

## 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

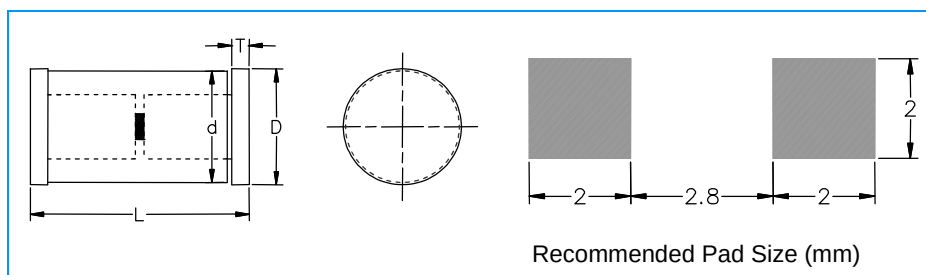
#### Part Numbering

UNB - 201    M - SMD

(1)      (2)      (3)      (4)

- (1) Series
- (2)  $V_S$  Voltage, e.g. 201=20X10<sup>1</sup>=200V
- (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<br>Vs(V) | Minimum Insulation Resistance<br>IR(OHM)/DC | Maximum Capacitance<br>1KHZ-6Vmax<br>C (pF) | Surge Current Capacity<br>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

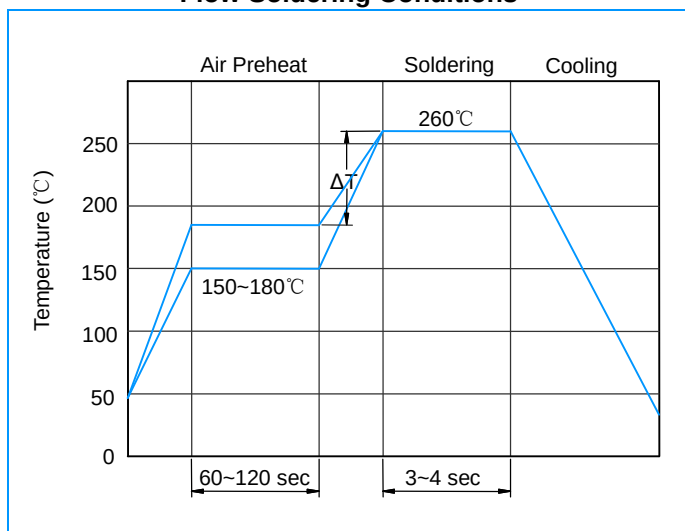
| Items                         | Test Method                                                                                                                                                                                                | Standard                                                                                        |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <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( $V_s < 1000V$ ) or 500V/s( $V_s \geq 1000V$ ). | Rate-of-change, within $\pm 30\%$ 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.                                                                                                          | $ \Delta V_s/V_s  \leq 30\%$<br>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), $\pm 5$ 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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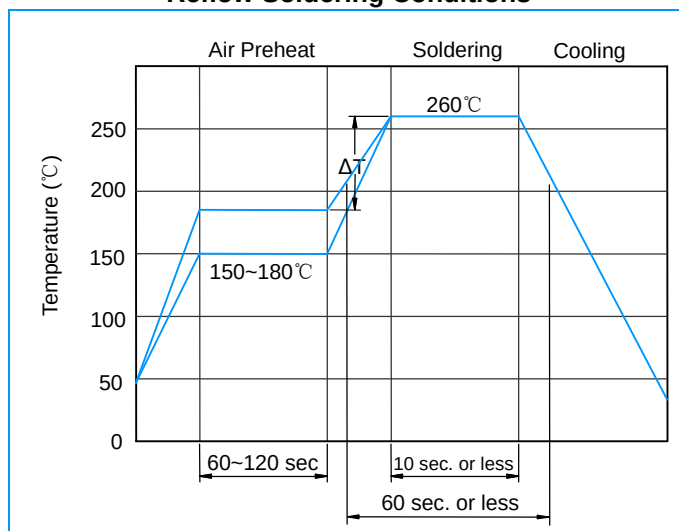
### UNB-SMD Series

#### 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

- 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°C 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

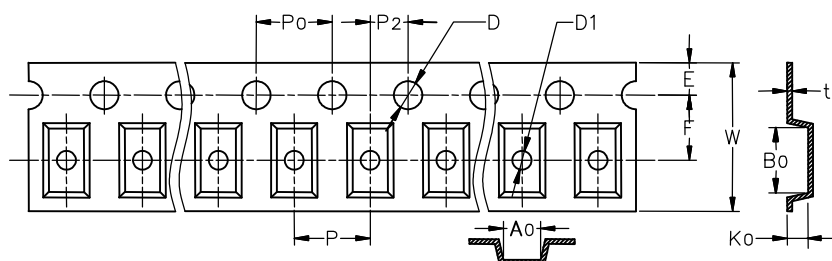
Cleaning time: 5 minutes max.

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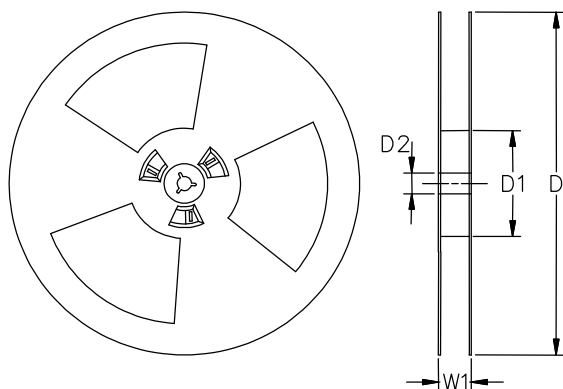
#### Packaging

##### Tape



| Symbol    | Inches      | Millimeters |
|-----------|-------------|-------------|
| <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  |