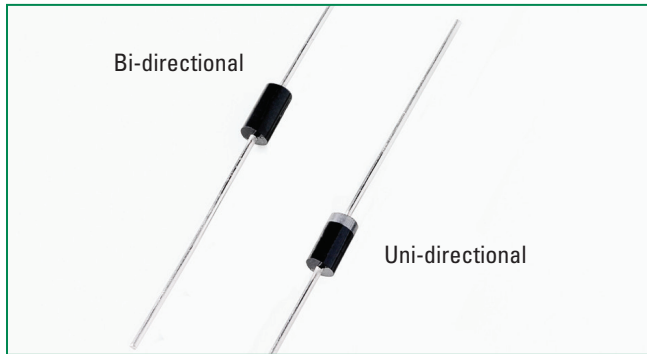


**TP6KE Series**



**Agency Approvals**

AGENCY	AGENCY FILE NUMBER
	E230531

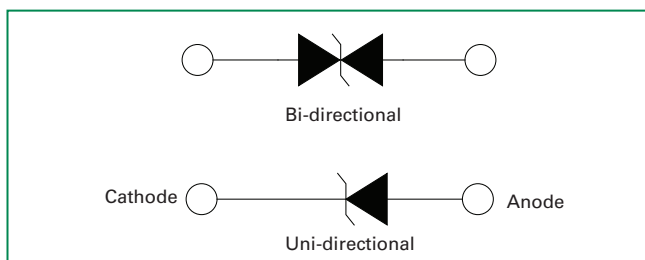
**Maximum Ratings and Thermal Characteristics  
(T<sub>A</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation by 10/1000µs Test Waveform (Fig.2) (Note 1)	P <sub>PPM</sub>	600	W
Steady State Power Dissipation on Infinite Heat Sink at T <sub>L</sub> =75°C (Fig. 6)	P <sub>D</sub>	5.0	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave Unidirectional Only (Note 2)	I <sub>FSM</sub>	100	A
Maximum Instantaneous Forward Voltage at 50A for Unidirectional Only	V <sub>F</sub>	3.5	V
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to 175	°C
Typical Thermal Resistance Junction to Lead	R <sub>uJL</sub>	20	°C/W
Typical Thermal Resistance Junction to Ambient	R <sub>uJA</sub>	75	°C/W

**Notes:**

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

**Functional Diagram**



**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**

- Hi reliability application and automotive grade AEC-Q101 qualified
- Glass passivated chip junction in DO-15 Package
- 600W peak pulse capability at 10/1000µs 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°C/40sec / 0.375"/(9.5mm) lead length, 5 lbs., (2.3kg) tension
- V<sub>BR</sub> @ T<sub>J</sub> = V<sub>BR</sub> @ 25°C x (1 + α T x (T<sub>J</sub> - 25)) (α T: 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**

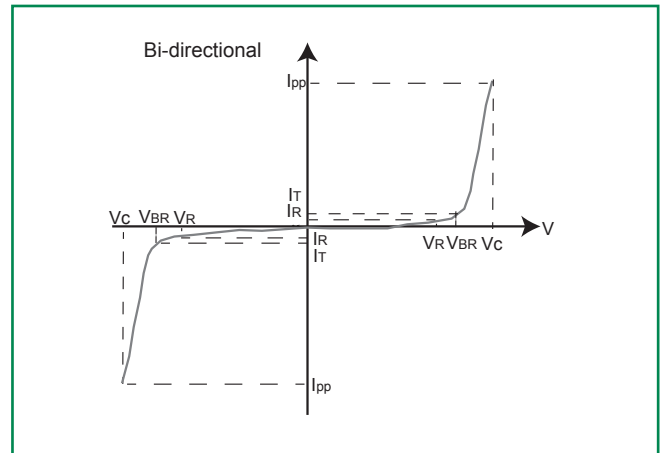
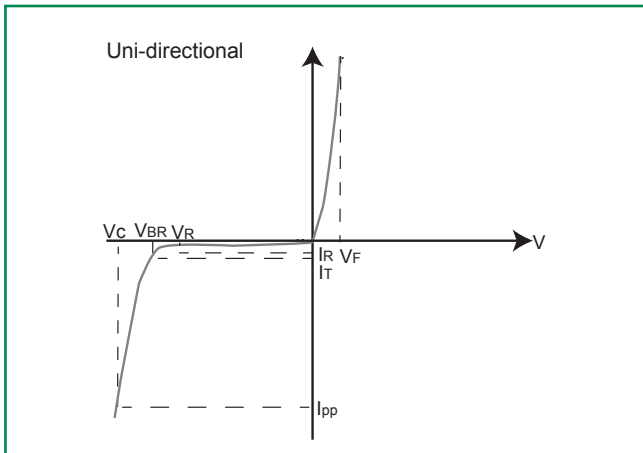
TVS devices are ideal for the protection of I/O interfaces, V<sub>CC</sub> bus and other vulnerable circuits used in telecom, computer, industrial and consumer electronic applications.

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

Part Number (Uni)	Part Number (Bi)	Reverse Stand off Voltage V <sub>R</sub> (Volts)	Breakdown Voltage V <sub>BR</sub> (Volts) @ I <sub>T</sub>		Test Current I <sub>T</sub> (mA)	Maximum Clamping Voltage V <sub>C</sub> @ I <sub>pp</sub> (V)	Maximum Peak Pulse Current I <sub>pp</sub> (A)	Maximum Reverse Leakage I <sub>R</sub> @ V <sub>R</sub> (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<sub>BR</sub> is ± 10% and V<sub>C</sub> is 5% higher than with A parts

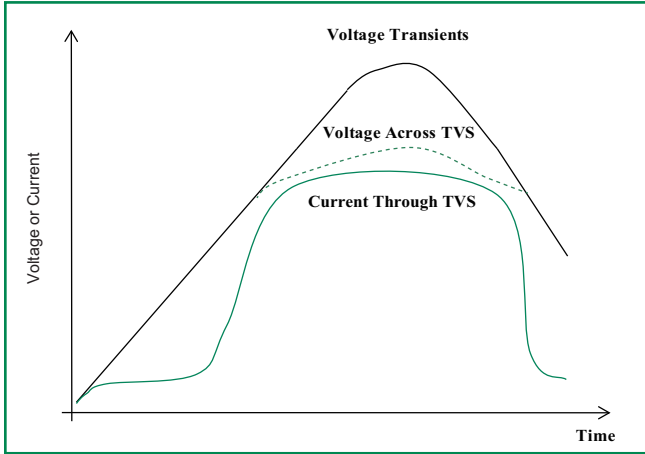
### I-V Curve Characteristics



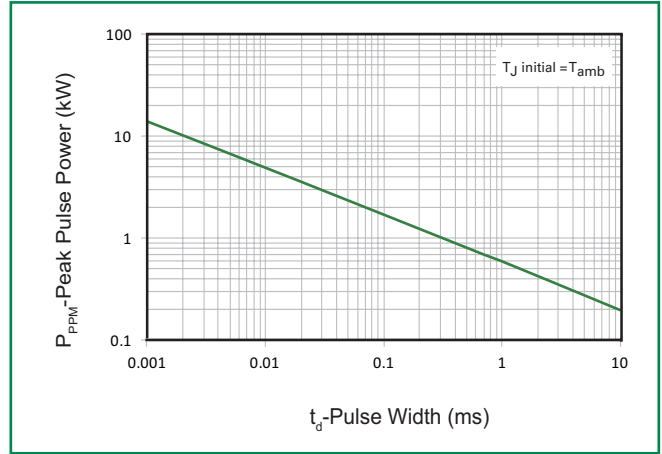
- P<sub>PPM</sub> Peak Pulse Power Dissipation** – Max power dissipation
- V<sub>R</sub> Stand-off Voltage** – Maximum voltage that can be applied to the TVS without operation
- V<sub>BR</sub> Breakdown Voltage** – Maximum voltage that flows through the TVS at a specified test current (I<sub>T</sub>)
- V<sub>C</sub> Clamping Voltage** – Peak voltage measured across the TVS at a specified I<sub>ppm</sub> (peak impulse current)
- I<sub>R</sub> Reverse Leakage Current** – Current measured at V<sub>R</sub>
- V<sub>F</sub> Forward Voltage Drop for Uni-directional**

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

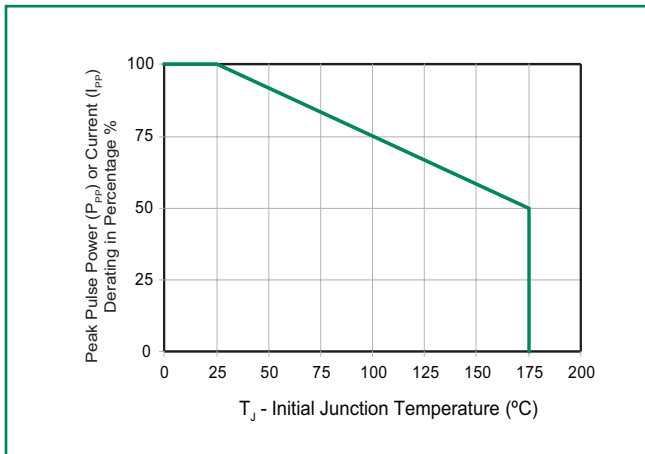
**Figure 1 - TVS Transients Clamping Waveform**



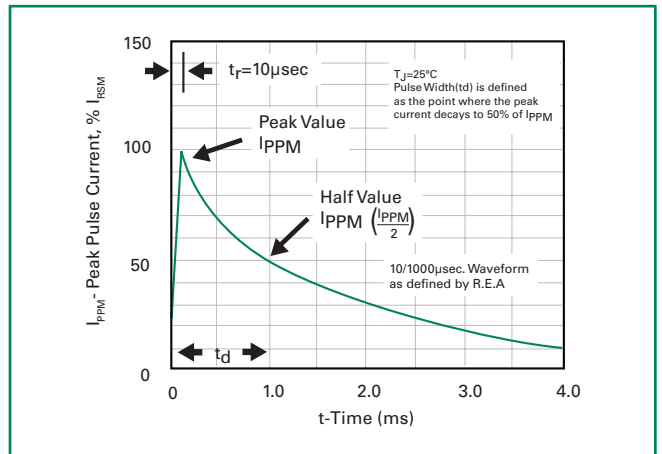
**Figure 2 - Peak Pulse Power Rating**



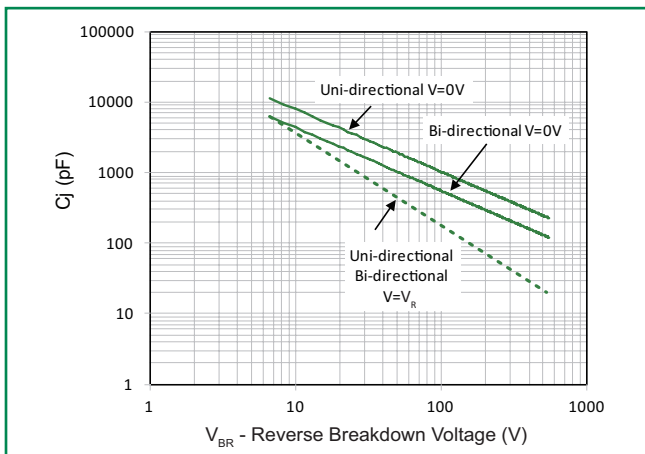
**Figure 3 - Peak Pulse Power Derating Curve**



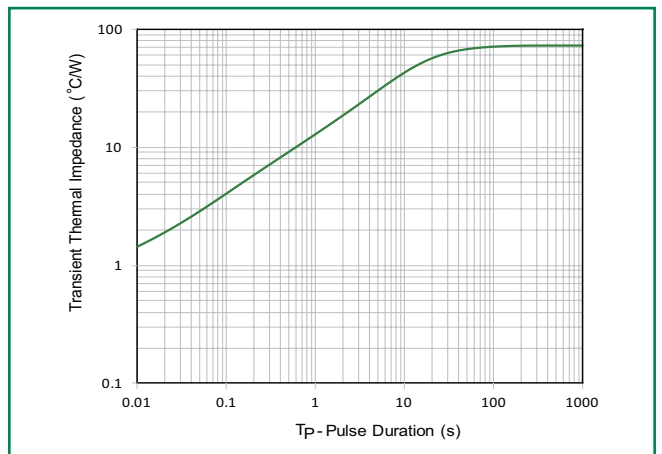
**Figure 4 - Pulse Waveform**



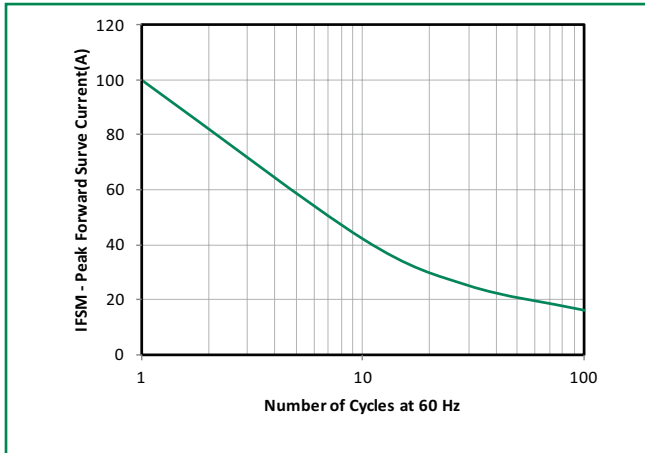
**Figure 5 - Typical Junction Capacitance**



**Figure 6 - Typical Transient Thermal Impedance**



**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

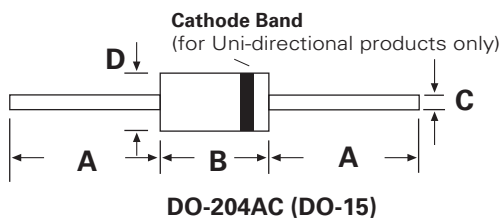
**Physical Specificationst**

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**

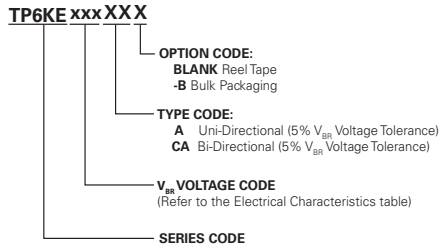
High Temp. Storage	JESD22-A103
HTRB	JESD22-A108
Temperature Cycling	JESD22-A104
H3TRB	JESD22-A101
RSH	JESD22-B106

**Dimensions**

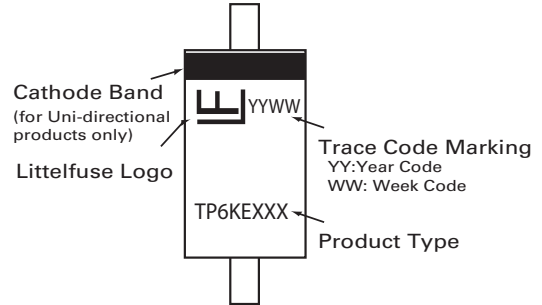


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.230	0.300	5.80	7.60
C	0.028	0.034	0.71	0.86
D	0.104	0.140	2.60	3.60

**Part Numbering System**



**Part Marking System**



**Packaging**

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

**Tape and Reel Specification**

