



# PROTEK DEVICES®

..... Engineered solutions for the transient environment

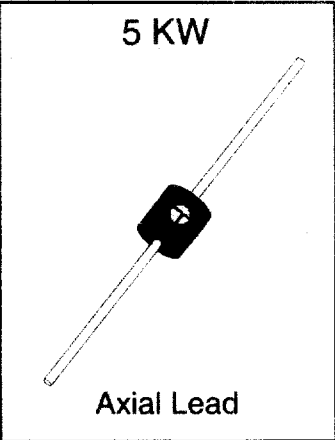
TVS  
Transient Voltage  
Suppressors  
5KP50  
thru  
5KP110A

## DESCRIPTION

This specification sheet defines a series of 5kW Silicon Transient Suppressors used in applications where large voltage transients can permanently damage voltage sensitive components. TVS diodes are Silicon PN junction devices designed for absorption of high voltage transients. This series is available from 5.0 volts thru 110 volts with 5 percent and 10 percent tolerances. Both are referenced to the power supply output or operating voltage level. Special voltages are available from the factory.

TVS diodes are characterized by their high surge capability, extremely fast response time, and low impedance, ( $R_{ON}$ ). Because of the unpredictable nature of transients and the variation of the impedance with respect to these transients, impedance, per se, is not a specified parametric value. However, a minimum voltage ( $V_{BR}$ ) at low current conditions and a maximum clamping voltage ( $V_C$ ) at a maximum peak pulse current is specified. In some instances, the thermal effect (see  $V_C$  Clamping Voltage) may be responsible for 50 to 70 percent of the observed voltage differential when subjected to high current pulses or severe duty cycles, thus making maximum impedance specification insignificant. Curves depicting clamping voltage vs. various current pulses are available from the factory. Extended power curves vs. pulse time are also available.

This 5kW TVS series has a peak pulse power rating of 5,000 watts for one millisecond and therefore can be used in applications where induced lightning on rural or remote transmission lines present a hazard to electronic circuitry. The response time of TVS clamping action is theoretically instantaneous ( $1 \times 10^{-12}$  sec); therefore, they can protect Integrated Circuits, MOS devices, Hybrids, and other voltage-sensitive semiconductors and components. TVSs can also be used in series or parallel to increase the peak power ratings. Contact the factory for parallel matching conditions. This is only one of many series of Transient Voltage Suppressors available from ProTek Devices.



UL94V-0  
Diodes

## FEATURES

- 5,000 watts Peak Power dissipation
- Available in ranges from 5.0V to 110V
- Designed for DC power supply applications
- UL 94V-0 Flammability Classification

## MAXIMUM RATINGS

- 5,000 Watts of Peak Pulse Power dissipation at 25°C (see Figure 1)
- Operating and Storage temperatures: -55° to +175°C
- Forward surge rating: 400 amps, 1/120 second at 25°C
- Steady State power dissipation: 8.0 watts  $T_L = 75^\circ\text{C}$
- Repetition rate (duty cycle): .05%
- $t_{clamping}$  (0 volts to  $V_{BR}$  min): Less than  $1 \times 10^{-12}$  seconds theoretical

## MECHANICAL CHARACTERISTICS

- Molded case
- Weight: 4 grams (approximate)
- Positive terminal marked with band
- Body marked with Logo and type number

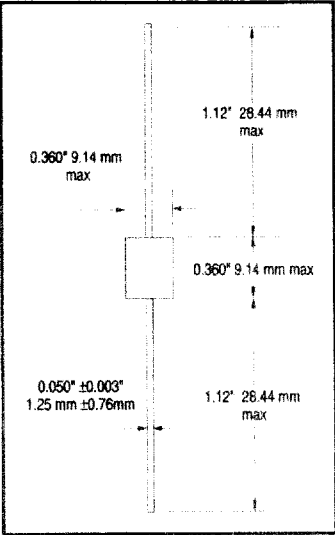


FIGURE 1  
PEAK PULSE POWER vs PULSE TIME

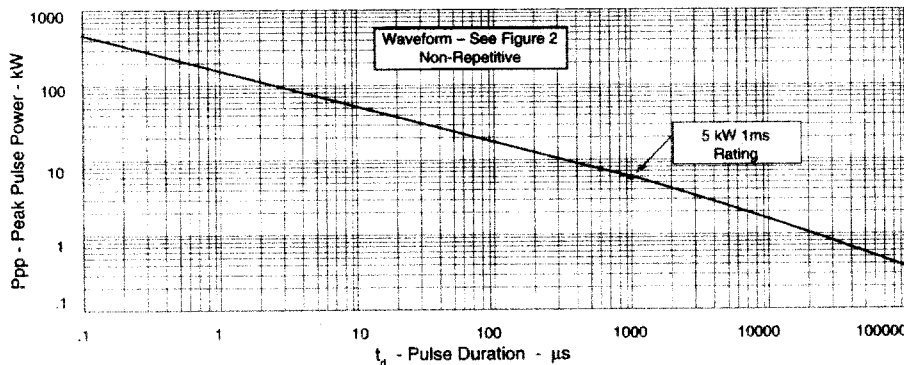
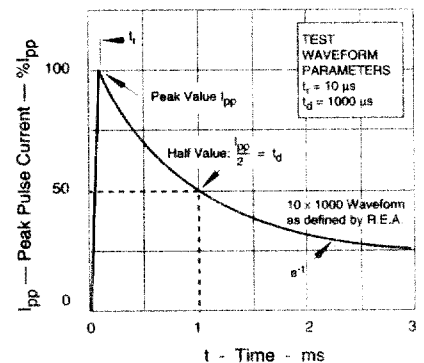


FIGURE 2  
PULSE WAVE FORM



PROTEK DEVICES

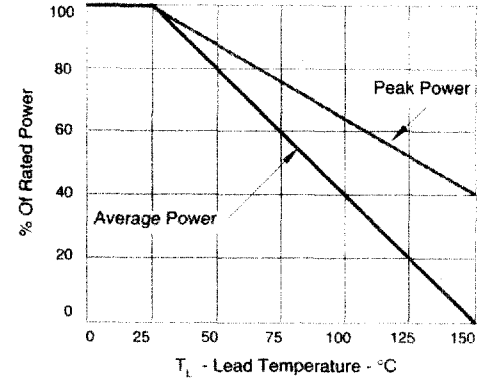
# ELECTRICAL CHARACTERISTICS @ 25°C

PROTEK TYPE NUMBER	RATED STAND-OFF VOLTAGE (See Note 1) V <sub>WM</sub> VOLTS	BREAKDOWN VOLTAGE		MAXIMUM STANDBY CURRENT @ V <sub>WM</sub> I <sub>D</sub> μA	MAXIMUM CLAMPING VOLTAGE @ I <sub>pp</sub> (See Fig. 2) V <sub>C</sub> VOLTS	MAXIMUM PEAK PULSE CURRENT (See Fig. 2) I <sub>pp</sub> A	MAXIMUM TEMPERATURE COEFFICIENT OF V <sub>BR</sub> mV/°C
		V <sub>BR</sub> VOLTS Min	@ I <sub>T</sub> mA				
P 5KP5.0	5.0	6.40	50	2000	9.6	520	4.0
P 5KP5.0A	5.0	6.40	50	2000	9.2	543	4.0
P 5KP6.0	6.0	6.67	50	5000	11.4	439	4.0
P 5KP6.0A	6.0	6.67	50	5000	10.3	483	4.0
5KP6.5	6.5	7.22	50	2000	12.3	407	4.0
5KP6.5A	6.5	7.22	50	2000	11.2	447	4.0
5KP7.0	7.0	7.78	50	1000	13.3	378	5.0
5KP7.0A	7.0	7.78	50	1000	12.0	417	5.0
5KP7.5	7.5	8.33	5	250	14.3	350	6.0
5KP7.5A	7.5	8.33	5	250	12.9	388	6.0
P 5KP8.0	8.0	8.89	5	150	15.0	333	6.0
P 5KP8.0A	8.0	8.89	5	150	13.6	367	6.0
5KP8.5	8.5	9.44	5	50	15.9	314	7.0
5KP8.5A	8.5	9.44	5	50	14.4	347	7.0
5KP9.0	9.0	10.0	5	20	16.9	295	8.0
5KP9.0A	9.0	10.0	5	20	15.4	325	8.0
P 5KP10	10	11.1	5	15	18.8	266	9.0
P 5KP10A	10	11.1	5	15	17.0	294	9.0
5KP11	11	12.2	5	10	20.1	249	10
5KP11A	11	12.2	5	10	18.2	274	10
P 5KP12	12	13.3	5	10	22.0	227	11
P 5KP12A	12	13.3	5	10	19.9	251	11
5KP13	13	14.4	5	10	23.8	210	12
5KP13A	13	14.4	5	10	21.5	232	12
5KP14	14	15.6	5	10	25.8	194	13
5KP14A	14	15.6	5	10	23.2	215	13
P 5KP15	15	16.7	5	10	26.9	188	15
P 5KP15A	15	16.7	5	10	24.4	206	15
5KP16	16	17.8	5	10	28.8	176	18
5KP16A	16	17.8	5	10	26.0	192	18
5KP17	17	18.9	5	10	30.5	164	19
5KP17A	17	18.9	5	10	27.6	181	18
5KP18	18	20.0	5	10	32.2	155	20
5KP18A	18	20.0	5	10	29.2	172	19
P 5KP20	20	22.2	5	10	35.8	139	24
P 5KP20A	20	22.2	5	10	32.4	154	22
5KP22	22	24.4	5	10	36.4	127	27
5KP22A	22	24.4	5	10	35.5	141	24
P 5KP24	24	26.7	5	10	43.0	116	30
P 5KP24A	24	26.7	5	10	38.9	128	27
P 5KP26	26	28.9	5	10	46.6	107	33
P 5KP26A	26	28.9	5	10	42.1	119	29
P 5KP28	28	31.1	5	10	50.1	99	34
P 5KP28A	28	31.1	5	10	45.5	110	30
5KP30	30	33.3	5	10	53.5	93	38
5KP30A	30	33.3	5	10	48.4	103	35
5KP33	33	36.7	5	10	59.0	85	41
5KP33A	33	36.7	5	10	53.3	94	38
P 5KP36	36	40.0	5	10	64.3	78	45
P 5KP36A	36	40.0	5	10	58.1	86	40
5KP40	40	44.4	5	10	71.4	70	50
5KP40A	40	44.4	5	10	64.5	78	45
5KP43	43	47.8	5	10	76.7	65	54
5KP43A	43	47.8	5	10	69.4	72	49
5KP45	45	50.0	5	10	80.3	62	57
5KP45A	45	50.0	5	10	72.7	69	51
5KP48	48	53.3	5	10	85.5	58	62
5KP48A	48	53.3	5	10	77.4	65	55
5KP51	51	56.7	5	10	91.1	55	65
5KP51A	51	56.7	5	10	82.4	61	60
5KP54	54	60.0	5	10	96.3	52	70
5KP54A	54	60.0	5	10	87.1	57	64
P 5KP58	58	64.4	5	10	103.0	49	77
P 5KP58A	58	64.4	5	10	93.6	53	69
5KP60	60	66.7	5	10	107.0	47	79
5KP60A	60	66.7	5	10	96.8	52	70
5KP64	64	71.1	5	10	114.0	44	85
5KP64A	64	71.1	5	10	103.0	49	75
5KP70	70	77.8	5	10	125	40	93
5KP70A	70	77.8	5	10	113	44	84
5KP75	75	83.3	5	10	134	37	100
5KP75A	75	83.3	5	10	121	41	90
5KP78	78	86.7	5	10	139	36	104
5KP78A	78	86.7	5	10	126	40	94
5KP85	85	94.4	5	10	151	33	113
5KP85A	85	94.4	5	10	137	36	102
P 5KP90	90	100	5	10	160	31	120
P 5KP90A	90	100	5	10	146	34	109
5KP100	100	111	5	10	179	28	134
5KP100A	100	111	5	10	162	31	122
5KP110	110	122	5	10	196	26	147
5KP110A	110	122	5	10	177	28	132

V<sub>p</sub> = 3.5V @ 100A, 8.3 ms sine wave

**Note:** P = Standard Part, for non-designated parts, contact the factory for minimum order quantity and delivery.  
**Note 1:** A TVS is normally selected according to its Rated Stand-Off Voltage (V<sub>WM</sub>) which should be equal to or greater than the continuous peak operating voltage level.  
**Note 2:** Bidirectional devices available, contact the factory.

**FIGURE 3  
DERATING CURVE**



### ABBREVIATIONS & SYMBOLS

- V<sub>WM</sub>** Rated Stand-Off Voltage: Maximum working (continuous) DC or peak voltage which may be applied over the standard operating temperature range. Note: V<sub>WM</sub> is a selected device parameter and must be equal to the maximum operating voltage of the line to be protected.
- V<sub>BR</sub> (min)** Minimum Breakdown Voltage: Minimum avalanche voltage the device will exhibit and is used to assure that conduction does not occur prior to the voltage at 25°C.
- V<sub>C</sub>** Maximum Clamping Voltage: Maximum peak voltage appearing across the TVS when subjected to the peak pulse current in a 20 μs time interval. The peak pulse voltage is the combination of voltage rise due to both the series resistance and the thermal rise.
- I<sub>pp</sub>** Peak Pulse Current - See Figure 2
- P<sub>p</sub>** Peak Pulse Power - See Figure 1
- I<sub>D</sub>** Standby-Current
- I<sub>T</sub>** Test Current
- Device Selection:** A TVS diode is normally selected according to the Rated Standoff voltage (V<sub>WM</sub>) which should be equal to or greater than the DC or continuous peak operating voltage level.

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