

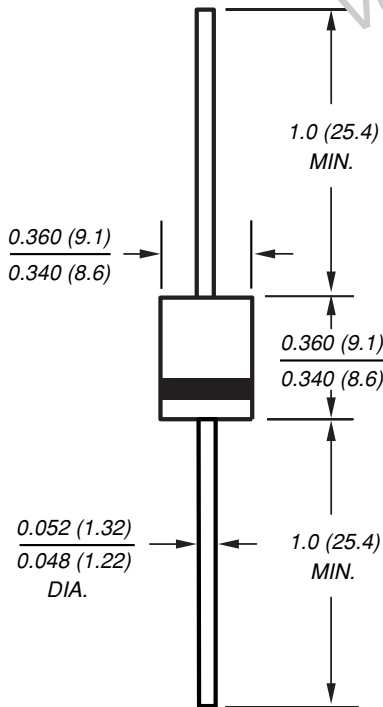


TRANSZORB® Transient Voltage Suppressors

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



Case Style P600



Extended Voltage Range

Features

- Plastic package has Underwriters Laboratory Flammability Classification 94V-0
- Glass passivated junction
- 5000W peak pulse power capability with a 10/1000µs waveform, repetition rate (duty cycle): 0.05%
- Excellent clamping capability
- Low incremental surge resistance
- Very fast response time
- Devices with $V_{(BR)} > 10V I_D$ are typically less than 1.0µA
- Available in uni-directional polarity only

Mechanical Data

Case: Molded plastic body over glass passivated junction

Terminals: Solder plated axial leads, solderable per MIL-STD-750, Method 2026

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

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

Mounting Position: Any

Weight: 0.07 oz., 2.1 g

Packaging codes/options:

- 1/750 ea. per Bulk Box
- 4/800 ea. per 13" Reel (52mm Tape)
- 23/300 ea. per Ammo Box (52mm Tape)

Maximum Ratings and Characteristics Ratings at 25°C unless otherwise noted.

| Parameter | Symbol | Value | Unit |
|---|----------------|----------------|------|
| Peak pulse power dissipation with a 10/1000µs waveform ⁽¹⁾ | PPPM | 5000 | W |
| Peak pulse current with a 10/1000µs waveform ⁽¹⁾ | IPPM | See next table | A |
| Steady state power dissipation at $T_L = 75^\circ\text{C}$ lead lengths 0.375" (9.5mm) ⁽²⁾ | $P_{M(AV)}$ | 8.0 | W |
| Peak forward surge current, 8.3ms single half sine-wave ⁽³⁾ | IFSM | 600 | A |
| Instantaneous forward voltage at 100A ⁽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 $T_A = 25^\circ\text{C}$ per Fig. 2.
- (2) Mounted on copper pad area of 1.6 x 1.6" (40 x 40mm) per Fig. 5.
- (3) Measured on 8.3ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum

5KP5.0 thru 5KP188A



Vishay Semiconductors
formerly General Semiconductor

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 |
| 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 |



Electrical Characteristics $T_A = 25^\circ\text{C}$ 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 $V_{(BR)}$ (% / $^\circ\text{C}$) |
|-------------|---|-------|-------------------------------------|---|---|--|---|---|
| | MIN | MAX | | | | | | |
| 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 | TBD |
| 5KP120A | 133 | 147 | 5.0 | 120 | 2.0 | 25.9 | 193 | TBD |
| 5KP130 | 144 | 176 | 5.0 | 130 | 2.0 | 21.6 | 230 | TBD |
| 5KP130A | 144 | 159 | 5.0 | 130 | 2.0 | 23.9 | 209 | TBD |
| 5KP150 | 167 | 204 | 5.0 | 150 | 2.0 | 18.7 | 268 | TBD |
| 5KP150A | 167 | 185 | 5.0 | 150 | 2.0 | 20.6 | 243 | TBD |
| 5KP160 | 178 | 218 | 5.0 | 160 | 2.0 | 17.4 | 287 | TBD |
| 5KP160A | 178 | 197 | 5.0 | 160 | 2.0 | 19.3 | 259 | TBD |
| 5KP170 | 189 | 231 | 5.0 | 170 | 2.0 | 16.4 | 304 | TBD |
| 5KP170A | 189 | 209 | 5.0 | 170 | 2.0 | 18.2 | 275 | TBD |
| 5KP188 | 209 | 255 | 5.0 | 188 | 2.0 | 14.5 | 344 | TBD |
| 5KP188A | 209 | 231 | 5.0 | 188 | 2.0 | 15.2 | 328 | TBD |

- 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 Characteristic Curves ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Fig. 1 - Peak Pulse Power Rating Curve

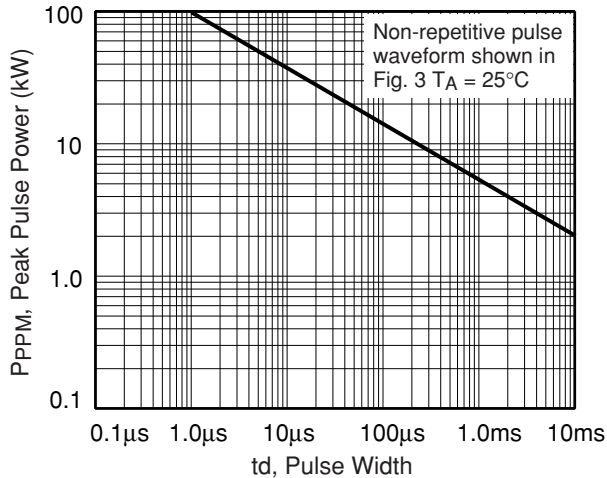


Fig. 2 - Pulse Power Derating Curve

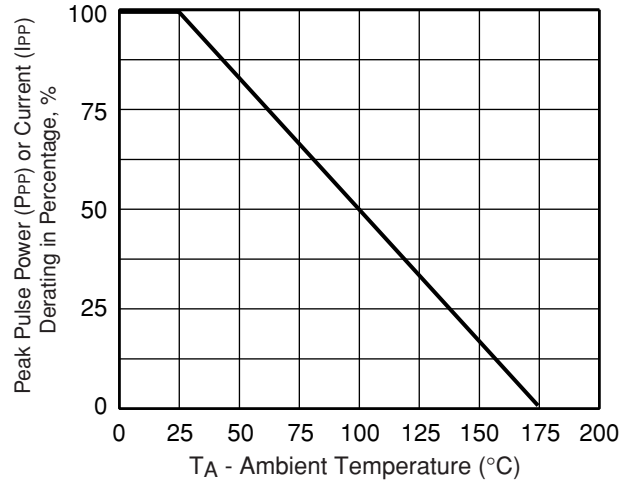


Fig. 3 - Pulse Waveform

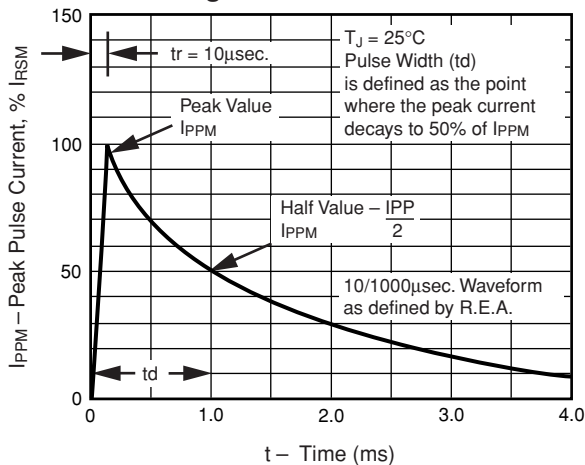


Fig. 4 - Typical Junction Capacitance

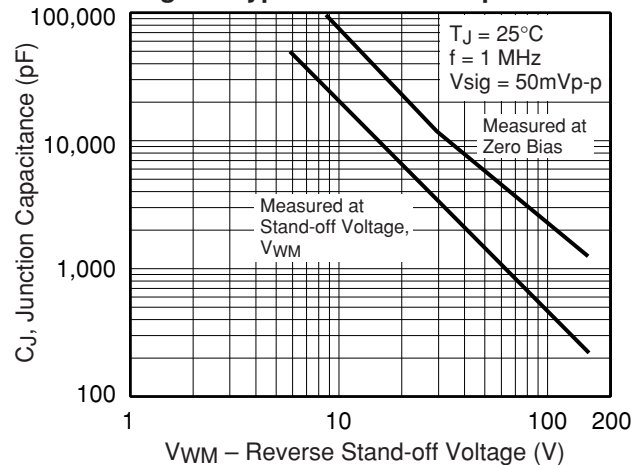


Fig. 5 - Steady State Power Derating Curve

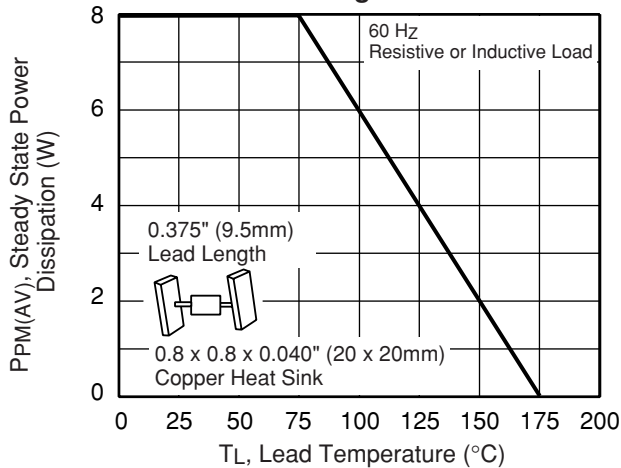


Fig. 6 - Maximum Non-repetitive Forward Surge Current

