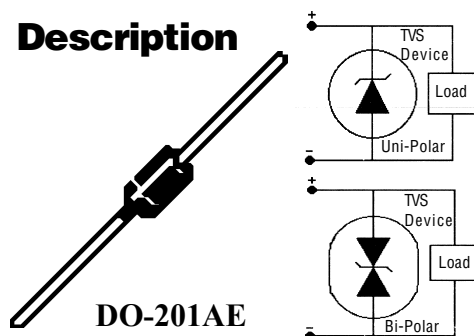


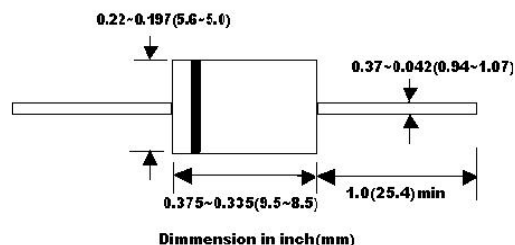
# 6.8V to 400V GPP TRANSIENT VOLTAGE SUPPRESSORS

**1.5KE Series**

## Description



## Mechanical Dimensions



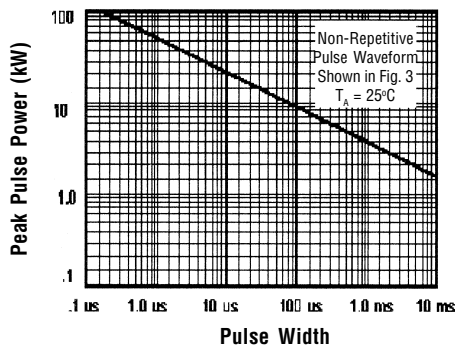
## Features

- 1500 WATT PEAK POWER PROTECTION
- EXCELLENT CLAMPING CAPABILITY
- FAST RESPONSE TIME
- TYPICAL  $I_R < 1\mu A$  ABOVE 10V
- GLASS PASSIVATED CHIP CONSTRUCTION
- MEETS UL SPECIFICATION 94V-0

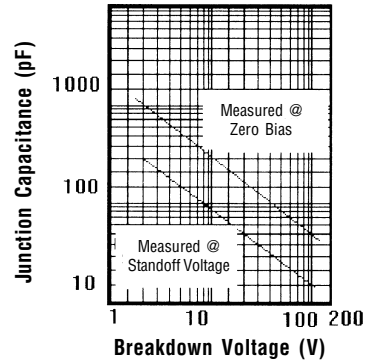
| <b>1.5KE Series</b> <small>(For Bi-Polar Applications, See Note 1)</small>                                                         |            | <b>Units</b>   |
|------------------------------------------------------------------------------------------------------------------------------------|------------|----------------|
| <b>Maximum Ratings</b>                                                                                                             |            |                |
| Peak Power Dissipation... $P_{PK}$<br>$T_p = 1ms$ (Note 5)                                                                         | 1500 Min.  | Watts          |
| Steady State Power Dissipation... $P_D$<br>@ $T_L = 75^\circ C$                                                                    | 5.00       | Watts          |
| Non-Repetitive Peak Forward Surge Current... $I_{FSM}$<br>@ Rated Load Conditions, 8.3 ms, 1/2 Sine Wave, Single Phase<br>(Note 3) | 200        | Amps           |
| Weight... $G_{RM}$                                                                                                                 | 0.20       | Grams          |
| Soldering Requirements (Time & Temp)... $S_T$<br>@ $250^\circ C$                                                                   | 11 Sec.    | Min. to Solder |
| Operating & Storage Temperature Range... $T_J, T_{STRG}$                                                                           | -65 to 175 | $^\circ C$     |

- NOTES:**
1. For Bi-Directional Applications, Use C or CA. Electrical Characteristics Apply in Both Directions.
  2. Mounted on 40mm<sup>2</sup> Copper Pads.
  3. 8.3 ms, 1/2 Sine Wave, Single Phase Duty Cycle, @ 4 Pulses Per Minute Maximum.
  4.  $V_{BR}$  Measured After  $I_T$  Applies for 300  $\mu s$ .  $I_T$  = Square Wave Pulse or Equivalent.
  5. Non-Repetitive Current Pulse. Per Fig. 3 and Derated Above  $T_A = 25^\circ C$  Per Fig. 2.

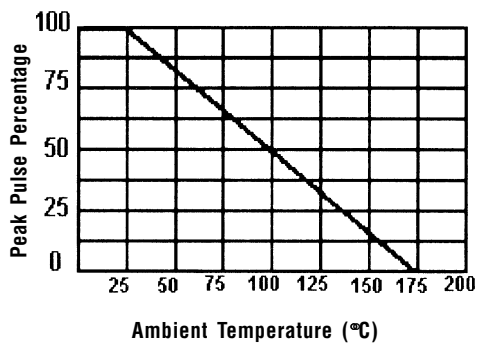
**Fig. 1 Pulse Rating Curve**



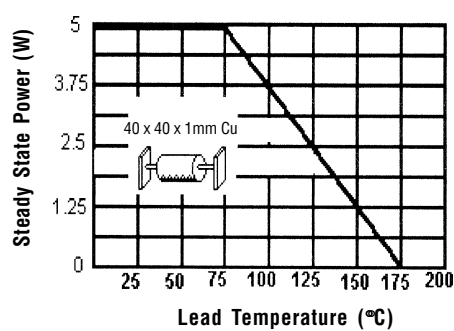
**Fig. 4 Typical Junction Capacitance**



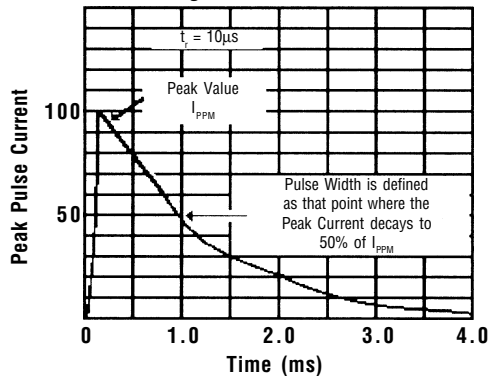
**Fig. 2 Pulse Derating Curve**



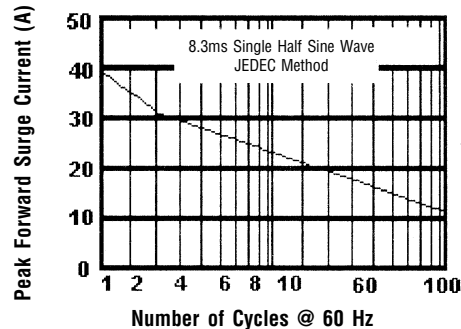
**Fig. 5 Steady State Power Derating**



**Fig. 3 Pulse Waveform**



**Fig. 6 Maximum Non-Repetitive Surge Current**



Ratings at 25 Deg. C ambient temperature unless otherwise specified.

Single Phase Half Wave, 60 Hz Resistive or Inductive Load.

For Capacitive Load, Derate Current by 20%.

## 6.8V to 400V GPP TRANSIENT VOLTAGE SUPPRESSORS

### 1.5KE Series

| DEVICE     | Breakdown Voltage          |       |                 | Working Peak Reverse Voltage<br>$V_{RWM}$ (V) | Maximum Reverse Leakage<br>@ $V_{RWM}$<br>$I_R$ ( $\mu$ A) | Peak Pulse Current<br>$I_{PPM}$ (A)<br>(Note 2) | Maximum Clamping Voltage<br>@ $I_{PPM}$<br>$V_C$ (V) | Maximum Temperature Coefficient<br>of $V_{BR}$<br>% / °C |
|------------|----------------------------|-------|-----------------|-----------------------------------------------|------------------------------------------------------------|-------------------------------------------------|------------------------------------------------------|----------------------------------------------------------|
|            | $V_{BR}$<br>Volts (Note 1) |       | @ $I_T$<br>(mA) |                                               |                                                            |                                                 |                                                      |                                                          |
|            | Min.                       | Max.  |                 |                                               |                                                            |                                                 |                                                      |                                                          |
| 1.5KE-6.8  | 6.12                       | 7.48  | 10.00           | 5.50                                          | 1000                                                       | 139.00                                          | 10.80                                                | 0.057                                                    |
| 1.5KE-6.8A | 6.45                       | 7.14  | 10.00           | 5.80                                          | 1000                                                       | 143.00                                          | 10.50                                                | 0.057                                                    |
| 1.5KE-7.5  | 6.75                       | 8.25  | 10.00           | 6.05                                          | 500                                                        | 128.00                                          | 11.70                                                | 0.061                                                    |
| 1.5KE-7.5A | 7.13                       | 7.88  | 10.00           | 6.40                                          | 500                                                        | 132.00                                          | 11.30                                                | 0.061                                                    |
| 1.5KE-8.2  | 7.38                       | 9.02  | 10.00           | 6.63                                          | 200                                                        | 120.00                                          | 12.50                                                | 0.065                                                    |
| 1.5KE-8.2A | 7.79                       | 8.61  | 10.00           | 7.02                                          | 200                                                        | 124.00                                          | 12.10                                                | 0.065                                                    |
| 1.5KE-9.1  | 8.19                       | 10.00 | 1.00            | 7.37                                          | 50.00                                                      | 109.00                                          | 13.80                                                | 0.068                                                    |
| 1.5KE-9.1A | 8.65                       | 9.55  | 1.00            | 7.78                                          | 50.00                                                      | 112.00                                          | 13.40                                                | 0.068                                                    |
| 1.5KE-10   | 9.00                       | 11.00 | 1.00            | 8.10                                          | 10.00                                                      | 100.00                                          | 15.00                                                | 0.073                                                    |
| 1.5KE-10A  | 9.50                       | 10.50 | 1.00            | 8.55                                          | 10.00                                                      | 103.00                                          | 14.50                                                | 0.073                                                    |
| 1.5KE-11   | 9.90                       | 12.10 | 1.00            | 8.92                                          | 5.00                                                       | 93.00                                           | 16.20                                                | 0.075                                                    |
| 1.5KE-11A  | 10.50                      | 11.60 | 1.00            | 9.40                                          | 5.00                                                       | 96.00                                           | 15.60                                                | 0.075                                                    |
| 1.5KE-12   | 10.80                      | 13.20 | 1.00            | 9.72                                          | 5.00                                                       | 87.00                                           | 17.30                                                | 0.078                                                    |
| 1.5KE-12A  | 11.40                      | 12.60 | 1.00            | 10.20                                         | 5.00                                                       | 90.00                                           | 16.70                                                | 0.078                                                    |
| 1.5KE-13   | 11.70                      | 14.30 | 1.00            | 10.50                                         | 5.00                                                       | 79.00                                           | 19.00                                                | 0.081                                                    |
| 1.5KE-13A  | 12.40                      | 13.70 | 1.00            | 11.10                                         | 5.00                                                       | 82.00                                           | 18.20                                                | 0.081                                                    |
| 1.5KE-15   | 13.50                      | 16.50 | 1.00            | 12.10                                         | 5.00                                                       | 68.00                                           | 22.00                                                | 0.084                                                    |
| 1.5KE-15A  | 14.30                      | 15.80 | 1.00            | 12.80                                         | 5.00                                                       | 71.00                                           | 21.20                                                | 0.084                                                    |
| 1.5KE-16   | 14.40                      | 17.60 | 1.00            | 12.90                                         | 5.00                                                       | 64.00                                           | 23.50                                                | 0.086                                                    |
| 1.5KE-16A  | 15.20                      | 16.80 | 1.00            | 13.60                                         | 5.00                                                       | 67.00                                           | 22.50                                                | 0.086                                                    |
| 1.5KE-18   | 16.20                      | 19.80 | 1.00            | 14.50                                         | 5.00                                                       | 56.50                                           | 26.50                                                | 0.088                                                    |
| 1.5KE-18A  | 17.10                      | 18.90 | 1.00            | 15.30                                         | 5.00                                                       | 59.50                                           | 25.20                                                | 0.088                                                    |
| 1.5KE-20   | 18.00                      | 22.00 | 1.00            | 16.20                                         | 5.00                                                       | 51.50                                           | 29.10                                                | 0.090                                                    |
| 1.5KE-20A  | 19.00                      | 21.00 | 1.00            | 17.10                                         | 5.00                                                       | 54.00                                           | 27.70                                                | 0.090                                                    |
| 1.5KE-22   | 19.80                      | 24.20 | 1.00            | 17.80                                         | 5.00                                                       | 47.00                                           | 31.90                                                | 0.092                                                    |
| 1.5KE-22A  | 20.90                      | 23.10 | 1.00            | 18.80                                         | 5.00                                                       | 49.00                                           | 30.60                                                | 0.092                                                    |
| 1.5KE-24   | 21.60                      | 26.40 | 1.00            | 19.40                                         | 5.00                                                       | 43.00                                           | 34.70                                                | 0.094                                                    |
| 1.5KE-24A  | 22.80                      | 25.20 | 1.00            | 20.50                                         | 5.00                                                       | 45.00                                           | 33.20                                                | 0.094                                                    |
| 1.5KE-27   | 24.30                      | 29.70 | 1.00            | 21.80                                         | 5.00                                                       | 38.50                                           | 39.10                                                | 0.096                                                    |
| 1.5KE-27A  | 25.70                      | 28.40 | 1.00            | 23.10                                         | 5.00                                                       | 40.00                                           | 37.50                                                | 0.096                                                    |
| 1.5KE-30   | 27.00                      | 33.00 | 1.00            | 24.30                                         | 5.00                                                       | 34.50                                           | 43.50                                                | 0.097                                                    |
| 1.5KE-30A  | 28.50                      | 31.50 | 1.00            | 25.60                                         | 5.00                                                       | 36.00                                           | 41.40                                                | 0.097                                                    |
| 1.5KE-33   | 29.70                      | 36.30 | 1.00            | 26.80                                         | 5.00                                                       | 31.50                                           | 47.70                                                | 0.098                                                    |
| 1.5KE-33A  | 31.40                      | 34.70 | 1.00            | 28.20                                         | 5.00                                                       | 33.00                                           | 45.70                                                | 0.098                                                    |
| 1.5KE-36   | 32.40                      | 39.60 | 1.00            | 29.10                                         | 5.00                                                       | 29.00                                           | 52.00                                                | 0.099                                                    |
| 1.5KE-36A  | 34.20                      | 37.80 | 1.00            | 30.80                                         | 5.00                                                       | 30.00                                           | 49.90                                                | 0.099                                                    |
| 1.5KE-39   | 35.10                      | 42.90 | 1.00            | 31.60                                         | 5.00                                                       | 26.50                                           | 56.40                                                | 0.100                                                    |
| 1.5KE-39A  | 37.10                      | 41.00 | 1.00            | 33.30                                         | 5.00                                                       | 28.00                                           | 53.90                                                | 0.100                                                    |
| 1.5KE-43   | 38.70                      | 47.30 | 1.00            | 34.80                                         | 5.00                                                       | 24.00                                           | 61.90                                                | 0.101                                                    |
| 1.5KE-43A  | 40.90                      | 45.20 | 1.00            | 36.80                                         | 5.00                                                       | 25.30                                           | 59.30                                                | 0.101                                                    |
| 1.5KE-47   | 42.30                      | 51.70 | 1.00            | 38.10                                         | 5.00                                                       | 22.20                                           | 67.80                                                | 0.101                                                    |
| 1.5KE-47A  | 44.70                      | 49.40 | 1.00            | 40.20                                         | 5.00                                                       | 23.20                                           | 64.80                                                | 0.101                                                    |

| DEVICE     | Breakdown Voltage          |        |                 | Working Peak Reverse Voltage<br>$V_{RWM}$ (V) | Maximum Reverse Leakage<br>@ $V_{RWM}$<br>$I_R$ ( $\mu$ A) | Peak Pulse Current<br>$I_{PPM}$ (A)<br>(Note 2) | Maximum Clamping Voltage<br>@ $I_{PPM}$<br>$V_C$ (V) | Maximum Temperature Coefficient<br>of $V_{BR}$<br>% / °C |
|------------|----------------------------|--------|-----------------|-----------------------------------------------|------------------------------------------------------------|-------------------------------------------------|------------------------------------------------------|----------------------------------------------------------|
|            | $V_{BR}$<br>Volts (Note 1) |        | @ $I_T$<br>(mA) |                                               |                                                            |                                                 |                                                      |                                                          |
|            | Min.                       | Max.   |                 |                                               |                                                            |                                                 |                                                      |                                                          |
| 1.5KE-51   | 45.90                      | 56.10  | 1.00            | 41.30                                         | 5.00                                                       | 20.40                                           | 73.50                                                | 0.102                                                    |
| 1.5KE-51A  | 48.50                      | 53.60  | 1.00            | 43.60                                         | 5.00                                                       | 21.40                                           | 70.10                                                | 0.102                                                    |
| 1.5KE-56   | 50.40                      | 61.60  | 1.00            | 45.40                                         | 5.00                                                       | 18.60                                           | 80.50                                                | 0.103                                                    |
| 1.5KE-56A  | 53.20                      | 58.80  | 1.00            | 47.80                                         | 5.00                                                       | 19.50                                           | 77.00                                                | 0.103                                                    |
| 1.5KE-62   | 55.80                      | 68.20  | 1.00            | 50.20                                         | 5.00                                                       | 16.90                                           | 89.00                                                | 0.104                                                    |
| 1.5KE-62A  | 58.90                      | 65.10  | 1.00            | 53.00                                         | 5.00                                                       | 17.70                                           | 85.00                                                | 0.104                                                    |
| 1.5KE-68   | 61.20                      | 74.80  | 1.00            | 55.10                                         | 5.00                                                       | 15.30                                           | 98.00                                                | 0.104                                                    |
| 1.5KE-68A  | 64.60                      | 71.40  | 1.00            | 58.10                                         | 5.00                                                       | 16.30                                           | 92.00                                                | 0.105                                                    |
| 1.5KE-75   | 67.50                      | 82.50  | 1.00            | 60.70                                         | 5.00                                                       | 13.90                                           | 108.00                                               | 0.105                                                    |
| 1.5KE-75A  | 71.30                      | 78.80  | 1.00            | 64.10                                         | 5.00                                                       | 14.60                                           | 103.00                                               | 0.105                                                    |
| 1.5KE-82   | 73.80                      | 90.20  | 1.00            | 66.40                                         | 5.00                                                       | 12.70                                           | 118.00                                               | 0.105                                                    |
| 1.5KE-82A  | 77.90                      | 86.10  | 1.00            | 70.10                                         | 5.00                                                       | 13.30                                           | 113.00                                               | 0.105                                                    |
| 1.5KE-91   | 81.90                      | 100.00 | 1.00            | 73.70                                         | 5.00                                                       | 11.40                                           | 131.80                                               | 0.106                                                    |
| 1.5KE-91A  | 86.50                      | 95.50  | 1.00            | 77.80                                         | 5.00                                                       | 12.00                                           | 125.00                                               | 0.106                                                    |
| 1.5KE-100  | 90.00                      | 110.00 | 1.00            | 81.00                                         | 5.00                                                       | 10.40                                           | 144.00                                               | 0.106                                                    |
| 1.5KE-100A | 95.00                      | 105.00 | 1.00            | 85.50                                         | 5.00                                                       | 11.00                                           | 137.00                                               | 0.106                                                    |
| 1.5KE-110  | 99.00                      | 121.00 | 1.00            | 89.20                                         | 5.00                                                       | 9.50                                            | 158.00                                               | 0.107                                                    |
| 1.5KE-110A | 105.00                     | 116.00 | 1.00            | 94.00                                         | 5.00                                                       | 9.90                                            | 152.00                                               | 0.107                                                    |
| 1.5KE-120  | 108.00                     | 132.00 | 1.00            | 97.20                                         | 5.00                                                       | 8.70                                            | 173.00                                               | 0.107                                                    |
| 1.5KE-120A | 114.00                     | 126.00 | 1.00            | 102.00                                        | 5.00                                                       | 9.10                                            | 165.00                                               | 0.107                                                    |
| 1.5KE-130  | 117.00                     | 143.00 | 1.00            | 105.00                                        | 5.00                                                       | 8.00                                            | 187.00                                               | 0.107                                                    |
| 1.5KE-130A | 124.00                     | 137.00 | 1.00            | 111.00                                        | 5.00                                                       | 8.40                                            | 179.00                                               | 0.107                                                    |
| 1.5KE-150  | 135.00                     | 165.00 | 1.00            | 121.00                                        | 5.00                                                       | 7.00                                            | 215.00                                               | 0.108                                                    |
| 1.5KE-150A | 143.00                     | 158.00 | 1.00            | 128.00                                        | 5.00                                                       | 7.20                                            | 207.00                                               | 0.108                                                    |
| 1.5KE-160  | 144.00                     | 176.00 | 1.00            | 130.00                                        | 5.00                                                       | 6.50                                            | 230.00                                               | 0.108                                                    |
| 1.5KE-160A | 152.00                     | 168.00 | 1.00            | 136.00                                        | 5.00                                                       | 6.80                                            | 219.00                                               | 0.108                                                    |
| 1.5KE-170  | 153.00                     | 187.00 | 1.00            | 138.00                                        | 5.00                                                       | 6.20                                            | 244.00                                               | 0.108                                                    |
| 1.5KE-170A | 162.00                     | 179.00 | 1.00            | 145.00                                        | 5.00                                                       | 6.40                                            | 234.00                                               | 0.108                                                    |
| 1.5KE-180  | 162.00                     | 198.00 | 1.00            | 146.00                                        | 5.00                                                       | 5.80                                            | 258.00                                               | 0.108                                                    |
| 1.5KE-180A | 171.00                     | 189.00 | 1.00            | 154.00                                        | 5.00                                                       | 6.10                                            | 246.00                                               | 0.108                                                    |
| 1.5KE-200  | 180.00                     | 220.00 | 1.00            | 162.00                                        | 5.00                                                       | 5.20                                            | 287.00                                               | 0.108                                                    |
| 1.5KE-200A | 190.00                     | 210.00 | 1.00            | 171.10                                        | 5.00                                                       | 5.50                                            | 274.00                                               | 0.108                                                    |
| 1.5KE-220  | 198.00                     | 242.00 | 1.00            | 175.00                                        | 5.00                                                       | 4.30                                            | 344.00                                               | 0.108                                                    |
| 1.5KE-220A | 209.00                     | 231.00 | 1.00            | 185.00                                        | 5.00                                                       | 4.60                                            | 328.00                                               | 0.108                                                    |
| 1.5KE-250  | 225.00                     | 275.00 | 1.00            | 202.00                                        | 5.00                                                       | 5.00                                            | 360.00                                               | 0.110                                                    |
| 1.5KE-250A | 237.00                     | 263.00 | 1.00            | 214.00                                        | 5.00                                                       | 5.00                                            | 344.00                                               | 0.110                                                    |
| 1.5KE-300  | 270.00                     | 330.00 | 1.00            | 243.00                                        | 5.00                                                       | 5.00                                            | 430.00                                               | 0.110                                                    |
| 1.5KE-300A | 285.00                     | 315.00 | 1.00            | 256.00                                        | 5.00                                                       | 5.00                                            | 414.00                                               | 0.110                                                    |
| 1.5KE-350  | 315.00                     | 385.00 | 1.00            | 284.00                                        | 5.00                                                       | 4.00                                            | 504.00                                               | 0.110                                                    |
| 1.5KE-350A | 332.00                     | 368.00 | 1.00            | 300.00                                        | 5.00                                                       | 4.00                                            | 482.00                                               | 0.110                                                    |
| 1.5KE-400  | 360.00                     | 440.00 | 1.00            | 324.00                                        | 5.00                                                       | 4.00                                            | 574.00                                               | 0.110                                                    |
| 1.5KE-400A | 380.00                     | 420.00 | 1.00            | 342.00                                        | 5.00                                                       | 4.00                                            | 548.00                                               | 0.110                                                    |
| 1.5KE-440  | 396.00                     | 484.00 | 1.00            | 356.00                                        | 5.00                                                       | 2.30                                            | 630.00                                               | 0.113                                                    |
| 1.5KE-440A | 418.00                     | 462.00 | 1.00            | 376.00                                        | 5.00                                                       | 2.30                                            | 600.00                                               | 0.113                                                    |