Innovative Service Around the Globe YAGEO

# DATA SHEET

## SPARK GAP PROTECTORS
## POWER SUPPLIES

BK2 series

RoHS compliant & Halogen free



Product specification– October 29, 2022 V.1

# Spark Gap (SPG) Data Sheet

## Features

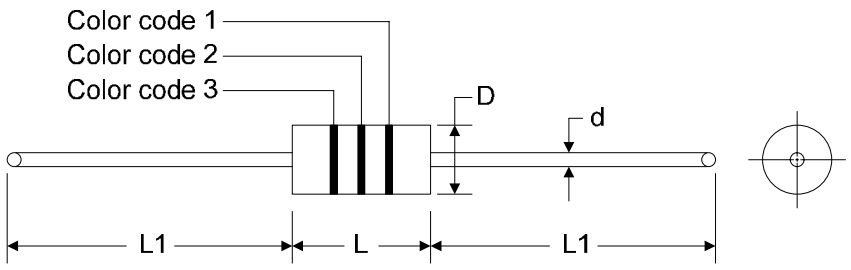


- Approximately zero leaking current before clamping voltage
- Less decay at on/off state.
- High capability to withstand repeated lightning strikes.
- Low electrode capacitance(≤0.8pF) and high isolation(≥100MΩ).
- RoHS compliant.
- Bilateral symmetrical.
- Temperature, humidity and lightness insensitive.
- Operating temperature: -40℃ ~ +85℃
- Storage temperature: -40℃ ~ +125℃
- 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 | 4.3±0.5 |
| L1 | 28.0±3.0 |
| D | Φ2.6±0.5 |
| d | Φ0.5±0.05 |

## Electrical Characteristics

| Part Number | DC Spark-over Voltage | Minimum Insulation Resistance | | Maximum Capacitance (1KHz-6$V_{MAX}$) | Surge Current Capacity (8/20μs) | Surge Life Test |
|---|---|---|---|---|---|---|
| | Vs(V) | Test Voltage(V) | $IR_{OHM}$(MΩ) | C(pf) | | 8/20μs,100A |
| BK22000702 | 140±20% | 50 | 100 | 0.8 | 1000A | 200 times |
| BK23000702 | 140±30% | 50 | 100 | 0.8 | 1000A | 200 times |
| BK22001002 | 200±20% | 100 | 100 | 0.8 | 1000A | 200 times |
| BK22001102 | 220±20% | 100 | 100 | 0.8 | 1000A | 200 times |
| BK22001502 | 300±20% | 100 | 100 | 0.8 | 1000A | 200 times |
| BK22002002 | 400±20% | 250 | 100 | 0.8 | 1000A | 200 times |
| BK22002502 | 500±20% | 250 | 100 | 0.8 | 1000A | 200 times |
| BK22003002 | 600±20% | 250 | 100 | 0.8 | 1000A | 200 times |
| BK22003502 | 700±20% | 250 | 100 | 0.8 | 1000A | 200 times |
| BK22005002 | 1000±20% | 500 | 100 | 0.8 | 1000A | 200 times |
| BK22007502 | 1500±20% | 500 | 100 | 0.8 | 1000A | 200 times |

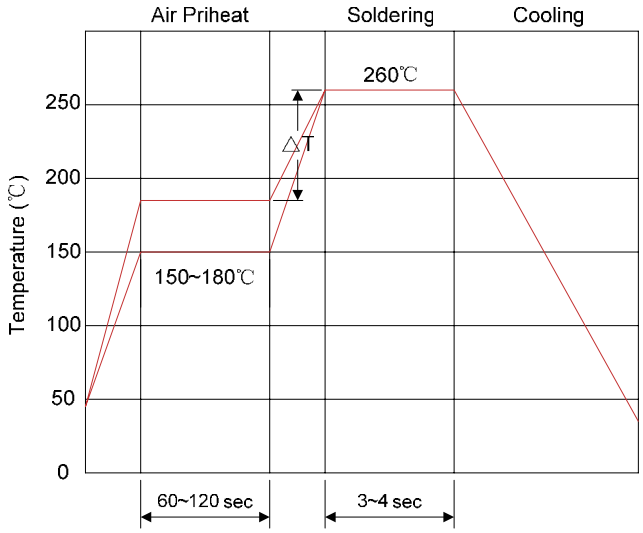
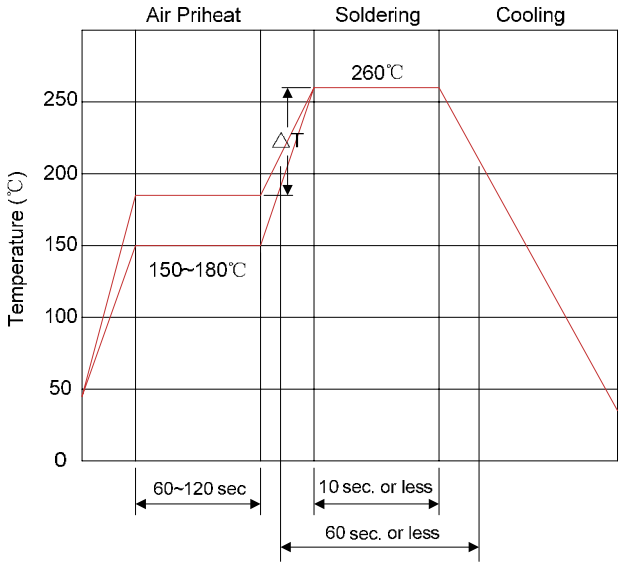
## Color Code

| Part Number | Color Code 1 | Color Code 2 | Color Code 3 |
|---|---|---|---|
| BK22000702 | Black | Yellow | - |
| BK23000702 | Black | Yellow | - |
| BK22001002 | Red | - | - |
| BK22001102 | Red | Red | - |
| BK22001502 | Orange | - | - |
| BK22002002 | Yellow | - | - |
| BK22002502 | Green | - | - |
| BK22003002 | Blue | - | - |
| BK22003502 | Purple | - | - |
| BK22005002 | Black | - | - |
| BK22007502 | Brown | Green | Red |

## Test Methods and Results

<table>
<tr><th>Items</th><th>Test Method</th><th>Standard</th></tr>
<tr><td>DC Spark-over Voltage</td><td>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).</td><td rowspan="3">Meet specified value.</td></tr>
<tr><td>Insulation Resistance</td><td>Measure the insulation resistance across the terminal at regular voltage. But the test voltage doesn’t over the DC spark-over voltage.</td></tr>
<tr><td>Capacitance</td><td>Measure the electrostatic capacitance by applying a voltage of less than 6V (at 1KHz) between terminals.</td></tr>
<tr><td>Static Life</td><td>10KV with 1500pf condenser is discharged through 0Ω resistor. 200 times at an interval of 10sec.</td><td>｜△Vs/Vs｜≤30%<br>Characteristics of other items must meet the specified value.</td></tr>
<tr><td>Surge Current Capacity</td><td>The following impulse current for specified current applied ±5 times, each time interval 60 seconds. Thereafter, outer appearance shall be visually examined.<table><tr><th>Type</th><th>Impulse current</th></tr><tr><td>Vs < 400V</td><td>1.2/50μs & 8/20μs, 1000A</td></tr><tr><td>Vs ≥ 400V</td><td>1.2/50μs & 8/20μs, 1000A, electrically connected with a resistor (1~2 Ω).</td></tr></table></td><td>No crack and no failures</td></tr>
<tr><td>Cold Resistance</td><td>Measurement after -40℃/1000 HRS & normal temperature/2 HRS.</td><td rowspan="4">Features are conformed to rated spec.</td></tr>
<tr><td>Heat Resistance</td><td>Measurement after 125℃/1000 HRS & normal temperature/2 HRS.</td></tr>
<tr><td>Humidity Resistance</td><td>Measurement after humidity 90~95℃(45℃) /1000 HRS & normal temperature/2 HRS.</td></tr>
<tr><td>Temperature Cycle</td><td>10 times repetition of cycle -40℃/30min →normal, temp/2 min →125℃/30min, measurement after normal temp/2 HRS.</td></tr>
<tr><td>Solder Ability</td><td>Apply flux and immerse in molten solder 230±5℃ for 3sec up to the point of 1.5mm from body. Check for solder adhesion.</td><td>Lead wire is evenly covered by solder.</td></tr>
<tr><td>Solder Heat</td><td>Measurement after lead wire is dipped up to the point of 1.5mm from body into 260±5℃ solder for 10sec.</td><td>Conformed to rated spec.</td></tr>
<tr><td>Pull Strength</td><td>Apply 0.5kg load for 10sec.</td><td rowspan="2">Lead shall not pull out to snap.</td></tr>
<tr><td>Flexural Strength</td><td>Bend lead wire at the point of 2mm from body under 0.25 load and back to its original point. Repeat 1 time.</td></tr>
</table>

## 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℃.
3) After soldering, do not force cool, allow the parts to cool gradually.

### Hand Soldering

Solder iron temperature: 350±5℃
Heating time: 3 seconds max.

### General attention to soldering

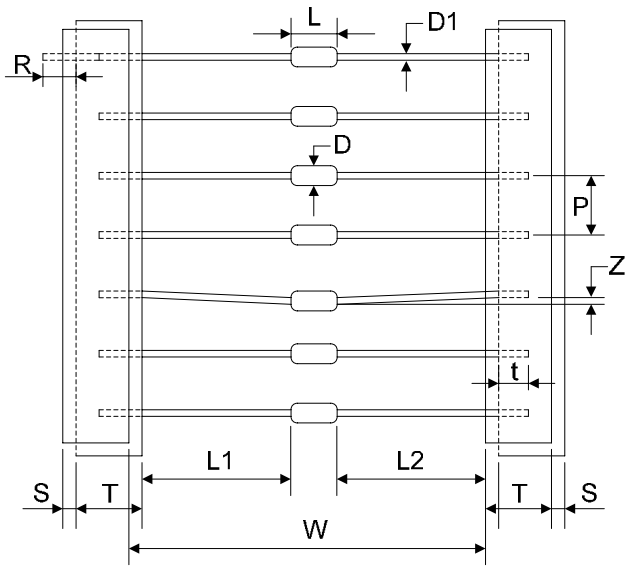
● High soldering temperatures and long soldering times can cause leaching of the termination, decrease in adherence strength, and the change of characteristic may occur.
● For soldering, please refer to the soldering curves above. However, please keep exposures to temperatures exceeding 200℃ to fewer 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.

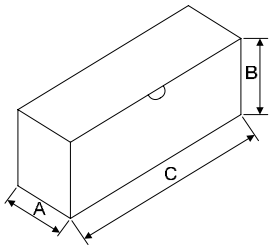
## Packaging

Tape




| Symbol | Dimension (mm) |
|---|---|
| W | 52.0±1.5 |
| P | 5.0±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 | Φ3.1max. |
| D1 | Φ0.5±0.05 |
| L | 4.8max. |

Inner Box




| | |
|---|---|
| A | 74.0±5.0 |
| B | 77.0±5.0 |
| C | 252.0±5.0 |
| Quantity: 2500PCS | |