

# DATA SHEET

## SPARK GAP PROTECTORS POWER SUPPLIES

BK1-H series

RoHS compliant & Halogen free



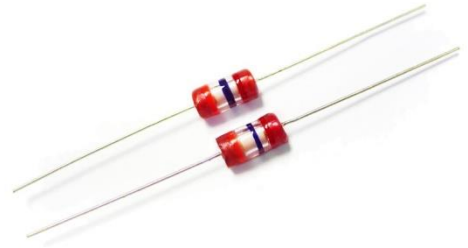
Product specification— July 04, 2023 V.1



## Spark Gap (SPG) Data Sheet

### Features

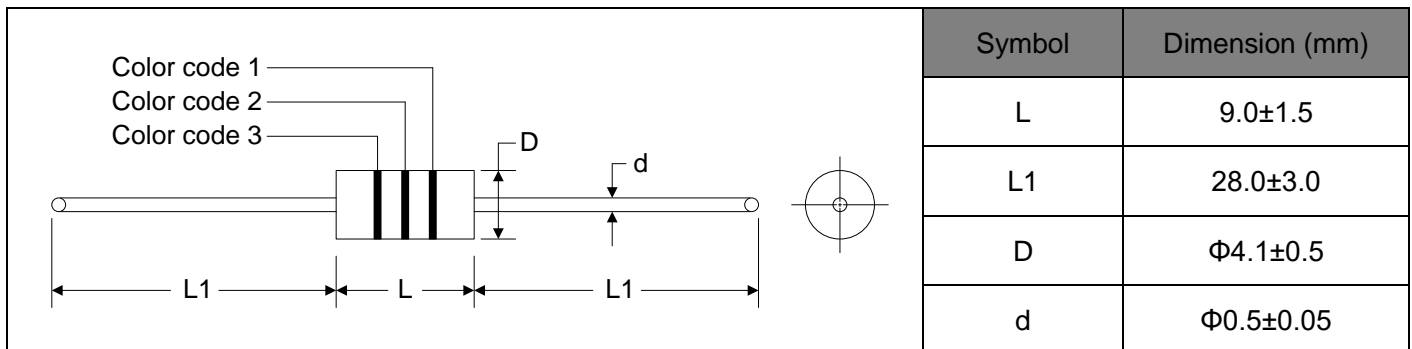
- Approximately zero leaking current before clamping voltage
- Less decay at on/off state.
- High capability to withstand repeated lightning strikes.
- Low electrode capacitance( $\leq 1.0\text{pF}$ ) and high isolation( $\geq 100\text{M}\Omega$ ).
- RoHS compliant.
- Bilateral symmetrical.
- Temperature, 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



### Applications

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

### Dimensions



**Electrical Characteristics**

| Part Number | Type<br>① | DC Spark-over Voltage | Minimum Insulation Resistance |                        | Maximum Capacitance (1KHz-6V <sub>MAX</sub> ) | Surge Current Capacity (8/20μs) | AC Withstanding Voltage |
|-------------|-----------|-----------------------|-------------------------------|------------------------|---|---------------------------------|-------------------------|
|             |           | V <sub>s</sub> (V)    | Test Voltage(V)               | IR <sub>OHM</sub> (MΩ) | C(pf)   |                                 |                         |
| BK12005002  | H         | 1000±20%              | 500                           | 100                    | 1.0   | 1500A                           | -                       |
| BK12007502  | H         | 1500±20%              | 500                           | 100                    | 1.0   | 1500A                           | -                       |
| BK12009002  | H         | 1800±20%              | 500                           | 100                    | 1.0   | 1500A                           | -                       |
| BK12010002  | H         | 2000±20%              | 500                           | 100                    | 1.0   | 1500A                           | -                       |
| BK12012002  | H         | 2400±20%              | 500                           | 100                    | 1.0   | 1500A                           | AC1200V, 3sec.          |
| BK12013502  | H         | 2700±20%              | 500                           | 100                    | 1.0   | 1500A                           | AC1200V, 3sec.          |
| BK12015002  | H         | 3000±20%              | 500                           | 100                    | 1.0   | 1500A                           | AC1500V, 3min.          |
| BK12018002  | H         | 3600±20%              | 500                           | 100                    | 1.0   | 1500A                           | AC1800V, 3sec.          |
| BK12020002  | H         | 4000±20%              | 500                           | 100                    | 1.0   | 1500A                           | AC1800V, 3sec.          |
| BK12022502  | H         | 4500±20%              | 500                           | 100                    | 1.0   | 1500A                           | AC2000V, 1min.          |
| BK12025002  | H         | 5000±20%              | 500                           | 100                    | 1.0   | 1500A                           | AC2000V, 1min.          |

Note: ① Specific code by request.

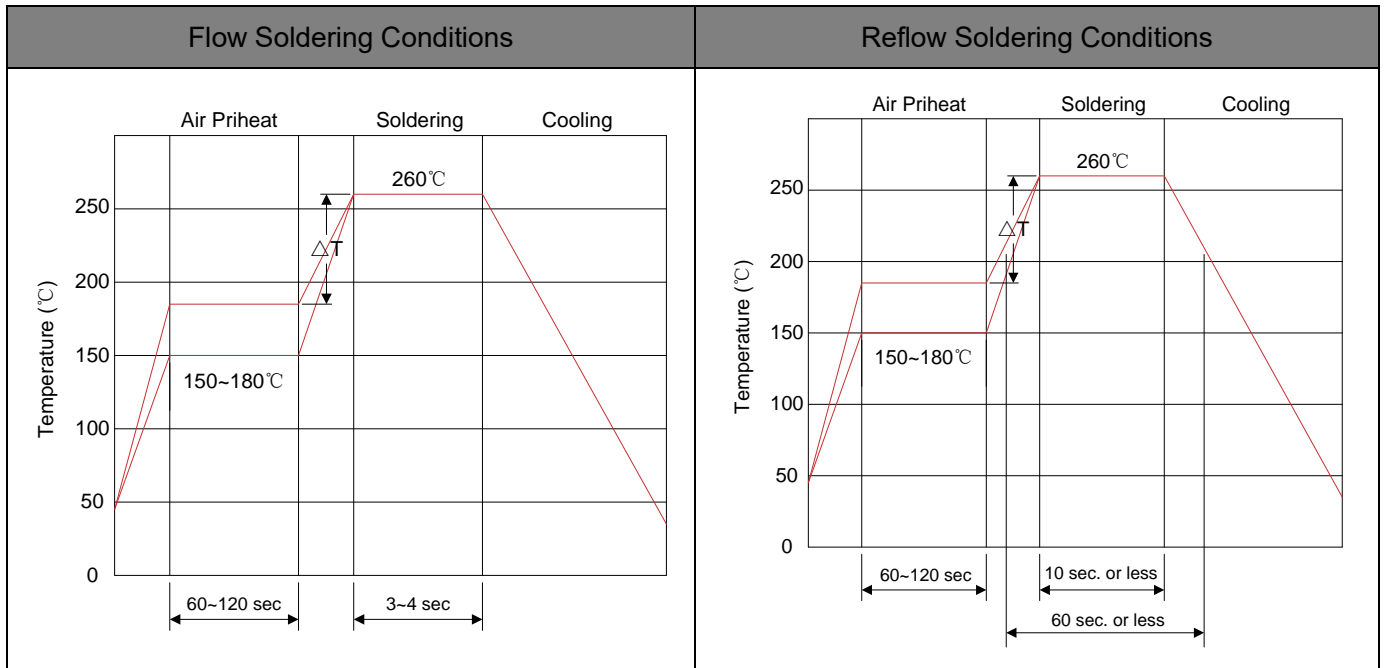
**Color Code**

| Part Number | Type | Color Code 1 | Color Code 2 | Color Code 3 |
|-------------|------|--------------|--------------|--------------|
| BK12005002  | H    | Brown        | Black        | Red          |
| BK12007502  | H    | Brown        | Green        | Red          |
| BK12009002  | H    | Brown        | Gray         | Red          |
| BK12010002  | H    | Red          | Black        | Red          |
| BK12012002  | H    | Red          | Yellow       | Red          |
| BK12013502  | H    | Red          | Purple       | Red          |
| BK12015002  | H    | Orange       | Black        | Red          |
| BK12018002  | H    | Orange       | Blue         | Red          |
| BK12020002  | H    | Yellow       | Black        | Red          |
| BK12022502  | H    | Yellow       | Green        | Red          |
| BK12025002  | 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, 1500A, and apply it to the sample. Do this 10 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

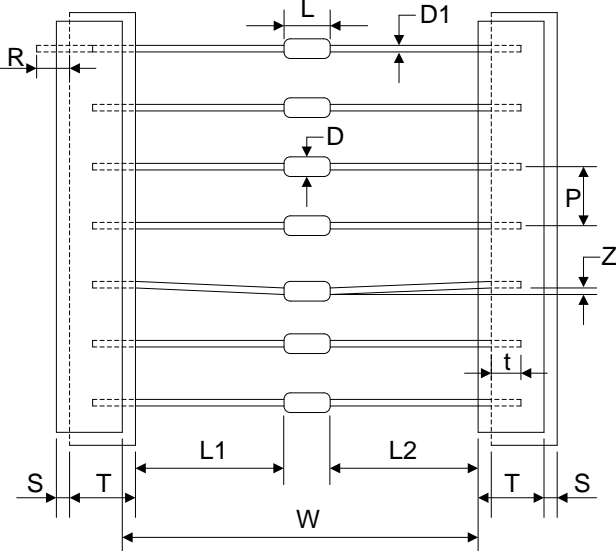
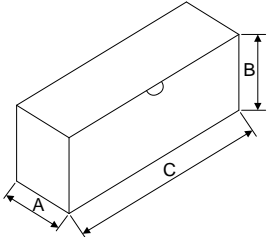
When using ultrasonic cleaning, the board may resonate if the output power is too high. Since this vibration can cause cracking or a decrease in the adherence of the termination, we recommend that you use the conditions below.

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.                              |           |
|   | <p data-bbox="108 1016 231 1048">Inner Box</p>  | A                                     | 75.0±5.0  |
|   |  | B                                     | 114.0±5.0 |
|   |  | C                                     | 250.0±5.0 |
|   | Quantity: 1000PCS  |                                       |           |