

## TRANSIENT VOLTAGE SUPPRESSOR

**BREAKDOWN VOLTAGE: 6.8 --- 440 V**  
**PEAK PULSE POWER: 400 W**

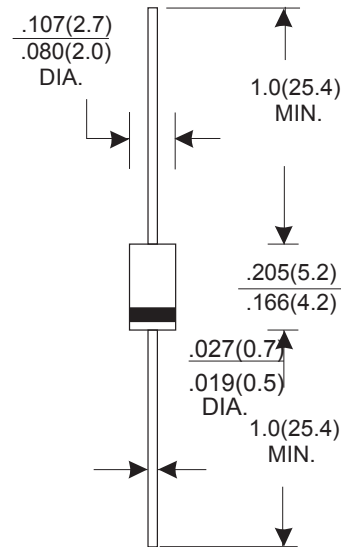
### FEATURES

- Plastic package has underwriters laboratory flammability classification 94V-0
- Glass passivated junction
- 400W peak pulse power capability with a 10/1000  $\mu$ s waveform, repetition rate (duty cycle): 0.01%
- Excellent clamping capability
- Low incremental surge resistance
- Fast response time: typically less than 1.0ps from 0 Volts to  $V_{(BR)}$  for uni-directional and 5.0ns for bi-directional types
- For devices with  $V_{(BR)}$  10V,  $I_D$  are typically less than 5.0  $\mu$ A
- High temperature soldering guaranteed: 265 / 10 seconds

### MECHANICAL DATA

- Case style: DO-41 molded plastic
- Polarity: color band denotes positive end (cathode) except for bidirectional
- Mounting position: any

### DO-41



## DEVICES FOR BIDIRECTIONAL APPLICATIONS

For bi-directional use C or CA suffix for types P4KE 7.5 thru types P4KE 440 (e.g. P4KE 7.5CA, P4KE 440CA).

Electrical characteristics apply in both directions.

## MAXIMUM RATINGS AND CHARACTERISTICS

@ 25°C Ambient Temperature (unless otherwise noted)

Parameter	Symbol	Value	Units
Peak Pulse Power Dissipation on 10/1000 $\mu$ s Waveform (Note 1, FIG.1)	PPPM	Min 400	W
Power Dissipation on Infinite Heat Sink at $T_L=75^\circ$ C	PD	6.5	W
Peak Pulse Current of on 10/1000 $\mu$ s Waveform (Note 1, FIG.3)	$I_{PPM}$	See Table 1	A
Peak Forward Surge Current, 8.3ms Single Half Sine-wave Superimposed on Rated Load, (JEDEC Method) (Note 2. 3)	$I_{FSM}$	40	A
Operating Junction Temperature Range	$T_J$	-50 to 150	$^\circ$ C
Storage Temperature Range	$T_{STG}$	- 50 to 150	$^\circ$ C

Notes:

1. Non-repetitive current pulse, per Fig.3 and derated above  $T_A=25^\circ$  C per Fig.2.
2. Mounted on 5.0mm $\times$ 2 (0.03mm thick) Copper Pads to each terminal.
3. 8.3 ms single half sine-wave, or equivalent square wave, Duty cycle=4 pluses per minute maximum.

## RATINGS AND CHARACTERISTIC CURVES

Electrical Specification (T<sub>A</sub>=25°C unless otherwise specified)

Type NO.		Reverse Stand-Off Voltage	Breakdown Voltage Min. @I <sub>T</sub>	Breakdown Voltage Max. @ I <sub>T</sub>	Test Current	Maximum Clamping Voltage @I <sub>PP</sub>	Peak Pulse Current	Reverse Leakage @V <sub>RMW</sub>
(Uni)	(Bi)	V <sub>RMW</sub> (V)	V <sub>BR MIN</sub> (V)	V <sub>BR MAX</sub> (V)	I <sub>T</sub> (mA)	V <sub>C</sub> (V)	I <sub>PP</sub> (A)	I <sub>R</sub> ( $\mu$ A)
P4KE6.8	P4KE6.8C	5.50	6.12	7.48	10.0	10.8	38.0	1000.0
P4KE6.8A	P4KE6.8CA	5.80	6.45	7.14	10.0	10.5	40.0	1000.0
P4KE7.5	P4KE7.5C	6.05	6.75	8.25	10.0	11.7	36.0	500.0
P4KE7.5A	P4KE7.5CA	6.40	7.13	7.88	10.0	11.3	37.0	500.0
P4KE8.2	P4KE8.2C	6.63	7.38	9.02	10.0	12.5	33.0	200.0
P4KE8.2A	P4KE8.2CA	7.02	7.79	8.61	10.0	12.1	35.0	200.0
P4KE9.1	P4KE9.1C	7.37	8.19	10.0	1.0	13.8	30.0	50.0
P4KE9.1A	P4KE9.1CA	7.78	8.65	9.55	1.0	13.4	31.0	50.0
P4KE10	P4KE10C	8.10	9.00	11.0	1.0	15.0	28.0	10.0
P4KE10A	P4KE10CA	8.55	9.50	10.5	1.0	14.5	29.0	10.0
P4KE11	P4KE11C	8.92	9.90	12.1	1.0	16.2	26.0	5.0
P4KE11A	P4KE11CA	9.40	10.5	11.6	1.0	15.6	27.0	5.0
P4KE12	P4KE12C	9.72	10.8	13.2	1.0	17.3	24.0	5.0
P4KE12A	P4KE12CA	10.2	11.4	12.6	1.0	16.7	25.0	5.0
P4KE13	P4KE13C	10.5	11.7	14.3	1.0	19.0	22.0	5.0
P4KE13A	P4KE13CA	11.1	12.4	13.7	1.0	18.2	23.0	5.0
P4KE15	P4KE15C	12.1	13.5	16.5	1.0	22.0	19.0	5.0
P4KE15A	P4KE15CA	12.8	14.3	15.8	1.0	21.2	20.0	5.0
P4KE16	P4KE16C	12.9	14.4	17.6	1.0	23.5	18.0	5.0
P4KE16A	P4KE16CA	13.6	15.2	16.8	1.0	22.5	19.0	5.0
P4KE18	P4KE18C	14.5	16.2	19.8	1.0	26.5	16.0	5.0
P4KE18A	P4KE18CA	15.3	17.1	18.9	1.0	25.2	17.0	5.0
P4KE20	P4KE20C	16.2	18.0	22.0	1.0	29.1	14.0	5.0
P4KE20A	P4KE20CA	17.1	19.0	21.0	1.0	27.7	15.0	5.0
P4KE22	P4KE22C	17.8	19.8	24.2	1.0	31.9	13.0	5.0
P4KE22A	P4KE22CA	18.8	20.9	23.1	1.0	30.6	14.0	5.0
P4KE24	P4KE24C	19.4	21.6	26.4	1.0	34.7	12.0	5.0
P4KE24A	P4KE24CA	20.5	22.8	25.2	1.0	33.2	13.0	5.0
P4KE27	P4KE27C	21.8	24.3	29.7	1.0	39.1	11.0	5.0
P4KE27A	P4KE27CA	23.1	25.7	28.4	1.0	37.5	11.2	5.0
P4KE30	P4KE30C	24.3	27.0	33.0	1.0	43.5	10.0	5.0
P4KE30A	P4KE30CA	25.6	28.5	31.5	1.0	41.4	10.0	5.0
P4KE33	P4KE33C	26.8	29.7	36.3	1.0	47.7	9.0	5.0
P4KE33A	P4KE33CA	28.2	31.4	34.7	1.0	45.7	9.0	5.0
P4KE36	P4KE36C	29.1	32.4	39.6	1.0	52.0	8.0	5.0
P4KE36A	P4KE36CA	30.8	34.2	37.8	1.0	49.9	8.4	5.0
P4KE39	P4KE39C	31.6	35.1	42.9	1.0	56.4	7.4	5.0
P4KE39A	P4KE39CA	33.3	37.1	41.0	1.0	53.9	7.8	5.0
P4KE43	P4KE43C	34.8	38.7	47.3	1.0	61.9	6.8	5.0
P4KE43A	P4KE43CA	36.8	40.9	45.2	1.0	59.3	7.1	5.0

※ For Bi-directional type having VRWM of 10 Volts and less, the IR limit is double.

※ For parts without A, the VBR is  $\pm$  10% and VC is 5% higher than with A parts.

## RATINGS AND CHARACTERISTIC CURVES

Electrical Specification ( $T_A=25^\circ\text{C}$  unless otherwise specified)

Type NO.		Reverse Stand-Off Voltage	Breakdown Voltage Min. @ $I_r$	Breakdown Voltage Max. @ $I_r$	Test Current	Maximum Clamping Voltage @ $I_{PP}$	Peak Pulse Current	Reverse Leakage @ $V_{RMW}$
(Uni)	(Bi)	$V_{RMW}(V)$	$V_{BR\ MIN}(V)$	$V_{BR\ MAX}(V)$	$I_r\ (mA)$	$V_c(V)$	$I_{PP}(A)$	$I_r(\mu A)$
P4KE47	P4KE47C	38.1	42.3	51.7	1.0	67.8	6.2	5.0
P4KE47A	P4KE47CA	40.2	44.7	49.4	1.0	64.8	5.0	5.0
P4KE51	P4KE51C	41.3	45.9	56.1	1.0	73.5	5.7	5.0
P4KE51A	P4KE51CA	43.6	48.5	53.6	1.0	70.1	6.0	5.0
P4KE56	P4KE56C	45.4	50.4	61.6	1.0	80.5	5.2	5.0
P4KE56A	P4KE56CA	47.8	53.2	58.8	1.0	77.0	5.5	5.0
P4KE62	P4KE62C	50.2	55.8	68.2	1.0	89.0	4.7	5.0
P4KE62A	P4KE62CA	53.0	58.9	65.1	1.0	85.0	5.0	5.0
P4KE68	P4KE68C	55.1	61.2	74.8	1.0	98.0	4.3	5.0
P4KE68A	P4KE68CA	58.1	64.6	71.4	1.0	92.0	4.6	5.0
P4KE75	P4KE75C	60.7	67.5	82.5	1.0	108	3.9	5.0
P4KE75A	P4KE75CA	64.1	71.3	78.8	1.0	103	4.1	5.0
P4KE82	P4KE82C	66.4	73.8	90.2	1.0	118	3.6	5.0
P4KE82A	P4KE82CA	70.1	77.9	86.1	1.0	113	3.7	5.0
P4KE91	P4KE91C	73.7	81.9	100	1.0	131	3.2	5.0
P4KE91A	P4KE91CA	77.8	86.5	95.5	1.0	125	3.4	5.0
P4KE100	P4KE100C	81.0	90.0	110	1.0	144	2.9	5.0
P4KE100A	P4KE100CA	85.5	95.0	105	1.0	137	3.1	5.0
P4KE110	P4KE110C	89.2	99.0	121	1.0	158	2.7	5.0
P4KE110A	P4KE110CA	94.0	105	116	1.0	152	2.8	5.0
P4KE120	P4KE120C	97.2	108	132	1.0	173	2.4	5.0
P4KE120A	P4KE120CA	102	114	126	1.0	165	2.5	5.0
P4KE130	P4KE130C	105	117	143	1.0	187	2.2	5.0
P4KE130A	P4KE130CA	111	124	137	1.0	179	2.3	5.0
P4KE150	P4KE150C	121	135	165	1.0	215	2.0	5.0
P4KE150A	P4KE150CA	128	143	158	1.0	207	2.0	5.0
P4KE160	P4KE160C	130	144	176	1.0	230	1.8	5.0
P4KE160A	P4KE160CA	136	152	168	1.0	219	1.9	5.0
P4KE170	P4KE170C	138	153	187	1.0	244	1.7	5.0
P4KE170A	P4KE170CA	145	162	179	1.0	234	1.8	5.0
P4KE180	P4KE180C	146	162	198	1.0	258	1.6	5.0
P4KE180A	P4KE180CA	154	171	189	1.0	246	1.7	5.0
P4KE200	P4KE200C	162	180	220	1.0	287	1.5	5.0
P4KE200A	P4KE200CA	171	190	210	1.0	274	1.53	5.0
P4KE220	P4KE220C	175	198	242	1.0	344	1.16	5.0
P4KE220A	P4KE220CA	185	209	231	1.0	328	1.22	5.0
P4KE250	P4KE250C	202	225	275	1.0	360	1.1	5.0
P4KE250A	P4KE250CA	214	237	263	1.0	344	1.16	5.0
P4KE300	P4KE300C	243	270	330	1.0	430	0.93	5.0
P4KE300A	P4KE300CA	256	285	315	1.0	414	0.97	5.0

※ For Bi-directional type having  $V_{RMW}$  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.

# RATINGS AND CHARACTERISTIC CURVES

Electrical Specification ( $T_A=25^\circ\text{C}$  unless otherwise specified)

Type NO.		Reverse Stand-Off Voltage	Breakdown Voltage Min. @ $I_T$	Breakdown Voltage Max. @ $I_T$	Test Current	Maximum Clamping Voltage @ $I_{PP}$	Peak Pulse Current	Reverse Leakage @ $V_{RMW}$
(Uni)	(Bi)	$V_{RMW}(V)$	$V_{BR\ MIN}(V)$	$V_{BR\ MAX}(V)$	$I_T\ (mA)$	$V_C(V)$	$I_{PP}(A)$	$I_R(\mu A)$
P4KE350	P4KE350C	284	315	385	1.0	504	0.79	5.0
P4KE350A	P4KE350CA	300	333	368	1.0	482	0.83	5.0
P4KE400	P4KE400C	324	360	440	1.0	574	0.70	5.0
P4KE400A	P4KE400CA	342	380	420	1.0	548	0.73	5.0
P4KE440	P4KE440C	356	396	484	1.0	631	0.63	5.0
P4KE440A	P4KE440CA	376	418	462	1.0	602	0.65	5.0

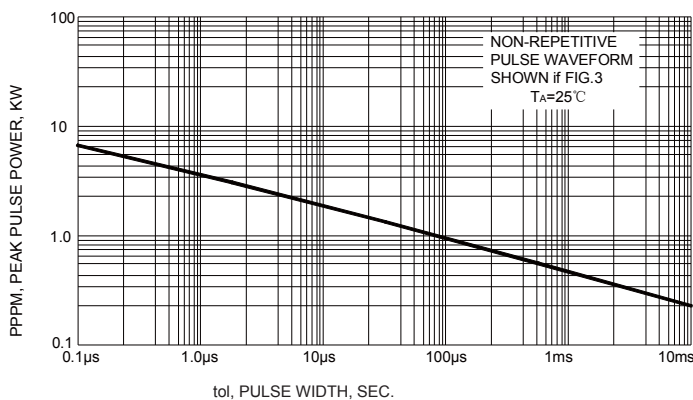
※ For Bi-directional type having  $V_{RMW}$  of 10 Volts and less, the  $I_R$  limit is double.

※ For parts without A, the  $V_{BR}$  is  $\pm 10\%$  and  $V_C$  is 5% higher than with A parts.

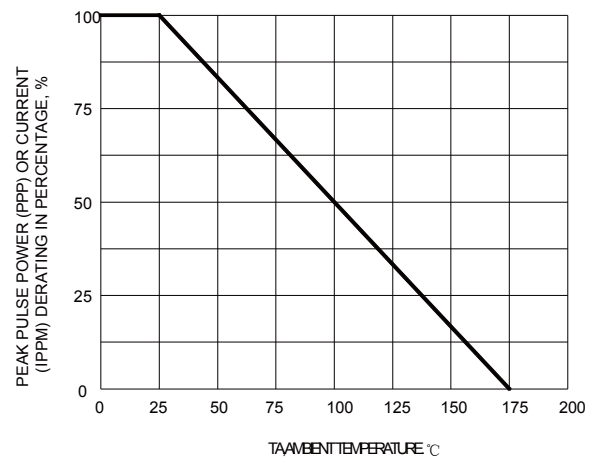
Notes:

1. A transient suppressor is normally selected according to the working peak reverse voltage ( $V_{RMW}$ ), which should be equal to or greater than the DC or continuous peak operating voltage level.
2.  $V_{BR}$  measured at pulse test current  $I_T$  at an ambient temperature of  $25^\circ\text{C}$ .
3. Surge current waveform per Figure 1 and derate per Figure 3.

**FIG.1 -- PEAK PULSE POWER RATING CURVE**



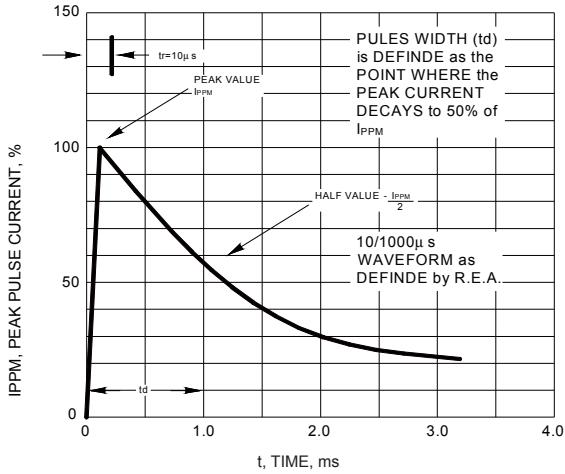
**FIG.2 -- PULSE DERATING CURVE**



# RATINGS AND CHARACTERISTIC CURVES

Electrical Specification ( $T_A=25@25^\circ\text{C}$  unless otherwise specified)

**FIG.3 -- PULSE WAVEFORM**



**FIG.4 -- TYPICAL JUNCTION CAPACITANCE UNIDIRECTIONAL**

