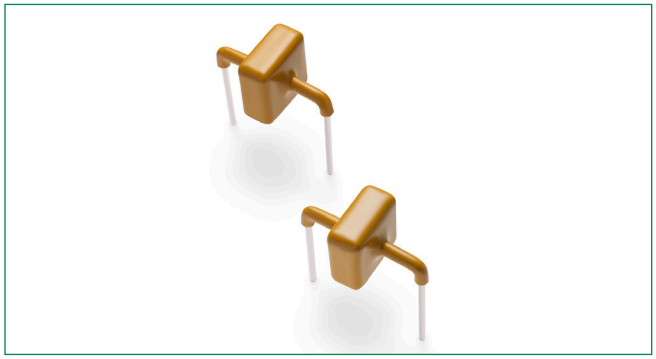
AK15-Y Series



Agency Approvals

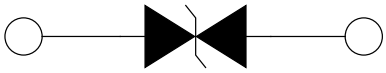
Agency	Agency File Number
	E128662

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}	15	kA

Note:
1. Rated I_{PP} measured with 8/20 pulse as defined in IEC 61000-4-5 2nd edition.

Functional Diagram



Bi-directional

Descriptions

The AK15-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

- No wear-out nor degrade surge rating over multiple transient events as long as within surge capability
- Ultra high power rating
- Very low clamping voltage
- Both reflow and wave soldering capable
- 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 lead width for easy soldering during assembly
- IEC 61000-4-2 ESD 15 kV (air), 8 kV (contact) rating
- Lightning, 15 kA (8/20 as defined in IEC 61000-4-5 2nd Edition)
- 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 (IPC/JEDEC J-STD-609A.01)

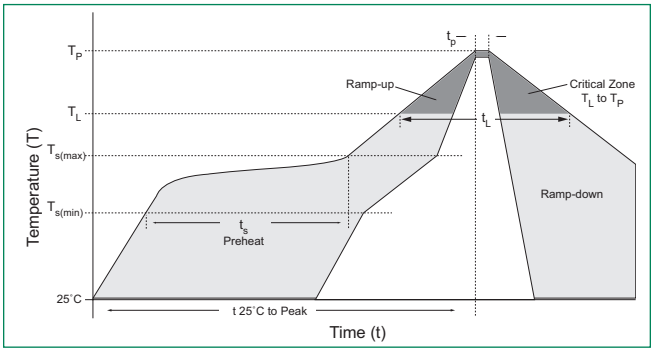
Electrical Characteristics (T_A=25°C unless otherwise noted)

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} @ Peak Pulse Current (I_{PP})			Max. Temp Coefficient of V_{BR}	Max. Capacitance 0V Bias 10kHz	Agency Approval
					Min Volts	Max Volts	(mA)	V_{CL} Volts	I_{PP} (8/20µs) (A)	I_{PP} (10/350µs) (A)	(%/°C)	(nF)	
AK15-058C-Y	15-058C	58	10	15	64	70	10	110	15,000	2,000	0.1	16	X
AK15-066C-Y	15-066C	66	10	15	72	80	10	120	15,000	2,000	0.1	12	X
AK15-076C-Y	15-076C	76	10	15	85	95	10	150	15,000	2,000	0.1	12	X
AK15-190C-Y	15-190C	190	10	15	200	245	10	290	15,000	1,500	0.1	5	X

Note: Using the 8/20 waveshape as defined in IEC 61000-4-5 2nd Edition.

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_L) to peak		3°C/second max
$T_{S(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	- Temperature (T_L) (Liquidus)	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)		30 seconds max
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes max.
Do not exceed		260°C

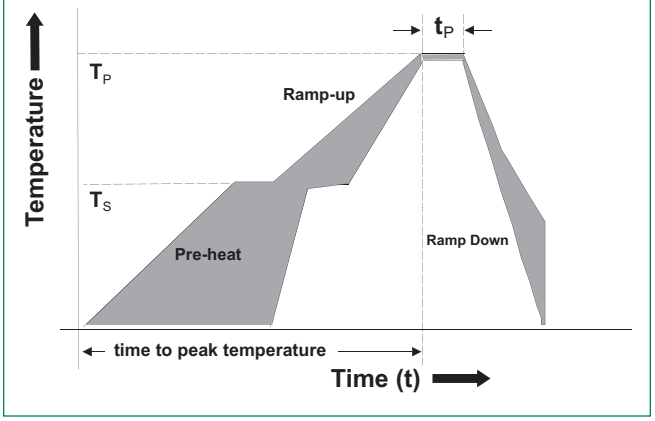


Physical Specifications

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

Flow Soldering (Solder Dipping)

Wave soldering condition		Pb - Free assembly
Pre Heat	- Temperature Min	140°C
	- Temperature Max	160°C
	Time to Pre-Heat Temp	60-150 seconds
Average ramp up rate to Pre-Heat Temp		5°C/second max
Peak Temperature		260+0/-5 °C
Average ramp up rate (Tpre-heat to Tp)		5°C/second max
Time within actual peak Temperature Max		6 seconds
Ramp-down Rate		5°C/second max



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

Figure 1- Peak Power Derating

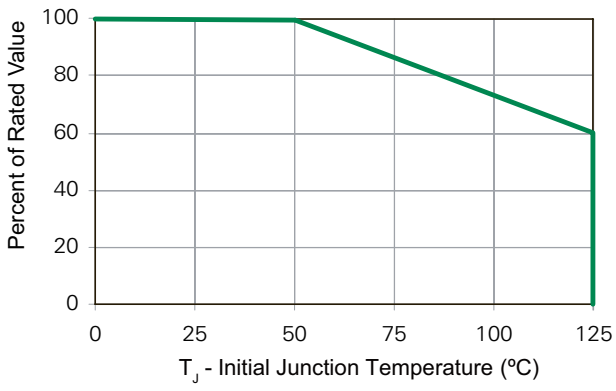
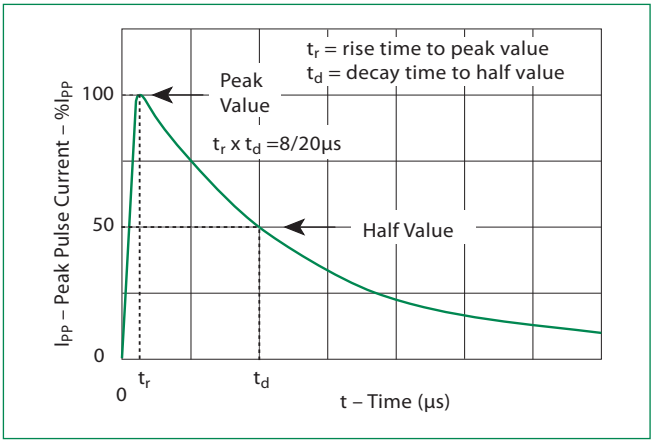


Figure 2 - Pulse Waveform



Revised: GD. 12/16/20

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

Figure 3 - Typical Peak Pulse Power Rating Curve

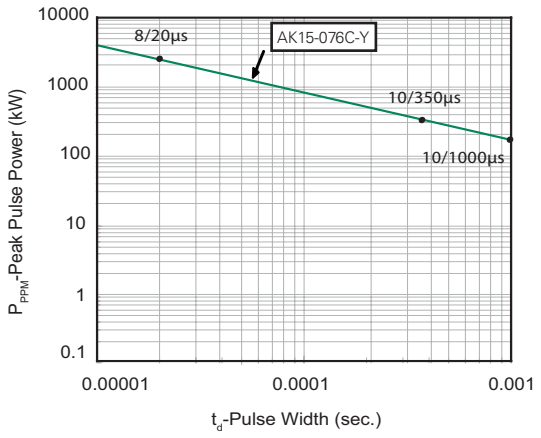


Figure 4 - Typical V_{BR} Vs Junction Temperature

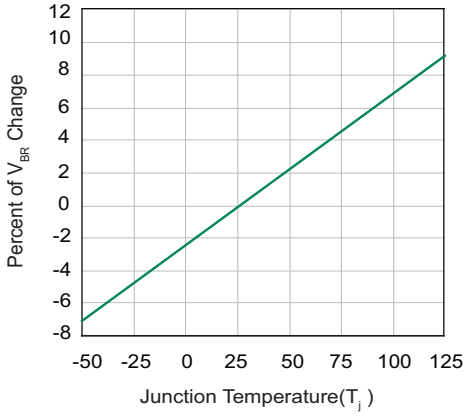
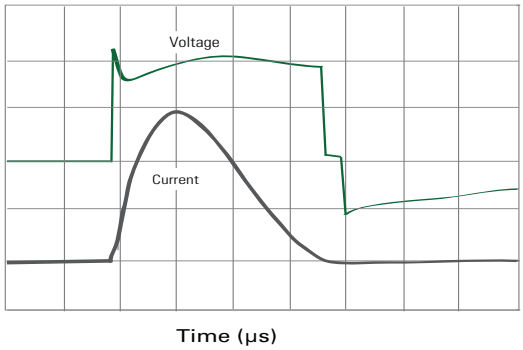
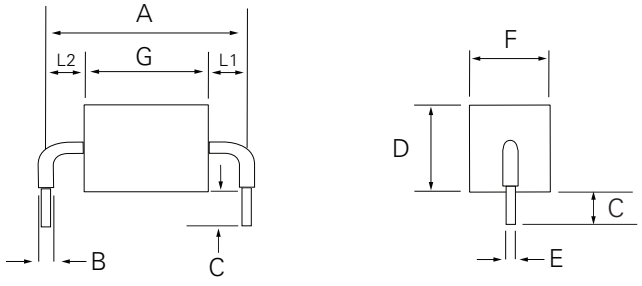


Figure 5 -Surge Response (8/20 Surge current waveform)



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.

Dimensions

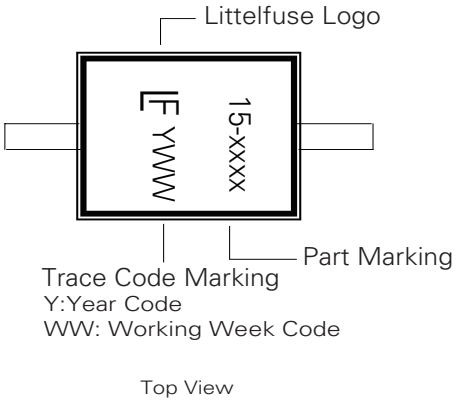


Dimensions	Inches	Millimeters
A	0.95±0.03	24.15±0.8
B	0.095±0.024	2.4±0.60
C	0.236±0.04	6.00±1.0
D	0.630±0.055	16.0±1.4
E	0.050±0.002	1.27±0.05
F	0.571±0.055	14.5±1.4
G - 058C-Y	0.292±0.047	7.41±1.20
G - 066C/076C-Y	0.351±0.047	8.91±1.20
G - 190C-Y	0.362±0.04	9.2±1.00
L1/L2	L1= L2 tolerance +/- 0.04 inch (1.0 mm)	

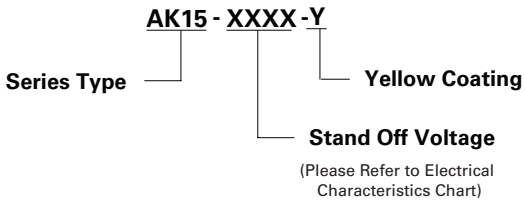
TVS Diodes

Axial Leaded - 15kA > AK15-Y Series

Part Marking System



Part Numbering System



Packing Options

Part Number	Component Package	Quantity	Packaging Option
AK15-XXXX-Y	AK Package	56pcs/Box	Bulk
AK15-XXXX-Y-12	AK Package	12pcs/Box	Bulk