

DIGITRON SEMICONDUCTORS

P6KE6.8 – P6KE440A

600 WATT TRANSIENT VOLTAGE SUPPRESSORS

SPECIFICATION FEATURES

Standard Zener Voltage Range	6.8 to 440 volts
Peak Power	600 watts @ 1 ms
Maximum Clamp Voltage	@ peak pulse current
Low Leakage	< 5µA above 10 volts
Maximum Temperature Coefficient Specified	
Response Time is Typically < 1 ns	
Available as Non-RoHS (standard) or RoHS compliant (add PBF suffix)	
Available as "HR"(high-reliability) screened per MIL-PRF-19500, JANTX level (add -HR suffix)	
Available as both unidirectional and bidirectional. (Add C or CA suffix to part number for bidirectional (i.e. P6KE6.8CA)	

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Power Dissipation ⁽¹⁾ @ T _L ≤ 25°C	P _{PK}	600	Watts
Steady State Power Dissipation @ T _L ≤ 75°C, Lead Length = 3/8" Derated above T _L = 75°C	P _D	5 50	Watts mW/°C
Forward Surge Current ⁽²⁾ @ T _A = 25°C	I _{FSM}	100	Amps
Operating and Storage Temperature Range	T _J , T _{stg}	-65 to +175	°C
Forward Voltage @ 25°C: (unidirectional only)		3.5V maximum @ 100A peak impulse of 8.3ms half-sine wave	

Lead temperature not less than 1/16" from the case for 10 seconds : 230°C

Note 1: Non repetitive current pulse per Figure 4 and derated above T_A = 25°C per Figure 2.

Note 2: ½ sine wave (or equivalent square wave), PW 8.3 ms, duty cycle = 4 pulses per minute maximum.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Part Number	Breakdown Voltage			Test Current I _(BR)	Rated Stand Off Voltage V _{WM}	Maximum Standby Current I _D @ V _{WM}	Maximum Clamping Voltage V _C @ I _{PP}	Peak Pulse Current I _{PP}	Maximum Temperature Coefficient of V _{BR} αV(BR)
	V _{BR} (Volts)								
	Min	Nom	Max						
	V _{DC}	V _{DC}	V _{DC}						
	mA	V	µA	V	A	(%/°C)			
P6KE6.8	6.12	6.8	7.48	10	5.50	1000	10.8	56.0	0.057
P6KE6.8A	6.45	6.8	7.14	10	5.80	1000	10.5	57.0	0.057
P6KE7.5	6.75	7.5	8.25	10	6.05	500	11.7	51.0	0.061
P6KE7.5A	7.13	7.5	7.88	10	6.40	500	11.3	53.0	0.061
P6KE8.2	7.38	8.2	9.02	10	6.63	200	12.5	48.0	0.065
P6KE8.2A	7.79	8.2	8.61	10	7.02	200	12.1	50.0	0.065
P6KE9.1	8.19	9.1	10.0	1	7.37	50	13.8	44.0	0.068
P6KE9.1A	8.65	9.1	9.55	1	7.78	50	13.4	45.0	0.068
P6KE10	9.0	10.0	11.0	1	8.10	10	15.0	40.0	0.073
P6KE10A	9.5	10.0	10.5	1	8.55	10	14.5	41.0	0.073
P6KE11	9.9	11.0	12.1	1	8.92	5	16.2	37.0	0.075
P6KE11A	10.5	11.0	11.6	1	9.40	5	15.6	38.0	0.075
P6KE12	10.8	12.0	13.2	1	9.72	5	17.3	35.0	0.078
P6KE12A	11.4	12.0	12.6	1	10.20	5	16.7	36.0	0.078
P6KE13	11.7	13.0	14.3	1	10.50	5	19.0	32.0	0.081
P6KE13A	12.4	13.0	13.7	1	11.10	5	18.2	33.0	0.081
P6KE15	13.5	15.0	16.5	1	12.10	1	22.0	27.0	0.084

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ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Part Number	Breakdown Voltage			Test Current $I_{(BR)}$	Rated Stand Off Voltage V_{WM}	Maximum Standby Current $I_D @ V_{WM}$	Maximum Clamping Voltage $V_C @ I_{PP}$	Peak Pulse Current I_{PP} Min	Maximum Temperature Coefficient of V_{BR} $\alpha_{V(BR)}$ Nom
	V_{BR} (Volts)								
	Min	Nom	Max						
	V_{DC}	V_{DC}	V_{DC}						
			mA	V	μA		V_{DC}	V_{DC}	
P6KE15A	14.3	15.0	15.8	1	12.80	1	21.2	28.0	0.084
P6KE16	14.4	16.0	17.6	1	12.90	1	23.5	26.0	0.086
P6KE16A	15.2	16	16.8	1	13.6	1	22.5	27.0	0.086
P6KE18	16.2	18.0	19.8	1	14.5	1	26.5	23.0	0.088
P6KE18A	17.1	18.0	18.9	1	15.3	1	25.2	24.0	0.088
P6KE20	18.0	20.0	22.0	1	16.2	1	29.1	21.0	0.090
P6KE20A	19.0	20.0	21.0	1	17.1	1	27.7	22.0	0.090
P6KE22	19.8	22.0	24.2	1	17.8	1	31.9	19.0	0.092
P6KE22A	20.9	22.0	23.1	1	18.8	1	30.6	20.0	0.092
P6KE24	21.6	24.0	26.4	1	19.4	1	34.7	17.0	0.094
P6KE24A	22.8	24.0	25.2	1	20.5	1	33.2	18.0	0.094
P6KE27	24.3	27.0	29.7	1	21.8	1	39.1	15.0	0.096
P6KE27A	25.7	27.0	28.4	1	23.1	1	37.5	16.0	0.096
P6KE30	27.0	30.0	33.0	1	24.3	1	43.5	14.0	0.097
P6KE30A	28.5	30.0	31.5	1	25.6	1	41.4	14.4	0.097
P6KE33	29.7	33.0	36.3	1	26.8	1	47.7	12.6	0.098
P6KE33A	31.4	33.0	34.7	1	28.2	1	45.7	13.2	0.098
P6KE36	32.4	36.0	39.6	1	29.1	1	52.0	11.6	0.099
P6KE36A	34.2	36.0	37.8	1	30.8	1	49.9	12.0	0.099
P6KE39	35.1	39.0	42.9	1	31.6	1	56.4	10.6	0.100
P6KE39A	37.1	39.0	41.0	1	33.3	1	53.9	11.2	0.100
P6KE43	38.7	43.0	47.3	1	34.8	1	61.9	9.6	0.101
P6KE43A	40.9	43.0	45.2	1	36.8	1	59.3	10.1	0.101
P6KE47	42.3	47.0	51.7	1	38.1	1	67.8	8.8	0.101
P6KE47A	44.7	47.0	49.4	1	40.2	1	64.8	9.3	0.101
P6KE51	45.9	51.0	56.1	1	41.3	1	73.5	8.2	0.102
P6KE51A	48.5	51.0	53.6	1	43.6	1	70.1	8.6	0.102
P6KE56	50.4	56.0	61.6	1	45.4	1	80.5	7.4	0.103
P6KE56A	53.2	56.0	58.8	1	47.8	1	77.0	7.8	0.103
P6KE62	55.8	62.0	68.2	1	50.2	1	89.0	6.8	0.104
P6KE62A	58.9	62.0	65.1	1	53.0	1	85.0	7.1	0.104
P6KE68	61.2	68.0	74.8	1	55.1	1	98.0	6.1	0.104
P6KE68A	64.6	68.0	71.4	1	58.1	1	92.0	6.5	0.104
P6KE75	67.5	75.0	82.5	1	60.7	1	108.0	5.5	0.105
P6KE75A	71.3	75.0	78.8	1	64.1	1	103.0	5.8	0.105
P6KE82	73.8	82.0	90.2	1	66.4	1	118.0	5.1	0.105
P6KE82A	77.9	82.0	86.1	1	70.1	1	113.0	5.3	0.105
P6KE91	81.9	91.0	100.0	1	73.7	1	131.0	4.5	0.106

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Part Number	Breakdown Voltage			Test Current I _(BR)	Rated Stand Off Voltage V _{WM}	Maximum Standby Current I _D @ V _{WM}	Maximum Clamping Voltage V _C @ I _{PP}	Peak Pulse Current I _{PP} Min Min	Maximum Temperature Coefficient of V _{BR} αV(BR) Nom Nom
	V _{BR} (Volts)								
	Min	Nom	Max						
	V _{DC}	V _{DC}	V _{DC}						
	V _{DC}	V _{DC}	V _{DC}	mA	V	µA		V _{DC}	V _{DC}
P6KE91A	86.5	91.0	95.5	1	77.8	1	125.0	4.8	0.106
P6KE100	90	100	110	1	81.0	1	144.0	4.2	0.106
P6KE100A	95	100	105	1	85.5	1	137.0	4.4	0.106
P6KE110	99	110	121	1	89.2	1	158.0	3.8	0.107
P6KE110A	105	110	116	1	94.0	1	152.0	3.4	0.107
P6KE120	108	120	132	1	97.2	1	173.0	3.5	0.107
P6KE120A	114	120	126	1	102.0	1	165.0	3.6	0.107
P6KE130	117	130	143	1	105.0	1	187.0	3.2	0.107
P6KE130A	124	130	137	1	111.0	1	179.0	3.3	0.107
P6KE150	135	150	165	1	121.0	1	215.0	2.8	0.108
P6KE150A	143	150	158	1	128.0	1	207.0	2.9	0.108
P6KE160	144	160	176	1	130.0	1	230.0	2.6	0.108
P6KE160A	152	160	168	1	136.0	1	219.0	2.7	0.108
P6KE170	153	170	187	1	138.0	1	244.0	2.5	0.108
P6KE170A	161	170	179	1	145.0	1	234.0	2.6	0.108
P6KE180	162	180	198	1	146.0	1	258.0	2.3	0.108
P6KE180A	171	180	189	1	154.0	1	246.0	2.4	0.108
P6KE200	180	200	220	1	162.0	1	287.0	2.1	0.108
P6KE200A	190	200	210	1	171.0	1	274.0	2.2	0.108
P6KE220	198	220	242	1	175.0	1	344.0	1.7	0.108
P6KE220A	209	220	231	1	185.0	1	328.0	1.8	0.108
P6KE250	225	250	275	1	202.0	1	360.0	1.7	0.110
P6KE250A	237	250	263	1	214.0	1	344.0	1.7	0.110
P6KE300	270	300	330	1	243.0	1	430.0	1.4	0.110
P6KE300A	285	300	315	1	256.0	1	414.0	1.4	0.110
P6KE350	315	350	385	1	284.0	1	504.0	1.2	0.110
P6KE350A	333	350	368	1	300.0	1	482.0	1.2	0.110
P6KE400	360	400	440	1	324.0	1	574.0	1.0	0.110
P6KE400A	380	400	420	1	342.0	1	548.0	1.1	0.110
P6KE440	396	440	484	1	356.0	1	631.0	0.95	0.110
P6KE440A	418	440	462	1	376.0	1	602.0	1.0	0.110

* V_{BR} measured after I_T applied for 300µs, I_T = square wave pulse or equivalent

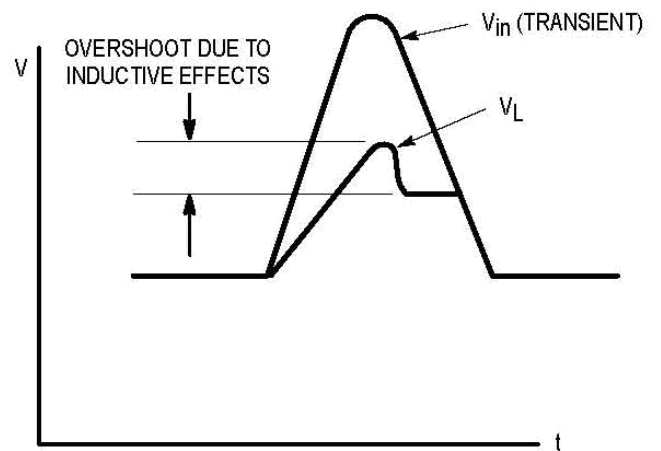
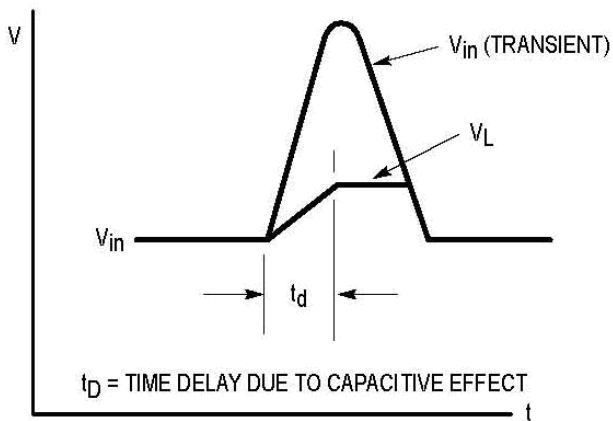
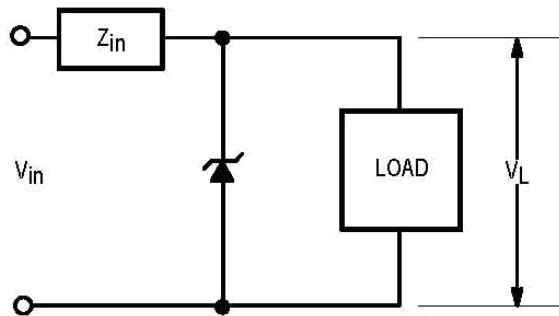
**1/2 sine wave (or equivalent square wave). PW = 8.3ms, duty cycle = 4 pulses per minute maximum

† Surge current waveform per Figure 4 and derate per Figure 2

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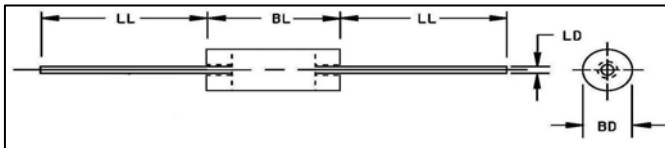
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MECHANICAL CHARACTERISTICS

Case:	Void free, thermosetting plastic
Marking:	Body painted, alpha-numeric
Polarity:	Cathode band

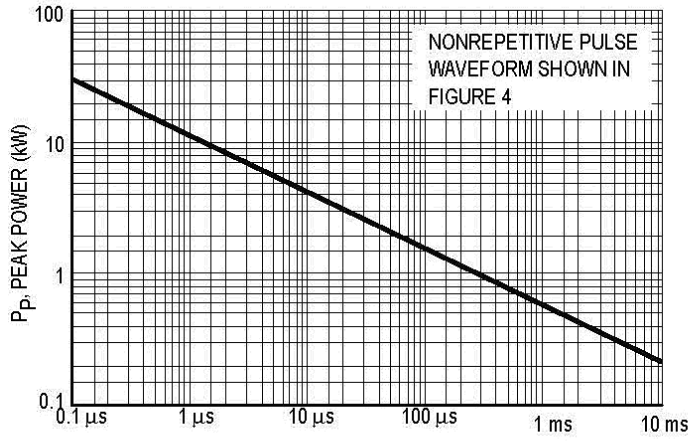


	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
BD	0.130	0.145	3.30	3.68
BL	0.330	0.350	8.38	8.89
LD	0.037	0.043	0.94	1.09
LL	1.000	1.250	25.40	31.75

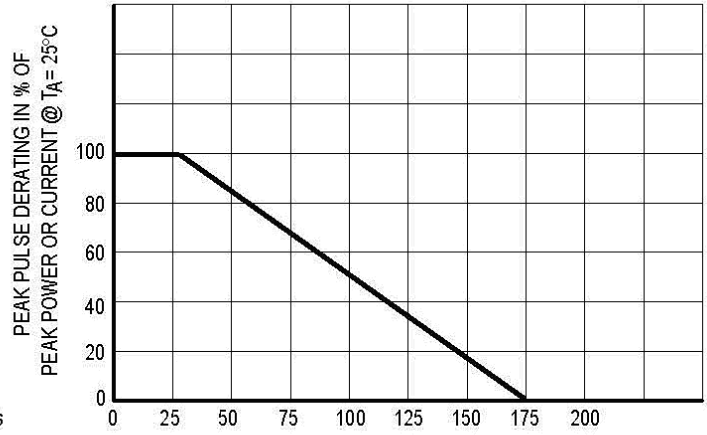
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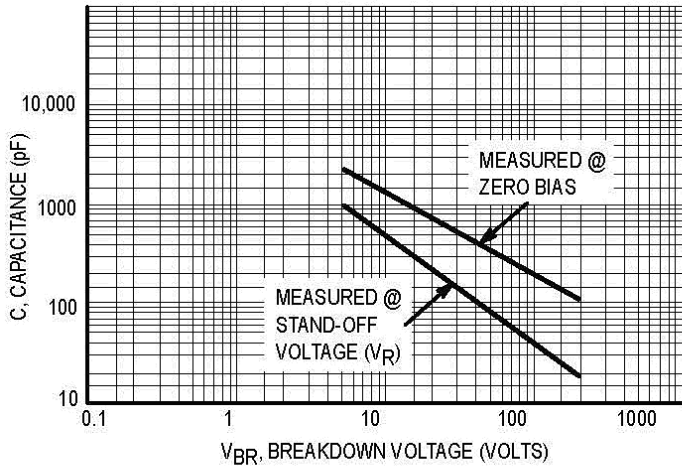
ZENER OVER VOLTAGE
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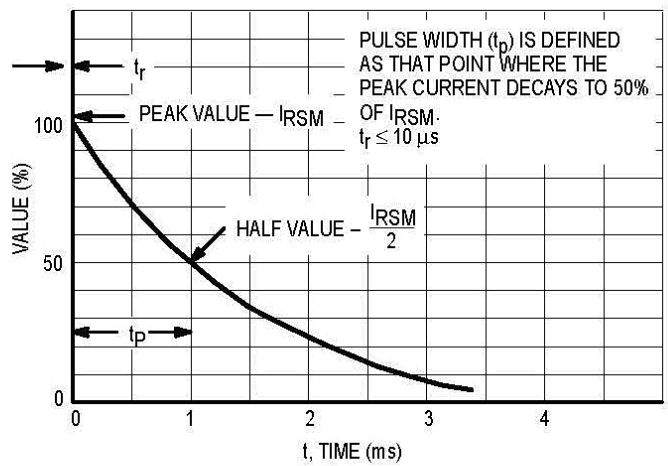
tp, PULSE WIDTH
Pulse Rating Curve



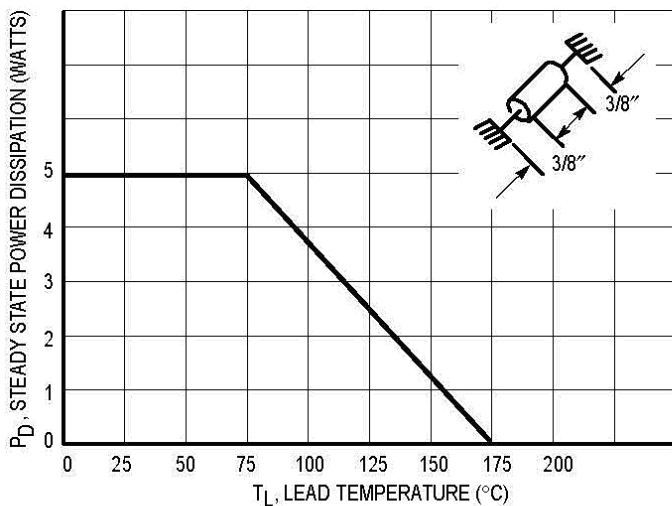
TA, AMBIENT TEMPERATURE (°C)
Pulse Derating Curve



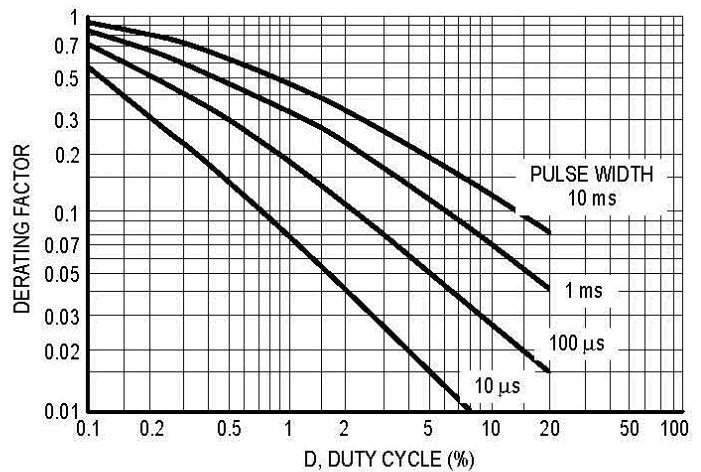
VBR, BREAKDOWN VOLTAGE (VOLTS)
Capacitance versus Breakdown Voltage



t, TIME (ms)
Pulse Waveform



TL, LEAD TEMPERATURE (°C)
Steady State Power Derating



D, DUTY CYCLE (%)
Typical Derating Factor for Duty Cycle