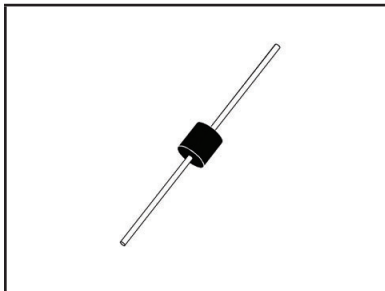


15kW POWER TVS COMPONENT



AXIAL LEAD PACKAGE

DESCRIPTION

The P15KP Series, are discrete 15,000 Watt, silicon transient voltage suppressors (TVS) designed for use in applications where large voltage transients can permanently damage voltage sensitive components and equipment.

The P15KP series is available in voltages ranging from 17V to 280V with 5 percent and 10 percent tolerances. Both tolerances are referenced to the power supply output or operating voltage level. This series is compatible with IEC 61000-4-5 (Surge) requirements.

FEATURES

- Compatible with IEC 61000-4-5 (Surge): 48A, 8/20 μ s - L3(Line-Ground), L4(Line-Line) & L1 (Power)
- 15,000 Watts Peak Pulse Power per Line (tp = 10/1000 μ s)
- Unidirectional and Bidirectional Configurations
- Easy Mounting to Printed Circuit Board
- tClamping (0V to V_{BR} Min.) < 1×10^{-12} seconds theoretical (Unidirectional) and < 5ns (Bidirectional)
- Available in Multiple Voltages Ranging From 17V to 280V
- RoHS Complaint (Exemption #7)

APPLICATIONS

- Relay Drives
- Motor (Start/Stop) Back EMF Protection
- Module Lightning Protection
- Secondary Lightning Protection for AC/DC

MECHANICAL CHARACTERISTICS

- Molded Case
- Approximate Weight: 5 grams
- Lead-Free Pure-Tin Plating (Annealed)
- Solder Reflow Temperature:
Pure-Tin - Sn, 100: 260-270°C
- Flammability Rating UL 94V-0

CIRCUIT DIAGRAMS



UNIDIRECTIONAL



BIDIRECTIONAL

TYPICAL DEVICE CHARACTERISTICS
MAXIMUM RATINGS @ 25°C Unless Otherwise Specified

| PARAMETER | SYMBOL | VALUE | UNITS |
|---|------------------|------------|-------|
| Peak Pulse Power (tp = 10/1000μs) - See Figure 1 | P _{PP} | 15,000 | Watts |
| Forward Surge Rating - 1/120 seconds - See Note 2 | I _F | 200 | Amps |
| Steady State Power Dissipation | P _P | 1.0 | Watts |
| Storage Temperature | T _{STG} | -55 to 150 | °C |
| Operating Temperature | T _L | -55 to 150 | °C |

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

| PART NUMBER (Notes 1 - 2) | RATED STAND-OFF VOLTAGE V _{WM} VOLTS | BREAKDOWN VOLTAGE | | MAXIMUM LEAKAGE CURRENT @V _{WM} I _D μA | MAXIMUM CLAMPING VOLTAGE (Fig. 2) @ 10/1000μs V _C @ I _{PP} | TEMPERATURE COEFFICIENT OF V _(BR) qV _(BR) mV/°C |
|------------------------------|---|--------------------------------|-----------------------|---|---|---|
| | | MIN V _(BR) VOLTS | @I _T mA | | | |
| P15KP17 | 17.0 | 18.9 | 50 | 5000 | 32.3V @ 464.0A | 19 |
| P15KP17A | 17.0 | 18.9 | 50 | 5000 | 29.3V @ 512.0A | 17 |
| P15KP18 | 18.0 | 20.0 | 50 | 5000 | 34.2V @ 439.0A | 20 |
| P15KP18A | 18.0 | 20.0 | 50 | 5000 | 30.9V @ 485.0A | 18 |
| P15KP20 | 20.0 | 22.2 | 20 | 1500 | 37.9V @ 396.0A | 24 |
| P15KP20A | 20.0 | 22.2 | 20 | 1500 | 34.3V @ 437.0A | 21 |
| P15KP22 | 22.0 | 24.4 | 10 | 500 | 41.1V @ 365.0A | 27 |
| P15KP22A | 22.0 | 24.4 | 10 | 500 | 37.1V @ 404.0A | 24 |
| P15KP24 | 24.0 | 26.7 | 5 | 150 | 45.0V @ 333.0A | 30 |
| P15KP24A | 24.0 | 26.7 | 5 | 150 | 40.7V @ 369.0A | 27 |
| P15KP26 | 26.0 | 28.9 | 5 | 50 | 48.7V @ 308.0A | 32 |
| P15KP26A | 26.0 | 28.9 | 5 | 50 | 44.0V @ 341.0A | 29 |
| P15KP28 | 28.0 | 31.1 | 5 | 25 | 52.4V @ 286.0A | 35 |
| P15KP28A | 28.0 | 31.1 | 5 | 25 | 47.5V @ 316.0A | 31 |
| P15KP30 | 30.0 | 33.3 | 5 | 15 | 56.2V @ 267.0A | 27 |
| P15KP30A | 30.0 | 33.3 | 5 | 15 | 50.7V @ 296.0A | 34 |
| P15KP33 | 33.0 | 36.7 | 5 | 10 | 60.6V @ 248.0A | 42 |
| P15KP33A | 33.0 | 36.7 | 5 | 10 | 54.8V @ 274.0A | 38 |
| P15KP36 | 36.0 | 40.0 | 5 | 10 | 66.0V @ 227.0A | 46 |
| P15KP36A | 36.0 | 40.0 | 5 | 10 | 59.7V @ 251.0A | 41 |
| P15KP40 | 40.0 | 44.4 | 5 | 10 | 72.8V @ 206.0A | 51 |
| P15KP40A | 40.0 | 44.4 | 5 | 10 | 65.8V @ 228.0A | 46 |
| P15KP43 | 43.0 | 47.8 | 5 | 10 | 77.1V @ 195.0A | 55 |
| P15KP43A | 43.0 | 47.8 | 5 | 10 | 69.7V @ 215.0A | 50 |
| P15KP45 | 45.0 | 50.0 | 5 | 10 | 80.7V @ 186.0A | 57 |
| P15KP45A | 45.0 | 50.0 | 5 | 10 | 73.0V @ 205.0A | 52 |

TYPICAL DEVICE CHARACTERISTICS

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

| PART NUMBER (Notes 1 - 2) | RATED STAND-OFF VOLTAGE V_{WM} VOLTS | BREAKDOWN VOLTAGE | | MAXIMUM LEAKAGE CURRENT @ V_{WM} I_D μA | MAXIMUM CLAMPING VOLTAGE (Fig. 2) @ 10/1000 μS V_C @ I_{PP} | TEMPERATURE COEFFICIENT OF $V_{(BR)}$ $qV_{(BR)}$ mV/°C |
|------------------------------|--|-------------------------|---------------|---|--|---|
| | | MIN $V_{(BR)}$ VOLTS | @ I_T mA | | | |
| P15KP48 | 48.0 | 53.3 | 5 | 10 | 85.9V @ 175.0A | 62 |
| P15KP48A | 48.0 | 53.3 | 5 | 10 | 77.7V @ 193.0A | 56 |
| P15KP51 | 51.0 | 56.7 | 5 | 10 | 91.5V @ 164.0A | 66 |
| P15KP51A | 51.0 | 56.7 | 5 | 10 | 82.8V @ 181.0A | 60 |
| P15KP54 | 54.0 | 60.0 | 5 | 10 | 96.8V @ 155.0A | 70 |
| P15KP54A | 54.0 | 60.0 | 5 | 10 | 87.5V @ 171.0A | 63 |
| P15KP58 | 58.0 | 64.4 | 5 | 10 | 104.0V @ 144.0A | 76 |
| P15KP58A | 58.0 | 64.4 | 5 | 10 | 94.0V @ 160.0A | 68 |
| P15KP60 | 60.0 | 66.7 | 5 | 10 | 107.0V @ 140.0A | 78 |
| P15KP60A | 60.0 | 66.7 | 5 | 10 | 97.3V @ 154.0A | 71 |
| P15KP64 | 64.0 | 71.1 | 5 | 10 | 115.0V @ 130.0A | 84 |
| P15KP64A | 64.0 | 71.1 | 5 | 10 | 104.0V @ 144.0A | 76 |
| P15KP70 | 70.0 | 77.8 | 5 | 10 | 126.0V @ 119.0A | 92 |
| P15KP70A | 70.0 | 77.8 | 5 | 10 | 114.0V @ 132.0A | 83 |
| P15KP75 | 75.0 | 83.3 | 5 | 10 | 135.0V @ 111.0A | 100 |
| P15KP75A | 75.0 | 83.3 | 5 | 10 | 122.0V @ 123.0A | 89 |
| P15KP78 | 78.0 | 86.7 | 5 | 10 | 140.0V @ 107.0A | 104 |
| P15KP78A | 78.0 | 86.7 | 5 | 10 | 126.0V @ 119.0A | 93 |
| P15KP85 | 85.0 | 94.4 | 5 | 10 | 152.0V @ 99.0A | 113 |
| P15KP85A | 85.0 | 94.4 | 5 | 10 | 137.0V @ 109.0A | 102 |
| P15KP90 | 90.0 | 100.0 | 5 | 10 | 160.0V @ 94.0A | 120 |
| P15KP90A | 90.0 | 100.0 | 5 | 10 | 146.0V @ 103.0A | 109 |
| P15KP100 | 100.0 | 111.0 | 5 | 10 | 179.0V @ 84.0A | 134 |
| P15KP100A | 100.0 | 111.0 | 5 | 10 | 162.0V @ 93.0A | 121 |
| P15KP110 | 110.0 | 122.0 | 5 | 10 | 196.0V @ 77.0A | 147 |
| P15KP110A | 110.0 | 122.0 | 5 | 10 | 178.0V @ 84.0A | 133 |
| P15KP120 | 120.0 | 133.0 | 5 | 10 | 214.0V @ 70.0A | 161 |
| P15KP120A | 120.0 | 133.0 | 5 | 10 | 193.0V @ 78.0A | 145 |
| P15KP130 | 130.0 | 144.0 | 5 | 10 | 231.0V @ 65.0A | 174 |
| P15KP130A | 130.0 | 144.0 | 5 | 10 | 209.0V @ 72.0A | 157 |
| P15KP150 | 150.0 | 167.0 | 5 | 10 | 268.0V @ 56.0A | 202 |
| P15KP150A | 150.0 | 167.0 | 5 | 10 | 243.0V @ 62.0A | 183 |
| P15KP160 | 160.0 | 178.0 | 5 | 10 | 287.0V @ 52.0A | 216 |
| P15KP160A | 160.0 | 178.0 | 5 | 10 | 259.0V @ 58.0A | 195 |

TYPICAL DEVICE CHARACTERISTICS

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

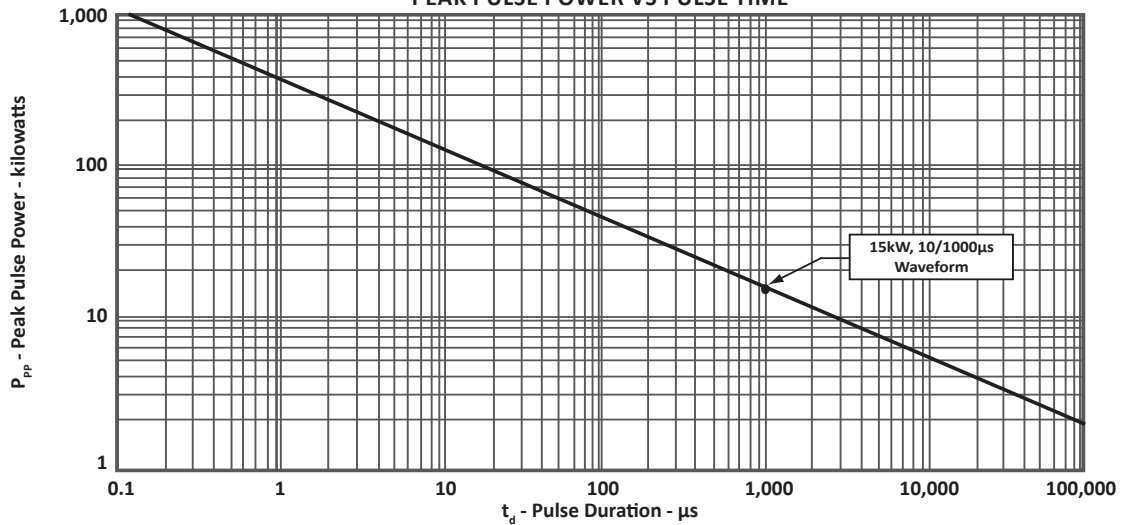
| PART NUMBER (Notes 1 - 2) | RATED STAND-OFF VOLTAGE V_{WM} VOLTS | BREAKDOWN VOLTAGE | | MAXIMUM LEAKAGE CURRENT @ V_{WM} I_D μA | MAXIMUM CLAMPING VOLTAGE (Fig. 2) @ 10/1000 μS V_C @ I_{PP} | TEMPERATURE COEFFICIENT OF $V_{(BR)}$ $qV_{(BR)}$ $mV/^{\circ}C$ |
|------------------------------|--|-------------------------|---------------|---|--|--|
| | | MIN $V_{(BR)}$ VOLTS | @ I_T mA | | | |
| P15KP170 | 170.0 | 189.0 | 5 | 10 | 304.0V @ 49.0A | 229 |
| P15KP170A | 170.0 | 189.0 | 5 | 10 | 275.0V @ 55.0A | 207 |
| P15KP180 | 180.0 | 200.0 | 5 | 10 | 321.0V @ 47.0A | 242 |
| P15KP180A | 180.0 | 200.0 | 5 | 10 | 291.0V @ 52.0A | 219 |
| P15KP200 | 200.0 | 222.0 | 5 | 10 | 356.0V @ 42.0A | 269 |
| P15KP200A | 200.0 | 222.0 | 5 | 10 | 322.0V @ 47.0A | 243 |
| P15KP220 | 220.0 | 245.0 | 5 | 10 | 393.0V @ 38.0A | 297 |
| P15KP220A | 220.0 | 245.0 | 5 | 10 | 356.0V @ 42.0A | 269 |
| P15KP240 | 240.0 | 267.0 | 5 | 10 | 428.0V @ 35.0A | 324 |
| P15KP240A | 240.0 | 267.0 | 5 | 10 | 388.0V @ 39.0A | 293 |
| P15KP260 | 260.0 | 289.0 | 5 | 10 | 464.0V @ 32.0A | 352 |
| P15KP260A | 260.0 | 289.0 | 5 | 10 | 419.0V @ 36.0A | 317 |
| P15KP280 | 280.0 | 311.0 | 5 | 10 | 500.0V @ 30.0A | 378 |
| P15KP280A | 280.0 | 311.0 | 5 | 10 | 452.0V @ 33.0A | 342 |

NOTES

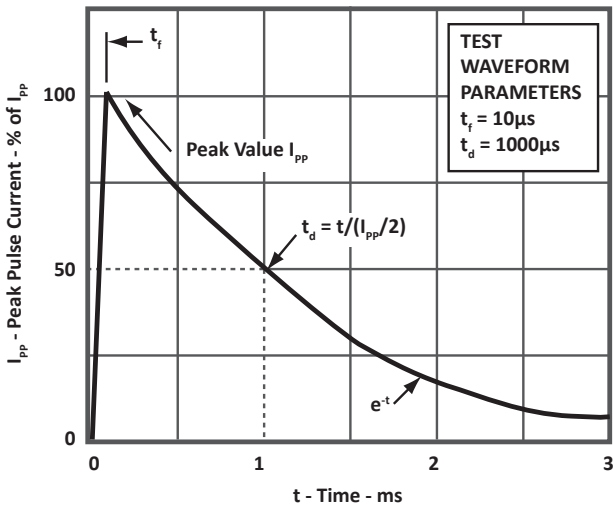
- Part numbers shown are unidirectional devices. Add a "CA" suffix to specify bidirectional devices, such as P15KP20CA.
- $V_f = 7.5$ Volts @ 200A, 8.3ms(1/2 Sine Wave) - Unidirectional devices only.

TYPICAL DEVICE CHARACTERISTICS

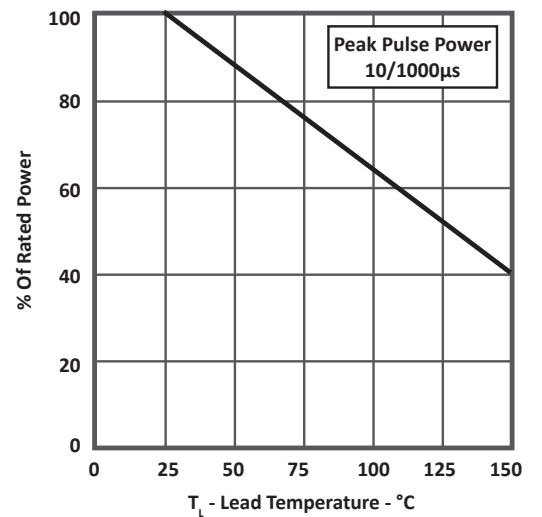
**FIGURE 1
PEAK PULSE POWER VS PULSE TIME**



**FIGURE 2
PULSE WAVEFORM**



**FIGURE 3
POWER DERATING CURVE**

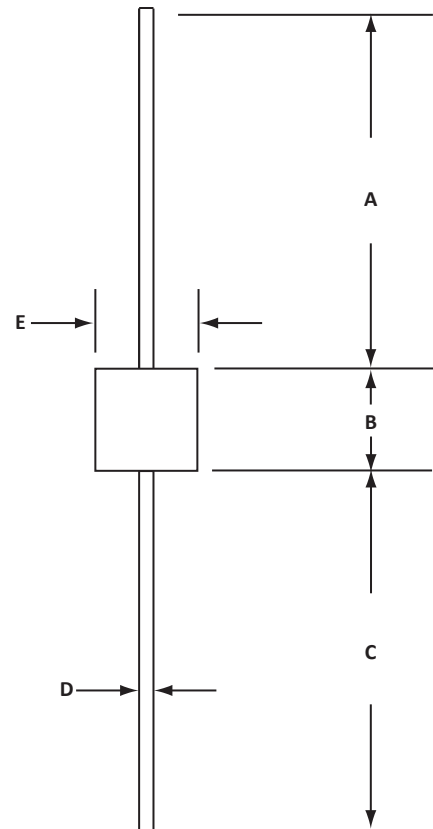


AXIAL LEAD(MOD) PACKAGE INFORMATION
OUTLINE DIMENSIONS

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|-----------|------------|------------|
| | MIN | MAX | MIN | MAX |
| A | 25.4 | - | 1.00 | - |
| B | 9.27 | 9.77 | 0.365 | 0.385 |
| C | 25.4 | - | 1.00 | - |
| D | 1.20 DIA. | 1.30 DIA. | 0.048 DIA. | 0.052 DIA. |
| E | 5.96 | 6.47 | 0.235 | 0.255 |

NOTES

1. Dimensions are exclusive of mold flash and metal burrs.


ORDERING INFORMATION

| BASE PART NUMBER (xx = Voltage) | LEADFREE SUFFIX | TAPE SUFFIX | QTY/REEL | REEL SIZE | TUBE QTY |
|------------------------------------|-----------------|-------------|----------|-----------|----------|
| P15KPxx | -LF | n/a | n/a | n/a | n/a |
| P15KPxxA | -LF | n/a | n/a | n/a | n/a |
| P15KPxxCA | -LF | n/a | n/a | n/a | n/a |

NOTES

1. Marking on Part - logo, part number, date code and positive terminal marked with band (unidirectional only).

MARKING DIAGRAM


COMPANY INFORMATION

COMPANY PROFILE

ProTek Devices, based in Tempe, Arizona USA, is a manufacturer of Transient Voltage Suppression (TVS) products designed specifically for the protection of electronic systems from the effects of lightning, Electrostatic Discharge (ESD), Nuclear Electromagnetic Pulse (NEMP), inductive switching and EMI/RFI. With over 25 years of engineering and manufacturing experience, ProTek designs TVS devices that provide application specific protection solutions for all electronic equipment/systems.

ProTek Devices Analog Products Division, also manufactures analog interface, control, RF and power management products.

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