TVS devices are ideal for the protection of I/O interfaces, VCC bus and other vulnerable circuits used in telecom, computer, industrial and consumer electronic applications.

**Features**

- 3000W peak pulse capability at 10/1000μs waveform, repetition rate (duty cycles):0.01%
- Glass passivated chip junction in P600 package
- Fast response time: typically less than 1.0ps from 0 Volts to BV min
- Excellent clamping capability
- Typical failure mode is short from over-specified voltage or current
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- IEC-61000-4-2 ESD 30kV(Air), 30kV (Contact)
- ESD protection of data lines in accordance with IEC 61000-4-2
- EFT protection of data lines in accordance with IEC 61000-4-4
- Low incremental surge resistance

**Applications**

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**Agency Approvals**

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## Transient Voltage Suppression Diodes

### Axial Leaded – 3000W > 3KP series

**Specifications**

- **Axial Leaded – 3000W**
- **> 3KP series**

**Electrical Characteristics** *(T<sub>j</sub>=25°C unless otherwise noted)*

<table>
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<th>Part Number (Uni)</th>
<th>Part Number (Bi)</th>
<th>Reverse Stand off Voltage V&lt;sub&gt;VR&lt;/sub&gt; (Volts)</th>
<th>Breakdown Voltage V&lt;sub&gt;B&lt;/sub&gt; @ I&lt;sub&gt;T&lt;/sub&gt; (Volts)</th>
<th>Test Current I&lt;sub&gt;T&lt;/sub&gt; (mA)</th>
<th>Maximum Clamping Voltage V&lt;sub&gt;C&lt;/sub&gt; @ IPP (V)</th>
<th>Maximum Peak Pulse Current I&lt;sub&gt;IPP&lt;/sub&gt; (A)</th>
<th>Maximum Reverse Leakage I&lt;sub&gt;R&lt;/sub&gt; @ VR (µA)</th>
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</table>

For parts without A, the V<sub>B</sub> is ± 10% and V<sub>VR</sub> is higher by 5% than with A parts.

For bidirectional type having VR of 10 volts and less, the IR limit is double.
I-V Curve Characteristics

Uni-directional

Bi-directional

P_{ppm} Peak Pulse Power Dissipation – Max power dissipation
V_R Stand-off Voltage – Maximum voltage that can be applied to the TVS without operation
V_{br} Breakdown Voltage – Maximum voltage that flows though the TVS at a specified test current (I_t)
V_C Clamping Voltage – Peak voltage measured across the TVS at a specified I_{ppm} (peak impulse current)
I_R Reverse Leakage Current – Current measured at V_R
V_F Forward Voltage Drop for Uni-directional

Ratings and Characteristic Curves (T_J = 25°C unless otherwise noted)

Figure 1 - TVS Transients Clamping Waveform

Figure 2 - Peak Pulse Power Rating Curve

continues on next page.
Figure 3 - Peak Pulse Power Derating Curve

Figure 4 - Pulse Waveform

Figure 5 - Typical Junction Capacitance

Figure 6 - Typical Transient Thermal Impedance

Figure 7 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only

Figure 8 - Peak Forward Voltage Drop vs Peak Forward Current (Typical Values)
$
\begin{align*}
\textbf{Soldering Parameters} \\
\textbf{Reflow Condition} & \quad \text{Lead–free assembly} \\
\textbf{Pre Heat} & \quad - \text{Temperature Min \left( T_{\text{min}} \right)} 150^\circ C \\
& \quad - \text{Temperature Max \left( T_{\text{max}} \right)} 200^\circ C \\
& \quad - \text{Time (min to max) \left( t \right)} 60 – 180 secs \\
\textbf{Average ramp up rate (Liquidus Temp \left( T_{\text{L}} \right)} \to \text{peak}} & \quad 3^\circ C/\text{second max} \\
\textbf{T}_{\text{L}} \to \text{T}_{\text{P}} - \text{Ramp-up Rate} & \quad 3^\circ C/\text{second max} \\
\textbf{Reflow} & \quad - \text{Temperature \left( T_{\text{P}} \right)} (\text{Liquidus}) 217^\circ C \\
& \quad - \text{Time (min to max) \left( t \right)} 60 – 150 seconds \\
\textbf{Peak Temperature \left( T_{\text{P}} \right)} & \quad 260{+/-} 5^\circ C \\
\textbf{Time within 5^\circ C of actual peak} & \quad 20 – 40 seconds \\
\textbf{Ramp-down Rate} & \quad 6^\circ C/\text{second max} \\
\textbf{Time 25}^\circ C \text{ to peak Temperature \left( T_{\text{P}} \right)} & \quad 8 \text{ minutes Max.} \\
\textbf{Do not exceed} & \quad 260^\circ C \\
\end{align*}$

$
\begin{align*}
\textbf{Physical Specifications} \\
\textbf{Weight} & \quad 0.07oz., 2.1g \\
\textbf{Case} & \quad \text{P600 molded plastic body over passivated junction.} \\
\textbf{Polarity} & \quad \text{Color band denotes the cathode except Bipolar.} \\
\textbf{Terminal} & \quad \text{Matte Tin axial leads, solderable per JESD22-B102.} \\
\end{align*}$

$
\begin{align*}
\textbf{Environmental Specifications} \\
\textbf{High Temp. Storage} & \quad \text{JESD22-A103} \\
\textbf{HTRB} & \quad \text{JESD22-A108} \\
\textbf{Temperature Cycling} & \quad \text{JESD22-A104} \\
\textbf{H3TRB} & \quad \text{JESD22-A101} \\
\textbf{RSH} & \quad \text{JESD22-B106} \\
\end{align*}$

$
\begin{align*}
\textbf{Dimensions} \\
\begin{array}{|c|c|c|c|c|}
\hline
\text{Dimensions} & \text{Inches} & \text{Millimeters} \\
\hline
\text{Min} & \text{Max} & \text{Min} & \text{Max} \\
\hline
\text{A} & 1.000 & - & 25.40 & - \\
\text{B} & 0.340 & 0.360 & 8.60 & 9.10 \\
\text{C} & 0.048 & 0.052 & 1.22 & 1.32 \\
\text{D} & 0.340 & 0.360 & 8.60 & 9.10 \\
\hline
\end{array}
\end{align*}$
Part Numbering System

3KPxxxXX X

- **OPTION CODE:**
  - BLANK: Reel Tape
  - B: Bulk Packaging
- **TYPE CODE:**
  - A: Uni-Directional (5% V<sub>VBR</sub> Voltage Tolerance)
  - CA: Bi-Directional (5% V<sub>VBR</sub> Voltage Tolerance)
- **SERIES CODE**

Part Marking System

- **Cathode Band** (for uni-directional products only)
- **Littelfuse Logo**
- **Trace Code Marking**
  - YY: Year Code
  - WW: Week Code
- **Product Type**

Packing Options

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Tape and Reel Specification

- **Dimensions are in inches/mm**
- **Recess Depth Max. 0.75 (19.05)**

Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.