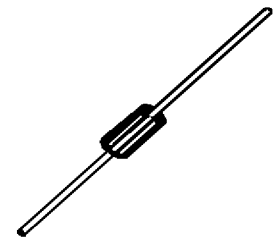
SGS-THOMSON MICROELECTRONICS

P6KE6V8P,A/440P,A
P6KE6V8CP,A/440CP,CA

TRANSIL

FEATURES

- PEAK PULSE POWER= 600 W @ 1ms.
- BREAKDOWN VOLTAGE RANGE : From 6V8 to 440 V.
- UNI AND BIDIRECTIONAL TYPES.
- LOW CLAMPING FACTOR.
- FAST RESPONSE TIME: $T_{clamping}$: 1ps (0 V to V_{BR}).
- UL RECOGNIZED.



CB417
(Plastic)

DESCRIPTION

Transil diodes provide high overvoltage protection by clamping action. Their instantaneous reponse to transients makes them particularly suited to protect voltage sensitive devices such as MOS Technology and low voltage supplied IC's.

MECHANICAL CHARACTERISTICS

- Body marked with : Logo, Date Code, Type Code, and Cathode Band (for unidirectional types only).
- Tinned copper leads.
- High temperature soldering.

ABSOLUTE RATINGS (limiting values)

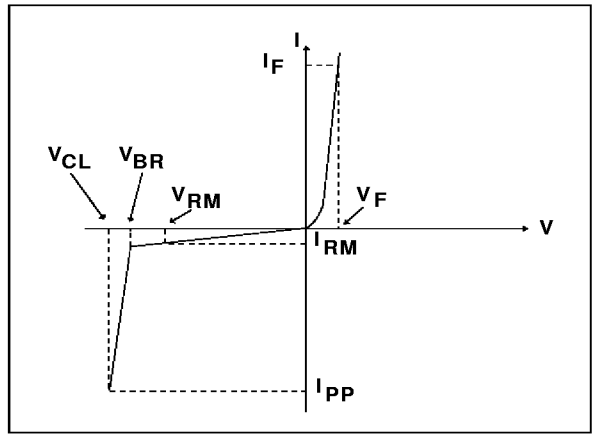
Symbol	Parameter		Value	Unit
P_p	Peak pulse power dissipation See note 1 and derating curve Fig 1.	Tamb = 25°C	600	W
P	Power dissipation on infinite heatsink See note 1 and derating curve Fig 1.	Tlead = 75°C	5	W
I_{FSM}	Non repetitive surge peak forward current For Unidirectional types.	Tamb = 25°C t =10 ms	100	A
T_{stg} T_j	Storage and junction temperature range		- 65 to + 175 175	°C °C
T_L	Maximum lead temperature for soldering during 10 s.		230	°C

THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
R_{th} (j-l)	Junction-leads on infinite heatsink	20	°C/W
R_{th} (j-a)	Junction to ambient. on printed circuit. L_{lead} = 10 mm	85	°C/W

ELECTRICAL CHARACTERISTICS

Symbol	Parameter
V_{RM}	Stand-off voltage.
V_{BR}	Breakdown voltage.
V_{CL}	Clamping voltage.
I_{RM}	Leakage current @ VRM.
I_{PP}	Surge current.
αT	Voltage temperature coefficient.
V_F	Forward Voltage drop $V_F < 3.5V$ @ $I_F = 50$ A.



TYPES		I_{RM} @ V_{RM} max		V_{BR} @ I_R min	nom	max		V_{CL} @ I_{PP} max 10/1000µs		V_{CL} @ I_{PP} max 8/20µs		αT max note3	C typ note4
					note2								
Unidirectional	**Bidirectional**	**µA**	**V**	**V**	**V**	**V**	**mA**	**V**	**A**	**V**	**A**	**10^{-4}/°C**	**(pF)**
P6KE6V8P	P6KE6V8CP	1000	5.8	6.45	6.8	7.48	10	10.5	57	13.4	298	5.7	4000
P6KE6V8A	P6KE6V8CA	1000	5.8	6.45	6.8	7.14	10	10.5	57	13.4	298	5.7	4000
P6KE7V5P	P6KE7V5CP	500	6.4	7.13	7.5	8.25	10	11.3	53	14.5	276	6.1	3700
P6KE7V5A	P6KE7V5CA	500	6.4	7.13	7.5	7.88	10	11.3	53	14.5	276	6.1	3700
P6KE8V2P	P6KE8V2CP	200	7.02	7.79	8.2	9.02	10	12.1	50	15.5	258	6.5	3400
P6KE8V2A	P6KE8V2CA	200	7.02	7.79	8.2	8.61	10	12.1	50	15.5	258	6.5	3400
P6KE9V1P	P6KE9V1CP	50	7.78	8.65	9.1	10	1	13.4	45	17.1	234	6.8	3100
P6KE9V1A	P6KE9V1CA	50	7.78	8.65	9.1	9.55	1	13.4	45	17.1	234	6.8	3100
P6KE10P	P6KE10CP	10	8.55	9.5	10	11	1	14.5	41	18.6	215	7.3	2800
P6KE10A	P6KE10CA	10	8.55	9.5	10	10.5	1	14.5	41	18.6	215	7.3	2800
P6KE11P	P6KE11CP	5	9.4	10.5	11	12.1	1	15.6	38	20.3	197	7.5	2500
P6KE11A	P6KE11CA	5	9.4	10.5	11	11.6	1	15.6	38	20.3	197	7.5	2500
P6KE12P	P6KE12CP	5	10.2	11.4	12	13.2	1	16.7	36	21.7	184	7.8	2300
P6KE12A	P6KE12CA	5	10.2	11.4	12	12.6	1	16.7	36	21.7	184	7.8	2300
P6KE13P	P6KE13CP	5	11.1	12.4	13	14.3	1	18.2	33	23.6	169	8.1	2150
P6KE13A	P6KE13CA	5	11.1	12.4	13	13.7	1	18.2	33	23.6	169	8.1	2150
P6KE15P	P6KE15CP	5	12.8	14.3	15	16.5	1	21.2	28	27.2	147	8.4	1900
P6KE15A	P6KE15CA	5	12.8	14.3	15	15.8	1	21.2	28	27.2	147	8.4	1900
P6KE16P	P6KE16CP	5	13.6	15.2	16	17.6	1	22.5	27	28.9	138	8.6	1800
P6KE16A	P6KE16CA	5	13.6	15.2	16	16.8	1	22.5	27	28.9	138	8.6	1800
P6KE18P	P6KE18CP	5	15.3	17.1	18	19.8	1	25.2	24	32.5	123	8.8	1600
P6KE18A	P6KE18CA	5	15.3	17.1	18	18.9	1	25.2	24	32.5	123	8.8	1600
P6KE20P	P6KE20CP	5	17.1	19	20	22	1	27.7	22	36.1	111	9.0	1500
P6KE20A	P6KE20CA	5	17.1	19	20	21	1	27.7	22	36.1	111	9.0	1500
P6KE22P	P6KE22CP	5	18.8	20.9	22	24.2	1	30.6	20	39.3	102	9.2	1350

P = Prefered device

TYPES		I_{RM} @ V_{RM} max		V_{BR} @ I_R min	nom	max		V_{CL} @ I_{PP} max 10/1000µs		V_{CL} @ I_{PP} max 8/20µs		αT max note3	C typ note4
					note2								
Unidirectional	**Bidirectional**	**µA**	**V**	**V**	**V**	**V**	**mA**	**V**	**A**	**V**	**A**	**10^{-4}/°C**	**(pF)**
P6KE22A	P6KE22CA	5	18.8	20.9	22	23.1	1	30.6	20	39.3	102	9.2	1350
P6KE24P	P6KE24CP	5	20.5	22.8	24	26.4	1	33.2	18	42.8	93	9.4	1250
P P6KE24A	P6KE24CA	5	20.5	22.8	24	25.2	1	33.2	18	42.8	93	9.4	1250
P P6KE27P	P P6KE27CP	5	23.1	25.7	27	29.7	1	37.5	16	48.3	83	9.6	1150
P6KE27A	P6KE27CA	5	23.1	25.7	27	28.4	1	37.5	16	48.3	83	9.6	1150
P P6KE30P	P P6KE30CP	5	25.6	28.5	30	33	1	41.5	14.5	53.5	75	9.7	1075
P P6KE30A	P P6KE30CA	5	25.6	28.5	30	31.5	1	41.5	14.5	53.5	75	9.7	1075
P6KE33P	P6KE33CP	5	28.2	31.4	33	36.3	1	45.7	13.1	59.0	68	9.8	1000
P P6KE33A	P P6KE33CA	5	28.2	31.4	33	34.7	1	45.7	13.1	59.0	68	9.8	1000
P P6KE36P	P P6KE36CP	5	30.8	34.2	36	39.6	1	49.9	12	64.3	62	9.9	950
P P6KE36A	P6KE36CA	5	30.8	34.2	36	37.8	1	49.9	12	64.3	62	9.9	950
P P6KE39P	P P6KE39CP	5	33.3	37.1	39	42.9	1	53.9	11.1	69.7	57	10.0	900
P P6KE39A	P P6KE39CA	5	33.3	37.1	39	41.0	1	53.9	11.1	69.7	57	10.0	900
P6KE43P	P6KE43CP	5	36.8	40.9	43	47.3	1	59.3	10.1	76.8	52	10.1	850
P6KE43A	P6KE43CA	5	36.8	40.9	43	45.2	1	59.3	10.1	76.8	52	10.1	850
P6KE47P	P P6KE47CP	5	40.2	44.7	47	51.7	1	64.8	9.3	84	48	10.1	800
P6KE47A	P P6KE47CA	5	40.2	44.7	47	49.4	1	64.8	9.3	84	48	10.1	800
P6KE51P	P P6KE51CP	5	43.6	48.5	51	56.1	1	70.1	8.6	91	44	10.2	750
P6KE51A	P P6KE51CA	5	43.6	48.5	51	53.6	1	70.1	8.6	91	44	10.2	750
P6KE56P	P P6KE56CP	5	47.8	53.2	56	61.6	1	77	7.8	100	40	10.3	700
P6KE56A	P6KE56CA	5	47.8	53.2	56	58.8	1	77	7.8	100	40	10.3	700
P6KE62P	P6KE62CP	5	53.0	58.9	62	68.2	1	85	7.1	111	36	10.4	650
P6KE62A	P6KE62CA	5	53.0	58.9	62	65.1	1	85	7.1	111	36	10.4	650
P6KE68P	P P6KE68CP	5	58.1	64.6	68	74.8	1	92	6.5	121	33	10.4	625
P6KE68A	P6KE68CA	5	58.1	64.6	68	71.4	1	92	6.5	121	33	10.4	625
P6KE75P	P6KE75CP	5	64.1	71.3	75	82.5	1	103	5.8	134	30	10.5	575
P6KE75A	P6KE75CA	5	64.1	71.3	75	78.8	1	103	5.8	134	30	10.5	575
P6KE82P	P P6KE82CP	5	70.1	77.9	82	90.2	1	113	5.3	146	27	10.5	550
P6KE82A	P6KE82CA	5	70.1	77.9	82	86.1	1	113	5.3	146	27	10.5	550
P6KE91P	P6KE91CP	5	77.8	86.5	91	100	1	125	4.8	162	25	10.6	525
P6KE91A	P6KE91CA	5	77.8	86.5	91	95.5	1	125	4.8	162	25	10.6	525
P6KE100P	P6KE100CP	5	85.5	95.0	100	110	1	137	4.4	178	22.5	10.6	500
P6KE100A	P6KE100CA	5	85.5	95.0	100	105	1	137	4.4	178	22.5	10.6	500
P6KE110P	P6KE110CP	5	94.0	105	110	121	1	152	3.9	195	20.5	10.7	470
P6KE110A	P6KE110CA	5	94.0	105	110	116	1	152	3.9	195	20.5	10.7	470
P6KE120P	P6KE120CP	5	102	114	120	132	1	165	3.6	212	19	10.7	450
P6KE120A	P6KE120CA	5	102	114	120	126	1	165	3.6	212	19	10.7	450
P6KE130P	P P6KE130CP	5	111	124	130	143	1	179	3.4	230	17.5	10.7	420
P6KE130A	P6KE130CA	5	111	124	130	137	1	179	3.4	230	17.5	10.7	420
P6KE150P	P P6KE150CP	5	128	143	150	165	1	207	2.9	265	15	10.8	400
P P6KE150A	P P6KE150CA	5	128	143	150	158	1	207	2.9	265	15	10.8	400
P6KE160P	P P6KE160CP	5	136	152	160	176	1	219	2.7	282	14	10.8	380
P6KE160A	P6KE160CA	5	136	152	160	168	1	219	2.7	282	14	10.8	380
P6KE170P	P6KE170CP	5	145	161	170	187	1	234	2.6	301	13	10.8	370
P6KE170A	P6KE170CA	5	145	161	170	179	1	234	2.6	301	13	10.8	370
P6KE180P	P P6KE180CP	5	154	171	180	198	1	246	2.4	317	12.6	10.8	360
P6KE180A	P6KE180CA	5	154	171	180	189	1	246	2.4	317	12.6	10.8	360
P6KE200P	P P6KE200CP	5	171	190	200	220	1	274	2.2	353	11.3	10.8	350
P P6KE200A	P P6KE200CA	5	171	190	200	210	1	274	2.2	353	11.3	10.8	350
P6KE220P	P6KE220CP	5	188	209	220	242	1	328	2	388	10.3	10.8	330
P6KE220A	P6KE220CA	5	188	209	220	231	1	328	2	388	10.3	10.8	330
P6KE250P	P P6KE250CP	5	213	237	250	275	1	344	2	442	9	11	310
P6KE250A	P6KE250CA	5	213	237	250	263	1	344	2	442	9	11	310
P6KE280P	P6KE280CP	5	239	266	280	308	1	384	2	494	8	11	300
P6KE280A	P6KE280CA	5	239	266	280	294	1	384	2	494	8	11	300

P = Prefered device

TYPES		I_{RM} @ V_{RM} max		V_{BR} @ I_R min nom max note2				V_{CL} @ I_{PP} max 10/1000µs		V_{CL} @ I_{PP} max 8/20µs		αT max note3	C typ note4
Unidirectional	**Bidirectional**	**µA**	**V**	**V**	**V**	**V**	**mA**	**V**	**A**	**V**	**A**	**10^{-4}/°C**	**(pF)**
P6KE300P	P6KE300CP	5	256	285	300	330	1	414	1.6	529	7.6	11	290
P6KE300A	P6KE300CA	5	256	285	300	315	1	414	1.6	529	7.6	11	290
P6KE320P	P6KE320CP	5	273	304	320	352	1	438	1.6	564	7.1	11	280
P6KE320A	P6KE320CA	5	273	304	320	336	1	438	1.6	564	7.1	11	280
P P6KE350P	P6KE350CP	5	299	332	350	385	1	482	1.6	618	6.5	11	270
P P6KE350A	P6KE350CA	5	299	332	350	368	1	482	1.6	618	6.5	11	270
P6KE400P	P P6KE400CP	5	342	380	400	440	1	548	1.3	706	5.7	11	360
P P6KE400A	P6KE400CA	5	342	380	400	420	1	548	1.3	706	5.7	11	360
P6KE440P	P P6KE440CP	5	376	418	440	484	1	603	1.3	776	5.2	11	350
P6KE440A	P6KE440CA	5	376	418	440	462	1	603	1.3	776	5.2	11	350

All parameters tested at 25 °C, except where indicated.

P = Prefered device

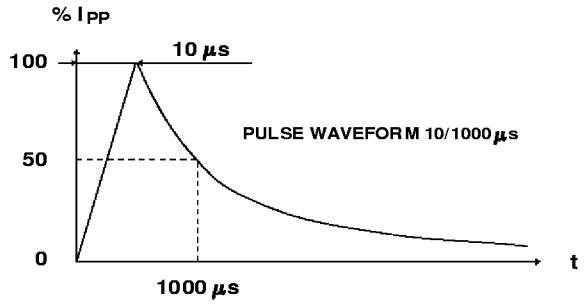
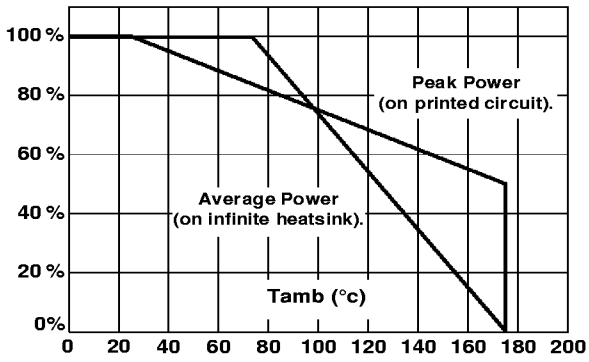


Figure 1: Power dissipation derating versus ambient temperature



Note 1 : For surges greater than the maximum values, the diode will present a short-circuit Anode - Cathode.

Note 2 : Pulse test: $T_P < 50$ ms.

Note 3 : $\Delta V_{BR} = \alpha T \cdot (Ta - 25) \cdot V_{BR(25°C)}$.

Note 4 $V_R = 0$ V, F = 1 MHz. For bidirectional types, capacitance value is divided by 2.

Figure 2 : Peak pulse power versus exponential pulse duration.

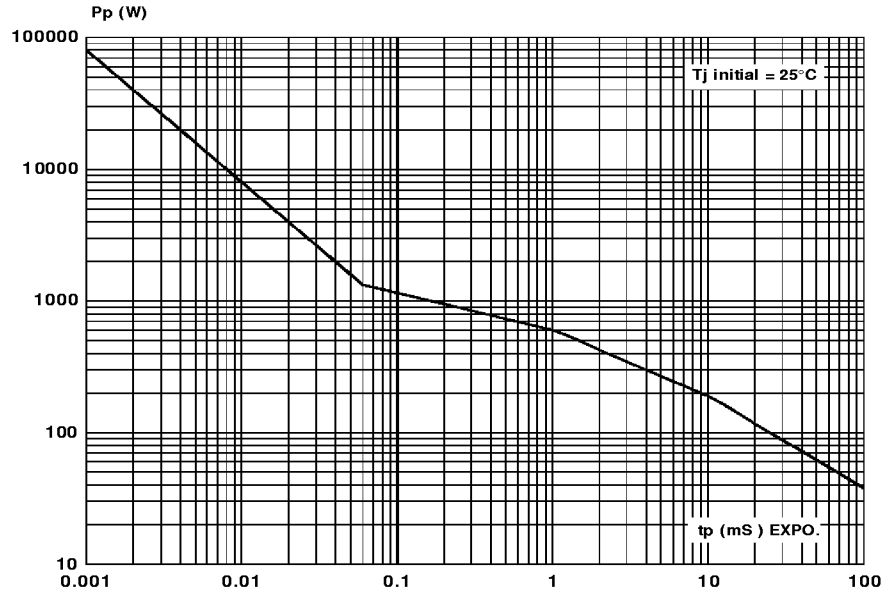
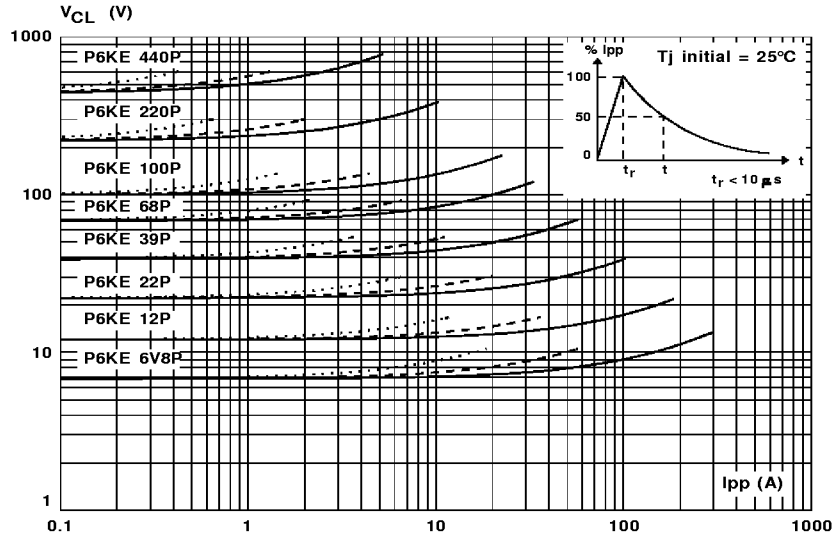


Figure 3 : Clamping voltage versus peak pulse current.
exponential waveform :
t = 20 µs_____
t = 1 ms----------
t =10 ms .....



Note : The curves of the figure 3 are specified for a junction temperature of 25 °C before surge.
The given results may be extrapolated for other junction temperatures by using the following formula :
$\Delta V_{(BR)} = \alpha T_{(V(BR))} * [T_a - 25] * V_{(BR)}$.
For intermediate voltages, extrapolate the given results.

Figure 4a : Capacitance versus reverse applied voltage for unidirectional types (typical values).

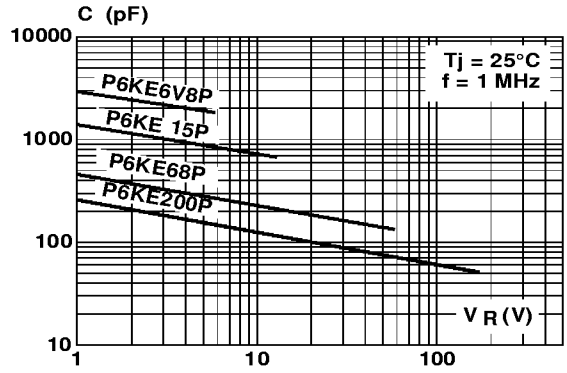


Figure 4b : Capacitance versus reverse applied voltage for bidirectional types (typical values)

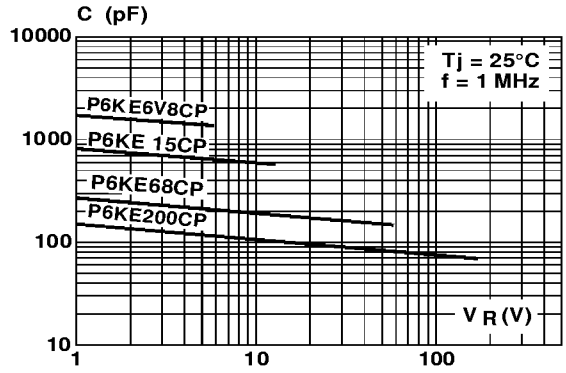


Figure 5 : Peak forward voltage drop versus peak forward current (typical values for unidirectional types).

Note : For units with $V_{BR} > 200$ V
V_F is twice than shown.

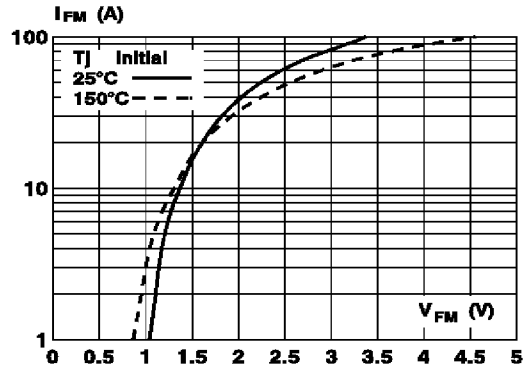
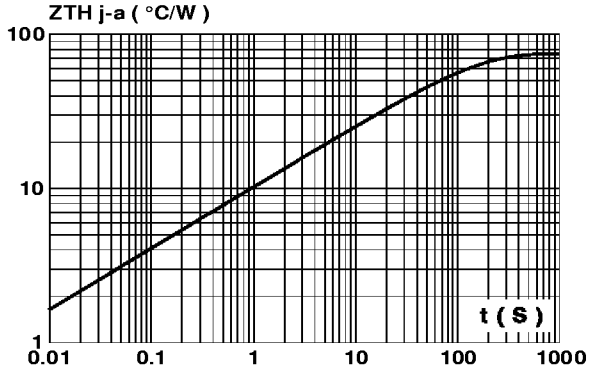
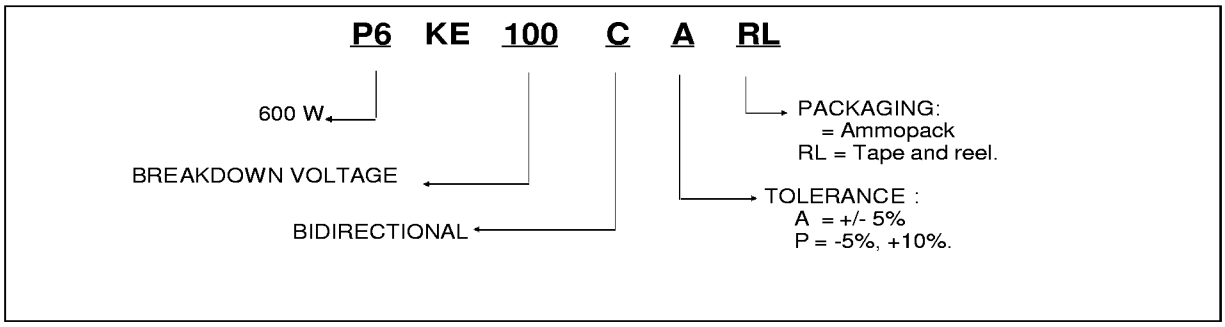


Figure 6 : Transient thermal impedance junction-ambient versus pulse duration. For a mounting on PC Board with L_{lead} = 10mm.



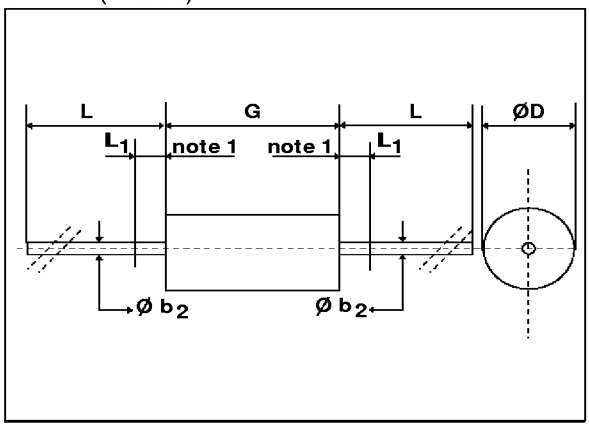
ORDER CODE



MARKING : Logo, Date Code, Type Code, Cathode Band (for unidirectional types only).

PACKAGE MECHANICAL DATA

CB417 (Plastic).



Ref	Millimeters		Inches	
	min	max	min	max
Ø b_2	-	1.092	-	0.043
Ø D	-	3.683	-	0.145
G	-	8.89	-	0.350
L	25.4	-	1.000	-
L_1	-	1.25	-	0.049

Weight = 0.65 g.

Packaging : standard packaging is in tape and reel.