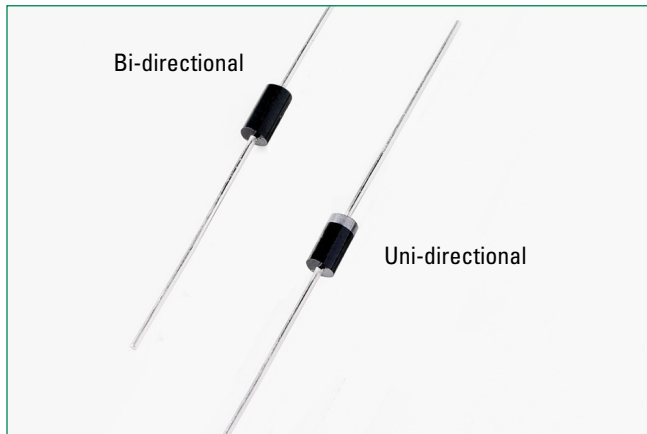


TP6KE Series

Axial Leaded – 600W



Additional Information



Resources



Accessories



Samples

Agency Approvals

| Agency | Agency File Number |
|--------|--------------------|
| | E230531 |

Maximum Ratings and Thermal Characteristics

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

| Parameter | Symbol | Value | Unit |
|---|----------------|------------|---------------------------|
| Peak Pulse Power Dissipation by 10/1000 μs Test Waveform (Fig.2) (Note 1) | P_{PPM} | 600 | W |
| Steady State Power Dissipation on Infinite Heat Sink at $T_L=75^\circ\text{C}$ (Fig. 6) | P_D | 5.0 | W |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave Unidirectional Only (Note 2) | I_{FSM} | 100 | A |
| Maximum Instantaneous Forward Voltage at 50A for Unidirectional Only | V_F | 3.5 | V |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 to 175 | $^\circ\text{C}$ |
| Typical Thermal Resistance Junction to Lead | R_{uJL} | 20 | $^\circ\text{C}/\text{W}$ |
| Typical Thermal Resistance Junction to Ambient | R_{uJA} | 75 | $^\circ\text{C}/\text{W}$ |

Notes:

1. Non-repetitive current pulse, per Fig. 4 and derated above T_J (initial) = 25°C per Fig. 3.
2. Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 per minute maximum.



Description

The AEC-Q101 qualified TP6KE Series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

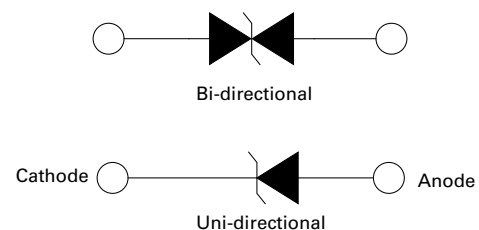
Features & Benefits

- Hi reliability application and automotive grade AEC-Q101 qualified
- Glass passivated chip junction in DO-15 Package
- 600W peak pulse capability at 10/1000 μs waveform, repetition rate (duty cycles):0.01%
- 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 (IEC801-2)
- EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)
- Low incremental surge resistance
- High temperature to reflow soldering guaranteed: 260 $^\circ\text{C}/40\text{sec}$ / 0.375"/(9.5mm) lead length, 5 lbs., (2.3kg) tension
- $VBR @ T_J = VBR @ 25^\circ\text{C} \times (1 + \alpha T \times (T_J - 25))$ (αT : Temperature Coefficient, typical value is 0.1%)
- Plastic package has underwriters laboratory flammability classification 94V-0
- Lead-free matte tin plated package
- Halogen free and RoHS compliant

Applications

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.

Functional Diagram



TP6KE Series

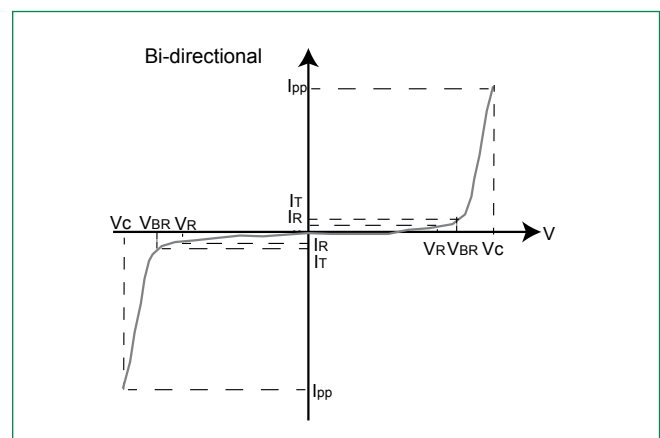
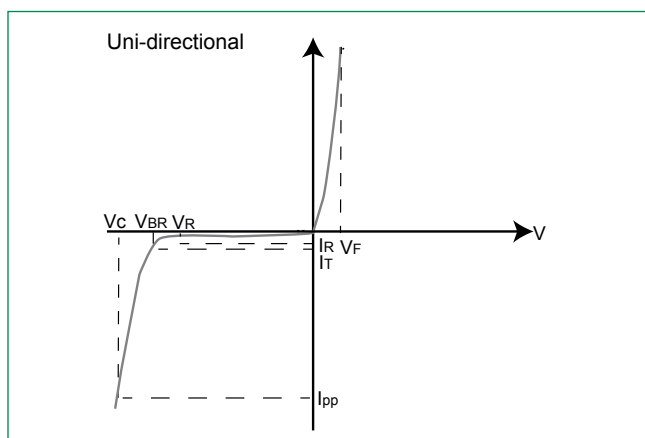
Axial Leaded – 600W

Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

| Part Number (Uni) | Part Number (Bi) | Reverse Stand off Voltage V_R (Volts) | Breakdown Voltage V_{BR} (Volts) @ 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_R (μA) | Agency Approval |
|-------------------|------------------|---|--|-------|-------------------------|---|---|---|-----------------|
| | | | MIN | MAX | | | | | |
| TP6KE13A | TP6KE13CA | 11.10 | 12.40 | 13.70 | 1 | 18.2 | 33.5 | 1 | X |
| TP6KE15A | TP6KE15CA | 12.80 | 14.30 | 15.80 | 1 | 21.2 | 28.8 | 1 | X |
| TP6KE16A | TP6KE16CA | 13.60 | 15.20 | 16.80 | 1 | 22.5 | 27.1 | 1 | X |
| TP6KE18A | TP6KE18CA | 15.30 | 17.10 | 18.90 | 1 | 25.2 | 24.2 | 1 | X |
| TP6KE20A | TP6KE20CA | 17.10 | 19.00 | 21.00 | 1 | 27.7 | 22.0 | 1 | X |
| TP6KE22A | TP6KE22CA | 18.80 | 20.90 | 23.10 | 1 | 30.6 | 19.9 | 1 | X |
| TP6KE24A | TP6KE24CA | 20.50 | 22.80 | 25.20 | 1 | 33.2 | 18.4 | 1 | X |
| TP6KE27A | TP6KE27CA | 23.10 | 25.70 | 28.40 | 1 | 37.5 | 16.3 | 1 | X |
| TP6KE30A | TP6KE30CA | 25.60 | 28.50 | 31.50 | 1 | 41.4 | 14.7 | 1 | X |
| TP6KE33A | TP6KE33CA | 28.20 | 31.40 | 34.70 | 1 | 45.7 | 13.3 | 1 | X |
| TP6KE36A | TP6KE36CA | 30.80 | 34.20 | 37.80 | 1 | 49.9 | 12.2 | 1 | X |
| TP6KE39A | TP6KE39CA | 33.30 | 37.10 | 41.00 | 1 | 53.9 | 11.3 | 1 | X |
| TP6KE43A | TP6KE43CA | 36.80 | 40.90 | 45.20 | 1 | 59.3 | 10.3 | 1 | X |
| TP6KE47A | TP6KE47CA | 40.20 | 44.70 | 49.40 | 1 | 64.8 | 9.4 | 1 | X |
| TP6KE51A | TP6KE51CA | 43.60 | 48.50 | 53.60 | 1 | 70.1 | 8.7 | 1 | X |
| TP6KE56A | TP6KE56CA | 47.80 | 53.20 | 58.80 | 1 | 77.0 | 7.9 | 1 | X |
| TP6KE62A | TP6KE62CA | 53.00 | 58.90 | 65.10 | 1 | 85.0 | 7.2 | 1 | X |
| TP6KE68A | TP6KE68CA | 58.10 | 64.60 | 71.40 | 1 | 92.0 | 6.6 | 1 | X |
| TP6KE75A | TP6KE75CA | 64.10 | 71.30 | 78.80 | 1 | 103.0 | 5.9 | 1 | X |
| TP6KE82A | TP6KE82CA | 70.10 | 77.90 | 86.10 | 1 | 113.0 | 5.4 | 1 | X |
| TP6KE91A | TP6KE91CA | 77.80 | 86.50 | 95.50 | 1 | 125.0 | 4.9 | 1 | X |

For parts without A, the V_{BR} is $\pm 10\%$ and V_C is 5% higher than with A parts

I-V Curve Characteristics



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 through 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

TP6KE Series

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

Figure 1 -
TVS Transients Clamping Waveform

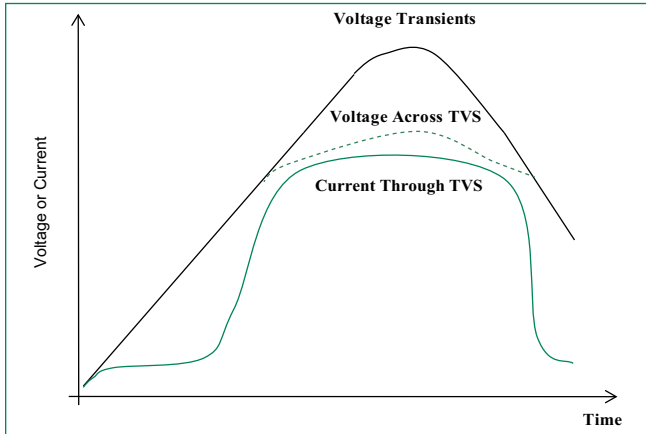


Figure 2 -
Peak Pulse Power Rating

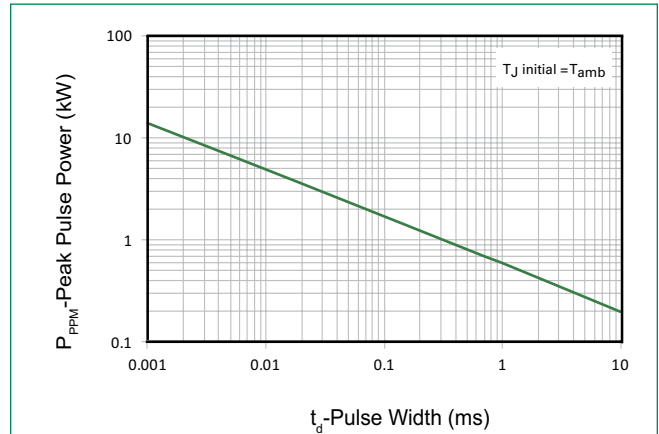


Figure 3 -
Peak Pulse Power Derating Curve

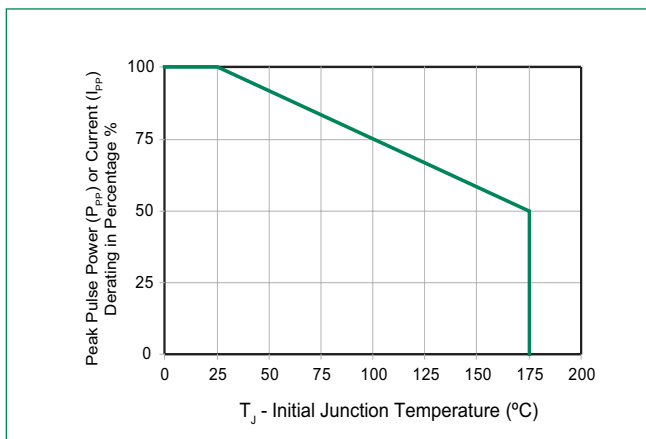


Figure 4 -
Pulse Waveform

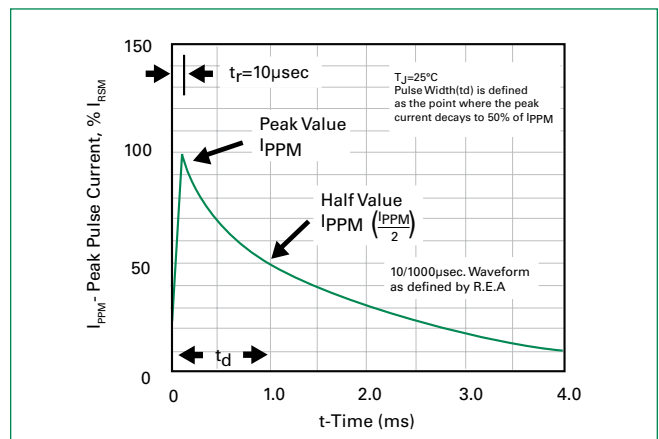


Figure 5 -
Typical Junction Capacitance

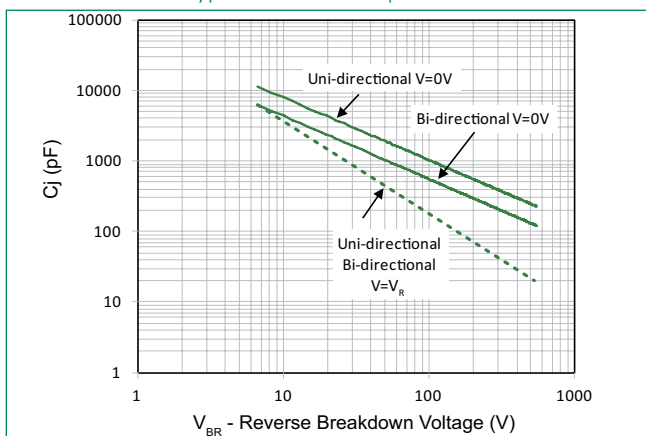
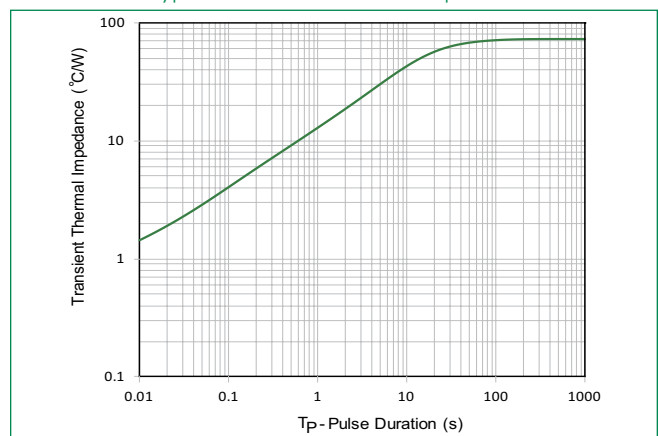


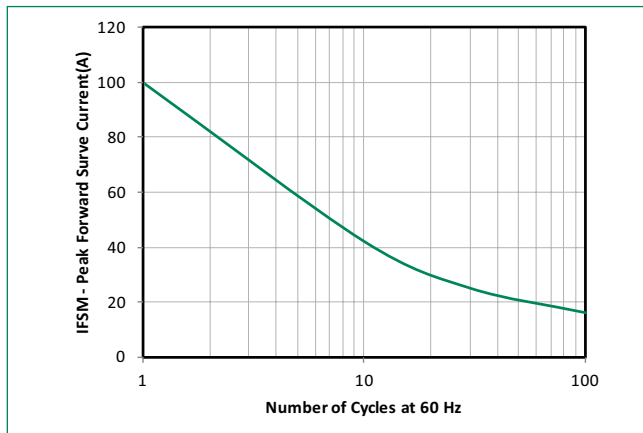
Figure 6 -
Typical Transient Thermal Impedance



TP6KE Series

Axial Leaded – 600W

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



Flow/Wave Soldering (Solder Dipping)

| | |
|---------------------------|------------|
| Peak Temperature : | 265°C |
| Dipping Time : | 10 seconds |
| Soldering : | 1 time |

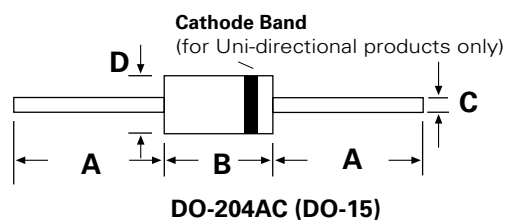
Physical Specificationst

| | |
|-----------------|--|
| Weight | 0.015oz., 0.4g |
| Case | JEDEC DO-204AC (DO-15) molded plastic body over passivated junction. |
| Polarity | Color band denotes the cathode except Bipolar. |
| Terminal | Matte Tin axial leads, solderable per JESD22-B102. |

Environmental Specifications

| | |
|----------------------------|-------------|
| High Temp. Storage | JESD22-A103 |
| HTRB | JESD22-A108 |
| Temperature Cycling | JESD22-A104 |
| H3TRB | JESD22-A101 |
| RSH | JESD22-B106 |

Dimensions

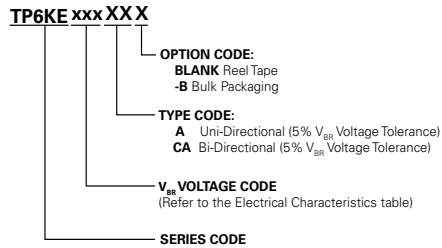


| Dimensions | Inches | | Millimeters | |
|------------|--------|-------|-------------|------|
| | Min | Max | Min | Max |
| A | 1.000 | - | 25.40 | - |
| B | 0.230 | 0.300 | 5.80 | 7.60 |
| C | 0.028 | 0.034 | 0.71 | 0.86 |
| D | 0.104 | 0.140 | 2.60 | 3.60 |

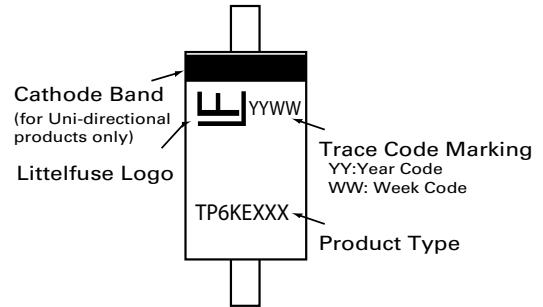
TP6KE Series

Axial Leaded – 600W

Part Numbering System



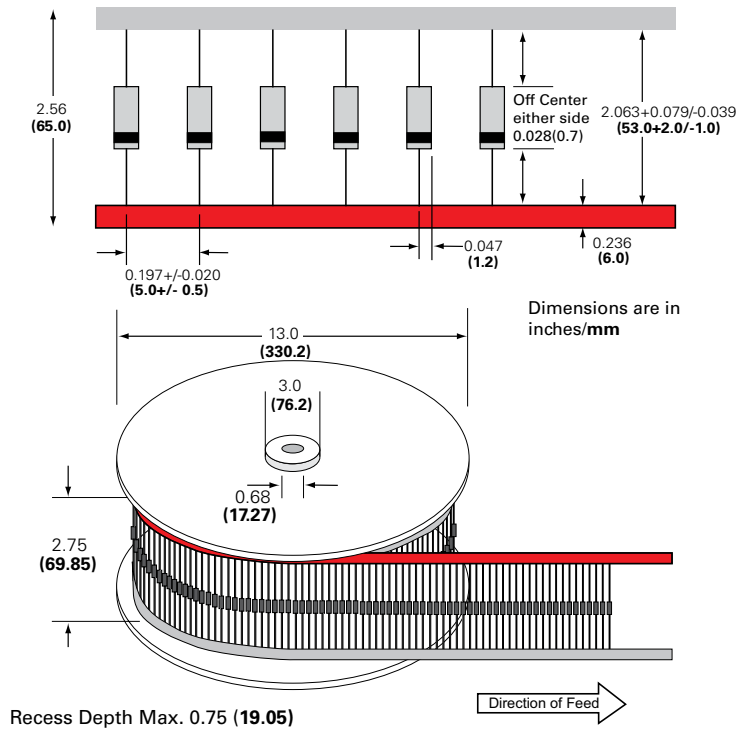
Part Marking System



Packaging

| Part Number | Component Package | Quantity | Packaging Option | Packaging Specification |
|--------------|-------------------|----------|------------------|-------------------------|
| TP6KExxxXX | DO-15 (DO-204AC) | 4000 | Tape & Reel | EIA STD RS-296 |
| TP6KExxxXX-B | DO-15 (DO-204AC) | 1000 | BULK | Littelfuse Spec. |

Tape and Reel Specification



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