

P4KE SERIES

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P4KE SERIES

400W Axial Leaded Transient Voltage Suppressors - 6.8V-440V

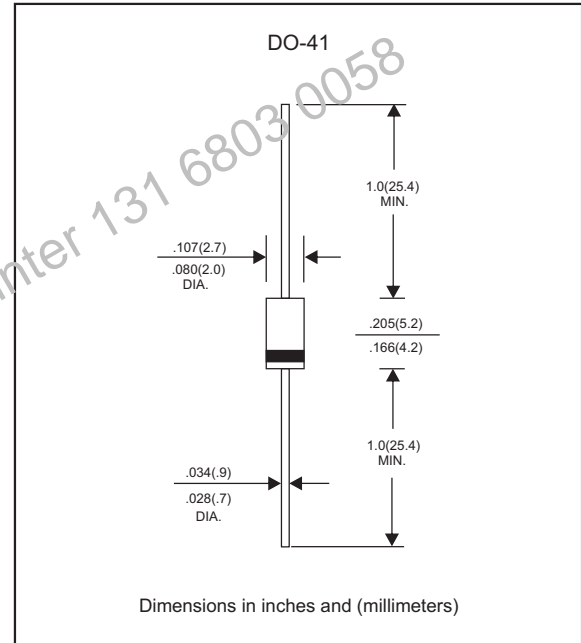
Package outline

Features

- Axial lead type devices for through hole design.
- 400W peak pulse power capability with a 10/1000us waveform, repetition rate (duty cycle): 0.01%.
- Excellent clamping capability.
- Low incremental surge resistance.
- Fast response time from 0V to VBR, typically less than 1 pS for uni-directional & 5 nS for bi-directional types.
- Ultra high-speed switching.
- Glass passivated chip junction.
- Lead-free parts meet environmental standards of MIL-STD-19500 /228
- Suffix "-H" indicates Halogen free parts, ex: P4KE6.8A-H

Mechanical data

- Epoxy : UL94-V0 rated flame retardant
- Case : Molded plastic, DO-41
- Lead : Axial leads, solderable per MIL-STD-202, Method 208 guaranteed
- Polarity: Color band denotes cathode end
- Mounting Position : Any
- Weight : Approximated 0.33 gram



Maximum ratings (AT $T_A=25^{\circ}\text{C}$ unless otherwise noted)

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Peak power dissipation	with a 10/1000us waveform, Note 1 & Fig. 1	P_{PPM}			400	W
Peak pulse current	with a 10/1000us waveform	I_{PPM}	See table 1			A
Steady state power dissipation	at $T_L=75^{\circ}\text{C}$ lead length 0.375" (9.5 mm)	$P_{M(AV)}$			1.0	W
Peak forward surge current	8.3ms single half sine-wave superimposed on rated load (jedec method), note 2	I_{FSM}			40	A
Maximum instantaneous forward voltage	for uni-directional types only, at 25A, see note 3	V_F			3.5/5.0	V
Operating temperature		T_J	-55		+150	$^{\circ}\text{C}$
Storage temperature		T_{STG}	-65		+175	$^{\circ}\text{C}$

Note 1. Non-repetitive current pulse, per Fig. 3 and derated above $T_A=25^{\circ}\text{C}$ per Fig. 2
 2. Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum
 3. $V_F=3.5\text{V}$ max. for devices of $V_{BR}<200\text{V}$, and $V_F=5.0\text{V}$ max. for devices of $V_{BR}>201\text{V}$

Electrical characteristics (at $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Table 1

Part No.	Absolute Maximum Rating($T_A = 25^{\circ}\text{C}$)					Electricity Characteristics($T_A = 25^{\circ}\text{C}$)		
	V_{RWM}	$V_{BR\ Min}$	$V_{BR\ Max}$	I_T	I_{FSM}	Max. $V_C @ I_{PPM}$		Max. $I_R @ V_{RWM}$
	Volts	Volts	Volts	mA	(A)@8.3ms	Volts	I_{PPM} (A)	
P4KE6.8(C)A	5.80	6.45	7.14	10	40	10.5	40.0	1000
P4KE7.5(C)A	6.40	7.13	7.88	10	40	11.3	37.0	500
P4KE8.2(C)A	7.02	7.79	8.61	10	40	12.1	35.0	200
P4KE9.1(C)A	7.78	8.65	9.55	1.0	40	13.4	31.0	50
P4KE10(C)A	8.55	9.50	10.5	1.0	40	14.5	29.0	10
P4KE11(C)A	9.40	10.5	11.6	1.0	40	15.6	27.0	5
P4KE12(C)A	10.2	11.4	12.6	1.0	40	16.7	25.0	5
P4KE13(C)A	11.1	12.4	13.7	1.0	40	18.2	23.0	5
P4KE15(C)A	12.8	14.3	15.8	1.0	40	21.2	20.0	5
P4KE16(C)A	13.6	15.2	16.8	1.0	40	22.5	19.0	5
P4KE18(C)A	15.3	17.1	18.9	1.0	40	25.5	17.0	5
P4KE20(C)A	17.1	19.0	21.0	1.0	40	27.7	15.0	5
P4KE22(C)A	18.8	20.9	23.1	1.0	40	30.6	14.0	5
P4KE24(C)A	20.5	22.8	25.2	1.0	40	33.2	13.0	5
P4KE27(C)A	23.1	25.7	28.4	1.0	40	37.5	11.2	5
P4KE30(C)A	25.6	28.5	31.5	1.0	40	41.4	10.0	5
P4KE33(C)A	28.2	31.4	34.7	1.0	40	45.7	9.0	5
P4KE36(C)A	30.8	34.2	37.8	1.0	40	49.9	8.4	5
P4KE39(C)A	33.3	37.1	41.0	1.0	40	53.9	7.8	5
P4KE43(C)A	36.8	40.9	45.2	1.0	40	59.3	7.1	5
P4KE47(C)A	40.2	44.7	49.4	1.0	40	64.8	6.5	5
P4KE51(C)A	43.6	48.5	53.6	1.0	40	70.1	6.0	5
P4KE56(C)A	47.8	53.2	58.8	1.0	40	77.0	5.5	5
P4KE62(C)A	53.0	58.9	65.1	1.0	40	85.0	5.0	5
P4KE68(C)A	58.1	64.6	71.4	1.0	40	92.0	4.6	5
P4KE75(C)A	64.1	71.3	78.8	1.0	40	103.0	4.1	5
P4KE82(C)A	70.1	77.9	86.1	1.0	40	113.0	3.7	5
P4KE91(C)A	77.8	86.5	95.5	1.0	40	125.0	3.4	5
P4KE100(C)A	85.5	95.0	105.0	1.0	40	137.0	3.1	5
P4KE110(C)A	94.0	105.0	116.0	1.0	40	152.0	2.8	5
P4KE120(C)A	102.0	114.0	126.0	1.0	40	165.0	2.5	5
P4KE130(C)A	111.0	124.0	137.0	1.0	40	179.0	2.3	5
P4KE150(C)A	128.0	143.0	158.0	1.0	40	207.0	2.0	5
P4KE160(C)A	136.0	152.0	168.0	1.0	40	219.0	1.9	5
P4KE170(C)A	145.0	162.0	179.0	1.0	40	234.0	1.8	5
P4KE180(C)A	154.0	171.0	189.0	1.0	40	246.0	1.7	5
P4KE200(C)A	171.0	190.0	210.0	1.0	40	274.0	1.53	5
P4KE220(C)A	185.0	209.0	231.0	1.0	40	328.0	1.22	5
P4KE250(C)A	214.0	237.0	263.0	1.0	40	344.0	1.16	5
P4KE300(C)A	256.0	285.0	315.0	1.0	40	414.0	0.97	5
P4KE350(C)A	300.0	332.0	368.0	1.0	40	482.0	0.83	5
P4KE400(C)A	342.0	380.0	420.0	1.0	40	548.0	0.73	5
P4KE440(C)A	376.0	418.0	462.0	1.0	40	600.0	0.67	5

- Note 1. V_{BR} measured after I_T applied for 300us, I_T =square wave pulse or equivalent
 2. Surge current waveform per Fig. 3 and derated per Fig. 2
 3. For bi-directional types having V_{RWM} of 10 volts and less, the I_R limit is doubled
 4. Suffix 'C' denotes bi-directional devices. Suffix 'A' denotes 5% tolerance devices, no suffix denotes 10% tolerance devices.
 5. All terms and symbols are consistent with ANS/IEEE C62.35



Rating and characteristic curves (P4KE SERIES)

Fig.1 - PEAK PULSE POWER RATING CURVE

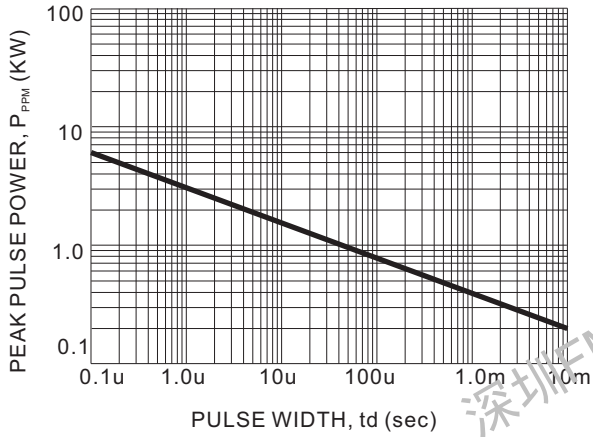


Fig.2 - PULSE DERATING CURVE

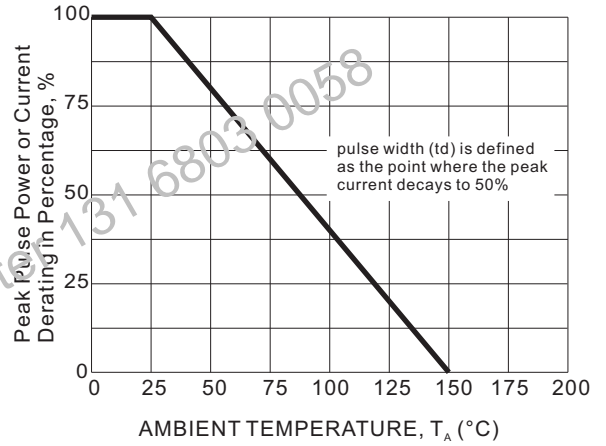


Fig.3 - Pulse Waveform

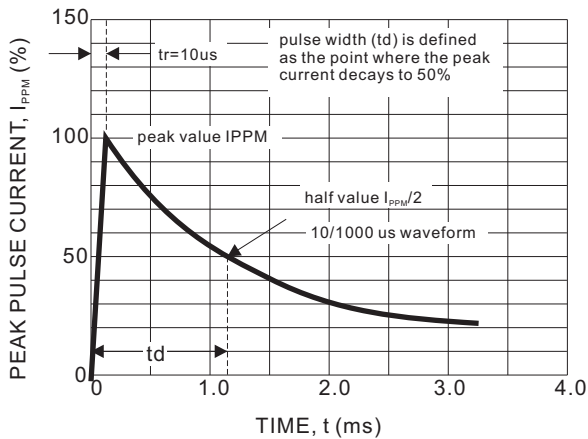


Fig.4 - Typical Junction Capacitance

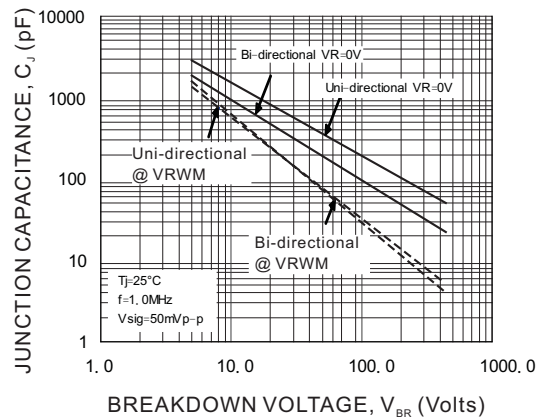


Fig.5 - STEADY STATE POWER DERATING CURVE

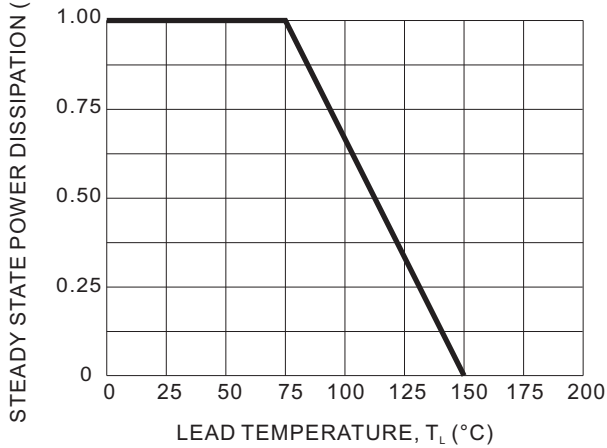
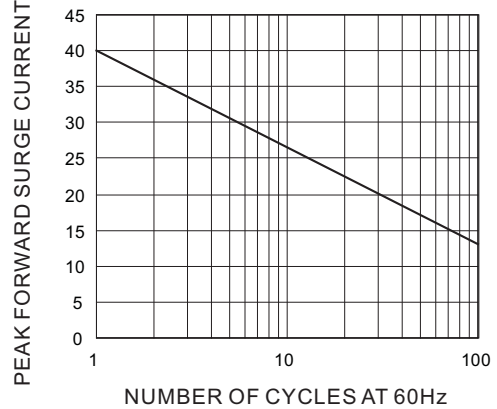


Fig.6 - MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT



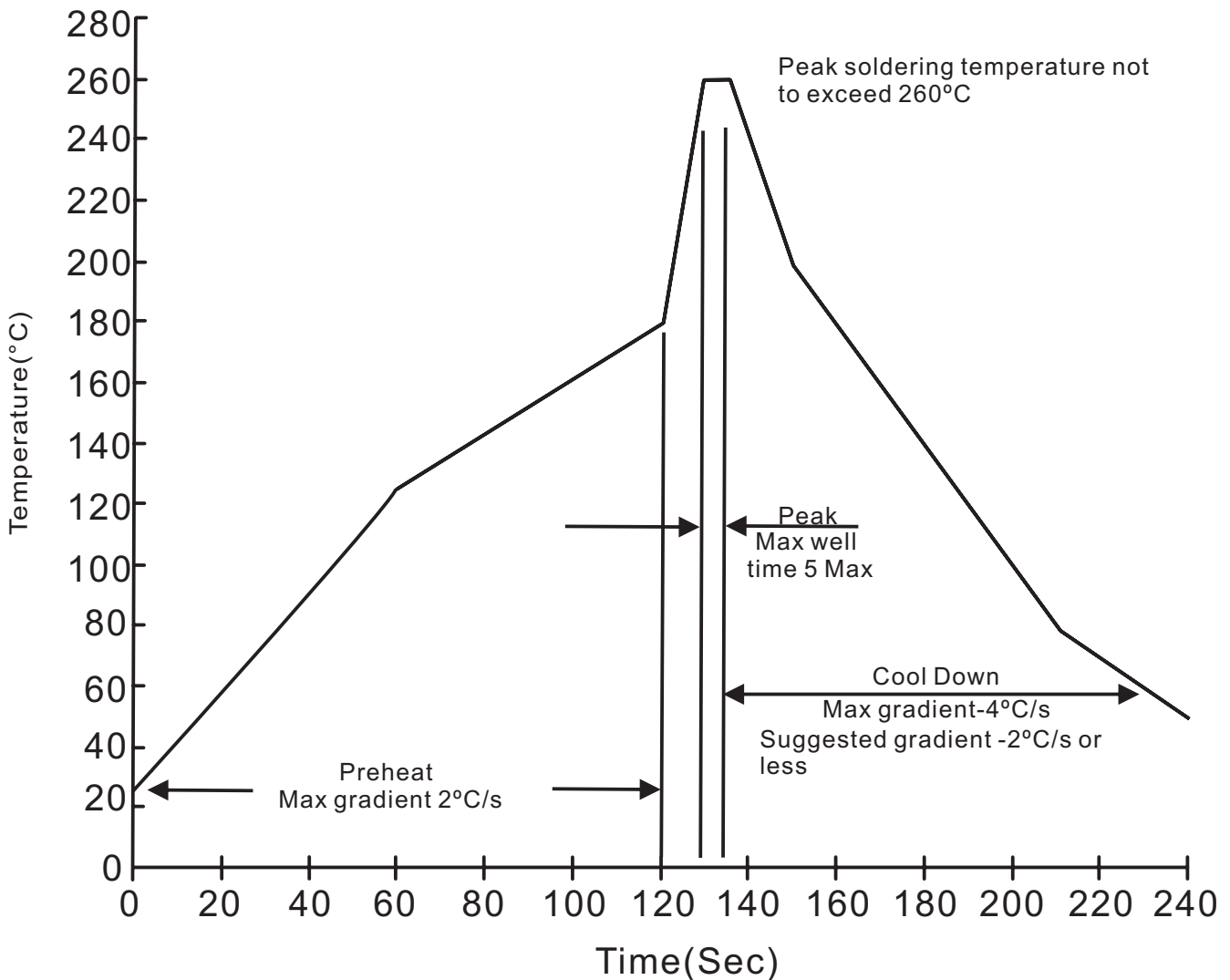
P4KE SERIES

Pinning information

Pin	Simplified outline	Symbol
Uni-Directional Pin1 cathode Pin2 anode		
Bi-Directional		

Suggested thermal profiles for soldering processes

1. Lead free temperature profile wave-soldering



P4KE SERIES

High reliability test capabilities

Item Test	Conditions	Reference
1. Solder Resistance	at 260±5°C for 10±2sec. immerse body into solder 1/16"±1/32"	MIL-STD-750D METHOD-2031
2. Solderability	at 245±5°C for 5 sec.	MIL-STD-202F METHOD-208
3. Pull Test	1.0kg in axial lead direction for 10 sec.	MIL-STD-750D METHOD-2036
4. Bend Lead	1.0kg weight applied to each lead bending arc 90°±5° for 3 times.	MIL-STD-750D METHOD-2036
5. High Temperature Reverse Bias	$V_{RWB} = 80\%$ rate at $T_J = 150^\circ\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
8. Pressure Cooker	15P _{SIG} at T _A = 121°C for 4 hrs.	JESD22-A102
7. Temperature Cycling	-55°C to +125°C dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
8. Thermal Shock	0°C for 5 min. rise to 100°C for 5 min. total 10 cycles.	MIL-STD-750D METHOD-1056
9. Humidity	at T _A = 85°C, RH = 85% for 1000hrs.	MIL-STD-750D METHOD-1021
10. High Temperature Storage Life	at 175°C for 1000 hrs.	MIL-STD-750D METHOD-1031