Spark Gap Protectors (SPG)

SCB-SMD Series

Features

- Approximately zero leaking current before clamping voltage
- Less decay at on/off state.
- High capability to withstand repeated lightning strikes.
- Low electrode capacitance (≤0.8pF) and high isolation (≥100MΩ).
- RoHS compliant.
- Bilateral symmetrical.
- Temperature, humidity and lightness insensitive.
- Operating temperature: -40℃~ +85 ℃
- Storage temperature: -40℃~ +125℃
- Meets MSL level 1, per J-STD-020

Applications

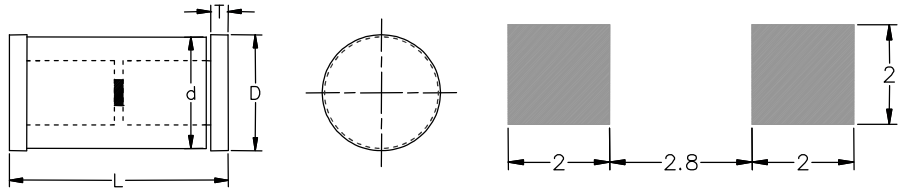
- Power Supplies
- Motor sparks eliminating
- Relay switching spark absorbing
- Data line pulse guarding
- Electronic devices requiring UL497A and UL497B compliant
- Telephone/Fax/Modem
- High frequency signal transmitters/receivers
- Satellite antenna
- Radio amplifiers
- Alarm systems
- Cathode ray tubes in Monitors/TVs

Part Numbering

SCB -	201	M	-	SMD
(1)	(2)	(3)		(4)

(1) Series
(2) V_S Voltage, e.g. 201=20X10^1=200V
(3) V_S Voltage tolerance: L - ±15%, M - ±20%, N - ±30%
(4) Surface mount devices

Dimensions



Recommended Pad Size (mm)

Dimensions	Inches	Millimeters
L	0.197	5.0
D	0.106	2.7
d	0.102	2.6
T	0.016	0.4

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Electrical Characteristics

Part Number	DC Spark-over Voltage Vs(V)	Minimum Insulation Resistance IR(OHM)/DC	Maximum Capacitance 1KHZ-6Vmax C (pF)	Surge Current Capacity 8/20 μS	Surge Life Test
SCB-141N-SMD	140(98~182)	>100M / 50V	<1.0	500A	10KV / 100A , >200T
SCB-181N-SMD	180(126~234)	>100M / 50V	<1.0	500A	10KV / 100A , >200T
SCB-201M-SMD	200(160~240)	>100M /100V	<1.0	500A	10KV / 100A , >200T
SCB-301M-SMD	300(240~360)	>100M /100V	<1.0	500A	10KV / 100A , >200T
SCB-401M-SMD	400(320~480)	>100M / 250V	<1.0	500A	10KV / 100A , >200T
SCB-501M-SMD	500(400~600)	>100M / 250V	<1.0	500A	10KV / 100A , >200T

Color Code

Part Number	Color Code1	Color Code2	Color Code3
SCB-141N-SMD	Brown	-	-
SCB-181N-SMD	Gray	-	-
SCB-201M-SMD	Red	-	-
SCB-301M-SMD	Orange	-	-
SCB-401M-SMD	Yellow	-	-
SCB-501M-SMD	Green	-	-

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Test Methods and Results

Items	Test Method	Standard
DC Spark-over Voltage	Measure starting discharge voltage (Vs) by gradually increasing applied DC voltage. Test current is 0.5mA max. And the DC voltage ascends up within 100V/s(Vs＜1000V) or 500V/s(Vs≥1000V).	Rate-of-change, within±30% insulation resistance & capacitance, conformed to rated spec.
Insulation Resistance	Measure the insulation resistance across the terminal at regular voltage. But the test voltage doesn't over the DC spark-over voltage.	
Capacitance	Measure the electrostatic capacitance by applying a voltage of less than 6V (at 1KHz) between terminals.	
Static Life	10KV with 1500pf condenser is discharged through 2KΩ resistor. 200 times at an interval of 10sec.	| △Vs/Vs | ≤30% Characteristics of other items must meet the specified value
Surge Current Capacity	The following impulse current for specified current applied ±5 times, each time interval 60 seconds. Thereafter, outer appearance shall be visually examined. Type: Impulse current Vs < 400V: 1.2/50μs & 8/20μs, 500A Vs ≥ 400V: 1.2/50μs & 8/20μs, 500A, electrically connected with a resistor (1~2 Ω).	No crack and no failures
Cold Resistance	Measurement after -40 ℃ /1000 HRS & normal temperature/2 HRS.	Features are conformed to rated spec
Heat Resistance	Measurement after 125 ℃ /1000 HRS & normal temperature/2 HRS.	
Humidity Resistance	Measurement after humidity 90~95℃(45℃) /1000 HRS & normal temperature/2 HRS.	
Temperature Cycle	10 times repetition of cycle -40℃ /30min →normal, temp/2 min →125℃/30min, measurement after normal temp/2 HRS.	
Solder Ability	Apply flux and immerse in molten solder 230±5℃ for 3sec up to the point of 1.5mm from body. Check for solder adhesion.	Lead wire is evenly covered by solder
Solder Heat	Measurement after lead wire is dipped up to the point of 1.5mm from body into 260±5℃ solder for 10sec	Conformed to rated spec
Pull Strength	Apply 0.5kg load for 10sec	Lead shall not pull out to snap
Flexural Strength	Bend lead wire at the point of 2mm from body under 0.25 load and back to its original point. Repeat 1 time.	

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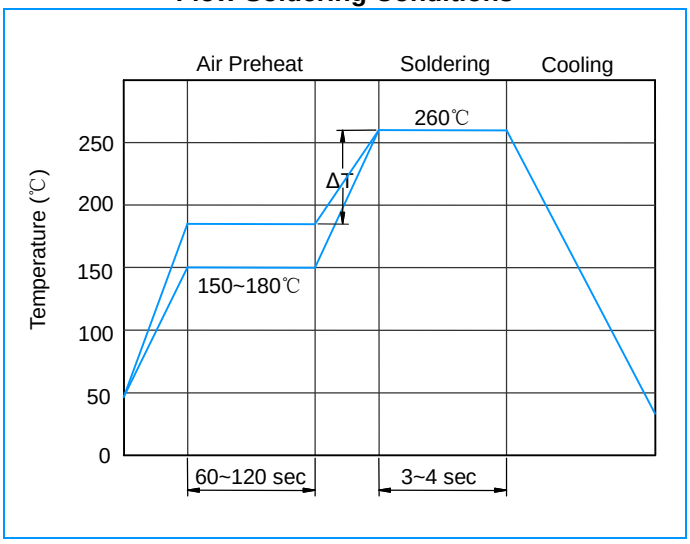
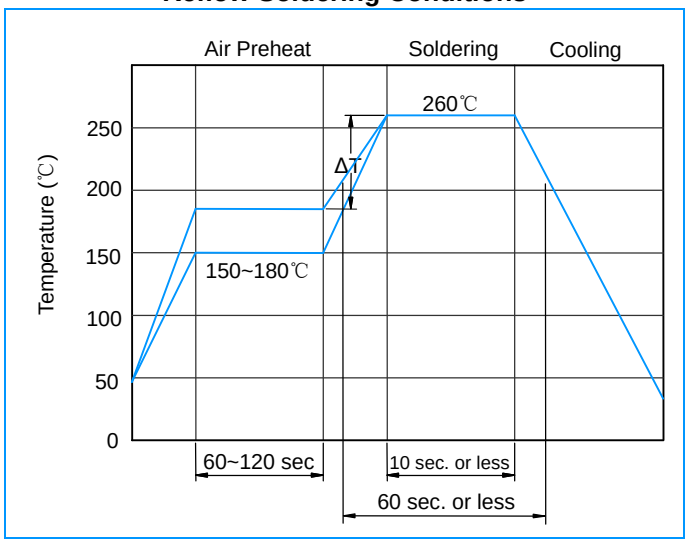
Recommended Soldering Conditions

Flow Soldering Conditions



Reflow Soldering Conditions



1) Time shown in the above figures is measured from the point when chip surface reaches temperature.

2) Temperature difference in high temperature part should be within 110℃ .

3) After soldering, do not force cool, allow the parts to cool gradually.

Hand Soldering

Solder iron temperature: 350±5℃

Heating time: 3 seconds max.

General attention to soldering

- **u** High soldering temperatures and long soldering times can cause leaching of the termination, decrease in adherence strength, and the change of characteristic may occur.
- **u** For soldering, please refer to the soldering curves above. However, please keep exposures to temperatures exceeding 200℃ to fewer than 50 seconds.
- **u** Please use a mild flux (containing less than 0.2wt% Cl). Also, if the flux is water soluble, be sure to wash thoroughly to remove any residue from the underside of components that could affect resistance.

Cleaning

When using ultrasonic cleaning, the board may resonate if the output power is too high. Since this vibration can cause cracking or a decrease in the adherence of the termination, we recommend that you use the conditions below:

Frequency: 40kHz max.

Output power: 20W/liter

Cleaning time: 5 minutes max.

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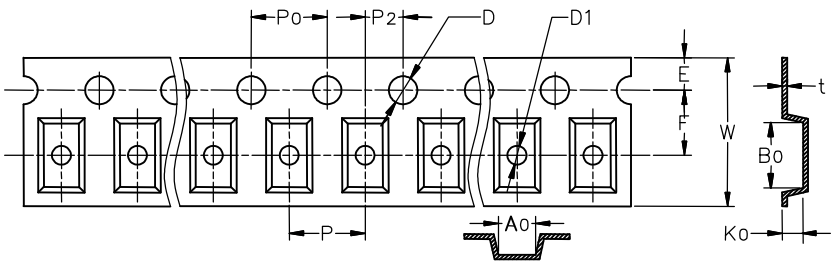
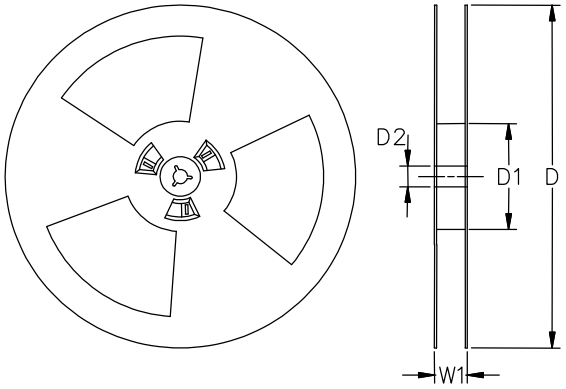
Packaging

Tape



Symbol	Inches	Millimeters
W	0.472±0.008	12.00±0.20
E	0.069±0.004	1.75±0.10
F	0.222±0.002	5.65±0.05
D	0.059±0.004	1.50±0.10
P	0.315±0.004	8.00±0.10
P0	0.315±0.004	8.00±0.10
P2	0.157±0.004	4.00±0.10
A0	0.181±0.004	4.60±0.10
B0	0.240±0.004	6.10±0.10
K0	0.118±0.004	3.00±0.10
t	0.012±0.002	0.30±0.05

Reel



Symbol	Inches	Millimeters
D	13.00±0.079	330.00±2.00
D1	1.969 min	50 min
D2	0.512±0.020	13.00±0.50
W1	0.661±0.079	16.80±2.00