W:2mR~3mR	5.10±0.20	2.60±0.20	0.65±0.20	2.10±0.30
	1.5W:4mR~400mR	5.10±0.20	2.60±0.20	0.65±0.20	0.70±0.30
2512	2W:2mR	6.40±0.30	3.20±0.30	0.65±0.20	2.80±0.30
	2W:3mR	6.40±0.30	3.20±0.30	0.65±0.20	2.60±0.30
	2W:4mR~400mR	6.40±0.30	3.20±0.30	0.65±0.20	1.05±0.30
3921	3W:2mR	11.10±0.30	5.10±0.30	0.65±0.20	4.90±0.30
	3W:3mR	11.10±0.30	5.10±0.30	0.65±0.20	4.55±0.30
	3W:4mR~100mR	11.10±0.30	5.10±0.30	0.65±0.20	2.36±0.30

<p>■ 功率衰减曲线(power attenuation curve)</p>  <p>工作温度范围 (Operating Temperature Range) : -55°C~+155°C。 当电阻在高于 70°C 的周围环境中工作时, 最大负载功率应该按照以上曲线减少。</p> <p>When the resistor is operating in an ambient environment above 70 °C, the maximum load power should be reduced according to the above curve.</p>	<p>■ 额定电流(rated current)</p> <p>额定电流计算方式如下</p> <p>The rated current is calculated by the following formula:</p> $I = \sqrt{P/R}$ <p>I: 额定电流 (Rated current) (A) P: 额定功率 (Rated Power) (W) R: 额定电阻 (Resistance) (ohm)</p> <p>如果计算出的电流超过此型别的最大工作电流, 则此型别的最大工作电流为此电阻的额定电流。</p> <p>In case the value calculated by the formula exceed the maximum working current as above table, the maximum working current shall be regarded as rated current.</p>
<p>■ 焊接建议 Soldering recommendations</p>	
<p>回流焊 Reflow-Soldering Profile</p> <p>预热: 145°C±15°C, max.120 sec. 焊锡: min.220°C, max.60 sec. 最高温度: 260±5°C, max.10 sec.</p>	<p>波峰焊 Wave-Soldering Profile</p> <p>预热: 100°C~130°C, max.100 sec. 焊锡: 250°C~260°C, max.10 sec. 最高温度: 260±5°C, max.10 sec.</p>
	
<p>■ 建议的焊板尺寸(Suggested PCB dimensions)</p>  <p>单位: mm</p>	

续:

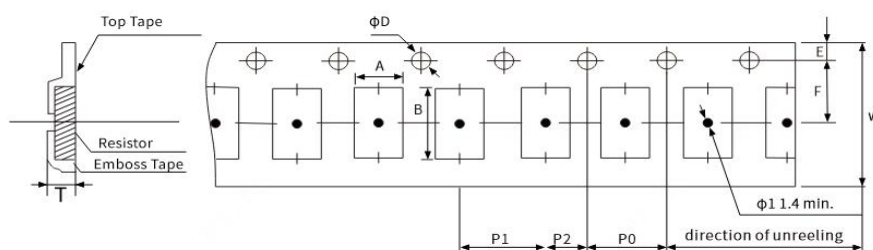
尺寸 dimension	阻值范围 resistance range	L	b	a
0603	1/2W:2mR~5mR	0.50	0.92	1.35
0603	1/2W:6mR~75mR	0.60	0.92	1.30
0805	3/4W:2mR~6mR	0.80	1.44	1.40
0805	3/4W:7mR~200mR	0.80	1.44	1.40
1206	1W:2mR~4mR	0.60	1.84	2.10
1206	1W:5mR~8mR	1.20	1.84	1.80
1206	1W:9mR~500mR	1.20	1.84	1.80
2010	1.5W:2mR~3mR	0.70	2.88	3.65
2010	1.5W:4mR~9mR	2.70	2.88	2.65
2010	1.5W:10mR~400mR	2.70	2.88	2.65
2512	2W:2mR	0.90	3.57	4.35
2512	2W:3mR	0.90	3.57	4.20
2512	2W:4mR~400mR	3.10	3.57	3.10
3921	3W:2mR	1.10	5.75	6.45
3921	3W:4mR~100mR	5.00	5.75	4.50

■ 包装尺寸(packing dimension)



单位: mm

Type	A	B	ΦD	F	P0	P1	P2	W	T
0603	1.18±0.20	1.98±0.20	1.50±0.10	3.50±0.15	4.00±0.10	2.00±0.10	4.00±0.10	8.00±0.30	0.75±0.20
0805	1.68±0.20	2.38±0.20	1.50±0.10	3.50±0.15	4.00±0.10	2.00±0.10	4.00±0.10	8.00±0.30	0.84±0.20
1206	2.05±0.20	3.65±0.20	1.50±0.10	3.50±0.15	4.00±0.10	2.00±0.10	4.00±0.10	8.00±0.30	0.84±0.20

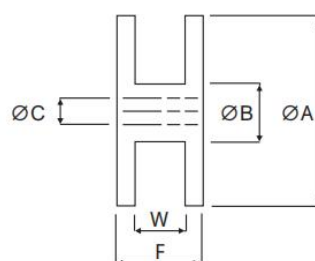


单位: mm

Type	A	B	W	F	E	P0	P1	P2	ΦD0	T
2010	2.85±0.20	5.45±0.20	12.0±0.30	5.5±0.10	1.75±0.10	4.00±0.10	4.00±0.10	2.0±0.05	1.5±0.10	0.8±0.20
2512	3.40±0.20	6.75±0.20	12.0±0.30	5.5±0.10	1.75±0.10	4.00±0.10	4.00±0.10	2.0±0.05	1.5±0.10	1.0±0.20
3921	5.50±0.20	11.50±0.20	24.0±0.30	11.5±0.10	1.75±0.10	4.00±0.10	8.00±0.10	2.0±0.05	1.5±0.10	0.9±0.20

■ 包装规格(Tapping Specification)

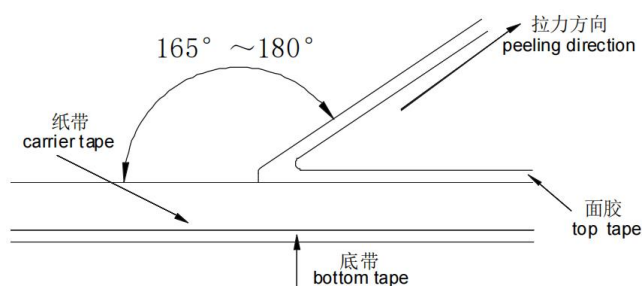
卷盘尺寸 reel dimension



单位: mm

尺寸 Dimensions	ΦA	ΦB	ΦC	FΦ	W	Qty/R
0603	178±5.00	60.00±2.00	13.50±0.50	11.40±0.10	9.00±1.0	5000
0805	178±5.00	60.00±2.00	13.50±0.50	11.40±0.10	9.00±1.0	5000
1206	178±5.00	60.00±2.00	13.50±0.50	11.40±0.10	9.00±1.0	5000
2010	178±5.00	60.00±2.00	13.50±0.50	15.40±1.00	13.00±1.0	4000
2512	178±5.00	60.00±2.00	13.50±0.50	15.40±1.00	13.00±1.0	4000
3921	178±5.00	60.00±2.00	13.50±0.50	15.40±1.00	24.50±1.0	2000

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



上胶带以 300mm/分钟的速度, 沿 165 ~180 度角的方向进行剥离, 如下图所示。纸带的剥离范围为 0.1N~0.7N(10g~70g), 载带的剥离力范围为 0.3N~1N(30g~100g)。

The top cover tape is pulled at a speed of 300 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).

■ 信赖性试验项目(Performance Reliability Test Methods)			
项目 project	测试方法 test	条件 condition	标准 norms
负荷寿命 Operational life	MIL-STD-202 METHOD 108	电阻放入恒温箱中, 温度 $70 \pm 2^{\circ}\text{C}$, 通电额定电 流 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. 测量试验前后阻值变化率。 Put the specimen in a chamber at $70 \pm 2^{\circ}\text{C}$ temperature , and applied rated currernt for 1.5H and rested for 0.5H repeatedly till total test time is $1000 + 48/-0$.. Measure the variation of resistance. $\Delta R\% = (R_2 - R_1) / R_1 * 100\%$ R_1 = 试验前阻值(resistance before test) R_2 = 试验后阻值(resistance after test)	$\leq \pm 1\%$
振动 Resistance to vibration	MIL-STD-202 METHOD 204	5g's 的力 20 分钟, 12 个循环, 测试频率从 10-2000 赫兹, 测量试验前后阻值变化率。 5g's for 20min.12cycles, 10-2000Hz . Measure the variation of resistance.	$\leq \pm 1\%$
抗焊锡热 Resistance to Solder Heat	IEC60115-1 4.18	沾助焊剂后浸入锡炉, 锡炉温度 $260 \pm 5^{\circ}\text{C}$, 时间 10 ± 1 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 ± 1 sec. Measure the variation of resistance.	$\leq \pm 1\%$ 外观无损伤
端子弯曲 Terminal bending	AEC-Q200-005	弯曲 2mm, 60 秒, 测量试验前后阻值变化率。 Min 2mm deflection, 60sec. Measure the variation of resistance. Measure the variation of resistance.	$\leq \pm 1\%$
机械冲击 Mechanical Shock	MIL-STD-202 METHOD 213	半正弦, 100g's, 震动 6ms, 速度 12.3 ft/s100Hz, 测量试验前后阻值变化率。 100g's, Normal duration is 6ms , half sine shock pulse, Measure the variation of resistance.	$\leq \pm 1\%$
端子强度 Terminal Strength	AEC-Q200-006	应用 17.7N (1.8Kg), 时间 60 ± 1 秒 Applied a 17.7N (1.8Kg) for 60 ± 1 seconds.	$\leq \pm 1\%$
冷热冲击 Thermal shock	MIL-STD-202 METHOD 107	温度 -55/+125 $^{\circ}\text{C}$, 周期数是 300, 设备安装; 最大传输时间是 20 秒, 停留 15 分钟, 测量试验前后阻值变化率。 Use -55/+125 $^{\circ}\text{C}$, Number of cycles is 300. Devices mounted. Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air -Air. Measure the variation of resistance.	$\leq \pm 1\%$
阻燃性 Flammability	UL-94	V-0 or V-1 可接受的, 电器特性测试不要求 V-0 or V-1 are acceptable. Electrical test not required.	$\leq \pm 1\%$
ESD 试验 ESD test	AEC-Q200-002	加载规定静电电压 2KV, 2 次/间隔 1 秒 2KV, 2times/1s	$\leq \pm 1\%$

■ 信赖性试验项目(Performance Reliability Test Methods)			
项目 project	测试方法 test	条件 condition	标准 norms
负荷寿命 Operational life	MIL-STD-202 METHOD 108	电阻放入恒温箱中, 温度 $70 \pm 2^{\circ}\text{C}$, 通电额定电 流 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. 测量试验前后阻值变化率。 Put the specimen in a chamber at $70 \pm 2^{\circ}\text{C}$ temperature , and applied rated currrent for 1.5H and rested for 0.5H repeatedly till total test time is $1000 + 48/-0$.. Measure the variation of resistance. $\Delta R\% = (R_2 - R_1) / R_1 * 100\%$ R_1 = 试验前阻值(resistance before test) R_2 = 试验后阻值(resistance after test)	$\leq \pm 1\%$
振动 Resistance to vibration	MIL-STD-202 METHOD 204	5g's 的力 20 分钟, 12 个循环, 测试频率从 10-2000 赫兹, 测量试验前后阻值变化率。 5g's for 20min.12cycles, 10-2000Hz . Measure the variation of resistance.	$\leq \pm 1\%$
抗焊锡热 Resistance to Solder Heat	IEC60115-1 4.18	沾助焊剂后浸入锡炉, 锡炉温度 $260 \pm 5^{\circ}\text{C}$, 时间 10 ± 1 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 ± 1 sec. Measure the variation of resistance.	$\leq \pm 1\%$ 外观无损伤
端子弯曲 Terminal bending	AEC-Q200-005	弯曲 2mm, 60 秒, 测量试验前后阻值变化率。 Min 2mm deflection, 60sec. Measure the variation of resistance. Measure the variation of resistance.	$\leq \pm 1\%$
机械冲击 Mechanical Shock	MIL-STD-202 METHOD 213	半正弦, 100g's, 震动 6ms, 速度 12.3 ft/s100Hz, 测量试验前后阻值变化率。 100g's, Normal duration is 6ms , half sine shock pulse, Measure the variation of resistance.	$\leq \pm 1\%$
端子强度 Terminal Strength	AEC-Q200-006	应用 17.7N (1.8Kg), 时间 60 ± 1 秒 Applied a 17.7N (1.8Kg) for 60 ± 1 seconds.	$\leq \pm 1\%$
冷热冲击 Thermal shock	MIL-STD-202 METHOD 107	温度 -55/+125 $^{\circ}\text{C}$, 周期数是 300, 设备安装; 最大传输时间是 20 秒, 停留 15 分钟, 测量试验前后阻值变化率。 Use -55/+125 $^{\circ}\text{C}$, Number of cycles is 300. Devices mounted. Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air -Air. Measure the variation of resistance.	$\leq \pm 1\%$
阻燃性 Flammability	UL-94	V-0 or V-1 可接受的, 电器特性测试不要求 V-0 or V-1 are acceptable. Electrical test not required.	$\leq \pm 1\%$
ESD 试验 ESD test	AEC-Q200-002	加载规定静电电压 2KV, 2 次/间隔 1 秒 2KV, 2times/1s	$\leq \pm 1\%$