

**TRANSZORB® Transient Voltage Suppressors****Case Style 1.5KE****PRIMARY CHARACTERISTICS**

|                                  |                |
|----------------------------------|----------------|
| $V_{BR}$ uni-directional         | 6.8 V to 540 V |
| $V_{BR}$ bi-directional          | 6.8 V to 440 V |
| $P_{PPM}$                        | 1500 W         |
| $P_D$                            | 6.5 W          |
| $I_{FSM}$ (uni-directional only) | 200 A          |
| $T_J$ max.                       | 175 °C         |

**DEVICES FOR BI-DIRECTION APPLICATIONS**

For bi-directional types, use C or CA suffix (e.g. 1.5KE440CA).

Electrical characteristics apply in both directions.

**FEATURES**

- Glass passivated chip junction
- Available in uni-directional and bi-directional
- 1500 W peak pulse power capability with a 10/1000  $\mu$ s waveform, repetitive rate (duty cycle): 0.01 %
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- Solder dip 260 °C, 40 s
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



**RoHS**  
COMPLIANT

**TYPICAL APPLICATIONS**

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for consumer, computer, industrial, automotive and telecommunication.

**MECHANICAL DATA**

**Case:** Molded epoxy body over passivated junction  
Molding compound meets UL 94 V-0 flammability rating

Base P/N-E3 - RoHS compliant, commercial grade  
Base P/NHE3 - RoHS compliant, high reliability/automotive grade (AEC Q101 qualified)

**Terminals:** Matte tin plated leads, solderable per J-STD-002 and JESD22-B102

E3 suffix meets JESD 201 class 1A whisker test, HE3 suffix meets JESD 201 class 2 whisker test

**Note:**

- 1.5KE250 ~ 1.5KE540A and 1.5KE250C ~ 1.5KE440CA for commercial grade only

**Polarity:** For uni-directional types the color band denotes cathode end, no marking on bi-directional types

**MAXIMUM RATINGS** ( $T_A = 25$  °C unless otherwise noted)

| PARAMETER                                                                                   | SYMBOL         | LIMIT          | UNIT |
|---------------------------------------------------------------------------------------------|----------------|----------------|------|
| Peak pulse power dissipation with a 10/1000 $\mu$ s waveform <sup>(1)</sup> (Fig. 1)        | $P_{PPM}$      | 1500           | W    |
| Peak pulse current with a 10/1000 $\mu$ s waveform <sup>(1)</sup>                           | $I_{PPM}$      | See next table | A    |
| Power dissipation on infinite heatsink at $T_L = 75$ °C (Fig. 5)                            | $P_D$          | 6.5            | W    |
| Peak forward surge current 8.3 ms single half sine-wave uni-directional only <sup>(2)</sup> | $I_{FSM}$      | 200            | A    |
| Maximum instantaneous forward voltage at 100 A for uni-directional only <sup>(3)</sup>      | $V_F$          | 3.5/5.0        | V    |
| Operating junction and storage temperature range                                            | $T_J, T_{STG}$ | - 55 to + 175  | °C   |

**Notes:**

(1) Non-repetitive current pulse, per Fig. 3 and derated above  $T_A = 25$  °C per Fig. 2

(2) Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum

(3)  $V_F = 3.5$  V for 1.5KE220 (A) and below;  $V_F = 5.0$  V for 1.5KE250(A) and above

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| JEDEC<br>TYPE<br>NUMBER | GENERAL<br>SEMICONDUCTOR<br>PART NUMBER | BREAKDOWN<br>VOLTAGE<br>$V_{BR}$ AT $I_T$ <sup>(1)</sup><br>(V) |      | TEST<br>CURRENT<br>$I_T$<br>(mA) | STAND-OFF<br>VOLTAGE<br>$V_{WM}$ (V) | MAXIMUM<br>REVERSE<br>LEAKAGE<br>AT $V_{WM}$<br>$I_D$ <sup>(4)</sup> ( $\mu\text{A}$ ) | MAXIMUM<br>PEAK<br>PULSE<br>CURRENT<br>AT $I_{PPM}$<br>$I_{PPM}$ <sup>(2)</sup> (A) | MAXIMUM<br>CLAMPING<br>VOLTAGE<br>AT $I_{PPM}$<br>$V_C$ (V) | MAXIMUM<br>TEMP.<br>COEFFICIENT<br>OF $V_{BR}$<br>(%/°C) |
|-------------------------|-----------------------------------------|-----------------------------------------------------------------|------|----------------------------------|--------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------|
|                         |                                         | MIN.                                                            | MAX. |                                  |                                      |                                                                                        |                                                                                     |                                                             |                                                          |
| 1N6267                  | (+) $1.5\text{KE}6.8$                   | 6.12                                                            | 7.48 | 10                               | 5.50                                 | 1000                                                                                   | 139                                                                                 | 10.8                                                        | 0.057                                                    |
| 1N6267A                 | (+) $1.5\text{KE}6.8\text{A}$           | 6.45                                                            | 7.14 | 10                               | 5.80                                 | 1000                                                                                   | 143                                                                                 | 10.5                                                        | 0.057                                                    |
| 1N6268                  | (+) $1.5\text{KE}7.5$                   | 6.75                                                            | 8.25 | 10                               | 6.05                                 | 500                                                                                    | 128                                                                                 | 11.7                                                        | 0.061                                                    |
| 1N6268A                 | (+) $1.5\text{KE}7.5\text{A}$           | 7.13                                                            | 7.88 | 10                               | 6.40                                 | 500                                                                                    | 133                                                                                 | 11.3                                                        | 0.061                                                    |
| 1N6269                  | (+) $1.5\text{KE}8.2$                   | 7.38                                                            | 9.02 | 10                               | 6.63                                 | 200                                                                                    | 120                                                                                 | 12.5                                                        | 0.065                                                    |
| 1N6269A                 | (+) $1.5\text{KE}8.2\text{A}$           | 7.79                                                            | 8.61 | 10                               | 7.02                                 | 200                                                                                    | 124                                                                                 | 12.1                                                        | 0.065                                                    |
| 1N6270                  | (+) $1.5\text{KE}9.1$                   | 8.19                                                            | 10.0 | 1.0                              | 7.37                                 | 50                                                                                     | 109                                                                                 | 13.8                                                        | 0.068                                                    |
| 1N6270A                 | (+) $1.5\text{KE}9.1\text{A}$           | 8.65                                                            | 9.55 | 1.0                              | 7.78                                 | 50                                                                                     | 112                                                                                 | 13.4                                                        | 0.068                                                    |
| 1N6271                  | (+) $1.5\text{KE}10$                    | 9.00                                                            | 11.0 | 1.0                              | 8.10                                 | 10                                                                                     | 100                                                                                 | 15.0                                                        | 0.073                                                    |
| 1N6271A                 | (+) $1.5\text{KE}10\text{A}$            | 9.50                                                            | 10.5 | 1.0                              | 8.55                                 | 10                                                                                     | 103                                                                                 | 14.5                                                        | 0.073                                                    |
| 1N6272                  | (+) $1.5\text{KE}11$                    | 9.90                                                            | 12.1 | 1.0                              | 8.92                                 | 5.0                                                                                    | 92.6                                                                                | 16.2                                                        | 0.075                                                    |
| 1N6272A                 | (+) $1.5\text{KE}11\text{A}$            | 10.5                                                            | 11.6 | 1.0                              | 9.40                                 | 5.0                                                                                    | 96.2                                                                                | 15.6                                                        | 0.075                                                    |
| 1N6273                  | (+) $1.5\text{KE}12$                    | 10.8                                                            | 13.2 | 1.0                              | 9.72                                 | 5.0                                                                                    | 86.7                                                                                | 17.3                                                        | 0.076                                                    |
| 1N6273A                 | (+) $1.5\text{KE}12\text{A}$            | 11.4                                                            | 12.6 | 1.0                              | 10.2                                 | 5.0                                                                                    | 89.8                                                                                | 16.7                                                        | 0.078                                                    |
| 1N6274                  | (+) $1.5\text{KE}13$                    | 11.7                                                            | 14.3 | 1.0                              | 10.5                                 | 5.0                                                                                    | 78.9                                                                                | 19.0                                                        | 0.081                                                    |
| 1N6274A                 | (+) $1.5\text{KE}13\text{A}$            | 12.4                                                            | 13.7 | 1.0                              | 11.1                                 | 5.0                                                                                    | 82.4                                                                                | 18.2                                                        | 0.081                                                    |
| 1N6275                  | (+) $1.5\text{KE}15$                    | 13.5                                                            | 16.5 | 1.0                              | 12.1                                 | 1.0                                                                                    | 68.2                                                                                | 22.0                                                        | 0.084                                                    |
| 1N6275A                 | (+) $1.5\text{KE}15\text{A}$            | 14.3                                                            | 15.8 | 1.0                              | 12.8                                 | 1.0                                                                                    | 70.8                                                                                | 21.2                                                        | 0.084                                                    |
| 1N6276                  | (+) $1.5\text{KE}16$                    | 14.4                                                            | 17.6 | 1.0                              | 12.9                                 | 1.0                                                                                    | 63.8                                                                                | 23.5                                                        | 0.086                                                    |
| 1N6276A                 | (+) $1.5\text{KE}16\text{A}$            | 15.2                                                            | 16.8 | 1.0                              | 13.6                                 | 1.0                                                                                    | 66.7                                                                                | 22.5                                                        | 0.086                                                    |
| 1N6277                  | (+) $1.5\text{KE}18$                    | 16.2                                                            | 19.8 | 1.0                              | 14.5                                 | 1.0                                                                                    | 56.6                                                                                | 26.5                                                        | 0.088                                                    |
| 1N6277A                 | (+) $1.5\text{KE}18\text{A}$            | 17.1                                                            | 18.9 | 1.0                              | 15.3                                 | 1.0                                                                                    | 59.5                                                                                | 25.2                                                        | 0.089                                                    |
| 1N6278                  | (+) $1.5\text{KE}20$                    | 18.0                                                            | 22.0 | 1.0                              | 16.2                                 | 1.0                                                                                    | 51.5                                                                                | 29.1                                                        | 0.090                                                    |
| 1N6278A                 | (+) $1.5\text{KE}20\text{A}$            | 19.0                                                            | 21.0 | 1.0                              | 17.1                                 | 1.0                                                                                    | 54.2                                                                                | 27.7                                                        | 0.090                                                    |
| 1N6279                  | (+) $1.5\text{KE}22$                    | 19.8                                                            | 24.2 | 1.0                              | 17.8                                 | 1.0                                                                                    | 47.0                                                                                | 31.9                                                        | 0.092                                                    |
| 1N6279A                 | (+) $1.5\text{KE}22\text{A}$            | 20.9                                                            | 23.1 | 1.0                              | 18.8                                 | 1.0                                                                                    | 49.0                                                                                | 30.6                                                        | 0.092                                                    |
| 1N6280                  | (+) $1.5\text{KE}24$                    | 21.6                                                            | 26.4 | 1.0                              | 19.4                                 | 1.0                                                                                    | 43.2                                                                                | 34.7                                                        | 0.094                                                    |
| 1N6280A                 | (+) $1.5\text{KE}24\text{A}$            | 22.8                                                            | 25.2 | 1.0                              | 20.5                                 | 1.0                                                                                    | 45.2                                                                                | 33.2                                                        | 0.094                                                    |
| 1N6281                  | (+) $1.5\text{KE}27$                    | 24.3                                                            | 29.7 | 1.0                              | 21.8                                 | 1.0                                                                                    | 38.4                                                                                | 39.1                                                        | 0.096                                                    |
| 1N6281A                 | (+) $1.5\text{KE}27\text{A}$            | 25.7                                                            | 28.4 | 1.0                              | 23.1                                 | 1.0                                                                                    | 40.0                                                                                | 37.5                                                        | 0.096                                                    |
| 1N6282                  | (+) $1.5\text{KE}30$                    | 27.0                                                            | 33.0 | 1.0                              | 24.3                                 | 1.0                                                                                    | 34.5                                                                                | 43.5                                                        | 0.097                                                    |
| 1N6282A                 | (+) $1.5\text{KE}30\text{A}$            | 28.5                                                            | 31.5 | 1.0                              | 25.6                                 | 1.0                                                                                    | 36.2                                                                                | 41.4                                                        | 0.097                                                    |
| 1N6283                  | (+) $1.5\text{KE}33$                    | 29.7                                                            | 36.3 | 1.0                              | 26.8                                 | 1.0                                                                                    | 31.4                                                                                | 47.7                                                        | 0.098                                                    |
| 1N6283A                 | (+) $1.5\text{KE}33\text{A}$            | 31.4                                                            | 34.7 | 1.0                              | 28.2                                 | 1.0                                                                                    | 32.8                                                                                | 45.7                                                        | 0.098                                                    |
| 1N6284                  | (+) $1.5\text{KE}36$                    | 32.4                                                            | 39.6 | 1.0                              | 29.1                                 | 1.0                                                                                    | 28.8                                                                                | 52.0                                                        | 0.099                                                    |
| 1N6284A                 | (+) $1.5\text{KE}36\text{A}$            | 34.2                                                            | 37.8 | 1.0                              | 30.8                                 | 1.0                                                                                    | 30.1                                                                                | 49.9                                                        | 0.099                                                    |
| 1N6285                  | (+) $1.5\text{KE}39$                    | 35.1                                                            | 42.9 | 1.0                              | 31.6                                 | 1.0                                                                                    | 26.6                                                                                | 56.4                                                        | 0.100                                                    |
| 1N6285A                 | (+) $1.5\text{KE}39\text{A}$            | 37.1                                                            | 41.0 | 1.0                              | 33.3                                 | 1.0                                                                                    | 27.8                                                                                | 53.9                                                        | 0.100                                                    |
| 1N6286                  | (+) $1.5\text{KE}43$                    | 38.7                                                            | 47.3 | 1.0                              | 34.8                                 | 1.0                                                                                    | 24.2                                                                                | 61.9                                                        | 0.101                                                    |
| 1N6286A                 | (+) $1.5\text{KE}43\text{A}$            | 40.9                                                            | 45.2 | 1.0                              | 36.8                                 | 1.0                                                                                    | 25.3                                                                                | 59.3                                                        | 0.101                                                    |
| 1N6287                  | (+) $1.5\text{KE}47$                    | 42.3                                                            | 51.7 | 1.0                              | 38.1                                 | 1.0                                                                                    | 22.1                                                                                | 67.8                                                        | 0.101                                                    |
| 1N6287A                 | (+) $1.5\text{KE}47\text{A}$            | 44.7                                                            | 49.4 | 1.0                              | 40.2                                 | 1.0                                                                                    | 23.1                                                                                | 64.8                                                        | 0.101                                                    |
| 1N6288                  | (+) $1.5\text{KE}51$                    | 45.9                                                            | 56.1 | 1.0                              | 41.3                                 | 1.0                                                                                    | 20.4                                                                                | 73.5                                                        | 0.102                                                    |
| 1N6288A                 | (+) $1.5\text{KE}51\text{A}$            | 48.5                                                            | 53.6 | 1.0                              | 43.6                                 | 1.0                                                                                    | 21.4                                                                                | 70.1                                                        | 0.102                                                    |
| 1N6289                  | (+) $1.5\text{KE}56$                    | 50.4                                                            | 61.8 | 1.0                              | 45.4                                 | 1.0                                                                                    | 18.6                                                                                | 80.5                                                        | 0.103                                                    |
| 1N6289A                 | (+) $1.5\text{KE}56\text{A}$            | 53.2                                                            | 58.8 | 1.0                              | 47.8                                 | 1.0                                                                                    | 19.5                                                                                | 77.0                                                        | 0.103                                                    |
| 1N6290                  | (+) $1.5\text{KE}62$                    | 55.8                                                            | 68.2 | 1.0                              | 50.2                                 | 1.0                                                                                    | 16.9                                                                                | 89.0                                                        | 0.104                                                    |
| 1N6290A                 | (+) $1.5\text{KE}62\text{A}$            | 58.9                                                            | 65.1 | 1.0                              | 53.0                                 | 1.0                                                                                    | 17.6                                                                                | 85.0                                                        | 0.104                                                    |
| 1N6291                  | (+) $1.5\text{KE}68$                    | 61.2                                                            | 74.8 | 1.0                              | 55.1                                 | 1.0                                                                                    | 15.3                                                                                | 98.0                                                        | 0.104                                                    |
| 1N6291A                 | (+) $1.5\text{KE}68\text{A}$            | 64.6                                                            | 71.4 | 1.0                              | 58.1                                 | 1.0                                                                                    | 16.3                                                                                | 92.0                                                        | 0.104                                                    |
| 1N6292                  | (+) $1.5\text{KE}75$                    | 67.5                                                            | 82.5 | 1.0                              | 60.7                                 | 1.0                                                                                    | 13.9                                                                                | 109                                                         | 0.105                                                    |
| 1N6292A                 | (+) $1.5\text{KE}75\text{A}$            | 71.3                                                            | 78.8 | 1.0                              | 64.1                                 | 1.0                                                                                    | 14.6                                                                                | 104                                                         | 0.105                                                    |



# 1.5KE6.8 thru 1.5KE540A, 1N6267 thru 1N6303

Vishay General Semiconductor

| ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                                         |                                                                                 |       |                                           |                                             |                                                                                           |                                                                            |                                                                             |                                                                 |
|----------------------------------------------------------------------------|-----------------------------------------|---------------------------------------------------------------------------------|-------|-------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------|
| JEDEC<br>TYPE<br>NUMBER                                                    | GENERAL<br>SEMICONDUCTOR<br>PART NUMBER | BREAKDOWN<br>VOLTAGE<br>V <sub>BR</sub> AT I <sub>T</sub> <sup>(1)</sup><br>(V) |       | TEST<br>CURRENT<br>I <sub>T</sub><br>(mA) | STAND-OFF<br>VOLTAGE<br>V <sub>WM</sub> (V) | MAXIMUM<br>REVERSE<br>LEAKAGE<br>AT V <sub>WM</sub><br>I <sub>D</sub> <sup>(4)</sup> (μA) | MAXIMUM<br>PEAK<br>PULSE<br>CURRENT<br>I <sub>PPM</sub> <sup>(2)</sup> (A) | MAXIMUM<br>CLAMPING<br>VOLTAGE<br>AT I <sub>PPM</sub><br>V <sub>C</sub> (V) | MAXIMUM<br>TEMP.<br>COEFFICIENT<br>OF V <sub>BR</sub><br>(%/°C) |
|                                                                            |                                         | MIN.                                                                            | MAX.  |                                           |                                             |                                                                                           |                                                                            |                                                                             |                                                                 |
| 1N6293                                                                     | (+) <sup>(+)</sup> 1.5KE82              | 73.8                                                                            | 90.2  | 1.0                                       | 66.4                                        | 1.0                                                                                       | 12.7                                                                       | 118                                                                         | 0.105                                                           |
| 1N6293A                                                                    | (+) <sup>(+)</sup> 1.5KE82A             | 77.9                                                                            | 86.1  | 1.0                                       | 70.1                                        | 1.0                                                                                       | 13.3                                                                       | 113                                                                         | 0.105                                                           |
| 1N6294                                                                     | (+) <sup>(+)</sup> 1.5KE91              | 81.9                                                                            | 100.0 | 1.0                                       | 73.7                                        | 1.0                                                                                       | 11.5                                                                       | 131                                                                         | 0.106                                                           |
| 1N6294A                                                                    | (+) <sup>(+)</sup> 1.5KE91A             | 86.5                                                                            | 95.5  | 1.0                                       | 77.8                                        | 1.0                                                                                       | 12.0                                                                       | 125                                                                         | 0.106                                                           |
| 1N6295                                                                     | (+) <sup>(+)</sup> 1.5KE100             | 90.0                                                                            | 110   | 1.0                                       | 81.0                                        | 1.0                                                                                       | 10.4                                                                       | 144                                                                         | 0.106                                                           |
| 1N6295A                                                                    | (+) <sup>(+)</sup> 1.5KE100A            | 95.0                                                                            | 105   | 1.0                                       | 85.5                                        | 1.0                                                                                       | 10.9                                                                       | 137                                                                         | 0.106                                                           |
| 1N6296                                                                     | (+) <sup>(+)</sup> 1.5KE110             | 99.0                                                                            | 121   | 1.0                                       | 89.2                                        | 1.0                                                                                       | 9.5                                                                        | 158                                                                         | 0.107                                                           |
| 1N6296A                                                                    | (+) <sup>(+)</sup> 1.5KE 110A           | 105                                                                             | 116   | 1.0                                       | 94.0                                        | 1.0                                                                                       | 9.9                                                                        | 152                                                                         | 0.107                                                           |
| 1N6297                                                                     | (+) <sup>(+)</sup> 1.5KE120             | 108                                                                             | 132   | 1.0                                       | 97.2                                        | 1.0                                                                                       | 8.7                                                                        | 173                                                                         | 0.107                                                           |
| 1N6297A                                                                    | (+) <sup>(+)</sup> 1.5KE120A            | 114                                                                             | 126   | 1.0                                       | 102                                         | 1.0                                                                                       | 9.1                                                                        | 165                                                                         | 0.107                                                           |
| 1N6298                                                                     | (+) <sup>(+)</sup> 1.5KE130             | 117                                                                             | 143   | 1.0                                       | 105                                         | 1.0                                                                                       | 8.0                                                                        | 187                                                                         | 0.107                                                           |
| 1N6298A                                                                    | (+) <sup>(+)</sup> 1.5KE130A            | 124                                                                             | 137   | 1.0                                       | 111                                         | 1.0                                                                                       | 8.4                                                                        | 179                                                                         | 0.107                                                           |
| 1N6299                                                                     | (+) <sup>(+)</sup> 1.5KE150             | 136                                                                             | 165   | 1.0                                       | 121                                         | 1.0                                                                                       | 7.0                                                                        | 215                                                                         | 0.108                                                           |
| 1N6299A                                                                    | (+) <sup>(+)</sup> 1.5KE150A            | 143                                                                             | 158   | 1.0                                       | 128                                         | 1.0                                                                                       | 7.2                                                                        | 207                                                                         | 0.106                                                           |
| 1N6300                                                                     | (+) <sup>(+)</sup> 1.5KE160             | 144                                                                             | 176   | 1.0                                       | 130                                         | 1.0                                                                                       | 6.5                                                                        | 230                                                                         | 0.106                                                           |
| 1N6300A                                                                    | (+) <sup>(+)</sup> 1.5KE160A            | 152                                                                             | 168   | 1.0                                       | 136                                         | 1.0                                                                                       | 6.8                                                                        | 219                                                                         | 0.108                                                           |
| 1N6301                                                                     | (+) <sup>(+)</sup> 1.5KE170             | 153                                                                             | 187   | 1.0                                       | 138                                         | 1.0                                                                                       | 6.1                                                                        | 244                                                                         | 0.108                                                           |
| 1N6301A                                                                    | (+) <sup>(+)</sup> 1.5KE170A            | 162                                                                             | 179   | 1.0                                       | 145                                         | 1.0                                                                                       | 6.4                                                                        | 234                                                                         | 0.108                                                           |
| 1N6302                                                                     | 1.5KE180                                | 162                                                                             | 198   | 1.0                                       | 146                                         | 1.0                                                                                       | 5.8                                                                        | 258                                                                         | 0.108                                                           |
| 1N6302A                                                                    | 1.5KE180A                               | 171                                                                             | 189   | 1.0                                       | 154                                         | 1.0                                                                                       | 6.1                                                                        | 246                                                                         | 0.108                                                           |
| 1N6303                                                                     | 1.5KE200                                | 180                                                                             | 220   | 1.0                                       | 162                                         | 1.0                                                                                       | 5.2                                                                        | 287                                                                         | 0.108                                                           |
| 1N6303A                                                                    | 1.5KE200A*                              | 190                                                                             | 210   | 1.0                                       | 171                                         | 1.0                                                                                       | 5.5                                                                        | 274                                                                         | 0.108                                                           |
|                                                                            | 1.5KE220                                | 198                                                                             | 242   | 1.0                                       | 175                                         | 1.0                                                                                       | 4.4                                                                        | 344                                                                         | 0.108                                                           |
|                                                                            | 1.5KE220A*                              | 209                                                                             | 231   | 1.0                                       | 185                                         | 1.0                                                                                       | 4.6                                                                        | 328                                                                         | 0.108                                                           |
|                                                                            | 1.5KE250                                | 225                                                                             | 275   | 1.0                                       | 202                                         | 1.0                                                                                       | 4.2                                                                        | 360                                                                         | 0.110                                                           |
|                                                                            | 1.5KE250A                               | 237                                                                             | 263   | 1.0                                       | 214                                         | 1.0                                                                                       | 4.4                                                                        | 344                                                                         | 0.110                                                           |
|                                                                            | 1.5KE300                                | 270                                                                             | 330   | 1.0                                       | 243                                         | 1.0                                                                                       | 3.5                                                                        | 430                                                                         | 0.110                                                           |
|                                                                            | 1.5KE300A                               | 285                                                                             | 315   | 1.0                                       | 256                                         | 1.0                                                                                       | 3.6                                                                        | 414                                                                         | 0.110                                                           |
|                                                                            | 1.5KE350                                | 315                                                                             | 385   | 1.0                                       | 284                                         | 1.0                                                                                       | 3.0                                                                        | 504                                                                         | 0.110                                                           |
|                                                                            | 1.5KE350A                               | 333                                                                             | 368   | 1.0                                       | 300                                         | 1.0                                                                                       | 3.1                                                                        | 482                                                                         | 0.110                                                           |
|                                                                            | 1.5KE400                                | 360                                                                             | 440   | 1.0                                       | 324                                         | 1.0                                                                                       | 2.6                                                                        | 574                                                                         | 0.110                                                           |
|                                                                            | 1.5KE400A                               | 380                                                                             | 420   | 1.0                                       | 342                                         | 1.0                                                                                       | 2.7                                                                        | 548                                                                         | 0.110                                                           |
|                                                                            | 1.5KE440                                | 396                                                                             | 484   | 1.0                                       | 356                                         | 1.0                                                                                       | 2.4                                                                        | 631                                                                         | 0.110                                                           |
|                                                                            | 1.5KE440A                               | 418                                                                             | 462   | 1.0                                       | 376                                         | 1.0                                                                                       | 2.5                                                                        | 602                                                                         | 0.110                                                           |
|                                                                            | 1.5KE480                                | 432                                                                             | 528   | 1.0                                       | 389                                         | 1.0                                                                                       | 2.19                                                                       | 686                                                                         | 0.110                                                           |
|                                                                            | 1.5KE480A                               | 456                                                                             | 504   | 1.0                                       | 408                                         | 1.0                                                                                       | 2.28                                                                       | 658                                                                         | 0.110                                                           |
|                                                                            | 1.5KE510                                | 459                                                                             | 561   | 1.0                                       | 413                                         | 1.0                                                                                       | 2.06                                                                       | 729                                                                         | 0.110                                                           |
|                                                                            | 1.5KE510A                               | 485                                                                             | 535   | 1.0                                       | 434                                         | 1.0                                                                                       | 2.15                                                                       | 698                                                                         | 0.110                                                           |
|                                                                            | 1.5KE540                                | 486                                                                             | 594   | 1.0                                       | 437                                         | 1.0                                                                                       | 1.94                                                                       | 772                                                                         | 0.110                                                           |
|                                                                            | 1.5KE540A                               | 513                                                                             | 567   | 1.0                                       | 459                                         | 1.0                                                                                       | 2.03                                                                       | 740                                                                         | 0.110                                                           |

## Notes:

(1) Pulse test: t<sub>p</sub> ≤ 50 ms

(2) Surge current waveform per Fig. 3 and derate per Fig. 2

(3) All terms and symbols are consistent with ANSI/IEEE CA62.35

(4) For bi-directional types with V<sub>R</sub> 10 V and less the I<sub>D</sub> limit is doubled

\* Bi-directional versions are UL approved under component across the line protection, ULV1414 file number E108274 (1.5KE200CA, 1.5KE220CA)

(+) Underwriters laboratory recognition for the classification of protectors (QVGQ2) under the UL standard for safety 497B and file number E136766 for both uni-directional and bi-directional devices

**THERMAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

| PARAMETER                                       | SYMBOL          | VALUE | UNIT                 |
|-------------------------------------------------|-----------------|-------|----------------------|
| Typical thermal resistance, junction to ambient | $R_{\theta JA}$ | 75    | $^{\circ}\text{C/W}$ |
| Typical thermal resistance, junction to lead    | $R_{\theta JL}$ | 15.4  |                      |

**ORDERING INFORMATION** (Example)

| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                    |
|--------------------------------|-----------------|------------------------|---------------|----------------------------------|
| 1.5KE6.8A-E3/54                | 0.968           | 54                     | 1400          | 13" diameter paper tape and reel |
| 1.5KE6.8AHE3/54 <sup>(1)</sup> | 0.968           | 54                     | 1400          | 13" diameter paper tape and reel |

**Note:**

(1) Automotive grade AEC-Q101 qualified

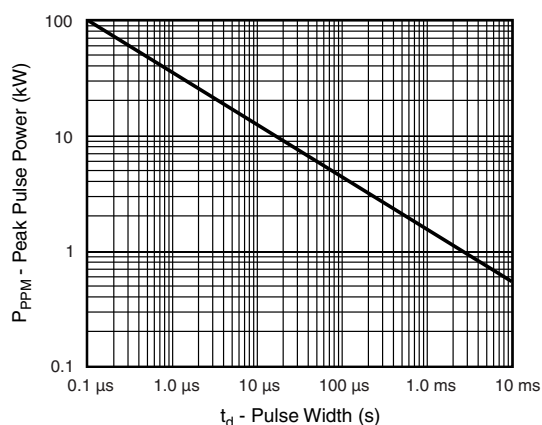
**RATINGS AND CHARACTERISTICS CURVES**( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

Figure 1. Peak Pulse Power Rating Curve

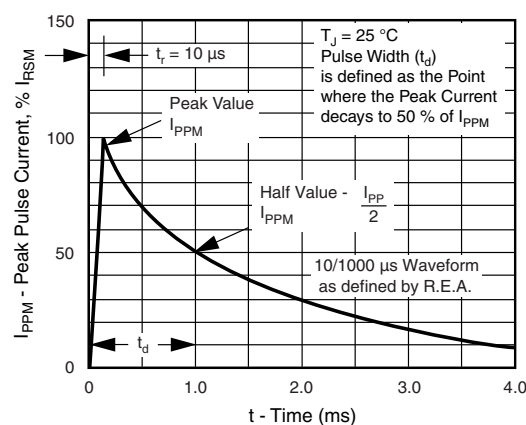


Figure 3. Pulse Waveform



Figure 2. Pulse Power or Current vs. Initial Junction Temperature



Figure 4. Typical Junction Capacitance



Figure 5. Power Derating Curve



Figure 8. Incremental Clamping Voltage Curve (Uni-Directional)



Figure 6. Maximum Non-Repetitive Forward Surge Current  
Uni-Directional only



Figure 9. Incremental Clamping Voltage Curve (Bi-directional)



Figure 7. Incremental Clamping Voltage Curve (Uni-Directional)



Figure 10. Incremental Clamping Voltage Curve (Bi-Directional)



Figure 11. Instantaneous Forward Voltage Characteristics Curve



Figure 12. Typical Transient Thermal Impedance

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



## APPLICATION NOTES

- This series of Silicon Transient Suppressors is used in applications where large voltage transients can permanently damage voltage-sensitive components.
- The TVS diode can be used in applications where induced lightning on rural or remote transmission lines presents a hazard to electronic circuitry (ref: R.E.A. specification P.E. 60).
- This Transient Voltage Suppressor diode has a pulse power rating of 1500 W for 1 ms. The response time of TVS diode clamping action is effectively instantaneous ( $1 \times 10^{-9}$  s bi-directional); therefore, they can protect integrated circuits, MOS devices, hybrids, and other voltage sensitive semiconductors and components. TVS diodes can also be used in series or parallel to increase the peak power ratings.



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