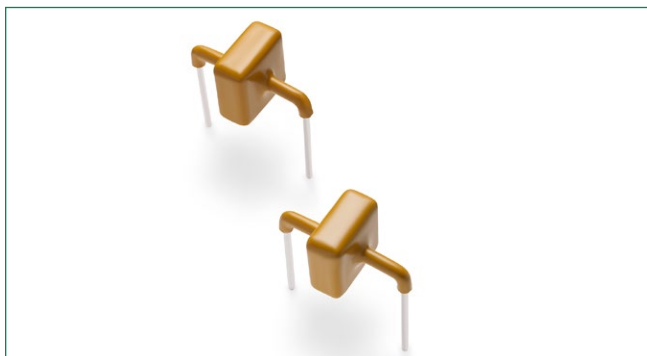



### AK10-Y Series



#### Agency Recognitions

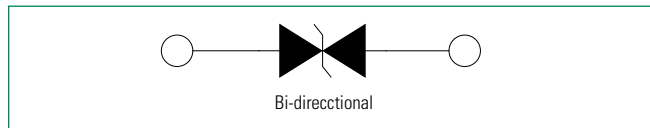
Agency	Agency File Number
	E128662

#### Maximum Ratings and Thermal Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Operating Storage Temperature Range	T <sub>STG</sub>	-55 to 150	°C
Operating Junction Temperature Range	T <sub>J</sub>	-55 to 125	°C
Current Rating <sup>1</sup>	I <sub>PP</sub>	10	kA

**Note:**  
 1. Rated I<sub>pp</sub> measured with 8/20µs pulse.

#### Functional Diagram




#### Description

The AK10-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

- 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
- Foldback 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 2<sup>nd</sup> level interconnect is Pb-free and the terminal finish material is silver

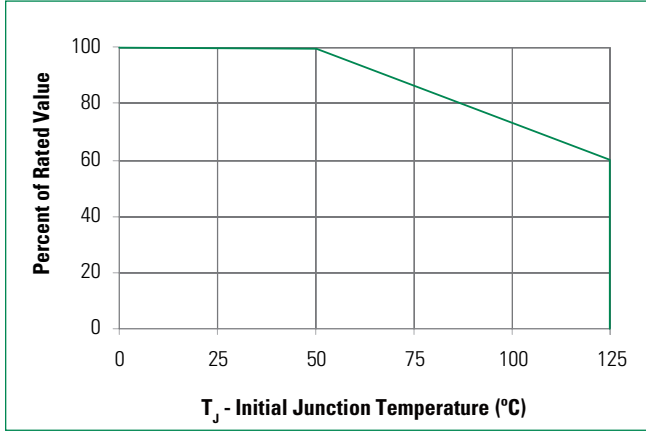
#### Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

Part Numbers	Part Marking	Standoff Voltage (V <sub>SO</sub> ) Volts	Max. Reverse Leakage (I <sub>R</sub> ) @ V <sub>SO</sub> µA	Typical I <sub>R</sub> @ 85°C (µA)	Reverse Breakdown Voltage (V <sub>BR</sub> ) @ I <sub>T</sub>		Test Current I <sub>T</sub> (mA)	Max. Clamping Voltage V <sub>CL</sub> @ Peak Pulse Current (I <sub>PP</sub> ) (Note 1)		Max. Temp Coefficient of V <sub>BR</sub> (%/°C)	Max. Capacitance 0 Bias 10kHz (nF)	Agency Approval 
					Min Volts	Max Volts		V <sub>CL</sub> Volts	I <sub>PP</sub> Amps			
AK10-015C-Y	10-015C	15	10	15	16	19	10	28	10,000	0.1	12.0	
AK10-030C-Y	10-030C	30	10	15	32	37	10	58	10,000	0.1	11.0	X
AK10-058C-Y	10-058C	58	10	15	64	70	10	110	10,000	0.1	6.5	X
AK10-066C-Y	10-066C	66	10	15	72	80	10	120	10,000	0.1	6.5	X
AK10-076C-Y	10-076C	76	10	15	85	95	10	140	10,000	0.1	6.5	X
AK10-170C-Y	10-170C	170	10	15	180	220	10	260	10,000	0.1	2.8	X
AK10-190C-Y	10-190C	190	10	15	200	245	10	290	10,000	0.1	2.5	X
AK10-240C-Y	10-240C	240	10	15	250	285	10	340	10,000	0.1	2.2	X
AK10-380C-Y	10-380C	380	10	15	401	443	10	520	10,000	0.1	2.0	X
AK10-430C-Y	10-430C	430	10	15	440	490	10	625	10,000	0.1	1.4	X
AK10-530C-Y	10-530C	530	10	15	560	619	10	750	10,000	0.1	1.0	X

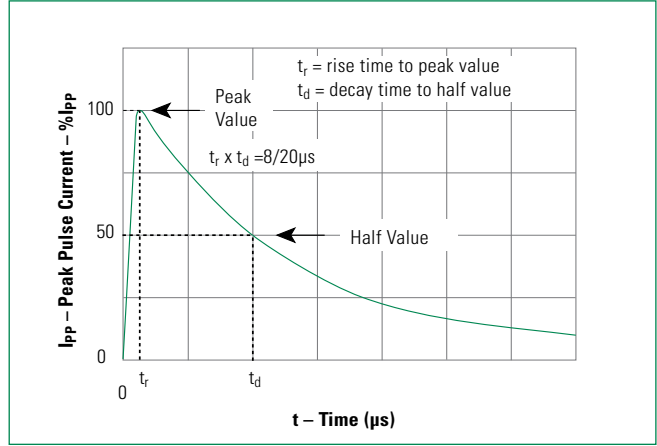
**Note:** Using 8/20µs wave shape as defined in IEC 61000-4-5.

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

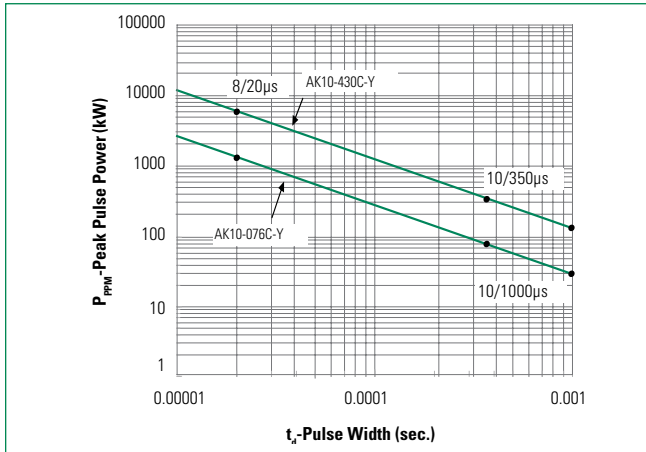
**Figure 1 - Peak Power Derating**



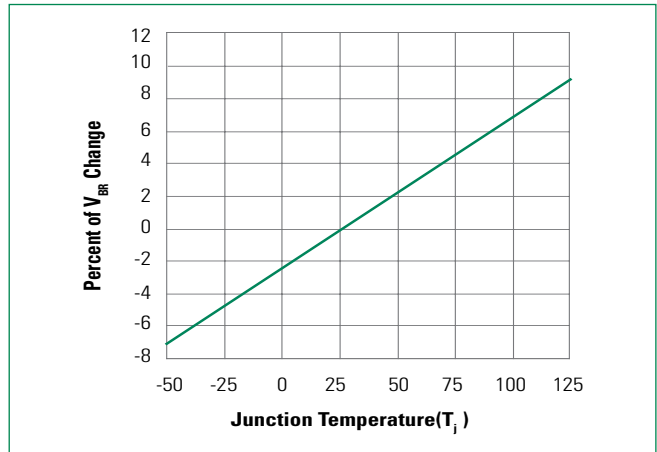
**Figure 2 - Pulse Waveform**



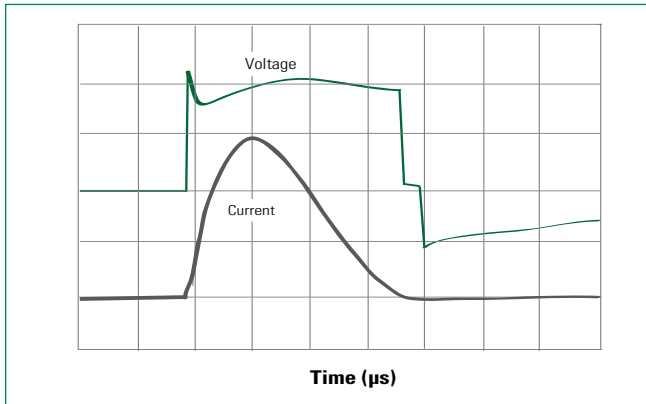
**Figure 3 - Typical Peak Pulse Power Rating Curve**



**Figure 4 - Typical  $V_{BR}$  Vs Junction Temperature**

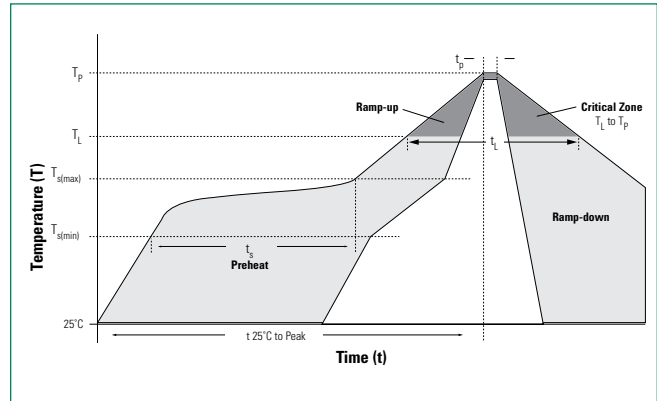


**Figure 5 - Surge Response (8/20 Surge current waveform)**



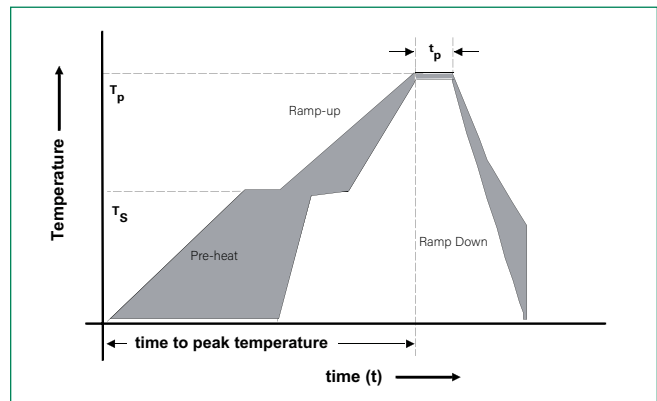
### Soldering Parameters

<b>Reflow Condition</b>		Lead-free assembly
<b>Pre Heat</b>	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 – 120 secs
<b>Average ramp up rate (Liquidus Temp (<math>T_L</math>) to peak)</b>		3°C/second max
<b><math>T_{s(max)}</math> to <math>T_A</math> - Ramp-up Rate</b>		3°C/second max
<b>Reflow</b>	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Time (min to max) ( $T_s$ )	60 – 150 seconds
<b>Peak Temperature (<math>T_p</math>)</b>		260 <sup>+0/-5</sup> °C
<b>Time within 5°C of actual peak Temperature (<math>t_p</math>)</b>		30 seconds
<b>Ramp-down Rate</b>		6°C/second max
<b>Time 25°C to peak Temperature (<math>T_p</math>)</b>		8 minutes Max.
<b>Do not exceed</b>		260°C



### Flow Soldering (Solder Dipping)

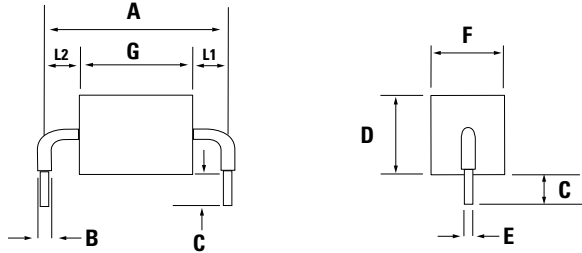
<b>Reflow Condition</b>		Lead-free assembly
<b>Pre Heat</b>	- Temperature Min ( $T_{s(min)}$ )	140°C
	- Temperature Max ( $T_{s(max)}$ )	160°C
	- Time to Pre-Heat Temp	60 – 150 secs
<b>Average ramp up rate to Pre-Heat Temp</b>		5°C/second max
<b>Peak Temperature (<math>T_p</math>)</b>		260 <sup>+0/-5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



### Physical Specifications

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

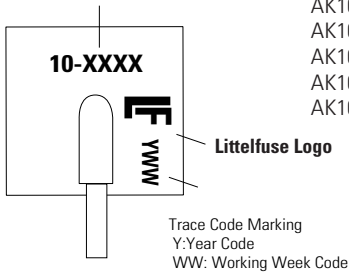
**Dimensions**



Dimensions	Inches	Millimeters
<b>A</b>	0.950 +/- 0.04	24.15 +/- 1.00
<b>A - 530C-Y</b>	1.370 +/- 0.08	34.70 +/- 2.00
<b>B</b>	0.095 +/- 0.024	2.4 +/- 0.60
<b>C</b>	0.236 +/- 0.04	6.00 +/- 1.00
<b>D</b>	0.570 max.	14.48 max.
<b>E</b>	0.050 +/- 0.002	1.270 +/- 0.05
<b>F</b>	0.500 max.	12.70 max.
<b>G - 015C-Y</b>	0.142 +/- 0.04	3.60 +/- 1.00
<b>G - 030C-Y</b>	0.167 +/- 0.04	4.23 +/- 1.00
<b>G - 058C-Y/066C-Y 076C-Y</b>	0.200 +/- 0.04	5.08 +/- 1.00
<b>G - 170C-Y/190C-Y</b>	0.362 +/- 0.04	9.2 +/- 1.00
<b>G - 240C-Y</b>	0.420 +/- 0.04	10.67 +/- 1.00
<b>G - 380C-Y/430C-Y</b>	0.650 +/- 0.04	16.50 +/- 1.00
<b>G - 530C-Y</b>	1.060 +/- 0.06	27.00 +/- 1.50
<b>L1/L2</b>	L1= L2 tolerance +/- 0.04 inch (1.0 mm)	

**Part Marking System**

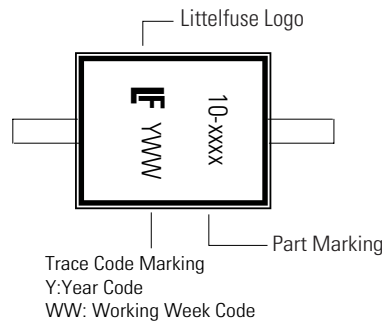
**Part Marking**



Type 1 - Side View

Apply to P/N listed below:

- AK10-015C-Y
- AK10-030C-Y
- AK10-058C-Y
- AK10-066C-Y
- AK10-076C-Y

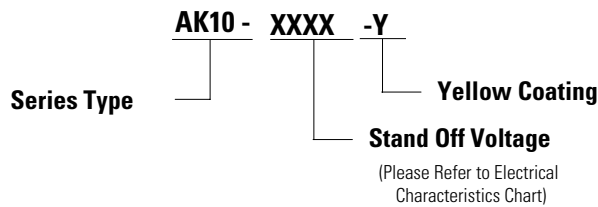


Type 2- Top View

Apply to P/N listed below:

- AK10-170C-Y
- AK10-190C-Y
- AK10-240C-Y
- AK10-380C-Y
- AK10-430C-Y
- AK10-530C-Y

**Part Numbering System**



**Packing Options**

Part Number	Component Package	Quantity	Packaging Option
AK10XXXX-Y	AK Package	56pcs/Box	Bulk
AK10-XXXX-Y12	AK Package	12pcs/Box	Bulk