

Description

The P4KE Automotive Series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

- Halogen-free
- Rohs compliant
- Typical maximum temperature coefficient
 $\Delta V_{BR} = 0.1\% \times V_{BR@25^{\circ}C} \times \Delta T$
- Glass passivated Chip junction in DO-41 package
- 400W peak pulse capability at 10x1000μs waveform, repetition rate (duty cycles):0.01%
- Fast response time: typically less than 1.0ps from 0 Volts to BV min
- Excellent clamping capability
- Low incremental surge resistance
- Typical I_R less than 1μA above 11V
- High temperature soldering guaranteed: 260°C/40 seconds / 0.375", (9.5mm) lead length, 5lbs., (2.3kg) tension
- Plastic package has underwriters laboratory flammability classification 94v-0
- Matte Tin Lead-free plated
- AEC-Q101 qualified.

Applications

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

Maximum Ratings And Characteristics ($T_A=25^{\circ}C$ unless otherwise noted)

Rating	Symbol	Value	Units
Peak Pulse Power Dissipation by 10x1000μs test waveform (Fig.1)(Note 1)	P_{PPM}	400	Watts
Steady State Power Dissipation on infinite heat sink at $T_L=75^{\circ}C$ (Fig. 5)	P_D	1.5	Watts
Peak Forward Surge Current, 8.3ms Single Half Sine Wave Unidirectional only (Note 2)	I_{FSM}	40	Amps
Maximum Instantaneous Forward Voltage at 25A for Unidirectional only (Note 3)	V_F	3.5/5.0	V
Operating junction and Storage Temperature Range.	T_J, T_{STG}	-55°C to 175°C	°C
Typical Thermal Resistance Junction to Lead	R_{UJL}	60	°C/W
Typical Thermal Resistance Junction to Ambient	R_{UJA}	100	°C/W

Notes:

1. Non-repetitive current pulse, per Fig. 3 and derated above $T_A = 25^{\circ}C$ per Fig. 2.
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 devices of $V_{BR_} < 200V$ and $V_F < 5.0V$ for devices of $V_{BR_} > 201V$.

Electrical Characteristics

Type Number		Reverse Stand-Off Voltage	Breakdown Voltage@IT		Test Current	Maximum Clamping Voltage@IPP	Peak Pulse Current	Reverse Leakage @VRWM
(UNI)	(BI)	VRWM(V)	VBR MIN.(V)	VBR MAX.(V)	IT(mA)	VC(V)	IPP(A)	IR(μA)
P4KE6.8A	P4KE6.8CA	5.80	6.45	7.14	10	10.5	39.0	1000
P4KE7.5A	P4KE7.5CA	6.40	7.13	7.88	10	11.3	36.3	500
P4KE8.2A	P4KE8.2CA	7.02	7.79	8.61	10	12.1	33.9	200
P4KE9.1A	P4KE9.1CA	7.78	8.65	9.55	1	13.4	30.6	50
P4KE10A	P4KE10CA	8.55	9.50	10.50	1	14.5	28.3	10
P4KE11A	P4KE11CA	9.40	10.50	11.60	1	15.6	26.3	1
P4KE12A	P4KE12CA	10.20	11.40	12.60	1	16.7	24.6	1
P4KE13A	P4KE13CA	11.10	12.40	13.70	1	18.2	22.5	1
P4KE15A	P4KE15CA	12.80	14.30	15.80	1	21.2	19.3	1
P4KE16A	P4KE16CA	13.60	15.20	16.80	1	22.5	18.2	1
P4KE18A	P4KE18CA	15.30	17.10	18.90	1	25.5	16.1	1
P4KE20A	P4KE20CA	17.10	19.00	21.00	1	27.7	14.8	1
P4KE22A	P4KE22CA	18.80	20.90	23.10	1	30.6	13.4	1
P4KE24A	P4KE24CA	20.50	22.80	25.20	1	33.2	12.3	1
P4KE27A	P4KE27CA	23.10	25.70	28.40	1	37.5	10.9	1
P4KE30A	P4KE30CA	25.60	28.50	31.50	1	41.4	9.7	1
P4KE33A	P4KE33CA	28.20	31.40	34.70	1	45.7	9.0	1
P4KE36A	P4KE36CA	30.80	34.20	37.80	1	49.9	8.2	1
P4KE39A	P4KE39CA	33.30	37.10	41.00	1	53.9	7.6	1
P4KE43A	P4KE43CA	36.80	40.90	45.20	1	59.3	6.9	1
P4KE47A	P4KE47CA	40.20	44.70	49.40	1	64.8	6.3	1
P4KE51A	P4KE51CA	43.60	48.50	53.60	1	70.1	5.8	1
P4KE56A	P4KE56CA	47.80	53.20	58.80	1	77.0	5.3	1
P4KE62A	P4KE62CA	53.00	58.90	65.10	1	85.0	4.8	1
P4KE68A	P4KE68CA	58.10	64.60	71.40	1	92.0	4.5	1
P4KE75A	P4KE75CA	64.10	71.30	78.80	1	103.0	4.0	1
P4KE82A	P4KE82CA	70.10	77.90	86.10	1	113.0	3.6	1
P4KE91A	P4KE91CA	77.80	86.50	95.50	1	125.0	3.3	1
P4KE100A	P4KE100CA	85.50	95.00	105.00	1	137.0	3.0	1
P4KE110A	P4KE110CA	94.00	105.00	116.00	1	152.0	2.7	1
P4KE120A	P4KE120CA	102.00	114.00	126.00	1	165.0	2.5	1
P4KE130A	P4KE130CA	111.00	124.00	137.00	1	179.0	2.3	1
P4KE150A	P4KE150CA	128.00	143.00	158.00	1	207.0	2.0	1
P4KE160A	P4KE160CA	136.00	152.00	168.00	1	219.0	1.9	1
P4KE170A	P4KE170CA	145.00	162.00	179.00	1	234.0	1.8	1
P4KE180A	P4KE180CA	154.00	171.00	189.00	1	246.0	1.7	1
P4KE200A	P4KE200CA	171.00	190.00	210.00	1	274.0	1.5	1
P4KE220A	P4KE220CA	185.00	209.00	231.00	1	328.0	1.3	1
P4KE250A	P4KE250CA	214.00	237.00	263.00	1	344.0	1.2	1
P4KE300A	P4KE300CA	256.00	285.00	315.00	1	414.0	1.0	1
P4KE350A	P4KE350CA	300.00	332.00	368.00	1	482.0	0.85	1
P4KE400A	P4KE400CA	342.00	380.00	420.00	1	548.0	0.75	1
P4KE440A	P4KE440CA	376.00	418.00	462.00	1	602.0	0.68	1
P4KE480A	P4KE480CA	408.00	456.00	504.00	1	658.0	0.61	1
P4KE510A	P4KE510CA	434.00	485.00	535.00	1	698.0	0.57	1
P4KE530A	P4KE530CA	477.00	503.50	556.50	1	725.0	0.55	1
P4KE540A	P4KE540CA	486.00	513.00	567.00	1	740.0	0.54	1
P4KE550A	P4KE550CA	495.00	522.50	577.50	1	760.0	0.52	1

For bidirectional type having V_R of 10 volts and less, the I_R limit is double.
 For parts without A, the V_{BR} is $\pm 10\%$ and V_C is 5% higher than with A parts

Figure 1 - Peak Pulse Power Rating

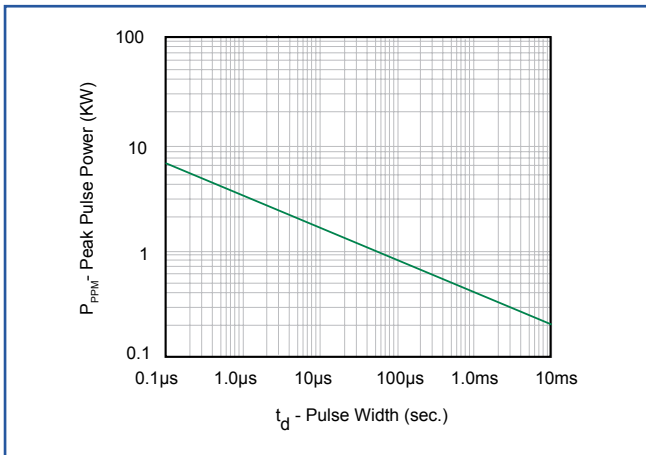


Figure 2 - Pulse Derating Curve

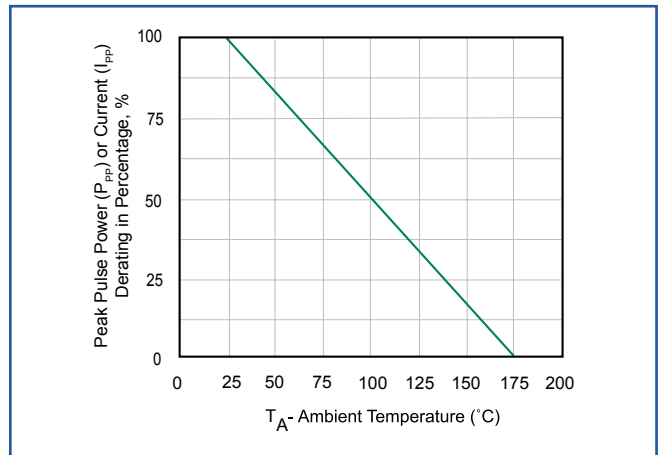


Figure 3 - Pulse Waveform

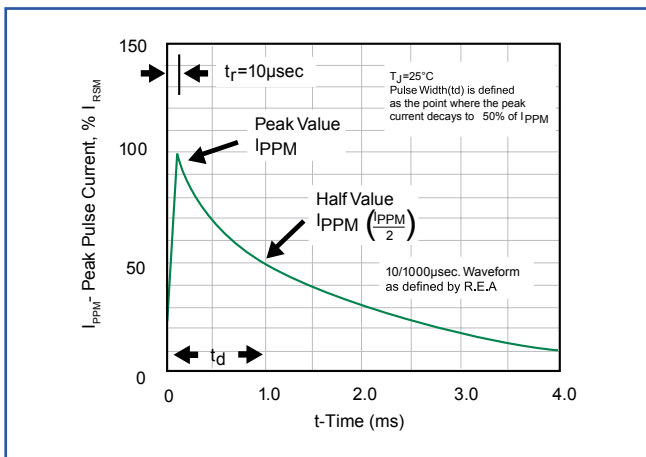


Figure 4 - Typical Junction Capacitance Uni-Directional

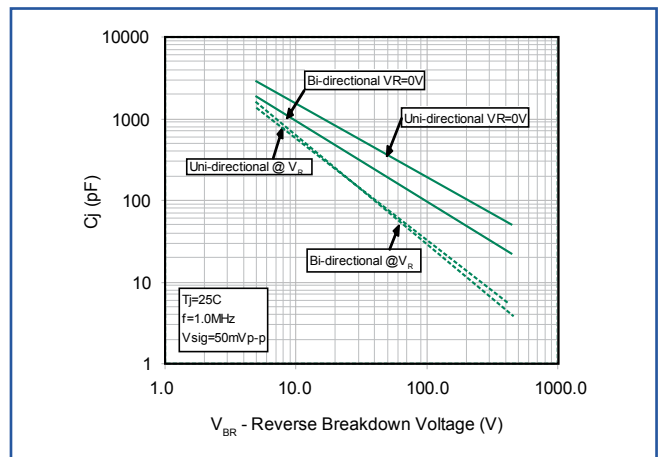


Figure 5 - Steady Pulse Derating Curve

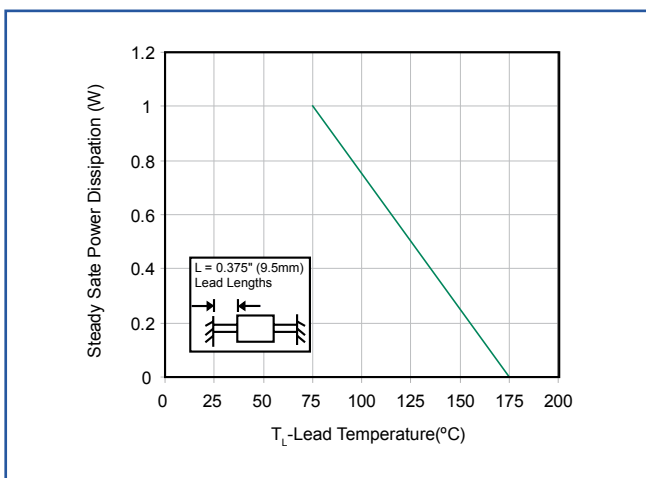
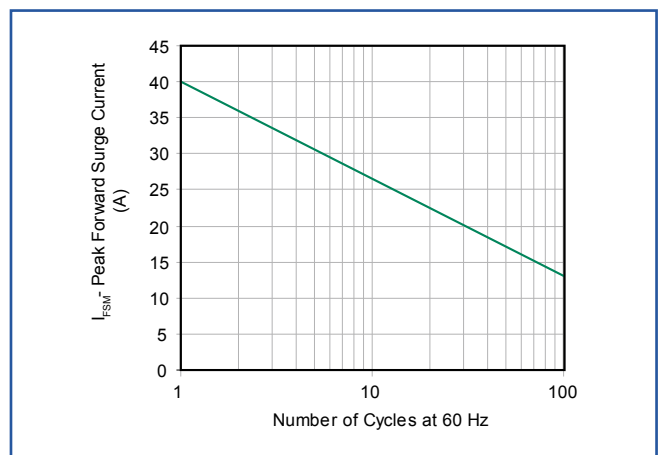
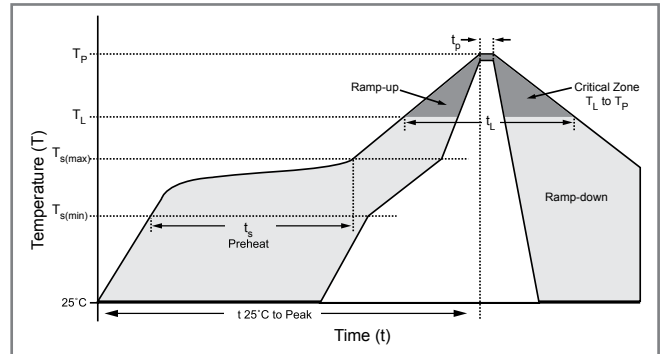


Figure 6 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only



Soldering Parameters

Reflow Condition	Lead-free assembly	
Pre Heat	- Temperature Min ($T_{s(min)}$)	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus Temp (T_L) to peak)	3°C/second max	
$T_{s(max)}$ to T_L - Ramp-up Rate	3°C/second max	
Reflow	- Temperature (T_L) (Liquidus)	217°C
	- Time (min to max) (t_s)	60 – 150 seconds
Peak Temperature (T_p)	260 ^{+0/-5} °C	
Time within 5°C of actual peak Temperature (t_p)	20 – 40 seconds	
Ramp-down Rate	6°C/second max	
Time 25°C to peak Temperature (T_p)	8 minutes Max.	
Do not exceed	280°C	



Flow/Wave Soldering (Solder Dipping)

Peak Temperature :	260°C
Dipping Time :	5 seconds
Soldering :	1 time

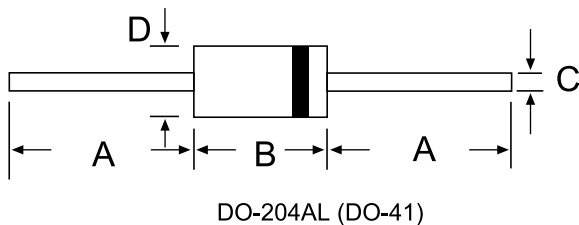
Physical Specifications

Weight	0.012oz., 0.3g
Case	JEDEC DO-204AL (DO-41) molded plastic body over passivated junction.
Polarity	Color band denotes the cathode except Bipolar.
Terminal	Matte Tin axial leads, solderable per JESD22-B102D.

Environmental Specifications

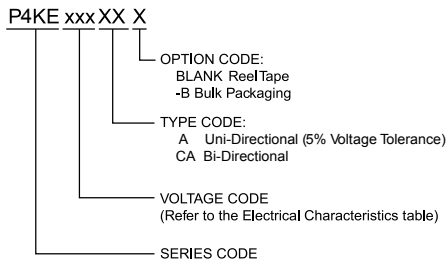
Temperature Cycle	JESD22-A104
Pressure Cooker	JESD 22-A102
High Temp. Storage	JESD22-A103
HTRB	JESD22-A108
Thermal Shock	JESD22-A106

Dimensions

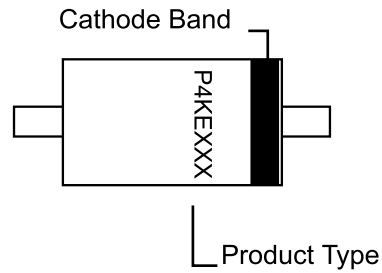


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.160	0.205	4.10	5.20
C	0.028	0.034	0.71	0.86
D	0.080	0.107	2.00	2.70

Part Numbering System



Part Marking System



Packaging

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
P4KExxxX	DO-204AL	5000	Tape & Reel	EIA STD RS-296E
P4KExxxXX-B	DO-204AL	500	BOX	Littelfuse Concord Packing Spec. DM-0016