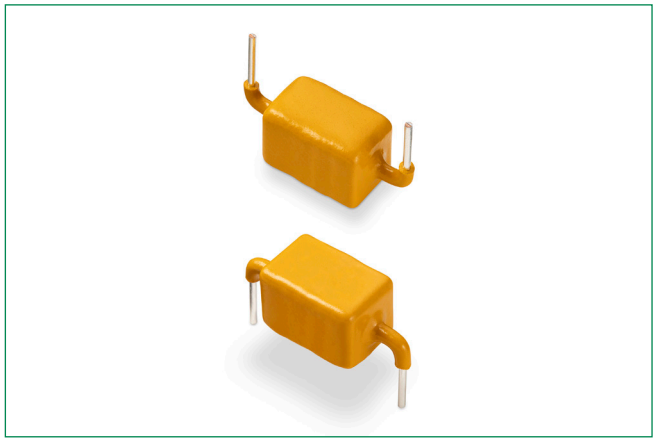
AK6-A Series

Axial Leaded - 6 kA Non-foldback TVS Diode



Description

The AK6-A 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 over traditional metal oxide (MOV) solutions. They can be connected in series and / or parallel to create a very high surge current protection solution.

Features & Benefits

- Ultra compact: less than onetenth the size of traditional discrete solutions
- Both reflow and wave soldering capable
- Typical failure mode is short from over-specified voltage orcurrent
- IEC 61000-4-2 ESD 15 kV(Air), 8 kV (Contact)
- Glass passivated junction
- Sharp breakdown voltage
- Low dynamic resistance
- V_{BR} @ T_J = V_{BR}@25 °C x (1+αT x (T_J - 25))(αT:Temperature Coefficient, typical value is 0.1 %)
- Halogen-free and RoHS compliant
- EFT protection of data lines in accordance with IEC 61000-4-4
- Symmetric in leads width for easier soldering during assembly
- Pb-free E4 means 2nd level interconnect is Pb-free and the terminal finish material is silver

Agency Recognitions

Agency	Agency File Number
	E128662

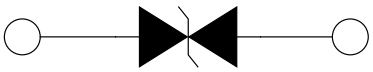
Maximum Ratings and Thermal Characteristics

(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}	6	kA

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

Functional Diagram



Bi-direcctional

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

Part Numbers	Part Marking	Standoff Voltage (V_R) 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}) (Note 1)		Max. Temp Coefficient of V_{BR}	Max. Capacitance 0 V Bias 10 kHz
					Min Volts	Max Volts	(mA)	V_{CL} Volts	I_{PP} Amps	(%/°C)	(nF)
AK6-430C-A	6-430A	430	10	15	440	490	10	740	6,000	0.1	1.4

Note: Using 8/20 µs wave shape as defined in IEC 61000-4-5.

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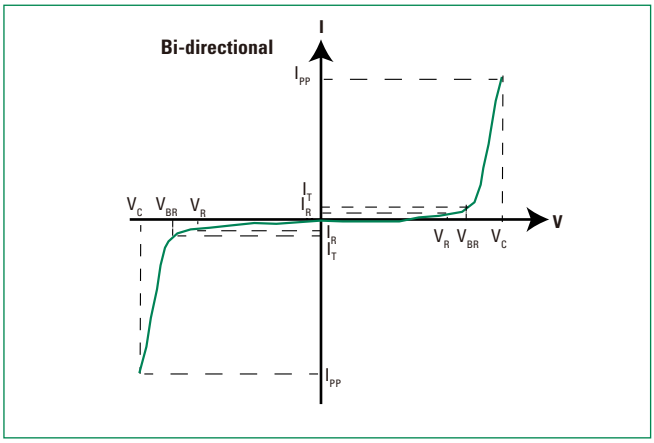
I-V Curve Characteristics



P_{PPM} Peak Pulse Power Dissipation (I_{PP} x V_C) – Max power dissipation
V_R Stand-off Voltage – Maximum voltage that can be applied to the TVS without operation
V_{BR} Breakdown Voltage – Maximum voltage that flows though the TVS at a specified test current (I_T)
V_C Clamping Voltage – Peak voltage measured across the TVS at a specified I_{PPM} (peak impulse current)
I_R Reverse Leakage Current – Current measured at V_R

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

Figure 1 : Peak Power Derating

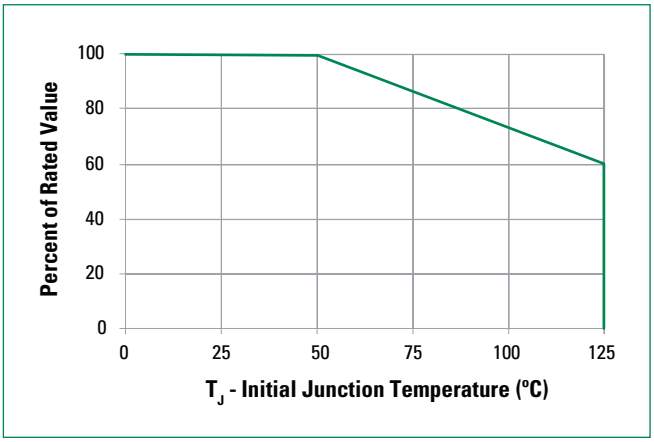


Figure 2 : Pulse Waveform

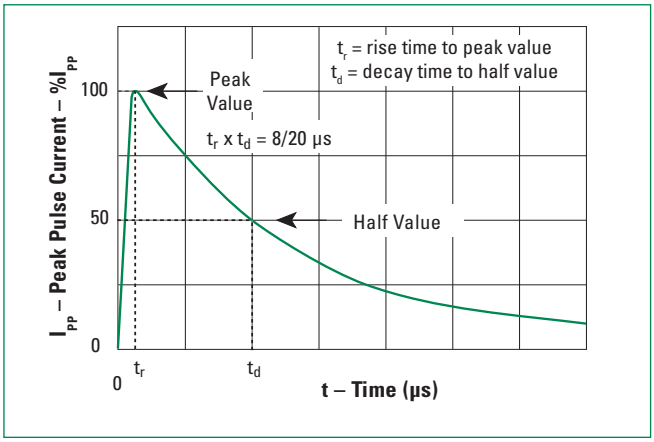


Figure 3 : Typical V_{BR} Vs Junction Temperature

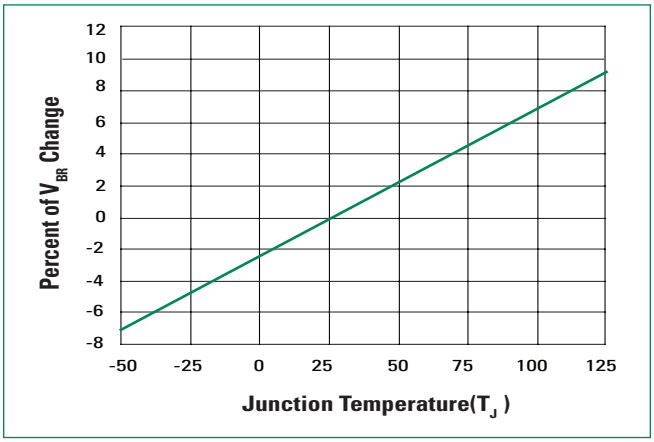


Figure 4 : Typical Peak Pulse Power Rating Curve

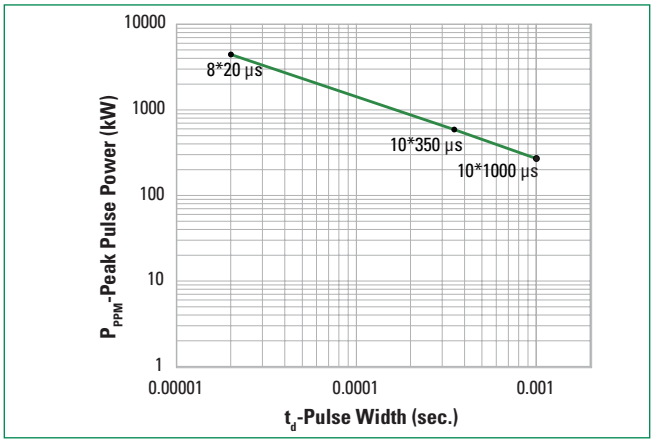


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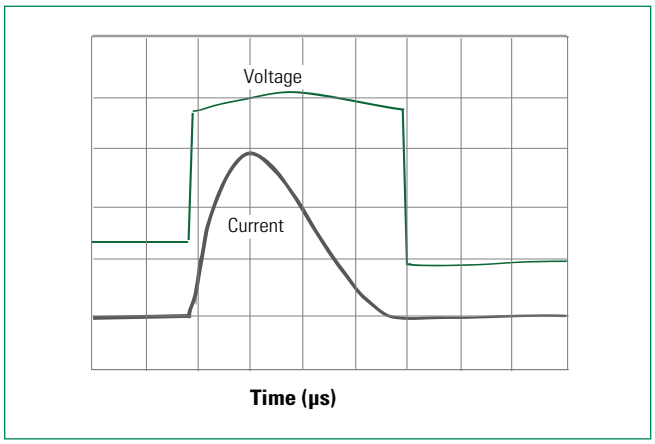
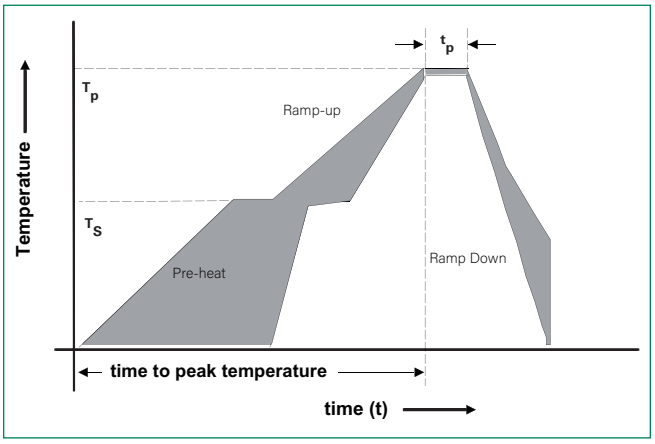
Figure 5 : Surge Response (8/20 Surge current waveform)



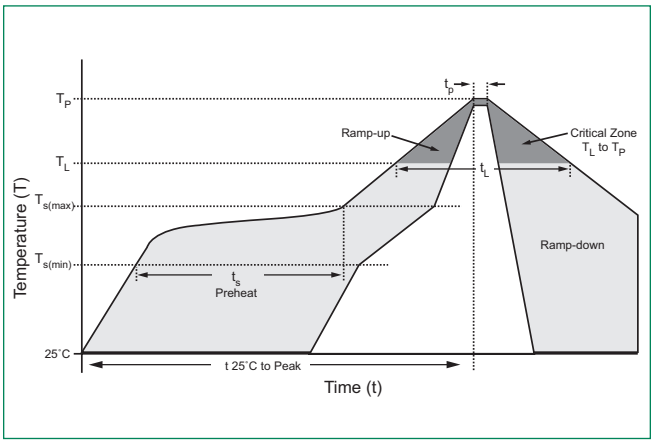
Flow Soldering (Solder Dipping)

Flow/Wave 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 seconds
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



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 seconds
Average Ramp Up Rate (Liquidus Temp (T_L) 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_S)	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



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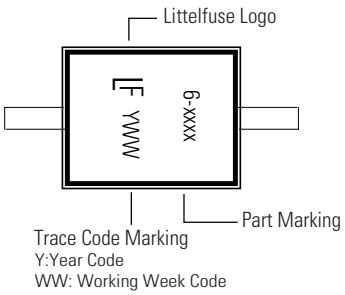
Physical Specifications

Weight	0.527 ounce, 14.95 grams
Case	Axial component over glass passivated junction
Terminal	Silver plated leads, solderable per MIL-STD-750 method 2026

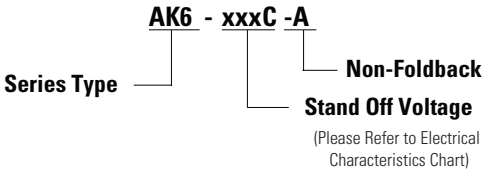
Environmental Specifications

High Temp Voltage Blocking (HTRB)	100% DC reverse voltage rated 125 °C, 1008 hours. JEDEC, JESD22-A-108
Biased Temp & Humidity (H3TRB)	1008 hours at T_A = 85 °C/85 % RH with part reversebiased at 80 % of rated breakdown voltage.JEDEC, JESD22-A-101
Temp Cycle (TC)	-55 °C to +125 °C, 15 min. dwell, 20 cycles JEDEC, JESD22-A104
Resistance to soldering heat (RSH)	+260 °C, 30 secs. JEDEC,JESD22-B-106

Part Marking System



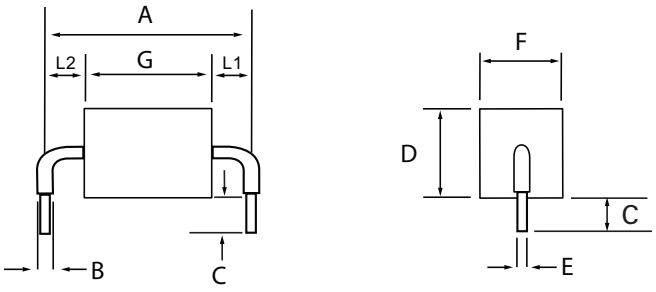
Part Marking System



Packing Option

Part Number	Component Package	Quantity	Packaging Option
AK6-xxxC-A	AK Package	56pcs/Box	Bulk

Dimensions



Dimensions	Inches	Millimeters
A	1.193 +/- 0.04	30.3 +/- 1.00
B	0.095 +/- 0.024	2.4 +/- 0.60
C	0.236 +/- 0.04	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	0.767 +/- 0.04	18.8 +/- 1.00
L1/L2	L1= L2 tolerance +/- 0.04 inch (1.0 mm)	