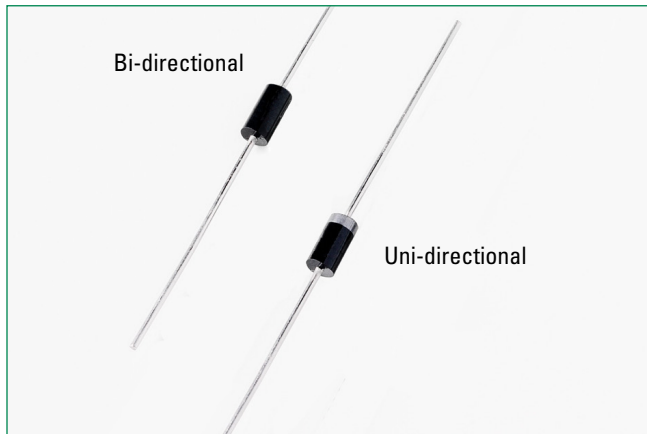


# TP6KE Series

## 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 $\mu\text{s}$ 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:

- Non-repetitive current pulse, per Fig. 4 and derated above  $T_J$  (initial) =  $25^\circ\text{C}$  per Fig. 3.
- 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.

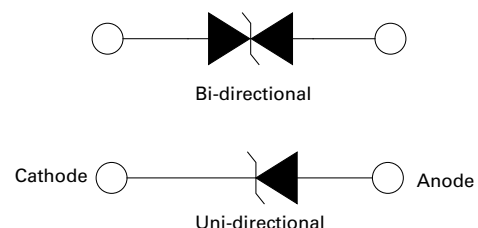
### Features & Benefits

- Hi reliability application and automotive grade AEC-Q101 qualified
- Glass passivated chip junction in DO-15 Package
- 600W peak pulse capability at 10/1000 $\mu\text{s}$  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
- $VBR @ T_J = VBR @ 25^\circ\text{C} \times (1 + \alpha T) \times (T_J - 25)$  ( $\alpha T$ : 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, VCC bus and other vulnerable circuits used in telecom, computer, industrial and consumer electronic applications.

### Functional Diagram



# TP6KE Series

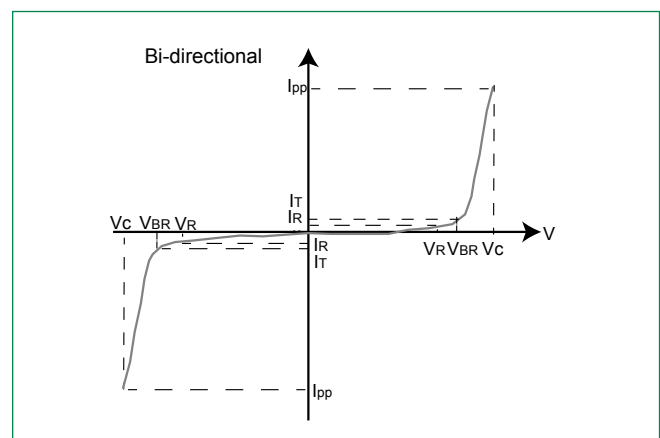
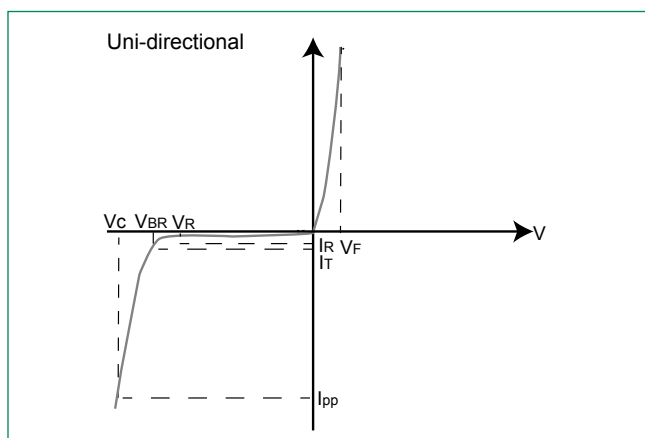
## Axial Leaded – 600W

### 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 $I_R$ @ $V_R$ ( $\mu\text{A}$ )	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



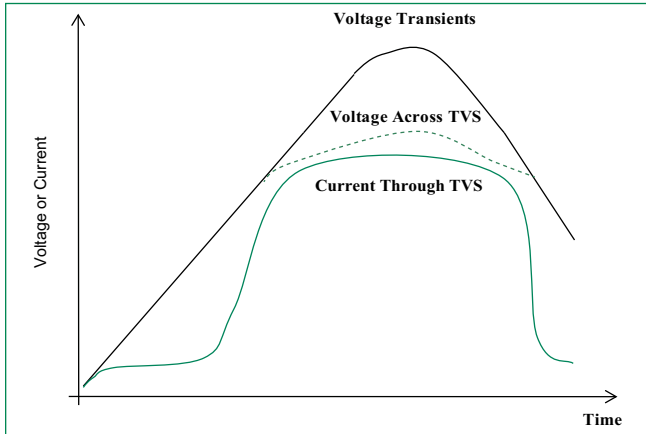
**$P_{PPM}$  Peak Pulse Power Dissipation** -- Max power dissipation  
 **$V_R$  Stand-off Voltage** -- Maximum voltage that can be applied to the TVS without operation  
 **$V_{BR}$  Breakdown Voltage** -- Maximum voltage that flows through the TVS at a specified test current ( $I_T$ )  
 **$V_C$  Clamping 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

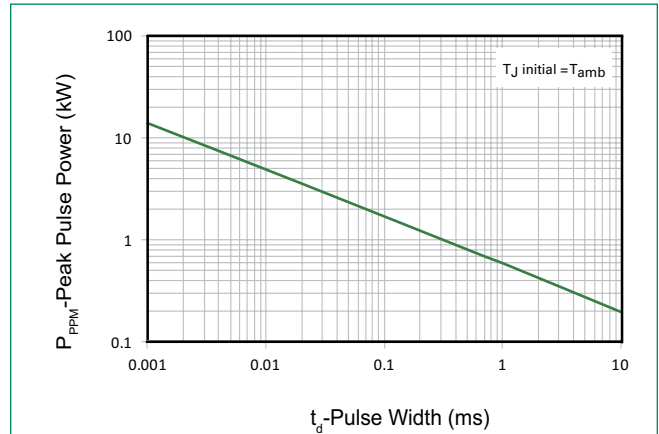
## Axial Leaded – 600W

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

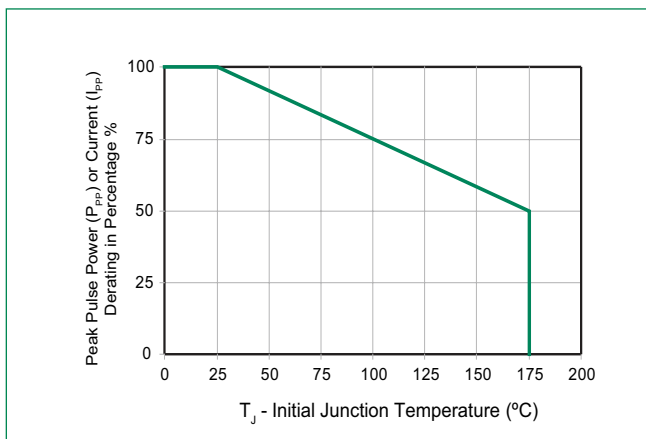
**Figure 1 -**  
TVS Transients Clamping Waveform



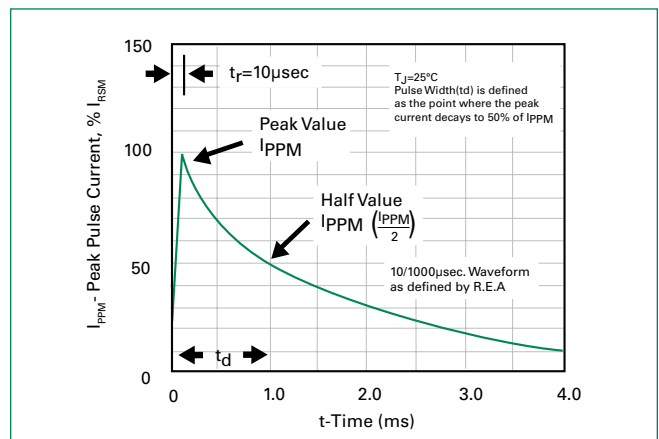
**Figure 2 -**  
Peak Pulse Power Rating



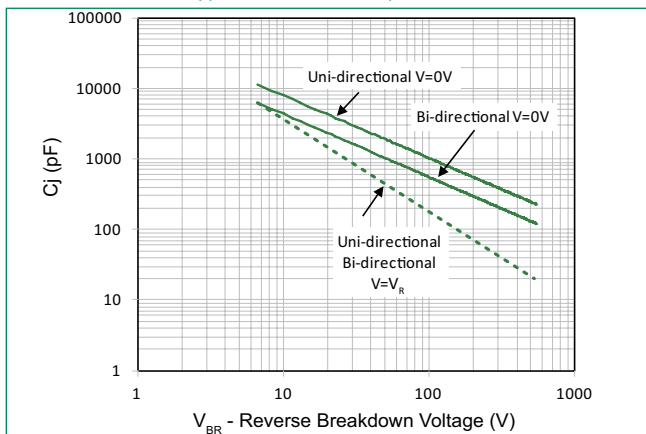
**Figure 3 -**  
Peak Pulse Power Derating Curve



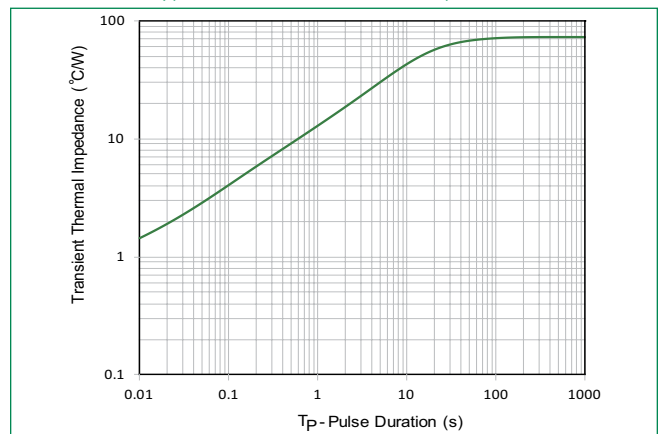
**Figure 4 -**  
Pulse Waveform



**Figure 5 -**  
Typical Junction Capacitance



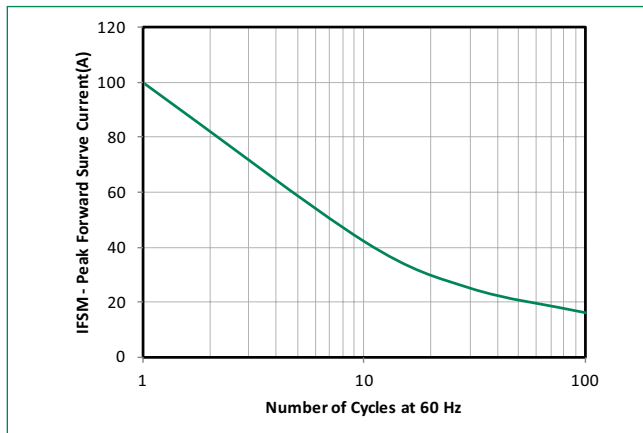
**Figure 6 -**  
Typical Transient Thermal Impedance



# TP6KE Series

## Axial Leaded – 600W

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



### Flow/Wave Soldering (Solder Dipping)

<b>Peak Temperature :</b>	265°C
<b>Dipping Time :</b>	10 seconds
<b>Soldering :</b>	1 time

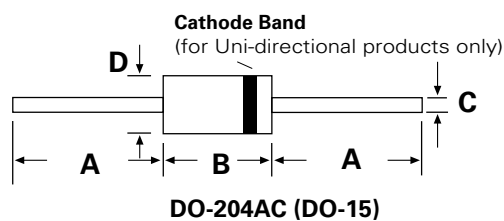
### Physical Specificationst

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

### Environmental Specifications

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

## Dimensions

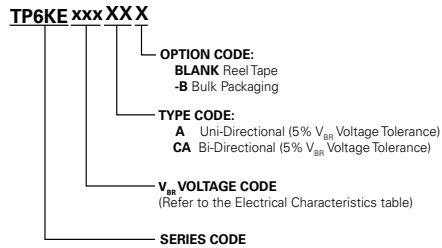


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.230	0.300	5.80	7.60
C	0.028	0.034	0.71	0.86
D	0.104	0.140	2.60	3.60

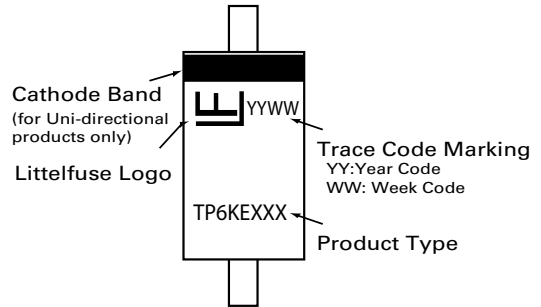
# TP6KE Series

## Axial Leaded – 600W

### Part Numbering System



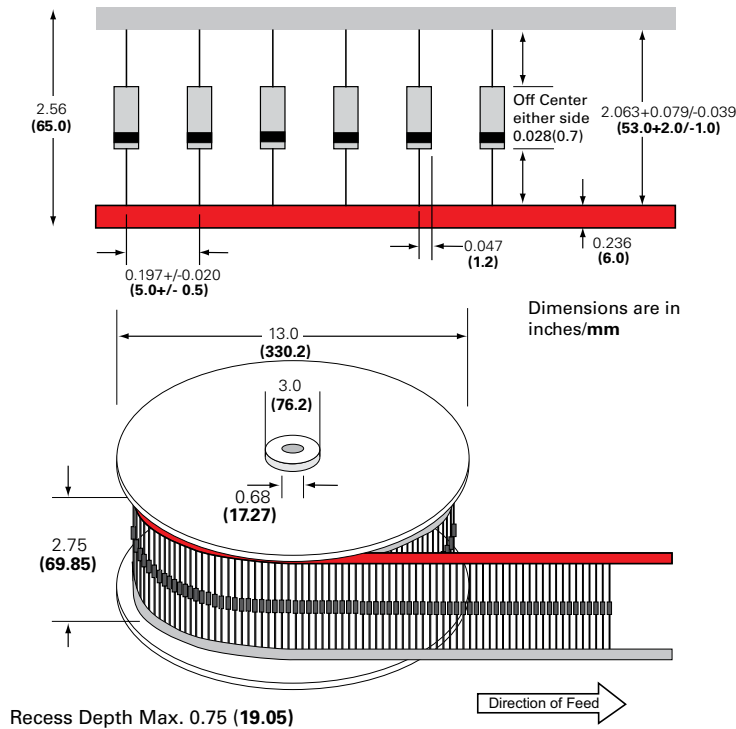
### Part Marking System



### 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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