

AK20-Y Series



Descriptions

The AK20-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.

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	°C
Operating Junction Temperature Range	T_J	-55 to 125	°C
Current Rating ¹	I_{PP}	20	kA

Note:

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

Functional Diagram



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, 20 kA (8/20 as defined in IEC 61000-4-5 2nd Edition)
- EFT protection of data lines in accordance with IEC 61000-4-4
- UL Recognized compound meeting flammability rating V-0
- 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)

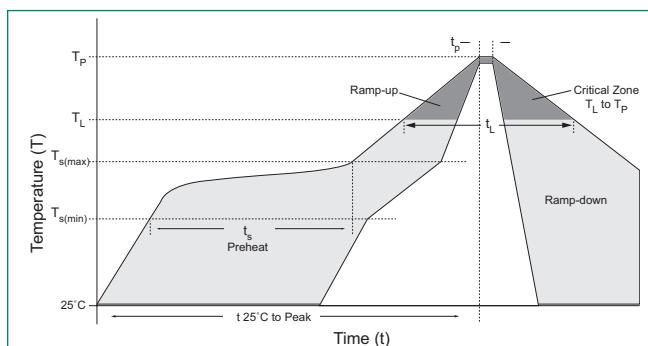
Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

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	Max. Clamping Voltage V_{CL} @ Peak Pulse Current (I_{PP})				Max. Temp Coefficient of V_{BR} (%)	Max. Capacitance 0V Bias 10kHz (nF)
					Min Volts	Max Volts		V_{CL} (8/20μs) Volts	I_{PP} (8/20μs) Amps	V_{CL} (10/350μs) Volts	I_{PP} (10/350μs) Amps		
AK20-016C-Y	20-016C	16	5	15	17.5	19.3	10	30	20,000	28	3,200	0.1	50
AK20-058C-Y	20-058C	58	5	15	64.0	70.0	10	120	20,000	107	3,200	0.1	15
AK20-063C-Y	20-063C	63	5	15	68.0	75.0	10	125	20,000	110	3,200	0.1	12
AK20-066C-Y	20-066C	66	5	15	72.0	80.0	10	130	20,000	120	3,200	0.1	12
AK20-076C-Y	20-076C	76	5	15	85.0	95.0	10	160	20,000	145	3,200	0.1	12

Note: using 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	

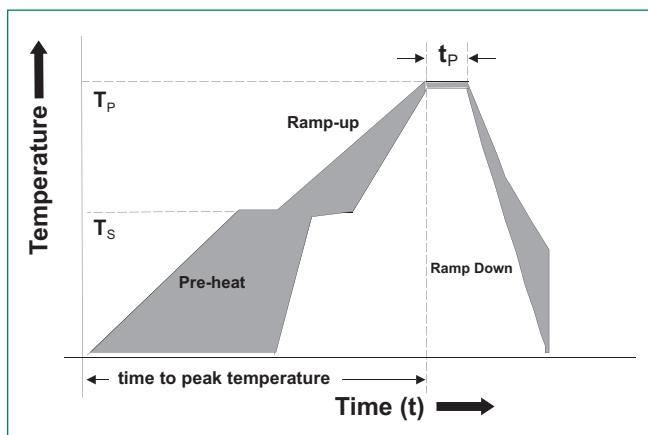


Physical Specifications

Weight	Contact manufacturer
Case	UL Recognized epoxy 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 (T _{pre-heat} to T _p)	5°C/second max	
Time within actual peak Temperature Max	6 seconds	
Ramp-down Rate	5°C/second max	



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

Figure 1- Peak Power Derating

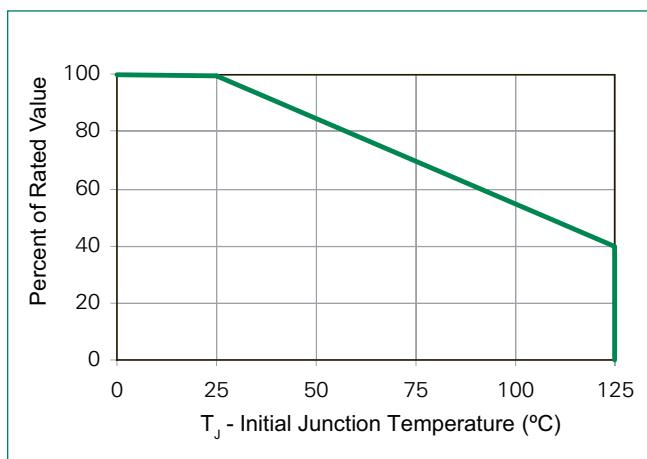
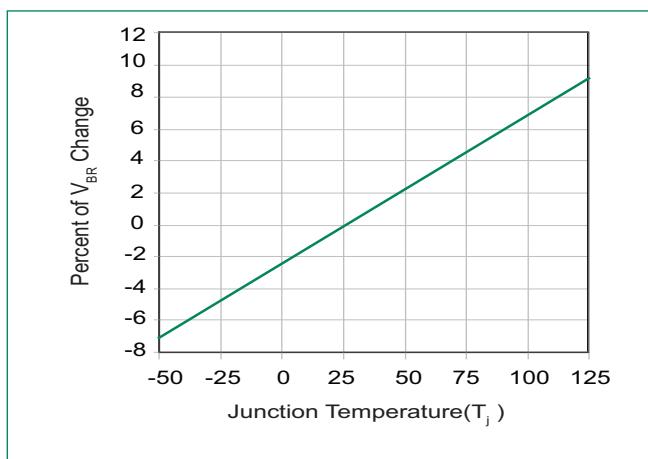


Figure 2 - Typical V_{BR} Vs Junction Temperature



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

Figure 3 - Pulse Waveform

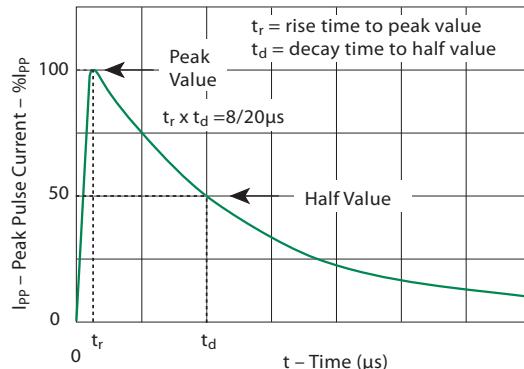
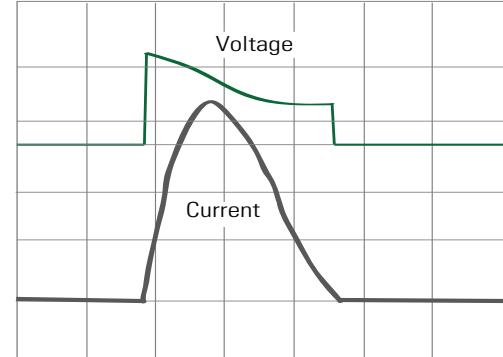


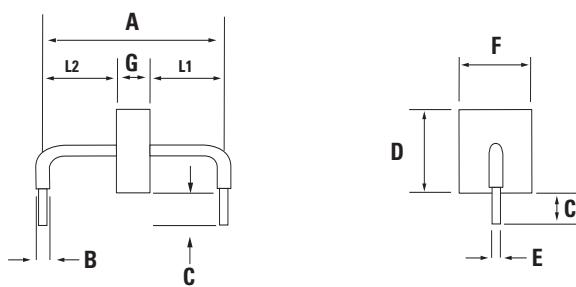
Figure 4 - Surge Response (8/20 Surge Current Waveform)



Note:

Its Foldback™ technology provides a clamping voltage lower than the avalanche voltage (but above the rated working voltage). Also use similar clamping diagram showing the actual voltage waveshape reaction of this foldback technology as shown in attached text at the end of this document. Please note this is specifically for a 10 kA rated AK, so we need an actual waveshape for this 20 kA rated component.

Dimensions



Dimensions	Inches	Millimeters
A	0.950 ± 0.030	24.15 ± 0.8
B	0.095 ± 0.024	2.4 ± 0.60
C	0.236 ± 0.040	6.00 ± 1.0
D	0.630 ± 0.055	16.0 ± 1.4
E	0.050 ± 0.002	1.27 ± 0.05
F	0.587 ± 0.055	14.9 ± 1.4
G - 016C	0.157 max.	4.00 max.
G - 058C/063C 066C/076C	0.307 max.	7.80 max.
L1/L2	L1 = L2 tolerance ± 0.04 inch (1.0 mm)	

Packing Options

Part Number	Component Package	Quantity	Packaging Option
AK20-XXXX-Y	AK Package	56pcs/Box	Bulk
AK20-XXXX-Y12	AK Package	12pcs/Box	Bulk

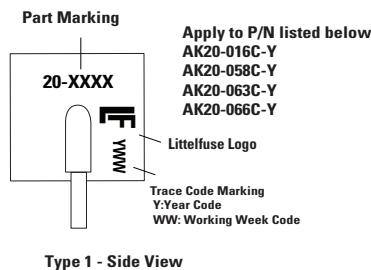
Part Numbering System

AK20 - **XXXX** -**Y**

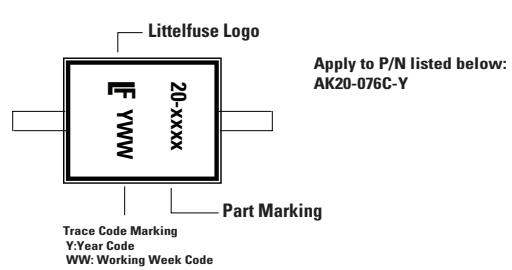
Series Type | Yellow Coating

 | Stand Off Voltage

Part Marking System



Type 1 - Side View



Type 2 - Top View

Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at <http://www.littelfuse.com/disclaimer-electronics>.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Littelfuse:](#)

[AK20-066C-Y](#) [AK20-076C-Y](#) [AK20-063C-Y](#) [AK20-058C-Y](#) [AK20-016C-Y](#)