



General

- Chip size from 0402 to 2512
- Resistance value from 10mΩ to 1000mΩ
- Compatible with Reflow and Wave Soldering processes
- Lead free, ROHS compliant for global
- Applications and halogen free

Application

- Switching model power supply
- Battery pack
- Notebook, personal computer
- Test Instrument
- Power Amplifier

Electrical Specifications

Type	Power Rating at 70°C (W)	Resistance Range (mΩ)	TCR (ppm/°C)	Resistance Tolerance	Operation Temp. Range
0402	1/16、1/6	100≤R<200	±700	±1%(F) ±2%(G) ±3%(H) ±5%(J)	-55°C~+155°C
		200≤R≤499	±500		
		500≤R≤999	±400		
0603	1/10、1/8、1/5	10≤R<33	±1500		
		33≤R<68	±1000		
		68≤R<100	±800		
		100≤R<200	±700		
		200≤R≤499	±500		
		500≤R≤999	±400		
0805	1/8、1/4	10≤R<20	±1500		
1206	1/4、1/2	20≤R<50	±1000		
1210	1/3、1/2	50≤R<100	±800		
2010	3/4、1	100≤R<200	±700		
2512	1、2	200≤R<500	±500		
		500≤R≤999	±400		

Part Number Information

SK 12 G D F R010 I
【1】 **【2】** **【3】** **【4】** **【5】** **【6】** **【7】**

【1】 Series Name: SART Thick Film Low Resistance Type

【2】 Chip size: 04: 0402 06: 0603 08:0805 12:1206 13:1210 20:2010 25:2512

【3】 Material Code: G:Ag Alloy

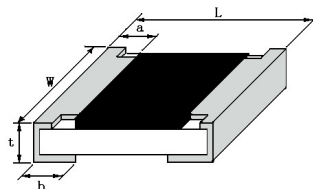
【4】 Power Code: 1:1W A:1/2W C:3/4W D:1/4W F:1/8W G:1/10W H:1/16W L:1/20W

【5】 Resistance Tolerance: F:±1% G:±2% H:±3% J:±5%

【6】 Resistance Code: R010=10mΩ 6M50=6.5mΩ

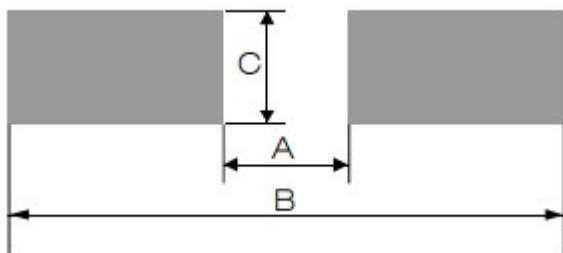
【7】 Packaging Code: T:Tape& Reel B:Bulk Pack

Dimensions



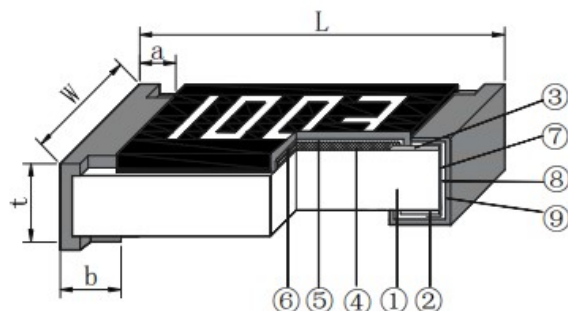
Type	L(mm)	W(mm)	t(mm)	a(mm)	b(mm)
0402	1.00±0.10	0.50±0.05	0.30±0.05	0.20±0.10	0.25±0.10
0603	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20
0805	2.00±0.10	1.25±0.15	0.50±0.10	0.30±0.20	0.40±0.20
1206	3.20±0.20	1.60±0.15	0.55±0.10	0.50±0.20	0.50±0.20
1210	3.20±0.20	2.50±0.20	0.55±0.10	0.50±0.20	0.50±0.20
2010	5.00±0.20	2.50±0.20	0.55±0.10	0.60±0.20	0.60±0.20
2512	6.30±0.20	3.20±0.20	0.55±0.10	0.60±0.20	0.60±0.20

Recommended Land Patterns



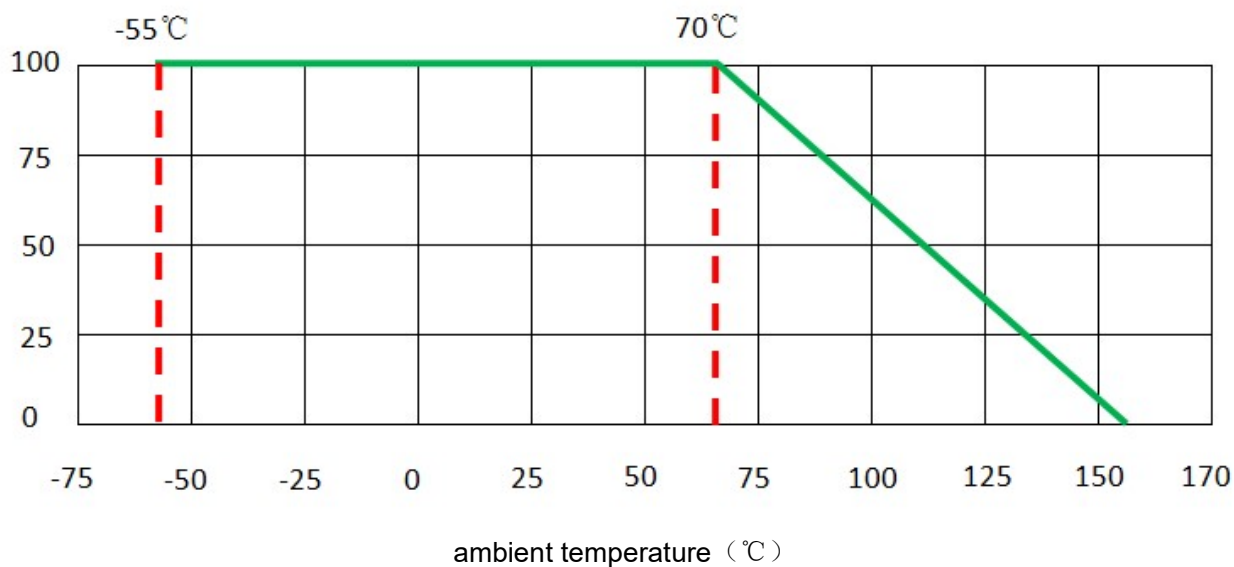
Type	A(mm)	B(mm)	C(mm)
0402	0.45±0.05	1.45±0.05	0.60±0.05
0603	0.80±0.05	2.50±0.05	0.95±0.05
0805	1.05±0.10	3.25±0.10	1.40±0.10
1206	1.90±0.10	4.50±0.10	1.75±0.10
1210	2.00±0.10	4.60±0.10	2.70±0.10
2010	3.50±0.10	6.50±0.10	2.70±0.10
2512	4.80±0.10	7.80±0.10	3.40±0.10

Materials



No.	Materials	No.	Materials
1	Ceramic	6	Marking
2	Bottom Electrode	7	Edge Electrode
3	Top Electrode	8	Barrier Layer
4	Resistive layer	9	External Electrode
5	Protective coating	/	

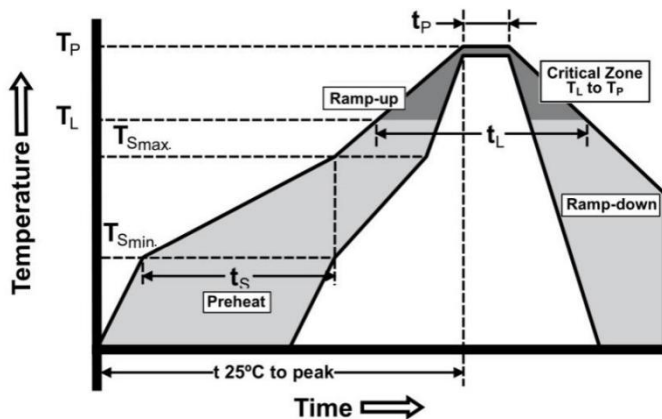
Power Derating Curve



Recommended Solder Curve

1. Infrared Reflow

- Temperature: 240°C~260°C
- Time: 10sec Max.
- Recommend Reflow profile:



Profile Feature	Pb-Free Assembly
Average Ramp-up Rate (T _{Smax} to T _P)	3°C/sec Max.
Preheat Temperature Min.(T _{Smin}) Temperature Max.(T _{Smax}) Time(T _{Smin} to T _{Smax})(t _S)	150°C 200°C 60sec~120sec
Peak Temperature(T _P)	240°C~260°C
Time(tp) within 5°C of actual Peak Temperature(T _P)	10sec Max.
Melting tin time(t _L)	60sec ~150sec
Ramp-down Rate	6°C/sec Max.
Time 25°C to peak Temperature	8 min Max.

2.Wave soldering

- Reservoir Temperature:250°C~260°C
- Time in Reservoir:10sec Max.

3. Hand Soldering

- Temperature: 350°C
- Time: 3sec Max.

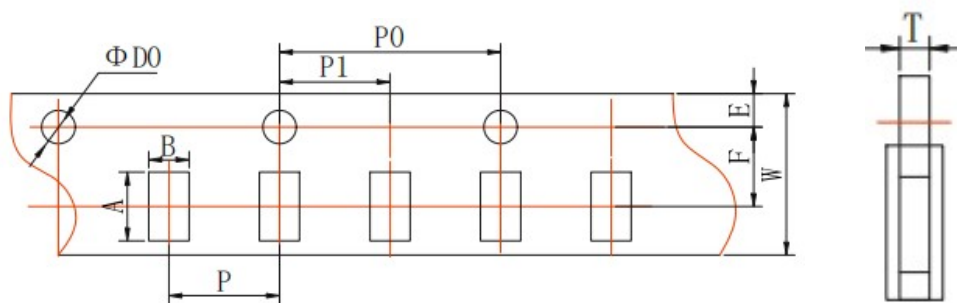
Product Characteristics

Item	Test Condition/ Methods	Performance	Standard
Short Time Overload	2.5X rated power for 5sec	$ \Delta R \leq 1.0\%R + 0.5m\Omega$	IEC60115-1 4.13
Temperature Coefficient of Resistance (T.C.R.)	$TCR = \frac{(R - R_0)}{R_0} \frac{(T_2 - T_1)}{T_1} \times 10^6$ Test temperature: +25°C~+125°C	Refer to SART Spec	IEC60115-1 4.8
Load Life	1000 hours at rated power, 70°C ± 2°C, 1.5hours "ON", 0.5hours "OFF"	$ \Delta R \leq 2.0\%R + 0.5m\Omega$	IEC60115-1 4.25.1
Bias Humidity	40°C ± 2°C, 93% ± 3% RH, 1000 hours at rated power, 1.5 hours "ON", 0.5 hours "OFF"	$ \Delta R \leq 3.0\%R + 0.5m\Omega$	IEC60115-1 4.24
Thermal Shock	-55°C (30min)/+155°C (30min), 300 cycles	$ \Delta R \leq 1.0\%R + 0.5m\Omega$	IEC60115-1 4.19
Solderability	245°C ± 5°C, 3sec ± 0.3sec	95% coverage Min.	IEC60115-1 4.17

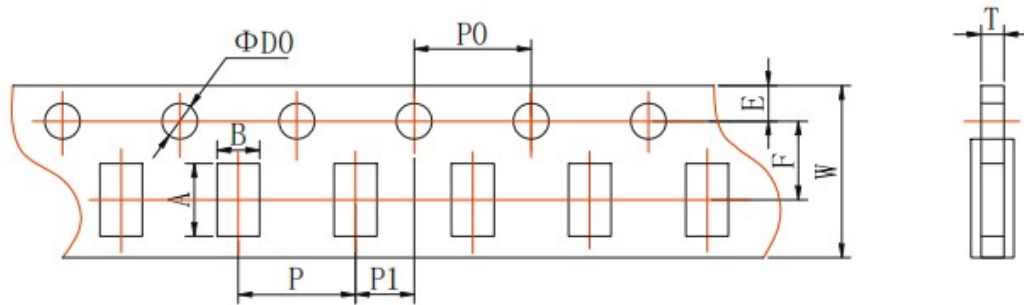
Resistance to Soldering Heat	270°C ± 5°C, 10sec ± 1sec	$ \Delta R \leq 1.0\%R + 0.5m\Omega$	IEC60115-1 4.18
High temperature Exposure	155°C ± 2°C, 1000 hours	$ \Delta R \leq 1.0\%R + 0.5m\Omega$	IEC60115-1 4.25.3
Bending Test	Epoxy thickness 1.6mm, fulcrums distance 90mm, bending width 5mm(0402\0603\0805), bending width 4mm(1206\1210), bending width 2mm(2010\2512); Duration: 60S ± 5S	$ \Delta R \leq 1.0\%R + 0.5m\Omega$	IEC60115-1 4.33
Insulation Resistance	(100V ± 15V) DC, For 1 Min	1000MΩ Min.	IEC60115-1 4.6
Operation at low temperature	-55°C ± 5°C, 1hour without load, rated voltage or limiting element voltage whichever is lower for 45 min, 15min without load	$ \Delta R \leq 1.0\%R + 0.5m\Omega$	IEC60115-1 4.36
Voltage proof	Apply max. overload voltage of AC RMS at a rate of approximately 100V/sec between substrate and terminations for 60sec ± 5sec	No breakdown or flash-over	IEC60115-1 4.7
Component solvent resistance	Iso-propyl alcohol (IPA) 23°C ± 5°C, 10hour	$ \Delta R \leq 1.0\%R + 0.5m\Omega$	IEC60115-1 4.29
Shear test	Applying force: 0402、0603: 5N; 0805: 9N; 1206, 1210: 25N; 2010, 2512: 45N Duration: 10sec ± 1sec	No mechanical damage	IEC60115-1 4.32

Packaging

1. Tape Packaging Dimensions

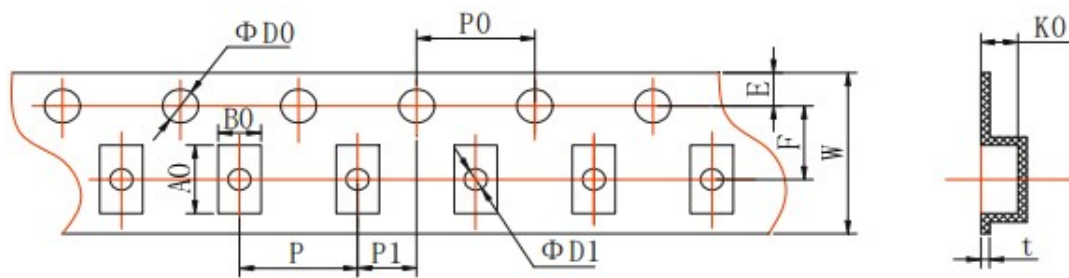


Type	A (mm)	B (mm)	W (mm)	F (mm)	E (mm)
0402	1.20 ± 0.10	0.70 ± 0.10	8.00 ± 0.20	3.50 ± 0.05	1.75 ± 0.10
Type	P (mm)	P0 (mm)	P1 (mm)	ΦD0 (mm)	T (mm)
0402	2.00 ± 0.05	4.00 ± 0.10	2.00 ± 0.05	1.50 ± 0.10	0.42 ± 0.05



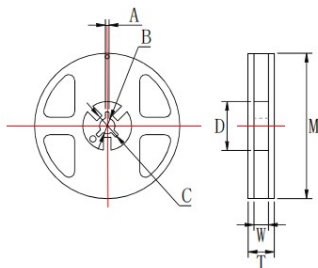
Type	A (mm)	B (mm)	W (mm)	F (mm)	E (mm)
0603	1.85 ± 0.10	1.10 ± 0.10	8.00 ± 0.20	3.50 ± 0.05	1.75 ± 0.10
0805	2.35 ± 0.10	1.65 ± 0.10	8.00 ± 0.20	3.50 ± 0.05	1.75 ± 0.10
1206	3.50 ± 0.20	1.90 ± 0.20	8.00 ± 0.20	3.50 ± 0.05	1.75 ± 0.10
1210	3.50 ± 0.20	2.80 ± 0.20	8.00 ± 0.20	3.50 ± 0.05	1.75 ± 0.10
Type	P (mm)	P0 (mm)	P1 (mm)	ØD0 (mm)	T (mm)
0603	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	1.50 ± 0.10	0.60 ± 0.10
0805	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	1.50 ± 0.10	0.75 ± 0.10
1206	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	1.50 ± 0.10	0.75 ± 0.10
1210	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	1.50 ± 0.10	0.75 ± 0.10

2. Embossed Tape Dimensions



Type	A0 (mm)	B0 (mm)	W (mm)	F (mm)	E (mm)	t (mm)
2010	5.50 ± 0.15	2.82 ± 0.15	12.00 ± 0.10	5.50 ± 0.10	1.75 ± 0.10	0.25 ± 0.05
2512	6.78 ± 0.15	3.45 ± 0.15	12.00 ± 0.10	5.50 ± 0.10	1.75 ± 0.10	0.25 ± 0.05
Type	P (mm)	P0 (mm)	P1 (mm)	ØD0 (mm)	ØD1 (mm)	K0 (mm)
2010	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	$1.50 \pm 0.10/-0$	1.50 ± 0.10	0.84 ± 0.10
2512	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	$1.50 \pm 0.10/-0$	1.50 ± 0.10	0.81 ± 0.10

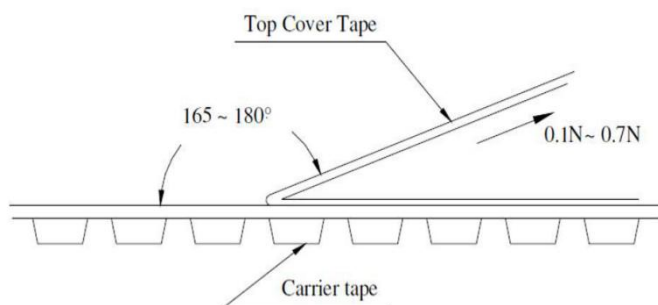
3.Reel Dimensions



Type	M (mm)	W (mm)	T (mm)	A (mm)	B (mm)	C (mm)	D (mm)
0402 0603 0805 1206 1210	178.00±2.00	9.50±1.00	12.50±1.50	2.00±0.50	13.00±0.50	21.00±0.50	58.00±2.00
2010 2512	178.00±2.00	13.00±0.50	15.50±1.50	2.00±0.50	13.00±0.50	21.00±0.50	57.00±2.00

4.Quantity of Package

Type	Quantities
0402	10K/Reel
0603/0805/1206/1210	5K/Reel
2010/2512	4K/Reel



Storage

- The ambient temperature shall between 5℃~30℃.
- The relative humidity recommended for storage is between 25%RH~60%RH.
- 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.