DIGITRON™ Semiconductors

High-reliability discrete products and engineering services since 1977

5KP5.0-5KP250A

5000W TRANSIENT VOLTAGE SUPPRESSOR

FEATURES

- Axial and radial available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding "-PBF" suffix.
- Available in both axial leaded and radial packages ("R" prefix for radial packages)
- Selections for 5.0 to 110 volts standoff voltage
- Suppresses transients up to 5000 watts @ 10/10000µa and 34000 watts @ 8/20µs
- Fast response

MAXIMUM RATINGS

Rating	Value
Peak Pulse Power Dissipation @ 25°C	5000 watts at 10/1000µs
Impulse Repetition Rate (Duty factor)	0.05%
$t_{clamping}$ (0 volts to $V_{(BR)}$ min):	< 100ps theoretical for unidirectional and < 5 ns for bidirectional
Operating and Storage Temperature:	-65 to +150°C
Thermal Resistance:	20°C/W junction to lead or 80°C/W junction to ambient when mounted on FR4 PC board with 4mm² copper pads and track width 1 mm, length 25 mm
Steady-State Power dissipation:	6 watts at T_L = 30°C or 1.56 watts at T_A = 25°C when mounted on FR4 PC board described for thermal resistance
Forward Surge Voltage:	3.5 V maximum @ 100 Amps 8.3 ms half-sine wave
Solder Temperatures:	260°C for 10 s (maximum)

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

Part Number[2]	Reverse Stand-Off Voltage V_{WM}[1]	Breakdown Voltage $V_{(BR)}$			Maximum Clamping Voltage V_C @ I_{PP}	Maximum Standby Current[3] I_D @ V_{WM}	Maximum Peak Pulse Current I_{PP} Fig. 2	Maximum Temperature Coefficient of $V_{(BR)}$ $\alpha_{V(BR)}$
		$V_{(BR)}$ @		$I_{(BR)}$				
	Volts	Volts		mA	Volts	µA	A	%/°C
5KP5.0	5.0	6.40	7.30	50	9.6	5000	521	0.057
5KP5.0A	5.0	6.40	7.00	50	9.2	5000	543	0.057
5KP6.0	6.0	6.67	8.15	50	11.4	5000	439	0.061
5KP6.0A	6.0	6.67	7.37	50	10.3	5000	485	0.061
5KP6.5	6.5	7.22	8.82	50	12.3	2000	407	0.065
5KP6.5A	6.5	7.22	7.98	50	11.2	2000	446	0.065
5KP7.0	7.0	7.78	9.51	50	13.3	1000	376	0.068
5KP7.0A	7.0	7.78	8.60	50	12.0	1000	417	0.068
5KP7.5	7.5	8.33	10.2	5	14.3	250	350	0.073
5KP7.5A	7.5	8.33	9.21	5	12.9	250	388	0.073
5KP8.0	8.0	8.89	10.9	5	15.0	150	333	0.075
5KP8.0A	8.0	8.89	9.83	5	13.6	150	368	0.075
5KP8.5	8.5	9.44	11.5	5	15.9	50	314	0.078
5KP8.5A	8.5	9.44	10.4	5	14.4	50	347	0.078
5KP9.0	9.0	10.0	12.2	5	16.9	20	296	0.081
5KP9.0A	9.0	10.0	11.1	5	15.4	20	325	0.081

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		$V_{(BR)}$ @		$I_{(BR)}$				
	Volts	Volts		mA	Volts	µA	A	mV/°C
5KP10	10	11.1	13.6	5	18.8	15	266	0.084
5KP10A	10	11.1	12.3	5	17.0	15	294	0.084
5KP11	11	12.2	14.9	5	20.1	10	249	0.086
5KP11A	11	12.2	13.5	5	18.2	10	275	0.086
5KP12	12	13.3	16.3	5	22.0	5	227	0.088
5KP12A	12	13.3	14.7	5	19.9	5	251	0.088
5KP13	13	14.4	17.6	5	23.8	2	210	0.090
5KP13A	13	14.4	15.9	5	21.5	2	233	0.090
5KP14	14	15.6	19.1	5	25.8	2	194	0.092
5KP14A	14	15.6	17.2	5	23.2	2	216	0.092
5KP15	15	16.7	20.4	5	26.9	2	186	0.094
5KP15A	15	16.7	18.5	5	24.4	2	205	0.094
5KP16	16	17.8	21.8	5	28.8	2	174	0.096
5KP16A	16	17.8	19.7	5	26.0	2	192	0.096
5KP17	17	18.9	23.1	5	30.5	2	164	0.097
5KP17A	17	18.9	20.9	5	27.6	2	181	0.097
5KP18	18	20.0	24.4	5	32.2	2	155	0.098
5KP18A	18	20.0	22.1	5	29.2	2	171	0.098
5KP20	20	22.2	27.1	5	35.8	2	140	0.099
5KP20A	20	22.2	24.5	5	32.4	2	154	0.099
5KP22	22	24.4	29.8	5	39.4	2	127	0.100
5KP22A	22	24.4	26.9	5	35.5	2	141	0.100
5KP24	24	26.7	32.6	5	43.0	2	116	0.101
5KP24A	24	26.7	29.5	5	38.9	2	129	0.101
5KP26	26	28.9	35.3	5	46.6	2	107	0.101
5KP26A	26	28.9	31.9	5	42.1	2	119	0.101
5KP28	28	31.1	38.0	5	50.0	2	100	0.102
5KP28A	28	31.1	34.4	5	45.4	2	110	0.102
5KP30	30	33.3	40.7	5	53.5	2	93.5	0.103
5KP30A	30	33.3	36.8	5	48.4	2	103	0.103
5KP33	33	36.7	44.9	5	59.0	2	84.7	0.104
5KP33A	33	36.7	40.6	5	53.3	2	93.8	0.104
5KP36	36	40.0	48.9	5	64.3	2	77.8	0.104
5KP36A	36	40.0	44.2	5	58.1	2	86.1	0.104

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Part Number[2]	Reverse Stand-Off Voltage V_{WM}[1]	Breakdown Voltage $V_{(BR)}$			Maximum Clamping Voltage V_C @ I_{PP}	Maximum Standby Current I_D @ V_{WM}	Maximum Peak Pulse Current I_{PP} Fig. 2	Maximum Temperature Coefficient of $V_{(BR)}$ $\alpha_{V(BR)}$
		$V_{(BR)}$ @		$I_{(BR)}$				
	Volts	Volts		mA	Volts	µA	A	mV/°C
5KP40	40	44.4	54.3	5	71.4	2	70	0.105
5KP40A	40	44.4	49.1	5	64.5	2	77.5	0.105
5KP43	43	47.8	58.4	5	76.7	2	65.2	0.105
5KP43A	43	47.8	52.8	5	69.4	2	72	0.105
5KP45	45	50.0	61.1	5	80.3	2	62.3	0.106
5KP45A	45	50.0	55.3	5	72.7	2	68.8	0.106
5KP48	48	53.3	65.1	5	85.5	2	58.5	0.106
5KP48A	48	53.3	58.9	5	77.4	2	64.6	0.106
5KP51	51	56.7	69.3	5	91.1	2	54.9	0.107
5KP51A	51	56.7	62.7	5	82.4	2	60.7	0.107
5KP54	54	60.0	73.3	5	96.3	2	51.9	0.107
5KP54A	54	60.0	66.3	5	87.1	2	57.4	0.107
5KP58	58	64.4	78.7	5	103	2	48.5	0.107
5KP58A	58	64.4	71.2	5	94	2	53.4	0.107
5KP60	60	66.7	81.5	5	107	2	46.7	0.108
5KP60A	60	66.7	73.7	5	97	2	51.7	0.108
5KP64	64	71.1	86.9	5	114	2	43.9	0.108
5KP64A	64	71.1	78.6	5	103	2	48.5	0.108
5KP70	70	77.8	95.1	5	125	2	40.0	0.108
5KP70A	70	77.8	86.0	5	113	2	44.2	0.108
5KP75	75	83.3	102.0	5	134	2	37.3	0.108
5KP75A	75	83.3	92.1	5	121	2	41.3	0.108
5KP78	78	86.7	106.0	5	139	2	36.0	0.108
5KP78A	78	86.7	95.8	5	126	2	39.7	0.108
5KP85	85	94.4	115.0	5	151	2	33.1	0.108
5KP85A	85	94.4	104.0	5	137	2	36.5	0.108
5KP90	90	100	122	5	160	2	31.3	0.110
5KP90A	90	100	111	5	146	2	34.2	0.110
5KP100	100	111	136	5	179	2	27.9	0.110
5KP100A	100	111	123	5	162	2	30.9	0.110
5KP110	110	122	149	5	196	2	25.5	0.110
5KP110A	110	122	135	5	177	2	28.2	0.110
5KP120	120	133	162	5	213	2	23.5	0.110
5KP120A	120	133	147	5	193	2	26.4	0.110
5KP130	130	144	175	5	231	2	21.6	0.110

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Part Number[2]	Reverse Stand-Off Voltage V_{WM}[1]	Breakdown Voltage $V_{(BR)}$			Maximum Clamping Voltage V_C @ I_{PP}	Maximum Standby Current I_D @ V_{WM}	Maximum Peak Pulse Current I_{PP} Fig. 2	Maximum Temperature Coefficient of $V_{(BR)}$ $\alpha_{V(BR)}$
		$V_{(BR)}$ @		$I_{(BR)}$				
	Volts	Volts		mA	Volts	µA	A	mV/°C
5KP130A	130	144	159	5	209	2	24.4	0.110
5KP150	150	167	204	5	268	2	18.7	0.110
5KP150A	150	167	185	5	243	2	21.0	0.110
5KP160	160	178	217	5	287	2	17.4	0.110
5KP160A	160	178	197	5	259	2	19.7	0.110
5KP170	170	189	231	5	304	2	16.4	0.110
5KP170A	170	189	209	5	275	2	18.5	0.110
5KP180	180	200	244	5	323	2	15.5	0.110
5KP180A	180	200	221	5	292	2	17.5	0.110
5KP190	190	211	258	5	343	2	14.6	0.110
5KP190A	190	211	233	5	310	2	16.5	0.110
5KP200	200	222	271	5	364	2	13.7	0.110
5KP200A	200	222	246	5	329	2	15.5	0.110
5KP210	210	233	284	5	386	2	12.9	0.110
5KP210A	210	233	258	5	349	2	14.6	0.110
5KP220	220	244	298	5	410	2	12.2	0.110
5KP220A	220	244	270	5	371	2	13.7	0.110
5KP250	250	277	338	5	470	2	10.6	0.110
5KP250A	250	277	306	5	425	2	12.0	0.110

Note 1: Transient voltage suppressors are normally selected with reverse "Stand-Off Voltage" V_{WM} which should be equal or greater than the dc or continuous peak operating voltage level.
Note 2: For bidirectional construction, indicate C or CA suffix after the part number.
Note 3: For the 5KP5.0C and 5KP5.0CA double the Maximum Standby Current to 4000 uA

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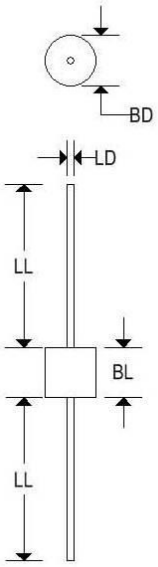
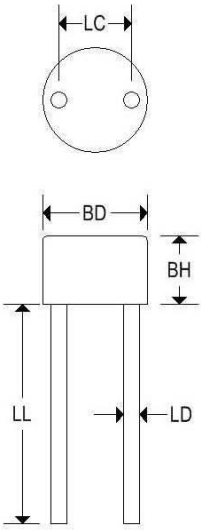
MECHANICAL CHARACTERISTICS

Case	Digi I
Marking	Body-painted, alpha numeric
Polarity	Cathode band. Bidirectional not marked for polarity.



	Digi I			
	Inches		Millimeters	
	Min	Max	Min	Max
BD	0.340	0.360	8.600	9.100
BL	0.340	0.360	8.600	9.100
LD	0.047	0.053	1.194	1.346
LL	1.000	-	25.400	-

Case	5R
Marking	Body-painted, alpha numeric
Polarity	Cathode band. Bidirectional not marked for polarity.



	Case 5R			
	Inches		Millimeters	
	Min	Max	Min	Max
BH	0.205	0.235	5.207	5.969
BD	0.340	0.360	8.636	9.144
LD	0.047	0.053	1.194	1.346
LL	0.750	-	19.050	-
LC	0.235	0.265	5.969	6.731

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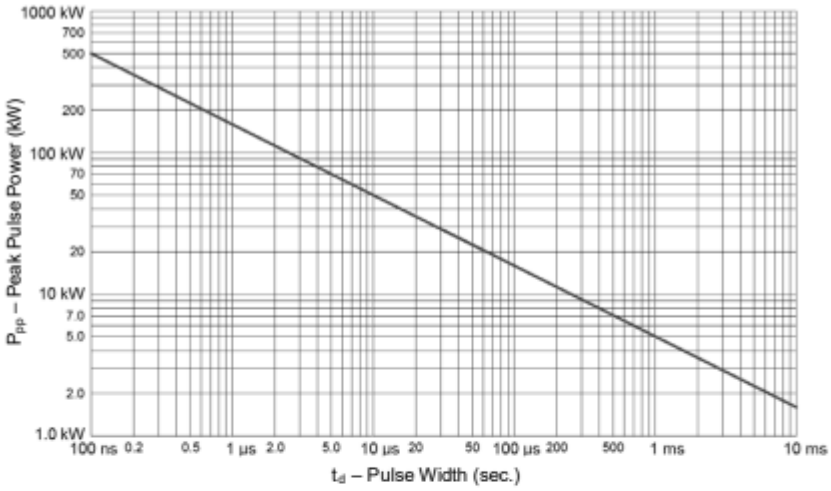

FIGURE 1
Peak Pulse Power Rating Curve

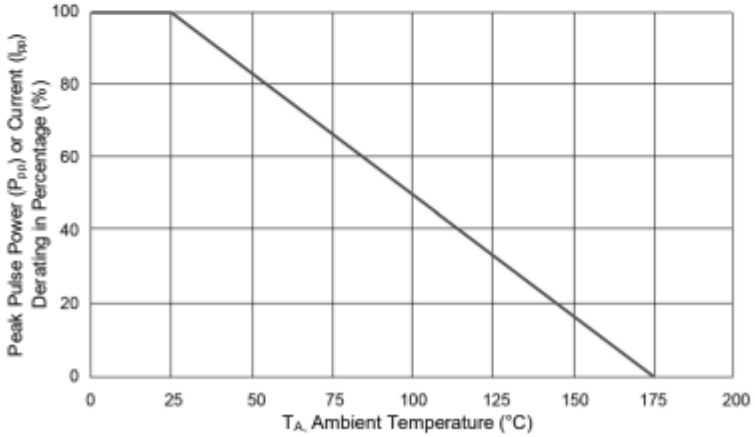

FIGURE 2
Pulse Derating Curve

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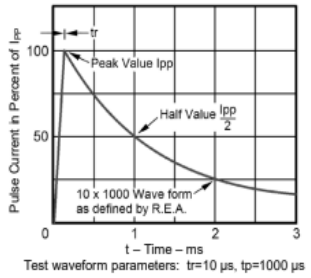

Test waveform parameters: tr=10 µs, tp=1000 µs

FIGURE 3
Pulse Waveform for 10/1000 µs Exponential Surge

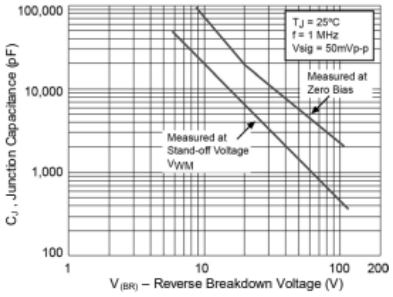

FIGURE 4
Typical Junction Capacitance

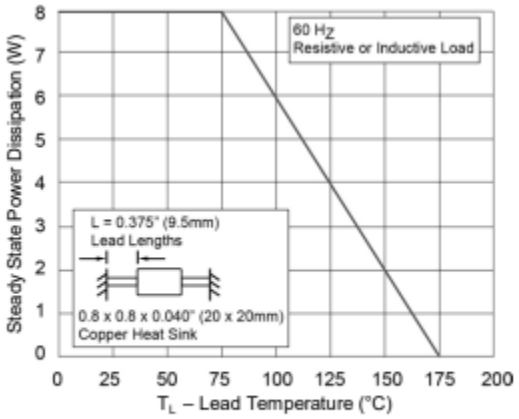

FIGURE 5
Steady State Power Derating Curve

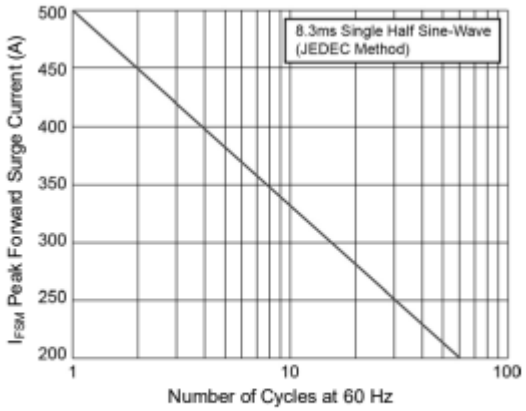

FIGURE 6
Maximum Non-repetitive Forward Surge Current