

TVS Diode – P6KE Series

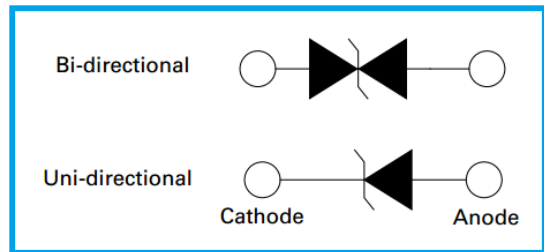
Features

- Plastic package, excellent insulation strength.
- Glass passivated chip junction in DO-15 package.
- Excellent voltage clamping capability.
- Low Zener impedance.
- 600W peak pulse power capability on 10/1000 μ s waveform.
- Typical leakage current less than 1 μ A above 13V.
- Very fast response time, typically less than 1.0ps from 0 volt to V_{BR} minimum.
- High temperature soldering guaranteed: 265 $^{\circ}$ C/10 sec.
- MSL: JEDEC-J-STD-020, Level 1



Applications

- I/O interface, V_{CC} bus
- Telecom
- Industrial and consumer electronic applications.
- Relay and electromagnetic valve surge absorption.



Agency Approval

- UL file no.: E474915

Mechanical and Physical Data

- Case: JEDEC DO-15 molded plastic.
- Axial leaded, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denoted cathode except bidirectional.

Maximum Ratings and Thermal Characteristics

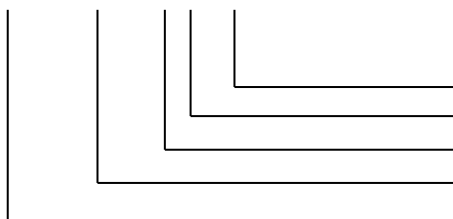
Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation on 10/1000 μ s waveform (Note 1, Fig.1).	P_{PPM}	Min 600	Watt
Peak Pulse Current of 10/1000 μ s waveform (Note 1, Fig.3).	I_{PPM}	See Table	Amp
Steady State Power Dissipation at $T_L = 75^{\circ}$ C, Lead lengths 0.375", (9.5mm) (Fig.5).	$P_{M(AV)}$	5.0	Watt
Peak Forward Surge Current, 8.3 ms Single Half Sine Wave Superimposed on Rated Load (Note 2, Fig.6).	I_{FSM}	100	Amp
Operating Junction and Storage Temperature Range.	T_J, T_{STG}	-55~175	$^{\circ}$ C

Note:

1. Non-repetitive current pulse, per Fig.3 and derated above $T_A = 25^{\circ}$ C per Fig.2.
2. 8.3ms single half sine wave, or equivalent square wave, Duty cycle = 4 pulses per minutes maximum.

Part Number Code

P6KE □□□ **CA** - □



- Packaging Code (T: Tape & Reel; B: Bulk)
- V_{BR} Voltage tolerance (A: 5%; Blank: 10%)
- C: Bi-directional; Blank: Uni-directional
- Typical Breakdown Voltage
- P6KE Series (600W)

TVS Diode – P6KE Series

I-V Curve Characteristics



I_{PPM} Peak Pulse Power Dissipation – Maximum 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

Electrical Characteristics

Part Number		Reverse Stand Off Voltage V_R (V)	Breakdown Voltage V_{BR} (V) @ I_T		Test Current I_T (mA)	Maximum Clamping Voltage V_C (V) @ I_{PP}	Maximum Peak Pulse Current I_{PP} (A)	Maximum Reverse Leakage I_R (μ A) @ V_R
Uni	Bi		Min.	Max.				
P6KE6.8A	P6KE6.8CA	5.80	6.45	7.14	10	10.5	57.1	1000
P6KE7.5A	P6KE7.5CA	6.40	7.13	7.88	10	11.3	53.1	500
P6KE8.2A	P6KE8.2CA	7.02	7.79	8.61	10	12.1	49.6	200
P6KE9.1A	P6KE9.1CA	7.78	8.65	9.55	1	13.4	44.8	50
P6KE10A	P6KE10CA	8.55	9.50	10.5	1	14.5	41.4	10
P6KE11A	P6KE11CA	9.40	10.5	11.6	1	15.6	38.5	5
P6KE12A	P6KE12CA	10.2	11.4	12.6	1	16.7	35.9	5
P6KE13A	P6KE13CA	11.1	12.4	13.7	1	18.2	33.0	1
P6KE15A	P6KE15CA	12.8	14.3	15.8	1	21.2	28.3	1
P6KE16A	P6KE16CA	13.6	15.2	16.8	1	22.5	26.7	1
P6KE18A	P6KE18CA	15.3	17.1	18.9	1	25.5	23.5	1
P6KE20A	P6KE20CA	17.1	19.0	21.0	1	27.7	21.7	1
P6KE22A	P6KE22CA	18.8	20.9	23.1	1	30.6	19.6	1
P6KE24A	P6KE24CA	20.5	22.8	25.2	1	33.2	18.1	1
P6KE27A	P6KE27CA	23.1	25.7	28.4	1	37.5	16.0	1
P6KE30A	P6KE30CA	25.6	28.5	31.5	1	41.4	14.5	1
P6KE33A	P6KE33CA	28.2	31.4	34.7	1	45.7	13.1	1
P6KE36A	P6KE36CA	30.8	34.2	37.8	1	49.9	12.0	1

TVS Diode – P6KE Series

Part Number		Reverse Stand Off Voltage V_R (V)	Breakdown Voltage V_{BR} (V) @ I_T		Test Current I_T (mA)	Maximum Clamping Voltage V_C (V) @ I_{PP}	Maximum Peak Pulse Current I_{PP} (A)	Maximum Reverse Leakage I_R (μ A) @ V_R
			Min.	Max.				
Uni	Bi							
P6KE39A	P6KE39CA	33.3	37.1	41.0	1	53.9	11.1	1
P6KE43A	P6KE43CA	36.8	40.9	45.2	1	59.3	10.1	1
P6KE47A	P6KE47CA	40.2	44.7	49.4	1	64.8	9.3	1
P6KE51A	P6KE51CA	43.6	48.5	53.6	1	70.1	8.6	1
P6KE56A	P6KE56CA	47.8	53.2	58.8	1	77.0	7.8	1
P6KE62A	P6KE62CA	53.0	58.9	65.1	1	85.0	7.1	1
P6KE68A	P6KE68CA	58.1	64.6	71.4	1	92.0	6.5	1
P6KE75A	P6KE75CA	64.1	71.3	78.8	1	103	5.8	1
P6KE82A	P6KE82CA	70.1	77.9	86.1	1	113	5.3	1
P6KE91A	P6KE91CA	77.8	86.5	95.5	1	125	4.8	1
P6KE100A	P6KE100CA	85.5	95.0	105.0	1	137	4.4	1
P6KE110A	P6KE110CA	94.0	105.0	116.0	1	152	4.0	1
P6KE120A	P6KE120CA	102.0	114.0	126.0	1	165	3.6	1
P6KE130A	P6KE130CA	111.0	124.0	137.0	1	179	3.4	1
P6KE150A	P6KE150CA	128.0	143.0	158.0	1	207	2.9	1
P6KE160A	P6KE160CA	136.0	152.0	168.0	1	219	2.7	1
P6KE170A	P6KE170CA	145.0	162.0	179.0	1	234	2.6	1
P6KE180A	P6KE180CA	154.0	171.0	189.0	1	246	2.4	1
P6KE200A	P6KE200CA	171.0	190.0	210.0	1	274	2.2	1
P6KE220A	P6KE220CA	185.0	209.0	231.0	1	328	1.8	1
P6KE250A	P6KE250CA	214.0	237.0	263.0	1	344	1.7	1
P6KE300A	P6KE300CA	256.0	285.0	315.0	1	414	1.5	1
P6KE350A	P6KE350CA	300.0	332.0	368.0	1	482	1.3	1
P6KE400A	P6KE400CA	342.0	380.0	420.0	1	548	1.1	1
P6KE440A	P6KE440CA	376.0	418.0	462.0	1	602	1.0	1
P6KE480A	P6KE480CA	408.0	456.0	504.0	1	658	0.9	1
P6KE510A	P6KE510CA	434.0	485.0	535.0	1	698	0.9	1
P6KE530A	P6KE530CA	451.0	503.5	556.5	1	725	0.8	1
P6KE540A	P6KE540CA	459.0	513.0	567.0	1	740	0.8	1
P6KE550A	P6KE550CA	468.0	522.5	577.5	1	760	0.8	1
P6KE600A	P6KE600CA	510.0	570.0	630.0	1	828	0.7	1

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Ratings and Characteristic Curves

Fig 1 - Peak Pulse Power Rating Curve

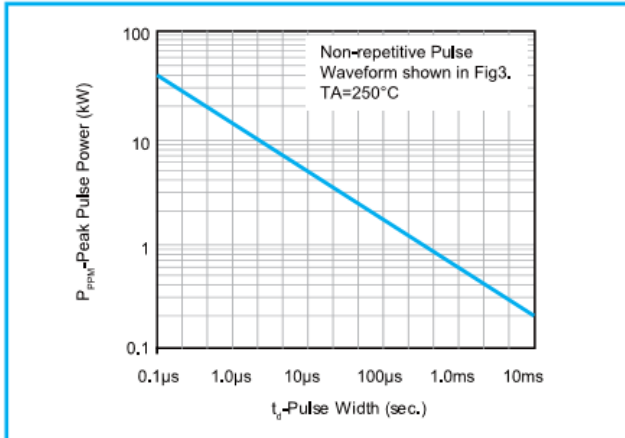


Fig 2 - Pulse Derating Curve

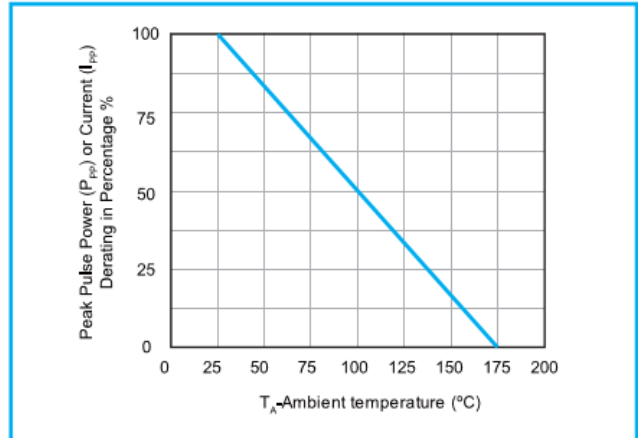


Fig 3 - Pulse Waveform

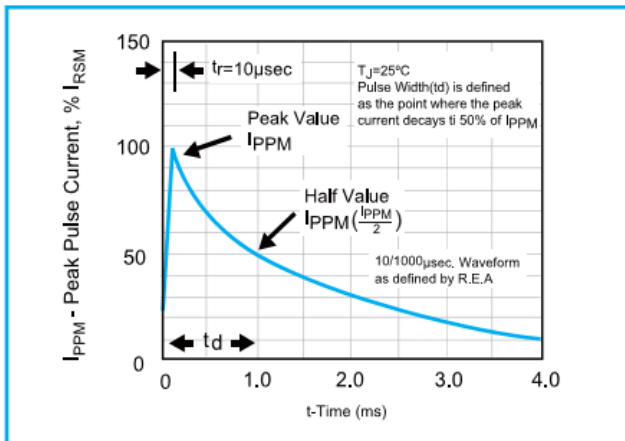


Fig 4 - Typical Junction Capacitance Uni-directional

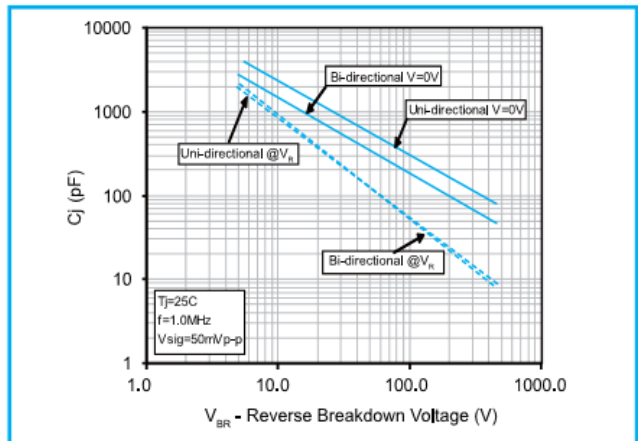


Fig 5 - Steady State Power Dissipation Derating Curve

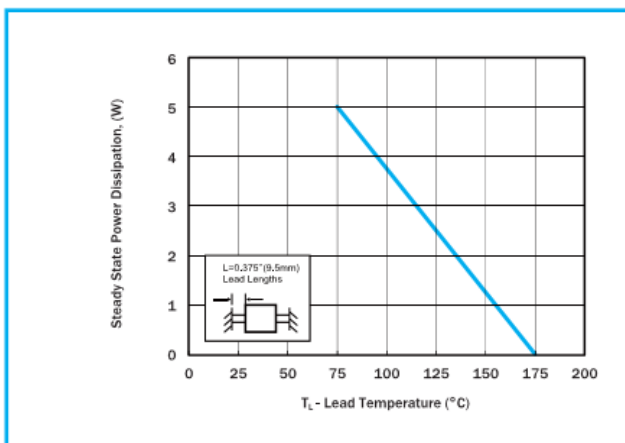
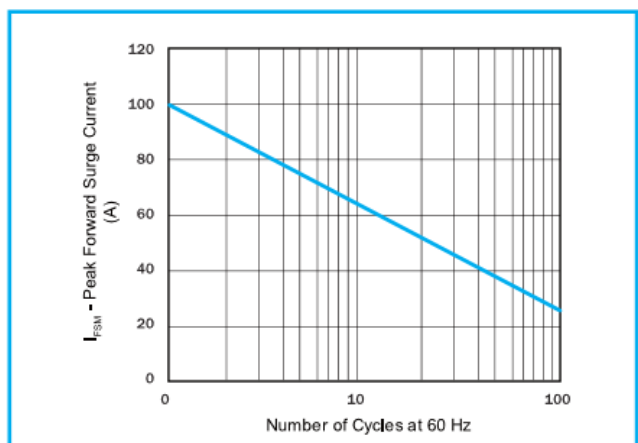
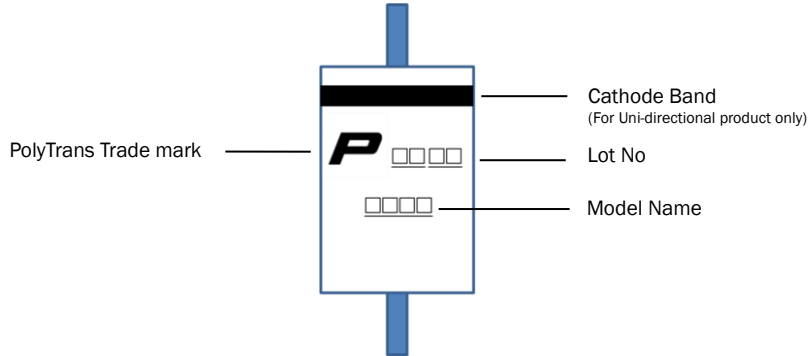


Fig 6 - Maximum Non-Repetitive Forward Surge Current (Uni-directional Only)

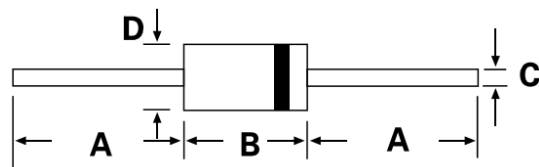


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Marking Definitions



Physical Dimensions

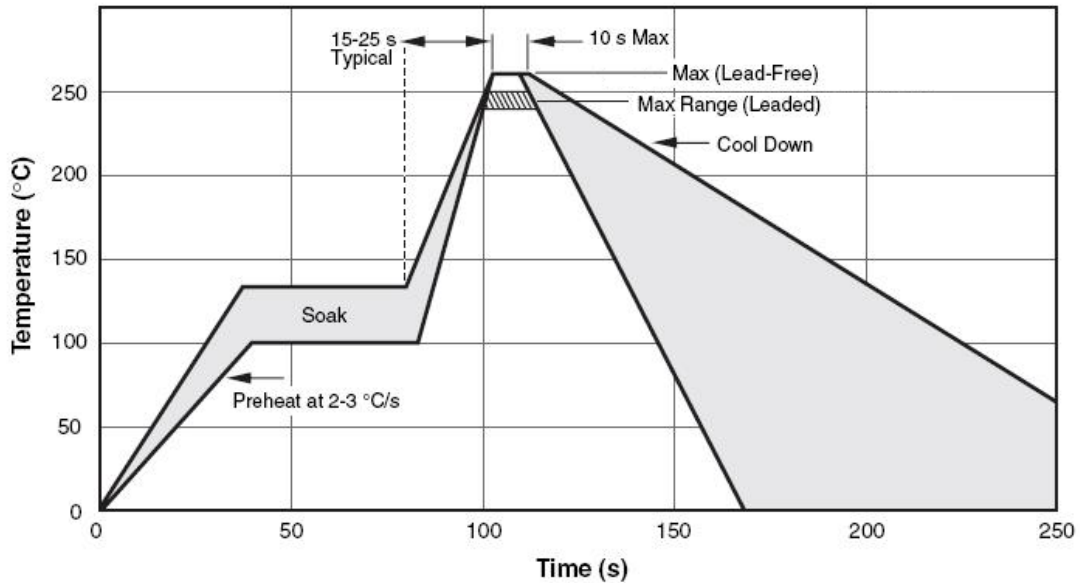


DO-204AC (DO-15)

Dimension	Millimeters		Inches	
	Min	Max	Min	Max
A	25.4	-	1.000	-
B	5.80	7.60	0.230	0.300
C	0.71	0.86	0.028	0.034
D	2.60	3.60	0.104	0.140

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Wave Soldering Parameters



Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate ($T_{s_{max}}$ to T_P)	4°C/second max.
Preheat	
-Temperature Min ($T_{s_{min}}$)	100°C
-Temperature Max ($T_{s_{max}}$)	125°C
-Time ($T_{s_{min}}$ to $T_{s_{max}}$)	60-180 seconds
Peak Temperature (T_P)	265°C
Max Time at Peak Temperature (t_p)	5 seconds
Ramp-Down Rate	6°C /second max.
Time 25°C to Peak Temperature	5 minutes max.
Storage Condition	0°C ~35°C, ≤ 80%RH

Note: If the wave soldering temperatures exceed the recommended profile, devices may not meet the performance requirements.

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Packaging Information

Part Number	Packaging Code	Component Package	Quantity	Packaging Option	Packaging Specification
P6KE Series	T	DO-15	4000	Tape & Reel	EIA STD RS-296
P6KE Series	B	DO-15	500	Bulk	-

Tape and Reel Specifications

