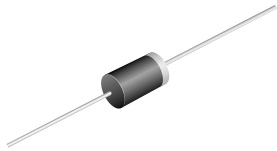
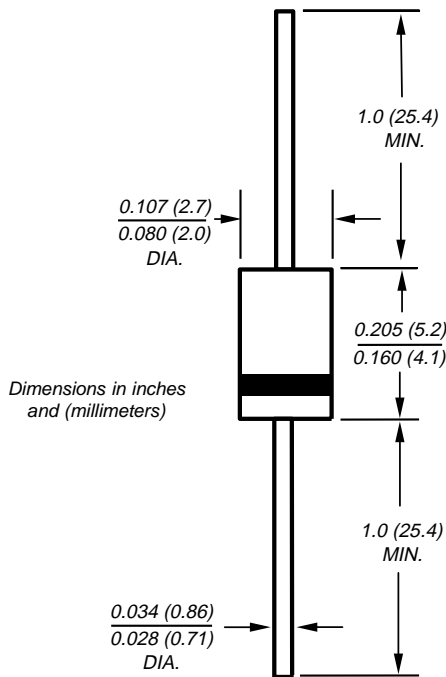


## TRANSZORB® Transient Voltage Suppressors

**Peak Pulse Power** 400W  
**Breakdown Voltage** 6.8 to 440V



### DO-204AL (DO-41 Plastic)



### Features

- Plastic package has Underwriters Laboratory Flammability Classification 94V-0
- Glass passivated junction
- 400W peak pulse power capability on 10/1000µs waveform, repetition rate (duty cycle): 0.01%
- Excellent clamping capability
- Low incremental surge resistance
- Very fast response time
- High temperature soldering guaranteed: 265°C/10 seconds, 0.375" (9.5mm) lead length, 5lbs. (2.3 kg) tension

### Mechanical Data

**Case:** JEDEC DO-204AL molded plastic body over passivated junction

**Terminals:** Axial leads, solderable per MIL-STD-750, Method 2026

**Polarity:** For unidirectional types the color band denotes the cathode, which is positive with respect to the anode under normal TVS operation

**Mounting Position:** Any **Weight:** 0.012oz., 0.3g

**Packaging codes/options:**

1/1K per Bulk Box, 11K/box

4/5.5K per 13" Reel (52mm tape), 16.5K/box

### Devices for Bidirectional Applications

For bi-directional, use C or CA suffix for types P4KE6.8 thru types P4KE440 (e.g. P4KE6.8C, P4KE440CA). Electrical characteristics apply in both directions.

### Maximum Ratings and Characteristics (T<sub>A</sub> = 25°C unless otherwise noted)

| Parameter  | Symbol                            | Limit          | Unit |
|--|-----------------------------------|----------------|------|
| Peak power dissipation with a 10/1000µs waveform <sup>(1)</sup><br>(Fig. 1)  | P <sub>PPM</sub>                  | Minimum 400    | W    |
| Peak pulse current with a 10/1000µs waveform <sup>(1)</sup>  | I <sub>PPM</sub>                  | See Next Table | A    |
| Steady state power dissipation<br>at T <sub>L</sub> = 75°C, lead lengths 0.375" (9.5mm) <sup>(2)</sup>                                     | P <sub>M(AV)</sub>                | 1.0            | W    |
| Peak forward surge current, 8.3ms<br>single half sine-wave superimposed on rated load<br>(JEDEC Method) unidirectional only <sup>(3)</sup> | I <sub>FSM</sub>                  | 40             | A    |
| Maximum instantaneous forward voltage<br>at 25A for unidirectional only <sup>(4)</sup>   | V <sub>F</sub>                    | 3.5/5.0        | V    |
| Typical thermal resistance junction-to-lead  | R <sub>θJL</sub>                  | 60             | °C/W |
| Typ. thermal resistance junction-to-ambient, L <sub>Lead</sub> = 10mm  | R <sub>θJA</sub>                  | 100            | °C/W |
| Operating junction and storage temperature range   | T <sub>J</sub> , T <sub>STG</sub> | -55 to +175    | °C   |

**Notes:** (1) Non-repetitive current pulse, per Fig.3 and derated above T<sub>A</sub> = 25°C per Fig. 2

(2) Mounted on copper pad area of 1.6 x 1.6" (40 x 40mm) per Fig. 5

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

(4) V<sub>F</sub> = 3.5 V for devices of V<sub>(BR)</sub> ≤ 220V, and V<sub>F</sub> = 5.0 Volt max. for devices of V<sub>(BR)</sub> > 220V

## TRANSZORB® Transient Voltage Suppressors

### Electrical Characteristics Ratings at 25°C ambient temperature unless otherwise specified.

| Device Type | Breakdown Voltage<br>$V_{(BR)}$<br>(V) <sup>(1)</sup> |      | Test Current<br>at $I_T$<br>(mA) | Stand-off<br>Voltage<br>$V_{WM}$<br>(V) | Maximum<br>Reverse<br>Leakage<br>at $V_{WM}$<br>$I_D^{(3)}$<br>( $\mu$ A) | Maximum<br>Peak Pulse<br>Current<br>$I_{PPM}^{(2)}$<br>(A) | Maximum<br>Clamping<br>Voltage at<br>$I_{PPM}$<br>$V_C$ (V) | Maximum<br>Temperature<br>Coefficient<br>of $V_{(BR)}$<br>(% / °C) |
|-------------|---|------|----------------------------------|---|---|--|---|--|
|             | MIN   | MAX  |                                  |   |   |  |   |  |
| P4KE6.8     | 6.12  | 7.48 | 10                               | 5.50                                    | 1000  | 37.0   | 10.8  | 0.057  |
| P4KE6.8A    | 6.45  | 7.14 | 10                               | 5.80                                    | 1000  | 38.1   | 10.5  | 0.057  |
| P4KE7.5     | 6.75  | 8.25 | 10                               | 6.05                                    | 500   | 34.2   | 11.7  | 0.061  |
| P4KE7.5A    | 7.13  | 7.88 | 10                               | 6.40                                    | 500   | 35.4   | 11.3  | 0.061  |
| P4KE8.2     | 7.38  | 9.02 | 10                               | 6.63                                    | 200   | 32.0   | 12.5  | 0.065  |
| P4KE8.2A    | 7.79  | 8.61 | 10                               | 7.02                                    | 200   | 33.1   | 12.1  | 0.06   |
| P4KE9.1     | 8.19  | 10.0 | 1.0                              | 7.37                                    | 50  | 29.0   | 13.8  | 0.068  |
| P4KE9.1A    | 8.65  | 9.55 | 1.0                              | 7.78                                    | 50  | 29.9   | 13.4  | 0.068  |
| P4KE10      | 9.00  | 11.0 | 1.0                              | 8.10                                    | 10  | 26.7   | 15.0  | 0.073  |
| P4KE10A     | 9.50  | 10.5 | 1.0                              | 8.55                                    | 10  | 27.6   | 14.5  | 0.073  |
| P4KE11      | 9.90  | 12.1 | 1.0                              | 8.92                                    | 5.0   | 24.7   | 16.2  | 0.075  |
| P4KE11A     | 10.5  | 11.6 | 1.0                              | 9.40                                    | 5.0   | 25.6   | 15.6  | 0.075  |
| P4KE12      | 10.8  | 13.2 | 1.0                              | 9.72                                    | 1.0   | 23.1   | 17.3  | 0.076  |
| P4KE12A     | 11.4  | 12.6 | 1.0                              | 10.2                                    | 1.0   | 24.0   | 16.7  | 0.078  |
| P4KE13      | 11.7  | 14.3 | 1.0                              | 10.5                                    | 1.0   | 21.1   | 19.0  | 0.081  |
| P4KE13A     | 12.4  | 13.7 | 1.0                              | 11.1                                    | 1.0   | 22.0   | 18.2  | 0.081  |
| P4KE15      | 13.5  | 16.5 | 1.0                              | 12.1                                    | 1.0   | 18.2   | 22.0  | 0.084  |
| P4KE15A     | 14.3  | 15.8 | 1.0                              | 12.8                                    | 1.0   | 18.9   | 21.2  | 0.084  |
| P4KE16      | 14.4  | 17.6 | 1.0                              | 12.9                                    | 1.0   | 17.0   | 23.5  | 0.086  |
| P4KE16A     | 15.2  | 16.8 | 1.0                              | 13.6                                    | 1.0   | 17.8   | 22.5  | 0.086  |
| P4KE18      | 16.2  | 19.8 | 1.0                              | 14.5                                    | 1.0   | 15.1   | 26.5  | 0.088  |
| P4KE18A     | 17.1  | 18.9 | 1.0                              | 15.3                                    | 1.0   | 15.9   | 25.2  | 0.088  |
| P4KE20      | 18.0  | 22.0 | 1.0                              | 16.2                                    | 1.0   | 13.7   | 29.1  | 0.090  |
| P4KE20A     | 19.0  | 21.0 | 1.0                              | 17.1                                    | 1.0   | 14.4   | 27.7  | 0.090  |
| P4KE22      | 19.8  | 24.2 | 1.0                              | 17.8                                    | 1.0   | 12.5   | 31.9  | 0.092  |
| P4KE22A     | 20.9  | 23.1 | 1.0                              | 18.8                                    | 1.0   | 13.1   | 30.6  | 0.092  |
| P4KE24      | 21.6  | 26.4 | 1.0                              | 19.4                                    | 1.0   | 11.5   | 34.7  | 0.094  |
| P4KE24A     | 22.8  | 25.2 | 1.0                              | 20.5                                    | 1.0   | 12.0   | 33.2  | 0.094  |
| P4KE27      | 24.3  | 29.7 | 1.0                              | 21.8                                    | 1.0   | 10.2   | 39.1  | 0.096  |
| P4KE27A     | 25.7  | 28.4 | 1.0                              | 23.1                                    | 1.0   | 10.7   | 37.5  | 0.096  |
| P4KE30      | 27.0  | 33.0 | 1.0                              | 24.3                                    | 1.0   | 9.2  | 43.5  | 0.097  |
| P4KE30A     | 28.5  | 31.5 | 1.0                              | 25.6                                    | 1.0   | 9.7  | 41.4  | 0.097  |
| P4KE33      | 29.7  | 36.3 | 1.0                              | 26.8                                    | 1.0   | 8.4  | 47.7  | 0.098  |
| P4KE33A     | 31.4  | 34.7 | 1.0                              | 28.2                                    | 1.0   | 8.8  | 45.7  | 0.098  |
| P4KE36      | 32.4  | 39.6 | 1.0                              | 29.1                                    | 1.0   | 7.7  | 52.0  | 0.099  |
| P4KE36A     | 34.2  | 37.8 | 1.0                              | 30.8                                    | 1.0   | 8.0  | 49.9  | 0.099  |
| P4KE39      | 35.1  | 42.9 | 1.0                              | 31.6                                    | 1.0   | 7.1  | 56.4  | 0.100  |
| P4KE39A     | 37.1  | 41.0 | 1.0                              | 33.3                                    | 1.0   | 7.4  | 53.9  | 0.100  |
| P4KE43      | 38.7  | 47.3 | 1.0                              | 34.8                                    | 1.0   | 6.5  | 61.9  | 0.101  |
| P4KE43A     | 40.9  | 45.2 | 1.0                              | 36.8                                    | 1.0   | 6.7  | 59.3  | 0.101  |
| P4KE47      | 42.3  | 51.7 | 1.0                              | 38.1                                    | 1.0   | 5.9  | 67.8  | 0.101  |
| P4KE47A     | 44.7  | 49.4 | 1.0                              | 40.2                                    | 1.0   | 6.2  | 64.8  | 0.101  |
| P4KE51      | 45.9  | 56.1 | 1.0                              | 41.3                                    | 1.0   | 5.4  | 73.5  | 0.102  |
| P4KE51A     | 48.5  | 53.6 | 1.0                              | 43.6                                    | 1.0   | 5.7  | 70.1  | 0.102  |
| P4KE56      | 50.4  | 61.6 | 1.0                              | 45.4                                    | 1.0   | 5.0  | 80.5  | 0.103  |
| P4KE56A     | 53.2  | 58.8 | 1.0                              | 47.8                                    | 1.0   | 5.2  | 77.0  | 0.103  |

## TRANSZORB® Transient Voltage Suppressors

### Electrical Characteristics (Con't.) Ratings at 25°C ambient temperature unless otherwise specified.

| Device Type | Breakdown Voltage<br>$V_{(BR)}$<br>(V) <sup>(1)</sup> |      | Test Current<br>at $I_T$<br>(mA) | Stand-off<br>Voltage<br>$V_{WM}$<br>(V) | Maximum<br>Reverse<br>Leakage<br>at $V_{WM}$<br>$I_D^{(3)}$<br>( $\mu$ A) | Maximum<br>Peak Pulse<br>Current<br>$I_{PPM}^{(2)}$<br>(A) | Maximum<br>Clamping<br>Voltage at<br>$I_{PPM}$<br>$V_C$ (V) | Maximum<br>Temperature<br>Coefficient<br>of $V_{(BR)}$<br>(% / °C) |
|-------------|---|------|----------------------------------|---|---|--|---|--|
|             | MIN   | MAX  |                                  |   |   |  |   |  |
| P4KE62      | 55.8  | 68.2 | 1.0                              | 50.2                                    | 1.0   | 4.5  | 89.0  | 0.104  |
| P4KE62A     | 58.9  | 65.1 | 1.0                              | 53.0                                    | 1.0   | 4.7  | 85.0  | 0.104  |
| P4KE68      | 61.2  | 74.8 | 1.0                              | 55.1                                    | 1.0   | 4.1  | 98.0  | 0.104  |
| P4KE68A     | 64.6  | 71.4 | 1.0                              | 58.1                                    | 1.0   | 4.3  | 92.0  | 0.104  |
| P4KE75      | 67.5  | 82.5 | 1.0                              | 60.7                                    | 1.0   | 3.7  | 108   | 0.105  |
| P4KE75A     | 71.3  | 78.8 | 1.0                              | 64.1                                    | 1.0   | 3.9  | 103   | 0.105  |
| P4KE82      | 73.8  | 90.2 | 1.0                              | 66.4                                    | 1.0   | 3.4  | 118   | 0.105  |
| P4KE82A     | 77.9  | 86.1 | 1.0                              | 70.1                                    | 1.0   | 3.5  | 113   | 0.105  |
| P4KE91      | 81.9  | 100  | 1.0                              | 73.7                                    | 1.0   | 3.1  | 131   | 0.106  |
| P4KE91A     | 86.5  | 95.5 | 1.0                              | 77.8                                    | 1.0   | 3.2  | 125   | 0.106  |
| P4KE100     | 90.0  | 110  | 1.0                              | 81.0                                    | 1.0   | 2.8  | 144   | 0.106  |
| P4KE100A    | 95.0  | 105  | 1.0                              | 85.5                                    | 1.0   | 2.9  | 137   | 0.106  |
| P4KE110     | 99.0  | 121  | 1.0                              | 89.2                                    | 1.0   | 2.5  | 158   | 0.107  |
| P4KE110A    | 105   | 116  | 1.0                              | 94.0                                    | 1.0   | 2.6  | 152   | 0.107  |
| P4KE120     | 108   | 132  | 1.0                              | 97.2                                    | 1.0   | 2.3  | 173   | 0.107  |
| P4KE120A    | 114   | 126  | 1.0                              | 102                                     | 1.0   | 2.4  | 165   | 0.107  |
| P4KE130     | 117   | 143  | 1.0                              | 105                                     | 1.0   | 2.1  | 187   | 0.107  |
| P4KE130A    | 124   | 137  | 1.0                              | 111                                     | 1.0   | 2.2  | 179   | 0.107  |
| P4KE150     | 135   | 165  | 1.0                              | 121                                     | 1.0   | 1.9  | 215   | 0.108  |
| P4KE150A    | 143   | 158  | 1.0                              | 128                                     | 1.0   | 1.9  | 207   | 0.108  |
| P4KE160     | 144   | 176  | 1.0                              | 130                                     | 1.0   | 1.7  | 230   | 0.108  |
| P4KE160A    | 152   | 168  | 1.0                              | 136                                     | 1.0   | 1.8  | 219   | 0.108  |
| P4KE170     | 153   | 187  | 1.0                              | 138                                     | 1.0   | 1.6  | 244   | 0.108  |
| P4KE170A    | 162   | 179  | 1.0                              | 145                                     | 1.0   | 1.7  | 234   | 0.108  |
| P4KE180     | 162   | 198  | 1.0                              | 146                                     | 1.0   | 1.6  | 258   | 0.108  |
| P4KE180A    | 171   | 189  | 1.0                              | 154                                     | 1.0   | 1.6  | 246   | 0.108  |
| P4KE200     | 180   | 220  | 1.0                              | 162                                     | 1.0   | 1.4  | 287   | 0.108  |
| P4KE200A    | 190   | 210  | 1.0                              | 171                                     | 1.0   | 1.5  | 274   | 0.108  |
| P4KE220     | 198   | 242  | 1.0                              | 175                                     | 1.0   | 1.2  | 344   | 0.108  |
| P4KE220A    | 209   | 231  | 1.0                              | 185                                     | 1.0   | 1.2  | 328   | 0.108  |
| P4KE250     | 225   | 275  | 1.0                              | 202                                     | 1.0   | 1.1  | 360   | 0.110  |
| P4KE250A    | 237   | 263  | 1.0                              | 214                                     | 1.0   | 1.2  | 344   | 0.110  |
| P4KE300     | 270   | 330  | 1.0                              | 243                                     | 1.0   | 0.93   | 430   | 0.110  |
| P4KE300A    | 285   | 315  | 1.0                              | 256                                     | 1.0   | 1.0  | 414   | 0.110  |
| P4KE350     | 315   | 385  | 1.0                              | 284                                     | 1.0   | 0.79   | 504   | 0.110  |
| P4KE350A    | 333   | 368  | 1.0                              | 300                                     | 1.0   | 0.83   | 482   | 0.110  |
| P4KE400     | 360   | 440  | 1.0                              | 324                                     | 1.0   | 0.70   | 574   | 0.110  |
| P4KE400A    | 380   | 420  | 1.0                              | 342                                     | 1.0   | 0.73   | 548   | 0.110  |
| P4KE440     | 396   | 484  | 1.0                              | 356                                     | 1.0   | 0.63   | 631   | 0.110  |
| P4KE440A    | 418   | 462  | 1.0                              | 376                                     | 1.0   | 0.66   | 602   | 0.110  |

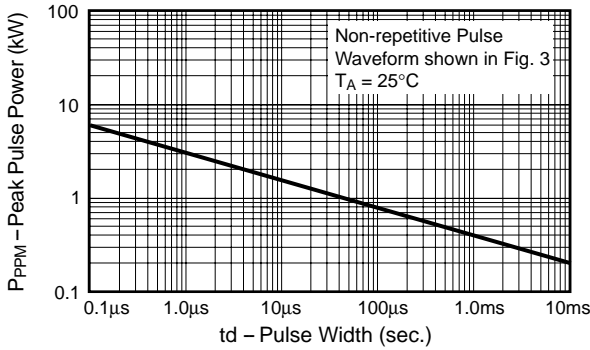
**Notes:**

- (1)  $V_{(BR)}$  measured after  $I_T$  applied for 300 $\mu$ s,  $I_T$ =square wave pulse or equivalent
- (2) Surge current waveform per Fig. 3 and derated per Fig. 2
- (3) For bidirectional types having  $V_{WM}$  of 10 volts and less, the  $I_D$  limit is doubled
- (4) All terms and symbols are consistent with ANSI/IEEE C62.35

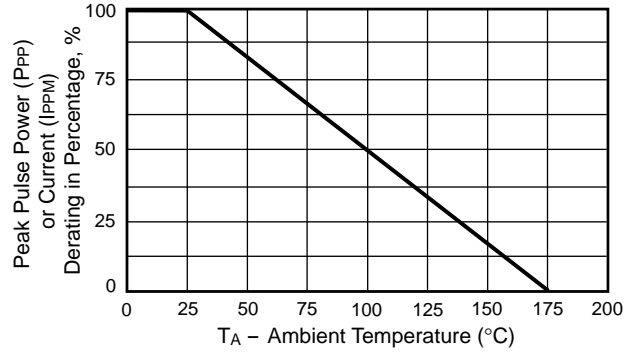
## TRANSZORB<sup>®</sup> Transient Voltage Suppressors

### Ratings and Characteristic Curves (T<sub>A</sub> = 25°C unless otherwise noted)

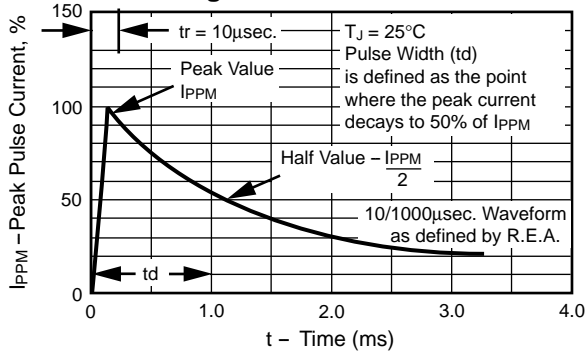
**Fig. 1 – Peak Pulse Power Rating Curve**



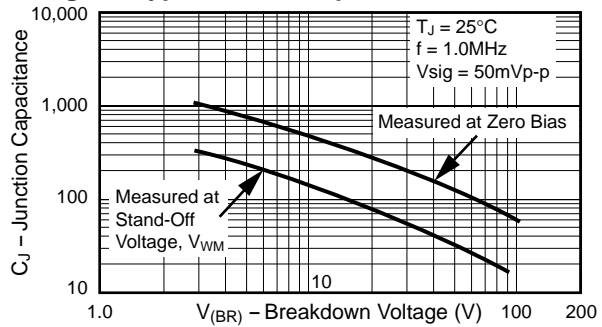
**Fig. 2 – Pulse Derating Curve**



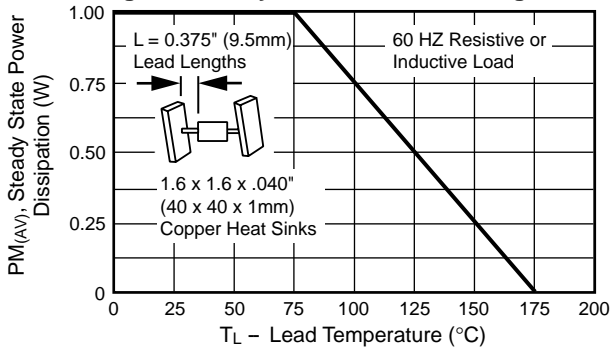
**Fig. 3 – Pulse Waveform**



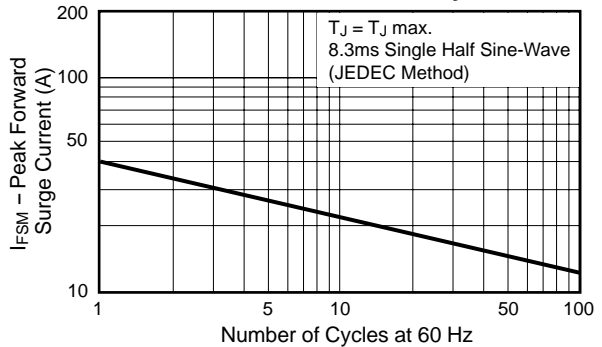
**Fig. 4 – Typ. Junction Capacitance Uni-Directional**



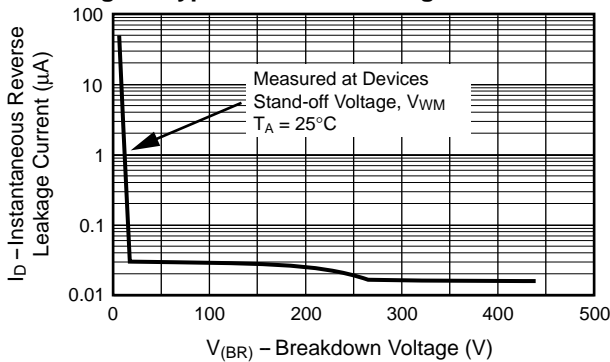
**Fig. 5 – Steady State Power Derating Curve**



**Fig. 6 - Max. Non-Repetitive Forward Surge Current Uni-Directional Only**



**Fig. 7 – Typical Reverse Leakage Characteristics**



**Fig. 8 – Typ. Transient Thermal Impedance**

