AK10 Series TVS Diodes Datasheet

Description

The AK10 series of high power TVS Diode is specially designed for use in A.C. line protection and any demanding applications (AC or DC).They offer superior clamping characteristics over standard S.A.D. technologies 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 contained to a minimum, providing the best possible protection level. They can also be connected in series and/ or parallel to create very high capacity protection solutions.

Features

- Very low clamping voltage
- Ultra compact: less than one-tenth the size of traditional discrete solutions
- Sharp breakdown voltage
- Bi-directional
- IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)

Maximum Ratings and Thermal Characteristics Features (T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Operating Junction and StorageTemperature Range	T_J , T_{STG}	**-55 to 125**	**°C**
Current Rating[1]	I_{PP}	**10**	**kA**

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

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

Part Numbers	Stand-Off Voltage(V_R) Volts	Breakdown Voltage V_{BR}@I_T		Test Current	Max.Clamping Voltage V_{CL} @ I_{PP} Peak Pluse Current(I_{PP}) (Note 1)		Max.Reverse Leakage(I_R) @V_R	Max.Temp Coefficient OF V_{BR}	Max.Capacitance o Bias 10kHz
	V	Min(V)	Max(V)	$I_{T(mA)}$	V_C(Volts)	I_{PP} Amps	(μA)	(% /°C)	(nF)
AK10-015C	15V	16V	19V	10	28V	10000A	10	0.1	40.0
AK10-020C	20V	22V	24V	10	50V	10000A	10	0.1	35.0
AK10-025C	25V	28V	30V	10	60V	10000A	10	0.1	26.0
AK10-030C	30V	32V	37V	10	48V	10000A	10	0.1	20.0
AK10-033C	33V	36V	40V	10	53V	10000A	10	0.1	20.0
AK10-042C	42V	47V	51V	10	105V	10000A	10	0.1	16.0
AK10-058C	58V	64V	70V	10	110V	10000A	10	0.1	10.0
AK10-066C	66V	72V	80V	10	120V	10000A	10	0.1	10.0
AK10-076C	76V	85V	95V	10	140V	10000A	10	0.1	6.5
AK10-100C	100V	110V	122V	10	150V	10000A	10	0.1	5.5
AK10-133C	133V	147V	162V	10	220V	10000A	10	0.1	5.0
AK10-170C	170V	180V	220V	10	260V	10000A	10	0.1	4.0
AK10-190C	190V	200V	245V	10	290V	10000A	10	0.1	3.0
AK10-200C	200V	222V	262V	10	330V	10000A	10	0.1	2.8
AK10-220C	220V	230V	270V	10	330V	10000A	10	0.1	2.5

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

Continue

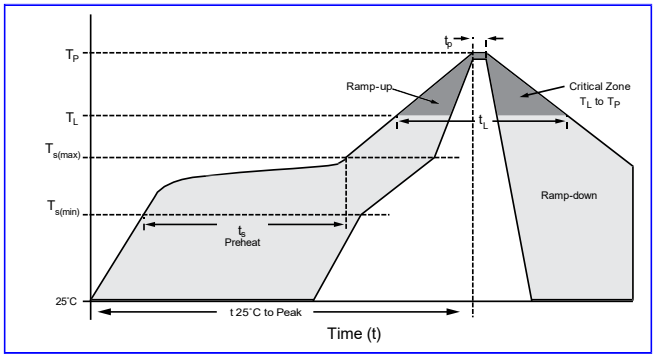
Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Numbers	Stand-Off Voltage(V_{so}) Volts	Breakdown Voltage V_{BR}@I_T		Test Current	Max.Clamping Voltage V_{CL} @ I_{pp} Peak Pluse Current(I_{pp}) (Note 1)		Max.Reverse Leakage(I_R) @V_{so}	Max.Temp Coefficient OF V_{BR}	Max.Capacitance o Bias 10kHz
	V	Min(V)	Max(V)	I_T(mA)	V_{CL}(Volts)	I_{PP} Amps	(μA)	(% /°C)	(nF)
AK10-240C	240V	250V	285V	10	340V	10000A	10	0.1	2.2
AK10-270C	270V	282V	315V	10	401V	10000A	10	0.1	2.3
AK10-275C	275V	300V	335V	10	435V	10000A	10	0.1	2.2
AK10-300C	300V	330V	366V	10	470V	10000A	10	0.1	2.2
AK10-380C	380V	401V	443V	10	520V	10000A	10	0.1	2.0
AK10-430C	430V	440V	490V	10	625V	10000A	10	0.1	1.4
AK10-530C	530V	560V	619V	10	750V	10000A	10	0.1	1.0

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

Soldering Parameters

ReflowCondition		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 – 180 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
PeakTemperature(T_P)		260$^{+0/-5}$ °C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peakTemperature (T_P)		8 minutes Max.
Do not exceed		280°C



Flow/Wave Soldering (Solder Dipping)

PeakTemperature :	265°C
Dipping Time :	10 seconds
Soldering :	1 time

Physical Specifications

Weight	Contact manufacturer
Case	Epoxy encapsulated
Terminal	Silver plated leads, solderable per MIL-STD-750, Method 2026

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

Figure 1 - Peak Power Derating

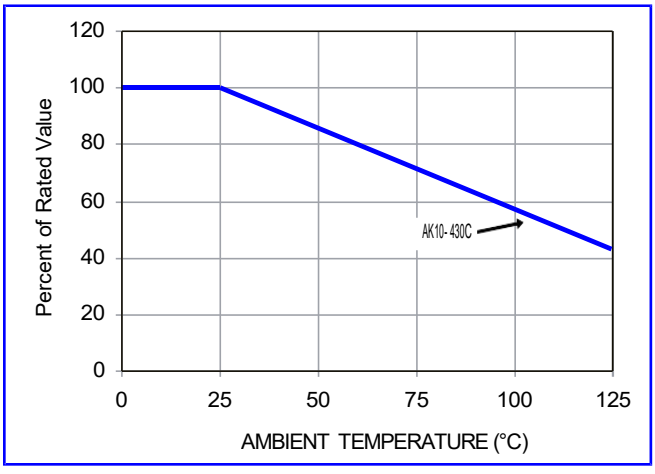


Figure 2 - Surge Response

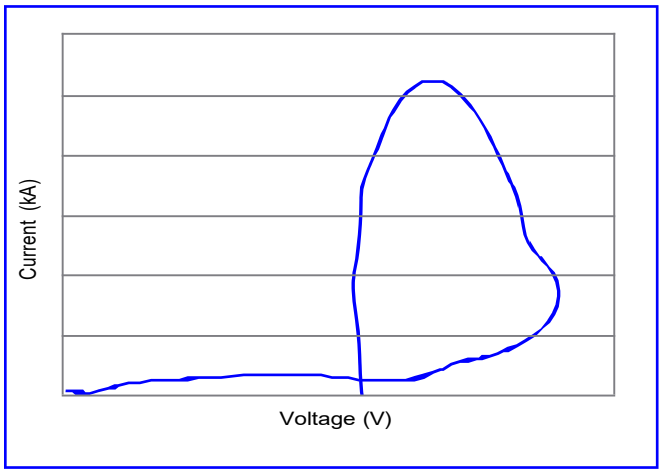
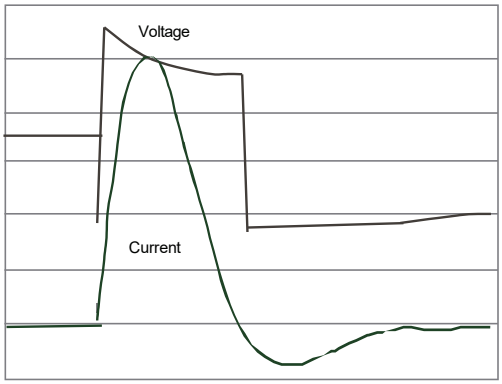


Figure 3 - Surge Response (8/20 Surge current waveform)

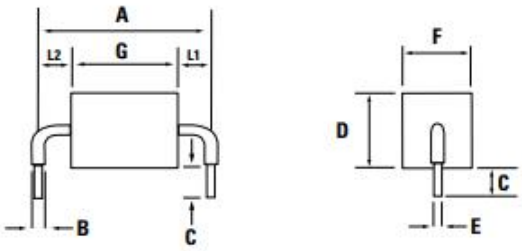


Notes:

1. Foldback characteristic reduce the clamping voltage to near the breakdown voltage

2. 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

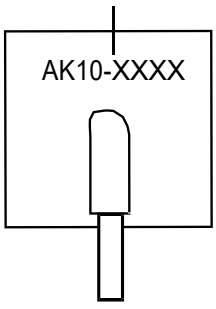
Dimensions



Symbol		Dimensions	
		Inches	Millimeters
A		0.951 +/- 0.039	24.15 +/- 1.00
A-350C		1.370 +/- 0.079	34.70 +/- 2.00
B		0.094 +/- 0.024	2.4 +/- 0.60
C		0.236 +/- 0.039	6.00 +/- 1.00
D		0.570 Max	14.48 Max
E		0.050 +/- 0.002	1.27 +/- 0.050
F		0.500 Max	12.70 Max
G	015C / 025C	0.157 +/- 0.047	4.00 +/- 1.20
	030C / 042C	0.189 +/- 0.047	4.80 +/- 1.20
	058C / 066C/ 076C	0.217 +/- 0.047	5.50 +/- 1.20
	100C	0.283 +/- 0.047	7.20 +/- 1.20
	133C	0.319 +/- 0.047	8.10 +/- 1.20
	170C / 190C	0.374 +/- 0.047	9.50 +/- 1.20
	200C	0.417 +/- 0.047	10.60 +/- 1.20
	240C	0.457 +/- 0.047	11.60 +/- 1.20
	275C / 300C	0.563 +/- 0.047	14.30 +/- 1.20
	380C/430C	0.610 +/- 0.047	15.50 +/- 1.20
L1 / L2		L1=L2 tolerance +/- 0.047 inch (+/- 1.2 mm)	

Part Marking System

Product Type



Side View

Part Numbering System

AK10 -XXXX

Series Type

Stand Off Voltage

(Please Refer to Electrical Characteristics Chart)

Packing Options

Part Number	Component Package	Quantity	Packaging Option
AK10-XXXX	AK Package	56pcs	Bulk