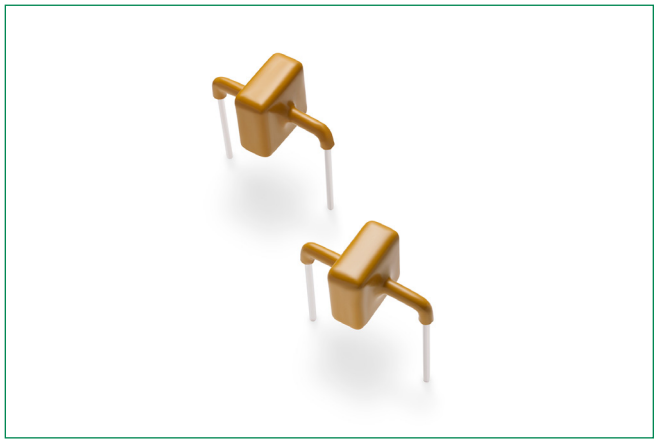
AK3-Y Series
Axial Leaded – 3kA



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 FoldbakTM 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
- FoldbakTM 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

Additional Information

Resources | Accessories | Samples

Agency Recognitions

Agency	Agency File Number
UL	E128662

Maximum Ratings and Thermal Characteristics

(T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Operating Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 125	°C
Current Rating[1]	I_{PP}	3	kA

Note:
1. Rated I_{PP} measured with 8/20µs pulse.

Functional Diagram

Bi-directional

Electrical Characteristics (T_A=25°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	Max. Clamping Voltage V_{CL} @ I_{PP} Peak Pulse Current (I_{PP}) (Note 1)		Max. Temp Coefficient OF V_{BR}	Max. Capacitance 0 Bias 10kHz	Agency Approval
					Min Volts	Max Volts	(mA)	V_{CL} Volts	I_{PP} Amps	(%/°C)	(nF)	UL
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 8/20µs wave shape as defined in IEC 61000-4-5.

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Ratings and Characteristic Curves (T_A=25°C unless otherwise noted) (Continued)

Figure 1:
Peak Power Derating

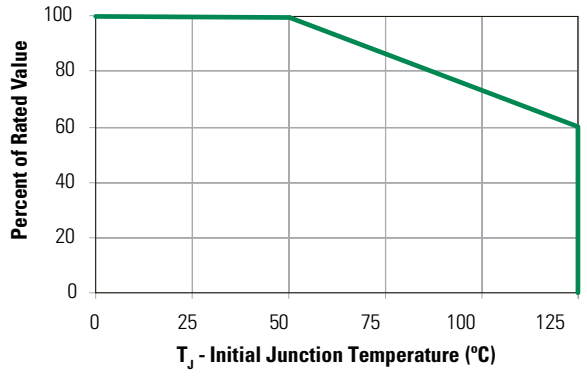


Figure 2:
Pulse Waveform

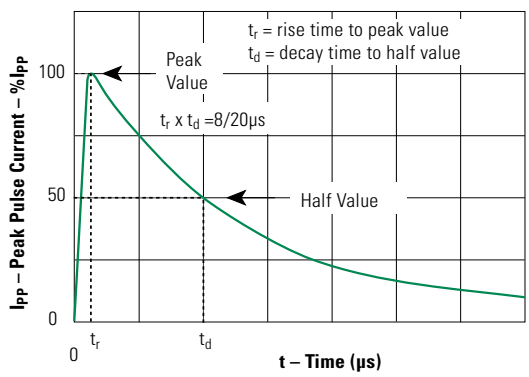


Figure 3:
Typical Peak Pulse Power Rating Curve

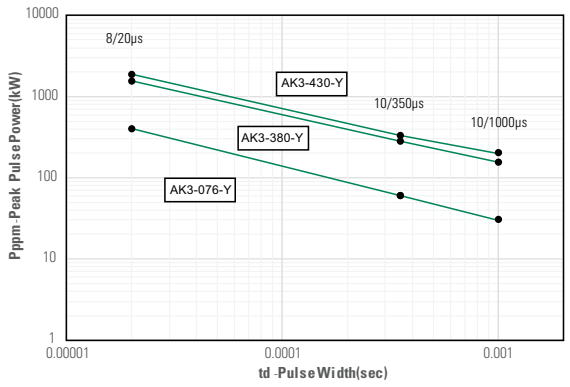


Figure 4:
Typical VBR Vs Junction Temperature

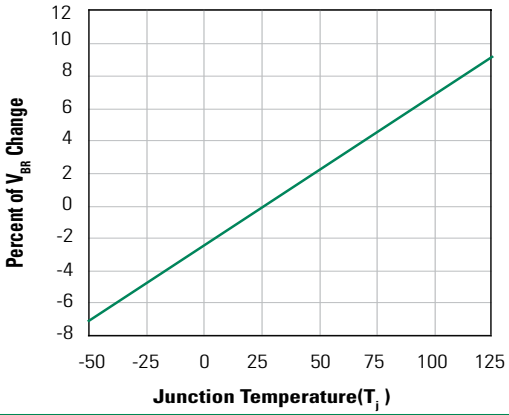
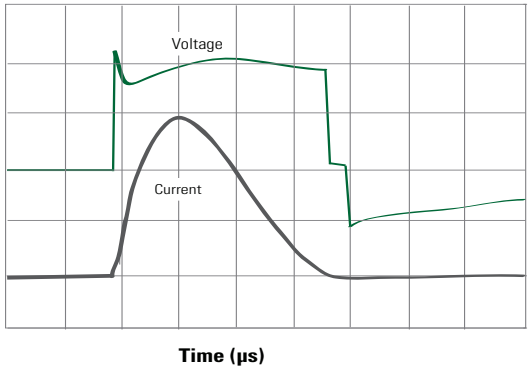


Figure 5:
Surge Response (8/20 Surge current waveform)



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.

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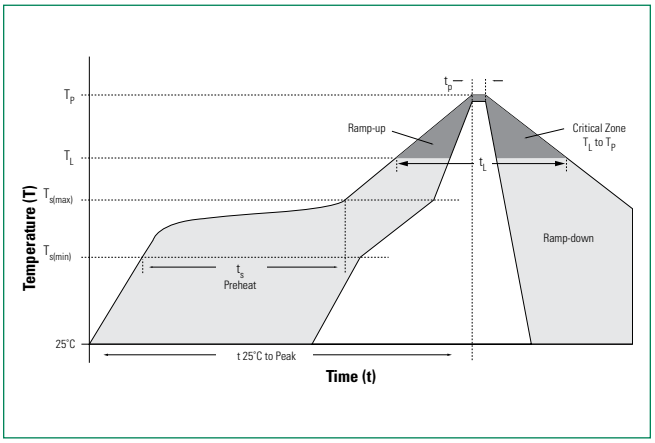
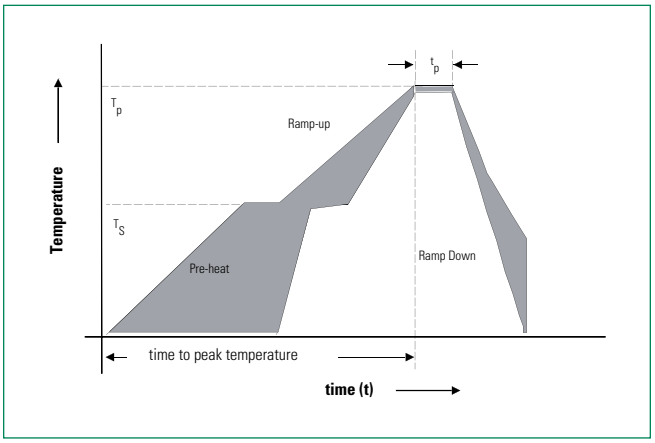
Soldering Parameters

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

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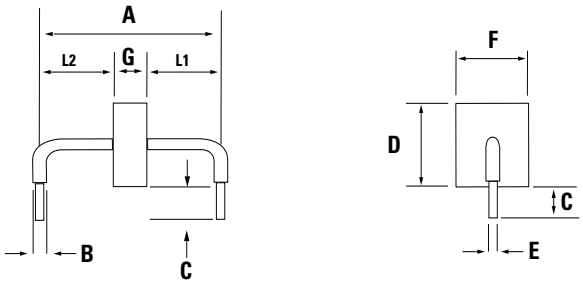
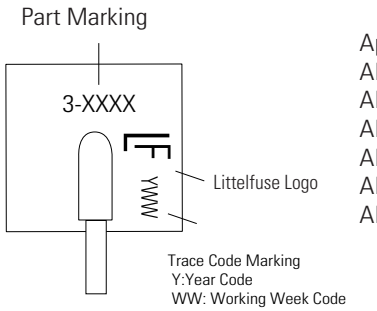
Dimensions



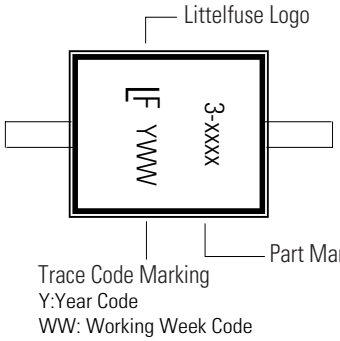
Dimensions		Inches	Millimeters
A		0.951 +/- 0.040	24.15 +/- 1.00
B		0.094 +/- 0.024	2.40 +/- 0.60
C		0.236 +/- 0.039	6.00 +/- 1.00
	-208C	0.145 +/- 0.040	3.68 +/- 1.00
D		0.433 max.	11.0 max.
E		0.050 +/- 0.002	1.27 +/- 0.05
F		0.374 max.	9.50 max.
G	-015C	0.093 +/- 0.039	2.36 +/- 1.00
	-030C/-038C/-066C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

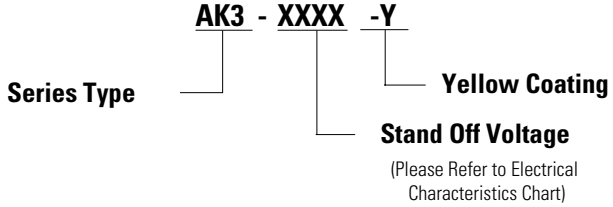
Type 1- Side View



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