



## TVS 30KPA Series — 30000W



R-6

### Features

- Available in uni-directional and bi-directional
- 30000 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 seconds

### Maximum Ratings and Thermal Characteristics ( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

| Parameter                                                                                 | Symbol         | Value      | Unit                 |
|-------------------------------------------------------------------------------------------|----------------|------------|----------------------|
| Peak Pulse Power Dissipation by 10x1000 $\mu$ s test waveform (Fig.1) (Note 1)            | $P_{PPM}$      | 30000      | W                    |
| Steady State Power Dissipation on infinite heat sink at $T_L=75^{\circ}\text{C}$ (Fig. 5) | $P_D$          | 8.0        | W                    |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave Unidirectional only (Note 2)      | $I_{FSM}$      | 400        | A                    |
| Operating Junction and Storage Temperature Range                                          | $T_J, T_{STG}$ | -55 to 175 | $^{\circ}\text{C}$   |
| Typical Thermal Resistance Junction to Lead                                               | $R_{uJL}$      | 8.0        | $^{\circ}\text{C/W}$ |
| Typical Thermal Resistance Junction to Ambient                                            | $R_{uJA}$      | 40         | $^{\circ}\text{C/W}$ |

#### Notes:

- 1.Non-repetitive current pulse , per Fig. 3 and derated above  $T_A = 25^{\circ}\text{C}$  per Fig. 2.
- 2.Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 per minute maximum.

### MECHANICAL DATA

**Case:** R-6

Epoxy meets UL 94V-0 flammability rating

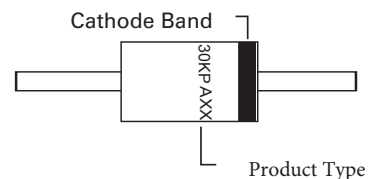
**Terminals:** Matte tin plated leads, solderable per J-STD-002B and JESD22-B102D

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

### 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.

### Part Marking System





### ELECTRICAL CHARACTERISTICS (TA = 25 °C unless otherwise noted)

| 30KPA<br>PART NUMBER |            | REVERSE<br>STAND- OFF<br>VOLTAGE<br>V <sub>RWM</sub> (V) | BREAKDOWN<br>VOLTAGE<br>V <sub>BR</sub> (V)<br>MIN. @I <sub>T</sub> | BREAKDOWN<br>VOLTAGE<br>V <sub>BR</sub> (V)<br>MAX. @I <sub>T</sub> | TEST<br>CURRENT<br>I <sub>T</sub> (mA) | PEAK<br>PULSE<br>CURRENT<br>I <sub>pp</sub> (A) | REVERSE<br>LEAKAGE<br>@ V <sub>RWM</sub><br>I <sub>R</sub> (μA) | MAXIMUM<br>CLAMPING<br>VOLTAGE<br>@I <sub>pp</sub> V <sub>C</sub> (V) |
|----------------------|------------|----------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------|-------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------|
| UNI-POLAR            | BI-POLAR   |                                                          |                                                                     |                                                                     |                                        |                                                 |                                                                 |                                                                       |
| 30KPA28A             | 30KPA28CA  | 28                                                       | 31.1                                                                | 34.4                                                                | 50                                     | 606.0                                           | 5000                                                            | 50.0                                                                  |
| 30KPA30A             | 30KPA30CA  | 30                                                       | 33.3                                                                | 36.8                                                                | 50                                     | 548.9                                           | 5000                                                            | 55.2                                                                  |
| 30KPA33A             | 30KPA33CA  | 33                                                       | 36.7                                                                | 40.6                                                                | 50                                     | 517.9                                           | 5000                                                            | 58.5                                                                  |
| 30KPA36A             | 30KPA36CA  | 36                                                       | 40.0                                                                | 44.4                                                                | 50                                     | 490.3                                           | 5000                                                            | 61.8                                                                  |
| 30KPA39A             | 30KPA39CA  | 39                                                       | 43.5                                                                | 47.7                                                                | 20                                     | 450.9                                           | 2000                                                            | 67.2                                                                  |
| 30KPA42A             | 30KPA42CA  | 42                                                       | 46.8                                                                | 51.4                                                                | 10                                     | 420.8                                           | 1000                                                            | 72.0                                                                  |
| 30KPA43A             | 30KPA43CA  | 43                                                       | 47.8                                                                | 52.8                                                                | 10                                     | 415.1                                           | 1000                                                            | 73.0                                                                  |
| 30KPA45A             | 30KPA45CA  | 45                                                       | 50.0                                                                | 55.3                                                                | 5                                      | 391.5                                           | 250                                                             | 77.4                                                                  |
| 30KPA48A             | 30KPA48CA  | 48                                                       | 53.2                                                                | 58.8                                                                | 5                                      | 371.3                                           | 150                                                             | 81.6                                                                  |
| 30KPA51A             | 30KPA51CA  | 51                                                       | 56.7                                                                | 62.7                                                                | 5                                      | 350.7                                           | 50                                                              | 86.4                                                                  |
| 30KPA54A             | 30KPA54CA  | 54                                                       | 60.0                                                                | 66.6                                                                | 5                                      | 331.5                                           | 20                                                              | 91.4                                                                  |
| 30KPA58A             | 30KPA58CA  | 58                                                       | 64.4                                                                | 71.2                                                                | 5                                      | 327.9                                           | 20                                                              | 92.4                                                                  |
| 30KPA60A             | 30KPA60CA  | 60                                                       | 66.6                                                                | 73.8                                                                | 5                                      | 297.1                                           | 15                                                              | 102.0                                                                 |
| 30KPA64A             | 30KPA64CA  | 64                                                       | 71.1                                                                | 78.6                                                                | 5                                      | 291.3                                           | 10                                                              | 104.0                                                                 |
| 30KPA66A             | 30KPA66CA  | 66                                                       | 73.2                                                                | 81.0                                                                | 5                                      | 283.2                                           | 2                                                               | 107.0                                                                 |
| 30KPA70A             | 30KPA70CA  | 70                                                       | 77.8                                                                | 86.0                                                                | 5                                      | 278.0                                           | 2                                                               | 109.0                                                                 |
| 30KPA71A             | 30KPA71CA  | 71                                                       | 79.2                                                                | 86.8                                                                | 5                                      | 271.7                                           | 2                                                               | 111.5                                                                 |
| 30KPA72A             | 30KPA72CA  | 72                                                       | 79.8                                                                | 88.2                                                                | 5                                      | 265.8                                           | 2                                                               | 114.0                                                                 |
| 30KPA75A             | 30KPA75CA  | 75                                                       | 83.5                                                                | 92.2                                                                | 5                                      | 253.8                                           | 2                                                               | 119.4                                                                 |
| 30KPA78A             | 30KPA78CA  | 78                                                       | 86.4                                                                | 95.4                                                                | 5                                      | 234.9                                           | 2                                                               | 129.0                                                                 |
| 30KPA84A             | 30KPA84CA  | 84                                                       | 93.6                                                                | 103.2                                                               | 5                                      | 217.7                                           | 2                                                               | 139.2                                                                 |
| 30KPA90A             | 30KPA90CA  | 90                                                       | 100.2                                                               | 111.0                                                               | 5                                      | 207.0                                           | 2                                                               | 146.4                                                                 |
| 30KPA96A             | 30KPA96CA  | 96                                                       | 106.8                                                               | 118.2                                                               | 5                                      | 194.2                                           | 2                                                               | 156.0                                                                 |
| 30KPA102A            | 30KPA102CA | 102                                                      | 113.4                                                               | 125.4                                                               | 5                                      | 183.0                                           | 2                                                               | 165.6                                                                 |
| 30KPA108A            | 30KPA108CA | 108                                                      | 120.0                                                               | 132.6                                                               | 5                                      | 172.9                                           | 2                                                               | 175.2                                                                 |
| 30KPA120A            | 30KPA120CA | 120                                                      | 133.2                                                               | 147.0                                                               | 5                                      | 155.9                                           | 2                                                               | 194.4                                                                 |
| 30KPA132A            | 30KPA132CA | 132                                                      | 146.4                                                               | 161.4                                                               | 5                                      | 142.3                                           | 2                                                               | 213.0                                                                 |
| 30KPA144A            | 30KPA144CA | 144                                                      | 160.2                                                               | 177.0                                                               | 5                                      | 135.8                                           | 2                                                               | 223.2                                                                 |
| 30KPA150A            | 30KPA150CA | 150                                                      | 167.0                                                               | 185.0                                                               | 5                                      | 129.8                                           | 2                                                               | 233.4                                                                 |
| 30KPA156A            | 30KPA156CA | 156                                                      | 173.4                                                               | 191.4                                                               | 5                                      | 123.7                                           | 2                                                               | 245.0                                                                 |
| 30KPA160A            | 30KPA160CA | 160                                                      | 178.0                                                               | 197.0                                                               | 5                                      | 120.0                                           | 2                                                               | 252.6                                                                 |
| 30KPA168A            | 30KPA168CA | 168                                                      | 186.6                                                               | 206.4                                                               | 5                                      | 111.2                                           | 2                                                               | 272.4                                                                 |
| 30KPA170A            | 30KPA170CA | 170                                                      | 189.0                                                               | 209.0                                                               | 5                                      | 110.2                                           | 2                                                               | 275.0                                                                 |
| 30KPA180A            | 30KPA180CA | 180                                                      | 199.8                                                               | 220.8                                                               | 5                                      | 104.3                                           | 2                                                               | 290.4                                                                 |
| 30KPA198A            | 30KPA198CA | 198                                                      | 220.2                                                               | 243.6                                                               | 5                                      | 94.7                                            | 2                                                               | 319.8                                                                 |
| 30KPA216A            | 30KPA216CA | 216                                                      | 240.0                                                               | 265.2                                                               | 5                                      | 86.9                                            | 2                                                               | 348.6                                                                 |
| 30KPA240A            | 30KPA240CA | 240                                                      | 266.4                                                               | 294.6                                                               | 5                                      | 78.3                                            | 2                                                               | 387.0                                                                 |
| 30KPA258A            | 30KPA258CA | 258                                                      | 286.8                                                               | 316.8                                                               | 5                                      | 72.8                                            | 2                                                               | 416.4                                                                 |
| 30KPA260A            | 30KPA260CA | 260                                                      | 290.2                                                               | 317.8                                                               | 5                                      | 72.8                                            | 2                                                               | 416.0                                                                 |
| 30KPA270A            | 30KPA270CA | 270                                                      | 300.0                                                               | 331.8                                                               | 5                                      | 69.5                                            | 2                                                               | 436.2                                                                 |
| 30KPA280A            | 30KPA280CA | 280                                                      | 312.6                                                               | 342.2                                                               | 5                                      | 65.3                                            | 2                                                               | 464.0                                                                 |
| 30KPA288A            | 30KPA288CA | 288                                                      | 319.8                                                               | 353.4                                                               | 5                                      | 64.5                                            | 2                                                               | 469.9                                                                 |

For bidirectional type having V<sub>R</sub> of 30 volts and less, the I<sub>R</sub> limit is double.

For parts without A, the V<sub>BR</sub> is + 0% and V<sub>C</sub> is 5% higher than with A parts



### Ratings and Characteristic Curves ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Figure 1 - Peak Pulse Power Rating Curve

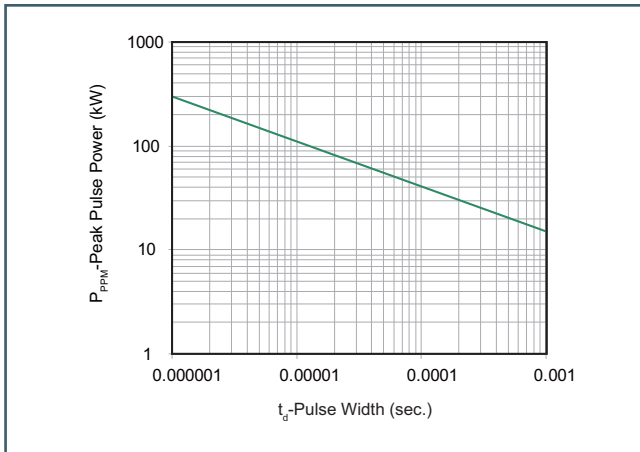


Figure 2 - Pulse Derating Curve

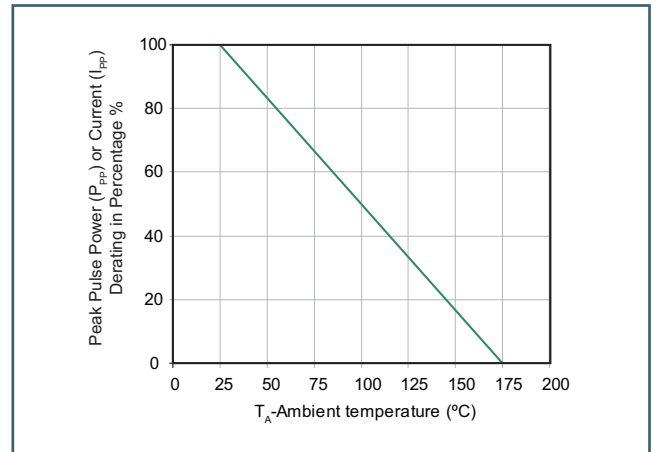


Figure 3 - Pulse Waveform

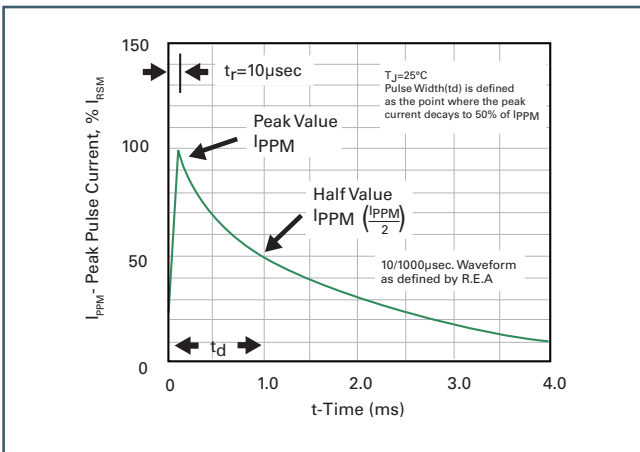


Figure 4 - Typical Junction Capacitance

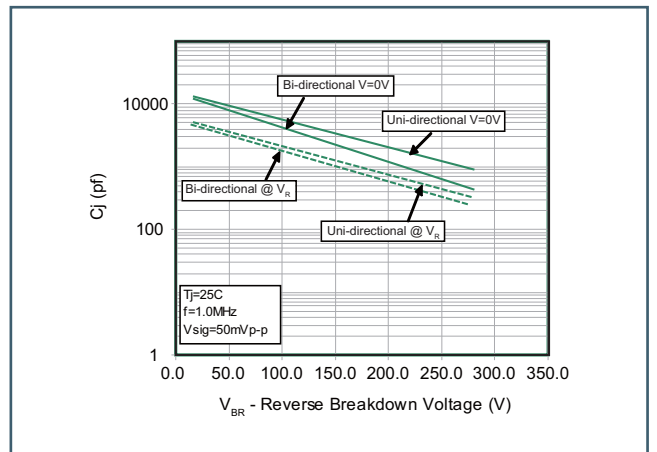


Figure 5 - Steady State Power Dissipation Derating Curve

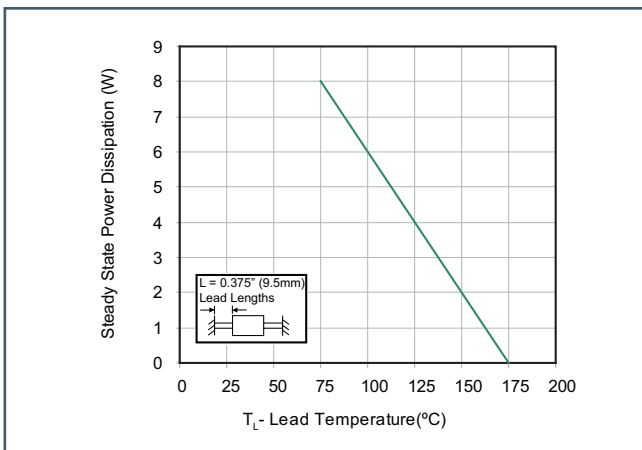
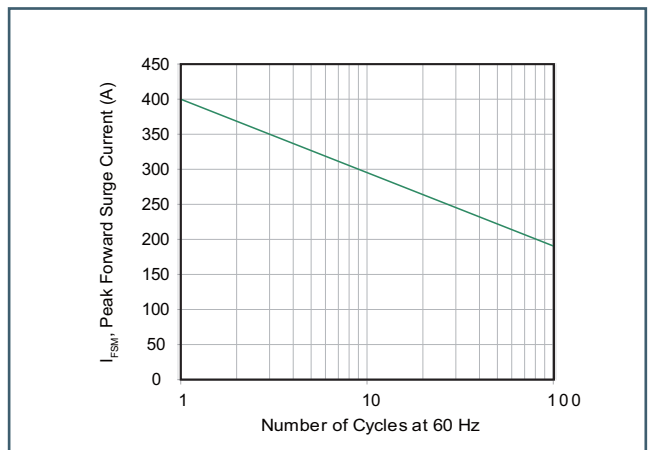


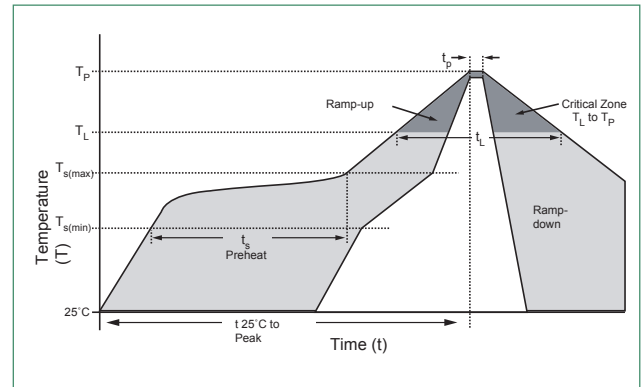
Figure 6 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



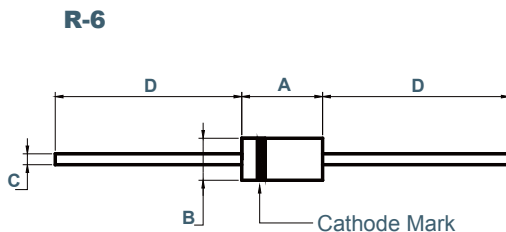


## Soldering Parameters

|                                                       |                                    |                    |
|-------------------------------------------------------|------------------------------------|--------------------|
| Reflow Condition                                      |                                    | Lead-free assembly |
| Pre Heat                                              | - Temperature Min ( $T_{s(min)}$ ) | 150°C              |
|                                                       | - Temperature Max ( $T_{s(max)}$ ) | 200°C              |
|                                                       | - Time (min to max) ( $t_s$ )      | 60 – 180 secs      |
| Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak |                                    | 3°C/second max     |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                  |                                    | 3°C/second max     |
| Reflow                                                | - Temperature ( $T_L$ ) (Liquidus) | 217°C              |
|                                                       | - Time (min to max) ( $t_s$ )      | 60 – 150 seconds   |
| Peak Temperature ( $T_p$ )                            |                                    | 260+0/-5 °C        |
| Time within 5°C of actual peak Temperature ( $t_p$ )  |                                    | 20 – 40 seconds    |
| Ramp-down Rate                                        |                                    | 6°C/second max     |
| Time 25°C to peak Temperature ( $T_p$ )               |                                    | 8 minutes Max.     |
| Do not exceed                                         |                                    | 280°C              |



## Dimensions



| DIMENSIONS |        |       |      |      |      |
|------------|--------|-------|------|------|------|
| DIM        | INCHES |       | MM   |      | NOTE |
|            | MIN    | MAX   | MIN  | MAX  |      |
| A          | 0.340  | 0.360 | 8.60 | 9.10 |      |
| B          | 0.340  | 0.360 | 8.60 | 9.10 | Φ    |
| C          | 0.048  | 0.052 | 1.20 | 1.30 | Φ    |
| D          | 1.000  | —     | 25.4 | —    |      |