

# DATA SHEET

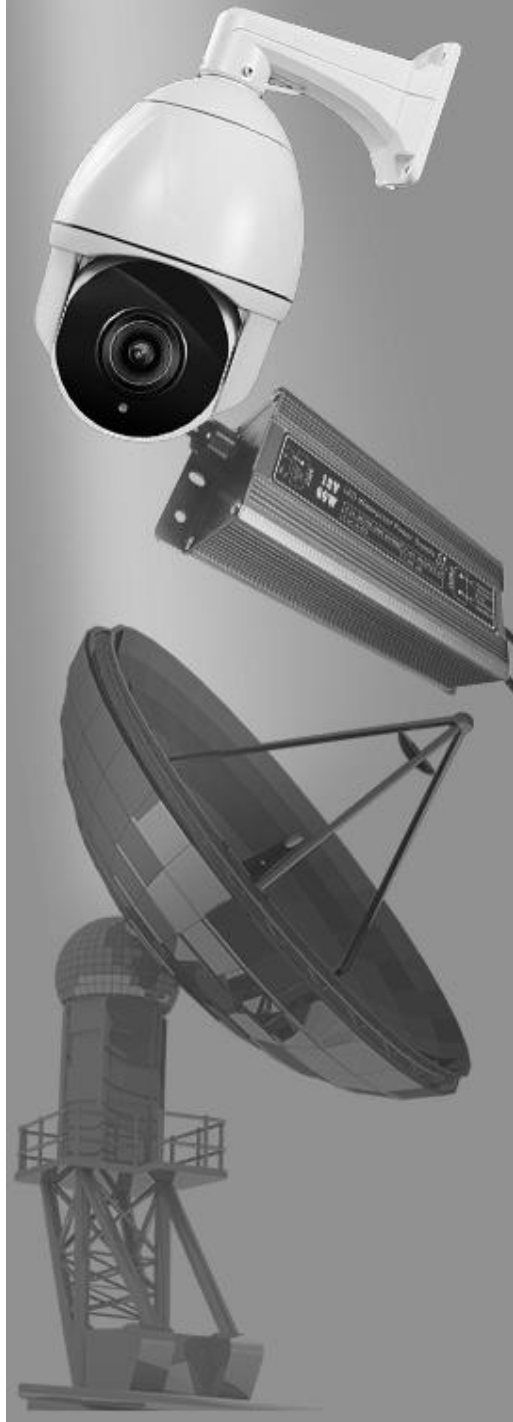
## SPARK GAP PROTECTORS POWER SUPPLIES

BK3-M 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( $\leq 0.8\text{pF}$ ) and high isolation( $\geq 100\text{M}\Omega$ ).
- RoHS compliant.
- Bilateral symmetrical.
- Temperature, humidity and lightness insensitive.
- 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

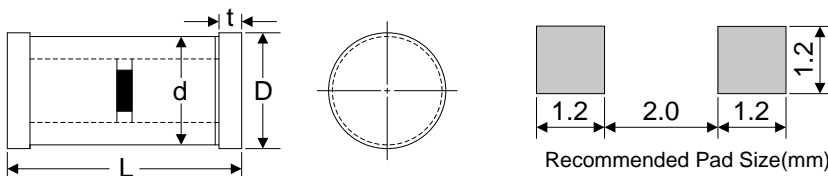


### Applications

- 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

| Symbol | Dimension (mm)     |
|--------|--------------------|
| L      | $3.4 \pm 0.5$      |
| D      | $\Phi 1.4 \pm 0.5$ |
| d      | $\Phi 1.3 \pm 0.5$ |
| t      | $0.4 \pm 0.1$      |



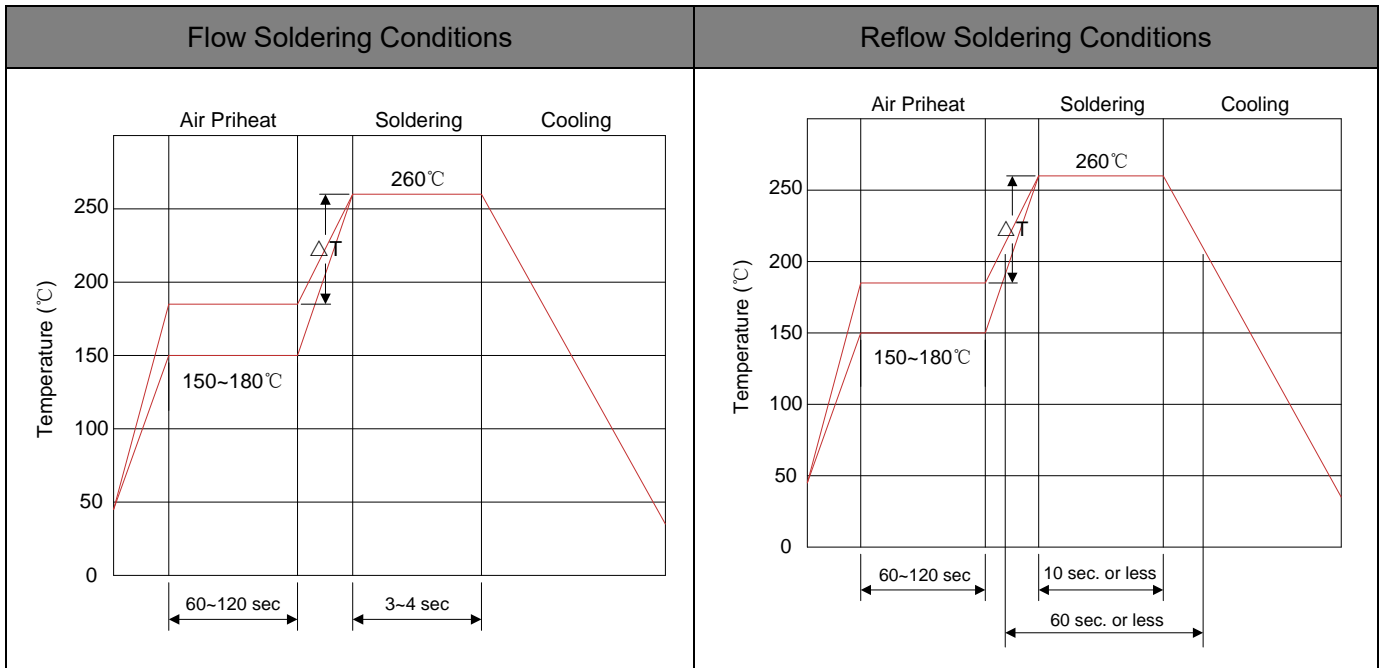
## Electrical Characteristics

| Part Number  | DC Spark-over Voltage | Minimum Insulation Resistance |                                 | Maximum Capacitance (1KHz-6V <sub>MAX</sub> ) | Surge Current Capacity (8/20 $\mu$ s) |
|--------------|-----------------------|-------------------------------|---------------------------------|---|---------------------------------------|
|              | Vs(V)                 | Test Voltage(V)               | IR <sub>OHM</sub> (M $\Omega$ ) | C(pf)   |                                       |
| BK33000702-M | 98~240V               | 50                            | 100                             | 0.8   | 300A                                  |
| BK32001002-M | 200 $\pm$ 20%         | 100                           | 100                             | 0.8   | 300A                                  |
| BK32001502-M | 300 $\pm$ 20%         | 100                           | 100                             | 0.8   | 300A                                  |

## 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 100V/s.     | 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.  |  |
| Static Life            | 10KV with 1500pf condenser is discharged through 0 $\Omega$ resistor. 200 times at an interval of 10sec.  | Rate-of-change, within $\pm$ 30% insulation resistance & capacitance, conformed to rated spec. |
| Surge Current Capacity | 1.2/50 $\mu$ s & 8/20 $\mu$ s, 300A, $\pm$ 5 times, each time interval 60 seconds. Thereafter, outer appearance shall be visually examined.                     | No crack and no failures   |
| 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.   |

**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                  | 8.00±0.30      |           |
|                   | P0                 | 4.00±0.10      |           |
|                   | P1                 | 4.00±0.10      |           |
|                   | P2                 | 2.00±0.10      |           |
|                   | D0                 | Φ1.5±0.10      |           |
|                   | D1                 | Φ1.0±0.10      |           |
|                   | E                  | 1.50±0.10      |           |
|                   | F                  | 3.40±0.10      |           |
|                   | A0                 | 1.60±0.10      |           |
|                   | K0                 | 1.60±0.10      |           |
|                   | B0                 | 4.00±0.10      |           |
|                   | T                  | 0.20±0.10      |           |
|                   | <p><b>Reel</b></p> | D              | 178.0±3.0 |
|                   |                    | d              | 13.0±1.0  |
|                   |                    | L              | 11.0±3.0  |
| Quantity: 3000PCS |                    |                |           |

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