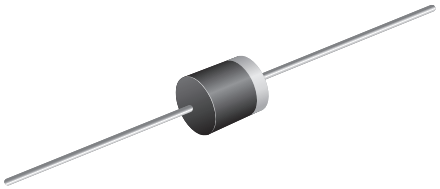
TRANSZORB® Transient Voltage Suppressors

Stand-off Voltage 5.0 to 188 V
Peak Pulse Power 5000 W



Features

- Glass passivated junction
- 5000 W peak pulse power capability with a 10/1000 μs waveform, repetition rate (duty cycle): 0.05 %
- Excellent clamping capability
- Low incremental surge resistance
- Very fast response time
- Devices with $V_{(BR)}$ > 10 V I_D are typically less than 1.0 μA
- Available in uni-directional polarity only
- Meets MSL level 1 per J-STD-020C
- AEC-Q101 qualified

Mechanical Data

Case: Molded plastic body over glass passivated junction. Epoxy meets UL 94V-0 Flammability rating

Terminals: Solder plated or matte tin plated (E3 Suffix) leads, Solderable per J-STD-002B and Mil-STD-750, Method 2026

High temperature soldering guaranteed:

265 °C/10 seconds, 0.375" (9.5 mm) lead length, 5 lbs. (2.3 kg) tension

Polarity: The color band denotes the cathode, which is positive with respect to the anode under normal TVS operation

Maximum Ratings and Characteristics

Ratings 25 °C, unless otherwise specified

Parameter	Test condition	Symbol	Value	Unit
Peak pulse power dissipation	10/1000 μs waveform(1)	P_{PPM}	5000	W
Peak pulse current	10/1000 μs waveform(1)	I_{PPM}	See next table	A
Steady state power dissipation	lead lengths 0.375“ (9.5 mm), T_L = 75 °C(2)	$P_{M(AV)}$	8.0	W
Peak forward surge current	8.3 ms single half sine-wave(3)	I_{FSM}	600	A
Instantaneous forward voltage	100 A(3)	V_F	3.5	V
Operating junction and storage temperature range		T_J, T_{STG}	-55 to +175	°C

Notes:

(1) Non-repetitive current pulse, per Fig. 3 and derated above T_A = 25 °C per Fig. 2.

(2) Mounted on copper pad area of 1.6 x 1.6" (40 x 40 mm) per Fig. 5.

(3) Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum

Electrical Characteristics

(T_A = 25 °C unless otherwise noted)

Device Type	Breakdown Voltage $V_{(BR)}$ (V)[1]		Test Current at I_T (mA)	Stand-off Voltage V_{WM} (V)	Maximum Reverse Leakage at V_{WM} I_D (μA)	Maximum Peak Pulse Current I_{PPM}[2] (A)	Maximum Clamping Voltage at I_{PPM} V_C (V)	Maximum Temperature Coefficient of $V_{(BR)}$ (% / °C)
	MIN	MAX						
5KP5.0	6.40	7.30	50	5.0	2000	521	9.6	0.057
5KP5.0A	6.40	7.00	50	5.0	2000	543	9.2	0.057
5KP6.0	6.67	8.15	50	6.0	5000	439	11.4	0.061
5KP6.0A	6.67	7.37	50	6.0	5000	485	10.3	0.061
5KP6.5	7.22	8.82	50	6.5	2000	407	12.3	0.065
5KP6.5A	7.22	7.98	50	6.5	2000	446	11.2	0.065
5KP7.0	7.78	9.51	50	7.0	1000	376	13.3	0.068
5KP7.0A	7.78	8.60	50	7.0	1000	417	12.0	0.068
5KP7.5	8.33	10.2	5.0	7.5	250	350	14.3	0.073
5KP7.5A	8.33	9.21	5.0	7.5	250	388	12.9	0.073
5KP8.0	8.89	10.9	5.0	8.0	150	333	15.0	0.075
5KP8.0A	8.89	9.83	5.0	8.0	150	368	13.6	0.075
5KP8.5	9.44	11.5	5.0	8.5	50	314	15.9	0.078
5KP8.5A	9.44	10.4	5.0	8.5	50	347	14.4	0.078
5KP9.0	10.0	12.2	5.0	9.0	20	296	16.9	0.081
5KP9.0A	10.0	11.1	5.0	9.0	20	325	15.4	0.081
5KP10	11.1	13.6	5.0	10.0	15	266	18.8	0.084
5KP10A	11.1	12.3	5.0	10.0	15	294	17.0	0.084
5KP11	12.2	14.9	5.0	11.0	10	249	20.1	0.086
5KP11A	12.2	13.5	5.0	11.0	10	275	18.2	0.086
5KP12	13.3	16.3	5.0	12.0	5.0	227	22.0	0.088
5KP12A	13.3	14.7	5.0	12.0	5.0	251	19.9	0.088
5KP13	14.4	17.6	5.0	13.0	2.0	210	23.8	0.090
5KP13A	14.4	15.9	5.0	13.0	2.0	233	21.5	0.090
5KP14	15.6	19.1	5.0	14.0	2.0	194	25.8	0.092
5KP14A	15.6	17.2	5.0	14.0	2.0	216	23.2	0.092
5KP15	16.7	20.4	5.0	15.0	2.0	186	26.9	0.094
5KP15A	16.7	18.5	5.0	15.0	2.0	205	24.4	0.094
5KP16	17.8	21.8	5.0	16.0	2.0	174	28.8	0.096
5KP16A	17.8	19.7	5.0	16.0	2.0	192	26.0	0.096
5KP17	18.9	23.1	5.0	17.0	2.0	164	30.5	0.097
5KP17A	18.9	20.9	5.0	17.0	2.0	181	27.6	0.097
5KP18	20.0	24.4	5.0	18.0	2.0	155	32.2	0.098
5KP18A	20.0	22.1	5.0	18.0	2.0	171	29.2	0.098
5KP20	22.2	27.1	5.0	20.0	2.0	140	35.8	0.099
5KP20A	22.2	24.5	5.0	20.0	2.0	154	32.4	0.099
5KP22	24.4	29.8	5.0	22.0	2.0	127	39.4	0.100
5KP22A	24.4	26.9	5.0	22.0	2.0	141	35.5	0.100
5KP24	26.7	32.6	5.0	24.0	2.0	116	43.0	0.101
5KP24A	26.7	29.5	5.0	24.0	2.0	129	38.9	0.101
5KP26	28.9	35.3	5.0	26.0	2.0	107	46.6	0.101
5KP26A	28.9	31.9	5.0	26.0	2.0	119	42.1	0.101
5KP26A	28.9	31.9	5.0	26.0	2.0	119	42.1	0.101
5KP28	31.1	38.0	5.0	28.0	2.0	100	50.1	0.102
5KP28A	31.1	34.4	5.0	28.0	2.0	110	45.4	0.102
5KP30	33.3	40.7	5.0	30.0	2.0	93.5	53.5	0.103
5KP30A	33.3	36.8	5.0	30.0	2.0	103	48.4	0.103
5KP33	36.7	44.9	5.0	33.0	2.0	84.7	59.0	0.104
5KP33A	36.7	40.6	5.0	33.0	2.0	93.8	53.3	0.104
5KP36	40.0	48.9	5.0	36.0	2.0	77.8	64.3	0.104
5KP36A	40.0	44.2	5.0	36.0	2.0	86.1	58.1	0.104

Device Type	Breakdown Voltage $V_{(BR)}$ (V)(1)		Test Current at I_T (mA)	Stand-off Voltage V_{WM} (V)	Maximum Reverse Leakage at V_{WM} I_D (µA)	Maximum Peak Pulse Current I_{PPM}(2) (A)	Maximum Clamping Voltage at I_{PPM} V_C (V)	Maximum Temperature Coefficient of $V_{(BR)}$ (% / °C)
	MIN	MAX						
5KP40	44.4	54.3	5.0	40.0	2.0	70.0	71.4	0.105
5KP40A	44.4	49.1	5.0	40.0	2.0	77.5	64.5	0.105
5KP43	47.8	58.4	5.0	43.0	2.0	65.2	76.7	0.105
5KP43A	47.8	52.8	5.0	43.0	2.0	72.0	69.4	0.105
5KP45	50.0	61.1	5.0	45.0	2.0	62.3	80.3	0.106
5KP45A	50.0	55.3	5.0	45.0	2.0	68.8	72.7	0.106
5KP48	53.3	65.2	5.0	48.0	2.0	58.5	85.5	0.106
5KP48A	53.3	58.9	5.0	48.0	2.0	64.6	77.4	0.106
5KP51	56.1	69.3	5.0	51.0	2.0	54.9	91.1	0.107
5KP51A	56.7	62.7	5.0	51.0	2.0	60.7	82.4	0.107
5KP54	60.0	73.3	5.0	54.0	2.0	51.9	96.3	0.107
5KP54A	60.0	66.3	5.0	54.0	2.0	57.4	87.1	0.107
5KP58	64.4	78.7	5.0	58.0	2.0	48.5	103	0.107
5KP58A	64.4	71.2	5.0	58.0	2.0	53.4	94	0.107
5KP60	66.7	81.5	5.0	60.0	2.0	46.7	107	0.108
5KP60A	66.7	73.7	5.0	60.0	2.0	51.7	97	0.108
5KP64	71.1	96.9	5.0	64.0	2.0	43.9	114	0.108
5KP64A	71.1	78.6	5.0	64.0	2.0	48.5	103	0.108
5KP70	77.6	95.1	5.0	70.0	2.0	40.0	125	0.108
5KP70A	77.8	86.0	5.0	70.0	2.0	44.2	113	0.108
5KP75	83.3	102	5.0	75.0	2.0	37.3	134	0.108
5KP75A	83.3	92.1	5.0	75.0	2.0	41.3	121	0.108
5KP78	86.7	106.0	5.0	78.0	2.0	36.0	139	0.108
5KP78A	86.7	95.8	5.0	78.0	2.0	39.7	126	0.108
5KP85	94.4	115	5.0	85.0	2.0	33.1	151	0.108
5KP85A	94.4	104	5.0	85.0	2.0	36.5	137	0.110
5KP90	100	122	5.0	90.0	2.0	31.3	160	0.110
5KP90A	100	111	5.0	90.0	2.0	34.2	146	0.110
5KP100	111	136	5.0	100	2.0	27.9	179	0.110
5KP100A	111	123	5.0	100	2.0	30.9	162	0.110
5KP110	122	149	5.0	110	2.0	25.5	196	0.112
5KP110A	122	135	5.0	110	2.0	28.2	177	0.112
5KP120	133	163	5.0	120	2.0	23.4	214	0.112
5KP120A	133	147	5.0	120	2.0	25.9	193	0.112
5KP130	144	176	5.0	130	2.0	21.6	230	0.112
5KP130A	144	159	5.0	130	2.0	23.9	209	0.112
5KP150	167	204	5.0	150	2.0	18.7	268	0.112
5KP150A	167	185	5.0	150	2.0	20.6	243	0.112
5KP160	178	218	5.0	160	2.0	17.4	287	0.112
5KP160A	178	197	5.0	160	2.0	19.3	259	0.112
5KP170	189	231	5.0	170	2.0	16.4	304	0.112
5KP170A	189	209	5.0	170	2.0	18.2	275	0.112
5KP188	209	255	5.0	188	2.0	14.5	344	0.112
5KP188A	209	231	5.0	188	2.0	15.2	328	0.112

Notes:

(1) $V_{(BR)}$ measured after I_T applied for 300 µs I_T = square wave pulse or equivalent

(2) Surge current waveform per Fig. 3 and derate per Fig. 2

(3) All items and symbols are consistent with ANSI/IEEE C62.35

Application

The 5KP series of high power transient voltage suppressors were designed to be used on the output of switching power supplies. These devices may be used to replace crowbar circuits. Both the 5 and 10 percent voltage tolerances are referenced to the power supply output voltage level.

They are able to withstand high levels of peak current while allowing a circuit breaker to trip or a fuse blow before shorting. This will enable the user to reset the breaker or replace the fuse and continue operation. For this type operation, it is recommended that a sufficient mounting surface be used for dissipating the heat generated by the Transient Voltage Suppressor during the transient or over-voltage condition.

Ratings and Characteristics Curves

(T_A = 25 °C unless otherwise specified)

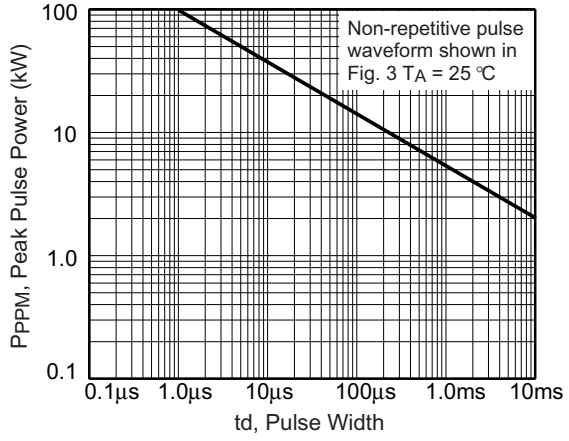


Figure 1. Peak Pulse Power Rating Curve

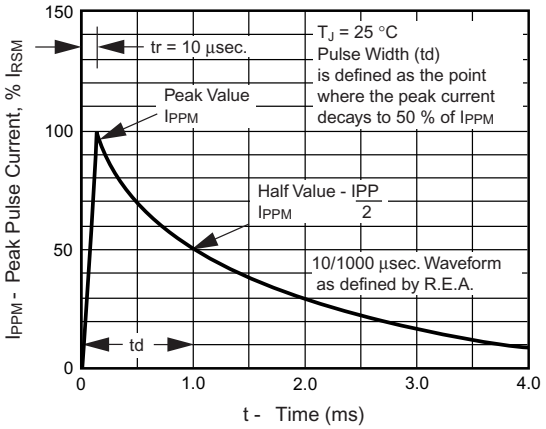


Figure 3. Pulse Waveform

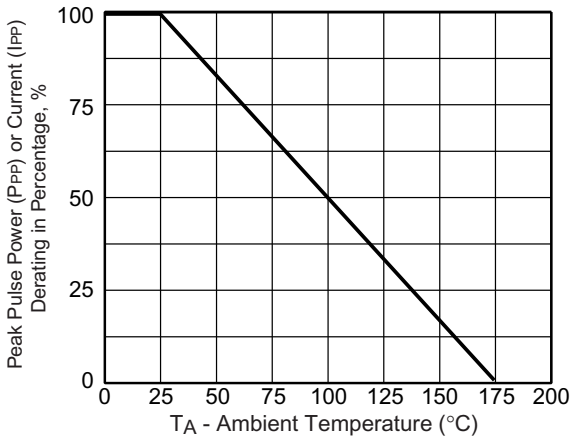


Figure 2. Pulse Power Derating Curve

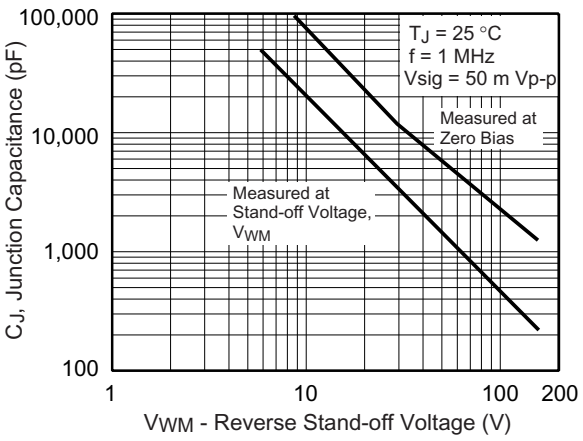


Figure 4. Typical Junction Capacitance

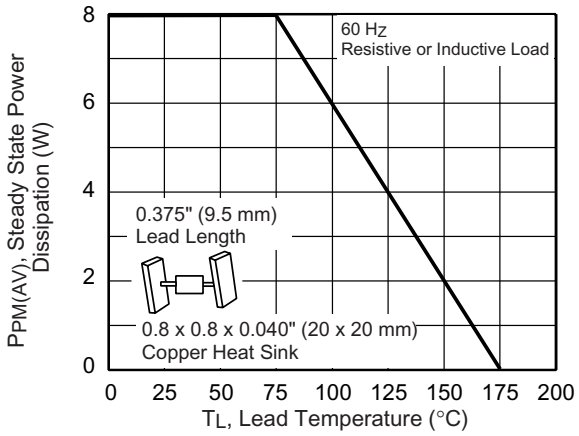


Figure 5. Steady State Power Derating Curve

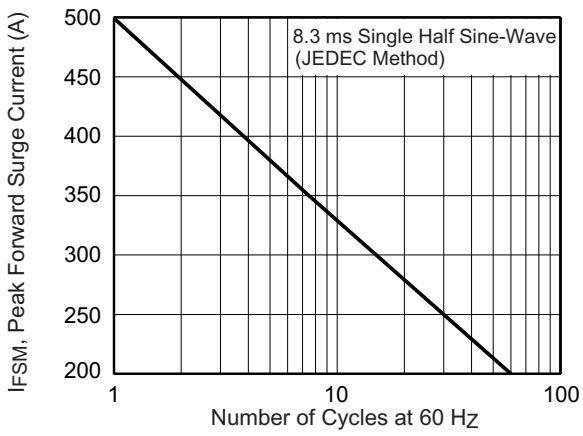
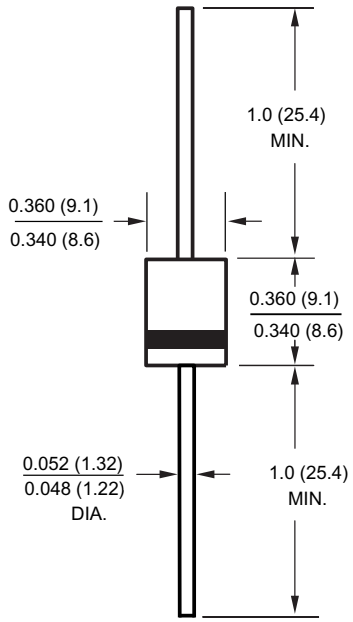


Figure 6. Maximum Non-repetitive Forward Surge Current

Package Dimensions in Inches (mm)

Case Style P600



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