

## Spark Gap Protectors (SPG)

### UNB-SMD Series

#### Features

- u Approximately zero leaking current before clamping voltage
- u Less decay at on/off state.
- u High capability to withstand repeated lightning strikes.
- u Low electrode capacitance ( $\leq 1.0\text{pF}$ ) and high isolation ( $\geq 100\text{M}\Omega$ ).
- u RoHS compliant.
- u Bilateral symmetrical.
- u Temperature, humidity and lightness insensitive.
- u Working temperature:  $-25^{\circ}\text{C} \sim +65^{\circ}\text{C}$
- u Storage temperature:  $-25^{\circ}\text{C} \sim +85^{\circ}\text{C}$
- u Meets MSL level 1, per J-STD-020



#### Applications

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

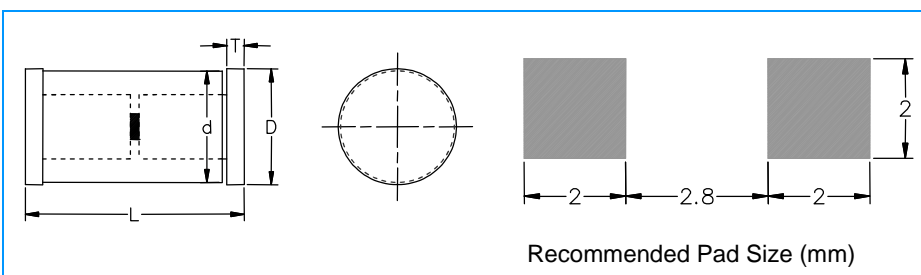
#### Part Numbering

UNB - 201    M - SMD

(1)    (2)    (3)    (4)

- (1) Series
- (2)  $V_S$  Voltage, e.g. 201= $20 \times 10^1 = 200\text{V}$
- (3)  $V_S$  Voltage tolerance: L -  $\pm 15\%$ , M -  $\pm 20\%$ , N -  $\pm 30\%$
- (4) Surface mount devices

#### Dimensions



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
UNB-141N-SMD	140(98~182)	100M / 50V	1.0	1000A	10KV / 150A , >200T
UNB-181N-SMD	180(126~234)	100M / 50V	1.0	1000A	10KV / 150A , >200T
UNB-201M-SMD	200(160~240)	100M /100V	1.0	1000A	10KV / 150A , >200T
UNB-301M-SMD	300(240~360)	100M /100V	1.0	1000A	10KV / 150A , >200T
UNB-401M-SMD	400(320~480)	100M / 250V	1.0	1000A	10KV / 150A , >200T
UNB-501M-SMD	500(400~600)	100M / 250V	1.0	1000A	10KV / 150A , >200T

#### Test Methods and Results

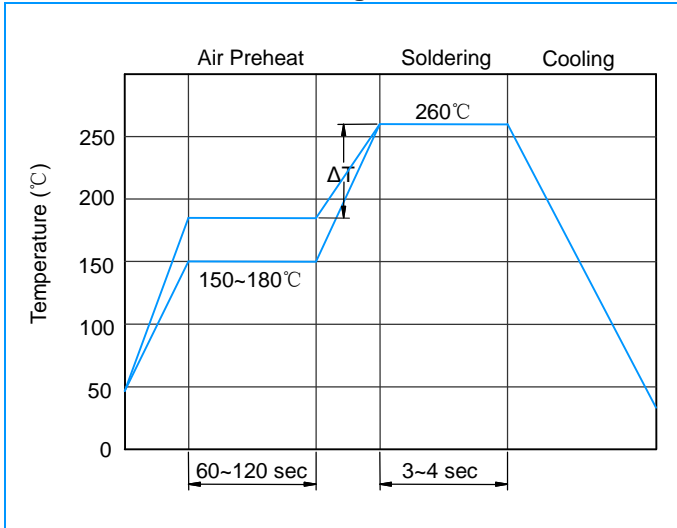
Items	Test Method	Standard
<b>DC Spark-over Voltage</b>	Measure starting discharge voltage (Vs) by gradually increasing applied DC voltage. Test current is 0.5mA max. And the DC voltage ascends up within 100V/s(Vs<1000V) or 500V/s(Vs≥1000V).	Rate-of-change, within±30% insulation resistance & capacitance, 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, 1000A, 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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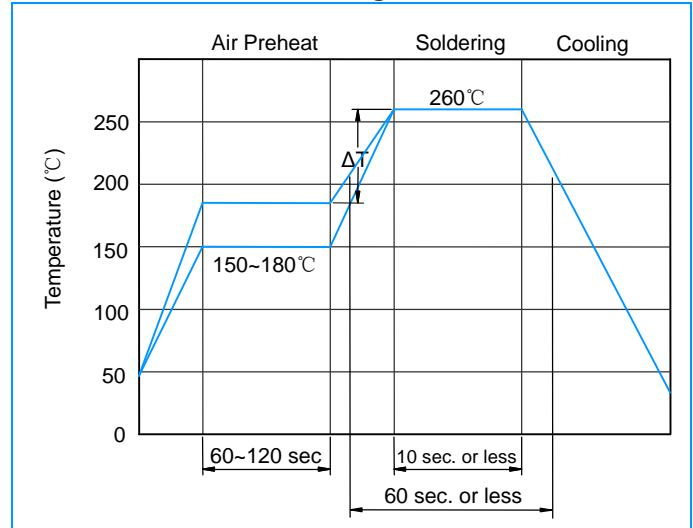
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#### Recommended Soldering Conditions

**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

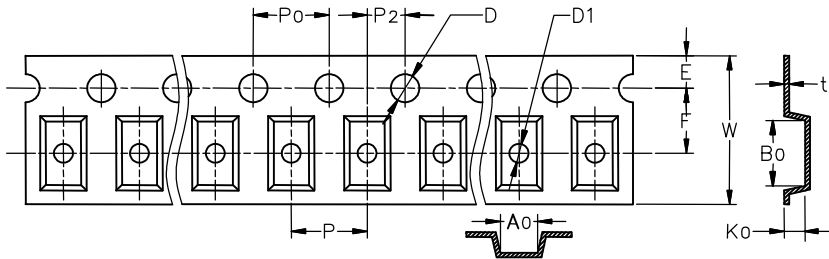
Cleaning time: 5 minutes max.

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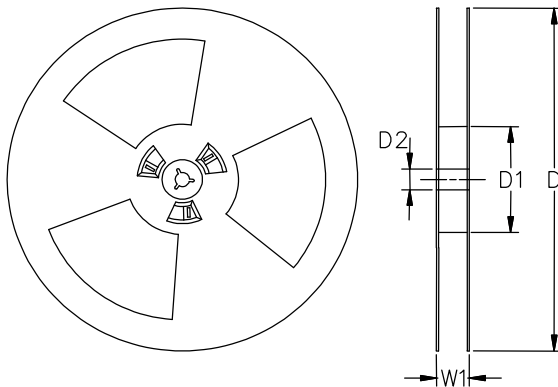
#### Packaging

##### Tape



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

##### Reel



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