

## Axial Lead Transient Voltage Suppressors (TVS)

**30KP Series 28 To 288 V 30000W**

### Description

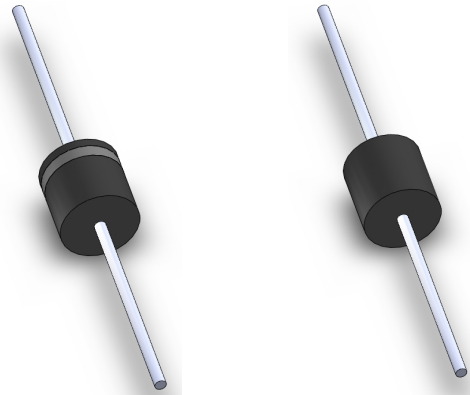
The 30KP series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

### Features

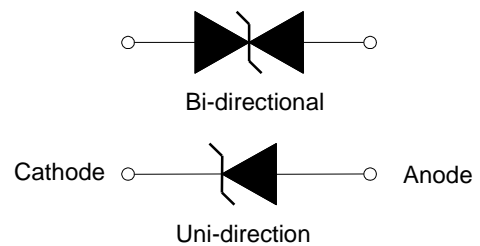
- u Glass passivated chip junction in P600 Package
- u Low leakage
- u Uni and Bidirectional unit
- u Excellent clamping capability
- u 30000W Peak power capability at 10 × 1000µs waveform Repetition rate (duty cycle):0.01%
- u Fast response time: typically less than 1.0ps from 0 Volts to  $V_{BR}$  min
- u Typical  $I_R$  less than 2µA above 73V.
- u High Temperature soldering: 260°C/40 seconds at terminals
- u Typical maximum temperature coefficient  $\Delta V_{BR} = 0.1\% \times V_{BR}@25^\circ\text{C} \times \Delta T$
- u Plastic package has Underwriters Laboratory Flammability 94V-0
- u Matte tin lead-free Plated
- u Halogen free and RoHS compliant
- u Typical failure mode is short from over-specified voltage or current
- u Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- u IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- u ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- u EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)

Uni-directional

Bi-directional



### Functional Diagram



### Applications

TVS devices are ideal for the protection of I/O interfaces,  $V_{CC}$  bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

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

| Parameter  | Symbol         | Value          | Unit             |
|--|----------------|----------------|------------------|
| Peak Pulse Power Dissipation with a 10/1000µs waveform (Fig.1)(Note 1), (Note 2) | $P_{PPM}$      | 20000          | Watts            |
| Peak Pulse Current with a 10/1000µs waveform.(Note1, Fig.3)                      | $I_{PP}$       | See Next Table | Amps             |
| Power Dissipation on Infinite Heat Sink at $T_L=75^\circ\text{C}$                | $P_{M(AV)}$    | 8.0            | Watt             |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)                 | $I_{FSM}$      | 500            | Amps             |
| Operating junction and Storage Temperature Range.                                | $T_J, T_{STG}$ | -55 to +150    | $^\circ\text{C}$ |

### Notes:

1. Non-repetitive current pulse, per Fig. 3 and derated above  $T_A = 25^\circ\text{C}$  per Fig. 2.
2. Mounted on 5.0mm x 5.0mm (0.03mm thick) Copper Pads to each terminal.
3. 8.3ms single half sine-wave, or equivalent square wave, Duty cycle = 4 pulses per minutes maximum.
4.  $V_F < 3.5\text{V}$  for  $V_{BR} < 200\text{V}$  and  $V_F < 6.5\text{V}$  for  $V_{BR} > 201\text{V}$ .

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| Part Number |           | Reverse Stand-Off Voltage $V_{RWM}$ (V) | Breakdown Voltage $V_{BR}$ (V) @ $I_T$ | Test Current $I_T$ (mA) | Maximum Clamping Voltage $V_C$ @ $I_{PP}$ (V) | Maximum Peak Pulse Current $I_{PP}$ (A) | Maximum Reverse Leakage $I_R$ @ $V_{RWM}$ ( $\mu$ A) |
|-------------|-----------|---|--|-------------------------|---|---|--|
| Uni         | Bi        |   | MIN                                    |                         |   |   |  |
| 30KP28A     | 30KP28CA  | 28                                      | 31.28                                  | 50                      | 50.0  | 606.0                                   | 5000   |
| 30KP30A     | 30KP30CA  | 30                                      | 33.51                                  | 50                      | 55.2  | 548.9                                   | 5000   |
| 30KP33A     | 30KP33CA  | 33                                      | 36.90                                  | 50                      | 58.5  | 517.9                                   | 5000   |
| 30KP36A     | 30KP36CA  | 36                                      | 40.20                                  | 50                      | 61.8  | 490.3                                   | 5000   |
| 30KP39A     | 30KP39CA  | 39                                      | 43.60                                  | 20                      | 67.2  | 450.9                                   | 2000   |
| 30KP42A     | 30KP42CA  | 42                                      | 46.90                                  | 10                      | 72.0  | 420.8                                   | 1000   |
| 30KP43A     | 30KP43CA  | 43                                      | 48.00                                  | 10                      | 73.0  | 415.1                                   | 1000   |
| 30KP45A     | 30KP45CA  | 45                                      | 50.30                                  | 5                       | 77.4  | 391.5                                   | 250  |
| 30KP48A     | 30KP48CA  | 48                                      | 53.60                                  | 5                       | 81.6  | 371.3                                   | 150  |
| 30KP51A     | 30KP51CA  | 51                                      | 57.00                                  | 5                       | 86.4  | 350.7                                   | 50   |
| 30KP54A     | 30KP54CA  | 54                                      | 60.30                                  | 5                       | 91.4  | 331.5                                   | 20   |
| 30KP58A     | 30KP58CA  | 58                                      | 64.80                                  | 5                       | 92.4  | 327.9                                   | 20   |
| 30KP60A     | 30KP60CA  | 60                                      | 67.00                                  | 5                       | 102.0   | 297.1                                   | 15   |
| 30KP64A     | 30KP64CA  | 64                                      | 71.50                                  | 5                       | 104.0   | 291.3                                   | 10   |
| 30KP66A     | 30KP66CA  | 66                                      | 73.70                                  | 5                       | 107.0   | 283.2                                   | 2  |
| 30KP70A     | 30KP70CA  | 70                                      | 78.20                                  | 5                       | 109.0   | 278.0                                   | 2  |
| 30KP71A     | 30KP71CA  | 71                                      | 79.30                                  | 5                       | 111.5   | 271.7                                   | 2  |
| 30KP72A     | 30KP72CA  | 72                                      | 80.40                                  | 5                       | 114.0   | 265.8                                   | 2  |
| 30KP75A     | 30KP75CA  | 75                                      | 83.80                                  | 5                       | 119.4   | 253.8                                   | 2  |
| 30KP78A     | 30KP78CA  | 78                                      | 87.10                                  | 5                       | 129.0   | 234.9                                   | 2  |
| 30KP84A     | 30KP84CA  | 84                                      | 93.80                                  | 5                       | 139.2   | 217.7                                   | 2  |
| 30KP90A     | 30KP90CA  | 90                                      | 100.50                                 | 5                       | 146.4   | 207.0                                   | 2  |
| 30KP96A     | 30KP96CA  | 96                                      | 107.20                                 | 5                       | 156.0   | 194.2                                   | 2  |
| 30KP102A    | 30KP102CA | 102                                     | 113.90                                 | 5                       | 165.6   | 183.0                                   | 2  |
| 30KP108A    | 30KP108CA | 108                                     | 120.60                                 | 5                       | 175.2   | 172.9                                   | 2  |
| 30KP120A    | 30KP120CA | 120                                     | 134.00                                 | 5                       | 194.4   | 155.9                                   | 2  |
| 30KP132A    | 30KP132CA | 132                                     | 147.40                                 | 5                       | 213.0   | 142.3                                   | 2  |
| 30KP144A    | 30KP144CA | 144                                     | 160.80                                 | 5                       | 223.2   | 135.8                                   | 2  |
| 30KP150A    | 30KP150CA | 150                                     | 167.60                                 | 5                       | 233.4   | 129.8                                   | 2  |
| 30KP156A    | 30KP156CA | 156                                     | 174.30                                 | 5                       | 245.0   | 123.7                                   | 2  |
| 30KP160A    | 30KP160CA | 160                                     | 178.70                                 | 5                       | 252.6   | 120.0                                   | 2  |
| 30KP168A    | 30KP168CA | 168                                     | 187.70                                 | 5                       | 272.4   | 111.2                                   | 2  |
| 30KP170A    | 30KP170CA | 170                                     | 189.90                                 | 5                       | 275.0   | 110.2                                   | 2  |
| 30KP180A    | 30KP180CA | 180                                     | 201.10                                 | 5                       | 290.4   | 104.3                                   | 2  |
| 30KP198A    | 30KP198CA | 198                                     | 221.20                                 | 5                       | 319.8   | 94.7                                    | 2  |
| 30KP216A    | 30KP216CA | 216                                     | 241.30                                 | 5                       | 348.6   | 86.9                                    | 2  |
| 30KP240A    | 30KP240CA | 240                                     | 268.10                                 | 5                       | 387.0   | 78.3                                    | 2  |
| 30KP258A    | 30KP258CA | 258                                     | 188.20                                 | 5                       | 416.4   | 72.8                                    | 2  |
| 30KP260A    | 30KP260CA | 260                                     | 290.40                                 | 5                       | 416.0   | 72.8                                    | 2  |
| 30KP270A    | 30KP270CA | 270                                     | 301.60                                 | 5                       | 436.2   | 69.5                                    | 2  |
| 30KP280A    | 30KP280CA | 280                                     | 312.80                                 | 5                       | 464.0   | 65.3                                    | 2  |
| 30KP288A    | 30KP288CA | 288                                     | 321.70                                 | 5                       | 469.9   | 64.5                                    | 2  |

**Note:**

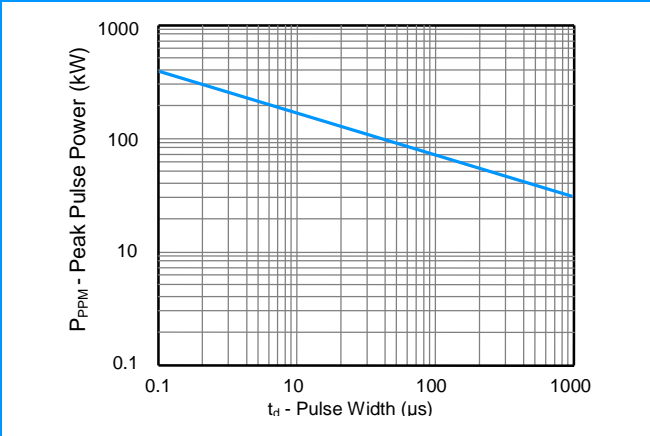
- For Bi-Directional devices having  $V_R$  of 60 volts and under, the  $I_R$  limit is double

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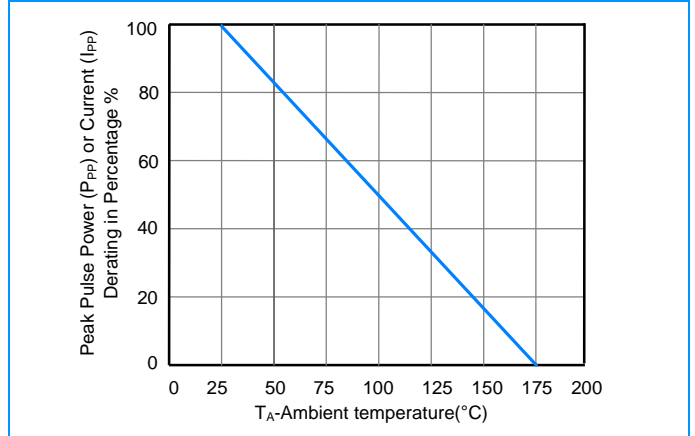
**30KP Series 28 To 288 V 30000W**

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

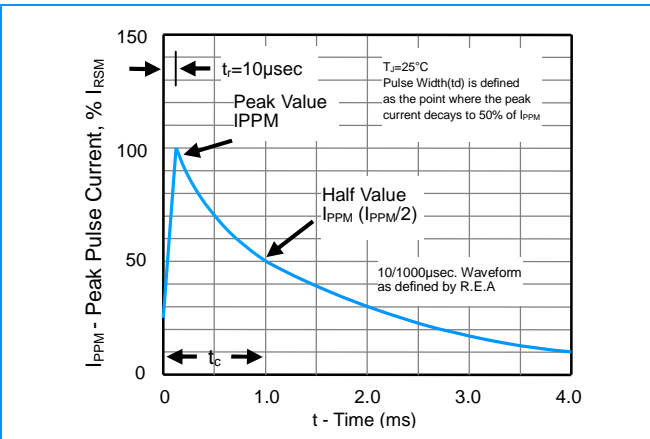
**Figure 1 - Peak Pulse Power Rating Curve**



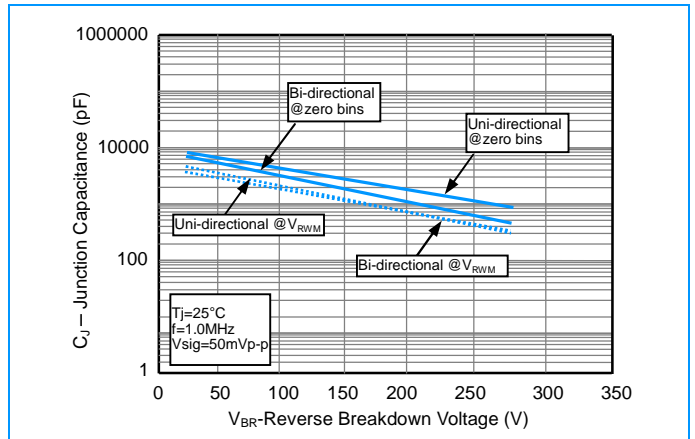
**Figure 2 - Pulse Derating Curve**



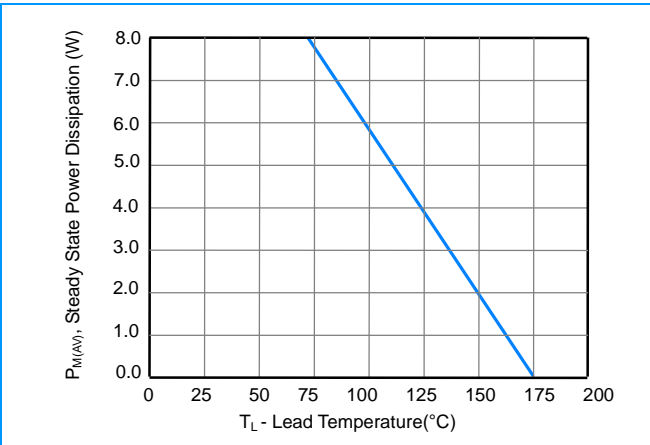
**Figure 3 - Pulse Waveform**



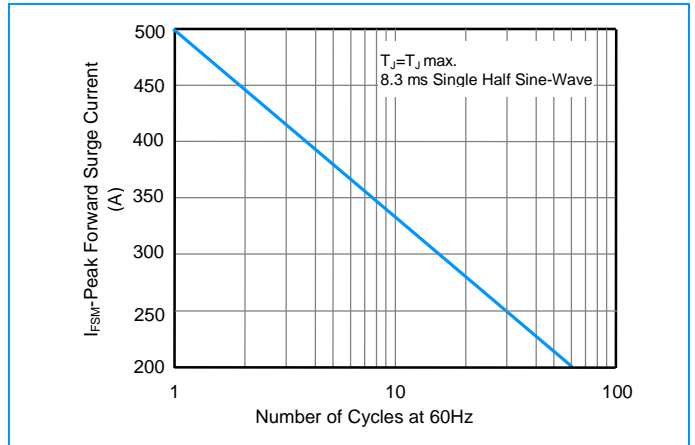
**Figure 4 - Typical Junction Capacitance**



**Figure 5 - Steady State Power Derating Curve**



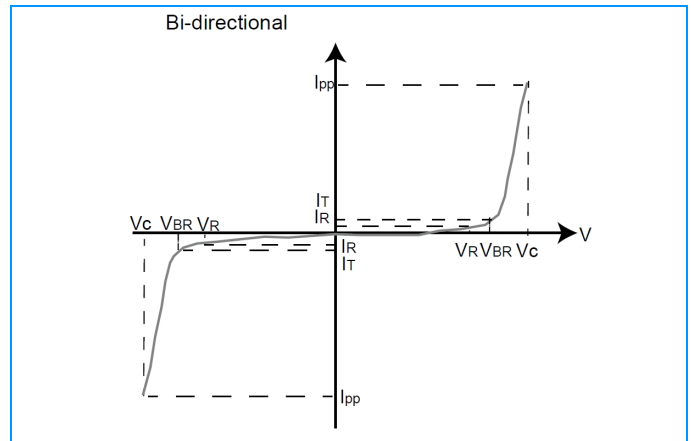
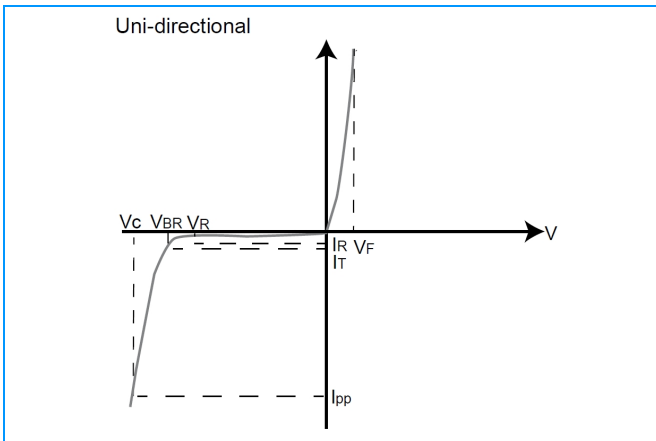
**Figure 6 - Maximum Non-Repetitive Surge Current**



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### I-V Curve Characteristics



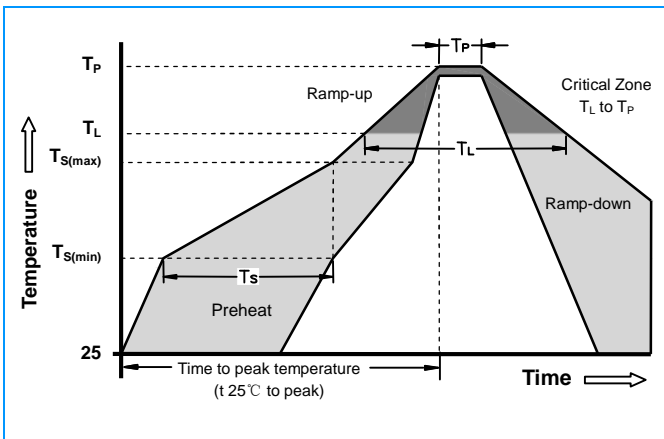
### Physical Specifications

|                 |  |
|-----------------|--|
| <b>Weight</b>   | 0.07 ounce, 2.1gram  |
| <b>Case</b>     | JEDEC R-6/P600 Molded Plastic over glass passivated junction |
| <b>Polarity</b> | Color band denotes cathode except Bipolar                    |
| <b>Terminal</b> | Matte Tin-plated leads, Solderable per JESD22-B102D          |

### Environmental Specifications

|                           |             |
|---------------------------|-------------|
| <b>Temperature Cycle</b>  | JESD22-A104 |
| <b>Pressure Cooker</b>    | JESD22-A102 |
| <b>High Temp. Storage</b> | JESD22-A103 |
| <b>HTRB</b>               | JESD22-A108 |
| <b>Thermal Shock</b>      | JESD22-A106 |

### Soldering Parameters

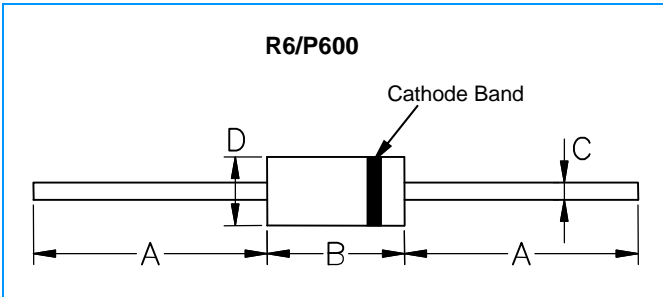


| Reflow Condition                                     |                                    | Lead-free assembly |
|--|------------------------------------|--------------------|
| Pre Heat   | -Temperature Min ( $T_{s(min)}$ )  | 150°C              |
|  | -Temperature Max ( $T_{s(max)}$ )  | 200°C              |
|  | - Time (min to max) ( $t_s$ )      | 60 -180 Seconds    |
| 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              |

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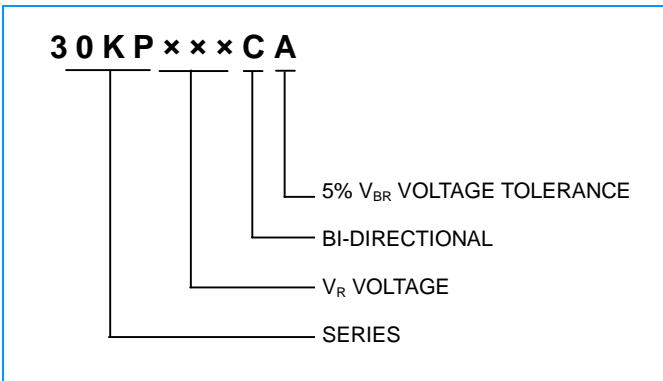
**30KP Series 28 To 288 V 30000W**

### Dimensions



| Dimensions | Inches |       | Millimeters |      |
|------------|--------|-------|-------------|------|
|            | Min    | Max   | Min         | Max  |
| <b>A</b>   | 1.000  | -     | 25.40       | -    |
| <b>B</b>   | 0.340  | 0.360 | 8.64        | 9.14 |
| <b>C</b>   | 0.048  | 0.052 | 1.22        | 1.32 |
| <b>D</b>   | 0.340  | 0.360 | 8.64        | 9.14 |

### Part Numbering



### Packaging

| Part Number | Component Package | Quantity | Packaging Option |
|-------------|-------------------|----------|------------------|
| 30KPXXXXX   | R6/P600           | 200      | Box              |

### Packaging Dimensions Unit: Inches (Millimeters)

