

# 1.5KE SERIES

1500 WATT PEAK POWER TRANSIENT VOLTAGE SUPPRESSORS



## FEATURES

- \* 1500 Watts Surge Capability at 1ms
- \* Excellent clamping capability
- \* Low zener impedance
- \* Fast response time: Typically less than 1.0ps from 0 volt to BV min.
- \* Typical  $I_r$  less than  $1\mu A$  above 10V
- \* High temperature soldering guaranteed:  $260^\circ C$  / 10 seconds / .375"(9.5mm) lead length, 5lbs.(2.3kg) tension

## MECHANICAL DATA

- \* Case: Molded plastic
- \* Epoxy: UL 94V-0 rate flame retardant
- \* Lead: Axial leads, solderable per MIL-STD-202, method 208 guaranteed
- \* Polarity: Color band denotes cathode end
- \* Mounting position: Any
- \* Weight: 1.20 grams

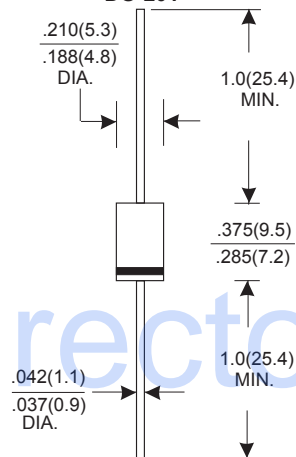
## VOLTAGE RANGE

6.8 to 440 Volts

1500 Watts Peak Power

5.0 Watts Steady State

DO-201



Dimensions in inches and (millimeters)

## MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Rating  $25^\circ C$  ambient temperature unless otherwise specified.  
Single phase half wave, 60Hz, resistive or inductive load.  
For capacitive load, derate current by 20%.

| RATINGS  | SYMBOL         | VALUE        | UNITS      |
|--|----------------|--------------|------------|
| Peak Power Dissipation at $T_A=25^\circ C$ , $T_P=1ms$ (NOTE 1)  | $P_{PK}$       | Minimum 1500 | Watts      |
| Steady State Power Dissipation at $T_L=75^\circ C$<br>Lead Length .375"(9.5mm) (NOTE 2)                      | $P_D$          | 5.0          | Watts      |
| Peak Forward Surge Current at 8.3ms Single Half Sine-Wave superimposed on rated load (JEDEC method) (NOTE 3) | $I_{FSM}$      | 200          | Amps       |
| Operating and Storage Temperature Range  | $T_J, T_{STG}$ | -55 to +175  | $^\circ C$ |

### NOTES:

1. Non-repetitive current pulse per Fig. 3 and derated above  $T_A=25^\circ C$  per Fig. 2.
2. Mounted on Copper Pad area of  $0.8" \times 0.8"$  ( $20mm \times 20mm$ ) per Fig.5.
3. 8.3ms single half sine-wave, duty cycle = 4 pulses per minute maximum.

## DEVICES FOR BIPOLAR APPLICATIONS

1. For Bidirectional use C or CA Suffix for types 1.5KE6.8 thru 1.5KE440.
2. Electrical characteristics apply in both directions.

# RATING AND CHARACTERISTIC CURVES (1.5KE SERIES)

FIG.1-PEAK PULSE POWER DERATING CURVE

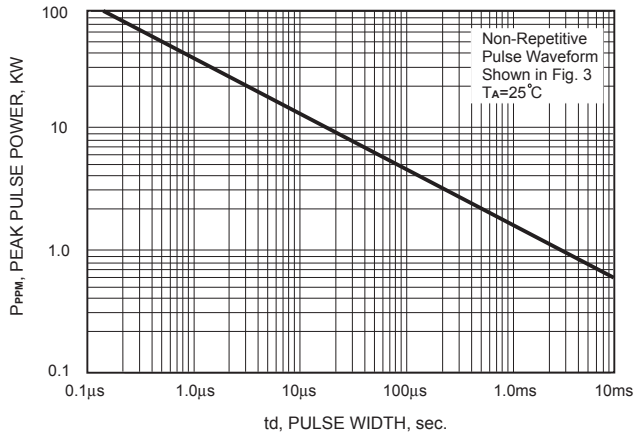


FIG.2-PULSE DERATING CURVE



FIG.3-PULSE WAVE FORM

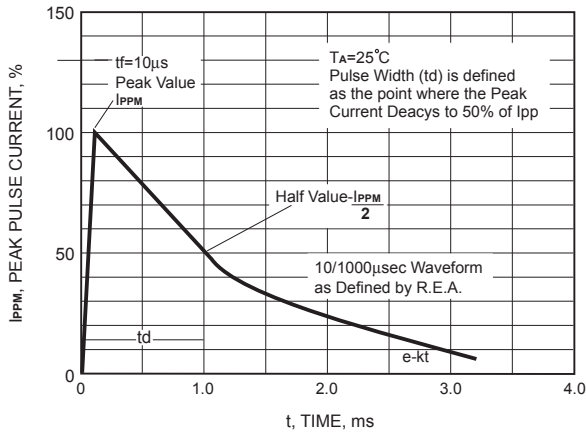


FIG.4-TYPICAL JUNCTION CAPACITANCE

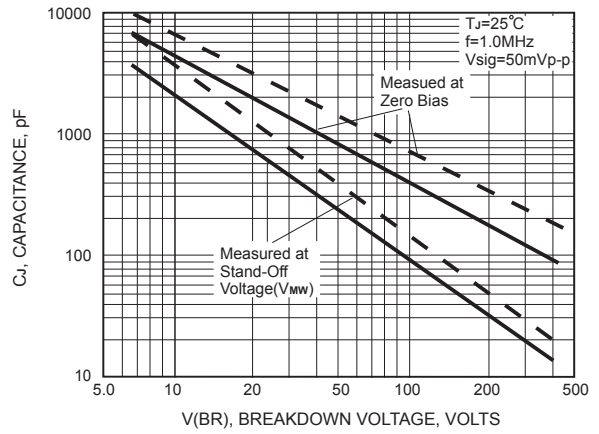


FIG.5-STEADY STATE POWER DERATING CURVE

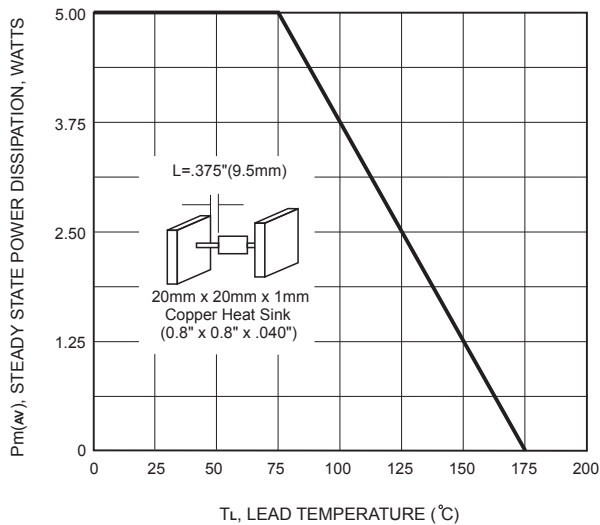
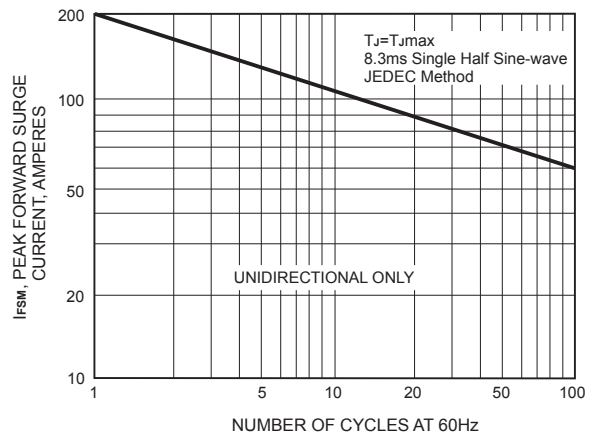


FIG.6-MAXIMUM NON-REPETITIVE PEAK FORWARD SURGE CURRENT, UNIDIRECTIONAL



# 1500 Watt Axial Lead TVS

| UNI DIRECTIONAL PART NUMBER | REVERSE STAND-OFF VOLTAGE VRWM (V) | BREAKDOWN VOLTAGE VBR (V) MIN. @IT | BREAKDOWN VOLTAGE VRB (V) MAX. @IT | TEST CURRENT IT (mA) | MAXIMUM CLAMPING VOLTAGE @Ipp Vc (V) | PEAK PULSE CURRENT Ipp (A) | REVERSE LEAKAGE @ VRWM IR(μA) |
|-----------------------------|------------------------------------|------------------------------------|------------------------------------|----------------------|--------------------------------------|----------------------------|-------------------------------|
| 1.5KE6.8                    | 5.50                               | 6.12                               | 7.48                               | 10                   | 10.8                                 | 140.7                      | 1000                          |
| 1.5KE6.8A                   | 5.80                               | 6.45                               | 7.14                               | 10                   | 10.5                                 | 144.8                      | 1000                          |
| 1.5KE7.5                    | 6.05                               | 6.75                               | 8.25                               | 10                   | 11.7                                 | 129.9                      | 500                           |
| 1.5KE7.5A                   | 6.40                               | 7.13                               | 7.88                               | 10                   | 11.3                                 | 134.5                      | 500                           |
| 1.5KE8.2                    | 6.63                               | 7.38                               | 9.02                               | 10                   | 12.5                                 | 121.6                      | 200                           |
| 1.5KE8.2A                   | 7.02                               | 7.79                               | 8.61                               | 10                   | 12.1                                 | 125.6                      | 200                           |
| 1.5KE9.1                    | 7.37                               | 8.19                               | 10.00                              | 1                    | 13.8                                 | 110.1                      | 50                            |
| 1.5KE9.1A                   | 7.78                               | 8.65                               | 9.50                               | 1                    | 13.4                                 | 113.4                      | 50                            |
| 1.5KE10                     | 8.10                               | 9.00                               | 11.00                              | 1                    | 15.0                                 | 101.3                      | 10                            |
| 1.5KE10A                    | 8.55                               | 9.50                               | 10.50                              | 1                    | 14.5                                 | 104.8                      | 10                            |
| 1.5KE11                     | 8.92                               | 9.90                               | 12.10                              | 1                    | 16.2                                 | 93.8                       | 5                             |
| 1.5KE11A                    | 9.40                               | 10.50                              | 11.60                              | 1                    | 15.6                                 | 97.4                       | 5                             |
| 1.5KE12                     | 9.72                               | 10.80                              | 13.20                              | 1                    | 17.3                                 | 87.9                       | 5                             |
| 1.5KE12A                    | 10.20                              | 11.40                              | 12.60                              | 1                    | 16.7                                 | 91.0                       | 5                             |
| 1.5KE13                     | 10.50                              | 11.70                              | 14.30                              | 1                    | 19.0                                 | 80.0                       | 5                             |
| 1.5KE13A                    | 11.10                              | 12.40                              | 13.70                              | 1                    | 18.2                                 | 83.5                       | 5                             |
| 1.5KE15                     | 12.10                              | 13.50                              | 16.50                              | 1                    | 22.0                                 | 69.1                       | 5                             |
| 1.5KE15A                    | 12.80                              | 14.30                              | 15.80                              | 1                    | 21.2                                 | 71.7                       | 5                             |
| 1.5KE16                     | 12.90                              | 14.40                              | 17.60                              | 1                    | 23.5                                 | 64.7                       | 5                             |
| 1.5KE16A                    | 13.60                              | 15.20                              | 16.80                              | 1                    | 22.5                                 | 67.6                       | 5                             |
| 1.5KE18                     | 14.50                              | 16.20                              | 19.80                              | 1                    | 26.5                                 | 57.4                       | 5                             |
| 1.5KE18A                    | 15.30                              | 17.10                              | 18.90                              | 1                    | 25.2                                 | 60.3                       | 5                             |
| 1.5KE20                     | 16.20                              | 18.00                              | 22.00                              | 1                    | 29.1                                 | 52.2                       | 5                             |
| 1.5KE20A                    | 17.10                              | 19.00                              | 21.00                              | 1                    | 27.7                                 | 54.9                       | 5                             |
| 1.5KE22                     | 17.80                              | 19.80                              | 24.20                              | 1                    | 31.9                                 | 47.6                       | 5                             |
| 1.5KE22A                    | 18.80                              | 20.90                              | 23.10                              | 1                    | 30.6                                 | 49.7                       | 5                             |
| 1.5KE24                     | 19.40                              | 21.60                              | 26.40                              | 1                    | 34.7                                 | 43.8                       | 5                             |
| 1.5KE24A                    | 20.50                              | 22.80                              | 25.20                              | 1                    | 33.2                                 | 45.8                       | 5                             |
| 1.5KE27                     | 21.80                              | 24.30                              | 29.70                              | 1                    | 39.1                                 | 38.9                       | 5                             |
| 1.5KE27A                    | 23.10                              | 25.70                              | 28.40                              | 1                    | 37.5                                 | 40.5                       | 5                             |
| 1.5KE30                     | 24.30                              | 27.00                              | 33.00                              | 1                    | 43.5                                 | 34.9                       | 5                             |
| 1.5KE30A                    | 25.60                              | 28.50                              | 31.50                              | 1                    | 41.4                                 | 36.7                       | 5                             |
| 1.5KE33                     | 26.80                              | 29.70                              | 36.30                              | 1                    | 47.7                                 | 31.9                       | 5                             |
| 1.5KE33A                    | 28.20                              | 31.40                              | 34.70                              | 1                    | 45.7                                 | 33.3                       | 5                             |
| 1.5KE36                     | 29.10                              | 32.40                              | 39.60                              | 1                    | 52.0                                 | 29.2                       | 5                             |
| 1.5KE36A                    | 30.80                              | 34.20                              | 37.80                              | 1                    | 49.9                                 | 30.5                       | 5                             |
| 1.5KE39                     | 31.60                              | 35.10                              | 42.90                              | 1                    | 56.4                                 | 27.0                       | 5                             |
| 1.5KE39A                    | 33.30                              | 37.10                              | 41.00                              | 1                    | 53.9                                 | 28.2                       | 5                             |
| 1.5KE43                     | 34.80                              | 38.70                              | 47.30                              | 1                    | 61.9                                 | 24.6                       | 5                             |
| 1.5KE43A                    | 36.80                              | 40.90                              | 45.20                              | 1                    | 59.3                                 | 25.6                       | 5                             |
| 1.5KE47                     | 38.10                              | 42.30                              | 51.70                              | 1                    | 67.8                                 | 22.4                       | 5                             |
| 1.5KE47A                    | 40.20                              | 44.70                              | 49.40                              | 1                    | 64.8                                 | 23.5                       | 5                             |
| 1.5KE51                     | 41.30                              | 45.90                              | 56.10                              | 1                    | 73.5                                 | 20.7                       | 5                             |
| 1.5KE51A                    | 43.60                              | 48.50                              | 53.60                              | 1                    | 70.1                                 | 21.7                       | 5                             |
| 1.5KE56                     | 45.40                              | 50.40                              | 61.60                              | 1                    | 80.5                                 | 18.9                       | 5                             |
| 1.5KE56A                    | 47.80                              | 53.20                              | 58.80                              | 1                    | 77.0                                 | 19.7                       | 5                             |
| 1.5KE62                     | 50.20                              | 55.80                              | 68.20                              | 1                    | 89.0                                 | 17.1                       | 5                             |
| 1.5KE62A                    | 53.00                              | 58.90                              | 65.10                              | 1                    | 85.0                                 | 17.9                       | 5                             |
| 1.5KE68                     | 55.10                              | 61.20                              | 74.80                              | 1                    | 98.0                                 | 15.5                       | 5                             |
| 1.5KE68A                    | 58.10                              | 64.60                              | 71.40                              | 1                    | 92.0                                 | 16.5                       | 5                             |
| 1.5KE75                     | 60.70                              | 67.50                              | 82.50                              | 1                    | 108.0                                | 14.1                       | 5                             |
| 1.5KE75A                    | 64.10                              | 71.30                              | 78.80                              | 1                    | 103.0                                | 14.8                       | 5                             |

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|-----------------------------|------------------------------------|------------------------------------|------------------------------------|----------------------|--------------------------------------|----------------------------|-------------------------------------|
| 1.5KE82                     | 66.40                              | 73.80                              | 90.20                              | 1                    | 118.0                                | 12.9                       | 5                                   |
| 1.5KE82A                    | 70.10                              | 77.90                              | 86.10                              | 1                    | 113.0                                | 13.5                       | 5                                   |
| 1.5KE91                     | 73.70                              | 81.90                              | 100.00                             | 1                    | 131.0                                | 11.6                       | 5                                   |
| 1.5KE91A                    | 77.80                              | 86.50                              | 95.50                              | 1                    | 125.0                                | 12.2                       | 5                                   |
| 1.5KE100                    | 81.00                              | 90.00                              | 110.00                             | 1                    | 144.0                                | 10.6                       | 5                                   |
| 1.5KE100A                   | 85.50                              | 95.00                              | 105.00                             | 1                    | 137.0                                | 11.1                       | 5                                   |
| 1.5KE110                    | 89.20                              | 99.00                              | 121.00                             | 1                    | 158.0                                | 9.6                        | 5                                   |
| 1.5KE110A                   | 94.00                              | 105.00                             | 116.00                             | 1                    | 152.0                                | 10.0                       | 5                                   |
| 1.5KE120                    | 97.20                              | 108.00                             | 132.00                             | 1                    | 173.0                                | 8.7                        | 5                                   |
| 1.5KE120A                   | 102.00                             | 114.00                             | 126.00                             | 1                    | 165.0                                | 9.2                        | 5                                   |
| 1.5KE130                    | 105.00                             | 117.00                             | 143.00                             | 1                    | 187.0                                | 8.1                        | 5                                   |
| 1.5KE130A                   | 111.00                             | 124.00                             | 137.00                             | 1                    | 179.0                                | 8.5                        | 5                                   |
| 1.5KE150                    | 121.00                             | 135.00                             | 165.00                             | 1                    | 215.0                                | 7.1                        | 5                                   |
| 1.5KE150A                   | 128.00                             | 143.00                             | 158.00                             | 1                    | 207.0                                | 7.3                        | 5                                   |
| 1.5KE160                    | 130.00                             | 144.00                             | 176.00                             | 1                    | 230.0                                | 6.9                        | 5                                   |
| 1.5KE160A                   | 136.00                             | 152.00                             | 168.00                             | 1                    | 219.0                                | 6.9                        | 5                                   |
| 1.5KE170                    | 138.00                             | 153.00                             | 187.00                             | 1                    | 244.0                                | 6.2                        | 5                                   |
| 1.5KE170A                   | 145.00                             | 162.00                             | 179.00                             | 1                    | 234.0                                | 6.5                        | 5                                   |
| 1.5KE180                    | 146.00                             | 162.00                             | 198.00                             | 1                    | 258.0                                | 5.9                        | 5                                   |
| 1.5KE180A                   | 154.00                             | 171.00                             | 189.00                             | 1                    | 246.0                                | 6.2                        | 5                                   |
| 1.5KE200                    | 162.00                             | 180.00                             | 220.00                             | 1                    | 287.0                                | 5.3                        | 5                                   |
| 1.5KE200A                   | 171.00                             | 190.00                             | 210.00                             | 1                    | 274.0                                | 5.5                        | 5                                   |
| 1.5KE220                    | 175.00                             | 198.00                             | 242.00                             | 1                    | 344.0                                | 4.4                        | 5                                   |
| 1.5KE220A                   | 185.00                             | 209.00                             | 231.00                             | 1                    | 328.0                                | 4.6                        | 5                                   |
| 1.5KE250                    | 202.00                             | 225.00                             | 275.00                             | 1                    | 360.0                                | 4.2                        | 5                                   |
| 1.5KE250A                   | 214.00                             | 237.00                             | 263.00                             | 1                    | 344.0                                | 4.4                        | 5                                   |
| 1.5KE300                    | 243.00                             | 270.00                             | 330.00                             | 1                    | 430.0                                | 3.5                        | 5                                   |
| 1.5KE300A                   | 256.00                             | 285.00                             | 315.00                             | 1                    | 414.0                                | 3.7                        | 5                                   |
| 1.5KE350                    | 284.00                             | 315.00                             | 385.00                             | 1                    | 504.0                                | 3.0                        | 5                                   |
| 1.5KE350A                   | 300.00                             | 332.00                             | 368.00                             | 1                    | 482.0                                | 3.2                        | 5                                   |
| 1.5KE400                    | 324.00                             | 360.00                             | 440.00                             | 1                    | 574.0                                | 2.6                        | 5                                   |
| 1.5KE400A                   | 342.00                             | 380.00                             | 420.00                             | 1                    | 548.0                                | 2.8                        | 5                                   |
| 1.5KE440                    | 356.00                             | 396.00                             | 484.00                             | 1                    | 631.0                                | 2.4                        | 5                                   |
| 1.5KE440A                   | 376.00                             | 418.00                             | 462.00                             | 1                    | 600.0                                | 2.5                        | 5                                   |