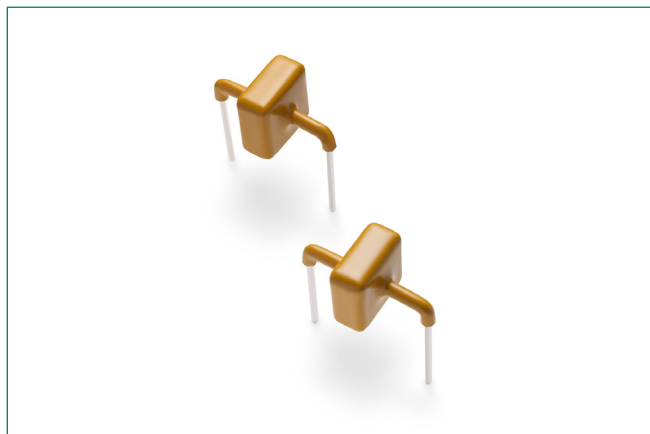


# AK3-Y Series

## Axial Leaded – 3kA



### Additional Information



Resources



Accessories



Samples

### 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>	$I_{PP}$	3	kA

Note:

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

### Description

The AK3-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 Foldbak™ 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
- Foldbak™ 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			
AK3-015C-Y	3-015C	15	10	15	16	19	10	28	3,000	0.1	12.0	X
AK3-030C-Y	3-030C	30	10	15	32	37	10	90	3,000	0.1	11.0	X
AK3-038C-Y	3-038C	38	10	15	40	46	10	95	3,000	0.1	10.0	-
AK3-058C-Y	3-058C	58	10	15	64	70	10	110	3,000	0.1	6.0	X
AK3-066C-Y	3-066C	66	10	15	72	80	10	120	3,000	0.1	6.0	X
AK3-076C-Y	3-076C	76	10	15	85	95	10	140	3,000	0.1	6.0	X
AK3-150C-Y	3-150C	150	10	15	158	194	10	230	3,000	0.1	2.6	X
AK3-170C-Y	3-170C	170	10	15	179	220	10	260	3,000	0.1	2.4	X
AK3-190C-Y	3-190C	190	10	15	200	245	10	290	3,000	0.1	2.4	X
AK3-208C-Y	3-208C	208	10	15	223	246	10	306	3,000	0.1	2.4	X
AK3-380C-Y	3-380C	380	10	15	401	443	10	520	3,000	0.1	2.0	X
AK3-430C-Y	3-430C	430	10	15	440	490	10	625	3,000	0.1	2.0	X

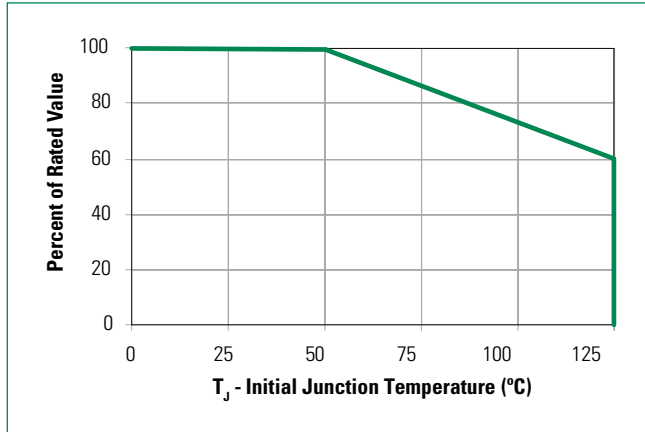
Note: 1. Using 8/20 $\mu\text{s}$  wave shape as defined in IEC 61000-4-5.

# AK3-Y Series

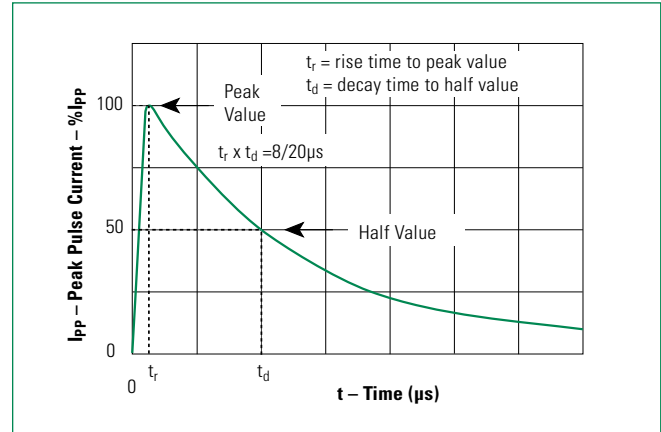
## Axial Leaded – 3kA

### Ratings and Characteristic Curves ( $T_A=25^\circ\text{C}$ unless otherwise noted) (Continued)

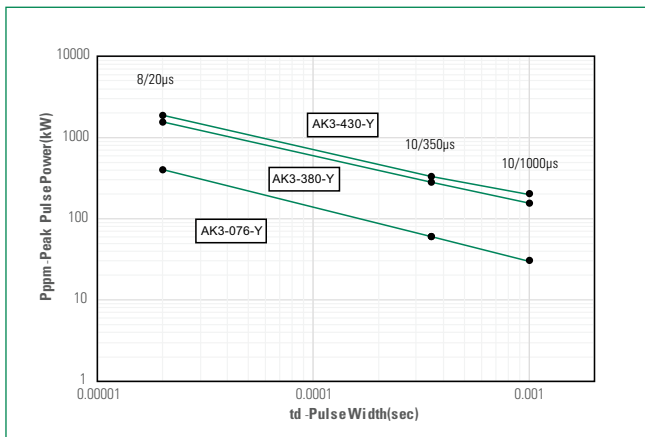
**Figure 1:**  
Peak Power Derating



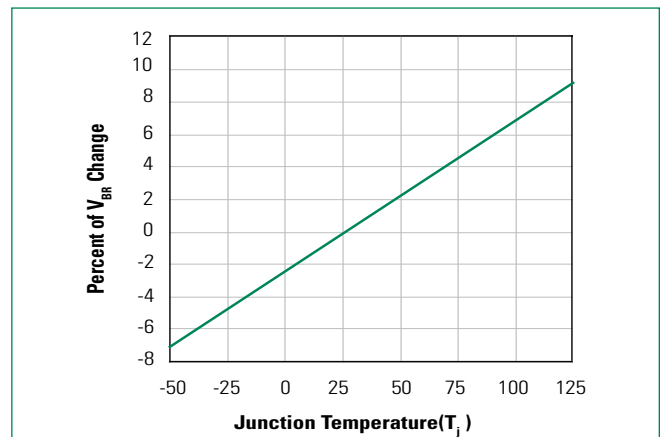
**Figure 2:**  
Pulse Waveform



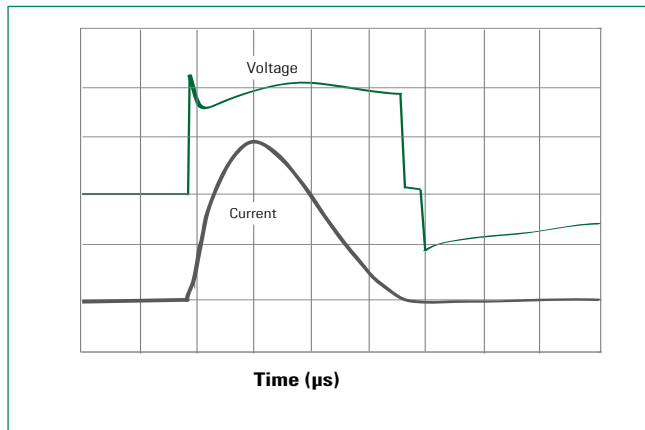
**Figure 3:**  
Typical Peak Pulse Power Rating Curve



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



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



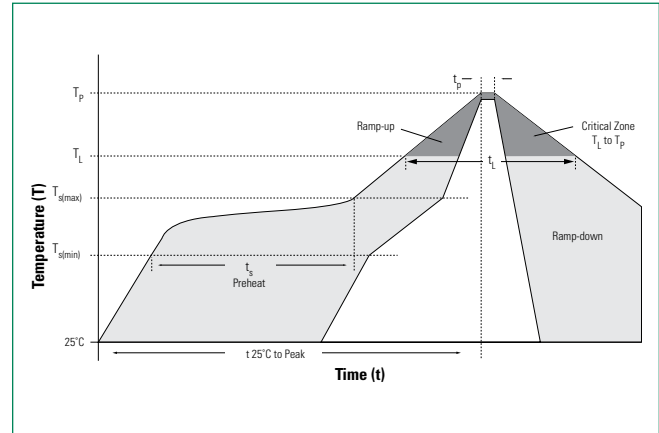
**Note:** The power dissipation causes a change in avalanche voltage during the surge and the avalanche voltage eventually returns to the original value when the transient has passed.

# AK3-Y Series

## Axial Leaded – 3kA

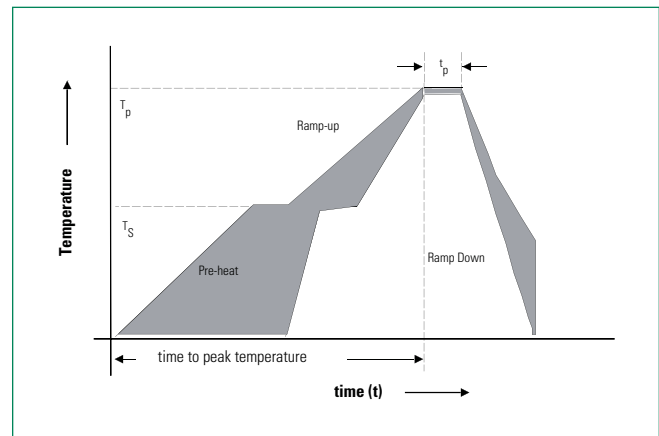
### Soldering Parameters

Reflow Condition		Lead-free assembly
Pre Heat	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 – 120 secs
Average ramp up rate (Liquidus Temp ( $T_A$ ) to peak		3°C/second max
$T_{s(max)}$ to $T_A$ - Ramp-up Rate		3°C/second max
Reflow	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Time (min to max) ( $t_L$ )	60 – 150 seconds
Peak Temperature ( $T_p$ )		260 <sup>+0/-5</sup> °C
Time within 5°C of actual peak Temperature ( $t_p$ )		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



### Flow Soldering (Solder Dipping)

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



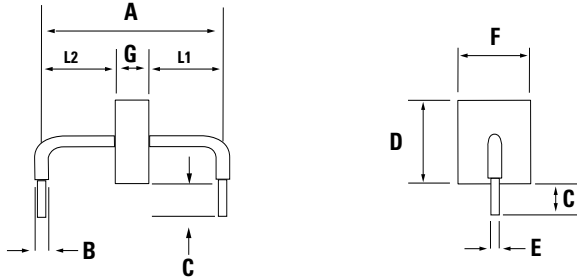
### Physical Specifications

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

# AK3-Y Series

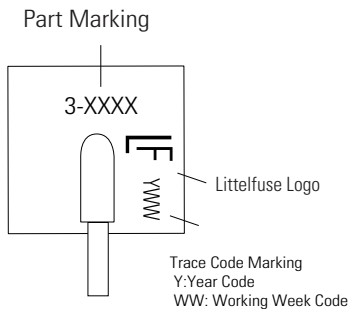
## Axial Leaded – 3kA

### Dimensions



Dimensions	Inches	Millimeters
<b>A</b>	0.951 +/- 0.040	24.15 +/- 1.00
<b>B</b>	0.094 +/- 0.024	2.40 +/- 0.60
<b>C</b>	0.236 +/- 0.039	6.00 +/- 1.00
<b>D</b>	0.145 +/- 0.040	3.68 +/- 1.00
<b>E</b>	0.433 max.	11.0 max.
<b>F</b>	0.050 +/- 0.002	1.27 +/- 0.05
<b>G</b>	0.374 max.	9.50 max.
<b>L1</b>	-015C 0.093 +/- 0.039 -030C/-038C/-066C 0.130 +/- 0.047 -058C/-076C 0.168 +/- 0.047 -150C 0.383 +/- 0.047 -170C/-190C 0.420 +/- 0.047 -208C 0.358 +/- 0.047 -380C 0.547 +/- 0.047 -430C 0.583 +/- 0.047 -208C 0.296 +/- 0.047	2.36 +/- 1.00 3.30 +/- 1.20 4.27 +/- 1.20 9.72 +/- 1.20 10.67 +/- 1.20 9.10 +/- 1.20 13.90 +/- 1.20 14.80 +/- 1.20 7.52 +/- 1.20
<b>L2</b>	L1 = L2 tolerance +/- 0.047 inch (+/- 1.20 mm) = A - (G+L1) tolerance +/- 0.047 inch (+/- 1.20 mm) L1 = L2 tolerance +/- 0.047 inch (+/- 1.20 mm)	

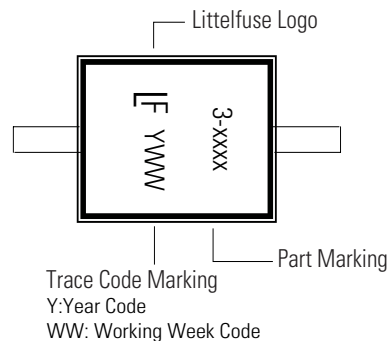
### Part Marking System



Apply to P/N listed below:

AK3-015C-Y  
AK3-030C-Y  
AK3-038C-Y  
AK3-058C-Y  
AK3-066C-Y  
AK3-076C-Y

**Type 1- Side View**

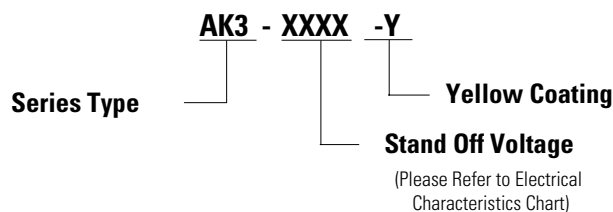


Apply to P/N listed below:

AK3-150C-Y  
AK3-170C-Y  
AK3-190C-Y  
AK3-208C-Y  
AK3-380C-Y  
AK3-430C-Y

**Type 2 - Top View**

### Part Numbering System



### Packing Options

Part Number	Component Package	Quantity	Packaging Option
AK3-XXXX-Y	AK Package	56pcs/Box	Bulk
AK3-XXXX-Y-12	AK Package	12pcs/Box	Bulk

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