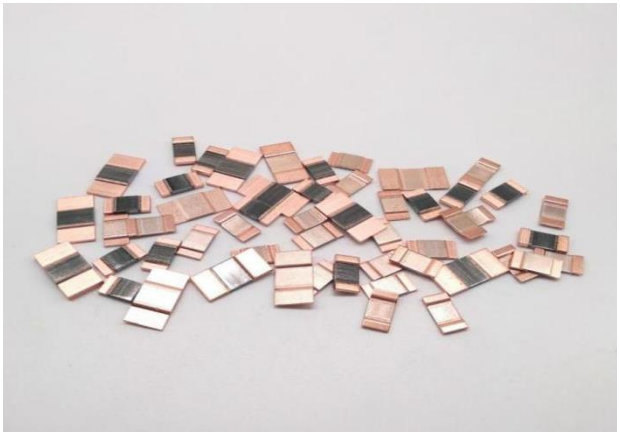


General

- Chip size from 2512 to 5931.
- Resistance value from 0.1mΩ to 5mΩ
- Low thermal EMF.
- Low TCR.
- Lead free, RoHS compliant for global.
- Applications and halogen free.

Application

- Switching model power supply.
- Battery pack.
- Notebook, personal computer.
- Test Instrument.
- Power Amplifier.
- AEC-Q200 qualified(1).

Electrical Specifications

Type	Power Rating at 125℃(W)	Resistance Range (mΩ)	Material	TCR +25℃~+125℃ (ppm/℃)	Resistance tolerance	Operation Temp. Range
2512	5	0.5、1	MnCu	±150	±0.5%(D) ±1%(F) ±2%(G) ±5%(J)	-55℃~+170℃
		2、3	FeCr/ Karma	±75		
3921	12	0.2	MnCu	±150		
	9	0.3、0.5、1				
		1	Karma	±75		
	5	1、2、3、4、5	FeCr			
5931	15	0.1	CuMnSn	±300		
		0.2	MnCu	±150		
	10	0.3、0.5				
		1	FeCr	±75		
	7	2、3				

Part Number information

SMSAP 39 M 9 F R001 T

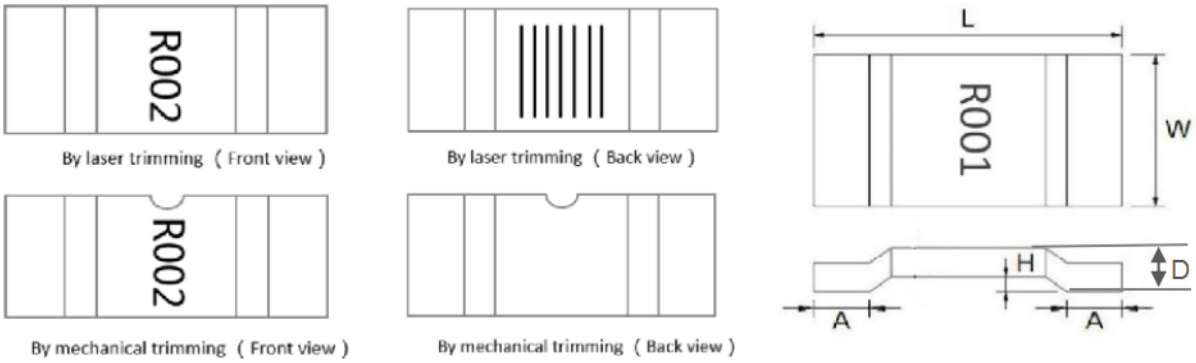
【1】 【2】【3】【4】 【5】【6】 【7】

【1】Series Name: SART Shunt Type, Automotive grade
【2】Chip size: 25:2512 39:3921 59:5931
【3】Material Code: M: MnCu F：FeCr K:Karma S: CuMnSn
【4】Power Code: 5:5W 7:7W 9:9W I:10W M:12W N:15W
【5】Resistance Tolerance: D:±0.5% F:±1% G:±2% J:±5%
【6】Resistance Code: 0L20=0.2mΩ R001=1mΩ
【7】Packaging Code: T: Tape& Reel B:Bulk Pack

Nanjing SART Science& Technology Development Co., Ltd.
ADD.: Maqun Science & Technology Park, Qingma Road 6#, Nanjing, China
TEL.: 086-25-84354852 FAX.:086-25-83241791 Web.: www.sartfuse.com

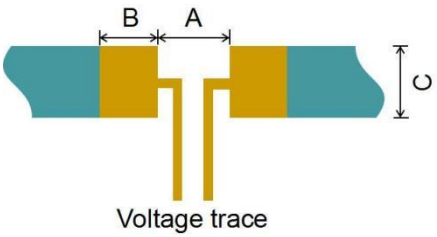
(1) Flame retardance test may not be applicable to some resistor technologies.
(2) Resistance test results should be measured at room temperature in accordance with the recommended pad size.

Dimensions



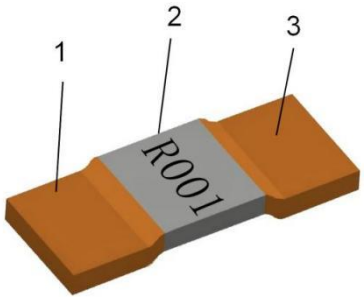
Type	Resistance range (mΩ)	L (mm)	W (mm)	A (mm)	H (mm)	D (mm)
2512	0.5~3	6.40±0.30	3.20±0.30	1.50±0.50	0.50±0.10	≤1.50
3921	0.2~5	10.00±0.30	5.20±0.30	2.00±0.30	0.50±0.10	≤2.40
5931	0.1	15.00±0.30	8.20±0.30	4.50±0.30	0.50±0.30	≤2.20
	0.2~3	15.00±0.30	7.70±0.30	4.20±0.30	0.50±0.10	≤2.20

Recommended Land Patterns



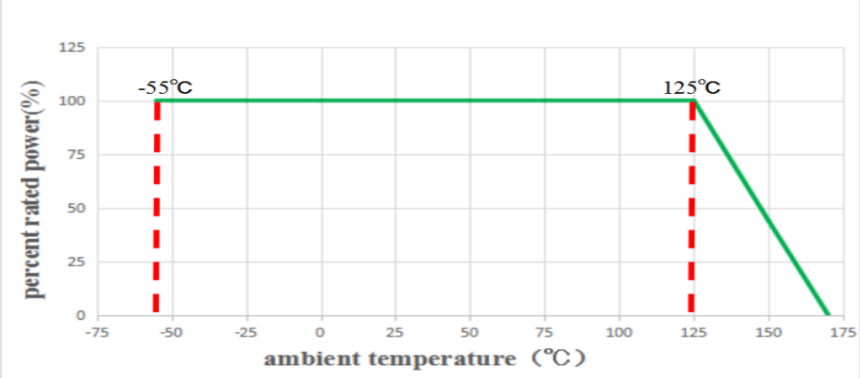
Type	A (mm)	B (mm)	C (mm)
2512	3.40	1.80	3.40
3921	5.60	2.70	6.20
5931	5.60	5.20	8.75

Materials

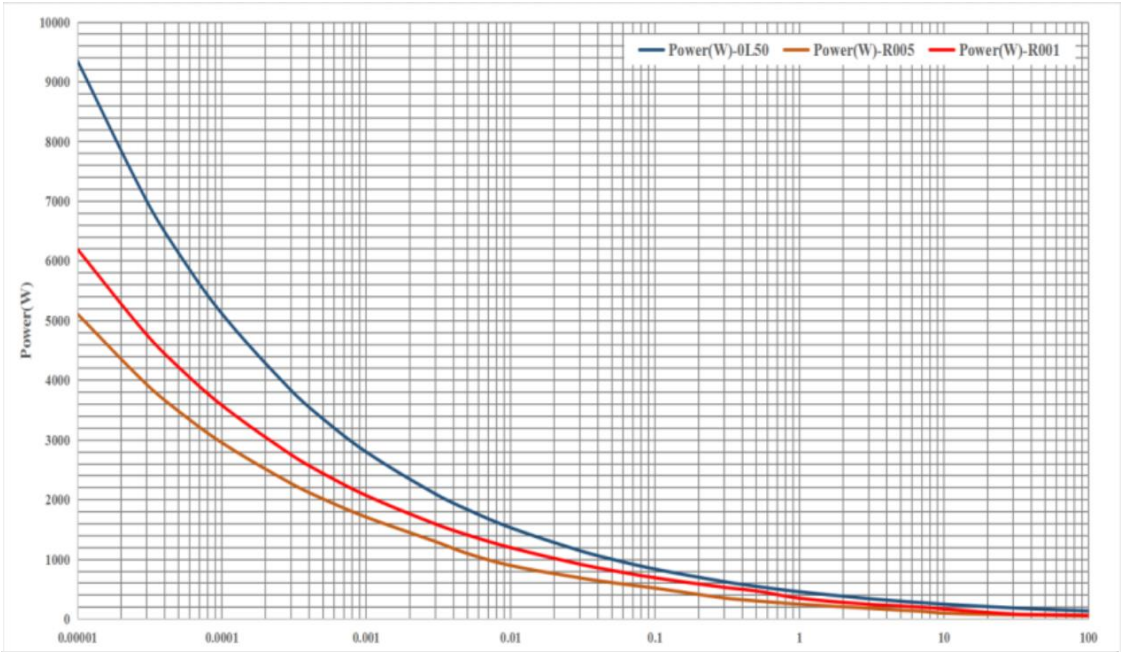


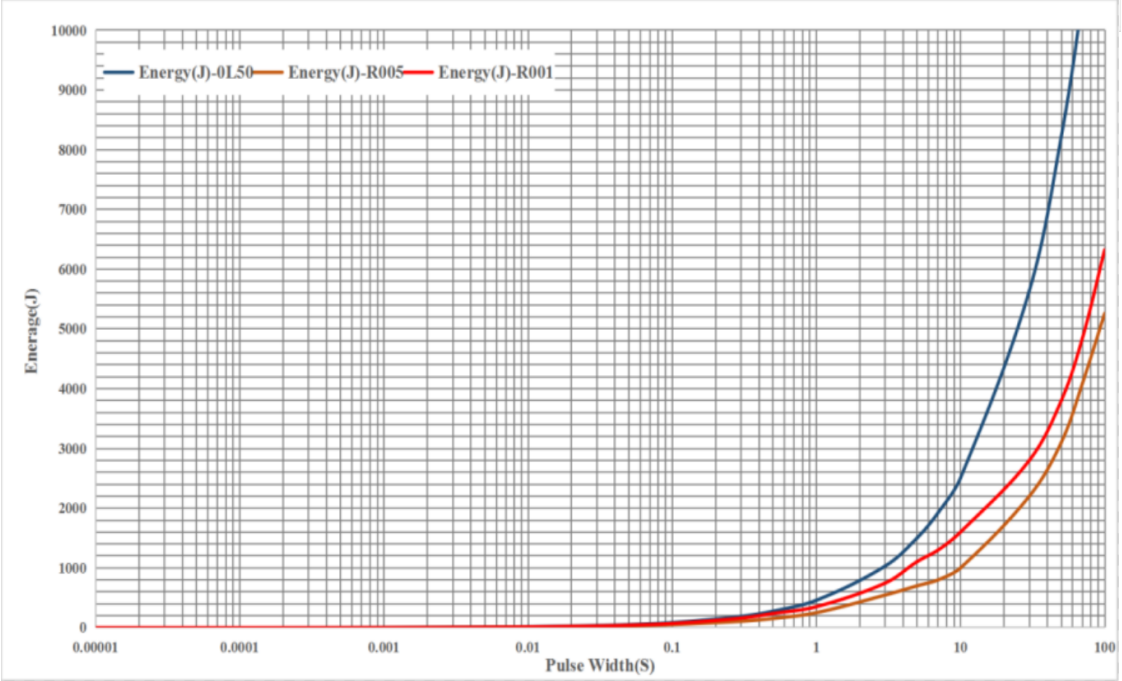
No.	Materials
1	Copper electrode
2	MnCu/FeCr/Karma/CuMnSn
3	Copper electrode

Power Derating Curve



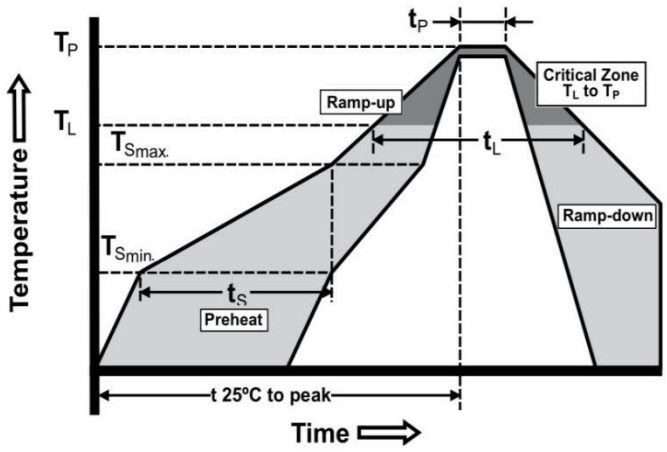
Maximum Pulse Power and Pulse Energy





Recommended Solder Curve

1. Infrared Reflow
   - Temperature: 260℃
   - Time: 5s Max.
   - Recommend Reflow profile:



Profile Feature	Pb-Free Assembly
Average Ramp-up Rate (Ts_{max} to Tp)	3℃/s Max.
Preheat Temperature Min.(Ts_{min}) Temperature Max.(Ts_{max}) Time(Ts_{min} to Ts_{max})	 150℃ 200℃ 60s~120s
Peak Temperature(Tp)	260℃
Time within 5℃ of actual Peak Temperature(Tp)	5s
Melting tin time(T_L)	20s~30s
Ramp-down Rate	6℃/s Max.
Time 25℃ to peak Temperature	8 min Max.

2. Hand Soldering
   - Temperature: 350℃
   - Time: 10s Max.

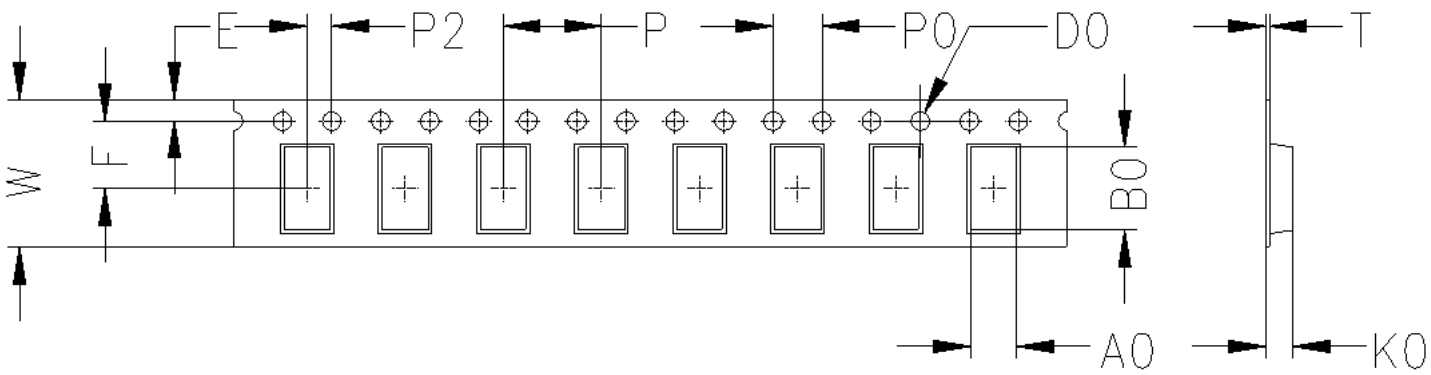
Product Characteristics

Item	Test condition/ Methods	Performance	Standard
Resistance	Measuring resistance value at room temperature 25℃±5℃	Refer to SART Spec	IEC60115-1 4.5
Temperature coefficient of resistance	TCR =(R-R_0)/R_0(T2-T1)X 10^6 T1 T2 Test temperature：+25℃~+125℃	Refer to SART Spec	MIL-STD-202 Method 304
Short time Overload	5 times the rated power for 5 s	|△R|≤±1%	IEC 60115-1 4.13
Solderability	Solder bath method (245 ± 5) °C (10 ± 2) s	95% coverage Min	J-STD-002
Resistance to Soldering Heat	260℃± 5℃ 10 s± 0.5 s	|△R|≤±1%	MIL-STD-202 Method 210
Temperature Cycling	-55℃ (15min)/+150℃(15min), 1000 cycles	|△R|≤±1%	JESD22 Method JA-104
High Temperature Storage	170℃ for 1000hours, No power	|△R|≤±1%	MIL-STD-202 Method 108
Temperature Humidity Bias Test	+85℃，85% RH，10%bias, 1000 hours	|△R|≤±0.5%	MIL-STD-202 Method103
Mechanical shock	100 g's ,6 ms, 5 pulses	|△R|≤±0.5%	MIL-STD-202 Method 213

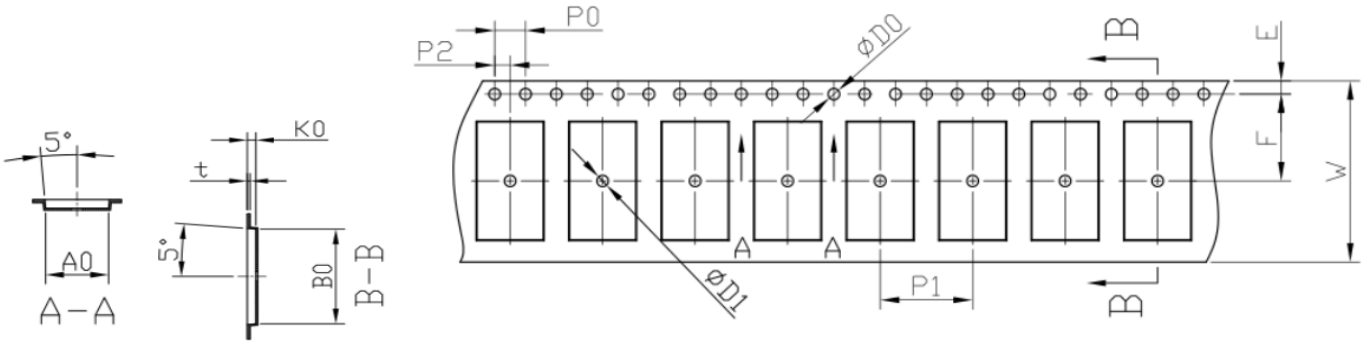
Vibration	Frequency：10Hz ~2000Hz acceleration：5g's for 20 min, 12 cycles each of 3 orientations	|△R|≤±0.5%	MIL-STD-202 Method 204
Load life	125℃± 2℃ for 1000 hours, Rated power	|△R|≤±1%	MIL-STD-202 Method 108
Moisture resistance	MIL-STD-202,method 106， No power, 7b not required	|△R|≤±1%	MIL-STD-202 Method 106
Board Flex	Bending amplitude 2mm for 60s	|△R|≤±1%	AEC Q200-005
Terminal Strength	Appling force 17.7N for 60 s	|△R|≤±1%	AEC-Q200-006

Packaging

1. Embossed Tape Dimensions

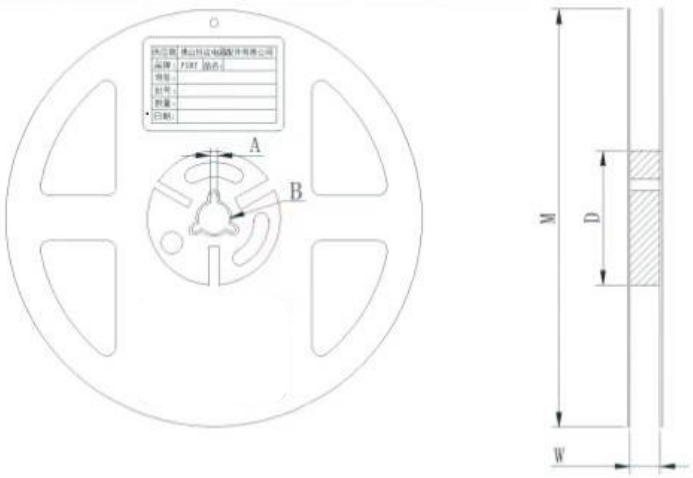


Type	A0 (mm)	B0 (mm)	W (mm)	E (mm)	F (mm)	D0 (mm)
2512	3.75±0.10	6.75±0.10	12.00±0.30	1.75±0.10	5.50±0.10	1.50±0.10
Type	T (mm)	K0 (mm)	P (mm)	P0 (mm)	P2 (mm)	/
2512	0.30±0.05	2.20±0.10	8.00±0.10	4.00±0.10	2.00±0.10	/

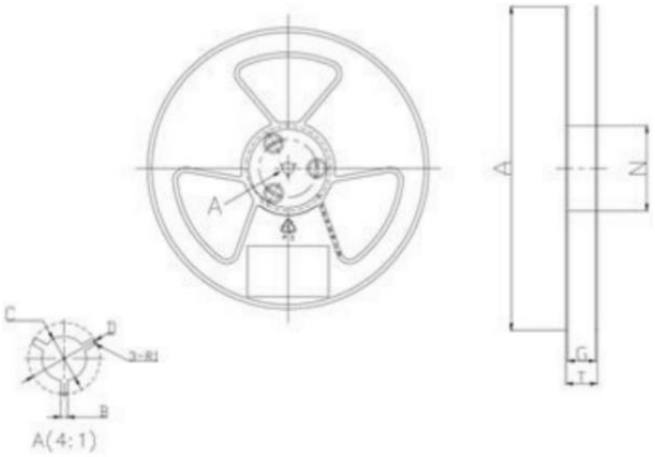


Type	A0 (mm)	B0 (mm)	E (mm)	F (mm)	W (mm)	t (mm)
3921	6.00±0.20	10.60±0.20	1.75±0.10	11.50±0.10	24.00±0.30	0.40±0.05
5931	8.60±0.20	15.60±0.20	1.75±0.10	11.50±0.10	24.00±0.30	0.40±0.05
Type	P0 (mm)	P1 (mm)	P2 (mm)	D0 (mm)	D1 (mm)	K0 （mm）
3921	4.00±0.10	8.00±0.10	2.00±0.05	1.50±0.10	1.50±0.10	1.20±0.10/2.50±0.10
5931	4.00±0.10	12.00±0.10	2.00±0.05	1.50±0.10	1.50±0.10	1.20±0.10/2.35±0.10

2. Reel Dimensions



Type	W (mm)	M (mm)	A (mm)	B (mm)	D (mm)
2512	12.80±0.50	178.00±1.00	2.40±1.00	13.50±1.00	60.00±2.00

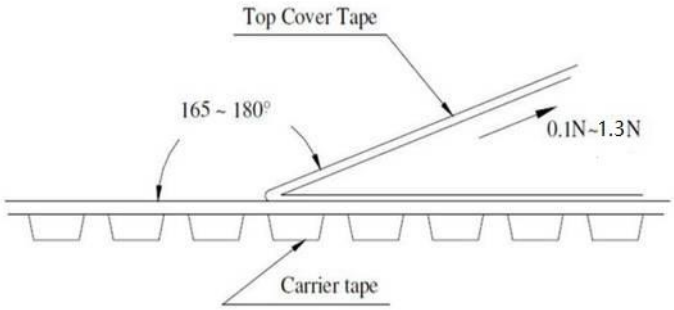


Type	A (mm)	N (mm)	C (mm)	D (mm)	B (mm)	G (mm)	T (mm)
3921	330.00±2.00	100.00±1.50	13.00±0.50	21.00±0.50	2.30±0.50	24.50±1.50	28.50±2.00
5931	330.00±2.00	100.00±1.50	13.00±0.50	21.00±0.50	2.30±0.50	24.50±1.50	28.50±2.00

3. Quantity of Package

Type	Resistance Range (mΩ)	Quantity (pcs)
2512	0.5、1、2、3	1000
3921	2、3、4、5	2500
	0.2、0.3、0.5、1	1500
5931	0.5、2、3	2000
	0.1、0.2、0.3、1	1000

4. Peeling Test



Storage

- The ambient temperature shall between 5℃~30℃.
- The relative humidity recommended for storage is between 25%~60%.
- Sealed plastic bags with desiccant shall be used to reduce the oxidation of the termination and shall only be opened prior to use.
- The products shall not be stored in areas where harmful gases containing sulfur or chlorine are present.