

# SURGING

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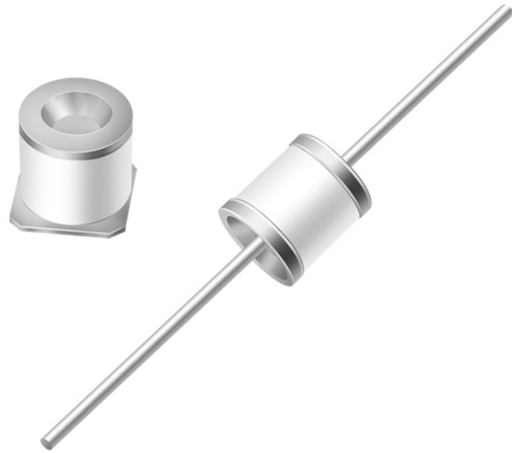


# Switching Spark Gap

开关放电管

KG5 Series

## Switching spark gap - KG5 Series



SURGING  
GAS DISCHARGE TUBE KG5 SERIES

### Description

The principle of gas discharge is used not only for overvoltage protection but also in switching applications. Unlike surge arresters, switching spark gaps are active components that work reliably even after igniting hundreds of thousands of times.

RUILON 2RK-5 series Switching Spark Gaps(SSG) can be used in all applications where high voltage pulses are generated, for example to ignite modern high-pressure gas discharge lamps such as xenon lamps in automotive headlights. Ignition performance is determined to a large degree by the properties of the switching component. An extremely fast switch is called for, which operates virtually without loss and with high insulation resistance in the non-conducting state. It should also be as compact as possible, rugged, highly reliable, and capable of operating over a wide temperature range.

### Features

- | Extremely long life time
- | Stable performance over life
- | Insensitive performance against variations in temperature
- | Low switching losses
- | Very short breakdown time
- | High reliability by robust design
- | Lead-free and RoHS compliant
- | Non-Radioactive

### Applications

- | Igniters for architectural and automotive Xenon discharge lamps
- | Electronic igniters for gas heating and gas domestic appliances, e.g., cookers
- | Ignition of ultra-high pressure gas discharge lamps for data and video projectors

### Part Number Code

**KG**      **5** - **600**      **T**

**Series:**  
Switching spark gap

**Volume:**  
5.5\*6

**DC Line Voltage:**  
600=600V

**Lead Type:**  
T:Lead  
S:SMD

## Switching spark gap - KG5 Series

### Electrical Characteristics

Part Number	DIP	KG5-230T	KG5-250T	KG5-300T	KG5-350T
	SMD	KG5-230S	KG5-250S	KG5-300S	KG5-350S
<b>Initial Values</b>					
Static Breakdown Voltage $V_S$ @100V/S <sup>1)</sup>					
First ignition Value after 24 hours in darkness		<275 V	<300 V	<360 V	<420 V
Following Ignition Values		207~253 V	225~275 V	270~330 V	315~385 V
<b>Electrical Life Time</b>					
Breakdown Voltage $V_B$ <sup>2)</sup>					
First ignition Value after 24 hours in darkness		<285 V	<310 V	<370 V	<435 V
Following Ignition Values		196~265 V	215~290 V	255~350 V	300~405 V
Switching Operations @ +25°C		10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>
Breakdown Time		<50 ns	<50 ns	<50 ns	<50 ns
Maximum Switching Frequency		100 Hz	100 Hz	200 Hz	200 Hz
<b>Test Circuit Parameters</b>					
Open Circuit Voltage $V_0$		230 V <sub>AC</sub>	350 V	400 V	450 V
Loading Resistance $R$		15 KΩ	10 KΩ	10 KΩ	10 KΩ
Discharge Capacitance $C$		2.2 μF	680 nF	680 nF	680 nF
Inductance $L$		10 μH	0.5 μH	0.5 μH	0.5 μH
Discharge Peak Current $I_P$		~300 A	~500 A	~500 A	~500 A

Part Number	DIP	KG5-380T	KG5-400T	KG5-420T	KG5-470T
	SMD	KG5-380S	KG5-400S	KG5-420S	KG5-470S
<b>Initial Values</b>					
Static Breakdown Voltage $V_S$ @100V/S <sup>1)</sup>					
First ignition Value after 24 hours in darkness		<460 V	<480 V	<520 V	<560 V
Following Ignition Values		350~420 V	360~440 V	380~495 V	423~517 V
<b>Electrical Life Time</b>					
Breakdown Voltage $V_B$ <sup>2)</sup>					
First ignition Value after 24 hours in darkness		<460 V	<500 V	<520 V	<585V
Following Ignition Values		330~440 V	340~460 V	360~515 V	400~540 V
Switching Operations @ +25°C		10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>
Breakdown Time		<50 ns	<50 ns	<50 ns	<50 ns
Maximum Switching Frequency		200 Hz	200 Hz	200 Hz	200 Hz
<b>Test Circuit Parameters</b>					
Open Circuit Voltage $V_0$		500 V	520 V	550 V	600 V
Loading Resistance $R$		10 KΩ	10 KΩ	10 KΩ	10 KΩ
Discharge Capacitance $C$		680 nF	680 nF	680 nF	680 nF
Inductance $L$		0.5 μH	0.5 μH	0.5 μH	0.5 μH
Discharge Peak Current $I_P$		~500 A	~500 A	~500 A	~500 A

## Switching spark gap - KG5 Series

Part Number	DIP	KG5-500T	KG5-550T	KG5-600T
	SMD	KG5-500S	KG5-550S	KG5-600S
<b>Initial Values</b>				
Static Breakdown Voltage $V_S$ @100V/S <sup>1)</sup>				
First ignition Value after 24 hours in darkness		<600 V	<680 V	<720 V
Following Ignition Values		450~550 V	510~630 V	540~660 V
<b>Electrical Life Time</b>				
Breakdown Voltage $V_B$ <sup>2)</sup>				
First ignition Value after 24 hours in darkness		<625 V	<710 V	<750 V
Following Ignition Values		425~575 V	485~655 V	510~690 V
Switching Operations @ +25°C		$10^5$	$10^5$	$10^5$
Breakdown Time		<50 ns	<50 ns	<50 ns
Maximum Switching Frequency		200 Hz	200 Hz	200 Hz
<b>Test Circuit Parameters</b>				
Open Circuit Voltage $V_0$		630 V	720 V	750 V
Loading Resistance $R$		13 KΩ	13 KΩ	13 KΩ
Discharge Capacitance $C$		470 nF	470 nF	470 nF
Inductance $L$		0.1 μH	0.1 μH	0.1 μH
Discharge Peak Current $I_P$		~600 A	~600 A	~600 A
<b>Insulation Resistance @100 V</b>		> $10^8 \Omega$		
<b>Capacitance @1MHz</b>		<1 pF		
<b>Weight</b>		~0.85g		
<b>Operation and storage temperature</b>		-40~+125°C		
<b>Surface treatment</b>		DIP -Nickel Plated SMD -Matte-tin plated		

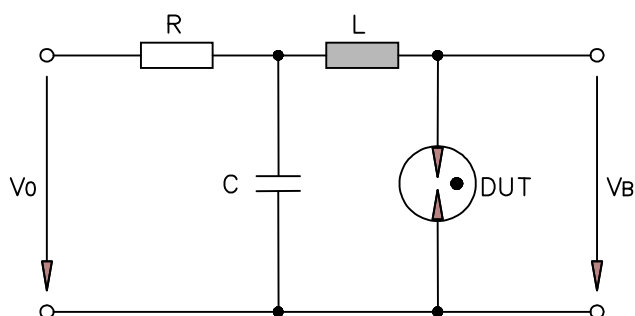
<sup>1)</sup> At delivery AQL 0.65 level II, DIN ISO 2859

<sup>2)</sup> Fig. 1

<sup>3)</sup> 350 Marking

<sup>4)</sup> 600 Marking

### Test Circuit Fig. 1

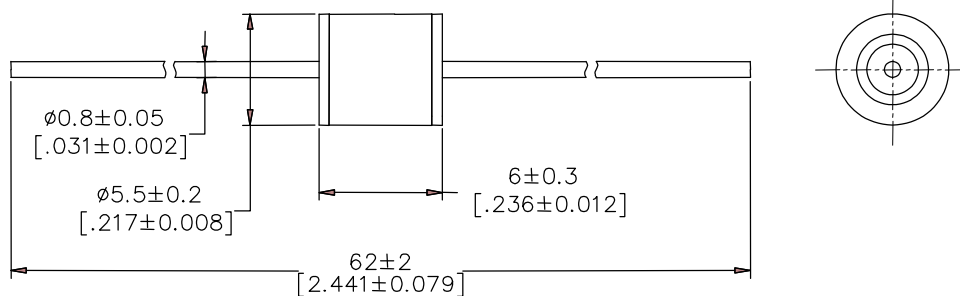


DUT Device Under Test  
 $V_B$  Breakdown Voltage  
 $V_0$ ,  $R$ ,  $L$  and  $C$  Parameters See above table

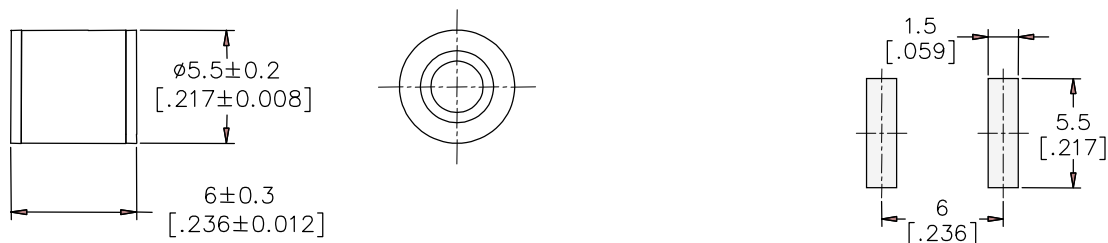
## Switching spark gap - KG5 Series

### Dimensions (Unit: mm/inch)

#### DIP Series ( KG5-xxxT )



#### SMD Series ( KG5-xxxS )

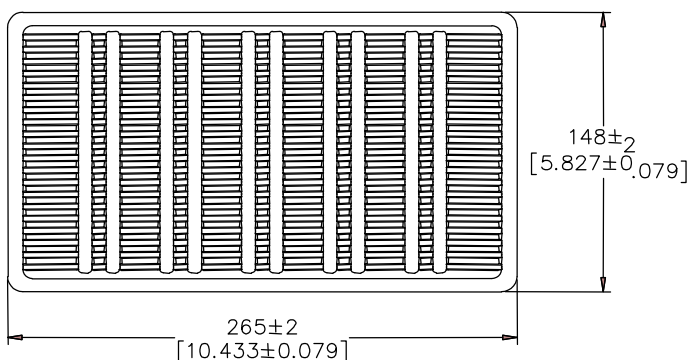


Recommended Soldering Pad Layout

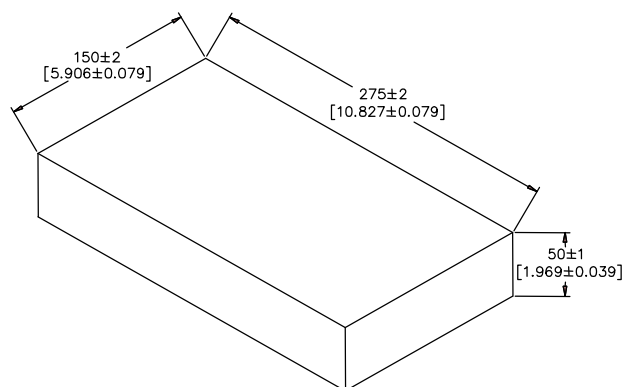
### Packaging Information (Unit: mm/inch)

#### Axial Packaging (Bulk)

##### Plastic Tray



##### Inner box



#### Packaging Quantity:

100 PCS per Plastic Tray

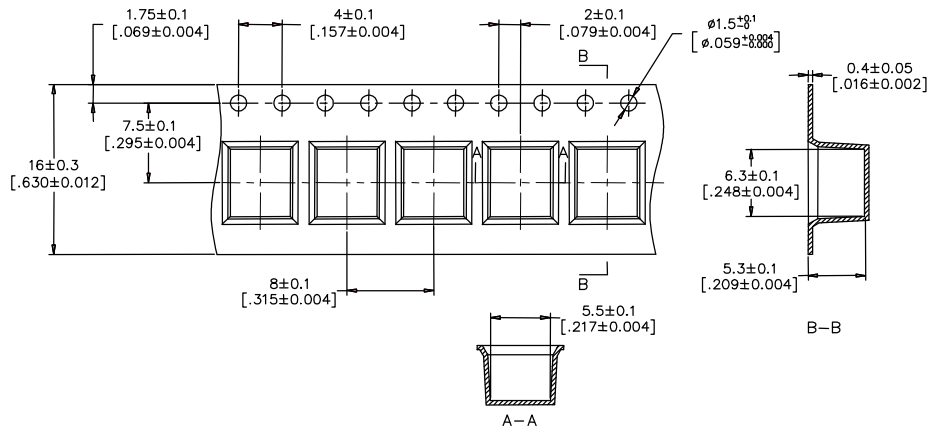
5 Plastic Trays per inner box

500 PCS per inner box

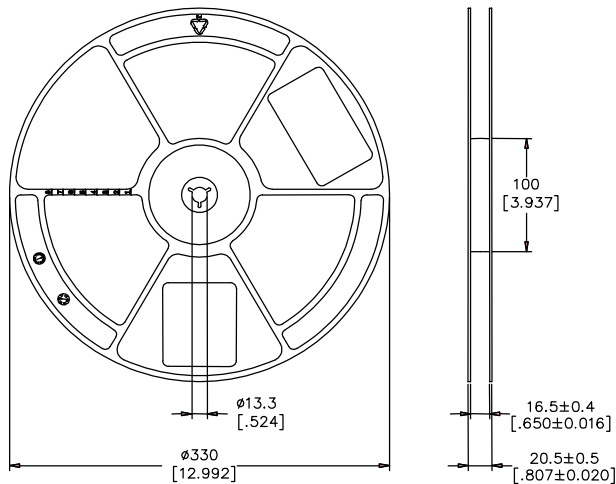
## Switching spark gap - KG5 Series

### SMD Packaging (Tape & Reel)

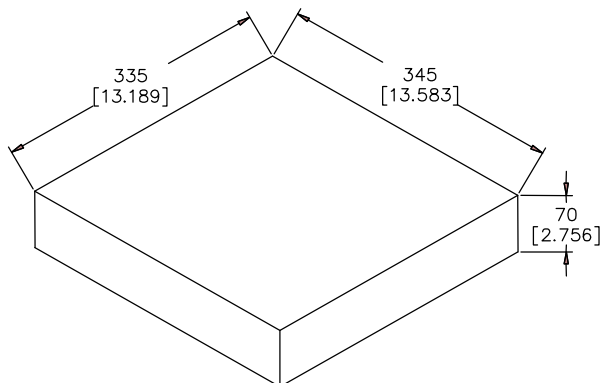
#### Tape



#### Reel



#### Inner box



#### Packaging Quantity:

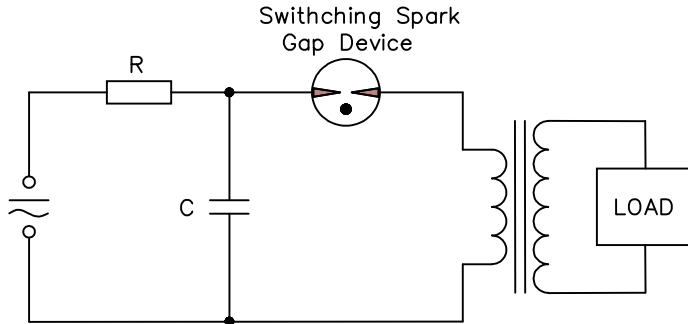
1,000 PCS per reel (13")

3 reels per inner box

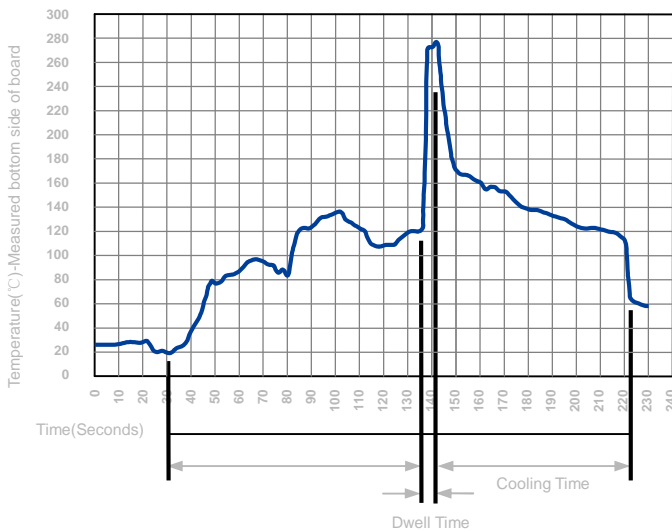
3,000 PCS per inner box

## Switching spark gap - KG5 Series

### Basic Application Circuit

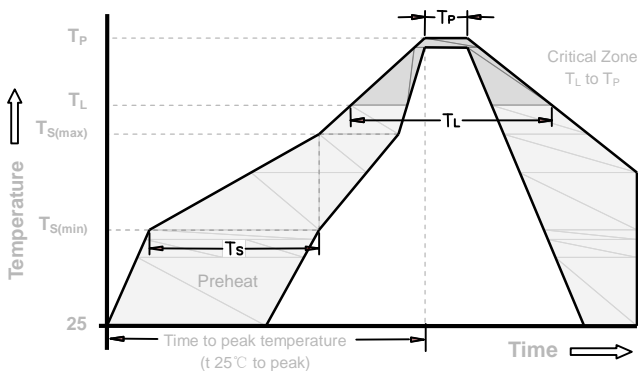


### Soldering Parameters - Wave soldering (Thru-Hole Devices)



Wave Soldering Condition		Pb-Free assembly
Preheat	Temperature Min	100°C
	Temperature Max	150°C
	Time (Min to Max)	60-180 Seconds
Solder Pot Temperature		280°C Max
Solder Dwell Time		2-5 Seconds

### Soldering Parameters - Reflow Soldering (Surface Mount Devices)



Reflow Condition		Pb - Free assembly
Preheat	-Temperature Min ( $T_{s(min)}$ )	150°C
	-Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 -180 Seconds
Average ramp up rate ( Liquids Temp $T_L$ to peak)		3°C/second max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		5°C/second max
Reflow	- Temperature ( $T_L$ ) (Liquids)	217°C
	- Time (min to max) ( $t_s$ )	60 -150 Seconds
Peak Temperature ( $T_P$ )		260 +0/-5°C
Time within 5°C of actual peak Temperature ( $t_p$ )		10 - 30 Seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature ( $T_P$ )		8 minutes Max
Do not exceed		260°C

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