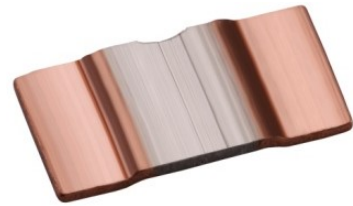


■车规片式分流电阻器
Chip Shunt Resistor Automotive Grade
◆特点
Features

- * 2512 最高功率达 6W
2512 High power up to 6W;
- * 3921 最高功率达 9W
3921 High power up to 9W;
- * 5931 最高功率达 15W
5931 High power up to 15W;
- * 适应再流焊
Suit for re-flow solder;
- * 符合 AEC-Q200 汽车标准条款和 ROHS 指令要求
Compliant with AEC-Q200 standard and RoHS directive.

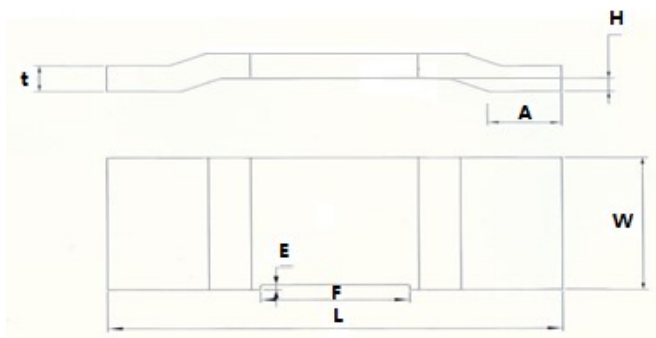

◆应用领域
Application

开关电源、过电流保护、电压调节器、电源转换器、充电器、便携式设备等。

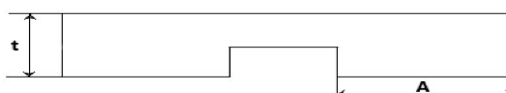
Switching Power Supply, Over Current Protection, Voltage Regulation Module(VRM)、DC-DC Converter、Charger、Portable Devices etc.

◆型号表示法
Part Number

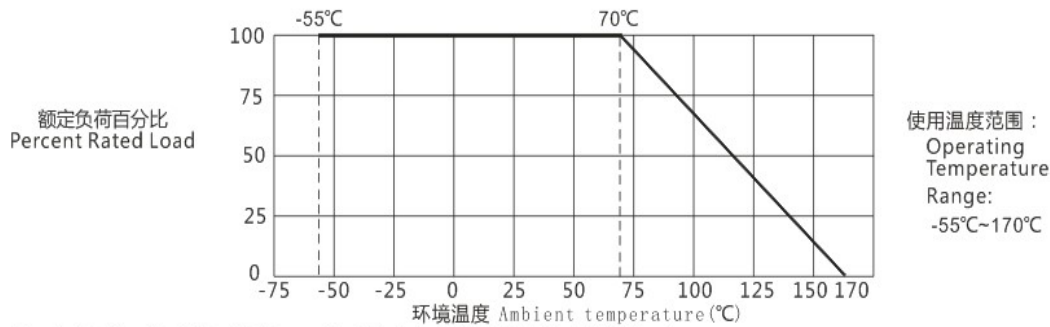
产品代号 Product Code	额定功率代号 Power Rating Code		型号代号 Type Code		电阻温度系数代号 T.C.R Code		电阻值代号 Resistance Value Code	阻值误差精度代号 Resistance Tolerance Code		包装方式代号 Packing Style Code		
车规片式 分流电阻器 Chip Shunt Resistor Automotive Grade	代号 Code	额定功率系列 Power rating	代号 Code	型号 Type	代号 Code	T.C.R PPM/°C	单位Ω，小数点 用R表示；单位 mΩ，小数点用M 表示； Units:Ω Decimal point should be expressed by “R”； Units : m Ω Decimal point should be expressed by ‘M’ 例如 Example: R001=0.001Ω R004=0.004Ω 0M20=0.20mΩ 0M50=0.50mΩ	代号 Code	误差精度 Tolerance	代号 Code	包装方法 Packing Style	
	N	3W	12	2512	H	±50		F	±1%	T	编带包装 Tape & Reel	
	U	4W			X	±75		G	±2%			
	V	5W			3921	3921		K	±100	J	±5%	C
	W	6W	J	±150								
	Z	7W	5931	5931				W	±200			
	A	8W										
	I	9W										
	B	10W										
	C	15W										

◆产品结构
Product Structure


*2512 0.2mΩ /5931 0.1mΩ 侧面示意图:


◆规格尺寸 Dimensions

型号 Type	电阻值(mΩ) Resistance Value	电阻 材料 Material	t (mm)	L(mm)	W(mm)	H(mm)	A(mm)	F(mm)	E(mm)
3921	0.2	MnCu	1.66±0.10	10.00 ±0.25	5.20±0.20	0.50 ±0.20	2.00±0.20	4.50±0.50	max.1
	0.3		1.28±0.10						
	0.5		0.77±0.10						
	0.7		0.55±0.10						
	1	FeCrAl	1.25±0.10						
	2		0.62±0.10						
	3		0.42±0.10						
	4		0.35±0.10						
5	0.28±0.10								
5931	0.1	MnCu	2.50±0.20	15.00 ±0.25	7.70 ±0.20	1.00±0.30	5.50±0.20	4.00±0.50	max.1
	0.2		1.50±0.10						
	0.3		0.96±0.10						
	0.4		0.72±0.10						
	0.5		0.58±0.10						
	0.7		0.42±0.10						
	0.75		0.39±0.10						
	0.8		0.36±0.10						
	1	FeCrAl	0.94±0.10			0.50 ±0.20	4.20±0.20	5.00±0.50	
	1.5		0.62±0.10						
	2		0.48±0.10						
	3		0.31±0.10						
	1	Karma	0.88±0.10						
	2		0.43±0.10						
3	0.30±0.10								
2512	0.2	MnCu	1.70±0.10	6.40±0.25	3.20 ±0.20	0.50 ±0.20	2.20±0.25	2.00±0.50	max.1
	0.3		0.95±0.10						
	0.35		0.80±0.10						
	0.4		0.88±0.10						
	0.5		0.85±0.10						
	0.7		0.60±0.10						
	0.75		0.56±0.10						
	1		0.42±0.10						
	2	FeCrAl	0.67±0.10				1.20±0.20	3.00 ±0.50	
	3		0.45±0.10						
	4		0.32±0.10						
	5		0.32±0.10						
	2	Karma	0.65±0.10						
	2.5		0.50±0.10						
	3		0.43±0.10						
	4		0.32±0.10						
5	0.28±0.10								

◆ 产品特性曲线图 Product Characteristic Curve


注：当电阻使用的环境温度超过70°C时，其额定负荷(额定功率)按上述曲线下降。

Note: For resistors operated in ambient over 70°C, rated load (rated power) shall be derated in accordance with the above figure.

◆ 额定值 Ratings

型号 Type	额定功率(70°C) Power Rating	电阻值 Resistance Value	TCR (PPM/°C)	使用温度范围 Operating Temp. Range
3921	5W - 9W	0.2mΩ	± 200	-55°C ~ +170°C
		0.3mΩ、0.5mΩ	± 150	
	5W - 7W	0.7mΩ		
		1mΩ		
5W	2mΩ ~ 5mΩ			
5931	7W - 15W	0.1 mΩ、0.2 mΩ	± 200	
	7W - 10W	0.3 mΩ		
	7W - 9W	0.4mΩ	± 150	
		0.5mΩ		
		0.7mΩ、0.75mΩ、0.8mΩ	± 100	
	7W	1mΩ	± 50	
1.5mΩ、2mΩ、3mΩ				
2512	3W - 6W	0.2 mΩ、0.3mΩ、0.35mΩ、0.4mΩ	± 200	
		0.5mΩ、0.7mΩ、0.75mΩ、1mΩ	± 150	
	3W - 5W	2mΩ		
	3W - 4W	2.5mΩ、3mΩ	± 50	
	3W	4 mΩ、5mΩ		

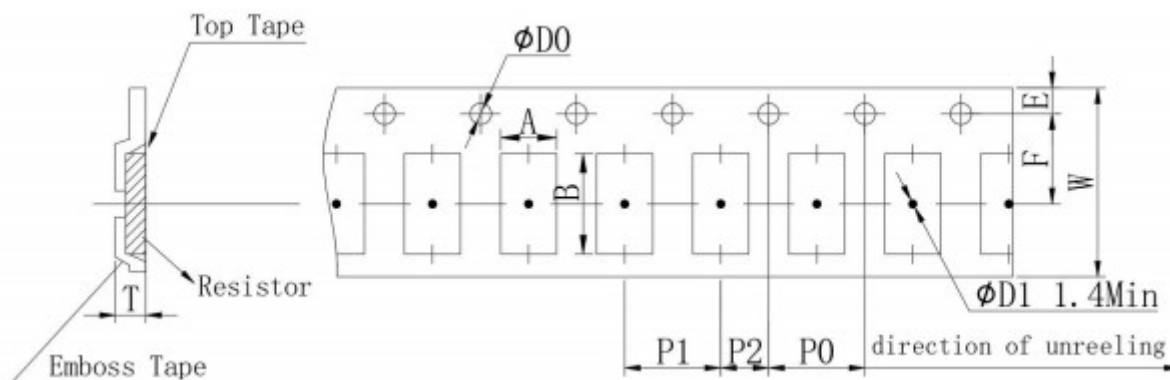
◆ 可靠性测试方法 Reliability Test Method

项目 Item	标准 Specifications	测试方法 Test Methods
电阻温度系数 T.C.R	在规定值内 Within specified T.C.R	IEC 60115-1 4.8 +20°C/+125°C/+20°C
短时过负载 Short time overload	无可见损伤 No mechanical damage $\Delta R \leq \pm 1.0\%R$	IEC 60115-1 4.13: 2.5 倍额定功率，保持 5 秒。 Rated Power × 2.5 for 5 seconds.
可焊性 Solderability	可焊面积 ≥ 95% 95% Cover Min	IEC 60115-1 4.17 245°C ± 5°C 锡槽，保持 3s ± 0.3s。 Lead-free solder bath at 245°C ± 5°C for 3s ± 0.3s.
耐焊接热 Resistance to Soldering Heat	无可见损伤 No mechanical damage $\Delta R \leq \pm 1.0\%R$	IEC 60115-1 4.18 270°C ± 5°C，保持 10s ± 1s。 Lead-free solder bath at 270°C ± 5°C for 10s ± 1s.

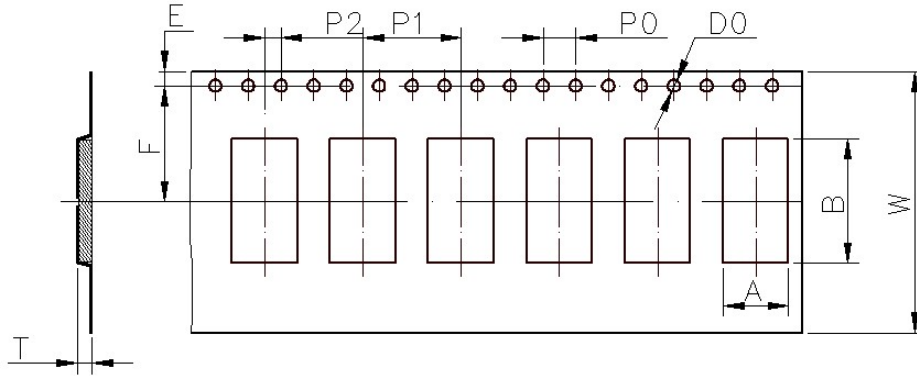
工作寿命 Operational Life	无可见损伤 No mechanical damage $\Delta R \leq \pm 1.0\%R$	AEC-Q200 Test 8/ MIL-STD-202 Method 108/IEC 60115-1 4.25.1 70°C ± 2°C, 1000 小时, 额定电流或元件极限电流 (取较小值), 通 1.5 小时/断 0.5 小时。 70°C ± 2°C, 1000h, rated current or limiting element current whichever is lower for 1.5h ON/0.5h OFF.
高温高湿 Biased Humidity	无可见损伤 No mechanical damage $\Delta R \leq \pm 1.0\%R$	AEC-Q200 Test 7/MIL-STD-202 Method 103 温度 85°C, 湿度 85%的条件下施加 10%额定功率 (电流) 或元件极限电流 (取较小值), 持续 1000 小时。 85°C/85%RH. 1000 hours, Apply 10% of operating power(current) or limiting element current whichever is lower.
热冲击 Thermal Shock	无可见损伤 No mechanical damage $\Delta R \leq \pm 1.0\%R$	AEC-Q200 Test 16/MIL-STD-202 Method 107 -55°C (15 分钟) ~ 常温 (≤ 20 秒) ~ 155°C (15 分钟), 300 个循环。 -55°C (15min) ~ normal temperature (≤ 20s) ~ 155°C (15min), 300 cycles.
上限类别温度耐久性 Endurance at Upper Category temperature	无可见损伤 No mechanical damage $\Delta R \leq \pm 1.0\%R$	AEC-Q200 Test 3/MIL-STD-202 method 108 /IEC 60115-1 4.25.3 170°C ± 2°C, 1000h
低温负载 Operation at Low Temperature	无可见损伤 No mechanical damage $\Delta R \leq \pm 1.0\%R$	IEC 60115-1 4.36 -55°C ± 5°C, 无负载 1 小时, 额定电流或元件极限电流 (取较小值) 45 分钟, 无负载 15 分钟。 -55°C ± 5°C, 1h without load, rated current or limiting element current whichever is lower for 45min, 15min without load
振动 Vibration	无可见损伤 No mechanical damage $\Delta R \leq \pm 1.0\%R$	AEC-Q200 Test 14/MIL-STD- 202 Method 204 频率: 10Hz ~ 2000Hz, 加速度: 5g's, 一个循环 20min, X、Y、Z 三个方向每个方向 12 个循环, 共 36 个循环。 Frequency: 10Hz ~ 2000Hz, acceleration: 5 g's, a loop 20min, X, Y, Z three directions, each direction 12 cycles, 36 cycles.
机械冲击 Mechanical Shock	无可见损伤 No mechanical damage $\Delta R \leq \pm 1.0\%R$	AEC-Q200 Test 13/MIL-STD-202 Method 213 正半弦波, 峰值加速度: 100g's, 脉冲持续时间: 6ms, 三轴六向各 3 次, 共 18 次。 Positive half wave, peak acceleration: 100g's, pulse duration: 6ms, three axis six to each 3 times, a total of 18 times.

◆ 包装 Packaging

*2512 型号载带图示:



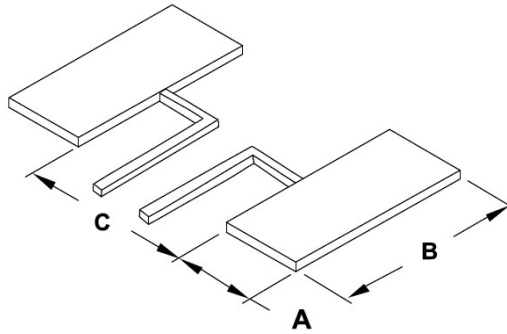
*3921/5931 型号载带图示:



Unit: mm

Type	A	B	W	E	F	P ₀	P ₁	P ₂	ØD ₁	T	Quantity (EA)
2512	3.5±0.1	6.8±0.1	16.0±0.1	1.75±0.10	7.5±0.1	4.0±0.1	8.0±0.1	2.0±0.1	1.50±0.10	1.8±0.1	4000
3921	5.5±0.1	10.3±0.1	24.0±0.1	1.75±0.10	11.5±0.1	4.0±0.1	12.0±0.1	2.0±0.1	1.50±0.10	2.5±0.1	2000
5931	8.2±0.1	16.1±0.1	32.0±0.1	1.75±0.10	11.5±0.1	4.0±0.1	12.0±0.1	2.0±0.1	1.50±0.10	2.5±0.1	2000

● 推荐焊盘尺寸 Solder pad dimensions



型号 Type	A(mm)	B(mm)	C(mm)
2512	1.80±0.25	3.60±0.25	3.80±0.25
3921	2.70±0.25	6.20±0.25	5.60±0.25
5931	5.20±0.25	8.75±0.25	5.60±0.25
5931 (0M10)	3.60±0.25	8.75±0.25	6.20±0.25