TVS Diodes Axial Leaded - 20kA > AK20-Y Series

AK20-Y Series

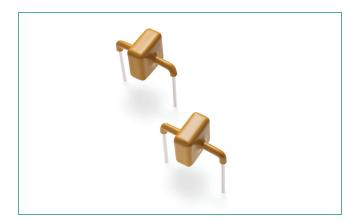












Descriptions

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
71	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	-55 to 125	°C
Current Rating ¹	I _{pp}	20	kA

1. Rated I., measured with 8/20us 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°C unless otherwise noted)

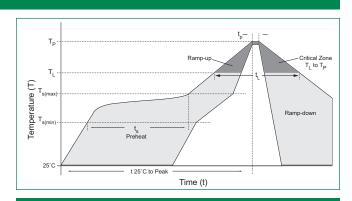
Part Numbers	Standoff Part Voltage Marking (V)	Voltage	Max. Reverse Leakage	Typical I _R @ 85°C	Reverse Breakdown Voltage (V _{BR}) @ I _T		Test Current I _T	Max. Clamping Voltage V _{CL} @ Peak Pulse Current (I _{pp})			Max.Temp Coefficient of V _{BR}	Max. Capacitance 0V Bias 10kHz	
Numbers	iviarking	(V _{so}) Volts	(I _R) @V _{so} (μΑ)	(μA)	Min Volts	Max Volts	(mA)	V _{cL} (8/20µs) Volts	Ι _թ (8/20μs) Amps	V _{cL} (10/350μs) Volts	Ι _{բբ} (10/350μs) Amps	(%/°C)	(nF)
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 Con	Lead-free assembly				
	-Temperature Min (T _{s(min)})	150°C			
Pre Heat	-Temperature Max (T _{s(max)})	200°C			
	-Time (min to max) (t _s)	60 – 120 secs			
Average ran	Average ramp up rate (Liquidus Temp (T _L) to peak				
T _{S(max)} to T _L -	3°C/second max				
Reflow	-Temperature (T _L) (Liquidus)	217°C			
	-Time (min to max) (t _s)	60 – 150 seconds			
Peak Tempe	260 ^{+0/-5} °C				
Time within	30 seconds max				
Ramp-down	6°C/second max				
Time 25°C to	8 minutes max.				
Do not exce	260°C				

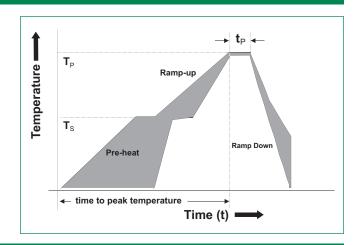


Physical Specifications

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 solde	ering condition	Pb - Free assembly		
	- Temperature Min	140°C		
Pre Heat	- Temperature Max	160°C		
	Time to Pre-Heat Temp	60-150 seconds		
Average ra	mp up rate to Pre-Heat Temp	5°C/second max		
Peak Tempe	erature	260+0/-5 °C		
Average ra	mp up rate (Tpre-heat to Tp)	5°C/second max		
Time withi	n actual peak Temperature Max	6 seconds		
Ramp-dow	n Rate	5°C/second max		



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

Figure 1- Peak Power Derating

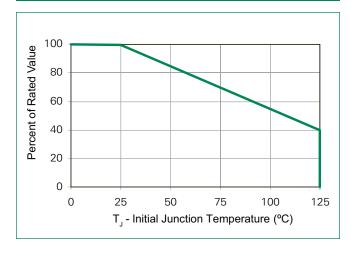
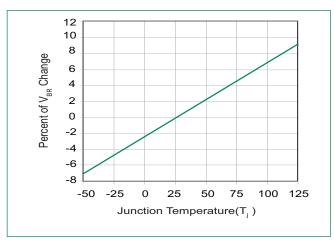


Figure 2 - Typical $V_{\rm BR}$ Vs Junction Temperature



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

Figure 3 - Pulse Waveform

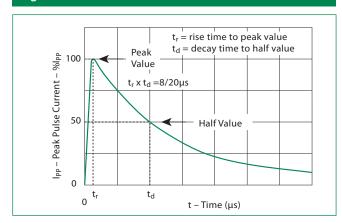
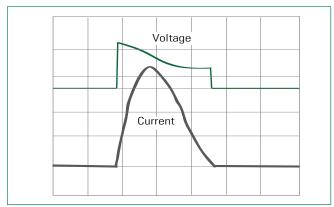


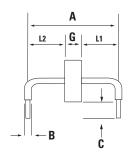
Figure 4 -Surge Response (8/20 Surge Current Waveform)

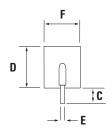


Note:

Its Foldback TM 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 nd 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



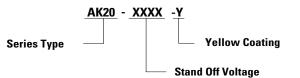


Dimensions	Inches	Millimeters	
Α	0.950±0.030	24.15±0.8	
В	0.095±0.024	2.4±0.60	
С	0.236±0.040	6.00±1.0	
D	0.630±0.055	16.0±1.4	
E	0.050±0.002	1.27±0.05	
F	0.587±0.055	14.9±1.4	
G - 016C	0.157 max.	4.00 max.	
G - 058C/063C 066C/076C	0.307 max.	7.80 max.	
L1/L2	L1/L2 L1= L2 tolerance +/- 0.04 inch (

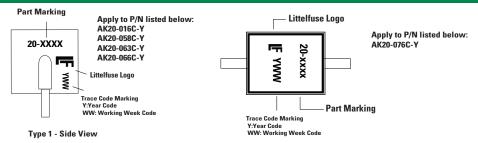
Packing Options

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

Part Numbering System



Part Marking System



Type 2- Top View

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