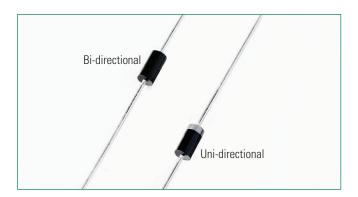
P6KE Series





Agency Approvals

Agency	Agency File Number
71.	E230531

Maximum Ratings and Thermal Characteristics (T_{Δ} =25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation(Fig.2) by 10/1000us Test Waveform(Fig.4)(Note 1) -Single Die Parts	P _{PPM}	600	W
Peak Pulse Power Dissipation(Fig.2) by 10/1000us Test Waveform(Fig.4)(Note 1) -Stacked Die Parts(Note 4)	P _{PPM}	800	W
Steady State Power Dissipation on Infinite Heat Sink at $\rm T_L = 75^{\circ}C$	P _D	5.0	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave Unidirectional Only (Note 2)	I _{FSM}	100	А
Maximum Instantaneous Forward Voltage at 50A for Unidirectional Only (Note 3)	V _F	3.5/5.0	V
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 to 175	°C
Typical Thermal Resistance Junction to Lead	R _{eJL}	20	°C/W
Typical Thermal Resistance Junction to Ambient	R _{eJA}	75	°C/W

Notes:

- Non-repetitive current pulse , per Fig. 4 and derated above T, (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.
- 3. $V_F < 3.5V$ for single die parts and $V_F < 5.0V$ for stacked-die parts.
- $\textbf{4.} \ \text{For stacked die component details, please refer to part numbers labeled by * in Electrical Characteristics.}$

Description

The P6KE Series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

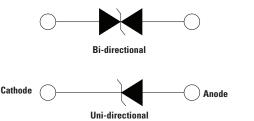
- 600W peak pulse capability at 10/1000µs waveform, repetition rate (duty cycles):0.01%
- Glass passivated chip junction in DO-15 Package
- Fast response time: typically less than 1.0ps from 0 Volts to BV min
- Excellent clamping capability
- Typical failure mode is short from over-specified voltage or current
- Whisker test conducted based on Table 4a and 4c of JEDEC JESD201A
- IEC 61000-4-2 ESD 30kV(Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- Low incremental surge resistance

- Typical I_R less than $1\mu A$ when V_{BR} min>12V
- Compatible with high temperature reflow soldering (260°C/30 s)
- V_{BR} @ T_{J} = V_{BR} @ 25° C x $(1+\alpha T \times (T_{J}-25))$ (αT :Temperature Coefficient, typical value is 0.1%)
- UL Recognized epoxy meeting flammability classification V-0
- Matte tin lead-free plated
- Halogen free and RoHS compliant
- Pb-free E3 means 2nd level interconnect is Pbfree and the terminal finish material is tin(Sn) (IPC/ JEDEC J-STD-609A.01)

Applications

TVS components are ideal for the protection of I/O interfaces, $V_{\rm CC}$ bus and other vulnerable circuits used in telecom, computer, industrial and consumer electronic applications.

Functional Diagram



Additional Infomation







Resources



Samples

TVS Diodes Axial Leaded - 600W > P6KE series

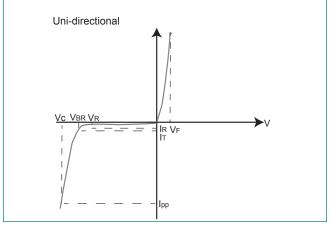
Electrical Characteristics (T_A=25°C unless otherwise noted)

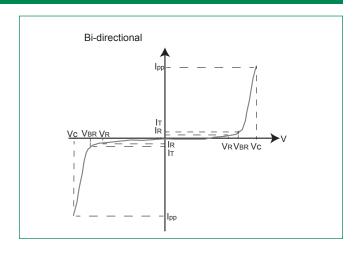
Part Number (Uni)	Part Number (Bi)	Reverse Stand off Voltage V _R (Volts)	Volta	down ge V _{BR} s) @ I _T	Test Current I _T (mA)	Maximum Clamping Voltage V _c @ I _m (V)	Maximum Peak Pulse Current I _{pp} (A)	Maximum Reverse Leakage I _R @ V _R	Agency Approval
			Min.	Max.	(mA)	C e Ipp (V)	i _{pp} (A)	(μΑ)	~
P6KE6.8A	P6KE6.8CA	5.80	6.45	7.14	10	10.5	58.1	1000	X
P6KE7.5A	P6KE7.5CA	6.40	7.13	7.88	10	11.3	54.0	500	X
P6KE8.2A	P6KE8.2CA	7.02	7.79	8.61	10	12.1	50.4	200	X
P6KE9.1A	P6KE9.1CA	7.78	8.65	9.55	1	13.4	45.5	50	X
P6KE10A	P6KE10CA	8.55	9.50	10.50	1	14.5	42.1	10	X
P6KE11A	P6KE11CA	9.40	10.50	11.60	1	15.6	39.1	5	X
P6KE12A	P6KE12CA	10.20	11.40	12.60	1	16.7	36.5	5	X
P6KE13A	P6KE13CA	11.10	12.40	13.70	1	18.2	33.5	1	X
P6KE15A	P6KE15CA	12.80	14.30	15.80	1	21.2	28.8	1	X
P6KE16A	P6KE16CA	13.60	15.20	16.80	1	22.5	27.1	1	X
P6KE18A	P6KE18CA	15.30	17.10	18.90	1	25.2	24.2	1	X
P6KE20A	P6KE20CA	17.10	19.00	21.00	1	27.7	22.0	1	X
P6KE22A	P6KE22CA	18.80	20.90	23.10	1	30.6	19.9	1	X
P6KE24A	P6KE24CA	20.50	22.80	25.20	1	33.2	18.4	1	X
P6KE27A	P6KE27CA	23.10	25.70	28.40	1	37.5	16.3	1	X
P6KE30A	P6KE30CA	25.60	28.50	31.50	1	41.4	14.7	1	X
P6KE33A	P6KE33CA	28.20	31.40	34.70	1	45.7	13.3	1	X
P6KE36A	P6KE36CA	30.80	34.20	37.80	1	49.9	12.2	1	X
P6KE39A	P6KE39CA	33.30	37.10	41.00	1	53.9	11.3	1	X
P6KE43A	P6KE43CA	36.80	40.90	45.20	1	59.3	10.3	1	X
P6KE47A	P6KE47CA	40.20	44.70	49.40	1	64.8	9.4	1	X
P6KE51A	P6KE51CA	43.60	48.50	53.60	1	70.1	8.7	1	X
P6KE56A	P6KE56CA	47.80	53.20	58.80	1	77.0	7.9	1	X
P6KE62A	P6KE62CA	53.00	58.90	65.10	1	85.0	7.2	1	X
P6KE68A	P6KE68CA	58.10	64.60	71.40	1	92.0	6.6	1	X
P6KE75A	P6KE75CA	64.10	71.30	78.80	1	103.0	5.9	1	X
P6KE82A	P6KE82CA	70.10	77.90	86.10	1	113.0	5.4	1	X
P6KE91A	P6KE91CA	77.80	86.50	95.50	1	125.0	4.9	1	X
P6KE100A	P6KE100CA	85.50	95.00	105.00	1	137.0	4.5	1	X
P6KE110A	P6KE110CA	94.00	105.00	116.00	1	152.0	4.0	1	X
P6KE120A	P6KE120CA	102.00	114.00	126.00	1	165.0	3.7	1	X
P6KE130A	P6KE130CA	111.00	124.00	137.00	1	179.0	3.4	1	X
P6KE150A	P6KE150CA	128.00	143.00	158.00	1	207.0	2.9	1	X
P6KE160A	P6KE160CA	136.00	152.00	168.00	1	219.0	2.8	1	X
P6KE170A	P6KE170CA	145.00	162.00	179.00	1	234.0	2.6	1	X
P6KE180A	P6KE180CA	154.00	171.00	189.00	1	246.0	2.5	1	X
P6KE200A	P6KE200CA	171.00	190.00	210.00	1	274.0	2.2	1	X
P6KE220A	P6KE220CA	185.00	209.00	231.00	1	328.0	1.9	1	X
P6KE250A	-	214.00	237.00	263.00	1	344.0	1.8	1	X
	P6KE250CA*	214.00	237.00	263.00	1	344.0	2.4	1	X
P6KE300A	-	256.00	285.00	315.00	1	414.0	1.5	1	X
	P6KE300CA*	256.00	285.00	315.00	1	414.0	2.0	1	X
P6KE350A*	P6KE350CA*	300.00	332.00	368.00	1	482.0	1.7	1	X
P6KE400A*	P6KE400CA*	342.00	380.00	420.00	1	548.0	1.5	1	X
P6KE440A*	P6KE440CA*	376.00	418.00	462.00	1	602.0	1.4	1	X
P6KE480A*	P6KE480CA*	408.00	456.00	504.00	1	658.0	1.3	1	X
P6KE510A*	P6KE510CA*	434.00	485.00	535.00	1	698.0	1.2	1	X
P6KE530A*	P6KE530CA*	451.00	503.50	556.50	1	725.0	1.2	1	X
P6KE540A*	P6KE540CA*	460.00	513.00	567.00	1	740.0	1.1	1	X
P6KE550A*	P6KE550CA*	468.00	522.50	577.50	1	760.0	1.1	1	X
P6KE600A*	P6KE600CA*	512.00	570.00	630.00	1	828.0	1.0	1	

For bidirectional type having V_R of 10 volts and less, the I_R limit is double. For parts without A, the V_{sc} is \pm 10% and V_C is 5% higher than with A parts, the parts without A are currently available, but not recommended for new designs. The parts with A are preferred. For stack-die parts, use * to label the part number.



I-V Curve Characteristics





- $\mathbf{P}_{_{\mathbf{PPM}}}$ Peak Pulse Power Dissipation Max power dissipation
- Stand-off Voltage Maximum voltage that can be applied to the TVS without operation
- Breakdown Voltage Maximum voltage that flows though the TVS at a specified test current (I_r)
- Clamping Voltage Peak voltage measured across the TVS at a specified lppm (peak impulse current)
- I_R Reverse Leakage Current - Current measured at V_R
- Forward Voltage Drop for Uni-directional

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

Figure 1 - TVS Transients Clamping Waveform

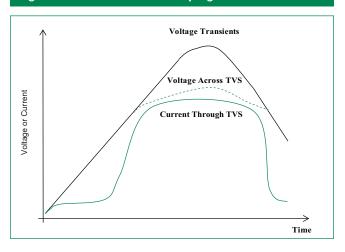
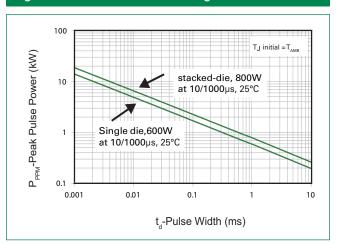


Figure 2 - Peak Pulse Power Rating





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

Figure 3 - Peak Pulse Power Derating Curve

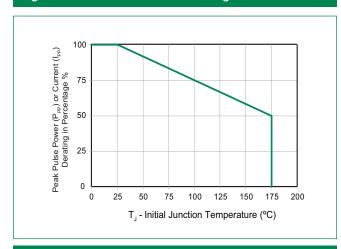


Figure 5 - Typical Junction Capacitance

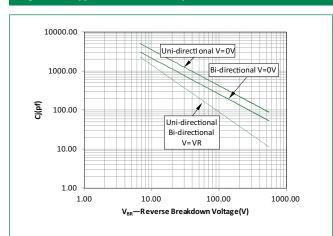


Figure 7 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only

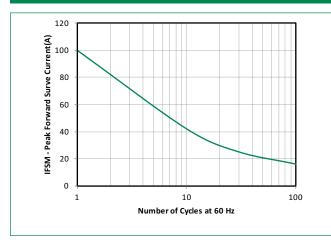


Figure 4 - Pulse Waveform

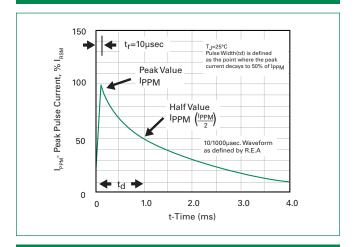


Figure 6 - Typical Transient Thermal Impedance

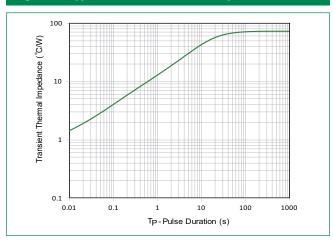
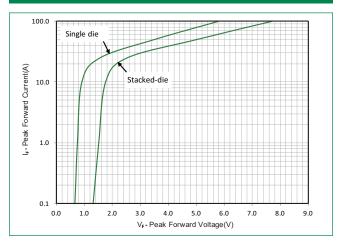


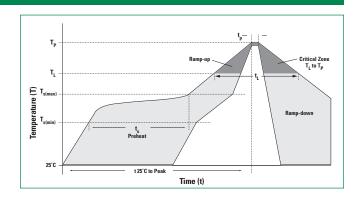
Figure 8 - Peak Forward Voltage Drop vs Peak Forward Current (Typical Values)



TVS Diodes Axial Leaded – 600W > P6KE series

Soldering Parameters

Reflow Con	Lead-free assembly		
	-Temperature Min (T _{s(min)})	150°C	
Pre Heat	-Temperature Max (T _{s(max)})	200°C	
	-Time (min to max) (t _s)	60 – 120 secs	
Average ran	Average ramp up rate (Liquidus Temp (T _L) to peak		
T _{S(max)} to T _L -	3°C/second max		
Reflow	-Temperature (T _L) (Liquidus)	217°C	
nellow	-Time (min to max) (t _L)	60 – 150 seconds	
Peak Tempe	Peak Temperature (T _p)		
Time within	Time within 5°C of actual peak Temperature (t _p)		
Ramp-down	6°C/second max		
Time 25°C t	Time 25°C to peak Temperature (T _p)		
Do not exce	260°C		



Flow/Wave Soldering (Solder Dipping)

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

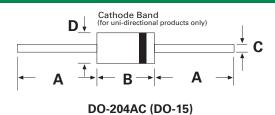
Physical Specificationst C

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		

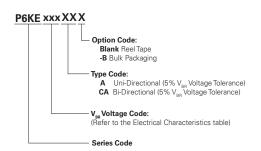
Dimensions

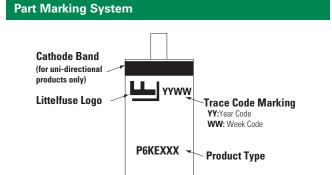


Dimensions	Inc	hes	Millimeters		
	Min	Max	Min	Max	
Α	1.000	-	25.40	-	
В	0.230	0.300	5.80	7.60	
С	0.028	0.034	0.71	0.86	
D	0.104	0.140	2.60	3.60	



Part Numbering System





Packaging				
Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
P6KExxxXX	DO-204AC	4000	Tape & Reel	EIA STD RS-296
P6KExxxXX-B	DO-204AC	1000	BULK	Littelfuse Spec.

Tape and Reel Specification

