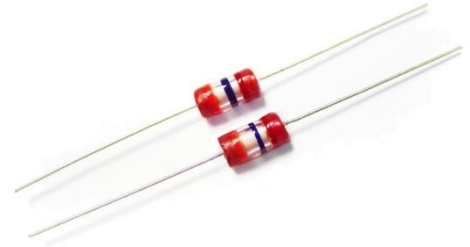


## Spark Gap (SPG) Data Sheet

### 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.
- No dark effect.
- Operating temperature:  $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
- Storage temperature:  $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$
- Meets MSL level 1, per J-STD-020
- Safety certification: UL: E472693



### 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

### Dimensions

| <p>Color code 1<br/>Color code 2<br/>Color code 3</p> <p>L1, L, D, d</p> | <table border="1"> <thead> <tr> <th>Symbol</th> <th>Dimension (mm)</th> </tr> </thead> <tbody> <tr> <td>L</td> <td><math>9.0 \pm 1.5</math></td> </tr> <tr> <td>L1</td> <td><math>28.0 \pm 3.0</math></td> </tr> <tr> <td>D</td> <td><math>\Phi 4.1 \pm 0.5</math></td> </tr> <tr> <td>d</td> <td><math>\Phi 0.5 \pm 0.05</math></td> </tr> </tbody> </table> | Symbol | Dimension (mm) | L | $9.0 \pm 1.5$ | L1 | $28.0 \pm 3.0$ | D | $\Phi 4.1 \pm 0.5$ | d | $\Phi 0.5 \pm 0.05$ |
|--|---|--------|----------------|---|---------------|----|----------------|---|--------------------|---|---------------------|
| Symbol   | Dimension (mm)  |        |                |   |               |    |                |   |                    |   |                     |
| L  | $9.0 \pm 1.5$   |        |                |   |               |    |                |   |                    |   |                     |
| L1   | $28.0 \pm 3.0$  |        |                |   |               |    |                |   |                    |   |                     |
| D  | $\Phi 4.1 \pm 0.5$  |        |                |   |               |    |                |   |                    |   |                     |
| d  | $\Phi 0.5 \pm 0.05$   |        |                |   |               |    |                |   |                    |   |                     |

## Electrical Characteristics

| Part Number<br>① | Type<br>② | DC Spark-over Voltage | Minimum Insulation Resistance |                           | Maximum Capacitance<br>(1KHz-6V <sub>MAX</sub> ) | Surge Current Capacity<br>(8/20μs) | AC Withstanding Voltage |
|------------------|-----------|-----------------------|-------------------------------|---------------------------|--|------------------------------------|-------------------------|
|                  |           | V <sub>s</sub> (V)    | Test Voltage(V)               | I <sub>ROHM</sub><br>(MΩ) | C(pf)  |                                    |                         |
| BK1XX05002       | H         | 1000                  | 500                           | 100                       | 1.0  | 3000A                              | -                       |
| BK1XX07502       | H         | 1500                  | 500                           | 100                       | 1.0  | 3000A                              | -                       |
| BK1XX09002       | H         | 1800                  | 500                           | 100                       | 1.0  | 3000A                              | -                       |
| BK1XX10002       | H         | 2000                  | 500                           | 100                       | 1.0  | 3000A                              | -                       |
| BK1XX12002       | H         | 2400                  | 500                           | 100                       | 1.0  | 3000A                              | AC1200V, 3sec.          |
| BK1XX13502       | H         | 2700                  | 500                           | 100                       | 1.0  | 3000A                              | AC1200V, 3sec.          |
| BK1XX15002       | H         | 3000                  | 500                           | 100                       | 1.0  | 3000A                              | AC1500V, 3min.          |
| BK1XX18002       | H         | 3600                  | 500                           | 100                       | 1.0  | 3000A                              | AC1800V, 3sec.          |
| BK1XX20002       | H         | 4000                  | 500                           | 100                       | 1.0  | 3000A                              | AC1800V, 3sec.          |
| BK1XX22502       | H         | 4500                  | 500                           | 100                       | 1.0  | 3000A                              | AC2000V, 1min.          |
| BK1XX25002       | H         | 5000                  | 500                           | 100                       | 1.0  | 3000A                              | AC2000V, 1min.          |

Note: ① V<sub>s</sub>±XX%

② Specific code by request.

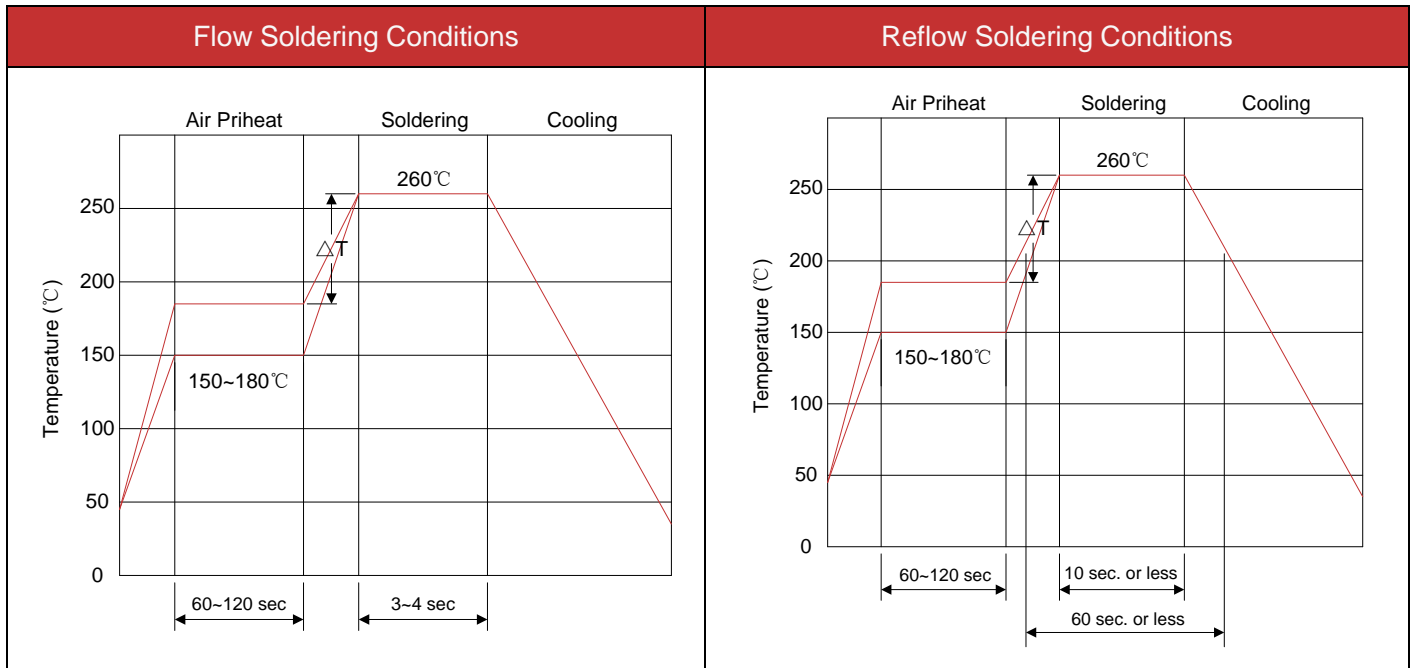
## Color Code

| Part Number | Type | Color Code 1 | Color Code 2 | Color Code 3 |
|-------------|------|--------------|--------------|--------------|
| BK1XX05002  | H    | Brown        | Black        | Red          |
| BK1XX07502  | H    | Brown        | Green        | Red          |
| BK1XX09002  | H    | Brown        | Gray         | Red          |
| BK1XX10002  | H    | Red          | Black        | Red          |
| BK1XX12002  | H    | Red          | Yellow       | Red          |
| BK1XX13502  | H    | Red          | Purple       | Red          |
| BK1XX15002  | H    | Orange       | Black        | Red          |
| BK1XX18002  | H    | Orange       | Blue         | Red          |
| BK1XX20002  | H    | Yellow       | Black        | Red          |
| BK1XX22502  | H    | Yellow       | Green        | Red          |
| BK1XX25002  | H    | Green        | Black        | Red          |

**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 500V/second. | Meet specified value.                  |
| 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.   |  |
| Surge Current Capacity | Charge a 1.2/50 $\mu$ s & 8/20 $\mu$ s, 2000A, and apply it to the sample. Do this 10 time. Or 3000A, 1 time.  | No crack and no failures               |
| Surge Life             | Apply a standard impulse current (8/20 $\mu$ s of 100A) for 300 times at 60 seconds intervals.   |  |
| Cold Resistance        | Measurement after -40 $^{\circ}$ C/1000 HRS & normal temperature/2 HRS.  | Features are conformed to rated spec.  |
| Heat Resistance        | Measurement after 125 $^{\circ}$ C/1000 HRS & normal temperature/2 HRS.  |  |
| Humidity Resistance    | Measurement after humidity 90~95 $^{\circ}$ C(45 $^{\circ}$ C) /1000 HRS & normal temperature/2 HRS.   |  |
| Temperature Cycle      | 10 times repetition of cycle -40 $^{\circ}$ C/30min $\rightarrow$ normal, temp/2 min $\rightarrow$ 125 $^{\circ}$ C/30min, measurement after normal temp/2 HRS.  |  |
| Solder Ability         | Apply flux and immerse in molten solder 230 $\pm$ 5 $^{\circ}$ C 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 $\pm$ 5 $^{\circ}$ C 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.  |  |

**Recommended 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.

**Packaging**

| Tape |  | Symbol    | Dimension (mm)                        |                   |           |
|------|--|-----------|---------------------------------------|-------------------|-----------|
|      |  | W         | 52.0±1.5                              |                   |           |
|      |  | P         | 10.0±0.5                              |                   |           |
|      |  | L1-L2     | 1.0max.                               |                   |           |
|      |  | T         | 6.0±1.0                               |                   |           |
|      |  | Z         | 1.2max.                               |                   |           |
|      |  | R         | Terminals must not project from tape. |                   |           |
|      |  | t         | 3.2max.                               |                   |           |
|      |  | S         | 0.8max.                               |                   |           |
|      |  | D         | Φ4.6max.                              |                   |           |
|      |  | D1        | Φ0.5±0.05                             |                   |           |
|      |  | L         | 10.5max.                              |                   |           |
|      |  | Inner Box |                                       | A                 | 75.0±5.0  |
|      |  |           |                                       | B                 | 114.0±5.0 |
|      |  |           |                                       | C                 | 250.0±5.0 |
|      |  |           |                                       | Quantity: 1000PCS |           |

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