# 合金电阻器　Alloy Resistor

深圳市捷而瑞科技有限公司

- 焊接电阻，电子束焊工艺 Welding resistance, electron beam welding process
- 高可靠性，高载流能力，产品精度高　High reliability, high current carrying capacity, high product precision
- 符合 ROHS 要求 Complies With ROHS Requirements

## ■ 产品图示(product illustration)

| ■ 产品特点(Features) | ■ 应用领域(Applications) |
|---|---|
| ■ 功率高<br>High power | ■ 汽车电子<br>Automotive electronics |
| ■ 超低感值<br>Low inductance | ■ 空调/变频器<br>Air conditioner/Variable frequency drive |
| ■ 耐冲击<br>Ideal for pulse application | ■ 工业/轻工业<br>Industry/lite industry |
| ■ 印字方式：激光打标<br>Printing method:laser marking | ■ 手机、电脑、消费性电子<br>Mobile phones、Computers 、Consumer |

## ■ 料号标识:示例 JSR2512F4R003=JSR 系列 2512 尺寸 4W 1% 3mΩ

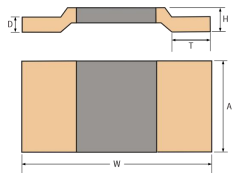
| JSR | 2512 | F | 4 | R003 |
|---|---|---|---|---|
| 产品系列 Type | 尺寸 Size<br>2512<br>3920<br>5930 | 公差<br>Tolerance<br>F:1%<br>G:2%<br>J:5% | 额定功率<br>Rated Power<br>A=1/2W<br>B= 3/4W<br>1=1W<br>2=2W<br>3=3W | 阻值<br>Resistance Value<br>R50m=0.5mΩ<br>R002=2mΩ<br>R010=10mΩ<br>1R5m=1.5mΩ |

## ■ 规格特性表(Specification and Specifications Table)

| 项目 Project | 参数 Parameter | 单位 Unit |
|---|---|---|
| 额定功率 Rated Power | 3 | W |
| 阻值 Resistance Value | 4 | mΩ |
| 最大额定电流 Maximum Rated Current | 27.38 | A |
| 精度 Tolerance | ±1 | % |
| 电阻温度系数 TCR | ±50 | ppm/℃ |
| 材质 Material | 铁铬铝 | |
| 工作温度范围<br>Operating Temperature Range | -55~+170 | ℃ |

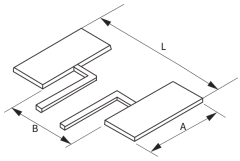
## ■ 产品尺寸(Dimension)

Unit:mm



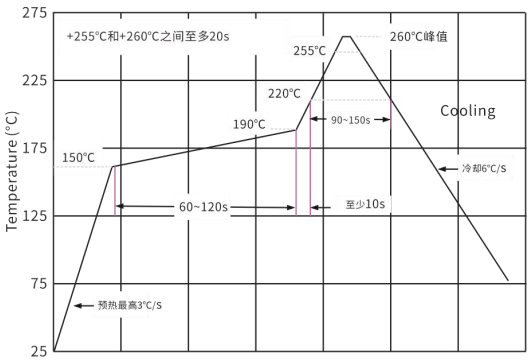

| 类型 Type | W | A | H | D | T |
|---|---|---|---|---|---|
| 2512 | 6.4±0.3 | 3.2±0.3 | 0.8±0.3 | 0.34±0.1 | 1.2±0.5 |

## ■ 焊盘尺寸 Pad size(Unit:mm)

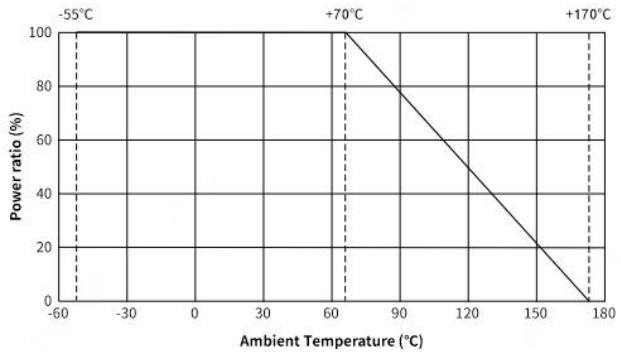



| A | B | L |
|---|---|---|
| 3.4 | 3.4 | 7 |

## ■ 回流焊曲线 (Reflow Soldering)



## ■ 功率衰减曲线(power attenuation curve)




工作温度范围（Operating Temperature Range）：-55°C~+170°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。

When the resistor is operating in an ambient environment above 70 °C, the maximum load power should be reduced according to the above curve.

## ■ 额定电流(rated current)

额定电流计算方式如下

The rated current is calculated by the following formula:

$$I = \sqrt{P/R}$$

I：额定电流（Rated current）(A)

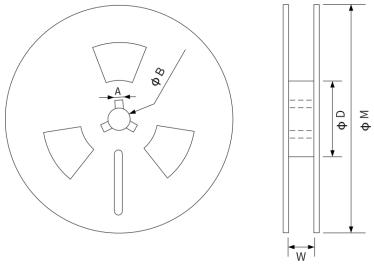
P：额定功率（Rated Power）(W)

R：额定电阻（Resistance）(ohm)

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。

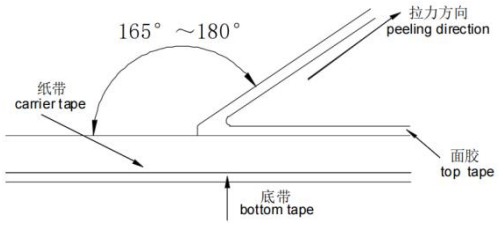
In case the value calculated by the formula exceed the maximum working current as above table, the maximum working current shall be regarded as rated current.

## ■ 卷盘尺寸 reel dimension(Unit:mm)




| ϕD | ϕM | ϕB | W | A | 盘装数量 |
|---|---|---|---|---|---|
| 60±2 | 178±2 | 13.5±1 | 13.8±1 | 2.3±1 | 1000 |

## ■ 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 |
|---|---|---|---|
| 短时间过负荷<br>Short Time Overload | JIS-C-5201 | 施加 2.5 倍额定功率、时间 5 秒<br>Apply 2.5 times the rated power for 5 seconds | △R≤±0.5% |
| 温度系数<br>Temperature Coefficient of Resistance | JIS-C-5201 | TCR(ppm/°C)=(R2-R1)/[R1×(T2-T1)]×10^6；R1 为室温下量测阻值(Ω)，R2 为 125°C下量测阻值(Ω)，T1 为室温(°C)，T2 为 125°C<br>TCR(ppm/°C)=(R2-R1)/[R1×(T2-T1)]×10^6; R1: resistance at room temperature (Ω), R2: resistance at 125°C (Ω), T1: room temperature (°C), T2: 125°C | 按规格<br>Per specification |
| 曲折强度测试<br>Bend Strength Test | AEC-Q200-005 | 2mm 判定规格，至少 60 秒的支撑时间<br>Bend to 2mm with a holding time of at least 60 seconds | △R≤±0.5% |
| 可焊性<br>Solderability | TEST 18<br>J-STD-002 | 焊锡温度 245±5°C，浸泡时间 3±0.5 秒<br>Solder bath temperature 245±5°C, immersion time 3±0.5 s | 焊料覆盖大于 95%<br>Solder coverage ≥95% |
| 耐溶剂性<br>Solvent Resistance | TEST 12<br>MIL-STD-202<br>Method 215 | 浸于 20~25°C异丙醇溶剂 60±5 秒后取出，静置 24 小时以上，量测阻值变化率<br>Immersed in isopropyl alcohol at 20~25°C for 60±5 s, left for over 24 h, then measure resistance change | △R≤±0.5% |
| 抗焊锡热测试<br>Resistance to Soldering Heat | TEST 15<br>MIL-STD-202<br>Method 210 | 将电阻浸 260±5°C锡炉中 10±1 秒取出，静置 60 分钟以上，再量测阻值变化率<br>Immersed in solder bath at 260±5°C for 10±1 s, left for over 60 min, then measure resistance change | △R≤±0.5% |
| 温度循环<br>Temperature Cycling | TEST 4<br>JESD22 Method<br>JA-104 | 1000 个循环（-55~155°C），每个温度驻留时间 30min，转换时间 15°C/min，试验结束后 24±4 小时内进行电气测试<br>1000 cycles (-55~155°C), dwell 30 min at each temperature, transition time 15°C/min; electrical test within 24±4 h after test | △R≤±0.5% |
| 高温存储<br>High Temperature Storage | TEST 3<br>MIL-STD-202<br>Method 108 | 155°C下 1000h，不通电，试验结束后 24±4h 内测试阻值变化率<br>1000 h at 155°C, unpowered; measure resistance change within 24±4 h after test | △R≤±0.5% |
| 偏高湿度<br>Damp Heat | TEST 7<br>MIL-STD-202<br>Method 103 | 1000 小时、85°C、85%相对湿度、加载 10%额定功率<br>1000 h at 85°C, 85% RH, loaded at 10% rated power | △R≤±0.5% |
| 负荷寿命<br>Load Life | TEST 8<br>MIL-STD-202<br>Method 108 | 额定电流，Ta=125°C，加载 100%功率，0.5 小时关、1.5 小时开，测试时间 1000H<br>Rated current, Ta=125°C, 100% rated power, 0.5 h off / 1.5 h on, duration 1000 h | △R≤±0.5% |

| 项目 project | 测试方法 test | 条件 condition | 标准 norms |
|---|---|---|---|
| 低温储存<br>Low Temperature Storage | IEC60115-1-4.23.4<br>JIS-C 5201-4.23.4 | 测试条件：-55°C，放置 1000H<br>-55°C for 1000 h | △R≤±0.5% |
| 机械冲击<br>Mechanical Shock | TEST 13<br>MIL-STD-202<br>Method 213 | X、Y、Z 三个方向冲击，半正弦脉冲，持续时间 0.5ms，峰值加速度 100g<br>Shock in X, Y, Z directions; half-sine pulse, duration 0.5 ms, peak acceleration 100g | △R≤±0.5% |
| 振动<br>Vibration | TEST 14<br>MIL-STD-202<br>Method 204 | 20min 内遍历 10~2000Hz 整个频率范围并返回 10Hz；该循环在三个相互垂直方向各执行 12 次（共 36 次）<br>Sweep 10~2000 Hz and back to 10 Hz within 20 min; repeat 12 times in each of 3 mutually perpendicular axes (36 cycles total) | △R≤±0.5% |