

## 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)

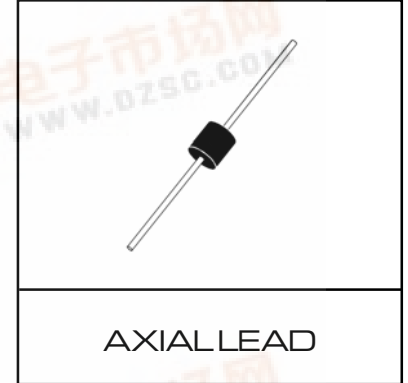
- ✓ 61000-4-5 (Surge): 48A, 8/20 $\mu$ s - L3 (Line-Gnd), L4 (Line-Line) & L1 (Power)

### FEATURES

- ✓ 15,000 Watts Peak Pulse Power per Line ( $t_p=10/1000\mu$ 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)

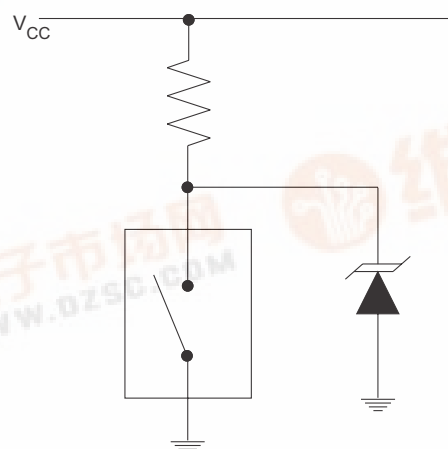
### MECHANICAL CHARACTERISTICS

- ✓ 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 <sub>PP</sub>  | 15000       | Watts |
| Forward Surge Rating (1/20 seconds) - See Note 2 | I <sub>F</sub>   | 200         | Amps  |
| Steady State Power Dissipation                   | P <sub>D</sub>   | 1.0         | Watts |
| Storage Temperature                              | T <sub>STG</sub> | -55 to +150 | °C    |
| Operating Temperature                            | T <sub>J</sub>   | -55 to +150 | °C    |

### ELECTRICAL CHARACTERISTICS @ 25°C Unless Otherwise Specified

| PART<br>NUMBER<br>(Notes 1 & 2) | RATED<br>STAND-OFF<br>VOLTAGE<br><br>V <sub>WM</sub><br>VOLTS | BREAKDOWN<br>VOLTAGE              |                        | MAXIMUM<br>LEAKAGE<br>CURRENT<br><br>@ V <sub>WM</sub><br>I <sub>D</sub><br>µA | MAXIMUM<br>CLAMPING<br>VOLTAGE<br>(See Fig. 2)<br><br>@ 10/1000µs<br>V <sub>C</sub> @ I <sub>PP</sub> | TEMPERATURE<br>COEFFICIENT<br>OF V <sub>(BR)</sub><br><br>qV <sub>(BR)</sub><br>mV/°C |
|---------------------------------|---------------------------------------------------------------|-----------------------------------|------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                 |                                                               | MIN<br>V <sub>(BR)</sub><br>VOLTS | @ I <sub>T</sub><br>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**

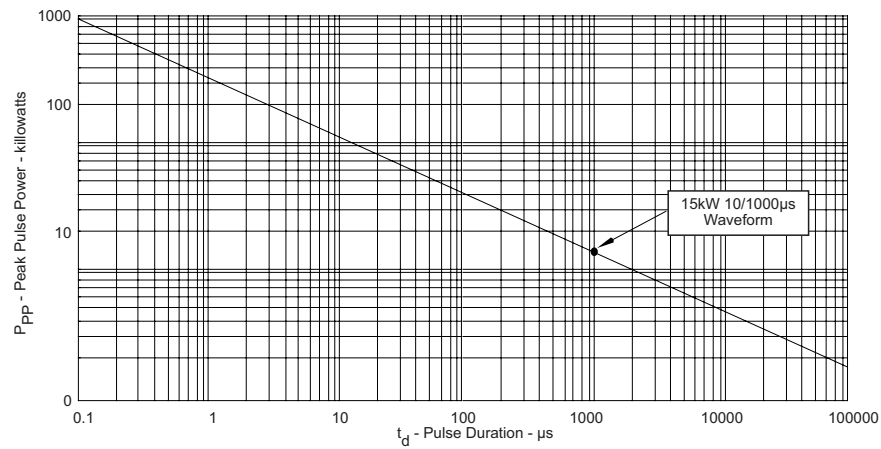
| PART<br>NUMBER<br>(Notes 1 & 2) | RATED<br>STAND-OFF<br>VOLTAGE<br><br>$V_{WM}$<br>VOLTS | BREAKDOWN<br>VOLTAGE       |               | MAXIMUM<br>LEAKAGE<br>CURRENT<br><br>$@ V_{WM}$<br>$I_D$<br>$\mu A$ | MAXIMUM<br>CLAMPING<br>VOLTAGE<br>(See Fig. 2)<br><br>$@ 10/1000\mu s$<br>$V_C @ I_{PP}$ | TEMPERATURE<br>COEFFICIENT<br>OF $V_{(BR)}$<br><br>$qV_{(BR)}$<br>$mV/^{\circ}C$ |
|---------------------------------|--------------------------------------------------------|----------------------------|---------------|---------------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
|                                 |                                                        | MIN<br>$V_{(BR)}$<br>VOLTS | $@ I_T$<br>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.

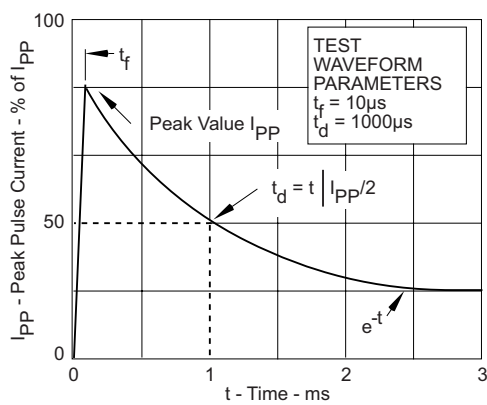
**Note 2:**  $V_F = 7.5$  Volts @ 200A, 8.3ms (1/2 Sine Wave) - *unidirectional devices only.*

## GRAPHS

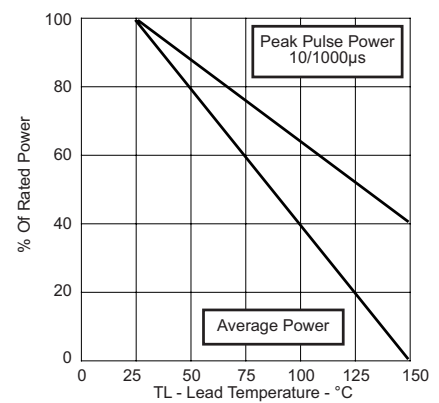
**FIGURE 1**  
**PEAK PULSE POWER VS PULSE TIME**



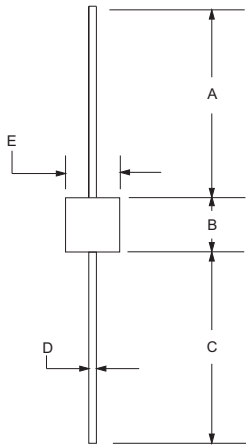
**FIGURE 2**  
**PULSE WAVE FORM**



**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      |     |
| NOTES                                                            |                                                                                   |             |           |           |     |
| 1. Dimensions are exclusive of mold flash and metal burrs.       |                                                                                   |             |           |           |     |
| 2. Suffix - LF = Lead-Free, Pure-Tin Plating, i.e., 15KPA90A-LF. |                                                                                   |             |           |           |     |
| Outline & Dimensions: Rev 0 - 12/01, 06028                       |                                                                                   |             |           |           |     |

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