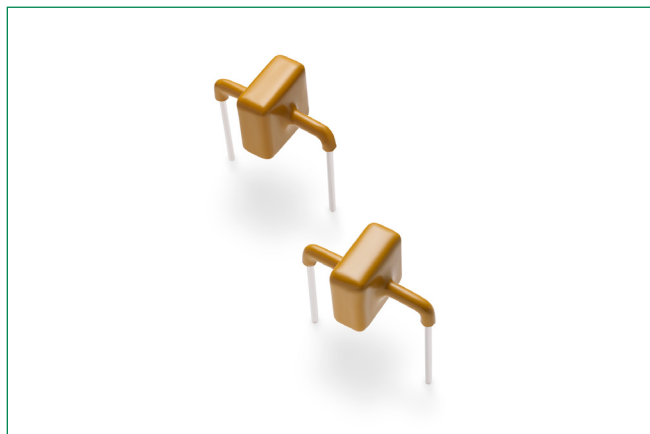


AK3-Y Series

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 ¹	I_{PP}	3	kA

Note:

1. Rated I_{PP} measured with 8/20 μs 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} μA	Typical I_R @ 85°C (μA)	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 μs 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

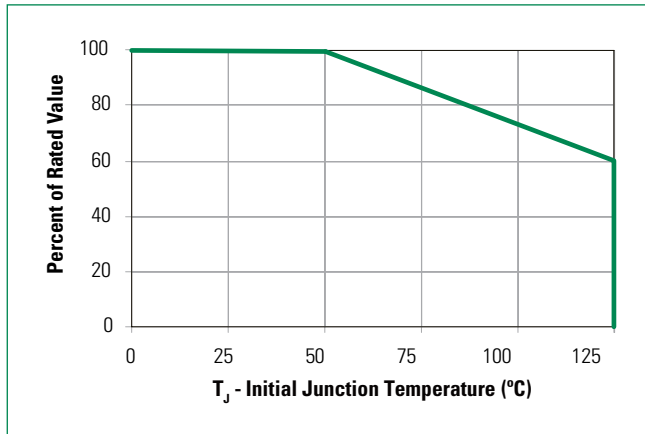


Figure 2:
Pulse Waveform

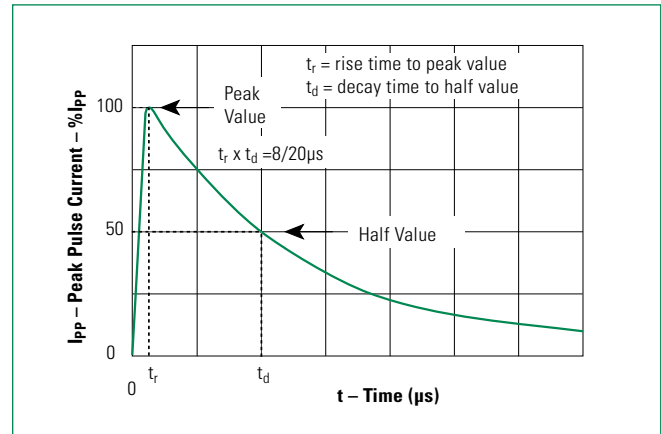


Figure 3:
Typical Peak Pulse Power Rating Curve

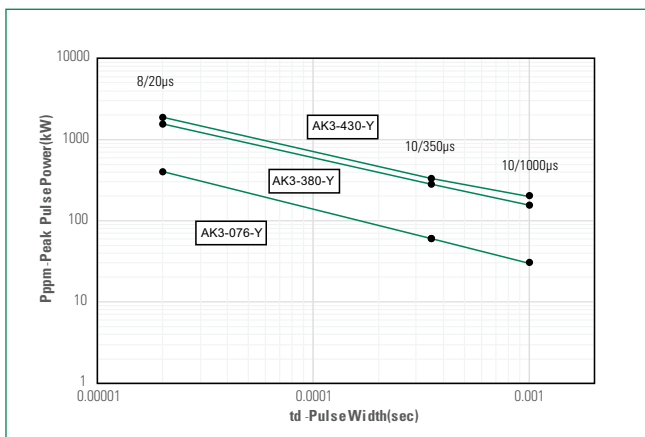


Figure 4:
Typical VBR Vs Junction Temperature

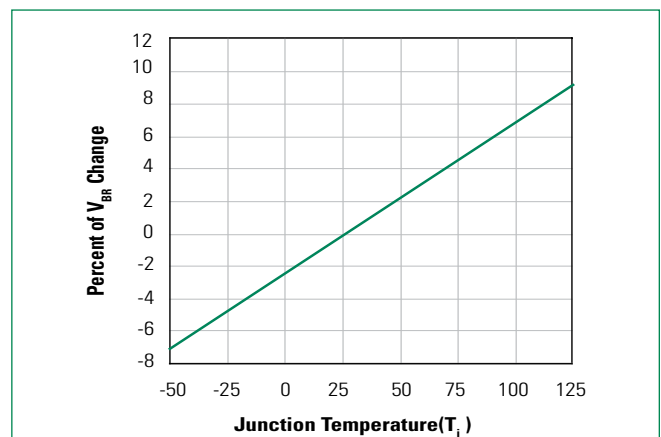
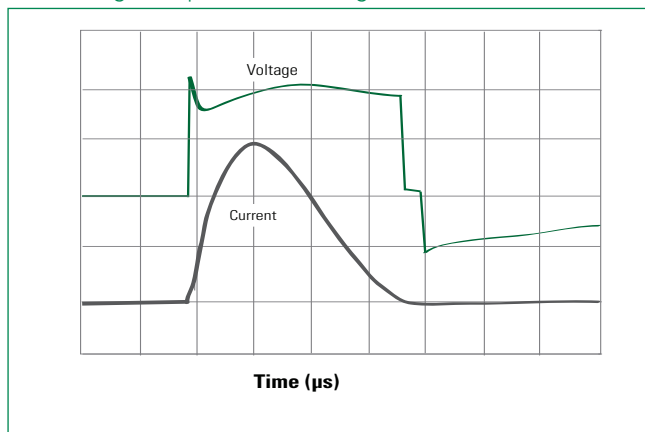


Figure 5:
Surge Response (8/20 Surge current waveform)



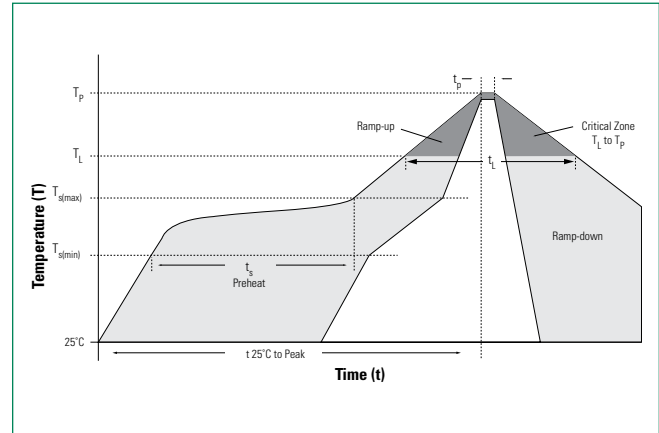
Note: The power dissipation causes a change in avalanche voltage during the surge and the avalanche voltage eventually returns to the original value when the transient has passed.

AK3-Y Series

Axial Leaded – 3kA

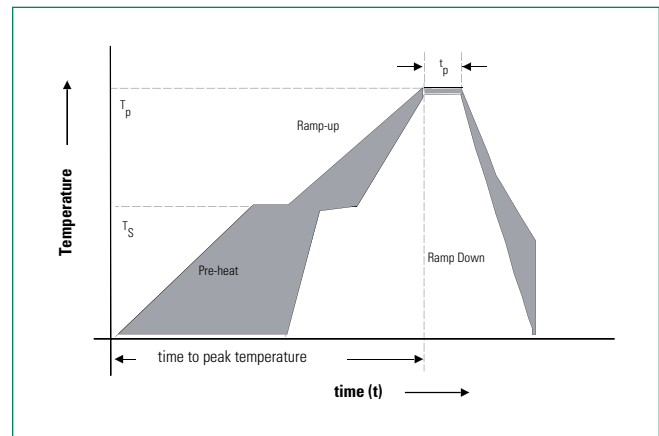
Soldering Parameters

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 ^{+0/-5} °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 ^{+0/-5} °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



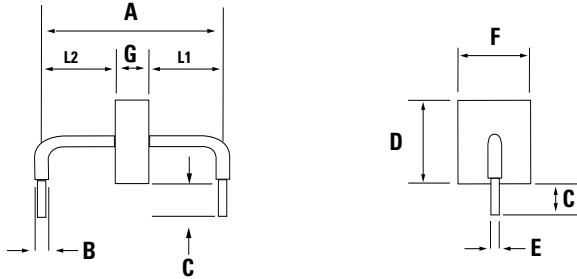
Physical Specifications

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

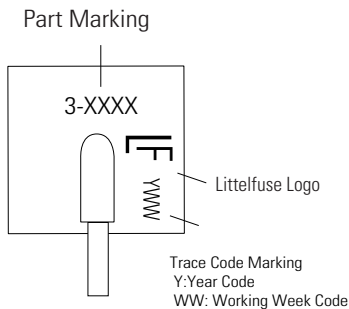
Axial Leaded – 3kA

Dimensions



Dimensions	Inches	Millimeters
A	0.951 +/- 0.040	24.15 +/- 1.00
B	0.094 +/- 0.024	2.40 +/- 0.60
C	0.236 +/- 0.039	6.00 +/- 1.00
D	0.145 +/- 0.040	3.68 +/- 1.00
E	0.433 max.	11.0 max.
F	0.050 +/- 0.002	1.27 +/- 0.05
G	0.374 max.	9.50 max.
L1	-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
L2	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)	

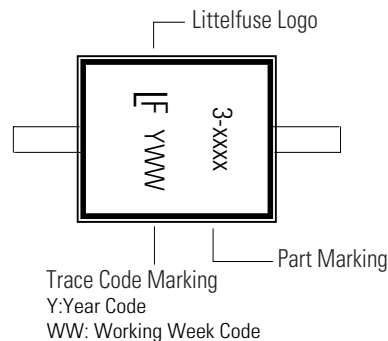
Part Marking System



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

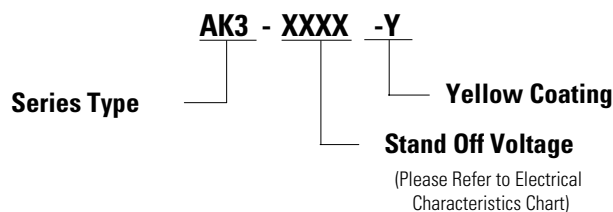


Apply to P/N listed below:

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

Disclaimer Notice - Littelfuse products are not designed for, and shall not be used for, any purpose (including, without limitation, automotive, military, aerospace, medical, life-saving, life-sustaining or nuclear facility applications, devices intended for surgical implant into the body, or any other application in which the failure or lack of desired operation of the product may result in personal injury, death, or property damage) other than those expressly set forth in applicable Littelfuse product documentation. Warranties granted by Littelfuse shall be deemed void for products used for any purpose not expressly set forth in applicable Littelfuse documentation. Littelfuse shall not be liable for any claims or damages arising out of products used in applications not expressly intended by Littelfuse as set forth in applicable Littelfuse documentation. The sale and use of Littelfuse products is subject to Littelfuse Terms and Conditions of Sale, unless otherwise agreed by Littelfuse. "Littelfuse" includes Littelfuse, Inc., and all of its affiliate entities. <http://www.littelfuse.com/disclaimer-electronics>