

DATA SHEET

SPARK GAP PROTECTORS POWER SUPPLIES

BK1-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	6.0 ± 0.5
		D	$\Phi 3.3\pm 0.5$
		d	$\Phi 3.1\pm 0.5$
		t	0.4 ± 0.1

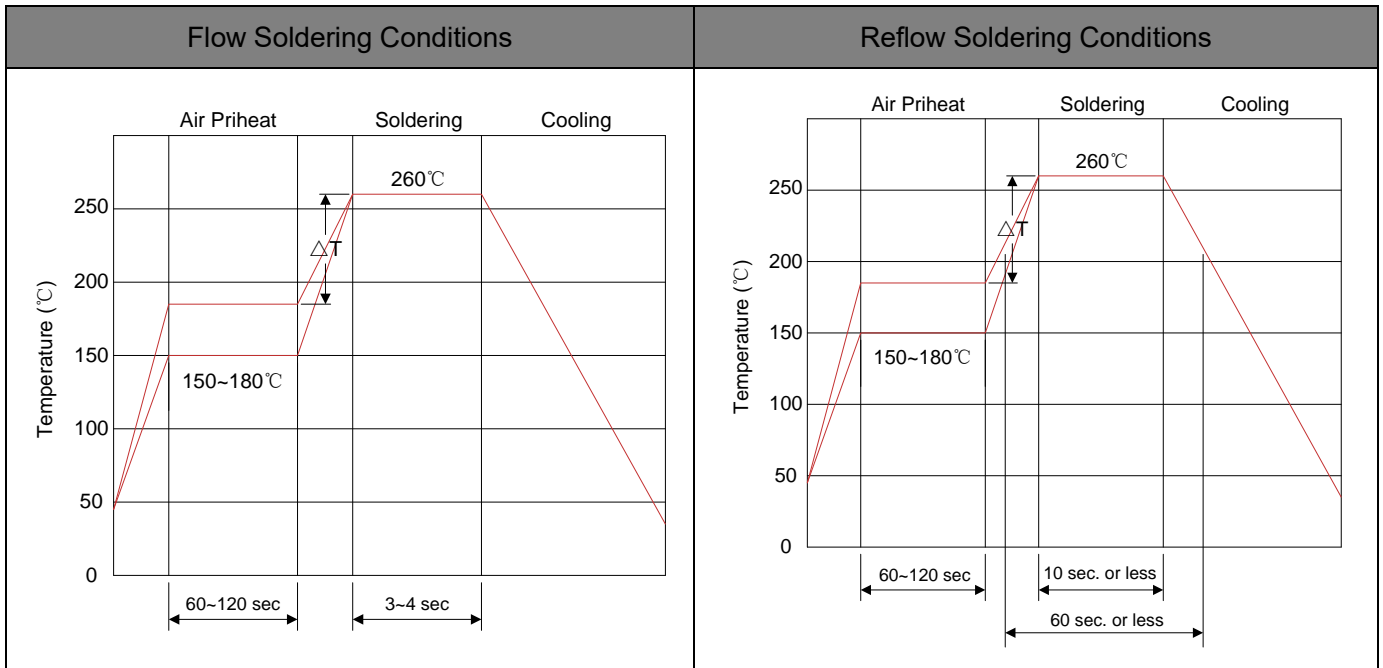
Electrical Characteristics

Part Number ①	DC Spark-over Voltage	Minimum Insulation Resistance		Maximum Capacitance (1KHz-6V _{MAX})	Surge Current Capacity (8/20μs)
	Vs(V)	Test Voltage(V)	IR _{OHM} (MΩ)	C(pf)	
BK13000702-M	140±30%	50	100	0.8	3000A
BK12001002-M	200±20%	100	100	0.8	3000A
BK12001502-M	300±20%	100	100	0.8	3000A
BK12002002-M	400±20%	250	100	0.8	3000A
BK12002502-M	500±20%	250	100	0.8	3000A
BK12003502-M	700±20%	250	100	0.8	3000A
BK12005002-M	1000±20%	500	100	0.8	3000A

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(Vs<1000V) or 500V/s(Vs≥1000V).	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 0Ω resistor. 200 times at an interval of 10sec.	Rate-of-change, within ±30% insulation resistance & capacitance, conformed to rated spec.
Surge Current Capacity	1.2/50μs & 8/20μs, 3000A, electrically connected with a resistor (2~4Ω), ±5 times, each time interval 60 seconds. Thereafter, outer appearance shall be visually examined.	No crack and no failures
Cold Resistance	Measurement after -40°C/1000 HRS & normal temperature/2 HRS.	Features are conformed to rated spec.
Heat Resistance	Measurement after 125°C/1000 HRS & normal temperature/2 HRS.	
Humidity Resistance	Measurement after humidity 90~95°C (45°C) /1000 HRS & normal temperature/2 HRS.	
Temperature Cycle	10 times repetition of cycle -40°C/30min → normal, temp/2 min → 125°C/30min, measurement after normal temp/2 HRS.	
Solder Ability	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.
Solder Heat	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.

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

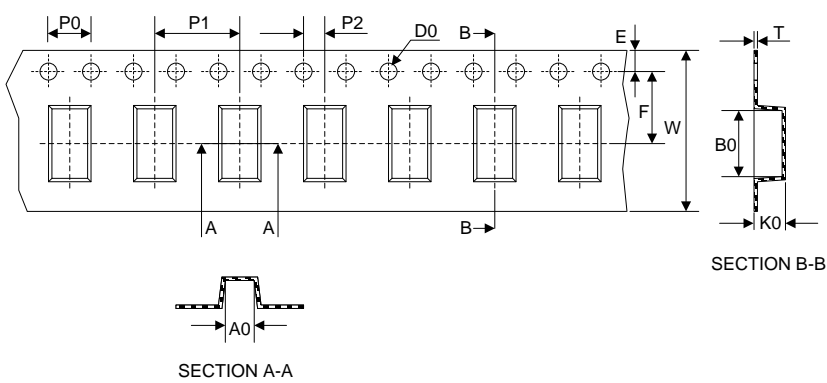
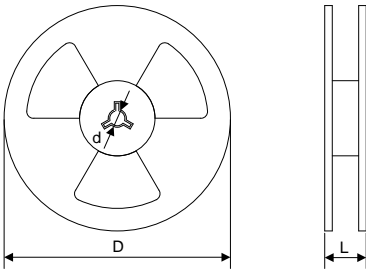
When using ultrasonic cleaning, the board may resonate if the output power is too high. Since this vibration can cause cracking or a decrease in the adherence of the termination, we recommend that you use the conditions below.

Frequency: 40kHz max.

Output power: 20W/liter

Cleaning time: 5 minutes max.

Packaging

Tape	Symbol	Dimension (mm)	
	W	16.00±0.20	
	P0	4.00±0.10	
	P1	8.00±0.10	
	P2	2.00±0.10	
	D0	Φ1.5±0.10	
	E	1.75±0.10	
	F	7.50±0.05	
	A0	3.50±0.10	
	B0	6.50±0.10	
	K0	3.50±0.10	
	T	0.50Max.	
	<p>Reel</p> 	D	330.0±3.0
		d	13.0±1.0
L		20.0±3.0	
Quantity: 2000PCS			

LEGAL DISCLAIMER

YAGEO, its distributors and agents (collectively, "YAGEO"), hereby disclaims any and all liabilities for any errors, inaccuracies or incompleteness contained in any product related information, including but not limited to product specifications, datasheets, pictures and/or graphics. YAGEO may make changes, modifications and/or improvements to product related information at any time and without notice.

YAGEO makes no representation, warranty, and/or guarantee about the fitness of its products for any particular purpose or the continuing production of any of its products. To the maximum extent permitted by law, YAGEO disclaims (i) any and all liability arising out of the application or use of any YAGEO product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for a particular purpose, non-infringement and merchantability.

YAGEO products are designed for general purpose applications under normal operation and usage conditions. Please contact YAGEO for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property: Aerospace equipment (artificial satellite, rocket, etc.), Atomic energy-related equipment, Aviation equipment, Disaster prevention equipment, crime prevention equipment, Electric heating apparatus, burning equipment, Highly public information network equipment, data-processing equipment, Medical devices, Military equipment, Power generation control equipment, Safety equipment, Traffic signal equipment, Transportation equipment and Undersea equipment, or for any other application or use in which the failure of YAGEO products could result in personal injury or death, or serious property damage. Particularly **YAGEO Corporation and its affiliates do not recommend the use of commercial or automotive grade products for high reliability applications or manned space flight.**

Information provided here is intended to indicate product specifications only. YAGEO reserves all the rights for revising this content without further notification, as long as products are unchanged. Any product change will be announced by PCN.