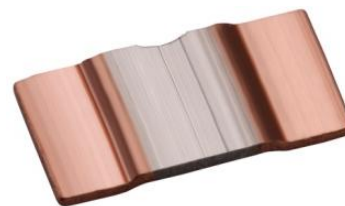


■车规片式分流电阻器 Chip Shunt Resistor Automotive Grade

◆特征 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.



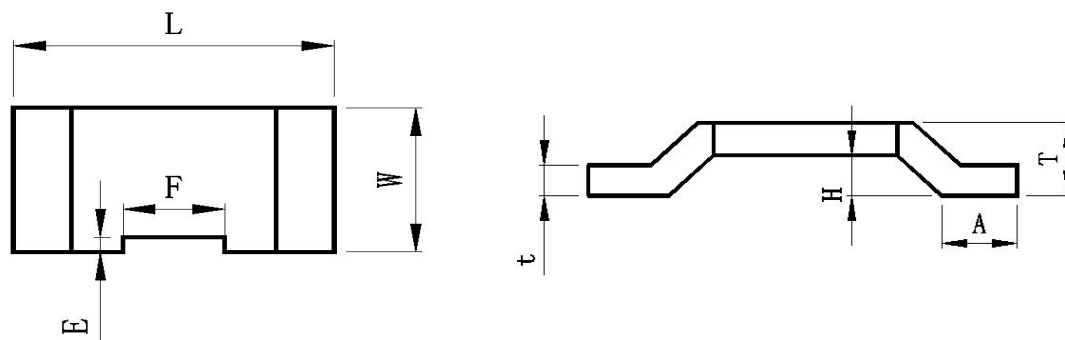
◆应用领域 Application

所有通用应用，汽车电子，工业电子。

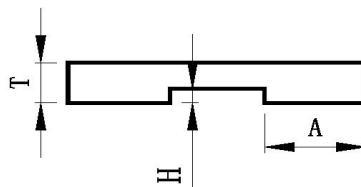
All general purpose applications, Car electronics, industrial application.

◆型号表示法 Part Number

AMS	V	3921	K	R001	F	T					
↓	↓	↓	↓	↓	↓	↓					
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/℃	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 : mΩ 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			K	±100		J	±5%		
	W	6W	3921	3921	J	±150					
	Z	7W			W	±200					
	A	8W			L	±250					
	I	9W	5931	5931							
	B	10W									
	C	15W									

◆产品结构 Construction


*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)	T (mm)	A (mm)	F (mm)	E (mm)
3921	0.2	MnCu	1.70±0.10	10.00 ±0.25	5.20 ±0.20	0.50 ±0.20	2.20±0.20	2.00±0.20	4.50±0.50	max. 1
	0.3		1.28±0.10				1.78±0.20			
	0.4		1.00±0.10				1.50±0.20			
	0.5		0.80±0.10				1.30±0.20			
	0.7		0.55±0.10				1.05±0.20			
	0.8		0.48±0.10				0.98±0.20			
	1	FeCrAl	1.25±0.10				1.75±0.20			
	2		0.62±0.10				1.12±0.20			
	3		0.42±0.10				0.92±0.20			
	4		0.35±0.10				0.85±0.20			
	5		0.28±0.10				0.78±0.20			
5931	0.1	MnCu	/	15.00 ±0.25	7.70 ±0.20	1.00±0.30	2.50±0.20	5.50±0.20	4.00±0.50	
	0.2		1.50±0.10			0.50 ±0.20	2.00±0.20	4.20±0.20	5.00±0.50	
	0.3		0.96±0.10				1.46±0.20			
	0.4		0.72±0.10				1.22±0.20			
	0.5		0.58±0.10				1.08±0.20			
	0.7		0.42±0.10				0.92±0.20			
	0.75		0.39±0.10				0.89±0.20			
	0.8		0.36±0.10				0.86±0.20			
	1	FeCrAl	0.94±0.10				1.44±0.20			
	2		0.48±0.10				0.98±0.20			
	3		0.31±0.10				0.81±0.20			
2512	0.2	MnCu	/	6.40 ±0.25	3.20 ±0.20	0.50 ±0.20	1.70±0.20	2.20±0.25	2.00±0.50	
	0.3		0.95±0.10				1.45±0.20	1.20±0.20	3.00 ±0.50	
	0.35		0.80±0.10				1.30±0.20			
	0.4		0.88±0.10				1.38±0.20			
	0.5		0.85±0.10				1.35±0.20			
	0.7		0.60±0.10				1.10±0.20			
	0.75		0.56±0.10				1.06±0.20			
	1		0.42±0.10				0.92±0.20			
	2	FeCrAl	0.67±0.10				1.17±0.20			
	3		0.45±0.10				0.95±0.20			
	4		0.32±0.10				0.82±0.20			
	5		0.32±0.10				0.82±0.20			

◆电性能参数 Electrical Performance Parameter

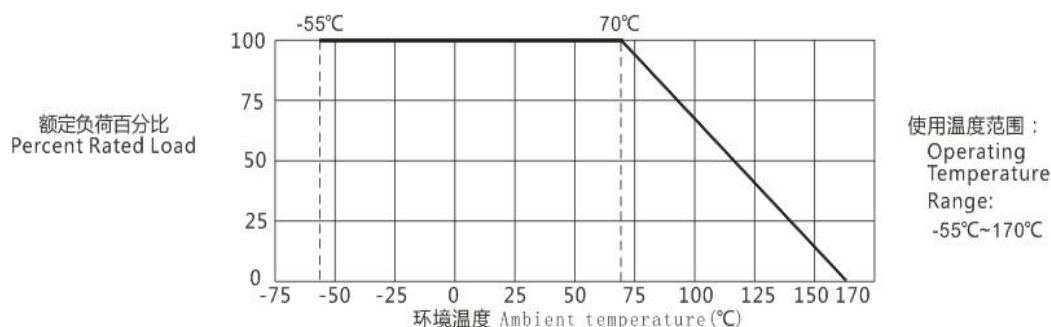
型号 Type	额定功率(70℃) Power Rating	电阻值 Resistance Value	TCR (PPM/°C)	使用温度范围 Operating Temp. Range
3921	5W - 9W	0.2mΩ	± 200	-55℃ ~ +170℃
		0.3mΩ、0.4mΩ、0.5mΩ	± 150	
	5W - 7W	0.7mΩ、0.8mΩ		
		1mΩ	± 75	
	5W - 6W	2m Ω、3mΩ		
	3W - 4W	4 mΩ、5mΩ		
5931	7W - 15W	0.1 mΩ、0.2 mΩ	± 200	
	7W - 10W	0.3 mΩ		
	7W - 9W	0.4mΩ		
		0.5mΩ		
		0.7mΩ、0.75mΩ、0.8mΩ	± 100	
			1mΩ	
	7W	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	±75	
3W - 4W		2.5mΩ、3mΩ		
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 6.2 +25℃/+125℃/+25℃
短时间过负载 Short Time Overload	无可见损伤 No mechanical damage $\Delta R \leq \pm 1.0\%R$	IEC 60115-1 8.1 5 倍额定功率，保持 5s。 5×Rated Power, for 5s.
可焊性 Solderability	可焊面积≥95% 95% Cover Min	IEC 60115-1 11.1 245℃±5℃锡槽，保持 3s±0.3s。 Lead-free solder bath at 245℃±5℃ 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 11.2 270℃±5℃锡槽，保持 10s±1s。 Lead-free solder bath at 270℃±5℃ 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℃±2℃，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℃±2℃,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℃，湿度 85%RH 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℃/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℃ (15 分钟) ~ 常温 (≤20 秒) ~ 155℃ (15 分钟)，300 个循环。 -55℃ (15min) ~ normal temperature(≤20s) ~ 155℃ (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 7.3 170°C $\pm 2^\circ\text{C}$, 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 10.2 -55°C $\pm 5^\circ\text{C}$, 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 $\pm 5^\circ\text{C}$, 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: 5 g'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.

◆ 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。

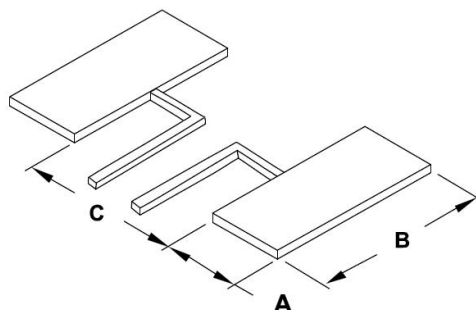
Note: For resistors operated in ambient over 70°C, rated load (rated power) shall be derated in accordance with the above figure.

◆ 包装 Packaging

包装方式见附录 Packaging can refer to the appendix

附录 Appendix I

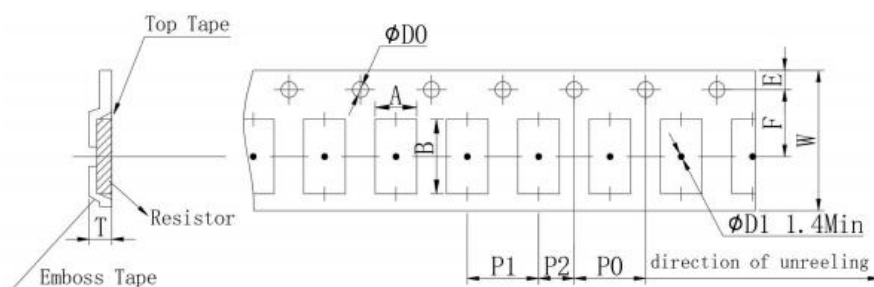
■ 推荐焊盘尺寸 Solder pad dimensions



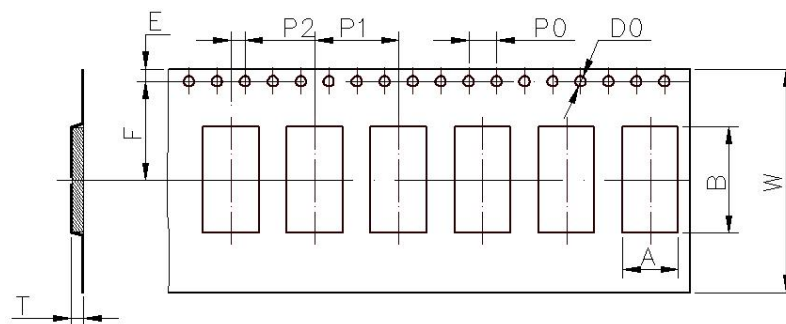
型号 Type	A(mm)	B(mm)	C(mm)
2512	1.80±0.25	3.60±0.25	3.80±0.25
3921	2.70±0.25	6.20±0.25	5.60±0.25
5931	5.20±0.25	8.75±0.25	5.60±0.25
5931 (0M10)	3.60±0.25	8.75±0.25	6.20±0.25

■ 包装 Packaging

*2512 型号载带图示:



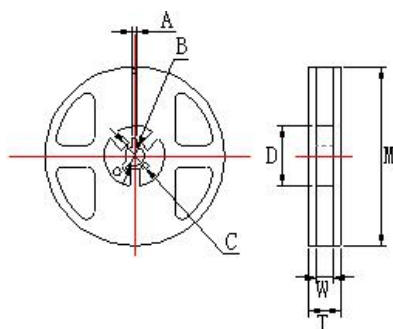
*3921/5931 型号载带图示:



单位: 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	5.7±0.1	11.2±0.1	24.0±0.1	1.75±0.10	7.5±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

■ 卷盘 Reel



单位 unit: mm

卷盘尺寸 Reel Type	型号 Type	M	W	T	A	B	C	D
13 英寸 13inch dia.Reel	2512	330±2.0	17.0±0.5	21.0±1.5	2.5±0.5	13.5±0.5	17.0±0.5	99.0±1.0
	3921	330±2.0	25.0±0.5	29.0±1.5	2.5±0.5	13.5±0.5	17.0±0.5	99.0±1.0
	5931	330±2.0	33.0±0.5	37.0±1.5	2.5±0.5	13.5±0.5	17.0±0.5	99.0±1.0

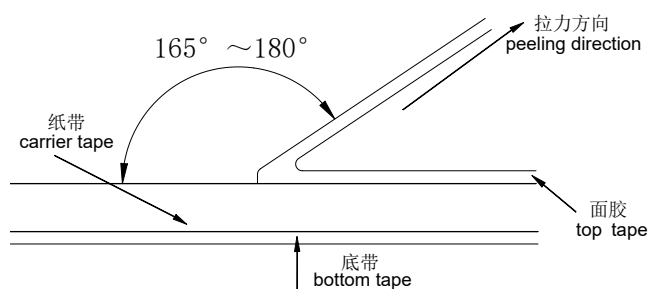
● 编带包装能力 Taping Ability

面带拉力 Top tape peel strength

面带拉力强度 11g~70g (0.1N~0.7N)，速度：300mm/min, 经下列试验后不允许有破裂断带现象。

Peel strength is 11g~70g (0.1N~0.7N), with speed of 300mm/min, and should not have flash and tear after peeling.

测试方法 Test method:



电阻松动自如，无粘面胶带、底胶带现象。

Resistor is free, no sticking to top tape and bottom tape.

电阻易从纸带中取出，且晶片孔无机械损伤。

Resistor is easy to take out from carrier tape and chip hole have no mechanical damage.

● 包装数量 Packaging Quantity

包装方法 Packaging style	13 英寸 13inch dia.Reel		
型号 Type	2512	3921	5931
数量 Quantity (pcs)	4000	2000	2000

◆储存方法 Storage conditions

温度 5℃~30℃, 相对湿度 30% RH~70% RH。建议在符合上述储存条件下十二个月内使用。

T: 5℃~30℃, RH: 30%RH~70%RH. The products are suggested to be used within twelve months when received, and the storage condition mentioned above should be followed.

■电流检测电阻阻值代码及标记规则

Description for resistance Value Code and Marking of Current Sensing Thick Film Chip Resistor

● 阻值代码 Resistance Value Code

所有电流检测电阻全尺寸统一采用四位数阻值代码表示。

All resistance value code of current sensing thick film chip resistor used four digits.

例 Example

MSV3921KR001FT

四位数字表示, 如: R001=1mΩ; 0M50=0.5mΩ

To use four digits codes represent resistance value,

例 Example R001=1mΩ; 0M50=0.5mΩ

● 标记 Marking

*E-24 和 E-96 系列 (2512、3921、5931, ≤±5%): 采用四位标记代码。

For (2512、3921、5931, ≤±5%), when resistance value belongs to E24 and E96 series, we suggest preferentially use four digits.

标记代码 Mark Code	阻值范围 Resistance Value	示例 Sample
R00×	1mΩ ≤ R ≤ 5mΩ	R005=5mΩ
×M××	0.1mΩ < R ≤ 5mΩ (包含小数点后两位有效数字) (Contains two significant digits after the decimal point.)	0M50=0.5mΩ

*非 IEC 标准系列的电阻标记表示方法: 一般以最接近 IEC E24 系列标称阻值的标记表示方法。

For the resistance values which don't belong to IEC serial, use the resistance of IEC serial which is most close to the required resistance of non-IEC serial for replacement.

* 客户对标记有特殊要求时, 则按照协商的结果印刷标记。

To get agreement by both party if there special requirement for the marking.

◆使用前的注意事项 Precautions before use

● 本产品在以下特殊环境下应用, 性能可能会受到影响:

- 1、在各种类型的液体, 包括水、油、化学品、有机溶剂的使用。
- 2、在户外直接暴露在阳光的地方, 或在灰尘多的地方使用。
- 3、在产品暴露的地方, 有海风或腐蚀性气体, 包括氯气、硫化氢、氨气、二氧化硫、二氧化氮。
- 4、在产品暴露于静电或电磁波的地方使用。
- 5、在产生热量的部件、塑料线, 或其他易燃物品附近使用。
- 6、在用树脂或其他涂层材料密封产品的情况下使用。
- 7、焊接后使用不洁焊料或使用水或水溶性清洗剂清洗产品。

● Application of the products in a special environment can deteriorate product performance:

- 1、 Use in various types of liquid, including water, oils, chemicals, and organic solvents.
- 2、 Use outdoors where the products are exposed to direct sunlight, or in dusty places.
- 3、 Use in places where the products are exposed to sea winds or corrosive gases, including Cl₂, H₂S, NH₃, SO₂, and NO₂ etc.
- 4、 Use in places where the products are exposed to static electricity or electromagnetic waves.
- 5、 Use in proximity to heat-producing components, plastic cords, or other flammable items.
- 6、 Use involving sealing or coating the products with resin or other coating materials.
- 7、 Use involving unclean solder or use of water or water-soluble cleaning agents for cleaning after soldering.

● 产品使用注意事项

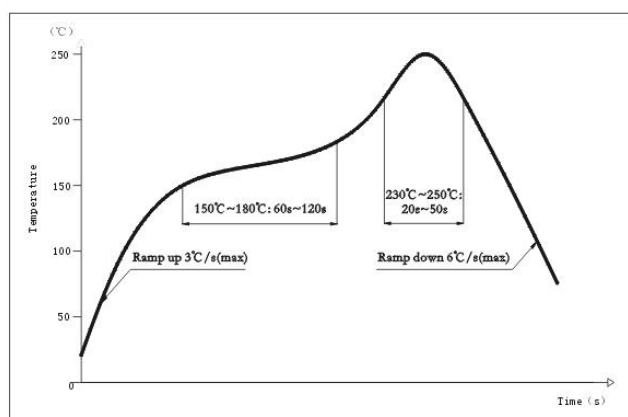
- 1、 避免采用超过正常额定功率的功率，超过额定功率的稳态负载条件下可能会对产品性能和可靠性产生负面影响。
- 2、 用镊子拿起产品时要小心，有可能会将保护或电阻体夹碎。
- 3、 手动安装产品时，烙铁头勿触碰产品。
- 4、 用于车载设备、医疗设备、航空设备以及其他涉及人身安全、或可能引起重大损失的设备上时，请务必事先与我公司联系。这些产品在这类用途中出现故障或失灵可能导致人身事故或严重损坏。

● Precautions on use of products

- 1、 Avoid applying power exceeding normal rated power, exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.
- 2、 Be careful when pick up the products with tweezers. There may be a care that the overcoat and / or the body can be chipped.
- 3、 Soldering tip shall not touch the product when install product manually.
- 4、 Contact our sales representatives before you use our products for applications including automotive, medical equipment and aerospace equipment. Malfunction or failure of the products in such applications may cause loss of human life or serious damage.

■ 推荐安装/焊接方法 Recommended installation/welding method

● 推荐的回流焊曲线 Recommended reflow profile



● 推荐的焊膏类型 Recommended solder alloy: 96.5Sn-3.0Ag-0.5Cu

◆修订履历 Revision History

版本 Version	日期 Date	修订内容 Change Description	修订确认 Checked by
I 6.0	2025-09-04	-附录：修改储存方法。 - Appendix: Modify the storage conditions.	刘瀚阳 Hanyang Liu
I 5.0	2025-08-26	-修改“应用领域” Revise the application. -修改“可靠性测试方法”中试验的引用标准 Revise the reference standard for tests in "Reliability Test Method" -修改“可靠性测试方法”中“短时过负载”的测试方法 Revise the test methods of Short Time Overload in Reliability Test Method. -按最新文件要求，统一格式以及相关描述。 According to the latest document requirements, the format and related descriptions are unified.	关育善 Yushan Guan
I 4.0	2025-06-18	-修改“型号表示法”的参数 Revised the parameters of Part Number. -修改“包装”的参数 Revised the parameters of packaging. -新增及修改部分产品的规格尺寸 Add and revised the dimensions of products. -修改“产品结构图”的参数 Revised the parameters of Construction. -修改附录 Revised the Appendix	关育善 Yushan Guan
I 3.0	2023-4-25	-修改特点、 型号表示方法、 规格尺寸、 额定值、特性的参数。 Revisethe parameters of Features,part Number, Dimensions,Ratings and characteristics.	敖桂荣 Guirong Ao
I 2.0	2023-12-18	-特点:增加潮敏等级 MSL1 Features:add the MSL 1 - 品名构成:增加 13 寸卷盘代号, 删除±2%、±10%、±20%精度 part number: add 13inch reelcode,delete toleranceof ±2%、 ±10%、 ±20%. - 附录: 增加 13 寸卷盘编带尺寸; 增加 0508、 0612、 1225 包装、 阻值代码及标记规则。 Appendix: add the dimentions of 13 inch reel; Add the parameters of 0508、 0612、 1225.	卢振强 zhenqiang Lu
I 1.0	2023-02-14	-原版 The original version	杨理强 Liqiang yang

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