



# 片式电阻规格书

SMD RESISTOR CATALOGUE

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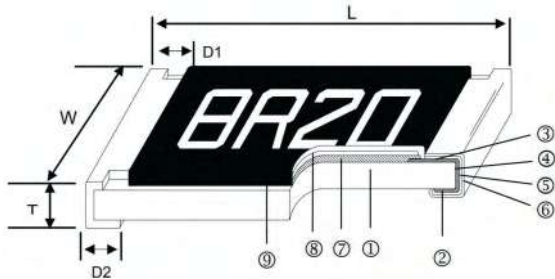
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## 摘要 Resume >>>

- Small size & light weight  
短小轻薄
- Reduction of assembly costs and matching with placement machine.  
可降低装置成本及配合机器组装
- Suitable for both wave & re-flow soldering.  
适合波峰焊与回流焊
- Applications: Navigator (GPS), Mobile Phone, Telecom, PDA, Setbox, Meter.  
应用于GPS, 移动电话, PDA, 机顶盒, 仪表.....

## 结构图 Construction >>>



- ① Alumina Substrate 陶瓷基体
- ② Bottom Electrode 背导电极
- ③ Top Electrode 正导电极
- ④ Edge Electrode 侧导电极
- ⑤ Barrier Layer 电镀介质层
- ⑥ External Electrode 外部端电极
- ⑦ Resistor Layer 电阻层
- ⑧ Overcoat 密封层
- ⑨ Marking 丝印

## 尺寸 Dimensions >>>

规格	L	W	T	D1	D2
01005	0.40 ±0.02	0.20 ±0.02	0.13 ±0.02	0.10 ±0.05	0.10 ±0.05
0201	0.60 ±0.03	0.30 ±0.03	0.23 ±0.03	0.10 ±0.05	0.15 ±0.05
0402	1.00 ±0.10	0.50 ±0.05	0.35 ±0.10	0.20 ±0.10	0.25 ±0.10
0603	1.60 ±0.10	0.80 ±0.15	0.45 ±0.10	0.30 ±0.20	0.30 ±0.20
0805	2.00 ±0.15	1.25 ±0.15	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20
1206	3.10 ±0.15	1.55 ±0.15	0.55 ±0.10	0.45 ±0.20	0.45 ±0.20
1210	3.10 ±0.10	2.60 ±0.15	0.55 ±0.10	0.50 ±0.25	0.60 ±0.25
1812	4.50 ±0.20	3.20 ±0.20	0.55 ±0.20	0.55 ±0.20	0.60 ±0.30
2010	5.00 ±0.20	2.50 ±0.20	0.55 ±0.10	0.60 ±0.25	0.60 ±0.30
2512	6.35 ±0.10	3.20 ±0.15	0.55 ±0.10	0.75 ±0.35	0.80 ±0.40
2512*	6.35 ±0.10	3.20 ±0.15	1.10 ±0.10	0.60 ±0.25	1.80 ±0.20

## 型号名称 Part Numbering >>>

RR	3216 ( 1206 )	L182	J	T	*O
Product Type 产品型号	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式	High Power 升功率
RR: 普通厚膜贴片电阻	0402 ( 01005 ) 0603 ( 0201 ) 1005 ( 0402 ) 1608 ( 0603 ) 2012 ( 0805 ) 3216 ( 1206 ) 3225 ( 1210 ) 4532 ( 1812 ) 5025 ( 2010 ) 6432 ( 2512 )	±5% L105:1MΩ L182:1.8KΩ L1R3:1.3Ω  ±1%及以下 L1004:1MΩ L1801:1.8KΩ L1R30:1.3Ω	D= ±0.5% F= ±1 % J= ±5 %	T:Taping Reel T: 编带 B: Bulk B: 散装	R:3W S:2W N:1W Q:3/4W U:1/2W O:1/3W V:1/4W P:1/5W W:1/8W X:1/10W

◆\*O: High Power升功率 (非升功率不加备注)

标准规格表 Standard Electrical Specifications >>>

Item Type 项目 型号	Power Rating 额定功率	Max. Operating Voltage 最大工作电压	Max. Overload Voltage 最大负载电压	Resistance Range 阻值范围			TCR温度系数 (PPM/°C)
				±0.5%	±1%	±5%	
01005	1/32W	15V	30V	/	1Ω-10MΩ	1Ω-10MΩ	1Ω≤R≤10Ω: ±600 10Ω<R≤10MΩ: ±300
0201	1/20W	25V	50V	/	1Ω-10MΩ	1Ω-10MΩ	1Ω≤R≤10Ω: ±350 10Ω<R≤10MΩ: ±200
0402	1/16W	50V	100V	1Ω-10MΩ	1Ω-22MΩ	1Ω-100MΩ	1Ω≤R≤10Ω: ±400 10Ω<R≤10MΩ: ±100 10MΩ<R≤100MΩ: ±200
0603	1/10W	75V	150V	1Ω-10MΩ	1Ω-22MΩ	1Ω-100MΩ	1Ω≤R≤10Ω: ±400 10Ω<R≤10MΩ: ±100 10MΩ<R≤100MΩ: ±200
0805	1/8W	150V	300V	1Ω-10MΩ	1Ω-22MΩ	1Ω-100MΩ	1Ω≤R≤10Ω: ±400 10Ω<R≤10MΩ: ±100 10MΩ<R≤100MΩ: ±200
1206	1/4W	200V	400V	1Ω-10MΩ	1Ω-22MΩ	1Ω-100MΩ	1Ω≤R≤10Ω: ±400 10Ω<R≤10MΩ: ±100 10MΩ<R≤100MΩ: ±200
1210	1/2W	200V	400V	1Ω-10MΩ	1Ω-22MΩ	1Ω-100MΩ	1Ω≤R≤10Ω: ±400 10Ω<R≤10MΩ: ±100 10MΩ<R≤100MΩ: ±200
1812	3/4W	200V	400V	1Ω-10MΩ	1Ω-10MΩ	1Ω-10MΩ	1Ω≤R≤10Ω: ±400 10Ω<R≤10MΩ: ±100 10MΩ<R≤100MΩ: ±200
2010	3/4W	200V	400V	1Ω-10MΩ	1Ω-22MΩ	1Ω-100MΩ	1Ω≤R≤10Ω: ±400 10Ω<R≤10MΩ: ±100 10MΩ<R≤100MΩ: ±200
2512	1W	200V	400V	1Ω-10MΩ	1Ω-22MΩ	1Ω-100MΩ	1Ω≤R≤10Ω: ±400 10Ω<R≤10MΩ: ±100 10MΩ<R≤100MΩ: ±200

◆Operating Temp.Range 操作温度范围: 01005~0201: -55~125°C, 0402~2512: -55~155°C

Type 型号	01005	0201	0402	0603	0805	1206	1210	1812	2010	2512
Rated Current of Jumper 零欧姆额定电流	0.5A	0.5A	1A	1A	2A	2A	2A	2A	2A	2A
Max Current of Jumper 零欧姆电阻最大电流	1A	1A	2A	2A	5A	10A	10A	10A	10A	10A
Jumper Resistance Value 零欧姆阻力值	50mΩMax									

高功率厚膜晶片电阻器 High-Power Thick Film Chip Resistors >>>

Item Type 型号	Power Rating 额定功率	Max.Operating Voltage 最大工作电压	Max.Overload Voltage 最大负载电压	TCR温度系数 (PPM/°C)	
				±1%	±5%
0402	1/10W	50V	100V	1Ω≤R≤10Ω: ±400 10Ω<R≤100Ω: ±200 100Ω<R≤10MΩ: ±100	
	1/8W	50V	100V	1Ω-10MΩ	
0603	1/5W	75V	150V	1Ω-10MΩ	
	1/4W	75V	150V	1Ω-10MΩ	
0805	1/4W	150V	300V	1Ω-10MΩ	
	1/3W	150V	300V	1Ω-10MΩ	
	1/2W	200V	300V	1Ω-10MΩ	
1206	1/2W	200V	400V	1Ω-10MΩ	
	3/4W	200V	400V	1Ω-10MΩ	
1210	3/4W	200V	400V	1Ω-10MΩ	
	1W	200V	400V	1Ω-10MΩ	
1812	1.25W	200V	400V	1Ω-10MΩ	
2010	1W	200V	400V	1Ω-10MΩ	
	1.5W	200V	400V	1Ω-10MΩ	
2512	2W	200V	400V	1Ω-10MΩ	
	3W	200V	400V	1Ω-10MΩ	

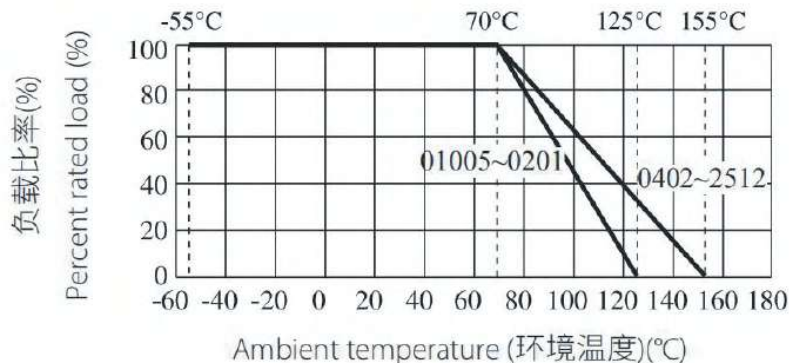
◆Operating Temp.Range 操作温度范围: 0402~2512: -55~155°C

±50PPM/°C规格表 TC50 Electrical Specifications >>>

Item Type 型号	Power Rating 额定功率	Max.Operating Voltage 最大工作电压	Max.Overload Voltage 最大负载电压	Resistance Range阻值范围				TCR温度系数 (PPM/°C)
				±0.1%	±0.25%	±0.5%	±1%	
0402	1/16W	50V	100V	/	/	100Ω-1MΩ		±50
0603	1/10W	75V	150V	10Ω-1MΩ		10Ω-10MΩ		±50
0805	1/8W	150V	300V	10Ω-1MΩ		10Ω-10MΩ		±50
1206	1/4W	200V	400V	10Ω-1MΩ		10Ω-10MΩ		±50
1210	1/3W	200V	400V	10Ω-1MΩ		10Ω-10MΩ		±50
2010	3/4W	200V	400V	10Ω-1MΩ		10Ω-10MΩ		±50
2512	1W	250V	500V	10Ω-1MΩ		10Ω-10MΩ		±50

◆Operating Temp.Range 操作温度范围: 0402~2512: -55~155°C

功率衰减曲线图 Derating Curve >>>



## 信赖性试验项目 Environmental Characteristics &gt;&gt;&gt;

Item 项目	Requirement 条件			Test Method 测试方法
	±1% & 及以下	±5%	Jumper 跳线	
Temperature Coefficient (T.C.R.) 温度系数(T.C.R.)	As Spec. 参考规格表			-55℃~+125℃, 25℃ is the refence temperature 参考温度
Short Time Overload 短时间过负载	±(1.0%+0.10Ω)	±(2.0%+0.10Ω)	<50mΩ	RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds,2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒,提升功率系列 2 秒
Insulation Resistor 绝缘阻抗	≥10G			Max.Overload voltage for 1 minute 施加最大负载电压 1 分钟
Endurance 负载寿命	±(3.0%+0.10Ω)		<50mΩ	70±2℃,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 70±2℃温度中施加额定电压, 1.5 小时"开", 0.5 小时"关", 共 1000 小时
Damp Heat with Load 耐湿负荷	±(2.0%+0.10Ω)	±(3.0%+0.10Ω)	<50mΩ	40±2℃,90~95%R.H.,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 在温度 40±2℃, 相对湿度 90~95%环境中施加额定电压, 1.5 小时"开", 0.5 小时"关", 共 1000 小时
Dry Heat 耐热性实验	±(1.0%+0.05Ω)		<50mΩ	At+125/+155℃ for 1000hrs 置于+125/+155℃温度中, 共 1000 小时
Bending Strength 弯折强度测试	±(1.0%+0.05Ω)		<50mΩ	Bending once for 5 seconds 2010,2512sizes:2mm Other sizes:3mm 产品焊在测试板上, 中央施力下压 5 秒 下压深度: 2010、2512: 2 毫米 其他尺寸: 3 毫米
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%			245±5℃ for 3 seconds 245±5℃锡炉中, 持续 3 秒
Resistance to Soldering Heat 抗焊锡热	±(1.0%+0.05Ω)		<50mΩ	260±5℃ for 10 seconds 260±5℃锡炉中, 持续 10 秒
Voltage Proof 耐电压	No breakdown or flashover 无击穿或跳火现象			1.42 times Max.Operating Voltage for 1 minute 最大操作电压*1.42 倍, 持续 1 分钟
Leaching 溶蚀测试	Individual leaching area≤5% Total leaching area≤10% 导体各面溶蚀区域≤5% 导体总面积溶蚀区域≤10%			260±5℃ for 30 seconds 260±5℃锡炉中, 持续 30 秒
Rapid Change of Temperature 冷热冲击	±(1.0%+0.05Ω)		<50mΩ	-55℃ to +155℃ 5 cycles -55℃ to +155℃ 5 次

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25±5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

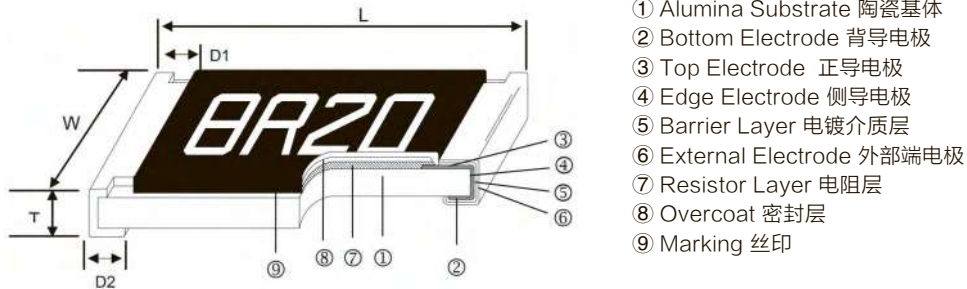
■电性能测量的环境条件: 温度: 25±5 相对湿度: 25%~75%RH

■依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

## 摘要 Resume >>>

- 适合贴片机组装 Suitable for SMT
- 符合欧盟 ROHS 标准 RoHS complaint
- 卓越的抗硫化特性 Superior resistance against sulfur containing atmosphere
- 符合AEC-Q200标准 Comply with AEC-Q200 standard

## 结构图 Construction >>>



## 尺寸 Dimensions >>>

规格	L	W	T	D1	D2
0201	0.60 ± 0.03	0.30 ± 0.03	0.23 ± 0.03	0.10 ± 0.05	0.15 ± 0.05
0402	1.00 ± 0.10	0.50 ± 0.05	0.35 ± 0.10	0.20 ± 0.10	0.25 ± 0.10
0603	1.60 ± 0.10	0.80 ± 0.15	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20
0805	2.00 ± 0.15	1.25 ± 0.15	0.55 ± 0.10	0.45 ± 0.20	0.40 ± 0.20
1206	3.10 ± 0.15	1.55 ± 0.15	0.55 ± 0.10	0.45 ± 0.20	0.45 ± 0.20
1210	3.10 ± 0.10	2.60 ± 0.15	0.55 ± 0.10	0.50 ± 0.25	0.60 ± 0.25
1812	4.50 ± 0.20	3.20 ± 0.20	0.55 ± 0.20	0.55 ± 0.20	0.60 ± 0.30
2010	5.00 ± 0.20	2.50 ± 0.20	0.55 ± 0.10	0.60 ± 0.25	0.60 ± 0.30
2512	6.35 ± 0.10	3.20 ± 0.15	0.55 ± 0.10	0.75 ± 0.35	0.80 ± 0.40

## 型号名称 Part Numbering >>>

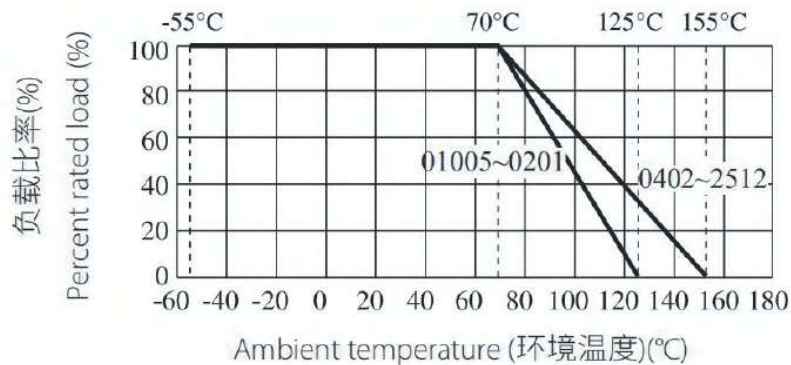
AS	02	0603(0201)	L1R30	F	T
Product Type 产品类型	Production line code 产线代码	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值精度	Packing Code 包装形式
AS: 防硫化贴片电阻	01 02 03 04 10	0603 ( 0201 ) 1005 ( 0402 ) 1608 ( 0603 ) 2012 ( 0805 ) 3216 ( 1206 ) 3225 ( 1210 ) 4532 ( 1812 ) 5025 ( 2010 ) 6432 ( 2512 )	± 5% L105:1MΩ L182:1.8KΩ L1R3:1.3Ω  ± 1%及以下 L1004:1MΩ L1801:1.8KΩ L1R30:1.3Ω	F= ± 1% J= ± 5%	T:Taping Reel T:编带 B:Bulk B: 散装

## 标准规格表 Standard Electrical Specifications &gt;&gt;&gt;

Item Type 型号	Power Rating 额定功率	Max. Operating Voltage 最大工作电压	Max. Overload Voltage 最大负载电压	Resistance Range 阻值范围		TCR温度系数 (PPM/°C)
				± 1%	± 5%	
0201	1/20W	25V	50V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 400 10Ω < R ≤ 10MΩ: ± 200
0402	1/16W	50V	100V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 200 10Ω < R ≤ 1MΩ: ± 100 1MΩ < R ≤ 10MΩ: ± 200
0603	1/10W	75V	150V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 200 10Ω < R ≤ 1MΩ: ± 100 1MΩ < R ≤ 10MΩ: ± 200
0805	1/8W	150V	300V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 200 10Ω < R ≤ 1MΩ: ± 100 1MΩ < R ≤ 10MΩ: ± 200
1206	1/4W	200V	400V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 200 10Ω < R ≤ 1MΩ: ± 100 1MΩ < R ≤ 10MΩ: ± 200
1210	1/3W	200V	400V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 200 10Ω < R ≤ 1MΩ: ± 100 1MΩ < R ≤ 10MΩ: ± 200
1812	3/4W	200V	400V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 400 10Ω < R ≤ 10MΩ: ± 100
2010	3/4W	200V	400V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 200 10Ω < R ≤ 1MΩ: ± 100 1MΩ < R ≤ 10MΩ: ± 200
2512	1W	200V	500V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 200 10Ω < R ≤ 1MΩ: ± 100 1MΩ < R ≤ 10MΩ: ± 200

◆ Operating Temp. Range 操作温度范围: 0201: -55 ~ 125°C, 0402 ~ 2512: -55 ~ 155°C

## 功率衰减曲线图 Derating Curve &gt;&gt;&gt;





## 信赖性试验项目 Environmental Characteristics &gt;&gt;&gt;

Item 项目	Requirement 技术指标			Test Method 测试方法
	± 1% & 及以下	± 5%	Jumper 跳线	
Temperature Coefficient of Resistance(T.C.R.) 温度系数(T.C.R.)	As Spec. 参考规格表			-55°C~+125°C, 25°C is the refence temperature 参考温度
Short Time Overload 短时间过负载	± (1.0%+0.05 Ω)	± (2.0%+0.05 Ω)	<50mΩ	RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds,2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒,提升功率系列 2 秒
Insulation Resis 绝缘阻抗	≥ 10G			Max.Overload voltage for 1 minute 施加最大负载电压 1 分钟
Endurance 负载寿命	± (2.0%+0.10 Ω)	± (3.0%+0.10 Ω)	< 100 m Ω	70 ± 2°C,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 70 ± 2°C温度中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Damp Heat with Load 耐湿负荷	± (2.0%+0.10 Ω)	± (3.0%+0.10 Ω)	< 100 m Ω	40 ± 2°C,90~95%R.H.,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 在温度 40 ± 2°C,相对湿度 90~95%环境中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Dry Heat 耐热性实验	± (1.0%+0.05 Ω)	± (1.5%+0.10 Ω)	< 100 m Ω	At+125/+155°C for 1000hrs 置于+125/+155°C温度中, 共 1000 小时
Bending Strength 弯折强度测试	± (1.0%+0.05 Ω)		<50mΩ	Bending once for 5 seconds 2010,2512sizes:2mm Other sizes:3mm 产品焊在测试板上, 中央施力下压 5 秒 下压深度: 2010、2512: 2 毫米 其他尺寸: 3 毫米
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%			245 ± 5°C for 3 seconds 245 ± 5°C锡炉中, 持续 3 秒
Resistance to Soldering Heat 抗焊锡热	± (1.0%+0.05 Ω)		<50mΩ	260 ± 5°C for 10 seconds 260 ± 5°C锡炉中, 持续 10 秒
Voltage Proof 耐电压	No breakdown or flashover 无击穿或跳火现象			1.42 times Max.Operating Voltage for 1 minute 最大操作电压*1.42 倍, 持续 1 分钟
Leaching 溶蚀测试	Individual leaching area ≤ 5% Total leaching area ≤ 10% 导体各面溶蚀区域 ≤ 5% 导体总面积溶蚀区域 ≤ 10%			260 ± 5°C for 30 seconds 260 ± 5°C锡炉中, 持续 30 秒
Rapid Change of Temperature 冷热冲击	± (0.5%+0.05 Ω)	± (1.0%+0.05 Ω)	<50mΩ	-55°C to +155°C 5 cycles -55°C to +155°C 5 次
Sulfur Test 硫测试	± (0.5%+0.05 Ω)		<50mΩ	H2S,50 ± 2°C, 91~93%R.H.,no power rating for 1000hrs H2S,50 ± 2°C, 91~93%R.H.,置于无额度功率下 1000 小时

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25 ± 5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压。

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

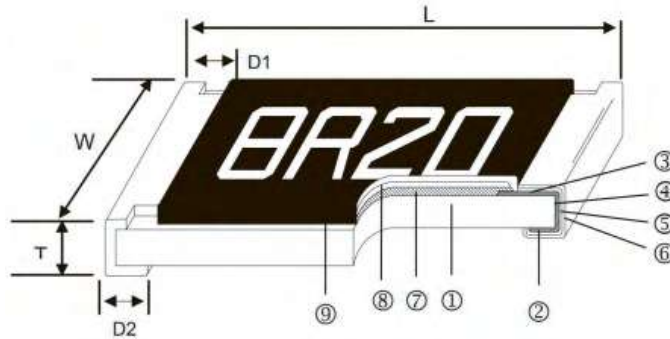
■电性能测量的环境条件: 温度: 25 ± 5 相对湿度: 25%~75%RH

■依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

摘要 Resume >>>

- 优越的抗浪涌电压特性 Superior Anti-Surge Voltage performance.
- 汽车电子 Automotive electronics
- 自动化设备控制器 Automatic Equipment Controller
- 医疗设备 Medical Equipment
- 户外电子应用 Outdoor Electronic Applications

结构图 Construction >>>



- ① Alumina Substrate 陶瓷基底
- ② Bottom Electrode 背导电极
- ③ Top Electrode 正导电极
- ④ Edge Electrode 侧导电极
- ⑤ Barrier Layer 电镀介质层
- ⑥ External Electrode 外部端电极
- ⑦ Resistor Layer 电阻层
- ⑧ Overcoat 密封层
- ⑨ Marking 丝印

尺寸 Dimensions >>>

Size 规格	L	W	T	D1	D2
0603	1.60 ± 0.10	0.80 ± 0.15	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20
0805	2.00 ± 0.15	1.25 ± 0.15	0.55 ± 0.10	0.45 ± 0.20	0.40 ± 0.20
1206	3.10 ± 0.15	1.55 ± 0.15	0.55 ± 0.10	0.45 ± 0.20	0.45 ± 0.20
1210	3.10 ± 0.10	2.60 ± 0.15	0.55 ± 0.10	0.50 ± 0.25	0.60 ± 0.20
2010	5.00 ± 0.10	2.50 ± 0.15	0.55 ± 0.10	0.60 ± 0.25	0.60 ± 0.30
2512	6.35 ± 0.10	3.20 ± 0.15	0.55 ± 0.10	0.75 ± 0.35	0.80 ± 0.40

型号名称 Part Numbering >>>

SWR	01	3216 ( 1206 )	L1R0	J	T	U
Product Type 产品型号	Production line code 产线代码	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式	High Power 升功率
SWR: 普通抗浪涌贴片电阻	01 02 03 04 10	1608 ( 0603 ) 2012 ( 0805 ) 3216 ( 1206 ) 3225 ( 1210 ) 5025 ( 2010 ) 6432 ( 2512 )	± 5% L105:1MΩ L182:1.8KΩ L1R3:1.3Ω  ± 1%及以下 L1004:1MΩ L1801:1.8KΩ L1R30:1.3Ω	J = ± 5 % K = ± 10 % M = ± 20 %	T:Taping Reel T:编带 B:Bulk B:散装	S:2W N:1W Q:3/4W U:1/2W O:1/3W V:1/4W P:1/5W W:1/8W X:1/10W

标准规格表 Standard Electrical Specifications >>>

Item Type 项目 型号	Power Rating 额定功率	Max. Operating Voltage 最大工作电压	Max. Overload Voltage 最大负载电压	Resistance Range 阻值范围			TCR温度系数 (PPM/°C)
				± 5%	± 10%	± 20%	
0603	1/8W	50V	100V	1Ω-10MΩ			1Ω ≤ R < 10Ω: ±400 10Ω ≤ R ≤ 270Ω: ±200 300Ω ≤ R ≤ 10M: ±100
0805	1/4W	150V	300V	1Ω-20MΩ			1Ω ≤ R < 10Ω: ±400 10Ω ≤ R ≤ 270Ω: ±200 300Ω ≤ R ≤ 20M: ±100
1206	1/3W	200V	400V	1Ω-20MΩ			1Ω ≤ R < 10Ω: ±400 10Ω ≤ R ≤ 20Ω: ±200 22Ω ≤ R ≤ 20M: ±100
1210	1/2W	200V	400V	1Ω-20MΩ			1Ω ≤ R < 10Ω: ±400 10Ω ≤ R ≤ 20Ω: ±200 22Ω ≤ R ≤ 20M: ±100
2010	3/4W	400V	800V	1Ω-20MΩ			1Ω ≤ R < 10Ω: ±400 10Ω ≤ R ≤ 20Ω: ±200 22Ω ≤ R ≤ 20M: ±100
2512	1.5W	500V	1000V	1Ω-20MΩ			1Ω ≤ R < 10Ω: ±400 10Ω ≤ R ≤ 20Ω: ±200 22Ω ≤ R ≤ 20M: ±100

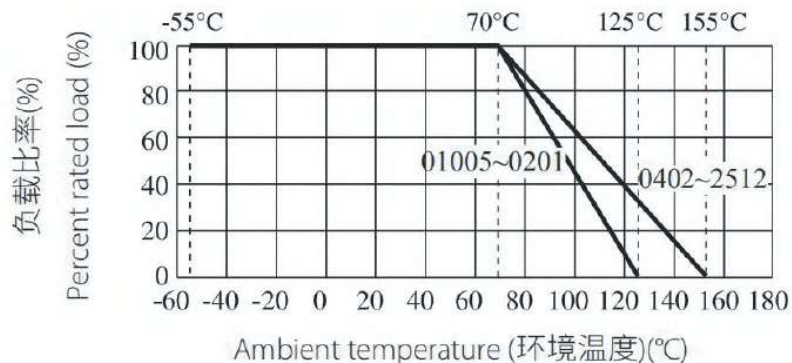
◆ Operating Temp. Range 操作温度范围: 0402~2512: -55~155°C

升功率规格表 High Power Rating Electrical Specifications >>>

Item Type 项目 型号	Power Rating 额定功率	Max. Operating Voltage 最大工作电压	Max. Overload Voltage 最大负载电压	Resistance Range 阻值范围			TCR温度系数 (PPM/°C)
				± 5%	± 10%	± 20%	
0402	1/8W	50V	100V	1Ω-10M			1Ω ≤ R ≤ 10Ω: ±400 10Ω < R ≤ 10M: ±100
0603	1/4W	75V	150V	1Ω-10M			1Ω ≤ R ≤ 10Ω: ±400 10Ω < R ≤ 10M: ±100
0805	1/2W	150V	300V	1Ω-10M			1Ω ≤ R ≤ 10Ω: ±400 10Ω < R ≤ 10M: ±100
1206	3/5W	200V	400V	1Ω-10M			1Ω ≤ R ≤ 10Ω: ±400 10Ω < R ≤ 10M: ±100
1210	3/4W	200V	500V	1Ω-10M			1Ω ≤ R ≤ 10Ω: ±400 10Ω < R ≤ 10M: ±100
2010	1.5W	400V	800V	1Ω-10M			1Ω ≤ R ≤ 10Ω: ±400 10Ω < R ≤ 10M: ±100
2512	2W	500V	1000V	1Ω-10M			1Ω ≤ R ≤ 10Ω: ±400 10Ω < R ≤ 10M: ±100

◆ Operating Temp. Range 操作温度范围: 0402~2512: -55~155°C

功率衰减曲线图 Derating Curve >>>



## 信赖性试验项目 Environmental Characteristics &gt;&gt;&gt;

Item 项目	Requirement 条件	Test Method 测试方法
Temperature Coefficient of Resistance(T.C.R.) 温度系数(T.C.R.)	As Spec. 参考规格表	-55℃~+125℃, 25℃ is the reference temperature 参考温度
Short Time Overload 短时间过负载	$\pm (1.0\%+0.05\Omega)$	RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds,2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒,提升功率系列 2 秒
Insulation Resis 绝缘阻抗	$\geq 10G$	Max.Overload voltage for 1 minute 施加最大负载电压 1 分钟
Endurance 负载寿命	$\pm (3.0\%+0.05\Omega)$	70 $\pm$ 2℃,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 70 $\pm$ 2℃温度中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Damp Heat with Load 耐湿负荷	$\pm (3.0\%+0.05\Omega)$	40 $\pm$ 2℃,90~95%R.H.,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 在温度 40 $\pm$ 2℃, 相对湿度 90~95%环境中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Dry Heat 耐热性实验	$\pm (3.0\%+0.05\Omega)$	At+125/+155℃ for 1000hrs 置于+125/+155℃温度中, 共 1000 小时
Bending Strength 弯折强度测试	$\pm (1.0\%+0.05\Omega)$	Bending once for 5 seconds 2010,2512sizes:2mm Other sizes:3mm 产品焊在测试板上, 中央施力下压 5 秒 下压深度: 2010、2512: 2 毫米 其他尺寸: 3 毫米
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%	245 $\pm$ 5℃ for 3 seconds 245 $\pm$ 5℃锡炉中, 持续 3 秒
Resistance to Soldering Heat 抗焊锡热	$\pm (1.0\%+0.05\Omega)$	260 $\pm$ 5℃ for 10 seconds 260 $\pm$ 5℃锡炉中, 持续 10 秒
Voltage Proof 耐电压	No breakdown or flashover 无击穿或跳火现象	1.42 times Max.Operating Voltage for 1 minute 最大操作电压*1.42 倍, 持续 1 分钟
Leaching 溶蚀测试	Individual leaching area $\leq$ 5% Total leaching area $\leq$ 10% 导体各面溶蚀区域 $\leq$ 5% 导体总面积溶蚀区域 $\leq$ 10%	260 $\pm$ 5℃ for 30 seconds 260 $\pm$ 5℃锡炉中, 持续 30 秒
Rapid Change of Temperature 冷热冲击	$\pm (1.0\%+0.05\Omega)$	-55℃ to +155℃ 5 cycles -55℃ to +155℃ 5 次

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25 $\pm$ 5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■ RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

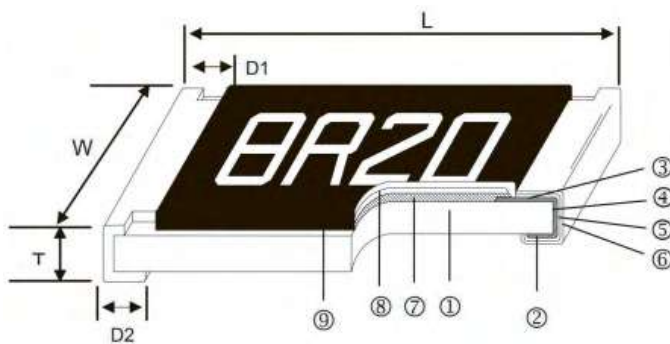
■ 电性能测量的环境条件: 温度: 25 $\pm$ 5 相对湿度: 25%~75%RH

■ 依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

## 摘要 Resume >>>

- 高精度、高功率 High-Precision, high-power
- 优越的抗浪涌电压特性 Superior Anti-Surge Voltage performance.
- 适合波峰焊与回流焊 Suitable for both wave & re-flow soldering
- 汽车电子 Automotive electronics
- 自动化设备控制器 Automatic Equipment Controller
- 医疗设备 Medical Equipment
- 户外电子应用 Outdoor Electronic Applications

## 结构图 Construction >>>



- ① Alumina Substrate 陶瓷基板
- ② Bottom Electrode 背导电极
- ③ Top Electrode 正导电极
- ④ Edge Electrode 侧导电极
- ⑤ Barrier Layer 电镀介质层
- ⑥ External Electrode 外部端电极
- ⑦ Resistor Layer 电阻层
- ⑧ Overcoat 密封层
- ⑨ Marking 丝印

## 尺寸 Dimensions >>>

Size 规格	L	W	T	D1	D2
0402	1.00 ± 0.10	0.50 ± 0.05	0.35 ± 0.05	0.20 ± 0.10	0.25 ± 0.10
0603	1.60 ± 0.10	0.80 ± 0.15	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20
0805	2.00 ± 0.15	1.25 ± 0.15	0.55 ± 0.10	0.45 ± 0.20	0.40 ± 0.20
1206	3.10 ± 0.15	1.55 ± 0.15	0.55 ± 0.10	0.45 ± 0.20	0.45 ± 0.20
1210	3.10 ± 0.10	2.60 ± 0.15	0.55 ± 0.10	0.50 ± 0.25	0.60 ± 0.20
2010	5.00 ± 0.10	2.50 ± 0.15	0.55 ± 0.10	0.60 ± 0.25	0.60 ± 0.30
2512	6.35 ± 0.10	3.20 ± 0.15	0.55 ± 0.10	0.75 ± 0.35	0.80 ± 0.40

## 型号名称 Part Numbering >>>

PWR	01	3216 ( 1206 )	L1R00	F	T	U
Product Type 产品型号	Production line code 产线代码	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式	High Power 升功率
PWR:高精密 抗浪涌电阻	01 02 03 04 10	1005 ( 0402 ) 1608 ( 0603 ) 2012 ( 0805 ) 3216 ( 1206 ) 3225 ( 1210 ) 5025 ( 2010 ) 6432 ( 2512 )	±5% L105:1MΩ L182:1.8KΩ L1R3:1.3Ω  ±1%及以下 L1004:1MΩ L1801:1.8KΩ L1R30:1.3Ω	D= ±0.5% F= ±1% J= ±5%	T:Taping Reel T:编带 B:Bulk B:散装	N:1 W Q:3/4 W U:1/2 W O:1/3 W V:1/4 W P:1/5 W W:1/8W

## 标准规格表 Standard Electrical Specifications >>>

Item Type 项目 型号	Power Rating 额定功率	Max. Operating Voltage 最大工作电压	Max. Overload Voltage 最大负载电压	Resistance Range 阻值范围			TCR温度系数 (PPM/°C)
				±0.5%	±1%	±5%	
0402	1/8W	50V	100V	/	1Ω-10M	1Ω ≤ R ≤ 10Ω: ±400 10Ω < R ≤ 100Ω: ±200 100Ω < R ≤ 10MΩ: ±100	
0603	1/10W	50V	100V	10Ω-1M	1Ω-10M	1Ω ≤ R ≤ 294Ω: ±200 300Ω ≤ R ≤ 10M: ±100	
0805	1/8W	150V	300V	10Ω-20M	1Ω-20M	1Ω ≤ R ≤ 294Ω: ±200 300Ω ≤ R ≤ 10MΩ: ±100 10MΩ < R ≤ 20MΩ: 200	
1206	1/3W	200V	400V	10Ω-20M	1Ω-20M	1Ω ≤ R ≤ 20Ω: ±200 20.5Ω ≤ R ≤ 10MΩ: ±100 10MΩ < R ≤ 20MΩ: 200	
1210	1/2W	200V	400V	10Ω-20M	1Ω-20M	1Ω ≤ R ≤ 20Ω: ±200 20.5Ω ≤ R ≤ 10MΩ: ±100 10MΩ < R ≤ 20MΩ: 200	
2010	3/4W	400V	800V	10Ω-20M	1Ω-20M	1Ω ≤ R ≤ 20Ω: ±200 20.5Ω ≤ R ≤ 10MΩ: ±100 10MΩ < R ≤ 20MΩ: 200	
2512	1.5W	500V	1000V	10Ω-20M	1Ω-20M	1Ω ≤ R ≤ 20Ω: ±200 20.5Ω ≤ R ≤ 10MΩ: ±100 10MΩ < R ≤ 20MΩ: 200	

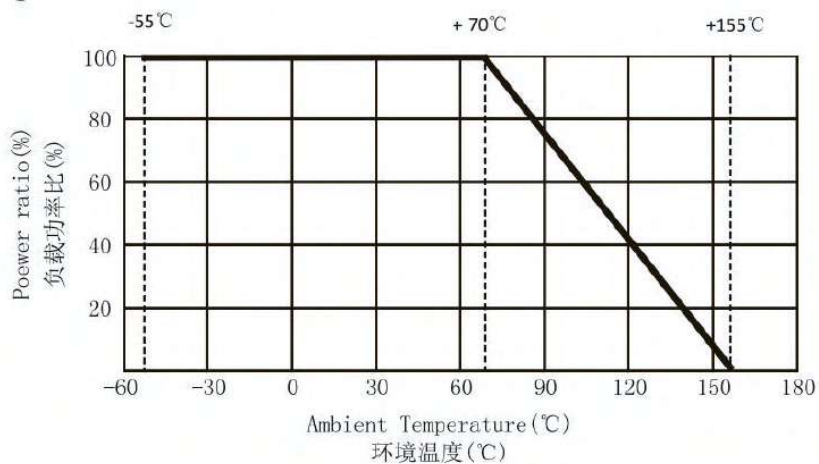
◆ Operating Temp. Range 操作温度范围: 0402~2512: -55~155°C

## 升功率规格表 High Power Rating Electrical Specifications >>>

Item 项目 Type 型号	Power Rating 额定功率	Max. Operating Voltage 最大工作电压	Max. Overload Voltage 最大负载电压	Resistance Range 阻值范围			TCR温度系数 (PPM/°C)
				±0.5%	±1%	±5%	
0402	1/5W	50V	100V	100Ω-1M	1Ω-1M	1Ω≤R≤20Ω: ±200 20.5Ω≤R≤1M :±100	
0603	1/4W	50V	100V	10Ω-1M	1Ω-10M	1Ω≤R≤294Ω: ±200 300Ω≤R≤10M :±100	
0805	2/5W	150V	300V	10Ω-1M	1Ω-1M	1Ω≤R≤294Ω: ±200 300Ω≤R≤10M :±100	
	1/3W	150V	300V	/	1Ω-10M	1Ω≤R≤20Ω: ±200 20.5Ω≤R≤10M :±100	
1206	1/2W	200V	400V	10Ω-1M	1Ω-10M	1Ω≤R≤20Ω: ±200 20.5Ω≤R≤10M :±100	
1210	3/4W	200V	500V	10Ω-1M	1Ω-10M	1Ω≤R≤20Ω: ±200 20.5Ω≤R≤10M :±100	
2010	1W	400V	800V	10Ω-1M	1Ω-10M	1Ω≤R≤20Ω: ±200 20.5Ω≤R≤10M :±100	
2512	2W	500V	1000V	/	1Ω-10M	±100	

◆ Operating Temp. Range 操作温度范围: 0402~2512: -55~155°C

## 功率衰减曲线图 Derating Curve >>>





## 信赖性试验项目 Environmental Characteristics >>>

Item 项目	Requirement 条件	Test Method 测试方法
Temperature Coefficient of Resistance(T.C.R.) 温度系数(T.C.R.)	As Spec. 参考规格表	-55°C~+125°C, 25°C is the refence temperature 参考温度
Short Time Overload 短时间过负载	±(1.0%+0.05Ω)	RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds,2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒,提升功率系列 2 秒
Insulation Resis 绝缘阻抗	≥10G	Max.Overload voltage for 1 minute 施加最大负载电压 1 分钟
Endurance 负载寿命	±(1.0%+0.05Ω)	70±2°C,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 70±2°C温度中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Damp Heat with Load 耐湿负荷	±(0.5%+0.05Ω)	40±2°C,90~95%R.H.,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 在温度 40±2°C,相对湿度 90~95%环境中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Dry Heat 耐热性实验	±(0.5%+0.05Ω)	At+125/+155°C for 1000hrs 置于+125/+155°C温度中, 共 1000 小时
Bending Strength 弯折强度测试	±(1.0%+0.05Ω)	Bending once for 5 seconds 2010,2512sizes:2mm Other sizes:3mm 产品焊在测试板上, 中央施力下压 5 秒 下压深度: 2010、2512: 2 毫米 其他尺寸: 3 毫米
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%	245±5°C for 3 seconds 245±5°C锡炉中, 持续 3 秒
Resistance to Soldering Heat 抗焊锡热	±(1.0%+0.05Ω)	260±5°C for 10 seconds 260±5°C锡炉中, 持续 10 秒
Voltage Proof 耐电压	No breakdown or flashover 无击穿或跳火现象	1.42 times Max.Operating Voltage for 1 minute 最大操作电压*1.42 倍, 持续 1 分钟
Leaching 溶蚀测试	Individual leaching area≤5% Total leaching area≤10% 导体各面溶蚀区域≤5% 导体总面积溶蚀区域≤10%	260±5°C for 30 seconds 260±5°C锡炉中, 持续 30 秒
Rapid Change of Temperature 冷热冲击	±(0.5%+0.05Ω)	-55°C to +155°C 5 cycles -55°C to +155°C 5 次

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25±5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■ RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

■ 电性能测量的环境条件: 温度: 25±5 相对湿度: 25%~75%RH

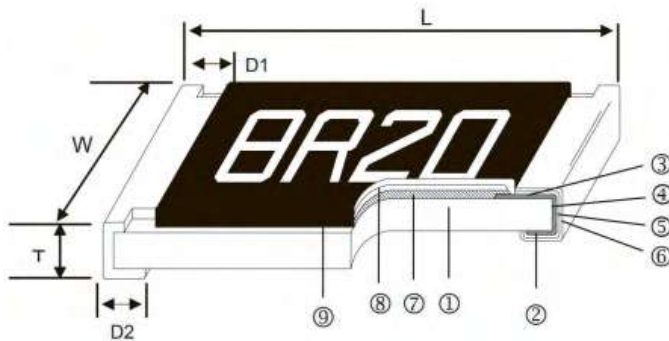
■ 依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1



## 摘要 Resume >>>

- 高阻值 High Resistance
- 适合波峰焊与回流焊 Suitable for reflow & wave soldering
- 适用于AV适配器, LCD背光电路, 照相机快门等.
- Application AV adapters, LCD back-light camera strobe etc.

## 结构图 Construction >>>



- ① Alumina Substrate 陶瓷基体
- ② Bottom Electrode 背导电极
- ③ Top Electrode 正导电极
- ④ Edge Electrode 侧导电极
- ⑤ Barrier Layer 电镀介质层
- ⑥ External Electrode 外部端电极
- ⑦ Resistor Layer 电阻层
- ⑧ Overcoat 密封层
- ⑨ Marking 丝印

## 尺寸 Dimensions >>>

Size 规格	L	W	T	D1	D2
0805	2.00 ± 0.15	1.25 ± 0.15	0.55 ± 0.10	0.45 ± 0.20	0.40 ± 0.20
1206	3.10 ± 0.15	1.55 ± 0.15	0.55 ± 0.10	0.45 ± 0.20	0.45 ± 0.20

## 型号名称 Part Numbering >>>

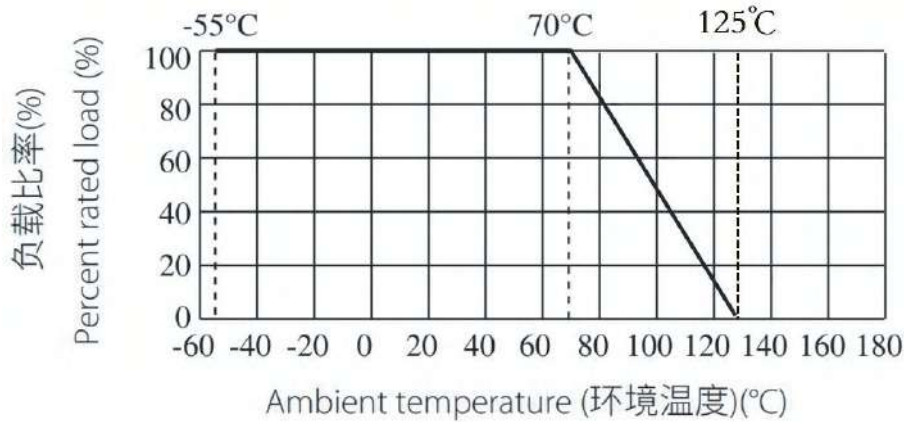
HMR	2012 (0805)	L117	J	T
Product Type 产品型号	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式
HMR: 高阻值贴片电阻	2012 (0805) 3216 (1206)	±5% L117: 110M Ω L507: 500M Ω L108: 1G Ω	J = ±5%	T:Taping Reel T:编带 B:Bulk B:散装

## 标准规格表 Standard Electrical Specifications >>>

Item 项目 Type 型号	Power Rating 额定功率	Max.Operating Voltage 最大工作电压	Max.Overload Voltage 最大负载电压	Resistance Range 阻值范围	TCR 温度系数 (PPM/°C)
				± 5%	
0805	1/8W	150V	300V	110MΩ-1GΩ	110MΩ ≤ R ≤ 500MΩ : ± 500 510MΩ ≤ R ≤ 1GΩ : ± 1000
1206	1/4W	200V	400V	110MΩ-1GΩ	110MΩ ≤ R ≤ 500MΩ : ± 500 510MΩ ≤ R ≤ 1GΩ : ± 1000

◆ Operating Temp.Range 操作温度范围: 0805 ~ 1206: -55 ~ 125°C

## 功率衰减曲线图 Derating Curve >>>



## 信赖性试验项目 Environmental Characteristics >>>

Item 项目	Requirement 条件	Test Method 测试方法
Temperature Coefficient of Resistance(T.C.R.) 温度系数(T.C.R.)	As Spec. 参考规格表	-55°C~+125°C, 25°C is the reference temperature 参考温度
Short Time Overload 短时间过负载	$\pm (2.0\%+0.05\Omega)$	RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds,2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒,提升功率系列 2 秒
Insulation Resis 绝缘阻抗	$\geq 10G$	Max.Overload voltage for 1 minute 施加最大负载电压 1 分钟
Endurance 负载寿命	$\pm (3.0\%+0.10\Omega)$	70 $\pm$ 2°C,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 70 $\pm$ 2°C温度中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Damp Heat with Load 耐湿负荷	$\pm (3.0\%+0.10\Omega)$	40 $\pm$ 2°C,90~95%R.H.,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 在温度 40 $\pm$ 2°C,相对湿度 90~95%环境中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Dry Heat 耐热性实验	$\pm (1.5\%+0.10\Omega)$	At+125/+155°C for 1000hrs 置于+125/+155°C温度中, 共 1000 小时
Bending Strength 弯折强度测试	$\pm (1.0\%+0.05\Omega)$	Bending once for 5 seconds 2010,2512sizes:2mm Other sizes:3mm 产品焊在测试板上, 中央施力下压 5 秒 下压深度: 2010、2512: 2 毫米 其他尺寸: 3 毫米
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%	245 $\pm$ 5°C for 3 seconds 245 $\pm$ 5°C锡炉中, 持续 3 秒
Resistance to Soldering Heat 抗焊锡热	$\pm (1.0\%+0.05\Omega)$	260 $\pm$ 5°C for 10 seconds 260 $\pm$ 5°C锡炉中, 持续 10 秒
Voltage Proof 耐电压	No breakdown or flashover 无击穿或跳火现象	1.42 times Max.Operating Voltage for 1 minute 最大操作电压*1.42 倍, 持续 1 分钟
Leaching 溶蚀测试	Individual leaching area $\leq$ 5% Total leaching area $\leq$ 10% 导体各面溶蚀区域 $\leq$ 5% 导体总面积溶蚀区域 $\leq$ 10%	260 $\pm$ 5°C for 30 seconds 260 $\pm$ 5°C锡炉中, 持续 30 秒
Rapid Change of Temperature 冷热冲击	$\pm (1.0\%+0.05\Omega)$	-55°C to +155°C 5 cycles -55°C to +155°C 5 次

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25  $\pm$  5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压。

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

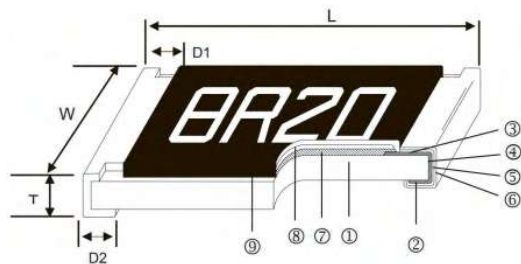
■电性能测量的环境条件: 温度: 25  $\pm$  5 相对湿度: 25%~75%RH

■依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

## 摘要 Resume >>>

- 在最大工作电压上优于普通厚膜晶片电阻
- Superiority in Max. Working Voltage performance than general thick film Chip Resistors.
- 适合波峰焊及回流焊
- Suitable for both wave & re-flow soldering
- 适用于AV适配器、LCD背光电路、照相机的闪光灯等
- Application: AV adapter, LCD Backlight, Flash Light of camera

## 结构图 Construction >>>



- ① Alumina Substrate 陶瓷基底
- ② Bottom Electrode 背导电极
- ③ Top Electrode 正导电极
- ④ Edge Electrode 侧导电极
- ⑤ Barrier Layer 电镀介质层
- ⑥ External Electrode 外部端电极
- ⑦ Resistor Layer 电阻层
- ⑧ Overcoat 密封层
- ⑨ Marking 丝印

## 尺寸 Dimensions >>>

Size 规格	L	W	T	D1	D2
0402	1.00 ± 0.10	0.50 ± 0.05	0.35 ± 0.05	0.20 ± 0.10	0.25 ± 0.10
0603	1.60 ± 0.10	0.80 ± 0.15	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20
0805	2.00 ± 0.15	1.25 ± 0.15	0.55 ± 0.10	0.45 ± 0.20	0.40 ± 0.20
1206	3.10 ± 0.15	1.55 ± 0.15	0.55 ± 0.10	0.45 ± 0.20	0.45 ± 0.20
1210	3.10 ± 0.10	2.60 ± 0.15	0.55 ± 0.10	0.50 ± 0.25	0.60 ± 0.20
2010	5.00 ± 0.10	2.50 ± 0.15	0.55 ± 0.10	0.60 ± 0.25	0.60 ± 0.30
2512	6.35 ± 0.10	3.20 ± 0.15	0.55 ± 0.10	0.75 ± 0.35	0.80 ± 0.40

## 型号名称 Part Numbering >>>

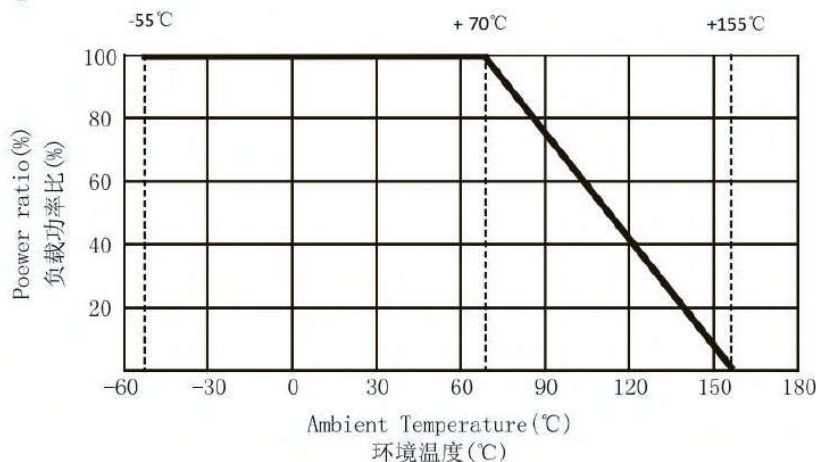
HVR	01	5025 (2010)	L1003	F	T
Product Type 产品型号	Production line code 产线代码	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式
HVR	01 02 03 04 10	1005 (0402) 1608 (0603) 2012 (0805) 3216 (1206) 3225 (1210) 5025 (2010) 6432 (2512)	± 5% L182: 1.8KΩ L180: 18Ω ± 1% L1003: 100KΩ Ω L10R0: 10Ω	F = ± 1% J = ± 5%	T: Taping Reel T: 编带 B: Bulk B: 散装

## 标准规格表 Standard Electrical Specifications >>>

Item 项目 Type 型号	Power Rating 额定功率	Max. Operating Voltage 最大工作电压	Max. Overload Voltage 最大负载电压	Resistance Range 阻值范围		TCR 温度系数 (PPM/°C)
				± 1%	± 5%	
0402	1/16W	100V	200V	100Ω-10MΩ	100Ω-100MΩ	47Ω ≤ R ≤ 1MΩ : ± 100 1MΩ < R ≤ 20MΩ : ± 200 20MΩ < R ≤ 100MΩ : ± 400
0603	1/10W	200V	400V	47Ω-10MΩ	47Ω-100MΩ	47Ω ≤ R ≤ 1MΩ : ± 100 1MΩ < R ≤ 20MΩ : ± 200 20MΩ < R ≤ 100MΩ : ± 400
0805	1/8W	400V	800V	47Ω-10MΩ	47Ω-100MΩ	47Ω ≤ R ≤ 1MΩ : ± 100 1MΩ < R ≤ 20MΩ : ± 200 20MΩ < R ≤ 100MΩ : ± 400
1206	1/4W	500V	1000V	47Ω-10MΩ	47Ω-100MΩ	47Ω ≤ R ≤ 1MΩ : ± 100 1MΩ < R ≤ 20MΩ : ± 200 20MΩ < R ≤ 100MΩ : ± 400
1210	1/2W	800V	1500V	50KΩ-10MΩ		47Ω ≤ R ≤ 1MΩ : ± 100 1MΩ < R ≤ 20MΩ : ± 200 20MΩ < R ≤ 100MΩ : ± 400
2010	1/2W	2000V	3000V	51KΩ-20MΩ	51KΩ-100MΩ	47Ω ≤ R ≤ 1MΩ : ± 100 1MΩ < R ≤ 20MΩ : ± 200 20MΩ < R ≤ 100MΩ : ± 400
	3/4W	2000V	3000V	50KΩ-10MΩ		47Ω ≤ R ≤ 1MΩ : ± 100 1MΩ < R ≤ 20MΩ : ± 200 20MΩ < R ≤ 100MΩ : ± 400
2512	1W	3000V	4000V	30KΩ-20MΩ	30KΩ-100MΩ	47Ω ≤ R ≤ 1MΩ : ± 100 1MΩ < R ≤ 20MΩ : ± 200 20MΩ < R ≤ 100MΩ : ± 400

◆ Operating Temp. Range 操作温度范围: 0402~2512: -55~155°C

## 功率衰减曲线图 Derating Curve >>>



## 信赖性试验项目 Environmental Characteristics >>>

Item 项目	Requirement 条件		Test Method 测试方法
	± 1%	± 5%	
Temperature Coefficient of Resistance(T.C.R.) 温度系数(T.C.R.)	As Spec. 参考规格表		-55℃~+125℃, 25℃ is the refence temperature 参考温度
Short Time Overload 短时间过负载	± (1.0%+0.05 Ω)	± (2.0%+0.05 Ω)	RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds,2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒,提升功率系列 2 秒
Insulation Resis 绝缘阻抗	≥ 10G		Max.Overload voltage for 1 minute 施加最大负载电压 1 分钟
Endurance 负载寿命	± (2.0%+0.10 Ω)	± (3.0%+0.10 Ω)	70 ± 2 °C ,RCWV for 1000hrs with 1.5hrs " ON " and 0.5hrs " OFF" 70 ± 2 °C 温度中施加额定电压, 1.5 小时 "开", 0.5 小时 "关", 共 1000 小时
Damp Heat with Load 耐湿负荷	± (2.0%+0.10 Ω)	± (3.0%+0.10 Ω)	40 ± 2 °C ,90~95%R.H.,RCWV for 1000hrs with 1.5hrs " ON " and 0.5hrs " OFF" 在温度 40 ± 2 °C , 相对湿度 90~95% 环境中施加额定电压, 1.5 小时 "开", 0.5 小时 "关", 共 1000 小时
Dry Heat 耐热性实验	± (1.0%+0.05 Ω)	± (1.5%+0.10 Ω)	At+125/+155℃ for 1000hrs 置于+125/+155℃温度中, 共 1000 小时
Bending Strength 弯折强度测试	± (1.0%+0.05 Ω)		Bending once for 5 seconds 2010,2512sizes:2mm Other sizes:3mm 产品焊在测试板上, 中央施力下压 5 秒 下压深度: 2010、2512: 2 毫米 其他尺寸: 3 毫米
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%		245 ± 5 °C for 3 seconds 245 ± 5 °C 锡炉中, 持续 3 秒
Resistance to Soldering Heat 抗焊锡热	± (0.5%+0.05 Ω)	± (1.0%+0.05 Ω)	260 ± 5 °C for 10 seconds 260 ± 5 °C 锡炉中, 持续 10 秒
Voltage Proof 耐电压	No breakdown or flashover 无击穿或跳火现象		1.42 times Max.Operating Voltage for 1 minute 最大操作电压*1.42 倍, 持续 1 分钟
Leaching 溶蚀测试	Individual leaching area ≤ 5% Total leaching area ≤ 10% 导体各面溶蚀区域 ≤ 5% 导体总面积溶蚀区域 ≤ 10%		260 ± 5 °C for 30 seconds 260 ± 5 °C 锡炉中, 持续 30 秒
Rapid Change of Temperature 冷热冲击	± (0.5%+0.05 Ω)	± (1.0%+0.05 Ω)	-55℃ to +155℃ 5 cycles -55℃ to +155℃ 5 次

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25 ± 5 Humidity: 25%~75%RH

Reference Standards: IEC 60115-1,60068-2-58; JIS-C 5201-1

■ RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

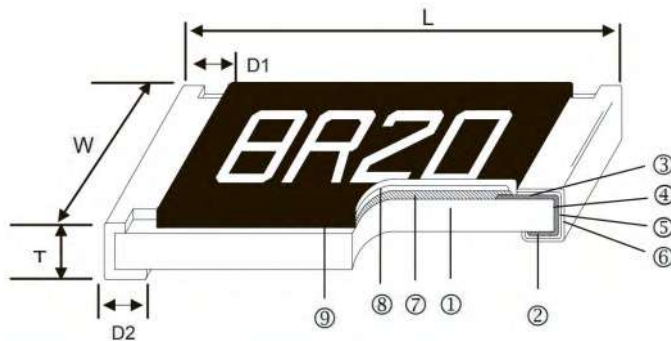
■ 电性能测量的环境条件: 温度: 25 ± 5 相对湿度: 25%~75%RH

■ 依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

## 摘要 Resume >>>

- 适合贴片机组装 Suitable for SMT
- 短小轻薄 Small Size & Light Weight
- 符合RoHS和无卤标准 Meet RoHS & HF Requirement
- 一般用途 General Purpose
- 通用型 Universal type

## 结构图 Construction >>>



- ① Alumina Substrate 陶瓷基体
- ② Bottom Electrode 背导电极
- ③ Top Electrode 正导电极
- ④ Edge Electrode 侧导电极
- ⑤ Barrier Layer 电镀介质层
- ⑥ External Electrode 外部端电极
- ⑦ Resistor Layer 电阻层
- ⑧ Overcoat 密封层
- ⑨ Marking 丝印

## 尺寸 Dimensions >>>

Size 规格	L	W	T	D1	D2
01005	0.40 ± 0.03	0.20 ± 0.03	0.13 ± 0.05	0.10 ± 0.05	0.10 ± 0.05
0201	0.60 ± 0.03	0.30 ± 0.03	0.23 ± 0.03	0.10 ± 0.05	0.15 ± 0.05
0402	1.00 ± 0.10	0.50 ± 0.05	0.35 ± 0.05	0.20 ± 0.10	0.25 ± 0.10
0603	1.60 ± 0.10	0.80 ± 0.15	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20
0805	2.00 ± 0.15	1.25 ± 0.15	0.55 ± 0.10	0.45 ± 0.20	0.40 ± 0.20
1206	3.10 ± 0.15	1.55 ± 0.15	0.55 ± 0.10	0.45 ± 0.20	0.45 ± 0.20
1210	3.10 ± 0.10	2.60 ± 0.15	0.55 ± 0.10	0.50 ± 0.25	0.60 ± 0.20
1812	4.50 ± 0.20	3.20 ± 0.20	0.55 ± 0.20	0.50 ± 0.20	0.60 ± 0.30
2010	5.00 ± 0.10	2.50 ± 0.15	0.55 ± 0.10	0.60 ± 0.25	0.60 ± 0.30
2512	6.35 ± 0.10	3.20 ± 0.15	0.55 ± 0.10	0.75 ± 0.35	0.80 ± 0.40

型号名称 Part Numbering >>>

LF	02	3216 ( 1206 )	L182	J	T	O
Product Type 产品型号	Production line code 产线代码	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式	High Power 升功率
LF: 无铅厚膜贴片电阻	01 02 03 04 10	0402 ( 01005 ) 0603 ( 0201 ) 1005 ( 0402 ) 1608 ( 0603 ) 2012 ( 0805 ) 3216 ( 1206 ) 3225 ( 1210 ) 4532 ( 1812 ) 5025 ( 2010 ) 6432 ( 2512 )	± 5% L105:1MΩ L182:1.8KΩ L1R3:1.3Ω  ± 1%及以下 L1004:1MΩ L1801:1.8KΩ L1R30:1.3Ω	F= ± 1 % J= ± 5 %	T:Taping Reel T:编带 B: Bulk B:散装	S:2 W N:1 W Q:3/4 W U:1/2 W O:1/3 W V:1/4 W W:1/8 W X:1/10W Y:1/16W L:1/32W

◆\*O: High Power升功率 (非升功率不加备注)

标准规格表 Standard Electrical Specifications >>>

Item Type 项目 型号	Power Rating 额定功率	Max. Operating Voltage 最大工作电压	Max. Overload Voltage 最大负载电压	Resistance Range 阻值范围		TCR温度系数 (PPM/°C)
				± 1%	± 5%	
01005	1/32W	15V	30V	10Ω-10MΩ	1Ω-10MΩ	1Ω ≤ R ≤ 10Ω: ± 600 10Ω < R ≤ 100Ω: ± 300 100Ω < R ≤ 10MΩ: ± 200
0201	1/20W	25V	50V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 400 10Ω < R ≤ 10MΩ: ± 200
0402	1/16W	50V	100V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 400 10Ω < R ≤ 100Ω: ± 200 100Ω < R ≤ 10MΩ: ± 100
0603	1/10W	50V	100V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 400 10Ω < R ≤ 100Ω: ± 200 100Ω < R ≤ 10MΩ: ± 100
0805	1/8W	150V	300V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 400 10Ω < R ≤ 100Ω: ± 200 100Ω < R ≤ 10MΩ: ± 100
1206	1/4W	200V	400V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 400 10Ω < R ≤ 100Ω: ± 200 100Ω < R ≤ 10MΩ: ± 100
1210	1/2W	200V	400V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 400 10Ω < R ≤ 100Ω: ± 200 100Ω < R ≤ 10MΩ: ± 100
1812	3/4W	200V	400V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 400 10Ω < R ≤ 100Ω: ± 200 100Ω < R ≤ 10MΩ: ± 100
2010	3/4W	200V	400V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 400 10Ω < R ≤ 100Ω: ± 200 100Ω < R ≤ 10MΩ: ± 100
2512	1W	200V	400V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 400 10Ω < R ≤ 100Ω: ± 200 100Ω < R ≤ 10MΩ: ± 100

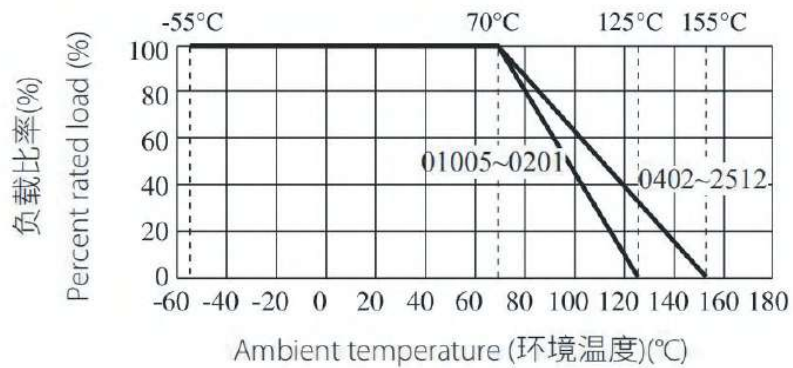
◆Operating Temp.Range 操作温度范围: 01005~0201: -55~125°C, 0402~2512: -55~155°C



标准规格表 Standard Electrical Specifications >>>

Type 型号	01005	0201	0402	0603	0805	1206	1210	1812	2010	2512
Rated Current of Jumper 零欧姆额定电流	0.5A	0.5A	1A	1A	2A	2A	2A	2A	2A	2A
Max Current of Jumper 零欧姆电阻最大电流	1A	1A	2A	2A	5A	10A	10A	10A	10A	10A
Jumper Resistance Value 零欧姆阻力值	50mΩ Max									

功率衰减曲线图 Derating Curve >>>



## 信赖性试验项目 Environmental Characteristics >>>

Item 项目	Requirement 条件			Test Method 测试方法
	± 1%	± 5%	Jumper 跳线	
Temperature Coefficient of Resistance(T.C.R.) 温度系数(T.C.R.)	As Spec. 参考规格表			-55°C~+125°C, 25°C is the refence temperature 参考温度
Short Time Overload 短时间过负载	±(1.0%+0.10Ω)	±(2.0%+0.10Ω)	<50mΩ	RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds,2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒,提升功率系列 2 秒
Insulation Resis 绝缘阻抗	≥1G			Max.Overload voltage for 1 minute 施加最大负载电压 1 分钟
Endurance 负载寿命	±(1.0%+0.10Ω)	±(3.0%+0.10Ω)	<50mΩ	70 ± 2°C ,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 70 ± 2°C 温度中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Damp Heat with Load 耐湿负荷	±(2.0%+0.10Ω)	±(3.0%+0.10Ω)	<50mΩ	40 ± 2°C,90~95%R.H.,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 在温度 40 ± 2°C, 相对湿度 90~95%环境中施加额定电压, 1.5 小时"开", 0.5 小时"关", 共 1000 小时
Dry Heat 耐热性实验	±(1.0%+0.05Ω)		<50mΩ	At+125/+155°C for 1000hrs 置于+125/+155°C温度中, 共 1000 小时
Bending Strength 弯折强度测试	±(1.0%+0.05Ω)		<50mΩ	Bending once for 5 seconds 2010,2512sizes:2mm Other sizes:3mm 产品焊在测试板上, 中央施力下压 5 秒 下压深度: 2010、2512: 2 毫米 其他尺寸: 3 毫米
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%			245 ± 5°C for 3 seconds 245 ± 5°C 锡炉中, 持续 3 秒
Resistance to Soldering Heat 抗焊锡热	±(1.0%+0.05Ω)		<50mΩ	260 ± 5°C for 10 seconds 260 ± 5°C 锡炉中, 持续 10 秒
Voltage Proof 耐电压	No breakdown or flashover 无击穿或跳火现象			1.42 times Max.Operating Voltage for 1 minute 最大操作电压*1.42 倍, 持续 1 分钟
Leaching 溶蚀测试	Individual leaching area ≤5% Total leaching area ≤10% 导体各面溶蚀区域 ≤5% 导体总面积溶蚀区域 ≤10%			260 ± 5°C for 30 seconds 260 ± 5°C 锡炉中, 持续 30 秒
Rapid Change of Temperature 冷热冲击	±(1.0%+0.05Ω)		<50mΩ	-55°C to +155°C 5 cycles -55°C to +155°C 5 次

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25 ± 5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

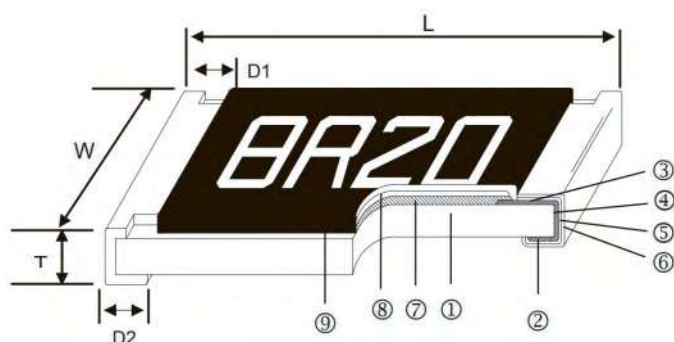
■电性能测量的环境条件: 温度: 25 ± 5 相对湿度: 25%~75%RH

■依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

## 摘要 Resume >>>

- 抗静电 Anti-Electro Static Discharge
- 适合波峰焊与回流焊 Suitable for reflow & wave soldering
- 适用于医疗器械、工业控制、电源适配器、照相机的闪光灯、汽车工业及户外设备等
- Application Medical Devices, Industrial Controls, AV adapter, Flash lamp of camera,
- Automotive Industry, Outdoor Equipments

## 结构图 Construction >>>



- ① Alumina Substrate 陶瓷基体
- ② Bottom Electrode 背导电极
- ③ Top Electrode 正导电极
- ④ Edge Electrode 侧导电极
- ⑤ Barrier Layer 电镀介质层
- ⑥ External Electrode 外部端电极
- ⑦ Resistor Layer 电阻层
- ⑧ Overcoat 密封层
- ⑨ Marking 丝印

## 尺寸 Dimensions >>>

Size 规格	L	W	T	D1	D2
0201	0.60 ± 0.03	0.30 ± 0.03	0.23 ± 0.03	0.10 ± 0.05	0.15 ± 0.05
0402	1.00 ± 0.10	0.50 ± 0.05	0.35 ± 0.05	0.20 ± 0.10	0.25 ± 0.10
0603	1.60 ± 0.10	0.80 ± 0.15	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20
0805	2.00 ± 0.15	1.25 ± 0.15	0.55 ± 0.10	0.45 ± 0.20	0.40 ± 0.20
1206	3.10 ± 0.15	1.55 ± 0.15	0.55 ± 0.10	0.45 ± 0.20	0.45 ± 0.20
1210	3.10 ± 0.10	2.60 ± 0.15	0.55 ± 0.10	0.50 ± 0.25	0.60 ± 0.20

## 型号名称 Part Numbering >>>

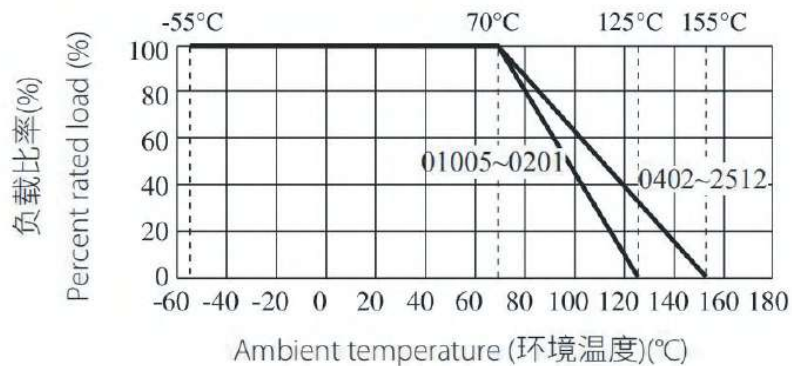
ESD	01	3216 (1206)	L182	J	T
Product Type 产品型号	Production line code 产线代码	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式
ESD	01 02 03 04 10	0603 (0201) 1005 (0402) 1608 (0603) 2012 (0805) 3216 (1206) 3225 (1210)	± 5% L105:1MΩ L182:1.8KΩ L1R3:1.3Ω ± 1%及以下 L1004:1MΩ L1801:1.8KΩ L1R30:1.3Ω	F = ± 1 % J = ± 5 %	T: Taping Reel T: 编带 B: Bulk B: 散装

标准规格表 Standard Electrical Specifications >>>

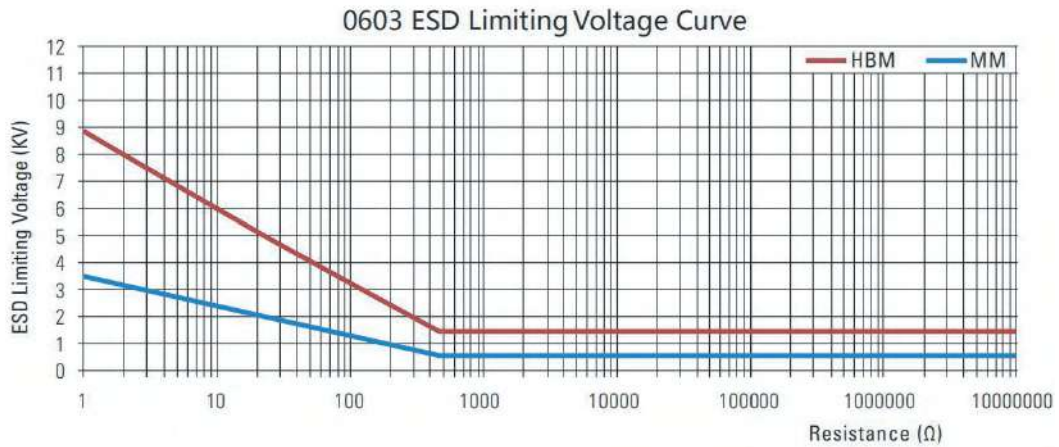
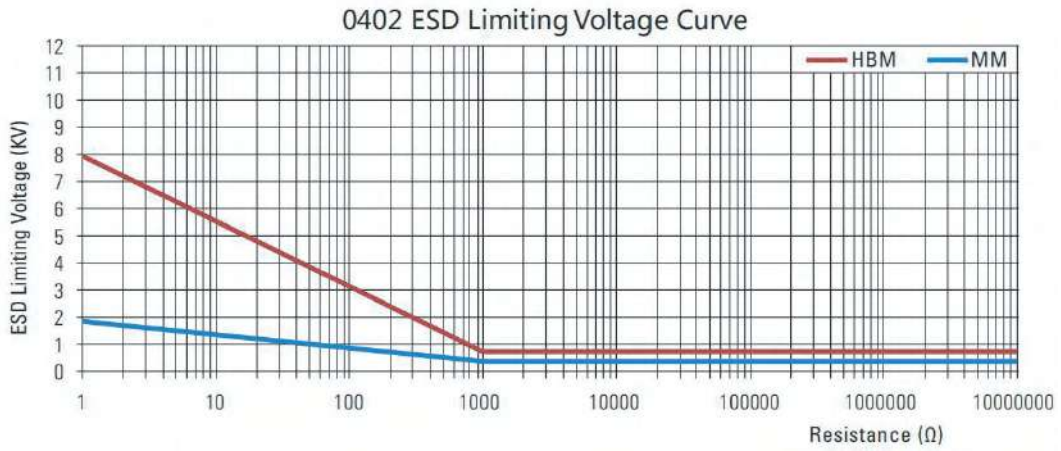
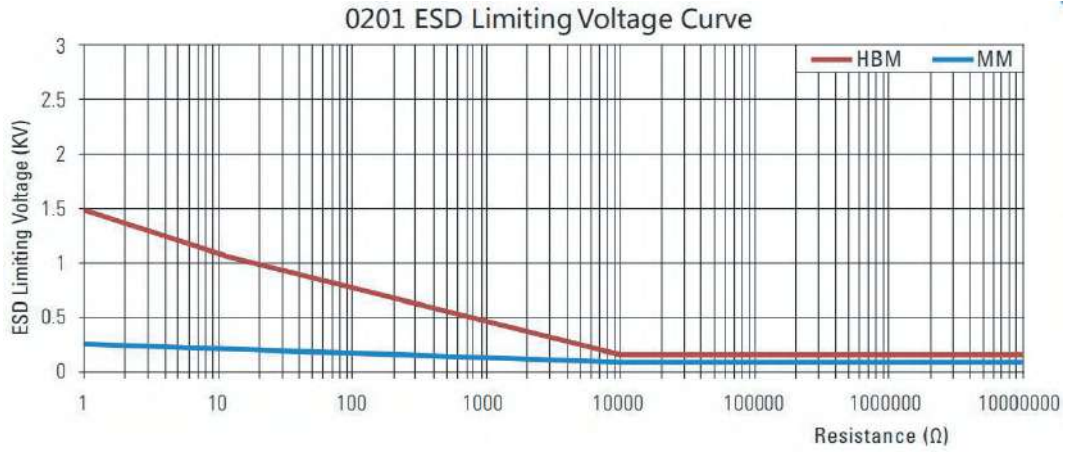
Item 项目 Type 型号	Power Rating 额定功率	Max.Operating Voltage 最大工作电压	Max.Overload Voltage 最大负载电压	Resistance Range 阻值范围		TCR 温度系数 (PPM/°C)
				± 1%	± 5%	
0201	1/20W	25V	50V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 400 10Ω < R ≤ 10MΩ: ± 200
0402	1/16W	50V	100V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 200 10Ω < R ≤ 10MΩ: ± 100
0603	1/4W	150V	200V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 200 10Ω < R ≤ 10MΩ: ± 100
0805	2/5W	200V	400V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 200 10Ω < R ≤ 10MΩ: ± 100
1206	2/3W	500V	1000V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 200 10Ω < R ≤ 10MΩ: ± 100
1210	1/2W	800V	1500V	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω: ± 200 10Ω < R ≤ 10MΩ: ± 100

◆ Operating Temp.Range 操作温度范围: 0201: -55 ~ 125°C, 0402 ~ 2512: -55 ~ 155°C

功率衰减曲线图 Derating Curve >>>

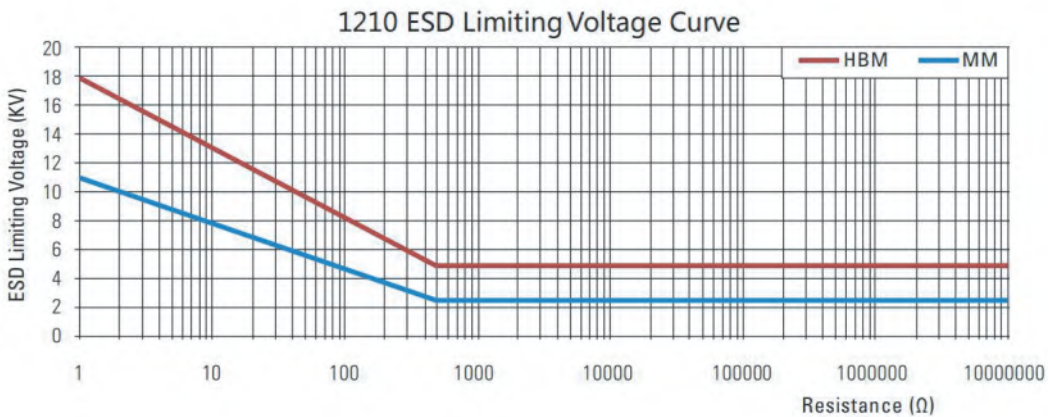
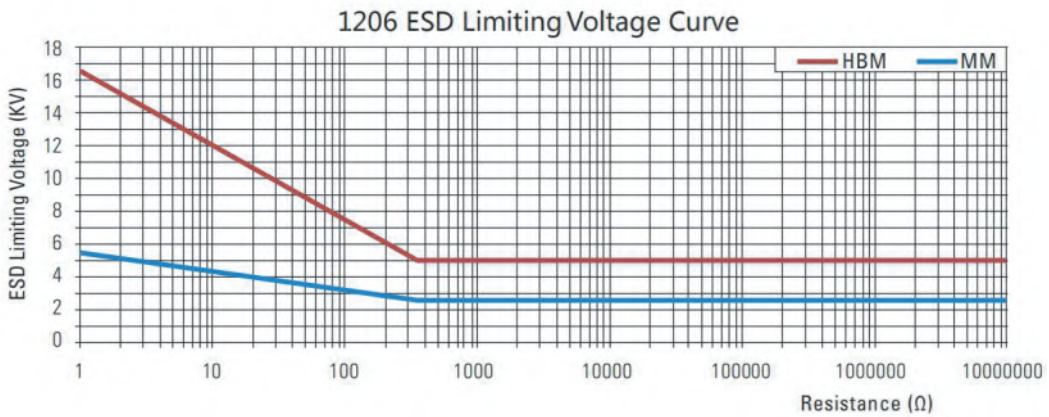
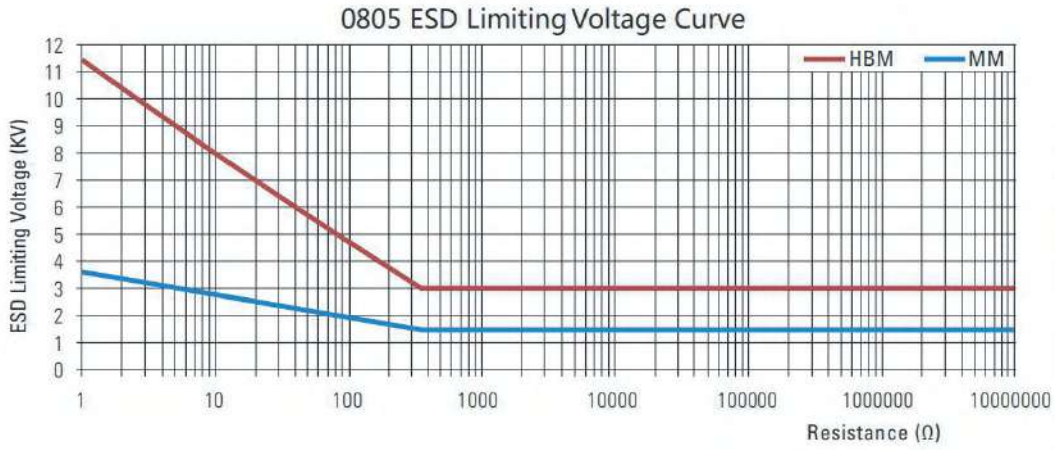


抗静电曲线 ESD Limiting Voltage Curve >>>





抗静电曲线 ESD Limiting Voltage Curve >>>



## 信赖性试验项目 Environmental Characteristics &gt;&gt;&gt;

Item 项目	Requirement 条件		Test Method 测试方法
	± 1%	± 5%	
Temperature Coefficient of Resistance(T.C.R.) 温度系数(T.C.R.)	As Spec. 参考规格表		-55°C~+125°C, 25°C is the reference temperature 参考温度
Short Time Overload 短时间过负载	± (1.0%+0.10Ω)	± (2.0%+0.10Ω)	RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds,2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒,提升功率系列 2 秒
Endurance 负载寿命	± (3.0%+0.10Ω)		70±2°C,RCWV for 1000hrs with 1.5hrs"ON" and 0.5hrs"OFF" 70±2°C温度中施加额定电压, 1.5 小时"开", 0.5 小时"关", 共 1000 小时
Damp Heat with Load 耐湿负荷	± (0.5%+0.10Ω)	± (5.0%+0.10Ω)	40±2°C,90~95%R.H.,RCWV for 1000hrs with 1.5hrs"ON" and 0.5hrs"OFF" 在温度 40±2°C, 相对湿度 90~95%环境中施加额定电压, 1.5 小时"开", 0.5 小时"关", 共 1000 小时
Bending Strength 弯折强度测试	± (1.0%+0.05Ω)		Bending once for 5 seconds 2010,2512sizes:2mm Other sizes:3mm 产品在测试板上, 中央施力下压 5 秒 下压深度: 2010、2512: 2 毫米 其他尺寸: 3 毫米
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%		245±5°C for 3 seconds 245±5°C锡炉中, 持续 3 秒
Resistance to Soldering Heat 抗焊锡热	± (1.0%+0.05Ω)		260±5°C for 10 seconds 260±5°C锡炉中, 持续 10 秒
Voltage Proof 耐电压	No breakdown or flashover 无击穿或跳火现象		1.42 times Max.Operating Voltage for 1 minute 最大操作电压*1.42 倍, 持续 1 分钟
Leaching 溶蚀测试	Individual leaching area≤5% Total leaching area≤10% 导体各面溶蚀区域≤5% 导体总面积溶蚀区域≤10%		260±5°C for 30 seconds 260±5°C锡炉中, 持续 30 秒
ESD 抗静电	± (1.0%+0.05Ω)		HBM:100PF 1K5 1Cycle MM:200PF 0E 1Cycle Note:ESD Voltage Refer to 4.0

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25±5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

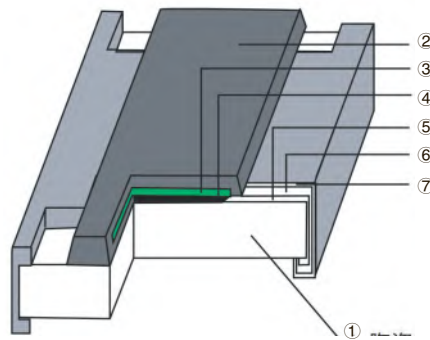
■电性能测量的环境条件: 温度: 25±5 相对湿度: 25%~75%RH

■依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

## 摘要 Resume >>>

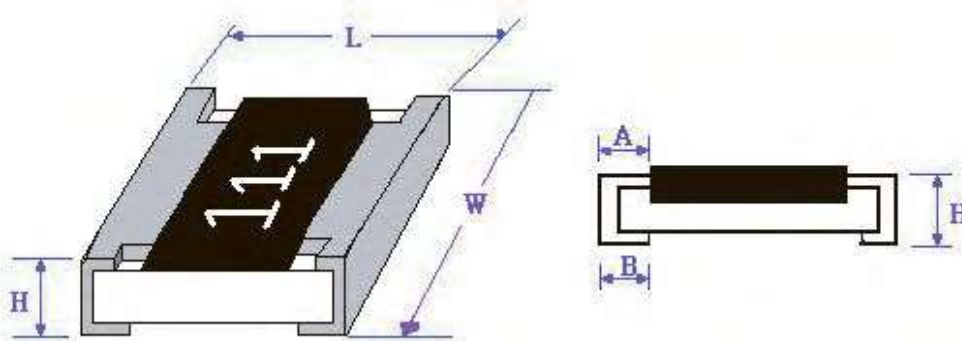
- 高功率，宽电极 High power & Wide terminal
- 适合波峰焊及回流焊 Suitable for both wave & re-flow soldering
- 适用于AV适配器，LCD背光电路，照相机阀门等 Application: AV adapters, LCD back-light, camera strobe etc.

## 结构图 Construction >>>



- ① Ceramic substrate 陶瓷基体
- ② Outer protection layer 外保护层
- ③ Inner protection layer 内保护层
- ④ Resistive layer 阻体层
- ⑤ Conductive layer 导电极
- ⑥ Ni plating layer 镀镍层
- ⑦ Sn plating layer 镀锡层

## 尺寸 Dimensions >>>



规格	L	W	H	A	B
0204	0.50 ± 0.05	1.00 ± 0.05	0.35 ± 0.05	0.10 ± 0.05	0.15 ± 0.05
0306	0.80 ± 0.10	1.60 ± 0.10	0.45 ± 0.10	0.15 ± 0.10	0.15 ± 0.10
0508	1.20 ± 0.10	2.00 ± 0.10	0.55 ± 0.10	0.20 ± 0.10	0.30 ± 0.20
0612	1.60 ± 0.15	3.20 ± 0.15	0.55 ± 0.10	0.30 ± 0.20	0.45 ± 0.20
1020	2.50 ± 0.15	5.00 ± 0.15	0.55 ± 0.10	0.40 ± 0.20	0.60 ± 0.20
1218	3.10 ± 0.10	4.60 ± 0.15	0.55 ± 0.10	0.45 ± 0.20	0.40 ± 0.20
1225	3.10 ± 0.15	6.25 ± 0.15	0.55 ± 0.10	0.45 ± 0.20	0.65 ± 0.20



型号名称 Part Numbering >>>

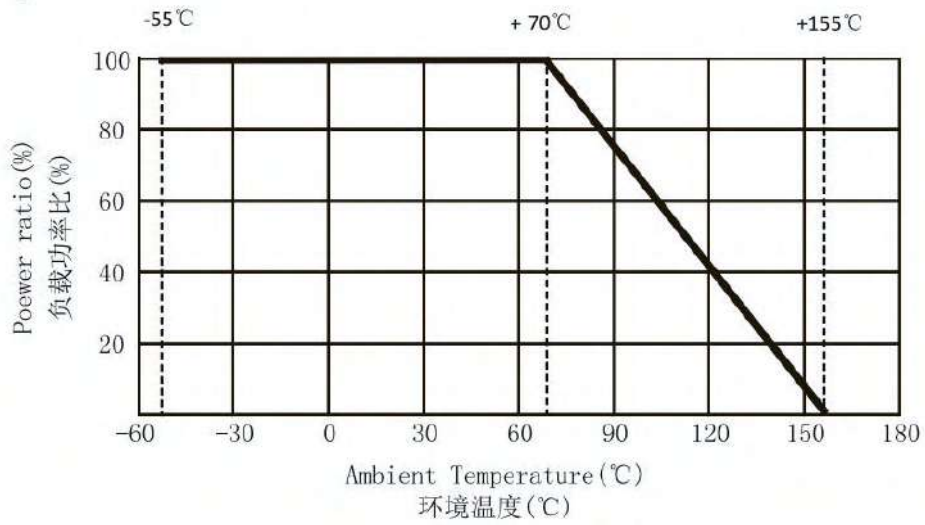
WTR	01	2550 ( 1020 )	L100	J	T
Product Type 产品型号	Production line code 产线代码	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式
WTR	01 02 03 04 10	0510(0204) 0816(0306) 1220(0508) 1632(0612) 2550(1020) 3245(1218) 3264(1225)	±5% L100:10Ω L182:1.8KΩ L1R3:1.3Ω  ±1% L1801: 1.8KΩ L1R30: 1.3Ω	F= ±1 % J= ±5 %	T:Taping Reel T: 编带 B: Bulk B: 散装

标准规格表 Standard Electrical Specifications >>>

Item Type 项目 型号	Power Rating 额定功率	Max. Operating Voltage 最大工作电压	Max. Overload Voltage 最大负载电压	Resistance Range 阻值范围		TCR 温度系数 (PPM/°C)
				±1%	±5%	
0204	1/3W	75V	100V	1Ω-1MΩ		1Ω ≤ R ≤ 10Ω: ±200 10Ω < R ≤ 1MΩ: ±100
0306	1/2W	150V	200V	1Ω-1MΩ		1Ω ≤ R ≤ 10Ω: ±200 10Ω < R ≤ 1MΩ: ±100
0508	1/3W	150V	300V	1Ω-1MΩ		1Ω ≤ R ≤ 10Ω: ±400 10Ω < R ≤ 100Ω: ±200 100Ω < R ≤ 1MΩ: ±100
0612	1/2W	200V	400V	1Ω-1MΩ		1Ω ≤ R ≤ 10Ω: ±400 10Ω < R ≤ 100Ω: ±200 100Ω < R ≤ 1MΩ: ±100
1020	1W	200V	400V	1Ω-1MΩ		1Ω ≤ R ≤ 10Ω: ±400 10Ω < R ≤ 100Ω: ±200 100Ω < R ≤ 1MΩ: ±100
1218	1W	200V	400V	1Ω-1MΩ		1Ω ≤ R ≤ 10Ω: ±400 10Ω < R ≤ 100Ω: ±200 100Ω < R ≤ 1MΩ: ±100
1225	2W	200V	400V	1Ω-1MΩ		1Ω ≤ R ≤ 10Ω: ±400 10Ω < R ≤ 100Ω: ±200 100Ω < R ≤ 1MΩ: ±100

◆ Operating Temp. Range 操作温度范围: 0204 ~ 1225: -55 ~ 155°C

功率衰减曲线图 Derating Curve >>>



信赖性试验项目 Environmental Characteristics >>>

Item 项目	Requirement 条件		Test Method 测试方法
	± 1%	± 5%	
Temperature Coefficient of Resistance(T.C.R.) 温度系数(T.C.R.)	As Spec. 参考规格表		-55°C~+125°C, 25°C is the reference temperature 参考温度
Short Time Overload 短时间过负载	± (1.0%+0.05Ω)	± (2.0%+0.05Ω)	RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds,2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒,提升功率系列 2 秒
Insulation Resis 绝缘阻抗	≥10G		Max.Overload voltage for 1 minute 施加最大负载电压 1 分钟
Endurance 负载寿命	± (1.0%+0.10Ω)	± (2.0%+0.10Ω)	70±2°C,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 70±2°C温度中施加额定电压, 1.5 小时"开", 0.5 小时"关", 共 1000 小时
Damp Heat with Load 耐湿负荷	± (1.0%+0.10Ω)	± (2.0%+0.10Ω)	40±2°C,90~95%R.H.,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 在温度 40±2°C, 相对湿度 90~95%环境中施加额定电压, 1.5 小时"开", 0.5 小时"关", 共 1000 小时
Dry Heat 耐热性实验	± (1.0%+0.05Ω)	± (1.5%+0.10Ω)	At+125/+155°C for 1000hrs 置于+125/+155°C温度中, 共 1000 小时
Bending Strength 弯折强度测试	± (1.0%+0.05Ω)		Bending once for 5 seconds 2010,2512sizes:2mm Other sizes:3mm 产品焊在测试板上, 中央施力下压 5 秒 下压深度: 2010、2512: 2 毫米 其他尺寸: 3 毫米
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%		245±5°C for 3 seconds 245±5°C锡炉中, 持续 3 秒
Resistance to Soldering 抗焊锡热	± (1.0%+0.05Ω)		260±5°C for 10 seconds 260±5°C锡炉中, 持续 10 秒
Voltage Proof 耐电压	No breakdown or flashover 无击穿或跳火现象		1.42 times Max.Operating Voltage for 1 minute 最大操作电压*1.42 倍, 持续 1 分钟
Leaching 溶蚀测试	Individual leaching area ≤5% Total leaching area ≤10% 导体各面溶蚀区域 ≤5% 导体总面积溶蚀区域 ≤10%		260±5°C for 30 seconds 260±5°C锡炉中, 持续 30 秒
Rapid Change of Temperature 冷热冲击	± (0.5%+0.05Ω)	± (1.0%+0.05Ω)	-55°C to +155°C 5 cycles -55°C to +155°C 5 次

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25 ± 5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

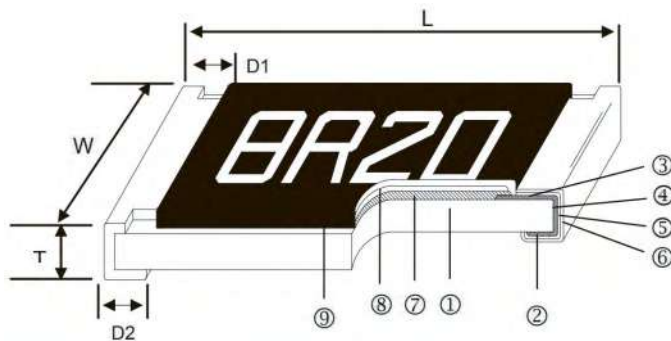
■电性能测量的环境条件: 温度: 25 ± 5 相对湿度: 25%~75%RH

■依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

## 摘要 Resume >>>

- Advanced thin film technology/Very tight tolerance down to  $\pm 0.01\%$ /Extremely low TCR down to  $\pm 5\text{PPM}$ /Wide resistance range  $1\Omega \sim 3\text{M}\Omega$ /Miniature Size 0201 available
- 先进的薄膜技术，极高公差精度 ( $\pm 0.01\%$ )，极低温度系数 ( $\pm 1\text{PPM}$ )，阻值范围广 ( $1\Omega \sim 3\text{M}\Omega$ )，小体积 (0201)

## 结构图 Construction >>>



- ① Alumina Substrate 陶瓷基底
- ② Bottom Electrode 背导电极
- ③ Top Electrode 正导电极
- ④ Edge Electrode 侧导电极
- ⑤ Barrier Layer 电镀介质层
- ⑥ External Electrode 外部端电极
- ⑦ Resistor Layer 电阻层
- ⑧ Overcoat 密封层
- ⑨ Marking 丝印

## 尺寸 Dimensions >>>

规格	L	W	T	D1	D2
0201	$0.58 \pm 0.05$	$0.29 \pm 0.05$	$0.23 \pm 0.05$	$0.12 \pm 0.05$	$0.15 \pm 0.05$
0402	$1.00 \pm 0.05$	$0.50 \pm 0.05$	$0.30 \pm 0.05$	$0.20 \pm 0.10$	$0.20 \pm 0.10$
0603	$1.55 \pm 0.10$	$0.80 \pm 0.10$	$0.45 \pm 0.10$	$0.30 \pm 0.20$	$0.30 \pm 0.20$
0805	$2.00 \pm 0.15$	$1.25 \pm 0.15$	$0.55 \pm 0.10$	$0.30 \pm 0.20$	$0.40 \pm 0.20$
1206	$3.05 \pm 0.15$	$1.55 \pm 0.15$	$0.55 \pm 0.10$	$0.42 \pm 0.20$	$0.35 \pm 0.25$
1210	$3.10 \pm 0.15$	$2.40 \pm 0.15$	$0.55 \pm 0.10$	$0.40 \pm 0.20$	$0.55 \pm 0.25$
2010	$4.90 \pm 0.15$	$2.40 \pm 0.15$	$0.55 \pm 0.10$	$0.60 \pm 0.30$	$0.50 \pm 0.25$
2512	$6.35 \pm 0.15$	$3.10 \pm 0.15$	$0.55 \pm 0.10$	$0.60 \pm 0.30$	$0.50 \pm 0.25$

## 型号名称 Part Numbering >>>

TCR	04	3216 (1206)	L1801	B	T	V	50PPM
Product Type 产品型号	Production line code 产线代码	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式	High Power 升功率	PPM/°C 温漂
TCR: 高精密薄膜贴片电阻	01 02 03 04 10	0603 (0201)	L1801: 1.8K Ω	T=±0.01 % A=±0.05 % B=±0.1 % C=±0.25 % D=±0.5 % F=±1 %	T:Taping Reel T: 编带 B: Bulk B: 散装	N:1W Q:3/4W O:1/3W V:1/4W M:1/6W W:1/8W X:1/10W	1PPM 2PPM 3PPM 5PPM 10PPM 15PPM 25PPM 50PPM
		1005 (0402)					
		1608 (0603)	L1R30: 1.3 Ω				
		2012 (0805)					
		3216 (1206)	LR001: 1m Ω				
		3225 (1210)					
		4532 (1812)					
5025 (2010)							
6432 (2512)							

## 标准规格表 Standard Electrical Specifications >>>

Item Type 项目 型号	Power Rating 额定功率	Max. Operating Voltage 最大工作电压	Max. Overload Voltage 最大负载电压	Resistance Range 阻值范围					TCR 温度系数 (PPM/°C)	
				±0.05%	±0.1%	±0.25%	±0.5%	±1%		
0201	1/32W	15V	30V	/	49.9Ω-4.99KΩ					±25
					49.9Ω-33KΩ					±50
0402	1/16W	25V	50V	49.9Ω-12KΩ	10Ω-511KΩ	4.7Ω-511KΩ			±25, ±50	
0603	1/16W	50V	100V	4.7Ω-332KΩ	4.7Ω-1MΩ	1Ω-1MΩ			±25, ±50	
0805	1/10W	100V	200V	4.7Ω-1MΩ	4.7Ω-2MΩ	1Ω-2MΩ			±25, ±50	
1206	1/8W	150V	300V	4.7Ω-1MΩ	4.7Ω-2.49MΩ	1Ω-2.49MΩ			±25, ±50	
1210	1/4W	150V	300V	4.7Ω-1MΩ	4.7Ω-2.49MΩ	1Ω-2.49MΩ			±25, ±50	
2010	1/4W	150V	300V	4.7Ω-1MΩ	4.7Ω-3MΩ	1Ω-3MΩ			±25, ±50	
2512	1/2W	150V	300V	4.7Ω-1MΩ	4.7Ω-3MΩ	1Ω-3MΩ			±25, ±50	

◆ Operating Temp. Range 操作温度范围: 0201: -55 ~ 125°C, 0402 ~ 2512: -55 ~ 155°C

## 特殊规格表 Special Electrical Specifications >>>

Item 项目 Type 型号	Power Rating 额定功率	Max.Ope rating Voltage 最大工作 电压	Max.Ove rload Voltage 最大负载 电压	Resistance Range 阻值范围						TCR 温度系 数(PPM/°C)		
				±0.01%	±0.05%	±0.1%	±0.25%	±0.5%	±1%			
0402	1/16W	25V	50V	49.9Ω-4.99KΩ		---				±1		
				49.9Ω-20KΩ						±5		
				49.9Ω-20KΩ		49.9Ω-100KΩ				±10		
						49.9Ω-69.8KΩ				±15		
0603	1/16W	50V	100V	24.9Ω-15KΩ		---				±1		
				24.9Ω-60KΩ						±5		
				24.9Ω-100KΩ		4.7Ω-332KΩ		4.7Ω-511KΩ				±10
										±15		
0805	1/10W	100V	200V	24.9Ω-30KΩ		---				±1		
				24.9Ω-150KΩ						±5		
				24.9Ω-200KΩ		4.7Ω-1MΩ				±10		
										±15		
1206	1/8W	150V	300V	24.9Ω-49.9KΩ		---				±1		
				24.9Ω-300KΩ~						±5		
				24.9Ω-499KΩ		4.7Ω-1.5MΩ				±10		
										±15		
1210	1/4W	150V	300V	24.9Ω-49.9KΩ		---				±1		
				24.9Ω-300KΩ						±5		
				24.9Ω-499KΩ		4.7Ω-1MΩ				±10		
										±15		
2010	1/4W	150V	300V	24.9Ω-100KΩ		---				±1		
				24.9Ω-300KΩ						±5		
				24.9Ω-499KΩ		4.7Ω-1MΩ				±10		
										±15		
2512	1/2W	150V	300V	24.9Ω-100KΩ		---				±1		
				24.9Ω-300KΩ						±5		
				24.9Ω-499KΩ		4.7Ω-1MΩ				±10		
										±15		

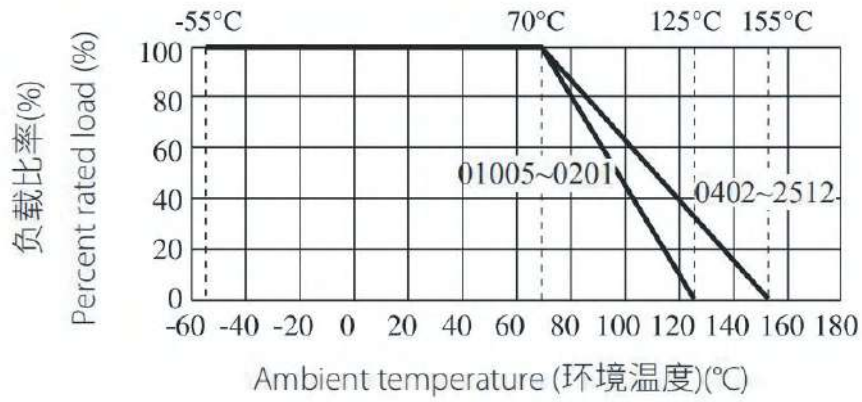
◆Operating Temp.Range 操作温度范围: 0201: -55 ~ 125°C, 0402~2512: -55 ~ 155°C

## 升功率规格表 High Power Rating Electrical Specifications >>>

Item 项目 Type 型号	Power Rating 额定功率	Max.Ope rating Voltage 最大工作 电压	Max.Ove rload Voltage 最大负载 电压	Resistance Range 阻值范围						TCR 温度系 数(PPM/°C)	
				±0.01%	±0.05%	±0.1%	±0.25%	±0.5%	±1%		
0402	1/10W	50V	100V	49.9Ω-4.99KΩ			---			±1	
				49.9Ω-4.99KΩ						±2	
				49.9Ω-12KΩ		49.9Ω-60KΩ				±3	
						49.9Ω-69.8KΩ				±5	
				---	49.9Ω -12KΩ	10Ω -255KΩ	4.7Ω-255KΩ			±10	
0603	1/10W	75V	150V	24.9Ω-15KΩ			---			±1	
				24.9Ω-15KΩ						±2	
				24.9Ω -100KΩ		4.7Ω -332KΩ		4.7Ω-332KΩ			±3
						4.7Ω-1MΩ			±5		
	1/6W	100V	150V	---	10Ω-332KΩ				±10		
0805	1/8W	150V	300V	24.9Ω-30KΩ			---			±1	
				24.9Ω-30KΩ						±2	
				24.9Ω -200KΩ		4.7Ω -511KΩ		4.7Ω-511KΩ			±3
						4.7Ω-1MΩ		4.7Ω-1MΩ			±5
	1/4W	150V	300V	---	10Ω-499KΩ				±10		
1206	1/4W	200V	400V	24.9Ω-49.9KΩ			---			±1	
				24.9Ω-49.9KΩ						±2	
				24.9Ω -499KΩ		4.7Ω-1MΩ				±3	
	1/3W	200V	400V	---	10Ω-1MΩ				±5		
1210	1/3W	200V	400V	24.9Ω-49.9KΩ			---			±1	
				24.9Ω-49.9KΩ						±2	
				24.9Ω -499KΩ		4.7Ω-1MΩ				±3	
	1/3W	200V	400V	---	10Ω-1MΩ				±5		
2010	1/3W	200V	400V	24.9Ω-49.9KΩ			---			±1	
				24.9Ω-49.9KΩ						±2	
				24.9Ω -499KΩ		4.7Ω-1MΩ				±3	
	1/3W	200V	400V	---	10Ω-1MΩ				±5		
2512	3/4W	200V	400V	24.9Ω-2KΩ	4.7Ω-2KΩ		1Ω-2KΩ		±10		
	1W	200V	400V	/	4.7Ω -100Ω		1Ω-100Ω		±15		

◆ Operating Temp.Range 操作温度范围: 0201: -55 ~ 125°C, 0402 ~ 2512: -55 ~ 155°C

功率衰减曲线图 Derating Curve >>>





## 信赖性试验项目 Environmental Characteristics >>>

Item 项目	Requirement 条件		Test Method 测试方法
	Tol. ≤0.05%	Tol. > 0.05%	
Temperature Coefficient of Resistance(T.C.R) 温度系数(T.C.R.)	As Spec. 参考规格表		-55℃~+125℃, 25℃ is the reference temperature 参考温度
Short Time Overload 短时间过载	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	RCWV*2.5 or Max.Overload voltage whichever is lower for 5seconds 额定电压的 2.5 倍或最大负载电压 5 秒
Insulation Resistance 绝缘阻抗	$\geq 1G$		Apply 100Vdc for 1 minute 施加电压 100V(DC)1 分钟
Endurance 负载寿命	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	70 ± 2℃,RCWV for 1000 hrs with 1.5 hrs" ON" and 0.5 hrs "OFF" 在温度 40 ± 2℃,相对湿度 90~95%环境中施加额定电压,1.5 小时"开",0.5 小时 "关",共 1000 小时
	$> 7K\Omega \Delta R \pm 0.5\%$		
	$\Delta R \pm 0.5\%$ for High power rating 大功率		
Damp Heat with Load 耐湿负荷	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.3\%$	40 ± 2℃,90~95% R.H.,RCWV for 1000 hrs with 1.5 hrs " ON" and 0.5 hrs "OFF" 在温度 40 ± 2℃,相对湿度 90~95%环境中施加额定电压,1.5 小时"开",0.5 小时 "关",共 1000 小时
	$\Delta R \pm 0.5\%$ for High power rating 大功率		
Bending Strength 弯折强度测试	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	Bending once for 5 seconds 2010,2512 sizes:2mm Other sizes:3mm 产品焊在测试板上,中央施力下压5秒下压深度:2010、2512:2毫米其他尺寸:3毫米
Solderability 焊锡性	95% min.coverage 导体爬锡面积大于 95%		245 ± 5℃ for 3 seconds 245 ± 5℃锡炉中,持续 3 秒
Resistance to Soldering Heat 抗焊锡热	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	260 ± 5℃ for 10 seconds 260 ± 5℃锡炉中,持续 10 秒
Dielectric Withstand Voltage 耐电压	By type 依据型号		Max.Operating Voltage for 1 minute 最大操作电压*1.42 倍,持续 1 分钟
Low Temperature Operation 低温操作	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	1 hour, -65℃,followed by 45 minutes of RCWV 在 45 分钟 RCWV 之后,在 -65℃温度下持续 1 小时
	$\Delta R \pm 0.5\%$ for High power rating 大功率		
Thermal Shock 热冲击	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.25\%$	-55℃ 到 +125/+150℃,100 次

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25 ± 5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■ RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

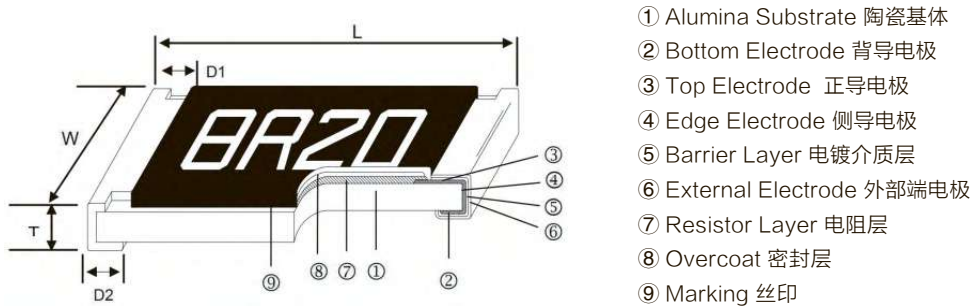
■ 电性能测量的环境条件: 温度: 25 ± 5 相对湿度: 25%~75%RH

■ 依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

## 摘要 Resume >>>

- Advanced thin film technology/Wide resistance range 1Ω~2.49MΩ
- 先进的薄膜技术，阻值范围1Ω~2.49MΩ

## 结构图 Construction >>>



## 尺寸 Dimensions >>>

Size 规格	L	W	T	D1	D2
0402	1.00 ± 0.05	0.50 ± 0.05	0.30 ± 0.10	0.20 ± 0.10	0.20 ± 0.10
0603	1.60 ± 0.10	0.80 ± 0.10	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20
0805	2.00 ± 0.15	1.25 ± 0.15	0.50 ± 0.10	0.30 ± 0.20	0.40 ± 0.20
1206	3.10 ± 0.15	1.55 ± 0.15	0.55 ± 0.10	0.42 ± 0.20	0.35 ± 0.25

## 型号名称 Part Numbering >>>

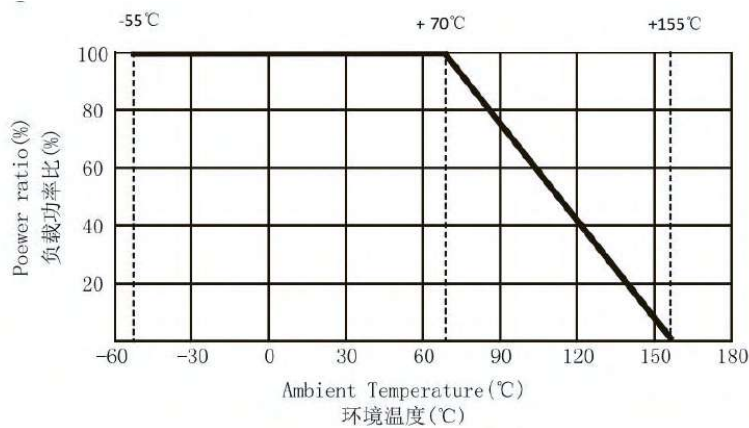
TCRG	04	3216 ( 1206 )	L1801	D	T	V	50PPM
Product Type 产品型号	Production line code 产线代码	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式	High Power 升功率	PPM/°C
TCRG: 薄膜贴片电阻	01 02 03 04 10	1005 ( 0402 ) 1608 ( 0603 ) 2012 ( 0805 ) 3216 ( 1206 )	L1801: 1.8K Ω L1R30: 1.3 Ω	B= ± 0.1% C= ± 0.25% D= ± 0.5% F= ± 1 %	T:Taping Reel T: 编带 B: Bulk B: 散装	Y:1/16W X:1/10W W:1/8 W V:1/4 W	25PPM 50PPM

标准规格表 Standard Electrical Specifications >>>

Item 项目 Type 型号	Power Rating 额定功率	Max.Operating Voltage 最大工作电压	Max.Overload Voltage 最大负载电压	Resistance Range 阻值范围				TC 温度系数 (PPM/°C)
				± 0.1%	± 0.25%	± 0.5%	± 1%	
0402	1/16W	50V	100V	4.7Ω-255KΩ				± 25 ± 50
0603	1/10W	75V	150V	1Ω-1MΩ				± 25 ± 50
0805	1/8W	150V	300V	1Ω-2MΩ				± 25 ± 50
1206	1/4W	200V	400V	1Ω-2.49MΩ				± 25 ± 50

◆ Operating Temp.Range 操作温度范围: 0402 ~ 1206: -55 ~ 155°C

功率衰减曲线图 Derating Curve >>>



信赖性试验项目 Environmental Characteristics >>>

Item 项目	Requirement 条件		Test Method 测试方法
	± 1%及以下	Jumper 跳线	
Temperature Coefficient of Resistance(T.C.R) 温度系数(T.C.R.)	As Spec. 参考规格表		-55℃~+125℃, 25℃ is the reference temperature 参考温度
Short Time Overload 短时间过负载	ΔR ± 0.05%		RCWV*2.5 or Max.Overload voltage whichever is lower for 5seconds 额定电压的 2.5 倍或最大负载电压 5 秒
Insulation Resistance 绝缘阻抗	≥ 1G		Apply 100Vdc for 1 minute 施加电压 100V(DC)1 分钟
Endurance 负载寿命	ΔR ± 0.05%		70 ± 2℃,RCWV for 1000 hrs with 1.5 hrs" ON" and 0.5 hrs "OFF" 70 ± 2℃温度中施加额定电压,1.5 小时"开", 0.5 小时 "关",共 1000 小时
Damp Heat with Load 耐湿负荷	ΔR ± 0.05%		40 ± 2℃,90~95% R.H.,RCWV for 1000 hrs with 1.5 hrs " ON" and 0.5 hrs "OFF" 在温度 40 ± 2℃,相对湿度 90~95%环境中施加额定电压, 1.5 小时"开", 0.5 小时 "关",共 1000 小时
Bending Strength 弯折强度测试	ΔR ± 0.25%		Bending once for 5 seconds 2010,2512 sizes:2mm Other sizes:3mm 产品焊在测试板上, 中央施力下压5秒下压深度: 2010、2512: 2毫米 其他尺寸: 3毫米
Solderability 焊锡性	95% min.coverage 导体爬锡面积大于 95%		245 ± 5℃ for 3 seconds 245 ± 5℃锡炉中,持续 3 秒
Resistance to Soldering Heat 抗焊锡热	ΔR ± 0.5%		260 ± 5℃ for 10 seconds 260 ± 5℃锡炉中,持续 10 秒
Dielectric Withstand Voltage 耐电压	By type 依据型号		Max.Operating Voltage for 1 minute 最大操作电压*1.42 倍, 持续 1 分钟
Low Temperature Operation 低温操作	ΔR ± 0.5%		1 hour, -65℃,followed by 45 minutes of RCWV 在 45 分钟 RCWV 之后, 在-65℃温度下持续 1 小时
Thermal Shock 热冲击	ΔR ± 0.5%		-55℃ 到 +125/+150℃,100 次

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25 ± 5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

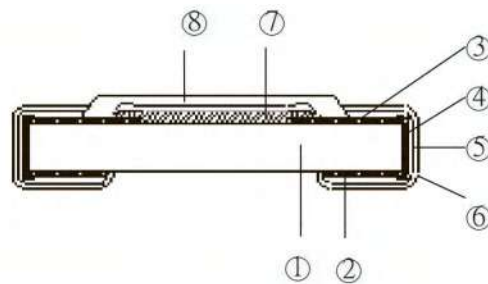
■电性能测量的环境条件: 温度: 25 ± 5 相对湿度: 25%~75%RH

■依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

摘要 Resume >>>

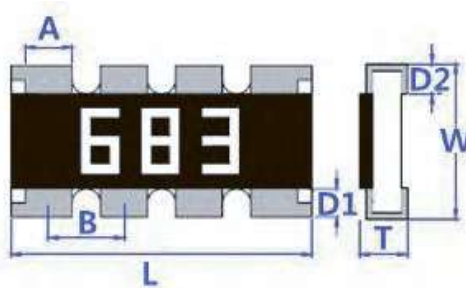
- Advanced thin film technology 先进的薄膜技术
- Very tight tolerance down to  $\pm 0.1\%$  极高的公差精度  $\pm 0.1\%$
- Extremely low TCR down to  $\pm 10\text{PPM}$  极低的温度系数  $\pm 10\text{PPM}$

结构图 Construction >>>



- ① Alumina Substrate 陶瓷基底
- ② Bottom Electrode 背导电极
- ③ Top Electrode 正导电极
- ④ Edge Electrode 侧导电极
- ⑤ Barrier Layer 电镀介质层
- ⑥ External Electrode 外部端电极
- ⑦ Resistor Layer 电阻层
- ⑧ Overcoat 密封层

尺寸 Dimensions >>>



Size 规格	L	W	T	D1	D2	A	B
0603	$3.20 \pm 0.15$	$1.60 \pm 0.15$	$0.55 \pm 0.10$	$0.30 \pm 0.15$	$0.30 \pm 0.15$	$0.50 \pm 0.15$	$0.80 \pm 0.05$

型号名称 Part Numbering >>>

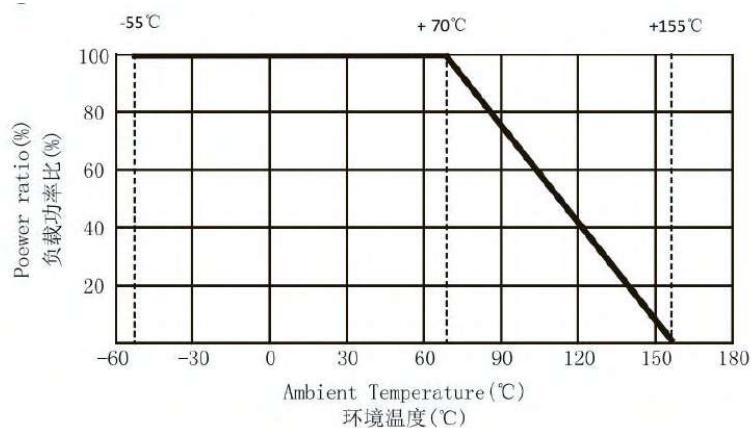
TCRA	产线代码	8P4R(0603)	L4R70	F	T
Product Type 产品型号	Production line code 产线代码	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式
TCRA: 薄膜贴片排阻	01 02 03 04 10	8P4R(0603)	L1801: 1.8KΩ L4R70: 4.7Ω	B= ±0.1% C= ±0.25% D= ±0.5% F= ±1%	T:Taping Reel T: 编带 B: Bulk B: 散装

标准规格表 Standard Electrical Specifications >>>

Item Type 项目 型号	Power Rating 额定功率	Max. Operating Voltage 最大工作电压	Max. Overload Voltage 最大负载电压	Resistance Range 阻值范围				TCR 温度系数 (PPM/°C)
				± 0.1%	± 0.25%	± 0.5%	± 1%	
0603	1/16W	50V	100V	24.9Ω-100KΩ				± 25 ± 50
				24.9Ω-2KΩ				± 10 ± 15

◆ Operating Temp. Range 操作温度范围: 0603: -55 ~ 155°C

功率衰减曲线图 Derating Curve >>>



信赖性试验项目 Environmental Characteristics >>>

Item 项目	Requirement 条件		Test Method 测试方法
	± 1%及以下	Jumper 跳线	
Temperature Coefficient of Resistance(T.C.R) 温度系数(T.C.R.)	As Spec. 参考规格表		-55℃~+125℃, 25℃ is the reference temperature 参考温度
Short Time Overload 短时间过负载	ΔR ± 0.1%		RCWV*2.5 or Max.Overload voltage whichever is lower for 5seconds 额定电压的 2.5 倍或最大负载电压 5 秒
Insulation Resistance 绝缘阻抗	≥ 1G		Apply 100Vdc for 1 minute 施加电压 100V(DC)1 分钟
Endurance 负载寿命	1000Hr: ΔR ± 0.15% 8000Hr: ΔR ± 0.30% 1000 小时: ΔR ± 0.15% 8000 小时: ΔR ± 0.30%		70 ± 2℃,RCWV for 1000 hrs with 1.5 hrs"ON" and 0.5 hrs "OFF" 70 ± 2℃温度中施加额定电压,1.5 小时"开", 0.5 小时 "关",共 1000 小时
Damp Heat with Load 耐湿负荷	ΔR ± 0.25%		40 ± 2℃,90~95% R.H.,RCWV for 1000 hrs with 1.5 hrs " ON" and 0.5 hrs "OFF" 在温度 40 ± 2℃,相对湿度 90~95%环境中施加额定电压, 1.5 小时"开", 0.5 小时 "关",共 1000 小时
Dry Heat 耐热性试验	1000Hr: ΔR ± 0.25% 8000Hr: ΔR ± 0.50% 1000 小时: ΔR ± 0.25% 8000 小时: ΔR ± 0.50%		At+125℃ 在温度+125℃下
Bending Strength 弯折强度测试	ΔR ± 0.2%		Bending amplitude 3 mm for 10seconds 产品焊在测试板上, 中央施力下压 10 秒 深度: 3 毫米
Solderability 焊锡性	95% min.coverage 导体爬锡面积大于 95%		245 ± 5℃ for 3 seconds 245 ± 5℃锡炉中,持续 3 秒

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25 ± 5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

■电性能测量的环境条件: 温度: 25 ± 5 相对湿度: 25%~75%RH

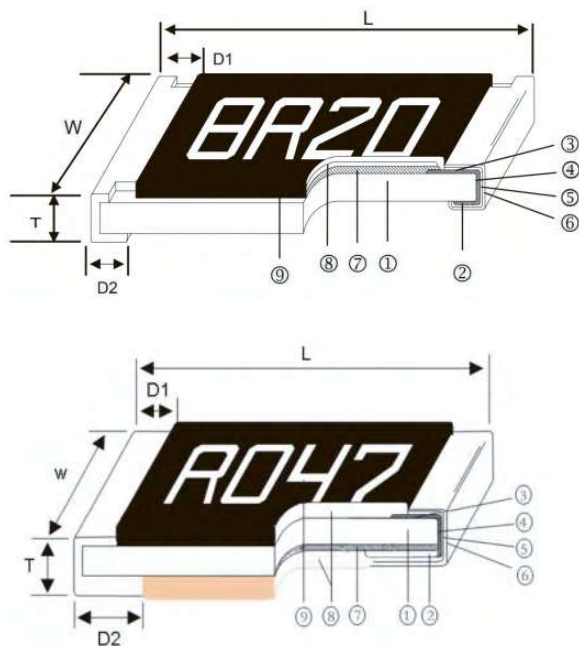
■依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1



摘要 Resume >>>

- Low inductance/Highly reliable multilayer electrode construction/Higher component and equipment reliability/reduced size of final equipment reliability.
- 低电感值，高可靠度多层电极结构，更高可靠度元件和设备，高可靠度的终端设备小体积化。

结构图 Construction >>>



- ① Alumina Substrate 陶瓷基体
- ② Bottom Electrode 背导电极
- ③ Top Electrode 正导电极
- ④ Edge Electrode 侧导电极
- ⑤ Barrier Layer 电镀介质层
- ⑥ External Electrode 外部端电极
- ⑦ Resistor Layer 电阻层
- ⑧ Overcoat 密封层
- ⑨ Marking 标识

尺寸 Dimensions >>>

Size 规格	L	W	T	D1	D2
0402	1.00 ± 0.05	0.50 ± 0.05	0.35 ± 0.05	0.20 ± 0.10	0.20 ± 0.10
0603	1.60 ± 0.10	0.80 ± 0.15	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20
0805	2.00 ± 0.15	1.25 ± 0.15	0.50 ± 0.10	0.40 ± 0.20	0.40 ± 0.20
1206	3.10 ± 0.10	1.55 ± 0.10	0.55 ± 0.10	0.50 ± 0.25	0.50 ± 0.20
1210	3.10 ± 0.10	2.60 ± 0.15	0.55 ± 0.10	0.50 ± 0.25	0.50 ± 0.25
1812	4.50 ± 0.20	3.20 ± 0.20	0.55 ± 0.20	0.50 ± 0.20	0.60 ± 0.20
2010	5.00 ± 0.10	2.50 ± 0.15	0.55 ± 0.10	0.60 ± 0.25	0.60 ± 0.30
2512	6.35 ± 0.10	3.10 ± 0.15	0.55 ± 0.10	0.75 ± 0.35	0.80 ± 0.40

型号名称 Part Numbering >>>

RR	2012 (0805)	LR010	J	T	V
Product Type 产品型号	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式	High Power 升功率
RR	1005 (0402) 1608 (0603) 2012 (0805) 3216 (1206) 3225 (1210) 4532 (1812) 5025 (2010) 6432 (2512)	LR100: 0.1 Ω LR010: 0.01 Ω LR001: 1m Ω	F= ± 1 % J = ± 5 %	T:Taping Reel T: 编带 B: Bulk B: 散装	S:2 W N:1 W Q:3/4W U:1/2W O:1/3W V:1/4W W:1/8W X:1/10W Y:1/16W

标准规格表 Standard Electrical Specifications >>>

Type 型号	Item 项目	Power Rating 额定功率	Max. Operating Current 最大工作电流	Resistance Range 阻值范围		TCR 温度系数 (PPM/°C)
				± 1%	± 5%	
0402	1/16W	1.11A	50mΩ ≤ R < 1000mΩ		50mΩ ≤ R ≤ 200mΩ : ± 800 200mΩ < R ≤ 500mΩ : ± 600 500mΩ < R < 1000mΩ : ± 500	
0603	1/10W	2.23A	10mΩ ≤ R < 1000mΩ		10mΩ ≤ R < 20mΩ : ± 1500 20mΩ ≤ R < 50mΩ : ± 1300 50mΩ ≤ R < 1000mΩ : ± 800	
0805	1/8W	3.53A	10mΩ ≤ R < 1000mΩ		10mΩ ≤ R < 20mΩ : ± 1500 20mΩ ≤ R < 50mΩ : ± 1300 50mΩ ≤ R < 1000mΩ : ± 800	
1206	1/4W	5.00A	10mΩ ≤ R < 1000mΩ		10mΩ ≤ R < 20mΩ : ± 1500 20mΩ ≤ R < 50mΩ : ± 1300 50mΩ ≤ R < 1000mΩ : ± 800	
1210	1/3W	5.77A	10mΩ ≤ R < 1000mΩ		10mΩ ≤ R < 20mΩ : ± 1500 20mΩ ≤ R < 50mΩ : ± 1300 50mΩ ≤ R < 1000mΩ : ± 800	
1812	3/4W	8.66A	10mΩ ≤ R < 1000mΩ		10mΩ ≤ R ≤ 15mΩ : ± 1500 15mΩ < R ≤ 30mΩ : ± 1000 30mΩ < R < 1000mΩ : ± 800	
2010	3/4W	8.66A	10mΩ ≤ R < 1000mΩ		10mΩ ≤ R < 20mΩ : ± 1500 20mΩ ≤ R < 50mΩ : ± 1300 50mΩ ≤ R < 1000mΩ : ± 800	
2512	1W	10.0A	10mΩ ≤ R < 1000mΩ		10mΩ ≤ R < 20mΩ : ± 1500 20mΩ ≤ R < 50mΩ : ± 1300 50mΩ ≤ R < 1000mΩ : ± 800	

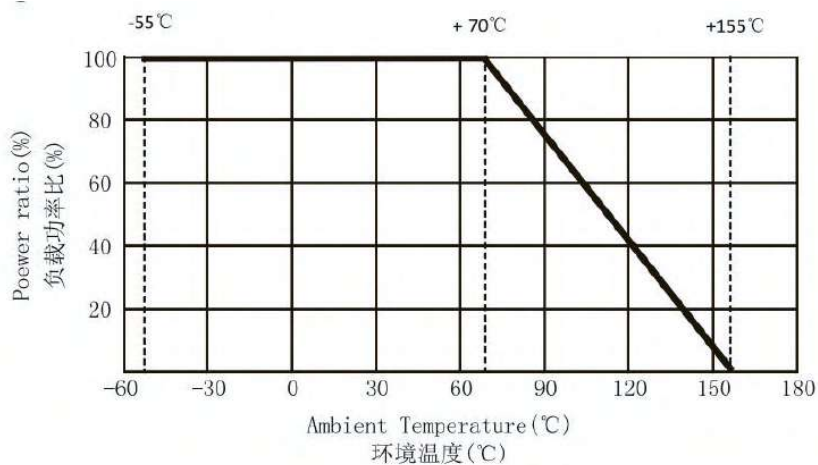
◆ Operating Temp. Range 操作温度范围: 0402 ~ 2512: -55 ~ 155°C

升功率规格表 High Power Rating Electrical Specifications >>>

Type 型号	Item 项目	Power Rating 额定功率	Max. Operating Current 最大工作电流	Resistance Range 阻值范围		TCR 温度系数 (PPM/°C)
				± 1%	± 5%	
0402		1/10W	1.40A	50mΩ ≤ R < 1000mΩ		50mΩ ≤ R ≤ 91mΩ : ± 800 100mΩ ≤ R < 1000mΩ : ± 500
0603		1/8W	2.50A	20mΩ ≤ R < 1000mΩ		20mΩ ≤ R ≤ 47mΩ : ± 1200 50mΩ ≤ R ≤ 91mΩ : ± 800 100mΩ ≤ R < 1000mΩ : ± 500
0805		1/4W	5.00A	10mΩ ≤ R < 1000mΩ		10mΩ ≤ R ≤ 18mΩ : ± 1500 20mΩ ≤ R ≤ 47mΩ : ± 1200 50mΩ ≤ R ≤ 91mΩ : ± 800 100mΩ ≤ R < 1000mΩ : ± 500
1206		1/2W	7.07A	10mΩ ≤ R < 1000mΩ		10mΩ ≤ R ≤ 18mΩ : ± 1500 20mΩ ≤ R ≤ 47mΩ : ± 1200 50mΩ ≤ R ≤ 91mΩ : ± 800 100mΩ ≤ R < 1000mΩ : ± 500
1210		1/2W	7.07A	10mΩ ≤ R < 1000mΩ		10mΩ ≤ R ≤ 18mΩ : ± 1500 20mΩ ≤ R ≤ 91mΩ : ± 800 100mΩ ≤ R < 1000mΩ : ± 500
2010		1W	10.0A	10mΩ ≤ R < 1000mΩ		10mΩ ≤ R ≤ 18mΩ : ± 1500 20mΩ ≤ R ≤ 91mΩ : ± 800 100mΩ ≤ R < 1000mΩ : ± 500
2512		2W	14.1A	10mΩ ≤ R < 1000mΩ		10mΩ ≤ R ≤ 18mΩ : ± 1500 20mΩ ≤ R ≤ 91mΩ : ± 800 100mΩ ≤ R < 1000mΩ : ± 500

◆ Operating Temp. Range 操作温度范围: 0402 ~ 2512: -55 ~ 155°C

功率衰减曲线图 Derating Curve >>>



信赖性试验项目 Environmental Characteristics >>>

Item 项目	Requirement 条件		Test Method 测试方法
	± 1%	± 5%	
Temperature Coefficient of Resistance(T.C.R) 温度系数(T.C.R.)	As Spec. 参考规格表		-55℃~+125℃, 25℃ is the refence temperature 参考温度
Short Time Overload 短时间过负载	± (1.0%+0.05Ω)	± (2.0%+0.05Ω)	RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds,2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒,提升功率系列 2 秒
Insulation Resis 绝缘阻抗	≥10G		Max.Overload voltage for 1 minute 施加最大负载电压 1 分钟
Endurance 负载寿命	± (1.0%+0.10Ω)	± (2.0%+0.10Ω)	70 ± 2℃,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 70 ± 2℃温度中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Damp Heat with Load 耐湿负荷	± (1.0%+0.10Ω)	± (2.0%+0.10Ω)	40 ± 2℃,90~95%R.H.,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 在温度 40 ± 2℃, 相对湿度 90~95%环境中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Dry Heat 耐热性实验	± (1.0%+0.05Ω)	± (1.5%+0.10Ω)	At+125/+155℃ for 1000hrs 置于+125/+155℃温度中, 共 1000 小时
Bending Strength 弯折强度测试	± (1.0%+0.05Ω)	± (1.0%+0.05Ω)	Bending once for 5 seconds 2010,2512sizes:2mm Other sizes:3mm 产品焊在测试板上, 中央施力下压 5 秒 下压深度: 2010、2512: 2 毫米 其他尺寸: 3 毫米
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%		245 ± 5℃ for 3 seconds 245 ± 5℃锡炉中, 持续 3 秒
Resistance to Soldering Heat 抗焊锡热	± (0.5%+0.05Ω)	± (1.0%+0.05Ω)	260 ± 5℃ for 10 seconds 260 ± 5℃锡炉中, 持续 10 秒
Voltage Proof 耐电压	No breakdown or flashover 无击穿或跳火现象		1.42 times Max.Operating Voltage for 1 minute 最大操作电压*1.42 倍, 持续 1 分钟
Leaching 溶蚀测试	Individual leaching area ≤5% Total leaching area ≤10% 导体各面溶蚀区域 ≤5% 导体总面积溶蚀区域 ≤10%		260 ± 5℃ for 30 seconds 260 ± 5℃锡炉中, 持续 30 秒
Rapid Changeof Temperature 冷热冲击	± (0.5%+0.05Ω)	± (1.0%+0.05Ω)	-55℃ to +155℃ 5 cycles -55℃ to +155℃ 5 次

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25 ± 5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

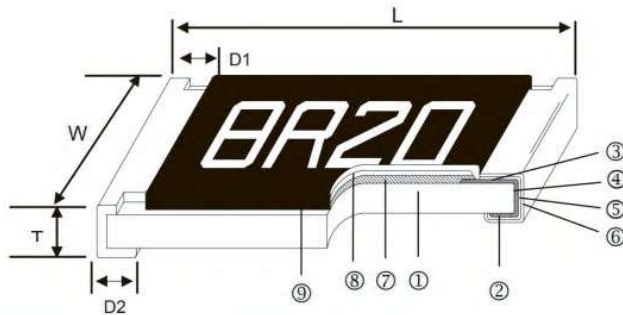
■电性能测量的环境条件: 温度: 25 ± 5 相对湿度: 25%~75%RH

■依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

## 摘要 Resume >>>

- High power in standard size/Low TCR of  $\pm 100\text{PPM}$ /Resistance values form  $10\text{m}\Omega$  to  $1\Omega$
- 标准规格大功率化，温度系数低 ( $\pm 100\text{PPM}$ )，阻值范围 ( $10\text{m}\Omega\sim 1\Omega$ )

## 结构图 Construction >>>



- ① Alumina Substrate 陶瓷基体
- ② Bottom Electrode 背导电极
- ③ Top Electrode 正导电极
- ④ Edge Electrode 侧导电极
- ⑤ Barrier Layer 电镀介质层
- ⑥ External Electrode 外部端电极
- ⑦ Resistor Layer 电阻层
- ⑧ Overcoat 密封层
- ⑨ Marking 丝印

## 尺寸 Dimensions >>>

Size 规格	L	W	T	D1	D2
0201	$0.60 \pm 0.03$	$0.30 \pm 0.03$	$0.23 \pm 0.05$	$0.12 \pm 0.05$	$0.15 \pm 0.05$
0402	$1.00 \pm 0.05$	$0.50 \pm 0.05$	$0.32 \pm 0.10$	$0.25 \pm 0.10$	$0.20 \pm 0.10$
0603	$1.60 \pm 0.10$	$0.80 \pm 0.10$	$0.45 \pm 0.10$	$0.30 \pm 0.20$	$0.30 \pm 0.20$
0805	$2.00 \pm 0.10$	$1.25 \pm 0.10$	$0.55 \pm 0.10$	$0.30 \pm 0.20$	$0.40 \pm 0.25$
1206	$3.10 \pm 0.10$	$1.55 \pm 0.10$	$0.55 \pm 0.10$	$0.50 \pm 0.30$	$0.40 \pm 0.25$
1210	$3.10 \pm 0.10$	$2.60 \pm 0.15$	$0.55 \pm 0.10$	$0.50 \pm 0.30$	$0.50 \pm 0.25$
2010	$5.00 \pm 0.10$	$2.50 \pm 0.15$	$0.60 \pm 0.15$	$0.60 \pm 0.30$	$0.50 \pm 0.25$
2512	$6.35 \pm 0.10$	$3.10 \pm 0.15$	$0.60 \pm 0.10$	$0.75 \pm 0.35$	$0.80 \pm 0.40$
2512(2W) 10~99mΩ	$6.35 \pm 0.20$	$3.15 \pm 0.15$	$0.74 \pm 0.10$	$0.60 \pm 0.30$	$0.55 \pm 0.25$
2512(2W) 100~1000mΩ	$6.35 \pm 0.20$	$3.15 \pm 0.15$	$0.74 \pm 0.10$	$0.60 \pm 0.30$	$2.10 \pm 0.10$
1225	$3.10 \pm 0.15$	$6.30 \pm 0.15$	$0.90 \pm 0.15$	$0.60 \pm 0.30$	$0.80 \pm 0.25$
3720	$2.00 \pm 0.20$	$3.75 \pm 0.20$	$0.60 \pm 0.10$	$0.40 \pm 0.20$	$0.40 \pm 0.20$
7520	$2.00 \pm 0.20$	$7.50 \pm 0.30$	$0.60 \pm 0.10$	$0.40 \pm 0.20$	$0.40 \pm 0.20$
0612	$1.55 \pm 0.10$	$3.10 \pm 0.15$	$0.55 \pm 0.10$	$0.30 \pm 0.15$	$0.45 \pm 0.15$

## 型号名称 Part Numbering >>>

CS	2012 (0805)	LR020	F	T	V
Product Type 产品型号	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式	High Power 升功率
CS	0603 (0201) 1005 (0402) 1608 (0603) 2012 (0805) 3216 (1206) 3225 (1210) 4532 (1812) 5025 (2010) 6432 (2512) 3720 7520 0612	LR100: 0.1 Ω LR010: 0.01 Ω LR001: 1m Ω	F= ±1 % G= ±2 % J= ±5 %	T:Taping Reel T: 编带 B: 散装	S:2 W A:1.5W N:1 W Q:3/4W U:1/2W V:1/4W P:1/5W W:1/8W

## 标准规格表 Standard Electrical Specifications >>>

Item Type 项目 型号	Power Rating 额定功率	Max. Operating Current 最大工作电流	Resistance Range 阻值范围			TCR 温度系数 (PPM/°C)
			±1%	±2%	±5%	
0201	1/20W	0.70A	100mΩ-1000mΩ			100mΩ ≤ R ≤ 147mΩ : ±1000 150mΩ ≤ R ≤ 500mΩ : ±600 510mΩ ≤ R ≤ 1000mΩ : ±300
0402	1/16W	1.11A	50mΩ-1000mΩ			50mΩ ≤ R ≤ 100mΩ : ±400 102mΩ ≤ R ≤ 500mΩ : ±300 510mΩ ≤ R ≤ 1000mΩ : ±200
0603	1/10W	2.23A	20mΩ-1000mΩ			20mΩ ≤ R ≤ 50mΩ : ±600 51mΩ ≤ R ≤ 100mΩ : ±400 102mΩ ≤ R ≤ 196mΩ : ±300 200mΩ ≤ R ≤ 1000mΩ : ±200
0805	1/8W	2.50A	20mΩ-1000mΩ			20mΩ ≤ R ≤ 50mΩ : ±600 51mΩ ≤ R ≤ 100mΩ : ±400 102mΩ ≤ R ≤ 196mΩ : ±300 200mΩ ≤ R ≤ 1000mΩ : ±200
1206	1/4W	5.00A	10mΩ-1000mΩ			10mΩ ≤ R ≤ 20mΩ : ±600 21mΩ ≤ R ≤ 50mΩ : ±400 51mΩ ≤ R ≤ 91mΩ : ±300 100mΩ ≤ R ≤ 1000mΩ : ±200
1210	1/2W	7.07A	10mΩ-1000mΩ			10mΩ ≤ R ≤ 20mΩ : ±600 21mΩ ≤ R ≤ 50mΩ : ±400 51mΩ ≤ R ≤ 91mΩ : ±300 100mΩ ≤ R ≤ 1000mΩ : ±200
2010	3/4W	8.66A	10mΩ-1000mΩ			10mΩ ≤ R ≤ 20mΩ : ±600 21mΩ ≤ R ≤ 50mΩ : ±400 51mΩ ≤ R ≤ 91mΩ : ±300 100mΩ ≤ R ≤ 1000mΩ : ±200
2512	1W	10.0A	10mΩ-1000mΩ			10mΩ ≤ R ≤ 20mΩ : ±600 21mΩ ≤ R ≤ 50mΩ : ±400 51mΩ ≤ R ≤ 91mΩ : ±300 100mΩ ≤ R ≤ 1000mΩ : ±200
1225	3W	31.6A	3mΩ-1000mΩ			3mΩ ≤ R ≤ 5mΩ : ±300 6mΩ ≤ R ≤ 20mΩ : ±200 21mΩ ≤ R ≤ 30mΩ : ±150 33mΩ ≤ R ≤ 1000mΩ : ±100
3720	1W	10.0A	10mΩ-500mΩ			10mΩ ≤ R ≤ 18mΩ : ±300 20mΩ ≤ R ≤ 500mΩ : ±150
7520	2W	44.7A	/	1mΩ-4mΩ		1mΩ ≤ R ≤ 4mΩ : ±300
			5mΩ-350mΩ			5mΩ ≤ R ≤ 10mΩ : ±200 11mΩ ≤ R ≤ 350mΩ : ±150
0612	1W	10.0A	10mΩ-1000mΩ			10mΩ ≤ R ≤ 27mΩ : ±600 30mΩ ≤ R ≤ 91mΩ : ±300 100mΩ ≤ R ≤ 499mΩ : ±200 500mΩ ≤ R ≤ 1000mΩ : ±100

◆ Operating Temp. Range 操作温度范围: 0402~0612: -55~155°C

升功率规格表 High Power Rating Electrical Specifications >>>

Type 型号	Item 项目	Power Rating 额定功率	Max.Operating Current 最大工作电流	Resistance Range 阻值范围		TCR 温度系数 (PPM/°C)
				± 1%	± 5%	
0402		1/8W	1.56A	51mΩ-1000mΩ		51mΩ ≤ R ≤ 100mΩ : ± 400 102mΩ ≤ R ≤ 500mΩ : ± 300 510mΩ ≤ R ≤ 1000mΩ : ± 200
0603		1/8W 1/5W	1.98A	51mΩ-1000mΩ		51mΩ ≤ R ≤ 100mΩ : ± 400 102mΩ ≤ R ≤ 500mΩ : ± 300 510mΩ ≤ R ≤ 1000mΩ : ± 200
0805		1/4W	2.21A	51mΩ-1000mΩ		51mΩ ≤ R ≤ 100mΩ : ± 400 102mΩ ≤ R ≤ 500mΩ : ± 300 510mΩ ≤ R ≤ 1000mΩ : ± 200
1206		1/2W	7.07A	10mΩ-1000mΩ		10mΩ ≤ R ≤ 20mΩ : ± 600 21mΩ ≤ R ≤ 50mΩ : ± 400 51mΩ ≤ R ≤ 91mΩ : ± 300 100mΩ ≤ R ≤ 1000mΩ : ± 200
1210		3/4W	8.66A	10mΩ-1000mΩ		10mΩ ≤ R ≤ 20mΩ : ± 600 21mΩ ≤ R ≤ 50mΩ : ± 400 51mΩ ≤ R ≤ 91mΩ : ± 300 100mΩ ≤ R ≤ 1000mΩ : ± 200
2010		1W	10.0A	10mΩ-1000mΩ		10mΩ ≤ R ≤ 20mΩ : ± 600 21mΩ ≤ R ≤ 50mΩ : ± 400 51mΩ ≤ R ≤ 91mΩ : ± 300 100mΩ ≤ R ≤ 1000mΩ : ± 200
2512		1.5W	12.2A	10mΩ-1000mΩ		10mΩ ≤ R ≤ 20mΩ : ± 600 21mΩ ≤ R ≤ 50mΩ : ± 400 51mΩ ≤ R ≤ 91mΩ : ± 300 100mΩ ≤ R ≤ 1000mΩ : ± 200
2512		2W	14.1A	10mΩ-1000mΩ		10mΩ ≤ R ≤ 20mΩ : ± 600 21mΩ ≤ R ≤ 50mΩ : ± 400 51mΩ ≤ R ≤ 91mΩ : ± 300 100mΩ ≤ R ≤ 1000mΩ : ± 200

◆ Operating Temp.Range 操作温度范围: 0402~2512: -55 ~ 155°C

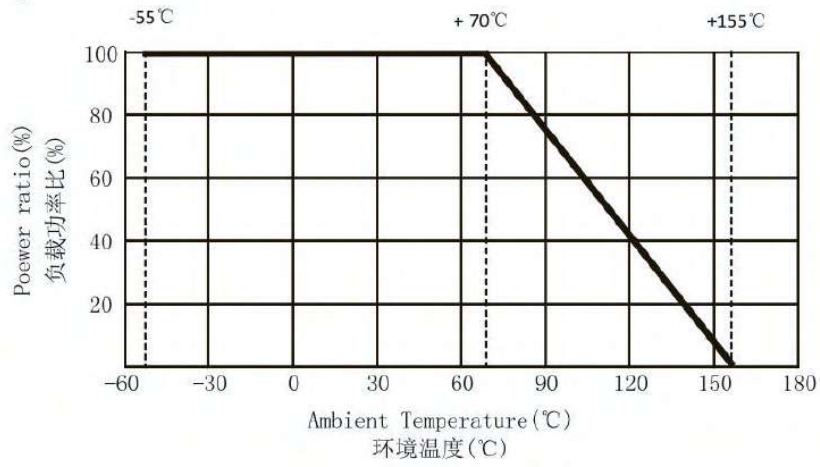
低温漂规格表 Low TCR Electrical Specifications >>>

Type 型号	Item 项目	Power Rating 额定功率	Max.Operating Current 最大工作电流	Resistance Range 阻值范围			TCR 温度系数 (PPM/°C)
				± 1%	± 2%	± 5%	
0805		1/8W	1.11A	100mΩ-1000mΩ			± 100
1206		1/4W	1.58A	100mΩ-1000mΩ			± 100
1210		1/2W	2.58A	75mΩ-1000mΩ			± 100
2010		3/4W	3.87A	50mΩ-1000mΩ			± 100
2512		1W	7.07A	20mΩ-1000mΩ			± 100
2512		*2W	6.32A	50mΩ-1000mΩ			± 100
3720		1W	3.16A	100mΩ-500mΩ			± 100
7520		2W	6.32A	50mΩ-350mΩ			± 100

◆ Operating Temp.Range 操作温度范围: 0402~0612: -55 ~ 155°C

\*: Ultra High Power

功率衰减曲线图 Derating Curve >>>





信赖性试验项目 Environmental Characteristics >>>

Item 项目	Requirement 条件			Test Method 测试方法
Temperature Coefficient of Resistance(T.C.R.) 温度系数(T.C.R.)	As Spec. 参考规格表			-55°C~+125°C, 25°C is the reference temperature 参考温度
Short Time Overload 短时间过负载	±(0.5%+0.05Ω)			RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds, 2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒,提升功率系列 2 秒
	±(1.0%+0.05Ω) For High Power Rating 大额定功率			
Insulation Resis 绝缘阻抗	≥10G			Max.Overload voltage for 1 minute 施加最大负载电压 1 分钟
Endurance 负载寿命	±(1.0%+0.05Ω)			70±2°C, RCWV for 1000hrs with 1.5hrs"ON" and 0.5hrs"OFF" 70±2°C 温度中施加额定电压, 1.5 小时"开", 0.5 小时"关", 共 1000 小时
Damp Heat with Load 耐湿负荷	±(0.5%+0.05Ω)			40±2°C, 90~95%R.H., RCWV for 1000hrs with 1.5hrs"ON" and 0.5hrs"OFF" 在温度 40±2°C, 相对湿度 90~95% 环境中施加额定电压, 1.5 小时"开", 0.5 小时"关", 共 1000 小时
Dry Heat 耐热性实验	±(0.5%+0.05Ω)			At+125/+155°C for 1000hrs 置于+125/+155°C 温度中, 共 1000 小时
Bending Strength 弯折强度测试	±(1.0%+0.05Ω)			Bending once for 5 seconds 2010, 2512 sizes: 2mm Other sizes: 3mm 产品焊在测试板上, 中央施力下压 5 秒 下压深度: 2010、2512: 2 毫米 其他尺寸: 3 毫米
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%			245±5°C for 3 seconds 245±5°C 锡炉中, 持续 3 秒
Resistance to Soldering Heat 抗焊锡热	±(0.5%+0.05Ω)			260±5°C for 10 seconds 260±5°C 锡炉中, 持续 10 秒
Voltage Proof 耐电压	No breakdown or flashover 无击穿或跳火现象			1.42 times Max.Operating Voltage for 1 minute 最大操作电压*1.42 倍, 持续 1 分钟
Leaching 溶蚀测试	Individual leaching area ≤5% Total leaching area ≤10% 导体各面溶蚀区域 ≤5% 导体总面积溶蚀区域 ≤10%			260±5°C for 30 seconds 260±5°C 锡炉中, 持续 30 秒
Rapid Change of Temperature 冷热冲击	±(0.5%+0.05Ω)	±(1.0%+0.05Ω)	<50mΩ	-55°C to +155°C 5 cycles -55°C to +155°C 5 次

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above, whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above, whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25±5 Humidity: 25%~75%RH

Reference Standards: IEC 60115-1, 60068-2-58; JIS-C 5201-1

■ RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压。

操作电压= $\sqrt{P \cdot R}$ , 过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ , 操作电流= $\sqrt{P/R}$

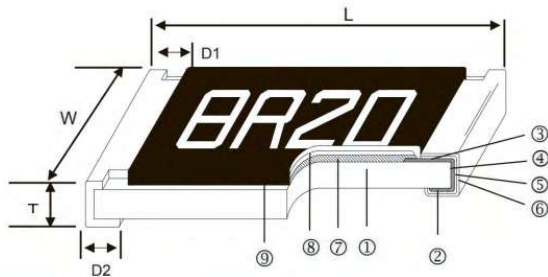
■ 电性能测量的环境条件: 温度: 25±5 相对湿度: 25%~75%RH

■ 依据标准: IEC 60115-1, 60068-2-58; JIS-C 5201-1

## 摘要 Resume >>>

- Thin film process/High power rating up to 3 Watts/Tight tolerance down to  $\pm 0.5\%$ /Extremely low TCR down to  $\pm 50\text{PPM}$ /Resistance values from  $50\text{m}\Omega$  to  $1\Omega$
- 薄膜工艺, 最大额定功率 (3 Watts), 高精度 ( $\pm 0.5\%$ ), 极低温度系数 ( $\pm 50\text{PPM}$ ), 阻值范围 ( $50\text{m}\Omega\sim 1\Omega$ )

## 结构图 Construction >>>



- ① Alumina Substrate 陶瓷基体
- ② Bottom Electrode 背导电极
- ③ Top Electrode 正导电极
- ④ Edge Electrode 侧导电极
- ⑤ Barrier Layer 电镀介质层
- ⑥ External Electrode 外部端电极
- ⑦ Resistor Layer 电阻层
- ⑧ Overcoat 密封层
- ⑨ Marking 丝印

## 尺寸 Dimensions >>>

Size 规格	L	W	T	D1	D2
0402	$1.00 \pm 0.05$	$0.50 \pm 0.05$	$0.32 \pm 0.10$	$0.25 \pm 0.10$	$0.20 \pm 0.10$
0603	$1.60 \pm 0.10$	$0.80 \pm 0.10$	$0.45 \pm 0.10$	$0.30 \pm 0.20$	$0.30 \pm 0.20$
0805	$2.00 \pm 0.15$	$1.25 \pm 0.15$	$0.55 \pm 0.10$	$0.30 \pm 0.20$	$0.40 \pm 0.25$
1206	$3.05 \pm 0.15$	$1.55 \pm 0.15$	$0.55 \pm 0.10$	$0.50 \pm 0.30$	$0.40 \pm 0.25$
2010	$5.00 \pm 0.20$	$2.45 \pm 0.15$	$0.60 \pm 0.15$	$0.60 \pm 0.30$	$0.50 \pm 0.25$
2512	$6.35 \pm 0.20$	$3.15 \pm 0.15$	$0.60 \pm 0.10$	$0.60 \pm 0.30$	$0.55 \pm 0.25$

## 型号名称 Part Numbering >>>

TCS	6432 ( 2512 )	LR100	D	I	R
Product Type 产品型号	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式	High Power 升功率
TCS	1005 ( 0402 ) 1608 ( 0603 ) 2012 ( 0805 ) 3216 ( 1206 ) 5025 ( 2010 ) 6432 ( 2512 )	LR100: $0.1\ \Omega$ LR010: $0.01\ \Omega$ LR001: $1\text{m}\ \Omega$	$D = \pm 0.5\%$ $F = \pm 1\%$	T:Taping Reel T: 编带 B: Bulk B: 散装	R:3W

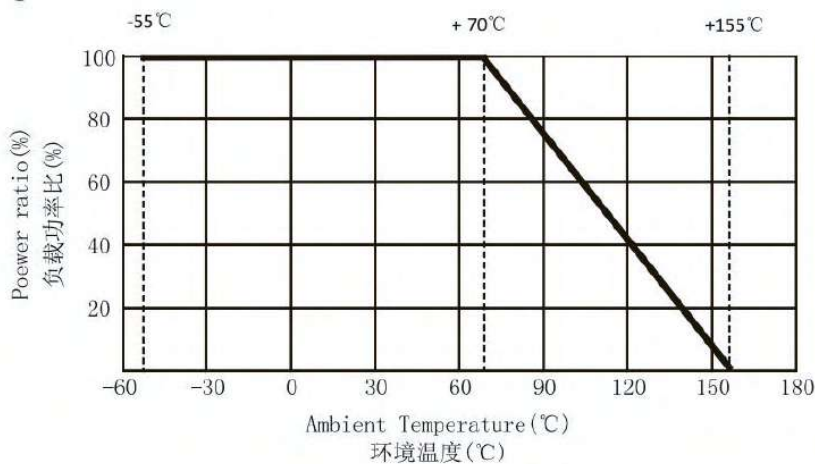
标准规格表 Standard Electrical Specifications >>>

Type 型号	Item 项目	Power Rating 额定功率	Resistance Range 阻值范围		TCR 温度系数 (PPM/°C)
			± 0.5%	± 1%	
0402		1/16W	500mΩ-1000mΩ		± 50 ± 100
0603		1/10w	200mΩ-1000mΩ		200mΩ ≤ R ≤ 300mΩ : ± 100 301mΩ ≤ R ≤ 1000mΩ : ± 50
0805		1/8W	200mΩ-1000mΩ		200mΩ ≤ R ≤ 300mΩ : ± 100 301mΩ ≤ R ≤ 1000mΩ : ± 50
1206		1/4W	---	50mΩ-100mΩ	50mΩ ≤ R ≤ 100mΩ : ± 200 101mΩ ≤ R ≤ 300mΩ : ± 100 301mΩ ≤ R ≤ 1000mΩ : ± 50
			101mΩ-1000mΩ		
2010		3/4W	50mΩ-1000mΩ		50mΩ ≤ R ≤ 100mΩ : ± 200 101mΩ ≤ R ≤ 300mΩ : ± 100 301mΩ ≤ R ≤ 1000mΩ : ± 50
2512		1W	50mΩ-1000mΩ		50mΩ ≤ R ≤ 100mΩ : ± 200 101mΩ ≤ R ≤ 300mΩ : ± 100 301mΩ ≤ R ≤ 1000mΩ : ± 50
2512		*3W	100mΩ-1000mΩ		± 100

◆ Operating Temp.Range 操作温度范围: 0402~2512: -55~155°C

\*High Power 升功率

功率衰减曲线图 Derating Curve >>>



信赖性试验项目 Environmental Characteristics >>>

Item 项目	Requirement 条件	Test Method 测试方法
Temperature Coefficient of Resistance(T.C.R) 温度系数(T.C.R.)	As Spec. 参考规格表	-55°C~+125°C, 25°C is the reference temperature 参考温度
Short Time Overload 短时间过负载	± 1%	RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds,2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒,提升功率系列 2 秒
Insulation Resis 绝缘阻抗	≥ 1000MΩ	Apply 100Vdc for 1 minute 施加电压 100V(DC)1 分钟
Endurance 负载寿命	± 1.0%	70 ± 2°C ,RCWV for 1000hrs with 1.5hrs " ON " and 0.5hrs" OFF" 70 ± 2°C 温度中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Damp Heat with Load 耐湿负荷	± 0.5%	40 ± 2°C,90~95%R.H.,RCWV for 1000hrs with 1.5hrs" ON " and 0.5hrs" OFF" 在温度 40 ± 2°C, 相对湿度 90~95%环境中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Bending Strength 弯折强度测试	± (1.0%+0.05Ω)	Bending once for 5 seconds 2010,2512sizes:2mm Other sizes:3mm 产品焊在测试板上, 中央施力下压 5 秒 下压深度: 2010、2512: 2 毫米 其他尺寸: 3 毫米
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%	245 ± 5°C for 3 seconds 245 ± 5°C 锡炉中, 持续 3 秒
Resistance to Soldering Heat 抗焊锡热	± 0.5%	260 ± 5°C for 10 seconds 260 ± 5°C 锡炉中, 持续 10 秒
Voltage Proof 耐电压	By Type 根据型号	1.42 times Max.Operating Voltage for 1 minute 最大操作电压*1.42 倍, 持续 1 分钟
Thermal Shock 热冲击	0.5%	-55°C to +155°C 5 cycles -55°C to +155°C 5 次
Low Temperature Operation 低温操作	0.5%	1 hour, -65°C, followed by 45 minutes of RCWV 在 45 分钟 RCWV 之后, 在 -65°C 温度下持续 1 小时

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25 ± 5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■ RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

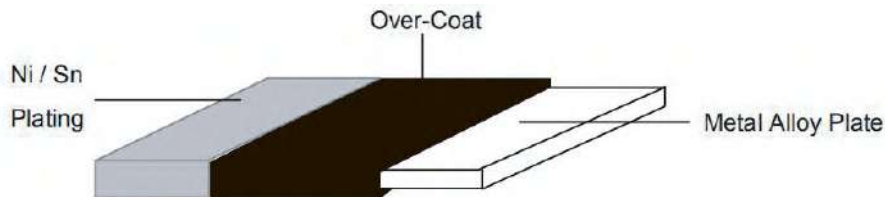
■ 电性能测量的环境条件: 温度: 25 ± 5 相对湿度: 25%~75%RH

■ 依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

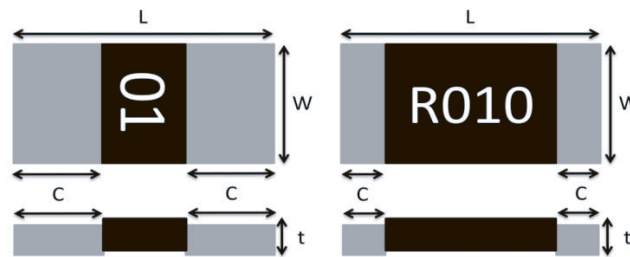
## 摘要 Resume >>>

- High power rating up to 5Watts/Low TCR down to down 50PPM/Resistance values form 0.25mΩ to 500mΩ/Customized resistance available
- 大功率 (5W), 低温度系数 (50PPM), 阻值范围 (0.25mΩ—500mΩ), 可定制电阻。

## 结构图 Construction >>>



## 尺寸 Dimensions >>>



Size 规格	L	W	T	C1	C2
0805	2.0 ± 0.2	1.25 ± 0.2	根据阻值、材质、产线决定		
1206	3.2 ± 0.3	1.6 ± 0.3			
2010	5.0 ± 0.3	2.5 ± 0.3			
2512	6.4 ± 0.3	3.2 ± 0.3			
2725	6.8 ± 0.3	6.3 ± 0.3			
2728	6.6 ± 0.3	6.7 ± 0.3			
4527	11.3 ± 0.5	6.6 ± 0.5			

## 型号名称 Part Numbering >>>

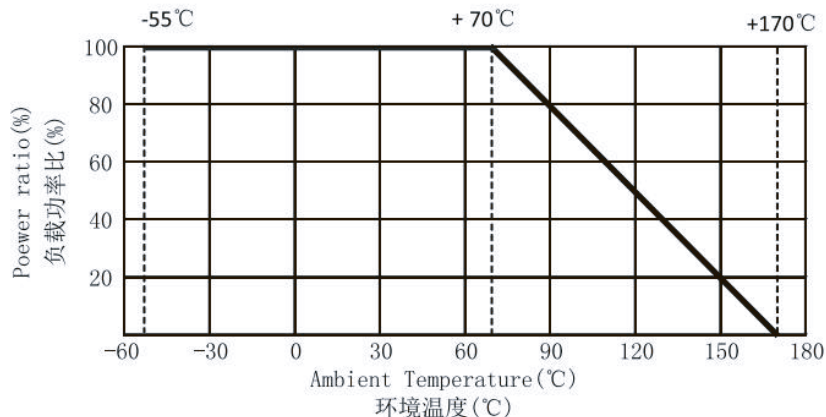
MRF	04	6432(2512)	LR3M5	F	T	S
Product Type 产品型号	Production line code 产线代码	Resistor Size 电阻规格	Resistance 阻 值	Resistance Tolerance 阻值公差	Packing Code 包装形式	RATE Power 额定功率
MRN: 镍铜合金 MRM: 锰铜合金 MRMC: 锰铜锡合金 MRF: 铁铬铝合金 MRC: 铜金属电阻	01 02 03 04 10	2012 (0805) 3216 (1206) 5025 (2010) 6432 (2512) 2725 2728 4527	LR001: 0.001 Ω LR010: 0.01 Ω LR3M5: 0.0035 Ω	D= ± 0.5% F= ± 1% G= ± 2% J= ± 5%	T: Taping Reel T: 卷装 B: Bulk B: 散装	Z: 5 W R: 3 W S: 2 W A: 1.5 W N: 1 W Q: 3/4 W U: 1/2 W V: 1/4 W

标准规格表 Standard Electrical Specifications >>>

Item Type 项目 型号	Power Rating 额定功率	Max. Operating Voltage 最大工作电压	Resistance Range 阻值范围 (mΩ)				Insulation Resistance 绝缘阻抗	TCR 温度系数 (PPM/°C)
			±0.5%	±1%	±2%	±5%		
0805	1/8W 1/4W 1/2W	√(P*R)	/	1.5 ≤ R ≤ 20		> 100MΩ	± 50	
1206	1/4W 1/2W 1W	√(P*R)	/	1 ≤ R ≤ 30		> 100MΩ	± 75	
	3/4W	√(P*R)	51 ≤ R ≤ 100				± 50	
	1W	√(P*R)	7 ≤ R ≤ 50	1 ≤ R ≤ 50				
	1.5W	√(P*R)	/	1 ≤ R ≤ 5				
2010	1/2W 3/4W 1W	√(P*R)	/	2 ≤ R ≤ 50		> 100MΩ	± 50	
	1.5W		0.75 ≤ R ≤ 50					
2512	1W	√(P*R)	---	0.5 ≤ R ≤ 0.75		> 100MΩ	± 75	
	1W		7 ≤ R ≤ 450	1 ≤ R ≤ 500			± 50	
	2W		---	0.5 ≤ R ≤ 0.75			± 75	
	2W		7 ≤ R ≤ 450	1 ≤ R ≤ 500			± 50	
	3W		---	0.5 ≤ R ≤ 0.75			± 75	
	3W		7 ≤ R ≤ 100	1 ≤ R ≤ 100			± 50	
2725	4W	√(P*R)	---	0.25 ≤ R ≤ 0.3		> 100MΩ	± 75	
			---	0.5 ≤ R ≤ 3			± 50	
2728	4W	√(P*R)	7 ≤ R ≤ 450	4 ≤ R ≤ 450		> 100MΩ	± 50	
4527	2W	√(P*R)	---	0.5		> 100MΩ	± 75	
	2W		7 ≤ R ≤ 100	1 ≤ R ≤ 100			± 50	
	3W		---	0.5			± 75	
	3W		7 ≤ R ≤ 60	1 ≤ R ≤ 60			± 50	
	5W		---	0.5			± 75	
	5W		7 ≤ R ≤ 500	1 ≤ R ≤ 500			± 50	

◆ Operating Temp. Range 操作温度范围: 0805 ~ 4527: -55 ~ 170°C

功率衰减曲线图 Derating Curve >>>



## 信赖性试验项目 Environmental Characteristics &gt;&gt;&gt;

Item 项目	Requirement 条件	Test Method 测试方法
Temperature Coefficient of Resistance(T.C.R) 温度系数(T.C.R.)	As Spec. 参考规格表	+25°C~+125°C, 25°C is the refence temperature 参考温度
Endurance 负载寿命	< ± 1%	1000hours at rated power.70°C 1.5hrs” ON” and 0.5 hrs “OFF” 70°C温度中施加额定电压, 1.5 小时“开”,0.5 小时“关”,共 1000 小时
Short Time Overload 短时间过负载	< ± 0.5%	5 X rated power for 5S 额定功率*5 倍, 持续 5 秒
Moisture no Load 水分空载	< ± 1%	85°C, 85%RH, 1000hrs 85°C, 85%RH, 持续 1000 小时
Temperature Cycle 温度循环	< ± 0.5%	-55°C&+155°C, 300cycle, 15min per extreme condition -55°C&+155°C,极端条件下每次 15 分钟, 共 300 次
Resistance to Soldering Heat 耐热性试验	< ± 0.5%	260 ± 5 for 2 ± 0.5 seconds 260 ± 5°C锡炉中, 持续 20 ± 1 秒
Solderability 焊锡性	95% min.coverage 导体爬锡面积大于 95%	245 ± 5°C for 2 ± 0.5 seconds 245 ± 5°C 锡炉中, 持续 2 ± 0.5 秒
High Temperature Exposure 高温曝光	< ± 1%	170°C,1000hrs 170°C, 持续 1000 小时
Low Temperature Storage 低温存储	< ± 0.5%	-55°C, 1000hrs -55°C, 持续 1000 小时
Substrate Bending 基板弯折强度	< ± 1%	Bending width 2mm 弯折宽度 2mm
Insulation Resistance 绝缘阻抗	≥ 100MΩ	100V DC for 1minute 100V DC, 持续 1 分钟

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25 ± 5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

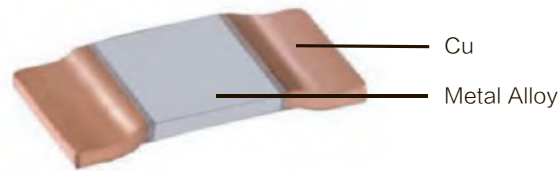
操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

■电性能测量的环境条件: 温度: 25 ± 5 相对湿度: 25%~75%RH

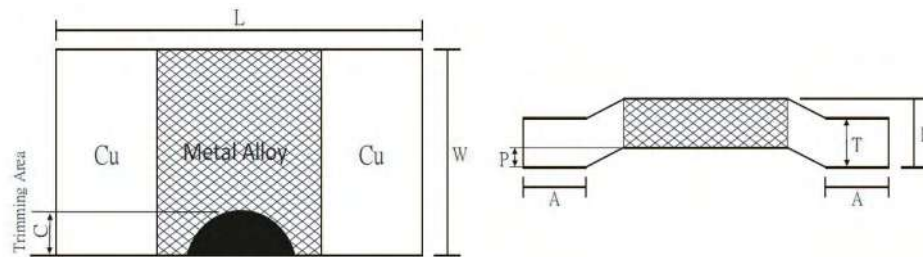
■依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

## 摘要 Resume >>>

- High power rating up to 15Watts/Low TCR down to down 50PPM/High precision current sensing and voltage division/ Excellent Anti-Surge ability.
- 超大功率（15W），低温度系数（50PPM），高精度电流传感和分压，抗浪涌能力强。



## 尺寸 Dimensions >>>



Size 规格	Resistance (mΩ)	L (mm)	W (mm)	H (mm)	T (mm)	A (mm)
1206	0.3	3.20 ± 0.30	1.65 ± 0.30	1.20 ± 0.20	---	0.80 ± 0.30
	0.5 1	3.20 ± 0.30	1.65 ± 0.30	0.90 ± 0.20	---	0.80 ± 0.30
2512	0.3	6.50 ± 0.30	3.25 ± 0.30	1.17 ± 0.20	0.82 ± 0.20	0.90 ± 0.30
	0.5	6.50 ± 0.30	3.25 ± 0.30	1.07 ± 0.20	0.72 ± 0.20	0.90 ± 0.30
	0.75	6.50 ± 0.30	3.25 ± 0.30	0.95 ± 0.20	0.60 ± 0.20	0.90 ± 0.30
	1	6.50 ± 0.30	3.25 ± 0.30	0.73 ± 0.20	0.38 ± 0.20	0.90 ± 0.30
	2	6.50 ± 0.30	3.25 ± 0.30	0.96 ± 0.20	0.61 ± 0.20	0.90 ± 0.30
	3	6.50 ± 0.30	3.25 ± 0.30	0.76 ± 0.20	0.41 ± 0.20	0.90 ± 0.30
	4	6.50 ± 0.30	3.25 ± 0.30	0.66 ± 0.20	0.31 ± 0.20	0.90 ± 0.30
3920	0.2	10.20 ± 0.30	5.20 ± 0.30	1.98 ± 0.20	1.48 ± 0.20	1.80 ± 0.30
	0.3	10.20 ± 0.30	5.20 ± 0.30	1.92 ± 0.20	1.42 ± 0.20	1.80 ± 0.30
	0.5	10.20 ± 0.30	5.20 ± 0.30	1.36 ± 0.20	0.86 ± 0.20	1.80 ± 0.30
	1	10.20 ± 0.30	5.20 ± 0.30	0.92 ± 0.20	0.42 ± 0.20	1.80 ± 0.30
	2	10.20 ± 0.30	5.20 ± 0.30	1.19 ± 0.20	0.69 ± 0.20	1.80 ± 0.30
	3	10.20 ± 0.30	5.20 ± 0.30	0.94 ± 0.20	0.44 ± 0.20	1.80 ± 0.30
	4	10.20 ± 0.30	5.20 ± 0.30	0.85 ± 0.20	0.35 ± 0.20	1.80 ± 0.30
5930	0.2	15.00 ± 0.30	7.75 ± 0.30	1.92 ± 0.20	1.42 ± 0.20	4.20 ± 0.20
	0.3	15.00 ± 0.30	7.75 ± 0.30	1.44 ± 0.20	0.94 ± 0.20	4.20 ± 0.20
	0.5	15.00 ± 0.30	7.75 ± 0.30	1.08 ± 0.20	0.58 ± 0.20	4.20 ± 0.20
	1	15.00 ± 0.30	7.75 ± 0.30	1.37 ± 0.20	0.87 ± 0.20	4.20 ± 0.20
	2	15.00 ± 0.30	7.75 ± 0.30	0.95 ± 0.20	0.46 ± 0.20	4.20 ± 0.20
	3	15.00 ± 0.30	7.75 ± 0.30	0.90 ± 0.20	0.40 ± 0.20	4.20 ± 0.20



## 型号名称 Part Numbering &gt;&gt;&gt;

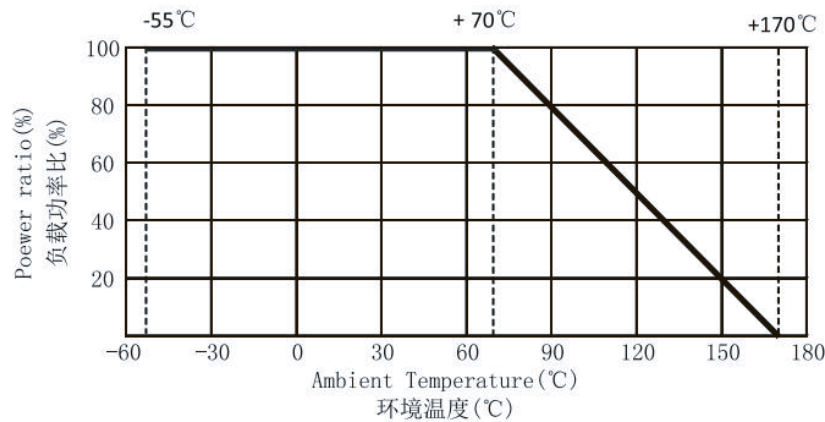
SRF	10	6432(2512)	LR3M5	F	T	S
Product Type 产品型号	Production line code 产线代码	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式	RATE Power 额定功率
SRM: 锰铜合金 SRMC: 锰铜锡合金 SRF: 铁铬铝合金	01 02 03 04 10	3216( 1206 ) 6432( 2512 ) 3920 5930	LR001: 0.001 Ω LR005: 0.005 Ω LR0M5: 0.0005Ω	F= ± 1% G= ± 2% J= ± 5%	T: Taping Reel T: 卷装 B: Bulk B: 散装	AE:15W AB:12W T:10W J:9W I:8W D:7W E:6W Z:5W H:4W R:3W B:2.5W S:2W

## 标准规格表 Standard Electrical Specifications &gt;&gt;&gt;

Item Type 项目 型号	Power Rating 额定功率	Max. Current Rating (A) 最大工作电流	Resistance Range 阻值范围 ( mΩ )			Insulation Resistance 绝缘阻抗	TCR 温度系数 (PPM/°C)
			± 1%	± 2%	± 5%		
1206	2W	81.6	0.3			> 100MΩ	± 300
		63.24	0.5				± 200
		44.72	1				± 150
2512	6W	141.42	0.3			> 100MΩ	± 150
	6W	109.54	0.5				± 115
	5W	81.65	0.75				± 115
	5W	70.71	1				± 100
	5W	50	2				± 50
	4W	36.51	3				± 50
	3W	27.38	4				± 50
3920	2.5W	22.36	5			> 100MΩ	± 50
	12W	244.94	0.2				± 200
	10W	182.57	0.3				± 150
	9W	134.16	0.5				± 75
	7W	83.66	1				± 50
	6W	54.77	2				± 50
	5W	40.82	3				± 50
5930	4W	31.62	4			> 100MΩ	± 50
	3W	24.49	5				± 50
	15W	273.86	0.2				± 100
	10W	182.57	0.3				± 100
	8W	126.49	0.5				± 75
	8W	89.44	1				± 50
7W	59.16	2			± 50		
5W	40.82	3			± 50		

◆ Operating Temp.Range 操作温度范围: 0402~5930: -55~170°C

## 功率衰减曲线图 Derating Curve &gt;&gt;&gt;



## 信赖性试验项目 Environmental Characteristics &gt;&gt;&gt;

Item 项目	Requirement 条件	Test Method 测试方法
Temperature Coefficient of Resistance(T.C.R) 温度系数(T.C.R.)	As Spec. 参考规格表	+25°C~+125°C, 25°C is the reference temperature 参考温度
Endurance 负载寿命	< ± 1%	1000hours at rated power.70°C 1.5hrs" ON" and 0.5 hrs "OFF" 70°C温度中施加额定电压,1.5小时“开”,0.5小时“关”, 共 1000 小时
Short Time Overload 短时间过负载	< ± 0.5%	5 X rated power for 5S 额定功率*5 倍,持续 5 秒
Moisture no Load 水分空载	< ± 1%	85°C, 85%RH, 1000hrs 85°C, 85%RH, 持续 1000 小时
Temperature Cycle 温度循环	< ± 0.5%	-55°C&+155°C, 300cycle, 15min per extreme condition -55°C&+155°C,极端条件下每次 15 分钟,共 300 次
Resistance to Soldering Heat 耐热性试验	< ± 0.5%	260 ± 5 for 2 ± 0.5 seconds 260 ± 5°C锡炉中,持续 20 ± 1 秒
Solderability 焊锡性	95% min.coverage 导体爬锡面积大于 95%	245 ± 5°C for 2 ± 0.5 seconds 245 ± 5°C 锡炉中,持续 2 ± 0.5 秒
High Temperature Exposure 高温曝光	< ± 1%	170°C, 1000hrs 170°C, 持续 1000 小时
Low Temperature Storage 低温存储	< ± 0.5%	-55°C, 1000hrs -55°C, 持续 1000 小时
Substrate Bending 基板弯折强度	< ± 1%	Bending width 2mm 弯折宽度 2mm
Insulation Resistance 绝缘阻抗	≥ 100MΩ	100V DC for 1minute 100V DC, 持续 1 分钟

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25 ± 5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

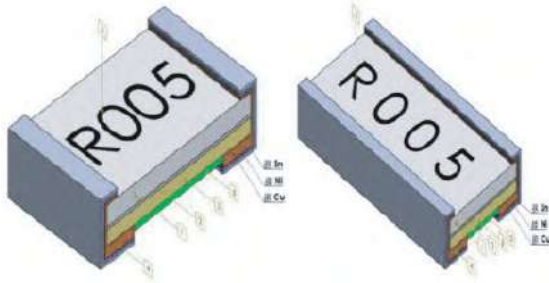
■电性能测量的环境条件: 温度: 25 ± 5 相对湿度: 25%~75%RH

■依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

## 摘要 Resume >>>

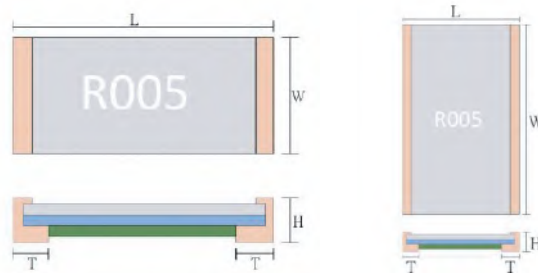
- High power rating up to 5Watts/Low TCR down to down 50PPM/Resistance values form 1mΩ to 700mΩ/  
Customized resistance available
- 大功率（5W），低温度系数（50PPM），阻值范围（1mΩ—700mΩ），可定制电阻。

## 结构图 Construction >>>



- ①底层：氧化铝陶瓷
- ②粘合层：环氧树脂
- ③电阻体：铜合金
- ④端电极：铜镍锡
- ⑤保护层：阻燃环氧树脂，符合UL-94-V0要求
- ⑥标记涂层：阻燃环氧树脂，符合UL-94-V0要求

## 尺寸 Dimensions >>>



Size 规格	Power Rating 额定功率	Resistance (mΩ)	L (mm)	W (mm)	H (mm)	T (mm)	
0603	0.5W	5mΩ	1.60 ± 0.25	0.80 ± 0.25	0.65 ± 0.20	0.50 ± 0.20	
		6~100mΩ				0.40 ± 0.20	
0805	0.75W	4~270mΩ	2.00 ± 0.25	1.20 ± 0.25	0.65 ± 0.20	0.50 ± 0.20	
1206	1W	4~700mΩ	3.20 ± 0.25	1.60 ± 0.25	0.65 ± 0.20	0.68 ± 0.30	
2010	1.5W	2~3mΩ	5.08 ± 0.25	2.54 ± 0.25	0.65 ± 0.20	2.10 ± 0.30	
		4~500mΩ				0.70 ± 0.30	
2512	2W	2mΩ	6.40 ± 0.30	3.20 ± 0.30	0.75 ± 0.20	1.65 ± 0.30	
		3mΩ				0.75 ± 0.20	1.65 ± 0.30
		4~560mΩ				0.65 ± 0.20	1.05 ± 0.30
3921	4W	10~50mΩ	11.10 ± 0.30	5.10 ± 0.30	0.65 ± 0.30	2.36 ± 0.30	
4527	5W	10~50mΩ	11.60 ± 1.0	7.10 ± 1.0	0.65 ± 0.30	2.70 ± 0.40	
0508	1W	1~100mΩ	1.35 ± 0.20	2.10 ± 0.20	0.65 ± 0.20	0.43 ± 0.20	
0612	1.5W	1mΩ	1.60 ± 0.25	3.20 ± 0.25	0.65 ± 0.20	0.50 ± 0.30	
		2~100mΩ				0.40 ± 0.20	
0815	2W	1~20mΩ	2.20 ± 0.20	3.80 ± 0.20	0.65 ± 0.20	0.61 ± 0.20	
1225	3W	1~100mΩ	3.20 ± 0.30	6.40 ± 0.30	0.65 ± 0.20	0.60 ± 0.20	
2139	5W	1~100mΩ	5.10 ± 0.40	11.10 ± 0.30	0.65 ± 0.30	0.90 ± 0.30	

## 型号名称 Part Numbering &gt;&gt;&gt;

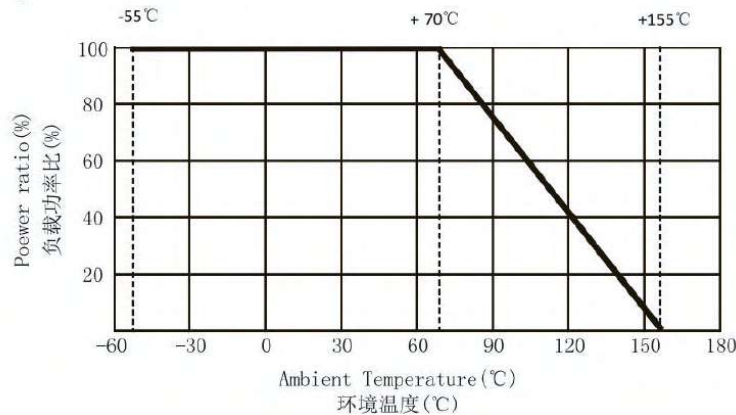
CSM	10	6432(2512)	LR005	F	T	S
Product Type 产品型号	Production line code 产线代码	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式	RATE Power 额定功率
CSM: 陶瓷贴合金	01 02 03 04 10	1608 (0603) 2012 (0805) 3216 (1206) 5025 (2010) 6432 (2512) 3921 4527 0508 0612 0815 1225 2139	LR005: 5 mΩ LR020: 20 mΩ LR150: 150 mΩ	D=±0.5% F=±1% G=±2%	T:卷装 B:散装	Z:5 W H:4 W R:3 W S:2 W N:1 W A:1.5W Q:3/4W U:1/2W

## 标准规格表 Standard Electrical Specifications &gt;&gt;&gt;

Item Type 项目 型号	Power Rating 额定功率	Max. Current Rating (A) 最大工作电流	Resistance Range 阻值范围 (mΩ)			Insulation Resistance 绝缘阻抗	TCR 温度系数 (PPM/°C)
			±0.5%	±1%	±2%		
0603	1/2W	10	---	5~9	---	>100MΩ	±75
		7.07	10~100	---	±50		
0805	3/4W	13.69	---	4~9	---	>100MΩ	±75
		8.66	10~270	---	±50		
1206	1W	15.81	---	4~9	---	>100MΩ	±75
		10	10~700	---	±50		
2010	1.5W	27.38	---	2~9	---	>100MΩ	±100
		12.24	10~500	---	±50		
2512	2W	31.62	---	2~9	---	>100MΩ	±75
		14.14	10~560	---	±50		
3921	4W	-	---	---	---	>100MΩ	---
		20	10~50	---	±50		
4527	5W	-	---	---	---	>100MΩ	---
		22.36	10~50	---	±50		
0508	1W	31.62	---	---	1	>100MΩ	±100
		22.36	---	1~9	---		±100
		10	10~100	---	±50		
0612	1.5W	38.72	---	---	1	>100MΩ	±100
		27.38	---	1~9	---		±100
		12.24	10~100	---	±50		
0815	2W	44.72	---	---	1	>100MΩ	±100
		31.62	---	1~9	---		±100
		14.14	10~20	---	±50		
1225	3W	54.77	---	1~9	---	>100MΩ	±100
		17.32	10~100	---	±50		
2139	5W	70.71	---	1~9	---	>100MΩ	±100
		22.36	10~100	---	±50		

◆ Operating Temp. Range 操作温度范围: 0603~2139: -55~155°C

## 功率衰减曲线图 Derating Curve &gt;&gt;&gt;



## 信赖性试验项目 Environmental Characteristics &gt;&gt;&gt;

Item 项目	Requirement 条件	Test Method 测试方法
Temperature Coefficient of Resistance(T.C.R) 温度系数(T.C.R.)	As Spec. 参考规格表	+25°C~+125°C, 25°C is the reference temperature 参考温度
Endurance 负载寿命	< ± 1%	1000hours at rated power.70°C 1.5hrs" ON" and 0.5 hrs "OFF" 70°C温度中施加额定电压,1.5小时“开”,0.5小时“关”,共1000小时
Short Time Overload 短时间过负载	< ± 0.5%	5 X rated power for 5S 额定功率*5倍,持续5秒
Moisture no Load 水分空载	< ± 1%	85°C, 85%RH, 1000hrs 85°C, 85%RH, 持续1000小时
Temperature Cycle 温度循环	< ± 0.5%	-55°C&+155°C, 300cycle, 15min per extreme condition -55°C&+155°C,极端条件下每次15分钟,共300次
Resistance to Soldering Heat 耐热性试验	< ± 0.5%	260 ± 5 for 2 ± 0.5 seconds 260 ± 5°C锡炉中,持续20 ± 1秒
Solderability 焊锡性	95% min.coverage 导体爬锡面积大于95%	245 ± 5°C for 2 ± 0.5 seconds 245 ± 5°C 锡炉中,持续2 ± 0.5秒
High Temperature Exposure 高温曝光	< ± 1%	170°C, 1000hrs 170°C, 持续1000小时
Low Temperature Storage 低温存储	< ± 0.5%	-55°C, 1000hrs -55°C, 持续1000小时
Substrate Bending 基板弯折强度	< ± 1%	Bending width 2mm 弯折宽度2mm
Insulation Resistance 绝缘阻抗	≥ 100MΩ	100V DC for 1minute 100V DC, 持续1分钟

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25 ± 5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

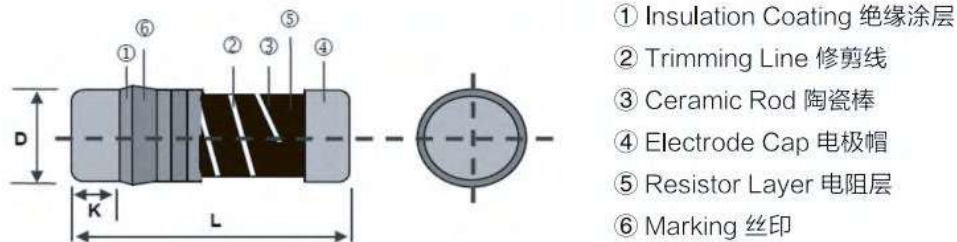
■电性能测量的环境条件: 温度: 25 ± 5 相对湿度: 25%~75%RH

■依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

## 摘要 Resume >>>

- Excellent overall stability/Tight tolerance down to  $\pm 0.1\%$ /Extremely low TCR down to  $\pm 10\text{PPM}$ /High power rating up to 1 Watts.
- 优良的整体稳定性，高精度公差 ( $\pm 0.1\%$ )，极低温度系数( $\pm 10\text{PPM}$ )，大功率 (1 W)

## 结构图 Construction >>>



- ① Insulation Coating 绝缘涂层
- ② Trimming Line 修剪线
- ③ Ceramic Rod 陶瓷棒
- ④ Electrode Cap 电极帽
- ⑤ Resistor Layer 电阻层
- ⑥ Marking 丝印

## 尺寸 Dimensions >>>

Size 规格	L	D	K
CSR0204	$3.50 \pm 0.20$	$1.40 \pm 0.15$	$0.80 \pm 0.10$
CSR0207	$5.90 \pm 0.20$	$2.20 \pm 0.20$	$1.30 \pm 0.10$

## 型号名称 Part Numbering >>>

CSR	01	0207	L1001	B	T	N	50PPM
Product Type 产品类型	Production line code 产线代码	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式	High Power 升功率	PPM/°C
CSR: 金属柱状 贴片电阻	01 02 03 04 10	0204 0207	$\pm 5\%$ L102: 1K $\Omega$ L1R3: 1.3 $\Omega$ $\pm 1\%$ 及以下 L1001: 1K $\Omega$ L4R70: 4.7 $\Omega$	B= $\pm 0.1\%$ C= $\pm 0.25\%$ D= $\pm 0.5\%$ F= $\pm 1\%$ J= $\pm 5\%$	T:Taping Reel T: 卷装 B: Bulk B:散装	N: 1 W G:2/5W	5 PPM 10PPM 15PPM 25PPM 50PPM

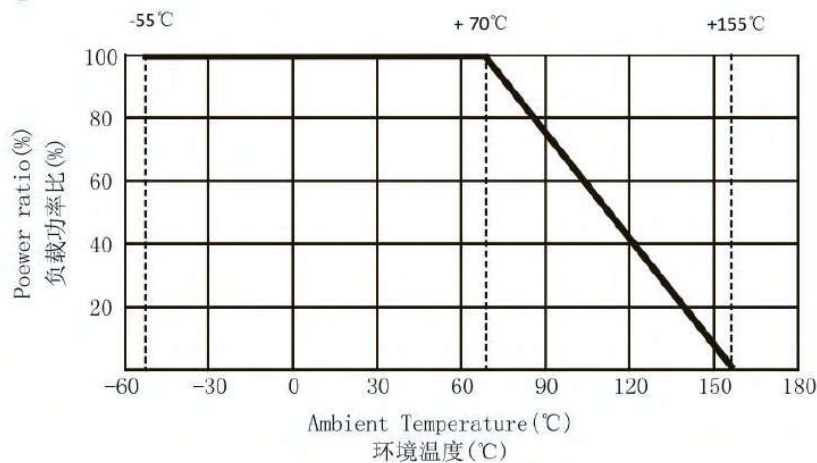
## 标准规格表 Standard Electrical Specifications >>>

Item 项目 Type 型号	Power Rating 额定功率	Operating Temp. Range 操作温度范围	Max. Operating Voltage 最大工作电压	Max.Overloa d Voltage 最大负载电压	Resistance Range 阻值范围					TCR 温度系数 (PPM/°C)
					± 0.1%	±0.25%	±0.5%	±1%	±5%	
CSR0204	1/4W	-55~155°C	200V	400V	10Ω~20KΩ					±10
					10Ω~300KΩ					±15
					10Ω~1MΩ			10Ω~4.7MΩ		±25
					10Ω ~1MΩ	1Ω~1MΩ		0.2Ω~10MΩ		±50
					/			0.1Ω~10MΩ		±100
	Jumper 跳线: 2A				0Ω(<15mΩ)					/
					10Ω~100kΩ					±15
					10Ω~1MΩ					±25
					10Ω ~1MΩ	1Ω~1MΩ		0.2Ω~1MΩ		±50
					/			0.1Ω~1MΩ		±100
CSR0207	1/2W	-55~155°C	300V	600V	10Ω~20KΩ					±10
					10Ω~300KΩ					±15
					10Ω~1MΩ			10Ω~4.7MΩ		±25
					10Ω ~1MΩ	1Ω~1MΩ		0.2Ω~10MΩ		±50
					/			0.1Ω~10MΩ		±100
	Jumper 跳线: 4A		0Ω(<15mΩ)					/		
			10Ω~100kΩ					±15		
			10Ω~1MΩ					±25		
			10Ω~1MΩ	1Ω~1MΩ		0.2Ω~1MΩ		±50		
			/			0.1Ω~1MΩ		±100		
*1W	350V	700V	10Ω~1MΩ					±50		
			/			0.1Ω~1MΩ		±100		

◆ Operating Temp. Range 操作温度范围: 0204~0207: -55~155°C

\*High Power 升功率

## 功率衰减曲线图 Derating Curve >>>





信赖性试验项目 Environmental Characteristics >>>

Item 项目	Requirement 条件	Test Method 测试方法
Temperature Coefficient of Resistance(T.C.R) 温度系数(T.C.R.)	As Spec. 参考规格表	-55°C~+125°C, 25°C is the refence temperature 参考温度
Short Time Overload 短时间过负载	0204/0207: $\pm(0.15\%+0.05\Omega)$ 0102: $\pm(0.5\%+0.05\Omega)$	RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds,2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒,提升功率系列 2 秒
Insulation Resis 绝缘阻抗	$\geq 10G$	Max.Overload voltage for 1 minute 施加最大负载电压 1 分钟
Endurance 负载寿命	0204/0207: $\pm(0.5\%+0.05\Omega)$ 0102: $\pm(1.5\%+0.05\Omega)$	70 $\pm$ 2°C,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 70 $\pm$ 2°C温度中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Damp Heat with Load 耐湿负荷	0204/0207: $\pm(1.0\%+0.05\Omega)$ 0102: $\pm(1.5\%+0.05\Omega)$	40 $\pm$ 2°C,90~95%R.H.,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 在温度 40 $\pm$ 2°C, 相对湿度 90~95%环境中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Dry Heat 耐热性实验	0204/0207: $\pm(1.0\%+0.05\Omega)$ 0102: $\pm(1.5\%+0.05\Omega)$	At+125/+155°C for 1000hrs 置于+125/+155°C温度中, 共 1000 小时
Bending Strength 弯折强度测试	$\pm(0.5\%+0.05\Omega)$	Bending once for 5 seconds With 2mm 产品焊在测试板上, 中央施力下压 5 秒 下压深度: 2 毫米
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%	245 $\pm$ 5°C for 3 seconds 245 $\pm$ 5°C锡炉中, 持续 3 秒
Resistance to Soldering Heat 抗焊锡热	$\pm(0.5\%+0.05\Omega)$	260 $\pm$ 5°C for 10 seconds 260 $\pm$ 5°C锡炉中, 持续 10 秒
Voltage Proof 耐电压	No breakdown or flashover 无击穿或跳火现象	1.42 times Max.Operating Voltage for 1 minute 最大操作电压*1.42 倍, 持续 1 分钟
Leaching 溶蚀测试	Individual leaching area $\leq 5\%$ Total leaching area $\leq 10\%$ 导体各面溶蚀区域 $\leq 5\%$ 导体总面积溶蚀区域 $\leq 10\%$	260 $\pm$ 5°C for 30 seconds 260 $\pm$ 5°C锡炉中, 持续 30 秒
Rapid Change of Temperature 冷热冲击	$\pm(0.5\%+0.05\Omega)$	-55°C to +155°C 5 cycles -55°C to +155°C 5 次

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25  $\pm$  5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■ RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

■ 电性能测量的环境条件: 温度: 25  $\pm$  5 相对湿度: 25%~75%RH

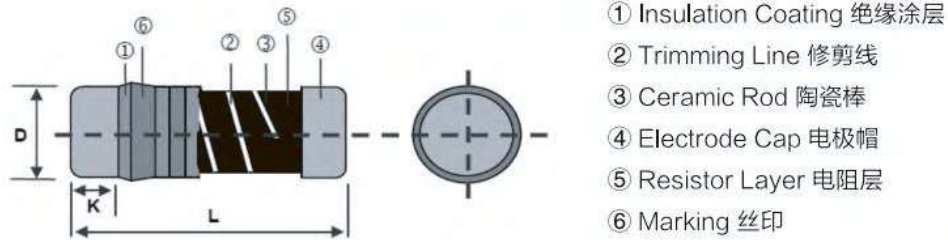
■ 依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1



摘要 Resume >>>

- Excellent overall stability/Tight tolerance down to  $\pm 0.1\%$ /Extremely low TCR down to  $\pm 10\text{PPM}$ /High power rating up to 1 Watts.
- 优良的整体稳定性, 高精公差 ( $\pm 0.1\%$ ), 极低温度系数( $\pm 10\text{PPM}$ ), 大功率 (1 W)

结构图 Construction >>>



尺寸 Dimensions >>>

Size 规格	L	D	K
CSRV0102	2.20 $\pm$ 0.10	1.10 $\pm$ 0.10	0.45 $\pm$ 0.05
CSRV0204	3.50 $\pm$ 0.20	1.40 $\pm$ 0.15	0.80 $\pm$ 0.10
CSRV0207	5.90 $\pm$ 0.20	2.20 $\pm$ 0.20	1.30 $\pm$ 0.10

型号名称 Part Numbering >>>

CSRV	01	0207	L1001	B	T	N	50PPM
Product Type 产品类型	Production line code 产线代码	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式	High Power 升功率	PPM/ $^{\circ}\text{C}$
CSR: 金属柱状 贴片电阻	01 02 03 04 10	0102 0204 0207	$\pm 5\%$ L102: 1K $\Omega$ L1R3: 1.3 $\Omega$ $\pm 1\%$ 及以下 L1001: 1K $\Omega$ L4R70: 4.7 $\Omega$	B= $\pm 0.1\%$ C= $\pm 0.25\%$ D= $\pm 0.5\%$ F= $\pm 1\%$ J= $\pm 5\%$	T:Taping Reel T: 卷装 B: Bulk B:散装	N: 1 W G:2/5W	5 PPM 10PPM 15PPM 25PPM 50PPM

标准规格表 Standard Electrical Specifications >>>

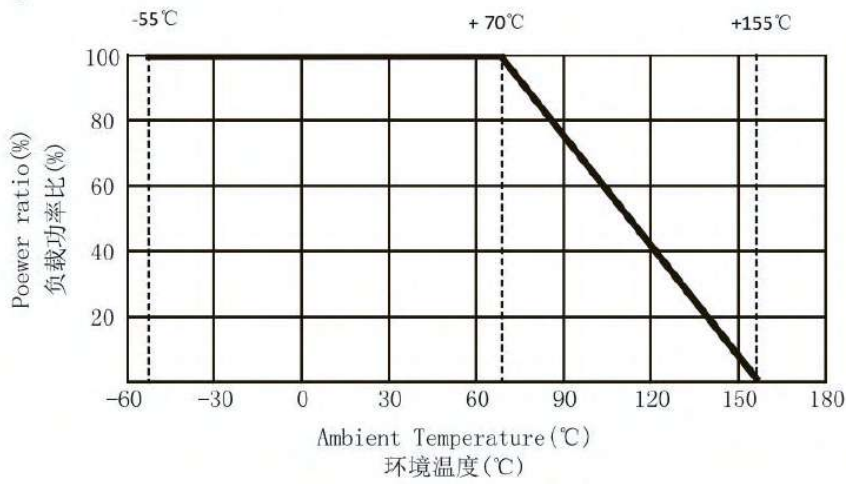
Item 项目	Power Rating 额定功率	Max. Operating Voltage 最大工作电压	Max. Overload Voltage 最大负载电压	Resistance Range 阻值范围					TCR 温度系数 (PPM/°C)	
				±0.1%	±0.25%	±0.5%	±1%	±5%		
0102	1/8W	150V	300V	100Ω-56KΩ					-	±15
				100Ω-82KΩ	49.9Ω-200KΩ	49.9Ω-390KΩ	-	±25		
				8.2Ω-1MΩ						±50
				40Ω-1MΩ						±100
	*1/5W	200V	400V	100Ω-56KΩ					-	±15
				100Ω-82KΩ	49.9Ω-200KΩ	49.9Ω-390KΩ	-	±25		
				8.2Ω-1MΩ						±50
				40Ω-1MΩ						±100
0204	1/4W	200V	400V	49.9Ω-20KΩ						±10
				10Ω-300KΩ						±15
				10Ω-1MΩ	10Ω-3.4MΩ	1Ω-3.4MΩ		±25		
				10Ω-1MΩ	1Ω-1MΩ	1Ω-3.4MΩ	0.2Ω-3.4MΩ		±50	
	*2/5W	200V	400V	-					0.1Ω-1MΩ	±100
				10Ω-300KΩ						±15
				10Ω-1MΩ	10Ω-3.4MΩ	1Ω-3.4MΩ		±25		
				10Ω-1MΩ	1Ω-1MΩ	1Ω-3.4MΩ	0.2Ω-3.4MΩ		±50	
0207	1/2W	300V	600V	49.9Ω-20KΩ						±10
				10Ω-300KΩ						±15
				10Ω-1MΩ	10Ω-3.4MΩ	1Ω-3.4MΩ		±25		
				10Ω-1MΩ	1Ω-1MΩ	1Ω-3.4MΩ	0.2Ω-3.4MΩ		±50	
	*1W	350V	700V	-					0.1Ω-1MΩ	±100
				10Ω-300KΩ						±15
				10Ω-1MΩ	10Ω-3.4MΩ	1Ω-3.4MΩ		±25		
				10Ω-1MΩ	1Ω-1MΩ	1Ω-3.4MΩ	0.2Ω-3.4MΩ		±50	
-					0.1Ω-1MΩ	±100				

◆ Operating Temp. Range 操作温度范围: 0204 ~ 0207: -55 ~ 155°C

\*High Power 升功率

Type 型号	0102	0204	0207
Rated Current of Jumper 零欧姆额定电流	2A	2A	4A
Jumper Resistance Value 零欧姆阻力值	15mΩ Max		

功率衰减曲线图 Derating Curve >>>



信赖性试验项目 Environmental Characteristics >>>

Item 项目	Requirement 条件	Test Method 测试方法
Temperature Coefficient of Resistance(T.C.R) 温度系数(T.C.R.)	As Spec. 参考规格表	-55℃~+125℃, 25℃ is the reference temperature 参考温度
Short Time Overload 短时间过负载	10Ω-270KΩ: (0.1%+0.01Ω) <10Ω & >270KΩ: (0.15%+0.01Ω) 0102: (0.15%+0.01Ω) 5ppm: (0.05%+0.01Ω)	RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds,2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒,提升功率系列 2 秒
Insulation Resis 绝缘阻抗	≥10G	Max.Overload voltage for 1 minute 施加最大负载电压 1 分钟
Endurance 负载寿命	10Ω-270KΩ: (0.25%+0.01Ω) <10Ω & >270KΩ: (0.5%+0.01Ω) 0102: (0.5%+0.01Ω)	70±2℃,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 70±2℃温度中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Biased Humidity 偏压湿度	10Ω-270KΩ: (0.5%+0.01Ω) <10Ω & >270KΩ: (1%+0.01Ω) 0102: (2%+0.01Ω)	1000 hrs 85℃/85%RH 10% of operating power. (≤100 V) 1000 小时 85 摄氏度/85%相对湿度工作功率的 10%。 (≤100 伏)
Dry Heat 耐热性实验	10Ω-270KΩ: (0.25%+0.01Ω) <10Ω & >270KΩ: (1%+0.01Ω) 0102: (1%+0.01Ω)	At+125/+155℃ for 1000hrs 置于+125/+155℃温度中, 共 1000 小时
Bending Strength 弯折强度测试	10Ω-270KΩ: (0.1%+0.01Ω) <10Ω & >270KΩ: (0.5%+0.01Ω) 0102: (0.5%+0.01Ω)	Bending once for 60 seconds with 2mm 弯曲一次 60 秒 2mm
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%	245±5℃ for 3 seconds 245±5℃锡炉中, 持续 3 秒
Resistance to Soldering Heat 抗焊锡热	10Ω-270KΩ: (0.1%+0.01Ω) <10Ω & >270KΩ: (0.25%+0.01Ω) 0102: (0.25%+0.01Ω) 5ppm: (0.05%+0.01Ω)	260±5℃ for 10 seconds 260±5℃锡炉中, 持续 10 秒
Leaching 溶蚀测试	Individual leaching area≤5% Total leaching area≤10% 导体各面溶蚀区域≤5% 导体总面积溶蚀区域≤10%	260±5℃ for 30 seconds 260±5℃锡炉中, 持续 30 秒
Voltage Proof 耐电压	No breakdown or flashover 无击穿或跳火现象	1.42 times Max.Operating Voltage for 1 minute 最大操作电压*1.42 倍, 持续 1 分钟
Rapid Change of Temperature 冷热冲击	10Ω-270KΩ: (0.25%+0.01Ω) <10Ω & >270KΩ: (0.5%+0.01Ω) 0102: (1%+0.01Ω)	-55℃ to +125℃ 1000 cycles -55℃ to +125℃ 1000 个周期
ESD	(0.5%+0.01Ω)	Human body, 0102/0204:2KV; 0207:4KV 人体, 0102/0204:2KV; 0207:4KV
Terminal strength 端子强度	No broken 不产生断裂	Force of 1.8kg 60 seconds 使用相当于 1.8kg 的压力持续 60 秒
Mechanical Shock 机械冲击	(0.25%+0.01Ω)	Wave Form: Tolerance for half sine shock pulse. Peak value is 100g, s. Normal duration (D) is 6. 波形: 半正弦冲击脉冲的公差。峰值为 100g, 正常持续时间 (D) 为 6。
Vibration 振动	(0.5%+0.01Ω)	5g, s ro 20min.,12cycles each of 3 orientations 10-2000Hz 5g, s 5g, 持续 20 分钟, 3 个方向各 12 个循环, 10-2000 赫兹

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25±5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

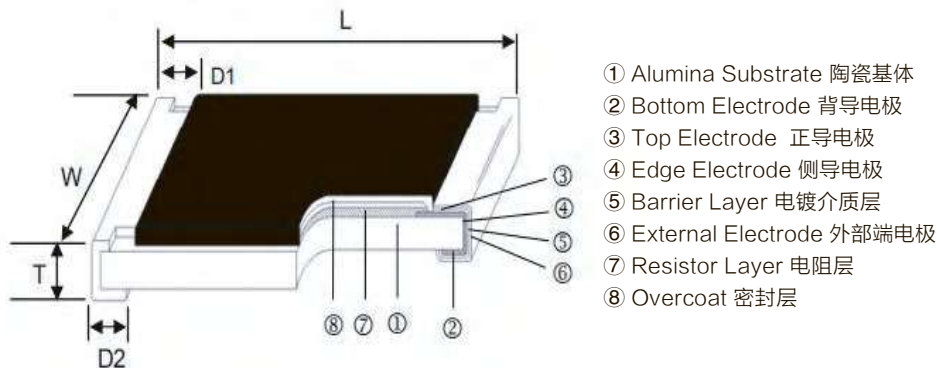
■电性能测量的环境条件: 温度: 25±5 相对湿度: 25%~75%RH

■依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

## 摘要 Resume >>>

- Suitable for laser fine tune/Small size and light weight/Highly reliable multilayer electrode construction/Compatible with all soldering process
- 适合激光微调, 体积小, 重量轻, 高可靠度多层电极结构, 适合所有焊接工艺。

## 结构图 Construction >>>



## 尺寸 Dimensions >>>

Size 规格	L	W	T	D <sub>1</sub>	D <sub>2</sub>
0603	1.60 ± 0.10	0.80 ± 0.10	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20
0805	2.00 ± 0.15	1.25 ± 0.15	0.50 ± 0.10	0.40 ± 0.20	0.40 ± 0.20
1206	3.10 ± 0.15	1.55 ± 0.15	0.55 ± 0.10	0.45 ± 0.20	0.45 ± 0.20

## 型号名称 Part Numbering >>>

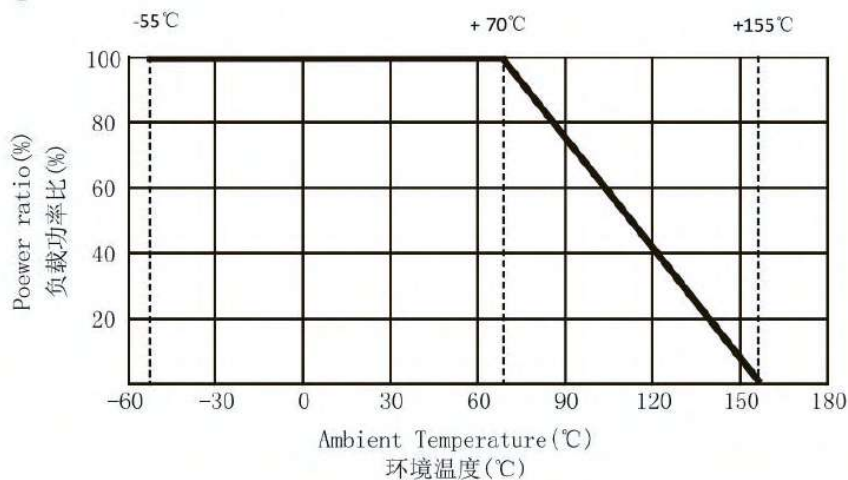
TR	01	3216(1206)	L182	N	T
Product Type 产品型号	Production line code 产线代码	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式
TR	01 02 03 04 10	1608(0603) 2012(0805) 3216(1206)	L182: 1.8KΩ L1R3: 1.3 Ω LR001: 1mΩ	Q=0~30% P=0~20% N=0~10%	T: Taping Reel T: 卷装 B: Bulk B: 散装

标准规格表 Standard Electrical Specifications >>>

Item 项目  Type 型号	Power Rating 额定功率	Max.Operating Voltage 最大工作电压	Max.Overload Voltage 最大负载电压	Resistance Range 阻值范围	TCR 温度系数 (PPM/°C)
				0~30% 0~20% 0~10%	
0603	1/10W	50V	100V	1Ω~10MΩ	1Ω ≤ R ≤ 9.76Ω : ± 200 10Ω ≤ R ≤ 1MΩ : ± 100 1.02MΩ ≤ R ≤ 10MΩ : 200
0805	1/8W	150V	300V	1Ω~10MΩ	1Ω ≤ R ≤ 9.76Ω : ± 200 10Ω ≤ R ≤ 1MΩ : ± 100 1.02MΩ ≤ R ≤ 10MΩ : 200
1206	1/4W	200V	400V	1Ω~10MΩ	1Ω ≤ R ≤ 9.76Ω : ± 200 10Ω ≤ R ≤ 1MΩ : ± 100 1.02MΩ ≤ R ≤ 10MΩ : 200

◆ Operating Temp.Range 操作温度范围: 0402~2512: -55~155°C

功率衰减曲线图 Derating Curve >>>



信赖性试验项目 Environmental Characteristics >>>

Item 项目	Requirement 条件	Test Method 测试方法
Temperature Coefficient of Resistance(T.C.R) 温度系数(T.C.R.)	As Spec. 参考规格表	-55°C~+125°C, 25°C is the refence temperature 参考温度
Short Time Overload 短时间过负载	$\pm (1.0\%+0.05\Omega)$	RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds,2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒,提升功率系列 2 秒
Insulation Resis 绝缘阻抗	$\geq 10G$	Max.Overload voltage for 1 minute 施加最大负载电压 1 分钟
Endurance 负载寿命	$\pm (2.0\%+0.10\Omega)$	70 $\pm$ 2°C,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 70 $\pm$ 2°C温度中施加额定电压, 1.5 小时"开", 0.5 小时"关", 共 1000 小时
Damp Heat with Load 耐湿负荷	$\pm (2.0\%+0.10\Omega)$	40 $\pm$ 2°C,90~95%R.H.,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 在温度 40 $\pm$ 2°C, 相对湿度 90~95%环境中施加额定电压, 1.5 小时"开", 0.5 小时"关", 共 1000 小时
Dry Heat 耐热性实验	$\pm (1.0\%+0.05\Omega)$	At+125/+155°C for 1000hrs 置于+125/+155°C温度中, 共 1000 小时
Bending Strength 弯折强度测试	$\pm (1.0\%+0.05\Omega)$	Bending once for 5 seconds 2010,2512sizes:2mm Other sizes:3mm 产品焊在测试板上, 中央施力下压 5 秒 下压深度: 2010、2512: 2 毫米 其他尺寸: 3 毫米
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%	245 $\pm$ 5°C for 3 seconds 245 $\pm$ 5°C锡炉中, 持续 3 秒
Resistance to Soldering Heat 抗焊锡热	$\pm (0.5\%+0.05\Omega)$	260 $\pm$ 5°C for 10 seconds 260 $\pm$ 5°C锡炉中, 持续 10 秒
Voltage Proof 耐电压	No breakdown or flashover 无击穿或跳火现象	1.42 times Max.Operating Voltage for 1 minute 最大操作电压*1.42 倍, 持续 1 分钟
Leaching 溶蚀测试	Individual leaching area $\leq$ 5% Total leaching area $\leq$ 10% 导体各面溶蚀区域 $\leq$ 5% 导体总面积溶蚀区域 $\leq$ 10%	260 $\pm$ 5°C for 30 seconds 260 $\pm$ 5°C锡炉中, 持续 30 秒
Rapid Changeof Temperature 冷热冲击	$\pm (0.5\%+0.05\Omega)$	-55°C to +155°C 5 cycles -55°C to +155°C 5 次

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25 $\pm$ 5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压。

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

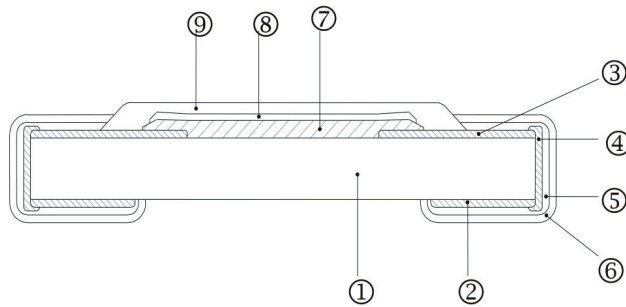
■电性能测量的环境条件: 温度: 25 $\pm$ 5 相对湿度: 25%~75%RH

■依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

## 摘要 Resume >>>

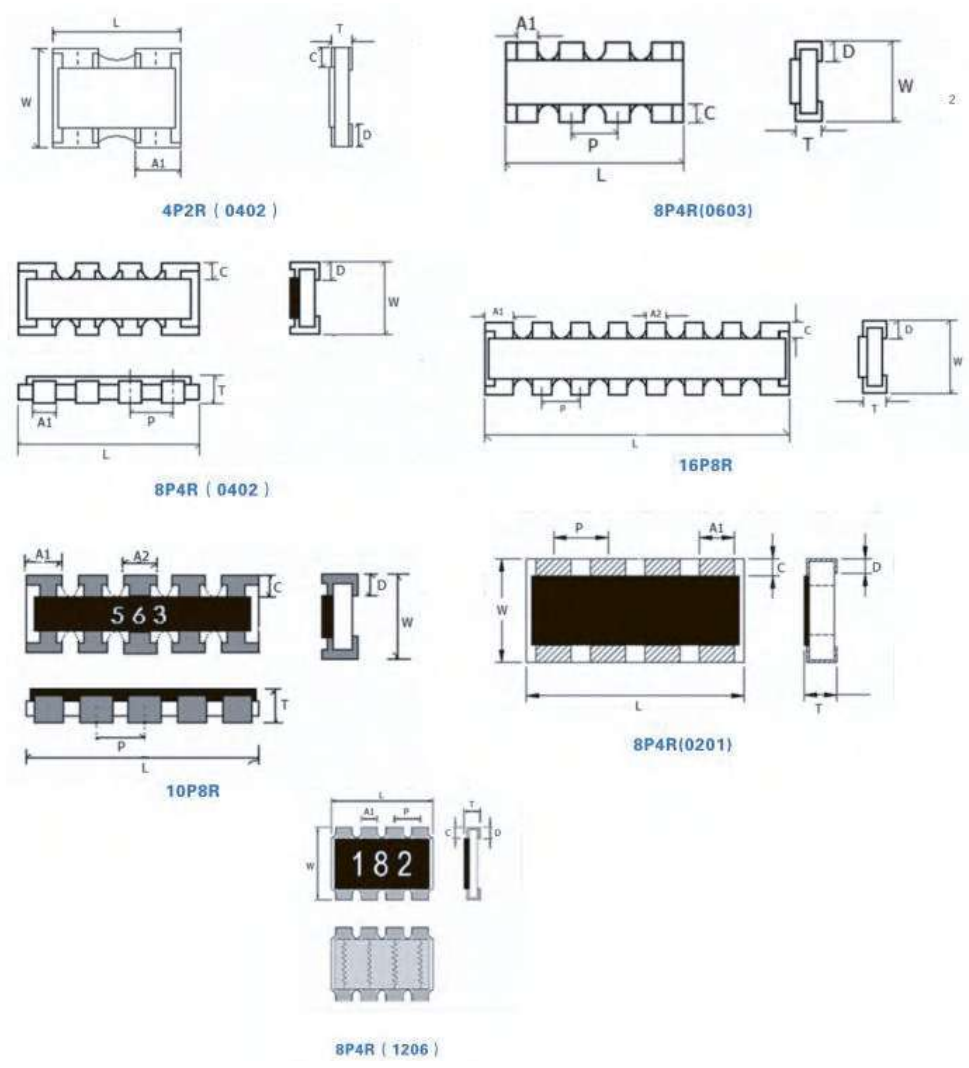
- Small size and light weight/Reduction of assembly costs and matching with placement machines/Reliability, high quality/Suitable for both IR reflow soldering and wave soldering.
- 体积小, 重量轻, 组装成本低, 与贴片机配套, 可靠度高, 红外回流焊和回流焊均适合。

## 结构图 Construction >>>



- ① Alumina Substrate 陶瓷基板
- ② Bottom Electrode 背导电极
- ③ Top Electrode 正导电极
- ④ Edge Electrode 侧导电极
- ⑤ Barrier Layer 电镀介质层
- ⑥ External Electrode 外部端电极
- ⑦ Resistor Layer 电阻层
- ⑧ Primary Overcoat 基层密封层
- ⑨ Secondary Overcoat 第二层密封层

## 尺寸 Dimensions >>>





尺寸 Dimensions >>>

Size 规格	L	W	A1	A2	P	C	D	T
8P4R(0201)	1.40±0.10	0.60±0.10	0.20±0.10	/	0.40±0.10	0.10±0.07	0.15±0.05	0.35±0.10
4P2R(0402)	1.00±0.10	1.00±0.10	0.33±0.10	/	0.65±0.05	0.15±0.10	0.25±0.10	0.35±0.10
8P4R(0402)	2.00±0.10	1.00±0.10	0.33±0.10	/	0.50±0.05	0.20±0.15	0.30±0.15	0.45±0.10
8P4R(0603)	3.20±0.20	1.60±0.20	0.50±0.15	/	0.80±0.10	0.30±0.15	0.30±0.15	0.50±0.10
16P8R	4.00±0.20	1.60±0.15	0.45±0.05	0.30±0.05	0.50±0.05	0.30±0.15	0.40±0.15	0.45±0.10
10P8R	3.20±0.20	1.60±0.15	0.50±0.05	0.35±0.05	0.64±0.05	0.40±0.10	0.30±0.15	0.55±0.10
8P4R(1206)	5.10±0.20	3.10±0.20	0.90±0.10	/	1.30±0.20	0.55±0.15	0.55±0.15	0.55±0.15

◆Operating Temp.Range 操作温度范围: 0201: -55 ~ 125°C, 0402 ~ 2512: -55 ~ 155°C

型号名称 Part Numbering >>>

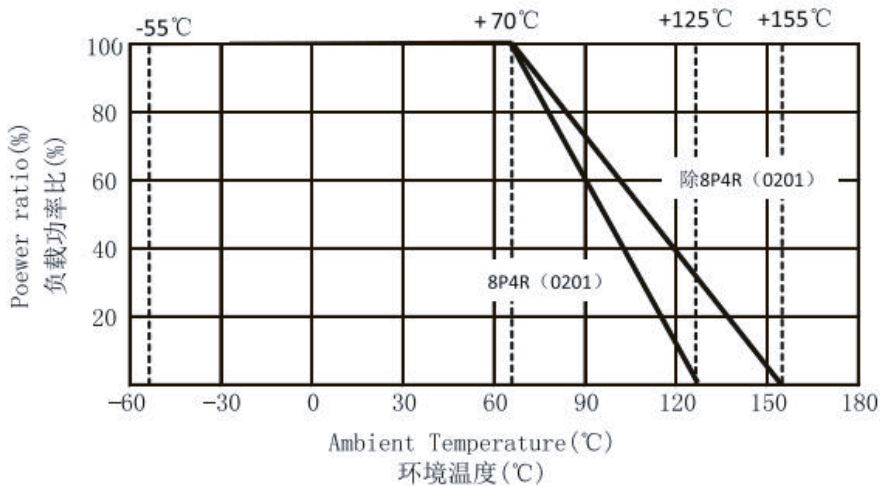
CAV	8P4R(0201)	L182	J	I
Product Type 产品型号	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式
CAV	8P4R(0201) 8P4R(0402) 8P4R(0603) 8P4R(1206) 4P2R(0402) 16P8R 10P8R	±5% L182: 1.8KΩ L1R3: 1.3 Ω ±1% L1801: 1.8KΩ L1R30: 1.3 Ω	F= ±1% J= ±5%	T: Taping Reel T: 卷装 B: Bulk B: 散装

标准规格表 Standard Electrical Specifications >>>

Type 型号	Item 项目	Power Rating 额定功率	Max.Operating Voltage 最大工作电压	Max.Overload Voltage 最大负载电压	Resistance Range 阻值范围		TCR 温度系数 (PPM/°C)
					±1%	±5%	
8P4R(0201)		1/32W	12.5V	25V	10Ω~1MΩ		±200
4P2R(0402)		1/16W	50V	100V	10Ω~1MΩ		±200
8P4R(0402)		1/16W	50V	100V	10Ω~1MΩ		±200
8P4R(0603)		1/16W	50V	100V	1Ω~1MΩ	< 10Ω: ±400	
						≥ 10Ω: ±200	
16P8R		1/16W	50V	100V	1Ω~1MΩ	< 10Ω: ±400	
						≥ 10Ω: ±200	
10P8R		1/32W	25V	50V	10Ω~1MΩ		±200
8P4R(1206)		1/4W	200V	400V	1Ω~1MΩ	< 10Ω: ±400	
						≥ 10Ω: ±200	

◆Operating Temp.Range 操作温度范围: 0201: -55 ~ 125°C, 0402~2512: -55 ~ 155°C

功率衰减曲线图 Derating Curve >>>



## 信赖性试验项目 Environmental Characteristics &gt;&gt;&gt;

Item 项目	Requirement 条件			Test Method 测试方法
	± 1%	± 5%	Jumper 跳线	
Temperature Coefficient of Resistance(T.C.R) 温度系数(T.C.R.)	As Spec. 参考规格表			-55℃~+125℃, 25℃ is the refence temperature 参考温度
Short Time Overload 短时间过负载	± (1.0%+0.05 Ω)	± (2.0%+0.05 Ω)	< 50m Ω	RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds,2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒,提升功率系列 2 秒
Insulation Resis 绝缘阻抗	≥ 10G			Max.Overload voltage for 1 minute 施加最大负载电压 1 分钟
Endurance 负载寿命	± (2.0%+0.10 Ω)	± (3.0%+0.10 Ω)	< 50m Ω	70 ± 2℃,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 70 ± 2℃温度中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Damp Heat with Load 耐湿负荷	± (2.0%+0.10 Ω)	± (3.0%+0.10 Ω)	< 50m Ω	40 ± 2℃,90~95%R.H.,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 在温度 40 ± 2℃, 相对湿度 90~95%环境中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Dry Heat 耐热性实验	± (1.0%+0.05 Ω)	± (1.5%+0.10 Ω)	< 50m Ω	At+125/+155℃ for 1000hrs 置于+125/+155℃温度中, 共 1000 小时
Bending Strength 弯折强度测试	± (1.0%+0.05 Ω)	± (1.0%+0.05 Ω)	< 50m Ω	Bending once for 5 seconds With 3mm 产品焊在测试板上, 中央施力下压 5 秒 下压深度: 3 毫米
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%			245 ± 5℃ for 3 seconds 245 ± 5℃锡炉中, 持续 3 秒
Resistance to Soldering Heat 抗焊锡热	± (0.5%+0.05 Ω)	± (1.0%+0.05 Ω)	< 50m Ω	260 ± 5℃ for 10 seconds 260 ± 5℃锡炉中, 持续 10 秒
Voltage Proof 耐电压	No breakdown or flashover 无击穿或跳火现象			1.42 times Max.Operating Voltage for 1 minute 最大操作电压*1.42 倍, 持续 1 分钟
Leaching 溶蚀测试	Individual leaching area ≤ 5% Total leaching area ≤ 10% 导体各面溶蚀区域 ≤ 5% 导体总面积溶蚀区域 ≤ 10%			260 ± 5℃ for 30 seconds 260 ± 5℃锡炉中, 持续 30 秒
Rapid Change of Temperature 冷热冲击	± (0.5%+0.05 Ω)	± (1.0%+0.05 Ω)	< 50m Ω	-55℃ to +155℃ 5 cycles -55℃ to +155℃ 5 次

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25 ± 5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■ RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

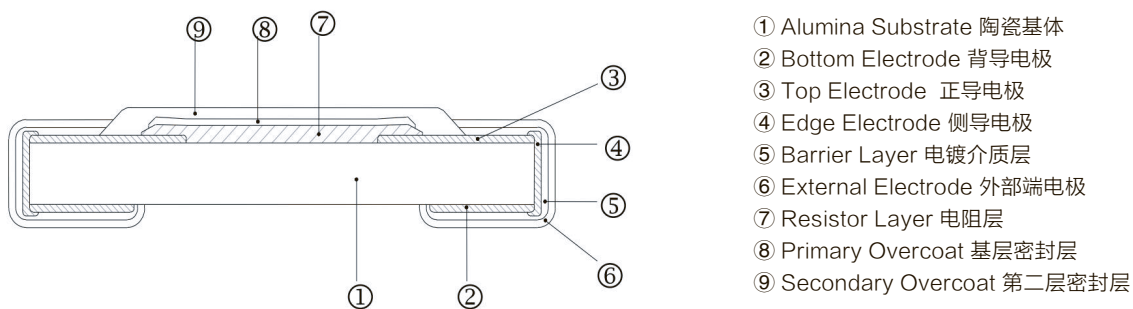
■ 电性能测量的环境条件: 温度: 25 ± 5 相对湿度: 25%~75%RH

■ 依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

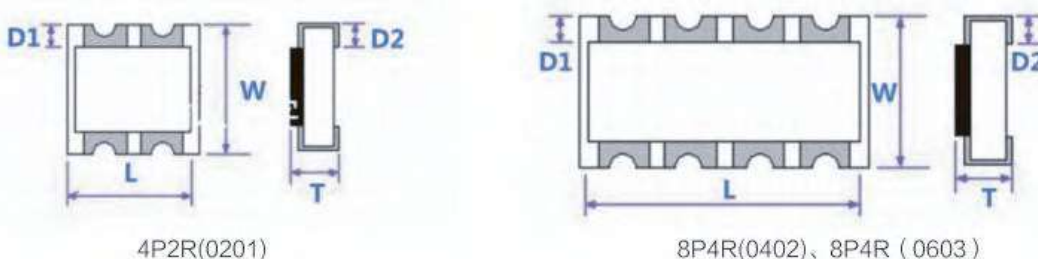
## 摘要 Resume >>>

- Small size and light weight/Reduction of assembly costs and matching with placement machines/
- Reliability,high quality/Suitable for both IR reflow soldering and wave soldering.
- 体积小,重量轻,组装成本低,与贴片机配套,可靠度高,质量好,红外回流焊和回流焊均适合。

## 结构图 Construction >>>



## 尺寸 Dimensions >>>



Size 规格	L	W	T	D <sub>1</sub>	D <sub>2</sub>
4P2R(0201)	1.00 ± 0.10	1.00 ± 0.10	0.35 ± 0.10	0.15 ± 0.10	0.30 ± 0.10
8P4R(0402)	2.00 ± 0.10	1.00 ± 0.10	0.45 ± 0.10	0.15 ± 0.10	0.30 ± 0.10
8P4R(0603)	3.20 ± 0.20	1.60 ± 0.20	0.60 ± 0.10	0.30 ± 0.20	0.40 ± 0.10

## 型号名称 Part Numbering >>>

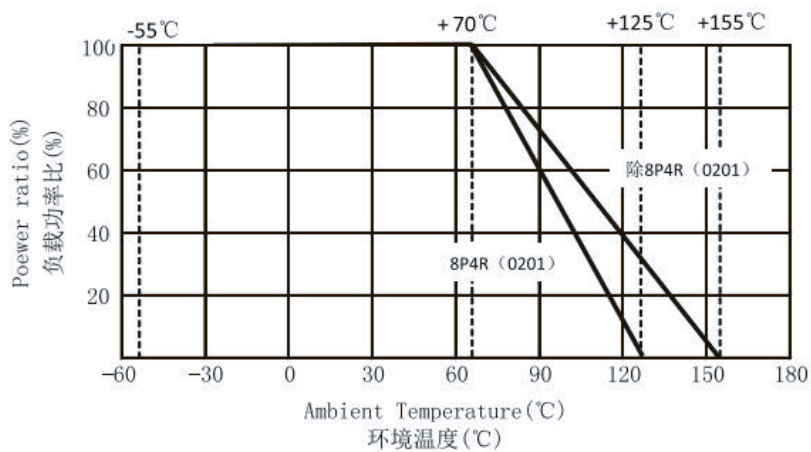
CAC	8P4R(0603)	L1R30	F	T
Product Type 产品型号	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式
CAC	4P2R(0201) 8P4R(0402) 8P4R(0603)	± 5% L182: 1.8K Ω L1R3: 1.3 Ω ± 1% L1801: 1.8K Ω L1R30: 1.3 Ω	F = ± 1% J = ± 5%	T: Taping Reel T: 卷装 B: Bulk B: 散装

## 标准规格表 Standard Electrical Specifications >>>

Item 项目  Type 型号	Power Rating 额定功率	Max.Operating Voltage 最大工作电压	Max.Overload Voltage 最大负载电压	Resistance Range 阻值范围		TCR 温度系数 ( PPM/°C )
				± 1%	± 5%	
4P2R(0201)	1/16W	50V	100V	10Ω~1MΩ		± 200
8P4R(0402)	1/16W	50V	100V	10Ω~1MΩ		± 200
8P4R(0603)	1/16W	50V	100V	1Ω~1MΩ		< 10Ω: ± 400
						≥ 10Ω: ± 200

◆ Operating Temp.Range 操作温度范围: 0201: -55 ~ 125°C, 0402~2512: -55 ~ 155°C

## 功率衰减曲线图 Derating Curve >>>



## 信赖性试验项目 Environmental Characteristics >>>

Item 项目	Requirement 条件			Test Method 测试方法
	± 1%	± 5%	Jumper 跳线	
Temperature Coefficient of Resistance(T.C.R) 温度系数(T.C.R.)	As Spec. 参考规格表			-55°C~+125°C, 25°C is the reference temperature 参考温度
Short Time Overload 短时间过载	± (1.0%+0.05 Ω)	± (2.0%+0.05 Ω)	< 50m Ω	RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds,2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒,提升功率系列 2 秒
Insulation Resis 绝缘阻抗	≥ 10G			Max.Overload voltage for 1 minute 施加最大负载电压 1 分钟
Endurance 负载寿命	± (2.0%+0.10 Ω)	± (3.0%+0.10 Ω)	< 50m Ω	70 ± 2 °C ,RCWV for 1000hrs with 1.5hrs " ON" and 0.5hrs " OFF" 70 ± 2°C 温度中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Damp Heat with Load 耐湿负荷	± (2.0%+0.10 Ω)	± (3.0%+0.10 Ω)	< 50m Ω	40 ± 2°C,90~95%R.H.,RCWV for 1000hrs with 1.5hrs" ON" and 0.5hrs" OFF" 在温度 40 ± 2°C, 相对湿度 90~95%环境中施加额定电压, 1.5 小时"开", 0.5 小时 "关", 共 1000 小时
Dry Heat 耐热性实验	± (1.0%+0.05 Ω)	± (1.5%+0.10 Ω)	< 50m Ω	At+125/+155°C for 1000hrs 置于+125/+155°C温度中, 共 1000 小时
Bending Strength 弯折强度测试	± (1.0%+0.05 Ω)	± (1.0%+0.05 Ω)	< 50m Ω	Bending once for 5 seconds With 3mm 产品焊在测试板上, 中央施力下压 5 秒 下压深度: 3 毫米
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%			245 ± 5°C for 3 seconds 245 ± 5°C 锡炉中, 持续 3 秒
Resistance to Soldering Heat 抗焊锡热	± (0.5%+0.05 Ω)	± (1.0%+0.05 Ω)	< 50m Ω	260 ± 5°C for 10 seconds 260 ± 5°C 锡炉中, 持续 10 秒
Voltage Proof 耐电压	No breakdown or flashover 无击穿或跳火现象			1.42 times Max.Operating Voltage for 1 minute 最大操作电压*1.42 倍, 持续 1 分钟
Leaching 溶蚀测试	Individual leaching area ≤ 5% Total leaching area ≤ 10% 导体各面溶蚀区域 ≤ 5% 导体总面积溶蚀区域 ≤ 10%			260 ± 5°C for 30 seconds 260 ± 5°C 锡炉中, 持续 30 秒
Rapid Change of Temperature 冷热冲击	± (0.5%+0.05 Ω)	± (1.0%+0.05 Ω)	< 50m Ω	-55°C to +155°C 5 cycles -55°C to +155°C 5 次

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25 ± 5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■ RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

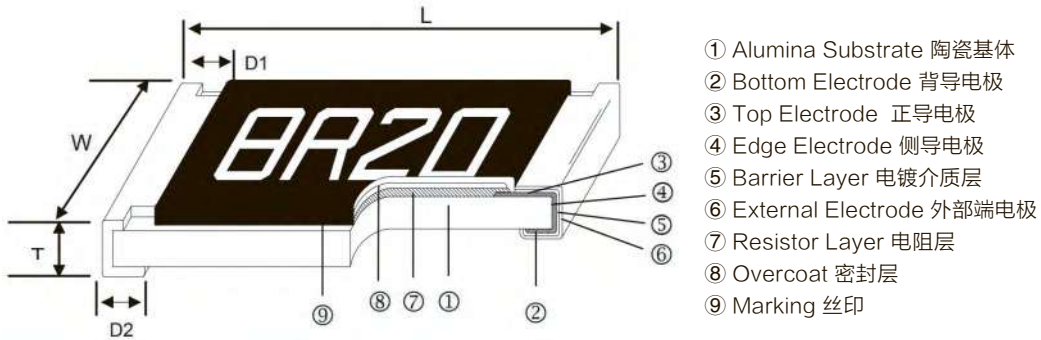
■ 电性能测量的环境条件: 温度: 25 ± 5 相对湿度: 25%~75%RH

■ 依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

## 摘要 Resume >>>

- AEC-Q200 Compliance、Compatible with soldering process
- 符合 AEC-Q200、兼容所有焊接工艺

## 结构图 Construction >>>



## 尺寸 Dimensions >>>

规格	L	W	T	D1	D2
0201	0.60 ± 0.03	0.30 ± 0.03	0.23 ± 0.03	0.15 ± 0.05	0.15 ± 0.05
0402	1.00 ± 0.05	0.50 ± 0.05	0.35 ± 0.05	0.20 ± 0.10	0.20 ± 0.10
0603	1.60 ± 0.10	0.80 ± 0.10	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20
0805	2.00 ± 0.15	1.25 ± 0.10	0.50 ± 0.10	0.35 ± 0.20	0.40 ± 0.20
1206	3.10 ± 0.10	1.55 ± 0.10	0.55 ± 0.10	0.50 ± 0.25	0.50 ± 0.20
1210	3.10 ± 0.10	2.60 ± 0.15	0.55 ± 0.10	0.50 ± 0.25	0.50 ± 0.20
2010	5.00 ± 0.10	2.50 ± 0.15	0.55 ± 0.10	0.60 ± 0.25	0.50 ± 0.20
2512	6.35 ± 0.10	3.10 ± 0.15	0.55 ± 0.10	0.75 ± 0.35	0.80 ± 0.40

## 型号名称 Part Numbering >>>

RRA	02	2012(0805)	L1001	F	T	O
Product Type 产品型号	Production line code 产线代码	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式	High Power 升功率
RRA: 汽车级厚膜贴片电阻	01 02 03 04 10	0603 ( 0201 ) 1005 ( 0402 ) 1608 ( 0603 ) 2012 ( 0805 ) 3216 ( 1206 ) 3225 ( 1210 ) 5025 ( 2010 ) 6432 ( 2512 )	± 5% L182:1.8K Ω L1R3:1.3 Ω ± 1% L1001: 1K Ω L1R30: 1.3 Ω	D= ± 0.5% F= ± 1 % J= ± 5 %	T:Taping Reel T: 编带 B: Bulk B: 散装	W:1/8W V: 1/4W O:1/3W U:1/2W N:1 W

标准规格表 Standard Electrical Specifications >>>

Item 项目 Type 型号	Power Rating 额定功率	Max.Operating Voltage 最大工作电压	Max.Overload Voltage 最大负载电压	Resistance Range 阻值范围			TCR 温度系数 (PPM/°C)
				± 0.5%	± 1%	± 5%	
0201	1/20W	25V	50V	10Ω-10MΩ	1Ω-10MΩ		1Ω ≤ R ≤ 10Ω : ± 350 10Ω < R ≤ 10MΩ : ± 200
0402	1/16W	25V	50V	10Ω-10MΩ	1Ω-22MΩ		1Ω ≤ R ≤ 10Ω : ± 200 10Ω < R ≤ 1MΩ : ± 100 1MΩ < R ≤ 22MΩ : ± 200
0603	1/10W	50V	100V	10Ω-10MΩ	1Ω-22MΩ		1Ω ≤ R ≤ 10Ω : ± 200 10Ω < R ≤ 1MΩ : ± 100 1MΩ < R ≤ 22MΩ : ± 200
0805	1/8W	75V	150V	10Ω-10MΩ	1Ω-22MΩ		1Ω ≤ R ≤ 10Ω : ± 200 10Ω < R ≤ 1MΩ : ± 100 1MΩ < R ≤ 22MΩ : ± 200
1206	1/4W	150V	300V	1Ω-10MΩ	1Ω-22MΩ		1Ω ≤ R ≤ 10Ω : ± 200 10Ω < R ≤ 1MΩ : ± 100 1MΩ < R ≤ 22MΩ : ± 200
1210	1/2W	200V	400V	1Ω-10MΩ	1Ω-22MΩ		1Ω ≤ R ≤ 10Ω : ± 200 10Ω < R ≤ 1MΩ : ± 100 1MΩ < R ≤ 22MΩ : ± 200
2010	3/4W	200V	500V	1Ω-10MΩ	1Ω-22MΩ		1Ω ≤ R ≤ 10Ω : ± 200 10Ω < R ≤ 1MΩ : ± 100 1MΩ < R ≤ 22MΩ : ± 200
2512	1W	200V	500V	1Ω-10MΩ	1Ω-22MΩ		1Ω ≤ R ≤ 10Ω : ± 200 10Ω < R ≤ 1MΩ : ± 100 1MΩ < R ≤ 22MΩ : ± 200

◆ Operating Temp.Range 操作温度范围: 01005~0201: -55~125°C, 0402~2512: -55~155°C

Type 型号	0201	0402	0603	0805	1206	1210	2010	2512
Rated Current of Jumper 零欧姆额定电流	0.5A	1A	1A	2A	2A	2A	2A	2A
Max Current of Jumper 零欧姆电阻最大电流	1A	2A	2A	5A	10A	10A	10A	10A
Jumper Resistance Value 零欧姆阻力值	50mΩ Max							

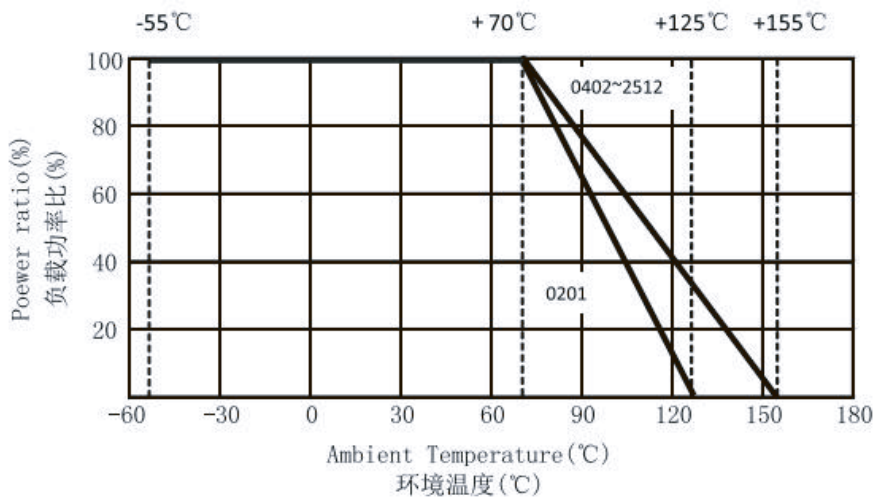


升功率规格表 High Power Rating Electrical Specifications >>>

Item Type 型号	Power Rating 额定功率	Max.Operating Voltage 最大工作电压	Max.Overload Voltage 最大负载电压	Resistance Range 阻值范围		TCR 温度系数 (PPM/°C)
				± 1%	± 5%	
0402	1/8W	50V	100V	1Ω-1MΩ		1Ω ≤ R < 10Ω : ± 200 10Ω ≤ R ≤ 1MΩ : ± 100
0603	1/4W	75V	150V	1Ω-1MΩ		1Ω ≤ R < 10Ω : ± 200 10Ω ≤ R ≤ 1MΩ : ± 100
0805	1/3W	150V	300V	1Ω-1MΩ		1Ω ≤ R < 10Ω : ± 200 10Ω ≤ R ≤ 1MΩ : ± 100
1206	1/2W	200V	400V	1Ω-1MΩ		1Ω ≤ R < 10Ω : ± 200 10Ω ≤ R ≤ 1MΩ : ± 100
2010	1W	200V	400V	1Ω-1MΩ		1Ω ≤ R < 10Ω : ± 200 10Ω ≤ R ≤ 1MΩ : ± 100
2512	2W	250V	500V	1Ω-1MΩ		1Ω ≤ R < 10Ω : ± 200 10Ω ≤ R ≤ 1MΩ : ± 100

◆ Operating Temp.Range 操作温度范围: 0402~2512: -55~155°C

功率衰减曲线图 Derating Curve >>>



## 信赖性试验项目 Environmental Characteristics >>>

Item 项目	Requirement 条件		Test Method 测试方法
	± 1%及以下	± 5%	
Temperature Coefficient of Resistance (T.C.R) 温度系数 (T.C.R)	AS.Spec. 参考规格表		-55°C~+125°C,25°C is the refence temperature 参考温度
Short Time Overload 短时间过载	± (1.0%+0.05 Ω)	± (2.0%+0.05 Ω)	RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds,2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒, 提升功率系列 2 秒
Insulation Resistance 绝缘阻抗	≥ 10G		Max.Overload voltage for 1 minute 最大负载电压持续 1 分钟
Endurance 负载寿命	± (1.0%+0.1 Ω)	± (2.0%+0.1 Ω)	70 ± 2°C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF" 70 ± 2°C温度中施加额定电压, 1.5 小时 "开", 0.5 小时 "关", 共 1000 小时
Biased Humidity 湿度偏差	± (1.0%+0.1 Ω)	± (2.0%+0.1 Ω)	1000hrs 85°C/85% R.H.10% of oprating power 在温度 85°C,相对湿度 85%环境中施加 10%的额定功率持续 1000 小时。
High Temperature Exposure 高温暴露测试	± (1.0%+0.05 Ω)	± (1.5%+0.1 Ω)	At +155°C for 1000hrs 置于+155°C温度中, 共 1000 小时
Temperature Cycling 温度循环	± (0.5%+0.05 Ω)	± (1.5%+0.05 Ω)	-55°C to +155°C, 1000 cycles -55°C to +155°C循环 1000 次
Bending Strength 弯折强度测试	± (1.0%+0.05 Ω)	± (1.0%+0.05 Ω)	Bending once for 5 seconds 2010,2512 sizes:2mm other size:3mm 产品焊在测试板上, 中央施力下压 5 秒 2010,2512 体积下压深度: 2 毫米 其他体积下压深度: 3 毫米
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%		245 ± 5°C for 3 seconds 245 ± 5°C 锡炉中, 持续 3 秒
Resistance to Soldering Heat 抗焊锡热	± (0.5%+0.05 Ω)	± (1.0%+0.05 Ω)	260 ± 5°C for 10 seconds 260 ± 5°C 锡炉中, 持续 10 秒
Terminal strength 端子强度	No broken 不产生断裂		Force of 1.8kg 60 seconds 使用相当于 1.8kg 的压力持续 60 秒
Mechanical Shock 机械冲击	± (0.25%+0.05 Ω)	± (1.0%+0.05 Ω)	Wave Form:Tolerance for half sine shock pulse. Pulse 波形: 半个正弦冲击脉冲的精度 Peak Value is 100g' s Normal duration (D) is 6 峰值为 100g' s 正常为 6
Vibration 振动	± (0.5%+0.05 Ω)	± (1.0%+0.5 Ω)	5g' s ro 20min.,12cycles each of 3 orientations 10~2000Hz 5g' s 持续时间为 20 分钟, 3 次 10~2000Hz 的定向, 共 12 次循环
ESD 静电释放	± (1.0%+0.05 Ω)		加载规定静电电压 2 次/间隔 1 秒, 0201/0402 规格: 0.5KV, 0603 规格: 1KV,其它规格: 2KV 0201/0402: 0.5KV, 0603: 1.0KV, Other: 2KV, 2times/1s
Flame Retardance 阻燃性	Not flame 不产生火焰		Temperature sensing at 500 °C, voltage power subjected to 32 VDC current Clamped up to 500ADC and decreased in 1.0VDC/hour 感应温度在 500°C, 电压需为 32VDC 上升到 500ADC, 然后降为 1.0VDC/小时
Resistance to solvents 耐溶剂性	Marking Unsmearred 丝印不模糊		Add Aqueous wash chemical-OKEM Clean or equivalent.Dot not us banned solvents 添加液体洗涤剂-OKEM 清洗或其他等同溶剂, 不可使用禁用溶剂
Voltage Proof 绝缘耐压	No breakdown or flashover 无击穿或跳火现象		1.42 times Max.operating voltage for 1 minute 最大额定电压*1.42 倍, 持续 1 分钟
Leaching 溶蚀试验	Individual leaching area ≤ 5% 导体各面溶蚀区域 ≤ 5% Total leaching area ≤ 10% 导体总面积溶蚀区域 ≤ 10%		260 ± 5°C for 30 seconds 260 ± 5°C 锡炉中, 持续 30 秒
Flammability 易燃性	No ignition of the tissue paper or Scorching or the pinewood board 不会引燃纸张或引起松木板的灼热		V=0 or V=1 are acceptable.Electrical test not required 可接受 V=0 或 V=1.不要求做电性测试

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25 ± 5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■ RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

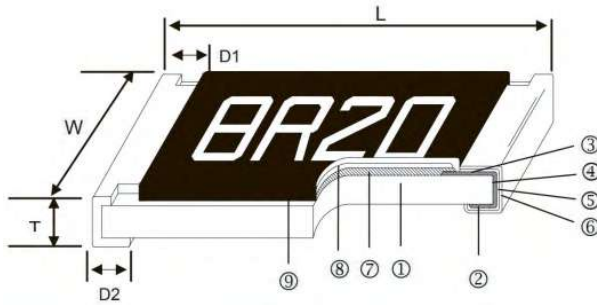
■ 电性能测量的环境条件: 温度: 25 ± 5 相对湿度: 25%~75%RH

■ 依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

## 摘要 Resume >>>

- AEC-Q200 Compliance、Advanced thin film technology、Special materials,design, and processing for high sulfur applications
- 符合AEC-Q200、先进薄膜技术、特殊材料、制程及应用于高硫环境

## 结构图 Construction >>>



- ① Alumina Substrate 陶瓷基体
- ② Bottom Electrode 背导电极
- ③ Top Electrode 正导电极
- ④ Edge Electrode 侧导电极
- ⑤ Barrier Layer 电镀介质层
- ⑥ External Electrode 外部端电极
- ⑦ Resistor Layer 电阻层
- ⑧ Overcoat 密封层
- ⑨ Marking 丝印

## 尺寸 Dimensions >>>

Size 规格	L	W	T	D1	D2
0402	1.00 ± 0.05	0.50 ± 0.05	0.30 ± 0.05	0.20 ± 0.10	0.20 ± 0.10
0603	1.55 ± 0.10	0.80 ± 0.10	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20
0805	2.00 ± 0.15	1.25 ± 0.15	0.55 ± 0.10	0.30 ± 0.20	0.40 ± 0.20
1206	3.05 ± 0.15	1.55 ± 0.10	0.55 ± 0.10	0.42 ± 0.20	0.35 ± 0.25
1210	3.10 ± 0.15	2.40 ± 0.15	0.55 ± 0.10	0.40 ± 0.20	0.55 ± 0.25
2010	4.90 ± 0.15	2.40 ± 0.15	0.55 ± 0.10	0.60 ± 0.30	0.50 ± 0.25
2512	6.35 ± 0.15	3.10 ± 0.15	0.55 ± 0.10	0.65 ± 0.35	0.70 ± 0.40

## 型号名称 Part Numbering >>>

ARA	02	2012(0805)	L1001	F	T	V	50PPM
Product Type 产品型号	Production line code 产线代码	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式	High Power 升功率	PPM/°C
ARA: 汽车级薄膜贴片电阻	01 02 03 04 10	1005 (0402) 1608 (0603) 2012 (0805) 3216 (1206) 3225 (1210) 5025 (2010) 6432 (2512)	L1001: 1K Ω L1R30: 1.3 Ω	A= ± 0.05% B= ± 0.1 % C= ± 0.25% D= ± 0.5 % F= ± 1 %	T:Taping Reel T: 编带 B: Bulk B: 散装	X: 1/10W W: 1/8W V: 1/4W O: 1/3W	10PPM 15PPM 25PPM 50PPM

标准规格表 Standard Electrical Specifications >>>

Item 项目 Type 型号	Power Rating 额定功率	Max. Operatin g Voltage 最大工作电压	Max. Overload Voltage 最大负载电压	Resistance Range 阻值范围		TCR 温度系 数 (PPM/°C)
				±0.05%	±0.1%, ±0.25%, ±0.5%, ±1%	
0402	1/16W	25V	50V	49.9Ω~10KΩ		±10
				49.9Ω~10KΩ	49.9Ω~69.8KΩ	±15
				49.9Ω~10KΩ	49.9Ω~100KΩ	±25 ±50
0603	1/16W	50V	100V	10Ω~49.9KΩ	10Ω~332KΩ	±10 ±15
				10Ω~49.9KΩ	10Ω~332KΩ	±25 ±50
0805	1/10W	100V	200V	10Ω~100KΩ	10Ω~511KΩ	±10
					10Ω~1MΩ	±15 ±25 ±50
1206	1/8W	300V	300V	10Ω~200KΩ	10Ω~1MΩ	±10 ±15 ±25 ±50
1210	1/4W	150V	300V	10Ω~499KΩ	10Ω~1MΩ	±10 ±15 ±25 ±50
2010	1/4W	150V	300V			
2512	1/2W	150V	300V			

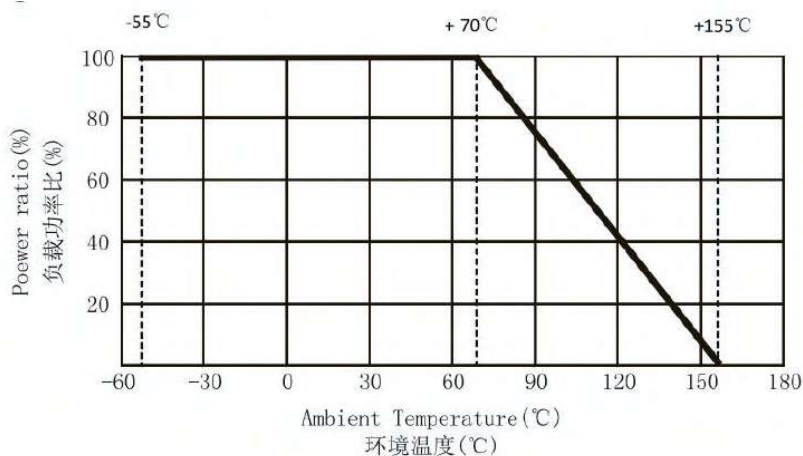
◆Operating Temp.Range 操作温度范围: 0402~2512: -55~155°C

升功率规格表 High Power Rating Electrical Specifications >>>

Item 项目 Type 型号	Power Rating 额定功率	Max.Operating Voltage 最大工作电压	Max.Overload Voltage 最大负载电压	Resistance Range 阻值范围		TCR 温度系数 (PPM/°C)
				±0.05%	±0.1%, ±0.25%, ±0.5%, ±1%	
0603	1/10W	75V	150V	10Ω~49.9KΩ	10Ω~332KΩ	±10 ±15 ±25 ±50
0805	1/8W	150V	300V	10Ω~100KΩ	10Ω~511KΩ	±10
					10Ω~1MΩ	±15 ±25 ±50
1206	1/4W	200V	400V	10Ω~200KΩ	10Ω~1MΩ	±10 ±15 ±25 ±50
1210	1/3W	200V	400V	10Ω~499KΩ	10Ω~1MΩ	
2010	1/3W	200V	400V	10Ω~499KΩ	10Ω~1MΩ	

◆Operating Temp.Range 操作温度范围: 0603~2010: -55~155°C

功率衰减曲线图 Derating Curve >>>



信赖性试验项目 Environmental Characteristics >>>

Item 项目	Requirement 条件		Test Method 测试方法
	± 1%及以下	± 5%	
Temperature Coefficient of Resistance (T.C.R) 温度系数 (T.C.R)	AS.Spec. 参考规格表		-55°C~+125°C,25°C is the refence temperature 参考温度
Short Time Overload 短时间过负载	ΔR ± 0.05%	ΔR ± 2.0%	RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds,2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒, 提升功率系列 2 秒
	ΔR ± 0.2% for high power rating		
Insulation Resistance 绝缘阻抗	≥ 1G		Apply 100Vdc for 1 minute 施加电压 100V(DC)1 分钟
Endurance 负载寿命	ΔR ± 0.05%	ΔR ± 0.2%	70 ± 2°C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF" 70 ± 2°C 温度中施加额定电压, 1.5 小时 "开", 0.5 小时 "关", 共 1000 小时
	> 7KΩ ΔR ± 0.5%		
	ΔR ± 0.5% for high power rating		
Biased Humidity 湿度偏差	ΔR ± 0.05%	ΔR ± 0.2%	1000hrs 85°C/85% R.H.10% of oprating power 在温度 85°C, 相对湿度 85%环境中施加 10%的额定功率持续 1000 小时。
	> 7KΩ ΔR ± 0.5%		
	ΔR ± 0.5% for high power rating		
High Temperature Exposure 高温暴露测试	ΔR ± 0.05%		At +155°C for 1000hrs 置于+155°C温度中, 共 1000 小时
Temperature Cycling 温度循环	ΔR ± 0.05%	ΔR ± 0.05%	-55°C to +155°C, 1000 cycles -55°C to +155°C循环 1000 次
Bending Strength 弯折强度测试	ΔR ± 0.05%	ΔR ± 0.2%	Bending once for 5 seconds 2010,2512 sizes:2mm other size:3mm 产品焊在测试板上, 中央施力下压 5 秒, 2010,2512 体积下压深度: 2 毫米, 其他体积下压深度: 3 毫米
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%		245 ± 5°C for 3 seconds 245 ± 5°C锡炉中, 持续 3 秒
Resistance to Soldering Heat 抗焊锡热	ΔR ± 0.05%	ΔR ± 0.2%	260 ± 5°C for 10 seconds 260 ± 5°C 锡炉中, 持续 10 秒
Terminal strength 端子强度	No broken 不产生断裂		Force of 1.8kg 60 seconds 使用相当于 1.8kg 的压力持续 60 秒
Mechanical Shock 机械冲击	ΔR ± 0.25%	ΔR ± 0.5%	Wave Form:Tolerance for half sine shock pulse. Pulse 波形: 半个正弦冲击脉冲的精度 Peak Value is 100g' s Normal duration (D) is 6 峰值为 100g' s 正常为 6
Vibration 振动	ΔR ± 0.25%	ΔR ± 0.5%	5g' s ro 20min.,12cycles each of 3 orientations 10-2000Hz 5g' s 持续时间为 20 分钟, 3 次 10-2000Hz 的定向, 共 12 次循环
ESD 静电释放	ΔR ± 0..1%		加载规定静电电压 2 次/间隔 1 秒, 0201/0402 规格: 0.5KV, 0603 规格: 1KV, 其它规格: 2KV 0201/0402: 0.5KV, 0603: 1.0KV, Other: 2KV, 2times/1s
Flame Retardance 阻燃性	Not flame 不产生火焰		Temperature sensing at 500 °C, voltage power subjected to 32 VDC current Clamped up to 500ADC and decreased in 1.0VDC/hour 感应温度在 500°C, 电压需为 32VDC 上升到 500ADC, 然后降为 1.0VDC/小时
Resistance to solvents 耐溶剂性	Marking Unsmearred 丝印不模糊		Add Aqueous wash chemical-OKEM Clean or equivalent.Dot not us banned solvents 添加液体洗涤剂-OKEM 清洗或其他等同溶剂, 不可使用禁用溶剂
Sulfur test 硫测试	± 0.5%		3-5ppm H2S, 50 ± 2°C, 91%~93% R.H., no power rating for 1000hrs 置于 3-5ppmH2S,50 ± 2°C, 91%~93%R.H.无额度功率下 1000 小时

Operating Voltage= $\sqrt{P \cdot R}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25 ± 5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■RCWV(额定持续工作电压)= $\sqrt{P \cdot R}$ 或者较小的最大操作电压.

操作电压= $\sqrt{P \cdot R}$ ,过负载电压= $2.5 \cdot \sqrt{P \cdot R}$ ,操作电流= $\sqrt{P/R}$

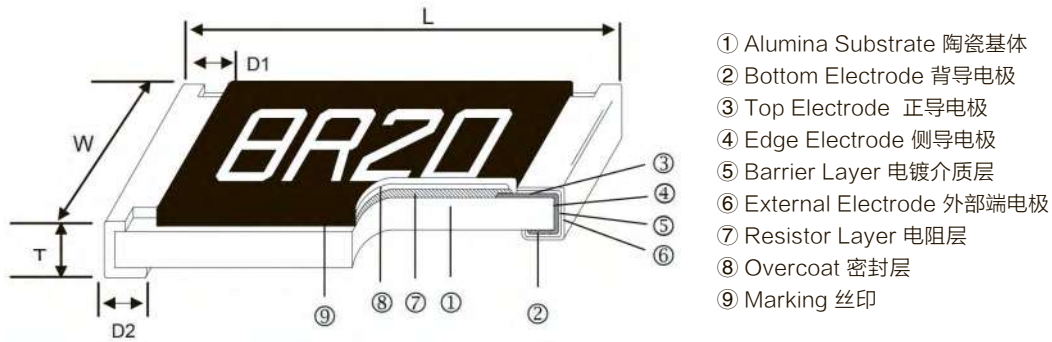
■电性能测量的环境条件: 温度: 25 ± 5 相对湿度: 25%~75%RH

■依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

摘要 Resume >>>

- Special construction to prevent sulfuration in a sulfur containing environment/AEC-Q200 Compliance
- 可防止在含硫环境下硫化的特殊结构，符合AEC-Q200.

结构图 Construction >>>



尺寸 Dimensions >>>

Size 规格	L	W	T	D1	D2
0201	0.60 ± 0.03	0.30 ± 0.03	0.23 ± 0.03	0.15 ± 0.15	0.15 ± 0.05
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	0.30 ± 0.20	0.30 ± 0.20
0805	2.00 ± 0.15	1.25 ± 0.15	0.55 ± 0.10	0.35 ± 0.20	0.40 ± 0.20
1206	3.10 ± 0.15	1.55 ± 0.15	0.55 ± 0.10	0.50 ± 0.25	0.50 ± 0.25
1210	3.10 ± 0.10	2.60 ± 0.20	0.55 ± 0.10	0.50 ± 0.25	0.50 ± 0.20
2010	5.00 ± 0.10	2.50 ± 0.15	0.55 ± 0.10	0.60 ± 0.25	0.50 ± 0.20
2512	6.35 ± 0.10	3.10 ± 0.15	0.55 ± 0.10	0.75 ± 0.35	0.80 ± 0.40

型号名称 Part Numbering >>>

ASA	02	1005(0402)	L1R00	F	T
Product Type 产品型号	Production line code 产线代码	Resistor Size 电阻规格	Resistance 阻值	Resistance Tolerance 阻值公差	Packing Code 包装形式
ASA: 汽车级防硫化贴片电阻	01 02 03 04 10	0603 ( 0201 ) 1005 ( 0402 ) 1608 ( 0603 ) 2012 ( 0805 ) 3216 ( 1206 ) 3225 ( 1210 ) 5025 ( 2010 ) 6432 ( 2512 )	± 5% L182: 1.8K Ω L1R3: 1.3 Ω LR001: 1m Ω ± 1%及以下 L1801: 1.8KΩ L1R30: 1.3 Ω LR001: 1m Ω	D= ± 0.5 % F= ± 1 % J= ± 5 %	T:Taping Reel T: 编带 B: Bulk B: 散装



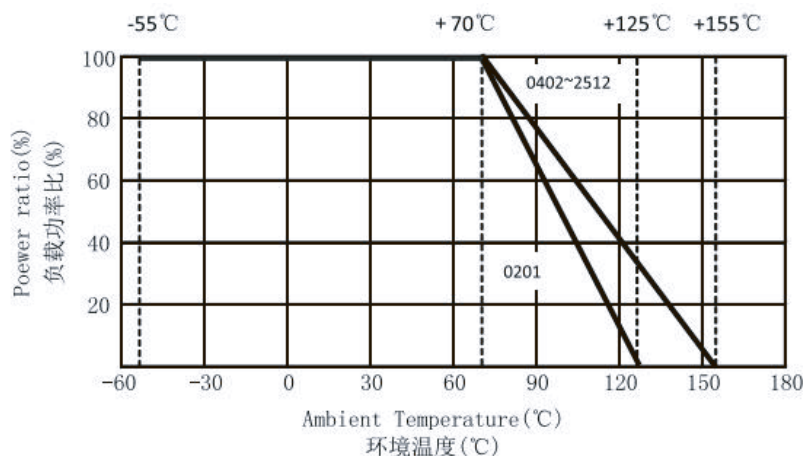
标准规格表 Standard Electrical Specifications >>>

Item Type 型号	Power Rating 额定功率	Max.Operating Voltage 最大工作电压	Max.Overload Voltage 最大负载电压	Resistance Range 阻值范围			TCR 温度系数 (PPM/°C)
				± 0.5%	± 1%	± 5%	
0201	1/20W	25V	50V	/	1Ω~10MΩ		1Ω ≤ R ≤ 10Ω: ± 400 >10Ω: ± 200
0402	1/16W	50V	100V	1Ω~10MΩ			1Ω ≤ R ≤ 10Ω: ± 200 10Ω < R ≤ 1MΩ: ± 100 1MΩ < R ≤ 10MΩ: ± 200
0603	1/10W	50V	100V	1Ω~10MΩ			1Ω ≤ R ≤ 10Ω: ± 200 10Ω < R ≤ 1MΩ: ± 100 1MΩ < R ≤ 10MΩ: ± 200
0805	1/8W	150V	300V	1Ω~10MΩ			1Ω ≤ R ≤ 10Ω: ± 200 10Ω < R ≤ 1MΩ: ± 100 1MΩ < R ≤ 10MΩ: ± 200
1206	1/4W	200V	400V	1Ω~10MΩ			1Ω ≤ R ≤ 10Ω: ± 200 10Ω < R ≤ 1MΩ: ± 100 1MΩ < R ≤ 10MΩ: ± 200
1210	1/2W	200V	400V	1Ω~10MΩ			1Ω ≤ R ≤ 10Ω: ± 200 10Ω < R ≤ 1MΩ: ± 100 1MΩ < R ≤ 10MΩ: ± 200
2010	3/4W	200V	400V	1Ω~10MΩ			1Ω ≤ R ≤ 10Ω: ± 200 10Ω < R ≤ 1MΩ: ± 100 1MΩ < R ≤ 10MΩ: ± 200
2512	1W	200V	500V	1Ω~10MΩ			1Ω ≤ R ≤ 10Ω: ± 200 10Ω < R ≤ 1MΩ: ± 100 1MΩ < R ≤ 10MΩ: ± 200

◆ Operating Temp. Range 操作温度范围: 01005~0201: -55~125°C, 0402~2512: -55~155°C

Type 型号	0201	0402	0603	0805	1206	1210	2010	2512
Rated Current of Jumper 零欧姆额定电流	0.5A	1A	1A	2A	2A	2A	2A	2A
Max Current of Jumper 零欧姆电阻最大电流	1A	2A	2A	5A	10A	10A	10A	10A
Jumper Resistance Value 零欧姆阻力值	50mΩ Max							

功率衰减曲线图 Derating Curve >>>





信赖性试验项目 Environmental Characteristics >>>

Item 项目	Requirement 条件			Test Method 测试方法
	± 1%及以下	± 5%	跳线	
Temperature Coefficient of Resistance (T.C.R) 温度系数 (T.C.R)	AS.Spec. 参考规格表			-55°C~+125°C, 25°C is the reference temperature 参考温度
Short Time Overload 短时间过载	± (1.0%+0.1Ω)	± (2.0%+0.1Ω)	< 50mΩ	RCWV*2.5 or Max.Overload voltage whichever is lower for 5 seconds, 2seconds for high power series 额定电压的 2.5 倍或最大负载电压 5 秒, 提升功率系列 2 秒
Insulation Resistance 绝缘阻抗	≥ 10G			Max.Overload voltage for 1 minute 最大负载电压持续 1 分钟
Endurance 负载寿命	± (2.0%+0.1Ω)	± (3.0%+0.1Ω)	< 100mΩ	70 ± 2°C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF" 70 ± 2°C 温度中施加额定电压, 1.5 小时 "开", 0.5 小时 "关", 共 1000 小时
Biased Humidity 温湿度偏差	± (2.0%+0.1Ω)	± (3.0%+0.1Ω)	< 100mΩ	1000hrs 85°C/85% R.H.10% of oprating power 在温度 85°C, 相对湿度 85%环境中施加 10%的额定功率持续 1000 小时。
High Temperature Exposure 高温暴露测试	± (1.0%+0.05Ω)	± (1.5%+0.10Ω)	< 50mΩ	At +155°C for 1000hrs 置于+155°C温度中, 共 1000 小时
Bending Strength 弯折强度测试	± (1.0%+0.05Ω)	± (1.0%+0.05Ω)	< 50mΩ	Bending once for 5 seconds 2010,2512 sizes:2mm other size:3mm 产品焊在测试板上, 中央施力下压 5 秒 2010,2512 体积下压深度: 2 毫米 其他体积下压深度: 3 毫米
Solderability 焊锡性	95%min.coverage 导体爬锡面积大于 95%			245 ± 5°C for 3 seconds 245 ± 5°C 锡炉中, 持续 3 秒
Resistance to Soldering Heat 抗焊锡热	± (0.5%+0.05Ω)	± (1.0%+0.05Ω)	< 50mΩ	260 ± 5°C for 10 seconds 260 ± 5°C 锡炉中, 持续 10 秒
Voltage Proof 绝缘耐压	No breakdown or flashover 无击穿或跳火现象			1.42 times Max.operating voltage for 1 minute 最大额定电压*1.42 倍, 持续 1 分钟
Leaching 溶蚀试验	Individual leaching area ≤ 5% 导体各面溶蚀区域 ≤ 5% Total leaching area ≤ 10% 导体总面积溶蚀区域 ≤ 10%			260 ± 5°C for 30 seconds 260 ± 5°C 锡炉中, 持续 30 秒

信赖性试验项目 Environmental Characteristics >>>

Temperature Cycling 温度循环	$\pm (0.5\%+0.05 \Omega)$	$\pm (1.5\%+0.05 \Omega)$	< 50m $\Omega$	-55°C to +155°C, 1000 cycles -55°C to +155°C循环 1000 次
Mechanical Shock 机械冲击	$\pm (0.25\%+0.05 \Omega)$	$\pm (1.0\%+0.05 \Omega)$	< 50m $\Omega$	Wave Form:Tolerance for half sine shock pulse. Pulse 波形: 半个正弦冲击脉冲的精度 Peak Value is 100g' s Normal duration (D) is 6 峰值为 100g' s 正常为 6
Vibration 振动	$\pm (0.5\%+0.05 \Omega)$	$\pm (1.0\%+0.05 \Omega)$	< 50m $\Omega$	5g' s ro 20min.,12cycles each of 3 orientations 10-2000Hz 5g' s 持续时间为 20 分钟, 3 次 10-2000Hz 的定向, 共 12 次循环
ESD 静电释放	$\pm (1\%+0.05 \Omega)$			加载规定静电电压 2 次/间隔 1 秒, 0201/0402 规格: 0.5KV, 0603 规格: 1KV, 其它规格: 2KV 0201/0402: 0.5KV, 0603: 1.0KV, Other: 2KV, 2times/1s
Flame Retardance 阻燃性	Not flame 不产生火焰			Temperature sensing at 500 °C, voltage power subjected to 32 VDC current Clamped up to 500ADC and decreased in 1.0VDC/hour 感应温度在 500°C, 电压需为 32VDC 上升到 500ADC, 然后降为 1.0VDC/小时
Resistance to solvents 耐溶剂性	Marking Unsmearred 丝印不模糊			Add Aqueous wash chemical-OKEM Clean or equivalent.Dot not us banned solvents 添加液体洗涤剂-OKEM 清洗或其他等同溶剂, 不可使用禁用溶剂
Terminal strength 端子强度	No broken 不产生断裂			Force of 1.8kg 60 seconds 使用相当于 1.8kg 的压力持续 60 秒
Flammability 易燃性	No ignition of the tissue paper or Scorching or the pinewood board 不会引燃纸张或引起松木板的灼热			V-0 or V-1 are acceptable.Electrical test not required 可接受 V-0 或 V-1.不要求做电性测试
Sulfur Test 硫测试	$\pm (0.5\%+0.05 \Omega)$	$\pm (0.5\%+0.05 \Omega)$	< 50m $\Omega$	1000ppm H2S,50 $\pm$ 2°C, 91%~93%R.H.,no power rating for 1000hrs 置于 1000ppmH2S,50 $\pm$ 2°C, 91%~93%R.H 无额定功率下 1000 小时
Rapid Change of temperature 冷热冲击	$\pm (0.5\%+0.05 \Omega)$	$\pm (1.0\%+0.05 \Omega)$	< 50m $\Omega$	-55°Cto+155°C, 5 Cycles -55°Cto+155°C, 循环 5 次

Operating Voltage= $\sqrt{(P^*R)}$  or Max.Operating Voltage listed above,whichever is lower.

Overload Voltage= $2.5^*\sqrt{(P^*R)}$  or Max.Overload Voltage listed above,whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{(P^*R)}$  or Max.Operating Voltage whichever is lower.

Environmental conditions for electrical performance measurement, Temperature: 25  $\pm$  5 Humidity: 25%~75%RH

Reference Standards:IEC 60115-1,60068-2-58; JIS-C 5201-1

■RCWV(额定持续工作电压)= $\sqrt{(P^*R)}$ 或者较小的最大操作电压.

操作电压= $\sqrt{(P^*R)}$ ,过载电压= $2.5^*\sqrt{(P^*R)}$ ,操作电流= $\sqrt{(P/R)}$

■电性能测量的环境条件: 温度: 25  $\pm$  5 相对湿度: 25%~75%RH

■依据标准: IEC 60115-1,60068-2-58; JIS-C 5201-1

Multiplier Code (for 0603  $\leq \pm 1\%$  marking) 【指数码(0603  $\leq \pm 1\%$  标志)】

Code 代码	A	B	C	D	E	F	G	H	X	Y	Z
Multiplier 指数	$10^0$	$10^1$	$10^2$	$10^3$	$10^4$	$10^5$	$10^6$	$10^7$	$10^{-1}$	$10^{-2}$	$10^{-3}$

Standar E-96 series Resistance Value code (for 0603  $\leq \pm 1\%$  marking)  
【E-96 系列标准组织代码 (对0603  $\leq \pm 1\%$  的字码)】

Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码
100	01	147	17	215	33	316	49	464	65	681	81
102	02	150	18	221	34	324	50	475	66	698	82
105	03	154	19	226	35	332	51	487	67	715	83
107	04	158	20	232	36	340	52	499	68	732	84
110	05	162	21	237	37	348	53	511	69	750	85
113	06	165	22	243	38	357	54	523	70	768	86
115	07	169	23	249	39	365	55	536	71	787	87
118	08	174	24	255	40	374	56	549	72	806	88
121	09	178	25	261	41	383	57	562	73	825	89
124	10	182	26	267	42	392	58	576	74	845	90
127	11	187	27	274	43	402	59	590	75	866	91
130	12	191	28	280	44	412	60	604	76	887	92
133	13	196	29	287	45	422	61	619	77	909	93
137	14	200	30	294	46	432	62	634	78	931	94
140	15	205	31	301	47	442	63	649	79	953	95
143	16	210	32	309	48	453	64	665	80	976	96

So the resistance value are marked as the following example  
(阻值标识如下) :



$$10X = 124 \Omega * 10^{-1} = 12.4 \Omega$$

Standard E-24 and not belong to E-96 series values ( $\leq \pm 1\%$ ) of 0603 size: the marking is the same as 5% tolerance but marking as underline 0603  $\pm 1\%$ 公差, 在标准E-24系列中, 但不属于E-96系列的阻值, 标示和5%的公差相同, 但是在字码下多加一条线



$$122 = 1200 \Omega = 1.2K \Omega$$



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