

POWER TVS COMPONENT

APPLICATIONS

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

IEC COMPATIBILITY (EN61000-4)

- ✓ 61000-4-5 (Surge): 48A, 8/20 μ s - L3 (Line-Gnd), L4 (Line-Line) & L1 (Power)

FEATURES

- ✓ 15,000 Watts Peak Pulse Power per Line (tp=10/1000 μ s)
- ✓ Unidirectional & Bidirectional Configurations
- ✓ Easy Mounting to Printed Circuit Board
- ✓ Available in Multiple Voltage Types Ranging From: 17V to 220V
- ✓ RoHS Compliant in Lead-Free Versions (Exemption #7)

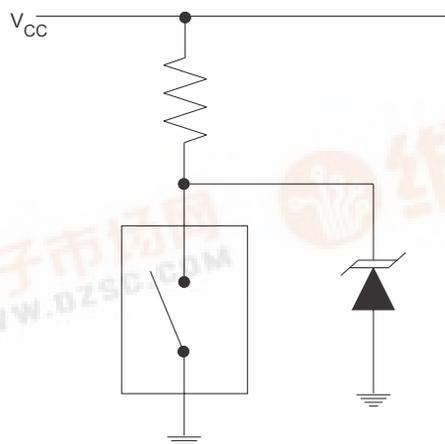
MECHANICAL CHARACTERISTICS

- ✓ Molded Case
- ✓ Weight 5 grams (Approximate)
- ✓ Flammability Rating UL 94V-0
- ✓ Available in Tin-Lead or Lead-Free Pure-Tin Plating(Annealed)
- ✓ Solder Reflow Temperature:
 - Tin-Lead - Sn/Pb, 85/15: 240-245°C
 - Pure-Tin - Sn, 100: 260-270°C
- ✓ Marking: Logo, Part Number & Date Code
- ✓ Positive Terminal Marked with Band - *Unidirectional Only*



APPLICATION

TYPICAL RELAY DRIVE PROTECTION



DEVICE CHARACTERISTICS

| MAXIMUM RATINGS @ 25°C Unless Otherwise Specified | | | |
|---|------------------|-------------|-------|
| PARAMETER | SYMBOL | VALUE | UNITS |
| Peak Pulse Power (tp =10/1000µs) - See Fig. 1 | P _{PP} | 15000 | Watts |
| Forward Surge Rating (1/20 seconds) - See Note 2 | I _F | 200 | Amps |
| Steady State Power Dissipation | P _D | 1.0 | Watts |
| Storage Temperature | T _{STG} | -55 to +150 | °C |
| Operating Temperature | T _J | -55 to +150 | °C |

| ELECTRICAL CHARACTERISTICS @ 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 (See Fig. 2) @ 10/1000µs V _C @ I _{PP} | TEMPERATURE COEFFICIENT OF V _(BR) qV _(BR) mV/°C |
| | | MIN V _(BR) VOLTS | @I _T mA | | | |
| 15KPA17 | 17.0 | 18.9 | 50 | 5000 | 32.3V @ 464.0A | 19 |
| 15KPA17A | 17.0 | 18.9 | 50 | 5000 | 29.3V @ 512.0A | 17 |
| 15KPA18 | 18.0 | 20.0 | 50 | 5000 | 34.2V @ 439.0A | 20 |
| 15KPA18A | 18.0 | 20.0 | 50 | 5000 | 30.9V @ 485.0A | 18 |
| 15KPA20 | 20.0 | 22.2 | 20 | 1500 | 37.9V @ 396.0A | 24 |
| 15KPA20A | 20.0 | 22.2 | 20 | 1500 | 34.3V @ 437.0A | 21 |
| 15KPA22 | 22.0 | 24.4 | 10 | 500 | 41.1V @ 365.0A | 27 |
| 15KPA22A | 22.0 | 24.4 | 10 | 500 | 37.1V @ 404.0A | 24 |
| 15KPA24 | 24.0 | 26.7 | 5 | 150 | 45.0V @ 333.0A | 30 |
| 15KPA24A | 24.0 | 26.7 | 5 | 150 | 40.7V @ 369.0A | 27 |
| 15KPA26 | 26.0 | 28.9 | 5 | 50 | 48.7V @ 308.0A | 32 |
| 15KPA26A | 26.0 | 28.9 | 5 | 50 | 44.0V @ 341.0A | 29 |
| 15KPA28 | 28.0 | 31.1 | 5 | 25 | 52.4V @ 286.0A | 35 |
| 15KPA28A | 28.0 | 31.1 | 5 | 25 | 47.5V @ 316.0A | 31 |
| 15KPA30 | 30.0 | 33.3 | 5 | 15 | 56.2V @ 267.0A | 27 |
| 15KPA30A | 30.0 | 33.3 | 5 | 15 | 50.7V @ 296.0A | 34 |
| 15KPA33 | 33.0 | 36.7 | 5 | 10 | 60.6V @ 248.0A | 42 |
| 15KPA33A | 33.0 | 36.7 | 5 | 10 | 54.8V @ 274.0A | 38 |
| 15KPA36 | 36.0 | 40.0 | 5 | 10 | 66.0V @ 227.0A | 46 |
| 15KPA36A | 36.0 | 40.0 | 5 | 10 | 59.7V @ 251.0A | 41 |
| 15KPA40 | 40.0 | 44.4 | 5 | 10 | 72.8V @ 206.0A | 51 |
| 15KPA40A | 40.0 | 44.4 | 5 | 10 | 65.8V @ 228.0A | 46 |
| 15KPA43 | 43.0 | 47.8 | 5 | 10 | 77.1V @ 195.0A | 55 |
| 15KPA43A | 43.0 | 47.8 | 5 | 10 | 69.7V @ 215.0A | 50 |
| 15KPA45 | 45.0 | 50.0 | 5 | 10 | 80.7V @ 186.0A | 57 |
| 15KPA45A | 45.0 | 50.0 | 5 | 10 | 73.0V @ 205.0A | 52 |
| 15KPA48 | 48.0 | 53.3 | 5 | 10 | 85.9V @ 175.0A | 62 |
| 15KPA48A | 48.0 | 53.3 | 5 | 10 | 77.7V @ 193.0A | 56 |
| 15KPA51 | 51.0 | 56.7 | 5 | 10 | 91.5V @ 164.0A | 66 |
| 15KPA51A | 51.0 | 56.7 | 5 | 10 | 82.8V @ 181.0A | 60 |
| 15KPA54 | 54.0 | 60.0 | 5 | 10 | 96.8V @ 155.0A | 70 |
| 15KPA54A | 54.0 | 60.0 | 5 | 10 | 87.5V @ 171.0A | 63 |
| 15KPA58 | 58.0 | 64.4 | 5 | 10 | 104.0V @ 144.0A | 76 |
| 15KPA58A | 58.0 | 64.4 | 5 | 10 | 94.0V @ 160.0A | 68 |
| 15KPA60 | 60.0 | 66.7 | 5 | 10 | 107.0V @ 140.0A | 78 |
| 15KPA60A | 60.0 | 66.7 | 5 | 10 | 97.3V @ 154.0A | 71 |
| 15KPA64 | 64.0 | 71.1 | 5 | 10 | 115.0V @ 130.0A | 84 |
| 15KPA64A | 64.0 | 71.1 | 5 | 10 | 104.0V @ 144.0A | 76 |
| 15KPA70 | 70.0 | 77.8 | 5 | 10 | 126.0V @ 119.0A | 92 |
| 15KPA70A | 70.0 | 77.8 | 5 | 10 | 114.0V @ 132.0A | 83 |

ELECTRICAL CHARACTERISTICS @ 25°C Unless Otherwise Specified

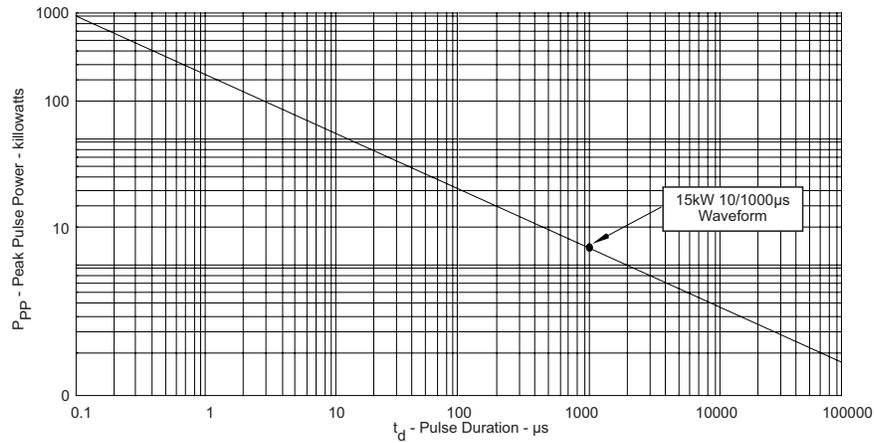
| PART NUMBER (Notes 1 & 2) | RATED STAND-OFF VOLTAGE V_{WM} VOLTS | BREAKDOWN VOLTAGE | | MAXIMUM LEAKAGE CURRENT I_D @ V_{WM} μA | MAXIMUM CLAMPING VOLTAGE (See Fig. 2) @ 10/1000 μs V_C @ I_{PP} | TEMPERATURE COEFFICIENT OF $V_{(BR)}$ $qV_{(BR)}$ mV/ $^{\circ}C$ |
|------------------------------|--|-------------------------|---------------|---|---|---|
| | | MIN $V_{(BR)}$ VOLTS | @ I_T mA | | | |
| 15KPA75 | 75.0 | 83.3 | 5 | 10 | 135.0V @ 111.0A | 100 |
| 15KPA75A | 75.0 | 83.3 | 5 | 10 | 122.0V @ 123.0A | 89 |
| 15KPA78 | 78.0 | 86.7 | 5 | 10 | 140.0V @ 107.0A | 104 |
| 15KPA78A | 78.0 | 86.7 | 5 | 10 | 126.0V @ 119.0A | 93 |
| 15KPA85 | 85.0 | 94.4 | 5 | 10 | 152.0V @ 99.0A | 113 |
| 15KPA85A | 85.0 | 94.4 | 5 | 10 | 137.0V @ 109.0A | 102 |
| 15KPA90 | 90.0 | 100.0 | 5 | 10 | 160.0V @ 94.0A | 120 |
| 15KPA90A | 90.0 | 100.0 | 5 | 10 | 146.0V @ 103.0A | 109 |
| 15KPA100 | 100.0 | 111.0 | 5 | 10 | 179.0V @ 84.0A | 134 |
| 15KPA100A | 100.0 | 111.0 | 5 | 10 | 162.0V @ 93.0A | 121 |
| 15KPA110 | 110.0 | 122.0 | 5 | 10 | 196.0V @ 77.0A | 147 |
| 15KPA110A | 110.0 | 122.0 | 5 | 10 | 178.0V @ 84.0A | 133 |
| 15KPA120 | 120.0 | 133.0 | 5 | 10 | 214.0V @ 70.0A | 161 |
| 15KPA120A | 120.0 | 133.0 | 5 | 10 | 193.0V @ 78.0A | 145 |
| 15KPA130 | 130.0 | 144.0 | 5 | 10 | 231.0V @ 65.0A | 174 |
| 15KPA130A | 130.0 | 144.0 | 5 | 10 | 209.0V @ 72.0A | 157 |
| 15KPA150 | 150.0 | 167.0 | 5 | 10 | 268.0V @ 56.0A | 202 |
| 15KPA150A | 150.0 | 167.0 | 5 | 10 | 243.0V @ 62.0A | 183 |
| 15KPA160 | 160.0 | 178.0 | 5 | 10 | 287.0V @ 52.0A | 216 |
| 15KPA160A | 160.0 | 178.0 | 5 | 10 | 259.0V @ 58.0A | 195 |
| 15KPA170 | 170.0 | 189.0 | 5 | 10 | 304.0V @ 49.0A | 229 |
| 15KPA170A | 170.0 | 189.0 | 5 | 10 | 275.0V @ 55.0A | 207 |
| 15KPA180 | 180.0 | 200.0 | 5 | 10 | 321.0V @ 47.0A | 242 |
| 15KPA180A | 180.0 | 200.0 | 5 | 10 | 291.0V @ 52.0A | 219 |
| 15KPA200 | 200.0 | 222.0 | 5 | 10 | 356.0V @ 42.0A | 269 |
| 15KPA200A | 200.0 | 222.0 | 5 | 10 | 322.0V @ 47.0A | 243 |
| 15KPA220 | 220.0 | 245.0 | 5 | 10 | 393.0V @ 38.0A | 297 |
| 15KPA220A | 220.0 | 245.0 | 5 | 10 | 356.0V @ 42.0A | 269 |
| 15KPA240 | 240.0 | 267.0 | 5 | 10 | 428.0V @ 35.0A | 324 |
| 15KPA240A | 240.0 | 267.0 | 5 | 10 | 388.0V @ 39.0A | 293 |
| 15KPA260 | 260.0 | 289.0 | 5 | 10 | 464.0V @ 32.0A | 352 |
| 15KPA260A | 260.0 | 289.0 | 5 | 10 | 419.0V @ 36.0A | 317 |
| 15KPA280 | 280.0 | 311.0 | 5 | 10 | 500.0V @ 30.0A | 378 |
| 15KPA280A | 280.0 | 311.0 | 5 | 10 | 452.0V @ 33.0A | 342 |

Note 1: Part numbers shown are unidirectional devices. Add a "CA" suffix to specify bidirectional devices, such as 15KPA20CA.

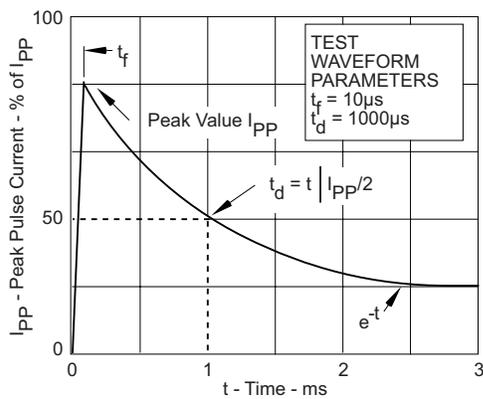
Note 2: $V_F = 7.5$ Volts @ 200A, 8.3ms (1/2 Sine Wave) - unidirectional devices only.

GRAPHS

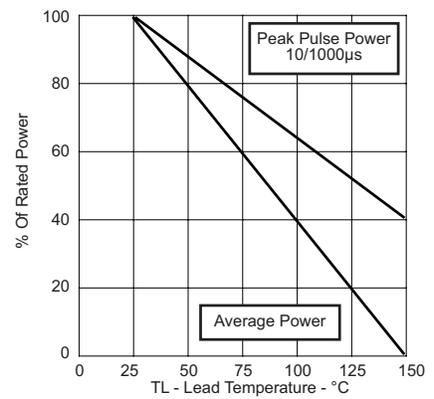
**FIGURE 1
PEAK PULSE POWER VS PULSE TIME**



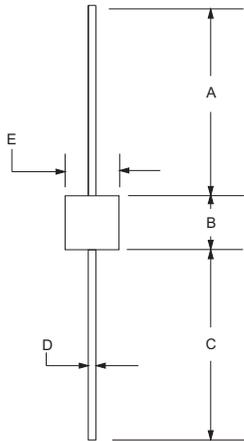
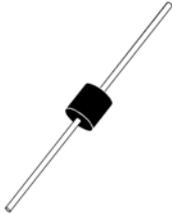
**FIGURE 2
PULSE WAVE FORM**



**FIGURE 3
POWER DERATING CURVE**



PACKAGE OUTLINE & DIMENSIONS

| PACKAGE OUTLINE | | AXIAL LEAD | | | |
|---|-------------|---|-----------|-----------|--|
|  | |  | | | |
| PACKAGE DIMENSIONS | | | | | |
| DIM | MILLIMETERS | | INCHES | | |
| | MIN | MAX | MIN | MAX | |
| A | 24.5 | - | 1.00 | - | |
| B | 8.60 | 9.10 | 0.34 | 0.36 | |
| C | 24.5 | - | 1.00 | - | |
| D | 1.20 DIA | 1.30 DIA | 0.048 DIA | 0.052 DIA | |
| E | 8.60 | 9.10 | 0.34 | 0.36 | |
| <p>NOTES</p> <p>1. Dimensions are exclusive of mold flash and metal burrs. 2. Suffix - LF = Lead-Free, Pure-Tin Plating, i.e., 15KPA90A-LF.</p> | | | | | |
| <p>Outline & Dimensions: Rev 0 - 12/01, 06028</p> | | | | | |

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