

# Spark Gap Protectors (SPG)

## SCA 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 ( $\leq 1.0\text{pF}$ ) and high isolation ( $\geq 100\text{M}\Omega$ ).
- ◆ RoHS compliant.
- ◆ Bilateral symmetrical.
- ◆ Temperature, humidity and lightness insensitive.
- ◆ Working temperature:  $-45^{\circ}\text{C} \sim +85^{\circ}\text{C}$
- ◆ Storage temperature:  $-45^{\circ}\text{C} \sim +85^{\circ}\text{C}$
- ◆ Meets MSL level 1, per J-STD-020



### Applications

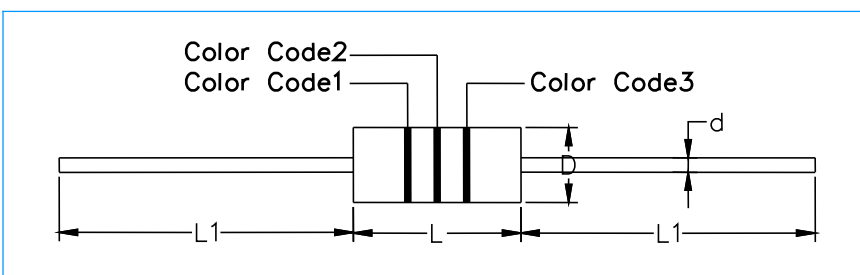
- ◆ Power Supplies
- ◆ Motor sparks eliminating
- ◆ Relay switching spark absorbing
- ◆ Data line pulse guarding
- ◆ Electronic devices requiring UL497A and UL497B compliant
- ◆ Telephone/Fax/Modem
- ◆ High frequency signal transmitters/receivers
- ◆ Satellite antenna
- ◆ Radio amplifiers
- ◆ Alarm systems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

### Part Numbering

**SCA - 201 M**  
 (1) (2) (3)

- (1) Series
- (2)  $V_s$  Voltage, e.g. 201=20X10<sup>1</sup>=200V
- (3)  $V_s$  Voltage tolerance: L -  $\pm 15\%$ , M -  $\pm 20\%$ , N -  $\pm 30\%$

### Dimensions



Symbol	Millimeters
L1	28.0 $\pm$ 3.0
L	4.0 $\pm$ 0.3
d	0.5 $\pm$ 0.05
D	2.0 $\pm$ 0.3

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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
SCA-141N	140(98~182)	100M / 50V	1.0	500A	10KV / 100A , >200T
SCA-201M	200(160~240)	100M /100V	1.0	500A	10KV / 100A , >200T
SCA-301M	300(240~360)	100M /100V	1.0	500A	10KV / 100A , >200T
SCA-401M	400(320~480)	100M / 250V	1.0	500A	10KV / 100A , >200T
SCA-501M	500(400~600)	100M / 250V	1.0	500A	10KV / 100A , >200T
SCA-601M	600(480~720)	100M / 250V	1.0	500A	10KV / 100A , >200T
SCA-102M	1000(800~1200)	100M / 500V	1.0	500A	10KV / 100A , >200T

#### Color Code

Part Number	Color Code1	Color Code2	Color Code3
SCA-141N	Yellow	Black	-
SCA-201M	Red	-	-
SCA-301M	Orange	-	-
SCA-401M	Yellow	-	-
SCA-501M	Green	-	-
SCA-601M	Blue	-	-
SCA-102M	Black	-	-

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#### Test Methods and Results

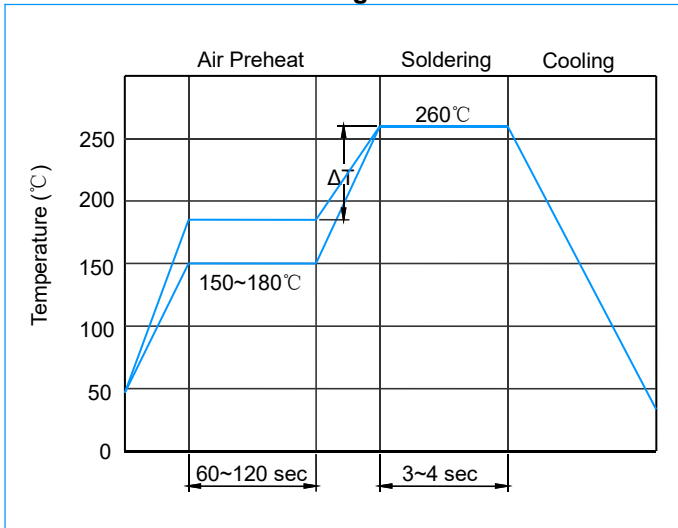
Items	Test Method	Standard
<b>DC Spark-over Voltage</b>	Measure starting discharge voltage (Vs) by gradually increasing applied DC voltage. Test current is 0.5mA max. And the DC voltage ascends up within 100V/s(Vs<1000V) or 500V/s(Vs≥1000V).	Rate-of-change, within±30% insulation resistance & capacitance,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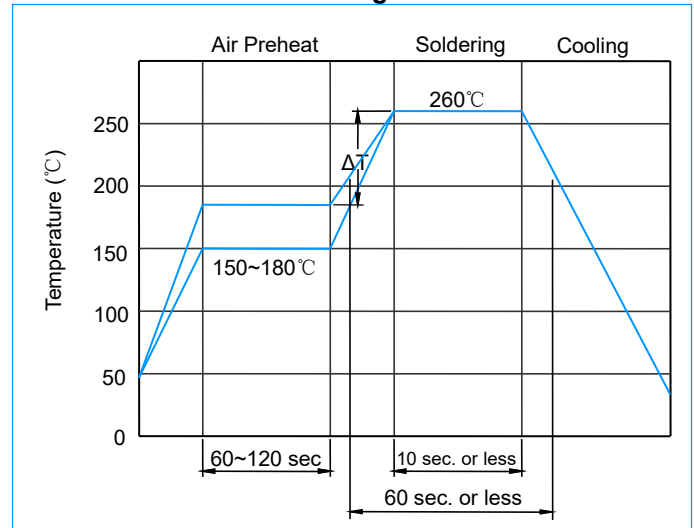
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### Recommended Soldering Conditions

**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°C .
- 3) After soldering, do not force cool, allow the parts to cool gradually.

### Hand Soldering

Solder iron temperature: 350±5°C

Heating time: 3 seconds max.

### General attention to soldering

- ◆ High soldering temperatures and long soldering times can cause leaching of the termination, decrease in adherence strength, and the change of characteristic may occur.
- ◆ For soldering, please refer to the soldering curves above. However, please keep exposures to temperatures exceeding 200°C to fewer than 50 seconds.
- ◆ 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

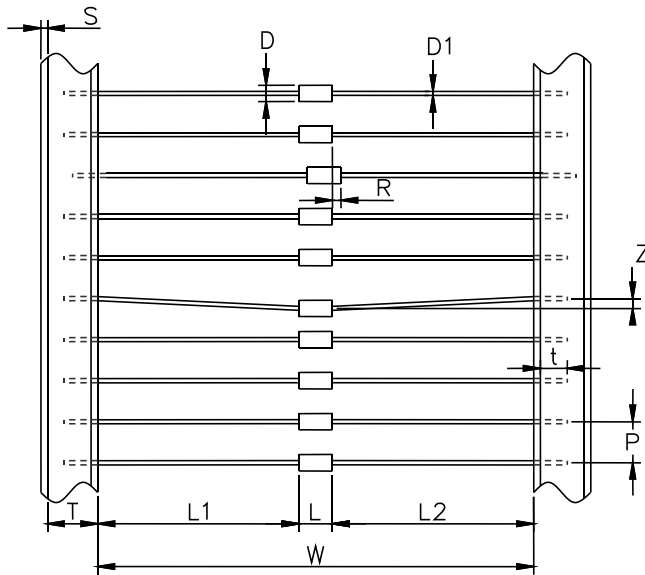
Cleaning time: 5 minutes max.

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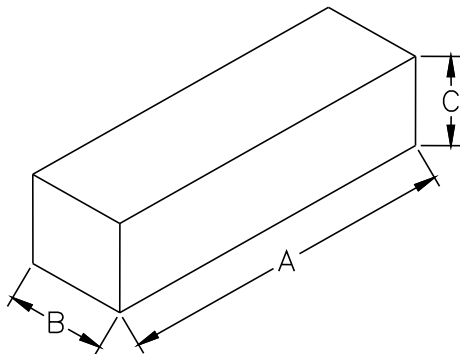
### Packaging

#### Tape



Symbol	Dimension (mm)
<b>W</b>	52±2.0/-1.0
<b>P</b>	5.0±0.5
<b>T</b>	6.0±1.0
<b>Z</b>	1.2 Max
<b>L1-L2</b>	1.0 Max
<b>S</b>	0.8 Max
<b>t</b>	3.2 Max
<b>L</b>	4.0±1.0
<b>D1</b>	Φ0.5±0.05
<b>D</b>	Φ2.0±0.3
<b>R</b>	1.0 Max

#### Inner Box



Item	Description
<b>Length</b>	A=255 mm
<b>Width</b>	B=75 mm
<b>Height</b>	C=68 mm
<b>Quantity</b>	3000 PCS
<b>Package</b>	There are upper and bottom board to protect the parts from damage.