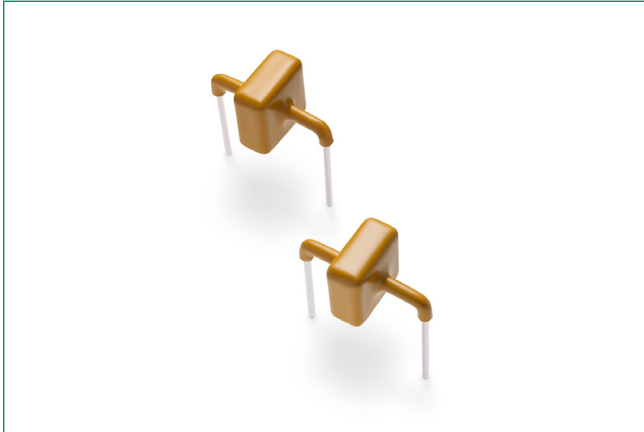


# AK6-Y Series

## Axial Leaded – 6kA



### Agency Recognitions

Agency	Agency File Number
	E128662

### Maximum Ratings and Thermal Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Operating Storage Temperature Range	$T_{STG}$	-55 to 150	$^\circ\text{C}$
Operating Junction Temperature Range	$T_J$	-55 to 125	$^\circ\text{C}$
Current Rating <sup>1</sup>	$I_{PP}$	6	kA

**Note:**

1. Rated  $I_{PP}$  measured with 8/20 $\mu\text{s}$  pulse.

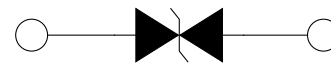
## Description

The AK6-Y series of high power TVS diode is specially designed for meeting severe surge test environment of both AC and DC line protection applications. It features a very fast response and ultra low clamping characteristics as compared to MOVs (Metal Oxide Varistors). It accomplishes this by virtue of the Littelfuse Foldback™ technology, which provides a clamping voltage lower than the avalanche voltage (but above the rated working voltage); therefore, any voltage rise due to increased current conduction is maintained at a minimum magnitude, providing the best possible protection level. These AK components can be connected in series and / or parallel to create a very high surge current protection solution.

## Features & Benefits

- Recognized to UL 497B as an Isolated Loop Circuit Protector
- Both reflow and wave soldering capable
- Very low clamping voltage
- Ultra compact: less than one-tenth the size of traditional discrete solutions
- Sharp breakdown voltage
- Low slope resistance
- Bi-directional
- Foldback technology for superior clamping factor
- Symmetric in leads width for easier soldering during assembly.
- IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ESD protection of data lines in accordance with IEC 61000-4-2
- EFT protection of data lines in accordance with IEC 61000-4-4
- Halogen-free and RoHS compliant
- Glass passivated junction
- Pb-free E4 means 2nd level interconnect is Pb-free and the terminal finish material is silver

### Functional Diagram



Bi-directional

### Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

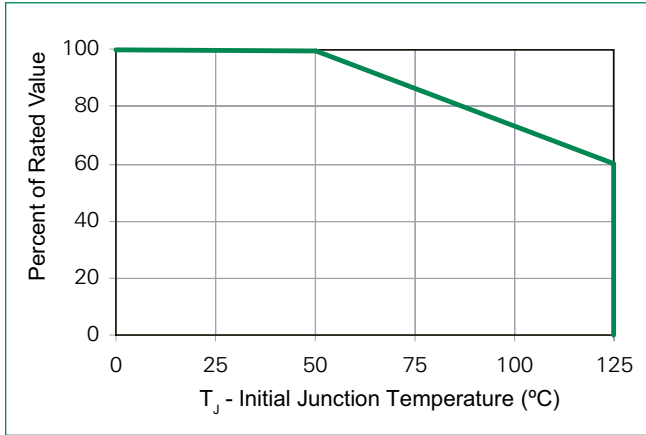
Part Numbers	Part Marking	Standoff Voltage ( $V_{SO}$ ) Volts	Max. Reverse Leakage ( $I_R$ ) @ $V_{SO}$ $\mu\text{A}$	Typical $I_R$ @ $85^\circ\text{C}$ ( $\mu\text{A}$ )	Reverse Breakdown Voltage ( $V_{BR}$ ) @ $I_T$		Test Current $I_T$ (mA)	Max. Clamping Voltage $V_{CL}$ @ $I_{PP}$ Peak Pulse Current ( $I_{PP}$ ) (Note 1)		Max. Temp Coefficient OF $V_{BR}$ (%/ $^\circ\text{C}$ )	Max. Capacitance 0 Bias 10kHz (nF)	Agency Approval
					Min Volts	Max Volts		$V_{CL}$ Volts	$I_{PP}$ Amps			
AK6-030C-Y	6-030C	30	10	15	32	37	10	90	6,000	0.1	11.0	X
AK6-058C-Y	6-058C	58	10	15	64	70	10	110	6,000	0.1	8.0	X
AK6-066C-Y	6-066C	66	10	15	72	80	10	120	6,000	0.1	6.0	X
AK6-076C-Y	6-076C	76	10	15	85	95	10	140	6,000	0.1	6.5	X
AK6-170C-Y	6-170C	170	10	15	180	220	10	260	6,000	0.1	2.8	X
AK6-190C-Y	6-190C	190	10	15	200	245	10	290	6,000	0.1	2.5	X
AK6-240C-Y	6-240C	240	10	15	250	285	10	340	6,000	0.1	2.0	X
AK6-270C-Y	6-270C	270	10	15	280	320	10	380	6,000	0.1	1.6	X
AK6-380C-Y	6-380C	380	10	15	401	443	10	520	6,000	0.1	1.4	X
AK6-430C-Y	6-430C	430	10	15	440	490	10	625	6,000	0.1	1.0	X

Note: Using 8/20 $\mu\text{s}$  wave shape as defined in IEC 61000-4-5.

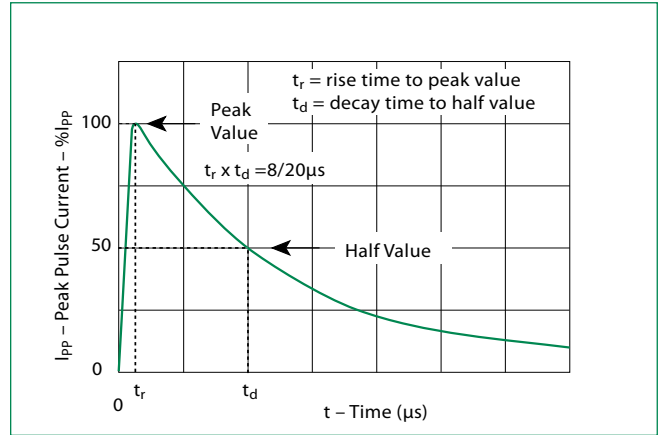
# AK6-Y Series

## Axial Leaded – 6kA

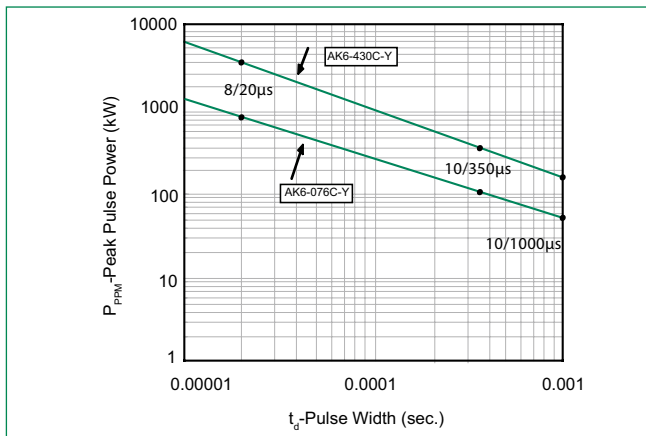
**Figure 1 - Peak Power Derating**



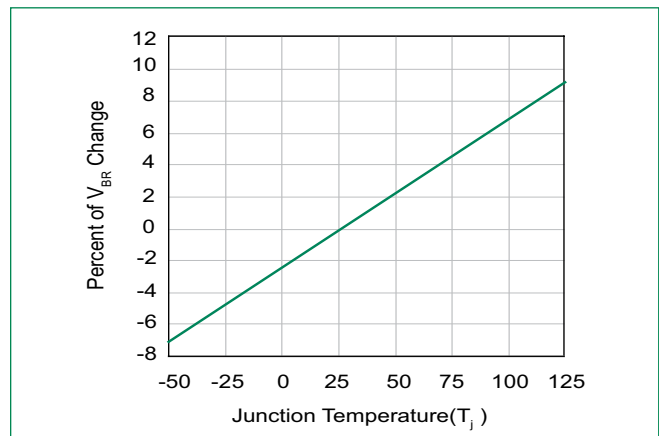
**Figure 2 - Pulse Waveform**



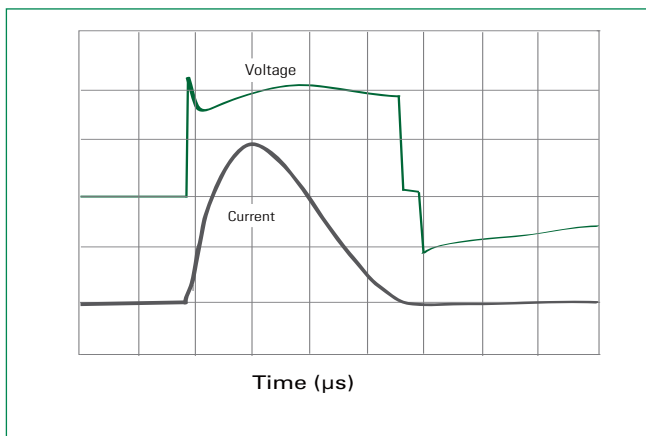
**Figure 3 - Typical Peak Pulse Power Rating Curve**



**Figure 4 - Typical VBR Vs Junction Temperature**



**Figure 5 - Surge Response (8/20 Surge current waveform)**



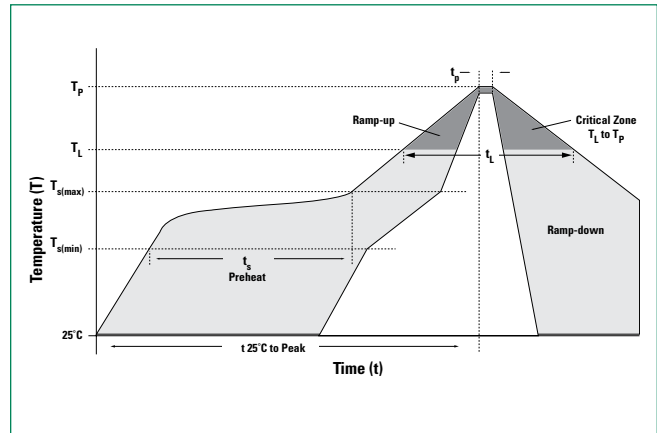
**Note:** The power dissipation causes a change in avalanche voltage during the surge and the avalanche voltage eventually returns to the original value when the transient has passed.

# AK6-Y Series

## Axial Leaded – 6kA

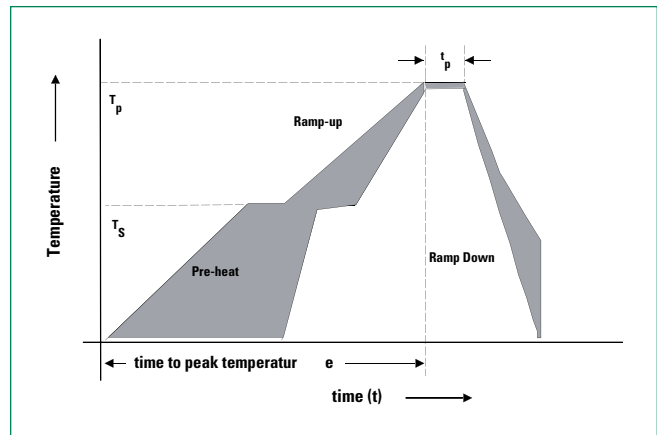
### Soldering Parameters

<b>Reflow Condition</b>		Lead-free assembly
<b>Pre Heat</b>	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 – 120 secs
<b>Average ramp up rate (Liquidus Temp (<math>T_L</math>) to peak)</b>		3°C/second max
<b><math>T_{s(max)}</math> to <math>T_A</math> - Ramp-up Rate</b>		3°C/second max
<b>Reflow</b>	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Time (min to max) ( $T_s$ )	60 – 150 seconds
<b>Peak Temperature (<math>T_p</math>)</b>		260 <sup>+0/-5</sup> °C
<b>Time within 5°C of actual peak Temperature (<math>t_p</math>)</b>		30 seconds
<b>Ramp-down Rate</b>		6°C/second max
<b>Time 25°C to peak Temperature (<math>T_p</math>)</b>		8 minutes Max.
<b>Do not exceed</b>		260°C



### Flow Soldering (Solder Dipping)

<b>Reflow Condition</b>		Lead-free assembly
<b>Pre Heat</b>	- Temperature Min ( $T_{s(min)}$ )	140°C
	- Temperature Max ( $T_{s(max)}$ )	160°C
	- Time to Pre-Heat Temp	60 – 150 secs
<b>Average ramp up rate to Pre-Heat Temp</b>		5°C/second max
<b>Peak Temperature (<math>T_p</math>)</b>		260 <sup>+0/-5</sup> °C
<b>Average ramp up rate (pre-heat to <math>T_p</math>)</b>		5°C/second max
<b>Time within actual peak Temperature Max</b>		6 seconds
<b>Ramp-down Rate</b>		5°C/second max



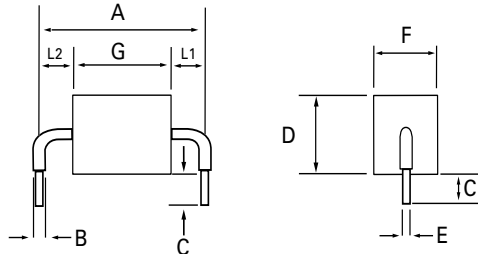
### Physical Specifications

<b>Weight</b>	Contact manufacturer
<b>Case</b>	UL Recognized compound meeting flammability rating V-0
<b>Terminal</b>	Silver plated leads, solderable per MIL-STD-750 Method 2026

# AK6-Y Series

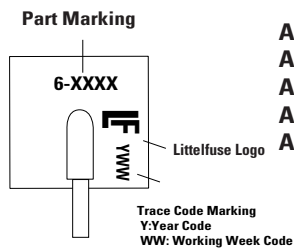
## Axial Leaded – 6kA

### Dimensions



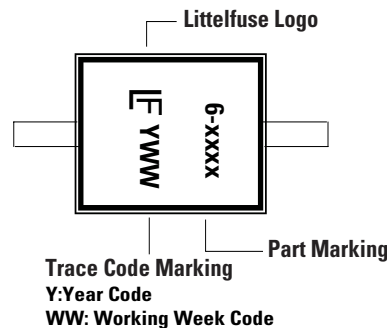
Dimensions	Inches	Millimeters
A	0.950 +/- 0.040	24.15 +/- 1.00
B	0.095 +/- 0.024	2.4 +/- 0.60
C	0.236 +/- 0.040	6.00 +/- 1.00
D	0.570 max.	14.48 max.
E	0.050 +/- 0.002	1.270 +/- 0.05
F	0.500 max.	12.70 max.
G - 030C-Y	0.161 +/- 0.040	4.10 +/- 1.00
G - 058C-Y/066C-Y 076C-Y	0.189 +/- 0.040	4.8 +/- 1.00
G - 170C-Y/190C-Y	0.320 +/- 0.040	8.13 +/- 1.00
G - 240C-Y	0.370 +/- 0.040	9.4 +/- 1.00
G - 380C-Y/430C-Y	0.543 +/- 0.040	13.8 +/- 1.00
L1/L2	L1= L2 tolerance +/- 0.04 inch (1.0 mm)	

### Part Marking System



Type 1- Side View

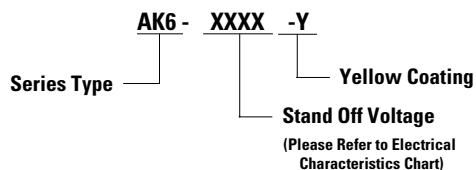
Apply to P/N listed below:  
**AK6-030C-Y**  
**AK6-058C-Y**  
**AK6-066C-Y**  
**AK6-076C-Y**



Type 2 - Top View

Apply to P/N listed below:  
**AK6-170C-y**  
**AK6-190C-y**  
**AK6-240C-y**  
**AK6-380C-y**  
**AK6-430C-y**

### Part Numbering System



### Packing Options

Part Number	Component Package	Quantity	Packaging Option
AK6-XXXX-Y	AK Package	56pcs/Box	Bulk
AK6-XXXX-Y-12	AK Package	12pcs/Box	Bulk

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