

AXIAL LEADED TRANSIENT VOLTAGE SUPPRESSOR



5000W Axial Leaded Transient Voltage Suppressors – 5.0V ~ 220V

The 5KP Series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Bidirectional



Uni-directional



FEATURES:

- Axial lead type devices for through hole design.
- 5kW peak pulse capability with at 10/1000μs waveform, repetition rate (duty cycles): 0.01%.
- Excellent clamping capability.
- Low incremental surge resistance.
- Fast response time from 0V to V_{BR} , typically less than 1 ps for uni-directional & 5 ns for bi-directional types.
- Glass passivated chip junction in P600 package.
- Lead-free parts meet RoHS requirements.
- Suffix “-H” indicates Halogen-free part, ex. ALP5KP17A-H.

APPLICATIONS:

TVS devices are ideal for the protection of I/O interfaces, VCC bus and other vulnerable circuits used in telecom, computer, industrial and consumer electronic applications.

MECHANICAL CHARACTERISTICS

- Epoxy: UL94-V0 rated flame retardant.
- Case: Molded plastic, P600.
- Lead: Axial leads, solderable per MIL-STD-202, method 208 guaranteed
- Polarity: Color band denotes cathode end except Bipolar
- Mounting Position: Any.
- Approximate Weight: 2.10 grams.

TYPICAL DEVICE CHARACTERISTICS

MAXIMUM RATINGS ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Operating Junction Temperature range	T_J	-55 to +150	$^{\circ}\text{C}$
Storage Temperature range	T_{STG}	-55 to 150	$^{\circ}\text{C}$
Maximum instantaneous forward voltage at 100A for uni-directional types only, Note 3	V_F	3.5/5.0	V
Peak Pulse Power Dissipation by 10/1000 μs Test Waveform (Fig.1) (Note 1)	P_{PPM}	15000	W
Peak Pulse current with a 10/1000 μs Waveform	I_{PPM}	See Table 1	A
Steady State Power Dissipation at $T_L=75^{\circ}\text{C}$ lead length 0.375" (9.5mm)	$P_{M(AV)}$	8.0	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (JEDEC Method) (Note 2)	I_{FSM}	400	A

Notes:

1. Non-repetitive current pulse, per Fig. 3 and derated above T_J (initial) $=25^{\circ}\text{C}$ per Fig. 2.
2. Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 pulses per minute maximum.
- 3: $V_F \leq 3.5\text{V}$ for devices of $V_{BR} \leq 200\text{V}$ and $V_F \leq 5.0\text{V}$ for devices of $V_{BR} \geq 201\text{V}$.

TYPICAL ELECTRICAL CHARACTERISTICS - (TABLE 1)

ELECTRICAL CHARACTERISTICS PER LINE @ T _A =25°C Unless Otherwise Specified							
PART NUMBER (Note 1)	REVERSE STAND- OFF VOLTAGE V _{RWM} VOLTS	BREAKDOWN VOLTAGE V _{BR} @ I _T VOLTS		TEST CURRENT @ I _T mA	MAXIMUM CLAMPING VOLTAGE V _C @ I _{PP}		MAXIMUM REVERSE LEAKAGE I _R @ V _{RWM} (μA)
		MIN	MAX		VOLTS	I _{PP} (A)	
ALP5KP5.0A / CA	5.0	6.40	7.00	50	9.2	543	5000
ALP5KP6.0A / CA	6.0	6.67	7.37	50	10.3	485	5000
ALP5KP6.5A / CA	6.5	7.22	7.98	50	11.2	447	2000
ALP5KP7.0A / CA	7.0	7.78	8.60	50	12.0	417	1000
ALP5KP7.5A / CA	7.5	8.33	9.21	5.0	12.9	388	250
ALP5KP8.0A / CA	8.0	8.89	9.83	5.0	13.6	367	150
ALP5KP8.5A / CA	8.5	9.44	10.4	5.0	14.4	347	50
ALP5KP9.0A / CA	9.0	10.0	11.1	5.0	15.4	325	20
ALP5KP10A / CA	10.0	11.1	12.3	5.0	17.0	294	15
ALP5KP11A / CA	11.0	12.2	13.5	5.0	18.2	274	2
ALP5KP12A / CA	12.0	13.3	14.7	5.0	19.9	251	2
ALP5KP13A / CA	13.0	14.4	15.9	5.0	21.5	232	2
ALP5KP14A / CA	14.0	15.6	17.2	5.0	23.2	215	2
ALP5KP15A / CA	15.0	16.7	18.5	5.0	24.4	206	2
ALP5KP16A / CA	16.0	17.8	19.7	5.0	26.0	192	2
ALP5KP17A / CA	17.0	18.9	20.9	5.0	27.6	181	2
ALP5KP18A / CA	18.0	20.0	22.1	5.0	29.2	172	2
ALP5KP20A / CA	20.0	22.2	24.5	5.0	32.4	154	2
ALP5KP22A / CA	22.0	24.0	26.9	5.0	35.5	144	2
ALP5KP24A / CA	24.0	26.7	29.5	5.0	38.9	128	2
ALP5KP26A / CA	26.0	28.9	31.9	5.0	42.1	119	2
ALP5KP28A / CA	28.0	31.1	34.4	5.0	45.4	110	2
ALP5KP30A / CA	30.0	33.3	36.8	5.0	48.4	103	2
ALP5KP33A / CA	33.0	36.7	40.6	5.0	53.3	94	2
ALP5KP36A / CA	36.0	40.0	44.2	5.0	58.1	86	2
ALP5KP40A / CA	40.0	44.4	49.1	5.0	64.5	78	2
ALP5KP43A / CA	43.0	47.8	52.8	5.0	69.4	72	2
ALP5KP45A / CA	45.0	50.0	55.3	5.0	72.7	69	2
ALP5KP48A / CA	48.0	53.3	58.9	5.0	77.4	65	2
ALP5KP51A / CA	51.0	56.7	62.7	5.0	82.4	61	2
ALP5KP54A / CA	54.0	60.0	66.3	5.0	87.1	57	2
ALP5KP58A / CA	58.0	64.4	71.2	5.0	93.6	53	2
ALP5KP60A / CA	60.0	66.7	73.7	5.0	96.8	52	2
ALP5KP64A / CA	64.0	71.1	78.6	5.0	103.0	49	2
ALP5KP70A / CA	70.0	77.8	86.0	5.0	113.0	44	2

ALP5KP75A / CA	75.0	83.3	92.1	5.0	121.0	41	2
ALP5KP78A / CA	78.0	86.7	95.8	5.0	126.0	40	2
ALP5KP85A / CA	85.0	94.4	104.0	5.0	137.0	36	2
ALP5KP90A / CA	90.0	100.0	111.0	5.0	146.0	34	2
ALP5KP100A / CA	100.0	110.0	123.0	5.0	162.0	31	2
ALP5KP110A / CA	110.0	122.0	135.0	5.0	177.0	28	2
ALP5KP120A / CA	120.0	133.0	147.0	5.0	193.0	26	2
ALP5KP130A / CA	130.0	144.0	159.0	5.0	209.0	24	2
ALP5KP150A / CA	150.0	167.0	185.0	5.0	243.0	21	2
ALP5KP160A / CA	160.0	178.0	197.0	5.0	259.0	19	2
ALP5KP170A / CA	170.0	189.0	209.0	5.0	275.0	18	2
ALP5KP180A / CA	180.0	200.0	220.0	5.0	292.0	17	2
ALP5KP190A / CA	190.0	211.0	232.0	5.0	310.0	16	2
ALP5KP200A / CA	200.0	224.0	247.0	5.0	329.0	15	2
ALP5KP210A / CA	210.0	233.0	258.0	5.0	350.0	15	2
ALP5KP220A / CA	220.0	246.0	272.0	5.0	371.0	14	2

NOTE

1. V_{BR} measured after I_T applied for 300us, I_T =square wave pulse or equivalent.
2. Surge current waveform per Fig. 3 and derated per Fig. 2
3. Suffix 'C' denotes bi-directional devices. Suffix 'A' denotes 5% tolerance devices, no suffix denotes 10% tolerance devices.
4. Part numbers with "CA" suffix are bidirectional devices, i.e., ALP15KPA17CA
5. For bidirectional type having V_{RWM} of 10 volts and less, the I_R limit is double.
6. All term and symbols are consistent with ANS/IEEE C62.35

TYPICAL DEVICE CHARACTERISTICS

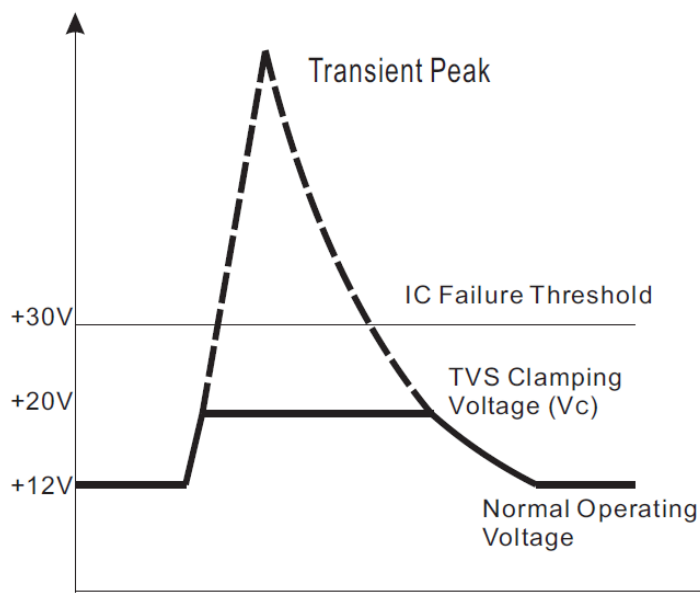


Fig. A – Transients of several thousand volts can be clamped to a safe level by the TVS

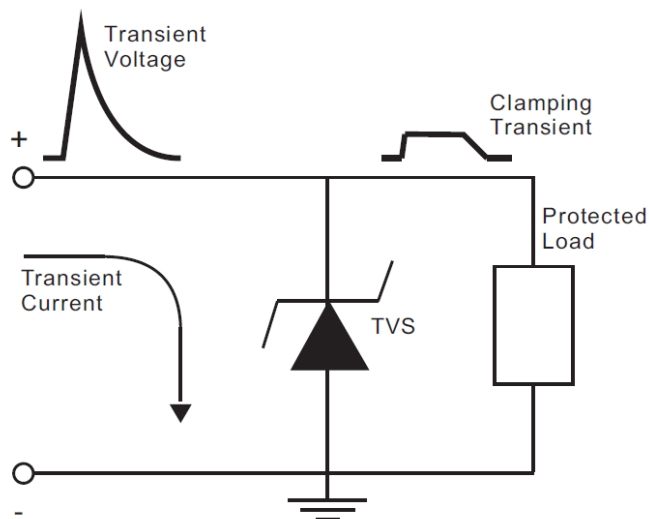


Fig. B – Transient current is diverted to ground thru TVS; the voltage seen by the protected load is limited to the clamping voltage level

RATING AND CHARACTERISTIC CURVES

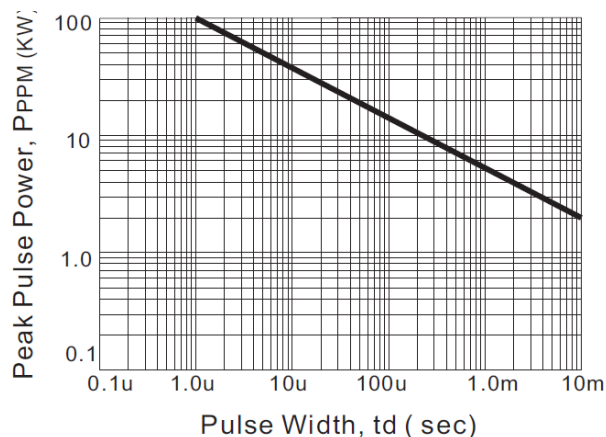


Fig1. PEAK PULSE POWER RATING CURVE

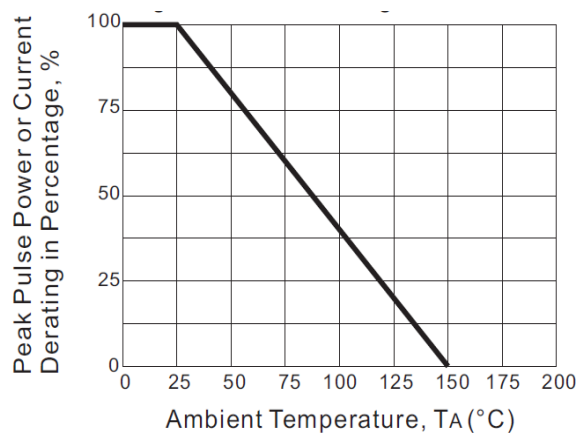


Fig2. PULSE DERATING CURVE

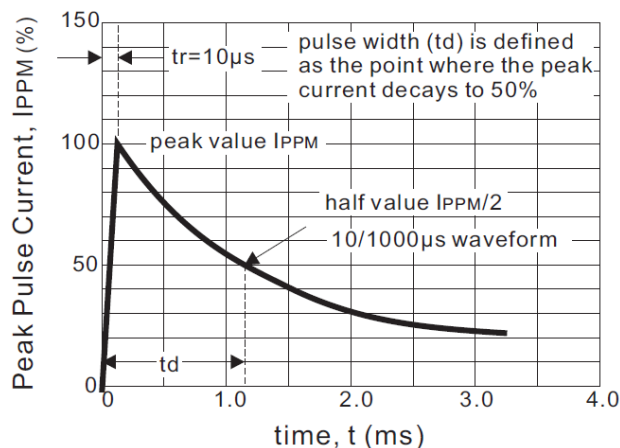


Fig3. PULSE WAVEFORM

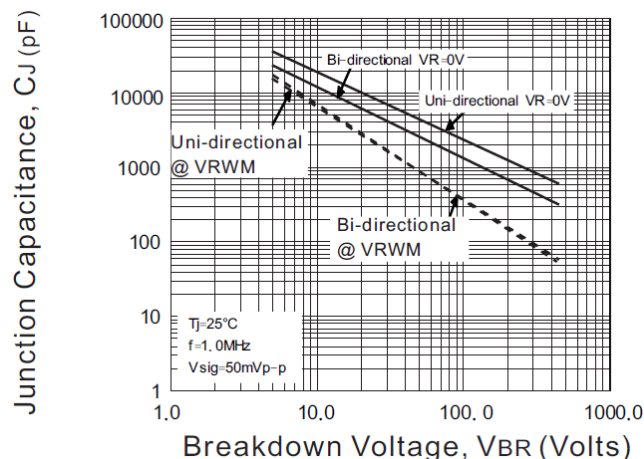


Fig4. TYPICAL JUNCTION CAPACITANCE

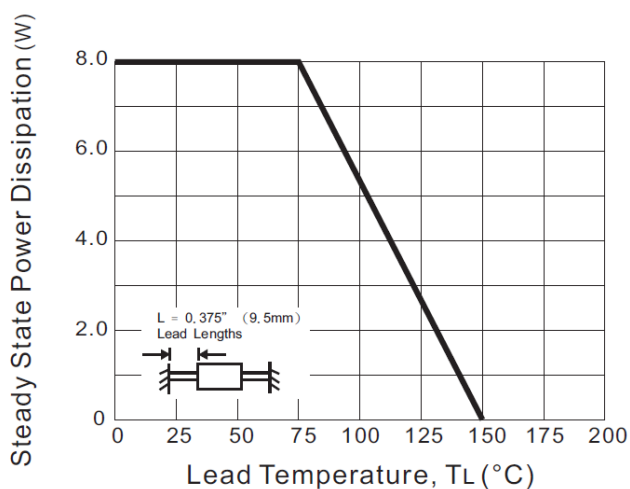


Fig5. STEADY STATE POWER DERATING CURVE

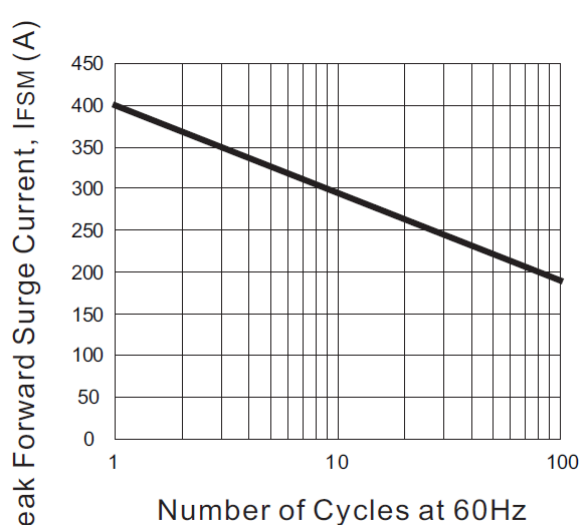
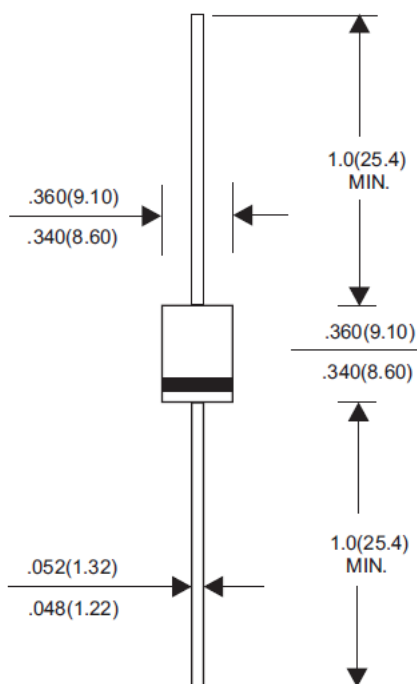


Fig6. MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT

PACKAGE INFORMATION

PACKAGE OUTLINE

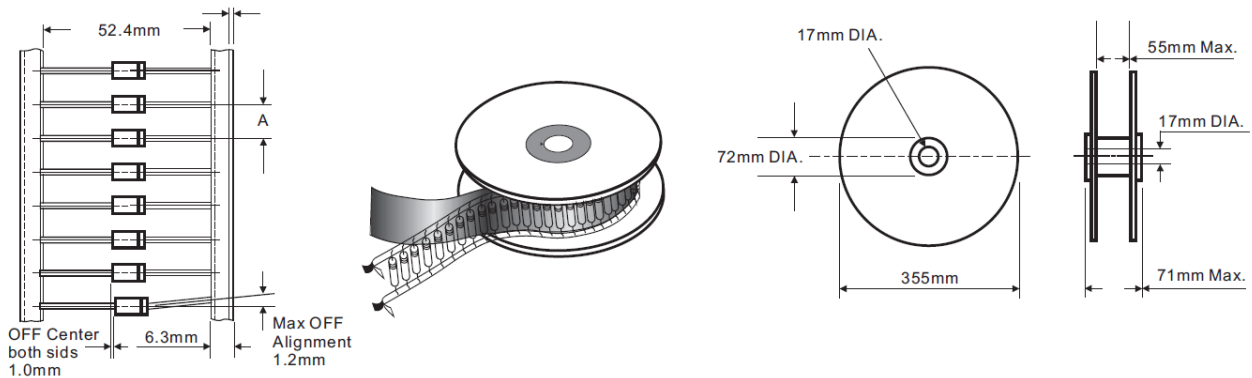


Dimensions in inches and (millimeters)

PINNING INFORMATION

PIN	SIMPLIFIED OUTLINE	SYMBOL
Uni-Directional Pin1 Cathode Pin2 Anode	1  2	1  2
Bi-Directional		

TAPING & BULK SPECIFICATIONS FOR AXIAL DEVICES



REEL PACKING

DEVICE CASE TYPE	QTY 1 (PCS / REEL)	COMPONENT SPACING "A" in FIG. A	CARTON SIZE (m/m)	QTY 2 (PCS / CARTON)	APROX. CROSS WEIGHT (kg)
P600	1000	10 mm	360 * 340 * 370	4000	9.5

AMMO PACKING

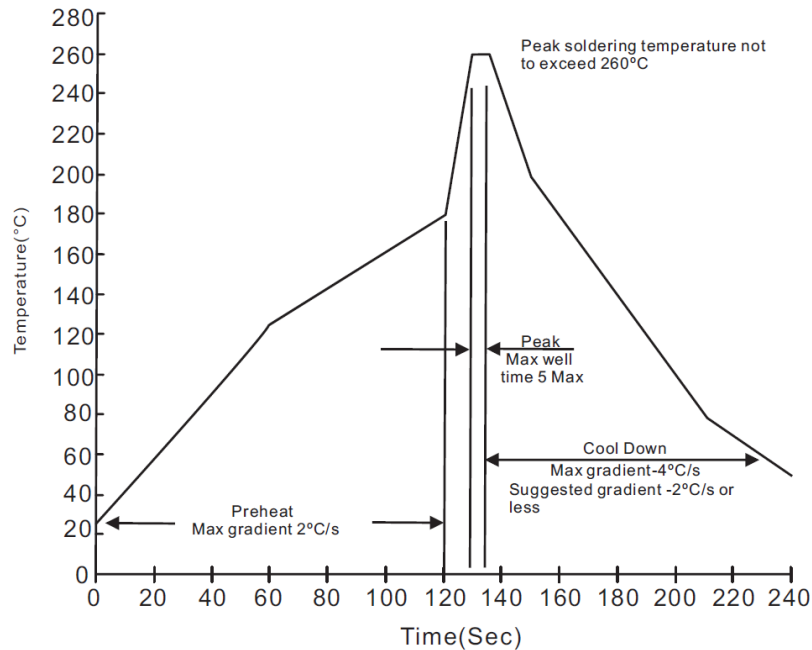
DEVICE CASE TYPE	QTY 1 (PCS / BOX)	INNER BOX SIZE (m/m)	CARTON SIZE (m/m)	QTY 2 (PCS / CARTON)	APROX. CROSS WEIGHT (kg)
P600	400	255 * 75 * 150	339 * 276 * 330	3200	9.2

BULK PACKING

DEVICE CASE TYPE	QTY 1 (PCS / BOX)	INNER BOX SIZE (m/m)	CARTON SIZE (m/m)	QTY 2 (PCS / CARTON)	APROX. CROSS WEIGHT (kg)
P600	250	194 * 84 * 20	355 * 320 * 280	6000	14.5

SOLDERING PARAMETERS

Lead Free temperature Profile wave-soldering



PRODUCT HIGH RELIABILITY TEST CAPABILITIES

ITEM	TEST CONDITIONS	STANDARD
Solder Resistance	At 260±5°C for 10±Sec, Immerse body into solder 1/16"±1/32"	MIL-STD-750D METHOD-2031
Solderability	At 245±5°C for 5 sec.	MIL-STD-202F METHOD-208
Pull Test	2.0kg in axial lead direction for 10 sec.	MIL-STD-750D METHOD-2036
Bend Lead	2.0kg weight applied to each lead bending arc 90°±5° for 3 times	MIL-STD-750D METHOD-2036
High Temperature Reverse Bias	$V_{BR} = V_{BR\ NOM} * 80\%$ at $T_J = 150^\circ$ for 168 hrs.	MIL-STD-750D METHOD-1038
Pressure Cooker	15P _{SIG} at $T_A = 121^\circ\text{C}$ for 4Hrs	JESD22-A102
Temperature Cycling	-55°C to +125°C dwelled for 30min and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
Humidity	At $T_A = 85^\circ\text{C}$, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
High Temperature Storage Life	At 175°C for 1000hrs.	MIL-STD-750D METHOD-1031



beyond boundaries...

ALP5KPXXXA/CA SERIES

CUSTOMER NOTE:

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2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).



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