SGS-THOMSON MICROELECTRONICS

BZW04-5V8, B → 376, B
BZW04P5V8, B → 376, B

UNI-AND BIDIRECTIONAL TRANSIENT VOLTAGE SUPPRESSORS

- HIGH SURGE CAPABILITY :
  400 W / 1 ms EXPO
- VERY FAST CLAMPING TIME :
  1 ps FOR UNIDIRECTIONAL TYPES
  5 ns FOR BIDIRECTIONAL TYPES
- LARGE VOLTAGE RANGE :
  5.8 V → 376 V
- ORDER CODE :
  TYPE NUMBER FOR UNIDIRECTIONAL TYPES, TYPE NUMBER + SUFFIX B FOR BIDIRECTIONAL TYPES

F 126
(Plastic)

DESCRIPTION

Transient voltage suppressor diodes especially useful in protecting integrated circuits, MOS, hybrids and other voltage-sensitive semiconductors and components.

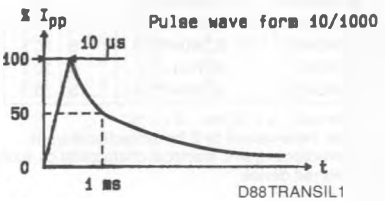
ABSOLUTE MAXIMUM RATINGS (limiting values)

Symbol	Parameter		Value	Unit
P_p	Peak Pulse Power for 1 ms Exponential Pulse	T_j Initial = 25 °C See note 1	400	W
P	Power Dissipation on Infinite Heatsink	T_{amb} = 50 °C	1.7	W
I_{FSM}	Non Repetitive Surge Peak Forward Current for Unidirectional Types	T_j Initial = 25 °C t = 10 ms	50	A
T_{stg} T_j	Storage and Operating Junction Temperature Range		– 55 to 150 150	°C °C
T_L	Maximum Lead Temperature for Soldering During 10 s at 4 mm from Case		230	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th(j-l)}$	Junction-leads on Infinite Heatsink for L_{lead} = 10 mm	60	°C/W

Note : 1. For surges upper than the maximum values, the diode will present a short-circuit anode-cathode.



ELECTRICAL CHARACTERISTICS (T_j = 25 °C)

Symbol	Parameter		Value
V_{RM}	Stand-off Voltage		See tables
$V_{(BR)}$	Breakdown Voltage		
$V_{(CL)}$	Clamping Voltage		
I_{pp}	Peak Pulse Current		
α_T	Temperature Coefficient of $V_{(BR)}$		
C	Capacitance		
$t_{clamping}$	Clamping Time (0 volt to $V_{(BR)}$)	Unidirectional Types	1 ps max.
		Bidirectional Types	5 ns max.

Types		I_{RM} @ V_{RM} max.		$V_{(BR)}$* (V) @ I_R				$V_{(CL)}$ @ I_{pp} max. 1ms expo		$V_{(CL)}$ @ I_{pp} max. 8-20µs expo		α_T max.	C** typ. V_R=0 f=1MHz
Unidirectional	Bidirectional	(µA)	(V)	min.	nom.	max.	(mA)	(V)	(A)	(V)	(A)	(10^{-4}/°C)	(pF)
P BZW04P5V8	P BZW04P5V8B	1000	5.8	6.45	6.8	7.48	10	10.5	38	13.4	174	5.7	3500
BZW04-5V8	BZW04-5V8B	1000	5.8	6.45	6.8	7.14	10	10.5	38	13.4	174	5.7	3500
BZW04P6V4	P BZW04P6V4B	500	6.4	7.13	7.5	8.25	10	11.3	35.4	14.5	160	6.1	3100
BZW04-6V4	BZW04-6V4B	500	6.4	7.13	7.5	7.88	10	11.3	35.4	14.5	160	6.1	3100
BZW04P7V0	P BZW04P7V0B	200	7.02	7.79	8.2	9.02	10	12.1	33	15.5	148	6.5	2700
BZW04-7V0	BZW04-7V0B	200	7.02	7.79	8.2	8.61	10	12.1	33	15.5	148	6.5	2700
BZW04P7V8	BZW04P7V8B	50	7.78	8.65	9.1	10.0	1	13.4	30	17.1	134	6.8	2300
BZW04-7V8	BZW04-7V8B	50	7.78	8.65	9.1	9.55	1	13.4	30	17.1	134	6.8	2300
BZW04P8V5	BZW04P8V5B	10	8.55	9.50	10	11.0	1	14.5	27.6	18.6	258	7.3	2000
BZW04-8V5	BZW04-8V5B	10	8.55	9.50	10	10.50	1	14.5	27.6	18.6	258	7.3	2000
P BZW04P9V4	P BZW04P9V4B	5	9.4	10.5	11	12.1	1	15.6	25.7	20.3	236	7.5	1750
BZW04-9V4	BZW04-9V4B	5	9.4	10.5	11	11.6	1	15.6	25.7	20.3	236	7.5	1750
BZW04P10	BZW04P10B	5	10.2	11.4	12	13.2	1	16.7	24	21.7	221	7.8	1550
BZW04-10	BZW04-10B	5	10.2	11.4	12	12.6	1	16.7	24	21.7	221	7.8	1550
P BZW04P11	P BZW04P11B	5	11.1	12.4	13	14.3	1	18.2	22	23.6	203	8.1	1450
BZW04-11	BZW04-11B	5	11.1	12.4	13	13.7	1	18.2	22	23.6	203	8.1	1450
P BZW04P13	P BZW04P13B	5	12.8	14.3	15	16.5	1	21.2	19	27.2	176	8.4	1200
BZW04-13	BZW04-13B	5	12.8	14.3	15	15.8	1	21.2	19	27.2	176	8.4	1200
P BZW04P14	P BZW04P14B	5	13.6	15.2	16	17.6	1	22.5	17.8	28.9	166	8.6	1100
BZW04-14	BZW04-14B	5	13.6	15.2	16	16.8	1	22.5	17.8	28.9	166	8.6	1100
P BZW04P15	P BZW04P15B	5	15.3	17.1	18	19.8	1	25.2	16	32.5	148	8.8	975
BZW04-15	BZW04-15B	5	15.3	17.1	18	18.9	1	25.2	16	32.5	148	8.8	975
BZW04P17	BZW04P17B	5	17.1	19	20	22	1	27.7	14.5	36.1	133	9.0	850
BZW04-17	BZW04-17B	5	17.1	19	20	21	1	27.7	14.5	36.1	133	9.0	850
BZW04P19	BZW04P19B	5	18.8	20.9	22	24.2	1	30.6	13	39.3	122	9.2	800
BZW04-19	BZW04-19B	5	18.8	20.9	22	23.1	1	30.6	13	39.3	122	9.2	800
BZW04P20	P BZW04P20B	5	20.5	22.8	24	26.4	1	33.2	12	42.8	112	9.4	725
BZW04-20	BZW04-20B	5	20.5	22.8	24	25.2	1	33.2	12	42.8	112	9.4	725
P BZW04P23	P BZW04P23B	5	23.1	25.7	27	29.7	1	37.5	10.7	48.3	99	9.6	625
BZW04-23	BZW04-23B	5	23.1	25.7	27	28.4	1	37.5	10.7	48.3	99	9.6	625
P BZW04P26	P BZW04P26B	5	25.6	28.5	30	33	1	41.5	9.6	53.5	90	9.7	575
BZW04-26	BZW04-26B	5	25.6	28.5	30	31.5	1	41.5	9.6	53.5	90	9.7	575
BZW04P28	P BZW04P28B	5	28.2	31.4	33	36.3	1	45.7	8.8	59	81.5	9.8	510
BZW04-28	BZW04-28B	5	28.2	31.4	33	34.7	1	45.7	8.8	59	81.5	9.8	510
P BZW04P31	P BZW04P31B	5	30.8	34.2	36	39.6	1	49.9	8	64.3	74.5	9.9	480
BZW04-31	BZW04-31B	5	30.8	34.2	36	37.8	1	49.9	8	64.3	74.5	9.9	480
P BZW04P33	BZW04P33B	5	33.3	37.1	39	42.9	1	53.9	7.4	69.7	69	10.0	450

* Pulse test $t_p \leq 50$ ms $\delta < 2$ %.

** Divide these values by 2 for bidirectional types.

For bidirectional types, electrical characteristics apply in both directions.

P : Preferred device.

Types		I_{RM} @ V_{RM} max.		$V_{(BR)}$* @ I_R (V)				$V_{(CL)}$ @ I_{pp} max. 1ms expo		$V_{(CL)}$ @ I_{pp} max. 8-20µs expo		α_T max.	C** typ. V_R=0 f=1MHz
Unidirectional	Bidirectional	(µA)	(V)	min.	nom.	max.	(mA)	(V)	(A)	(V)	(A)	(10^{-4}/°C)	(pF)
BZW04-33	BZW04-33B	5	33.3	37.1	39	41	1	53.9	7.4	69.7	69	10.0	450
BZW04P37	P BZW04P37B	5	36.8	40.9	43	47.3	1	59.3	6.7	76.8	62.5	10.1	400
BZW04-37	BZW04-37B	5	36.8	40.9	43	45.2	1	59.3	6.7	76.8	62.5	10.1	400
BZW04P40	BZW04P40B	5	40.2	44.7	47	51.7	1	64.8	6.2	84	57	10.1	370
BZW04-40	BZW04-40B	5	40.2	44.7	47	49.4	1	64.8	6.2	84	57	10.1	370
BZW04P44	BZW04P44B	5	43.6	48.5	51	56.1	1	70.1	5.7	91	52.5	10.2	350
BZW04-44	BZW04-44B	5	43.6	48.5	51	53.6	1	70.1	5.7	91	52.5	10.2	350
BZW04P48	BZW04P48B	5	47.8	53.2	56	61.6	1	77	5.2	100	48	10.3	320
BZW04-48	BZW04-48B	5	47.8	53.2	56	58.8	1	77	5.2	100	48	10.3	320
BZW04P53	BZW04P53B	5	53	58.9	62	68.2	1	85	4.7	111	43	10.4	290
BZW04-53	BZW04-53B	5	53	58.9	62	65.1	1	85	4.7	111	43	10.4	290
BZW04P58	BZW04P58B	5	58.1	64.6	68	74.8	1	92	4.3	121	39.5	10.4	270
BZW04-58	BZW04-58B	5	58.1	64.6	68	71.4	1	92	4.3	121	39.5	10.4	270
BZW04P64	BZW04P64B	5	64.1	71.3	75	82.5	1	103	3.9	134	36	10.5	250
BZW04-64	BZW04-64B	5	64.1	71.3	75	78.8	1	103	3.9	134	36	10.5	250
BZW04P70	P BZW04P70B	5	70.1	77.9	82	90.2	1	113	3.5	146	33	10.5	230
BZW04-70	BZW04-70B	5	70.1	77.9	82	86.1	1	113	3.5	146	33	10.5	230
BZW04P78	BZW04P78B	5	77.8	86.5	91	100	1	125	3.2	162	29.5	10.6	210
BZW04-78	BZW04-78B	5	77.8	86.5	91	95.5	1	125	3.2	162	29.5	10.6	210
P BZW04P85	BZW04P85B	5	85.5	95	100	110	1	137	2.9	178	27	10.6	200
BZW04-85	BZW04-85B	5	85.5	95	100	105	1	137	2.9	178	27	10.6	200
BZW04P94	BZW04P94B	5	94	105	110	121	1	152	2.6	195	24.5	10.7	185
BZW04-94	BZW04-94B	5	94	105	110	116	1	152	2.6	195	24.5	10.7	185
BZW04P102	BZW04P102B	5	102	114	120	132	1	165	2.4	212	22.5	10.7	170
BZW04-102	BZW04-102B	5	102	114	120	126	1	165	2.4	212	22.5	10.7	170
P BZW04P111	BZW04P111B	5	111	124	130	143	1	179	2.2	230	20.8	10.7	165
BZW04-111	BZW04-111B	5	111	124	130	137	1	179	2.2	230	20.8	10.7	165
P BZW04P128	P BZW04P128B	5	128	143	150	165	1	207	2.0	265	18.1	10.8	145
BZW04-128	BZW04-128B	5	128	143	150	158	1	207	2.0	265	18.1	10.8	145
P BZW04P136	P BZW04P136B	5	136	152	160	176	1	219	1.8	282	17	10.8	140
BZW04-136	BZW04-136B	5	136	152	160	168	1	219	1.8	282	17	10.8	140
P BZW04P145	BZW04P145B	5	145	161	170	187	1	234	1.7	301	16	10.8	135
BZW04-145	BZW04-145B	5	145	161	170	179	1	234	1.7	301	16	10.8	135
BZW04P154	BZW04P154B	5	154	171	180	198	1	246	1.6	317	15.1	10.8	125
BZW04-154	BZW04-154B	5	154	171	180	189	1	246	1.6	317	15.1	10.8	125
BZW04P171	BZW04P171B	5	171	190	200	220	1	274	1.5	353	13.6	10.8	120
BZW04-171	BZW04-171B	5	171	190	200	210	1	274	1.5	353	13.6	10.8	120
BZW04P188	P BZW04P188B	5	188	209	220	242	1	301	1.4	388	12.4	10.8	110
BZW04-188	BZW04-188B	5	188	209	220	231	1	301	1.4	388	12.4	10.8	110
P BZW04P213	BZW04P213B	5	213	237	250	275	1	344	1.5	442	12	11	100
BZW04-213	BZW04-213B	5	213	237	250	263	1	344	1.5	442	12	11	100
P BZW04P239	BZW04P239B	5	239	266	280	308	1	384	1.5	494	12	11	95
BZW04-239	BZW04-239B	5	239	266	280	294	1	384	1.5	494	12	11	95
BZW04P256	BZW04P256B	5	256	285	300	330	1	414	1.2	529	10	11	90
BZW04-256	BZW04-256B	5	256	285	300	315	1	414	1.2	529	10	11	90
BZW04P273	BZW04P273B	5	273	304	320	352	1	438	1.2	564	10	11	85
BZW04-273	BZW04-273B	5	273	304	320	336	1	438	1.2	564	10	11	85
P BZW04P299	BZW04P299B	5	299	332	350	385	1	482	0.9	618	9	11	80
BZW04-299	BZW04-299B	5	299	332	350	368	1	482	0.9	618	9	11	80
BZW04P342	BZW04P342B	5	342	380	400	440	1	548	0.9	706	8	11	75
BZW04-342	BZW04-342B	5	342	380	400	420	1	548	0.9	706	8	11	75
BZW04P376	BZW04P376B	5	376	418	440	484	1	603	0.8	776	8	11	70
BZW04-376	BZW04-376B	5	376	418	440	462	1	603	0.8	776	8	11	70

* Pulse test $t_p \leq 50$ ms $\delta < 2$ %.

** Divide these values by 2 for bidirectional types.

For bidirectional types, electrical characteristics apply in both directions.

P : Preferred device

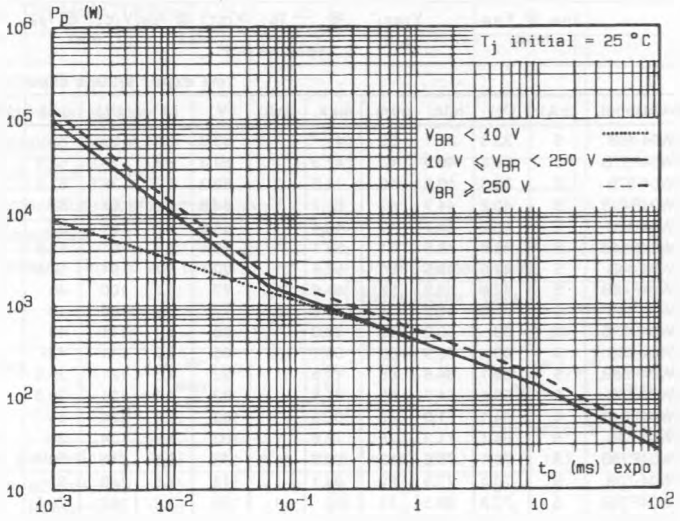


Fig.1 - Peak pulse power versus exponential pulse duration.

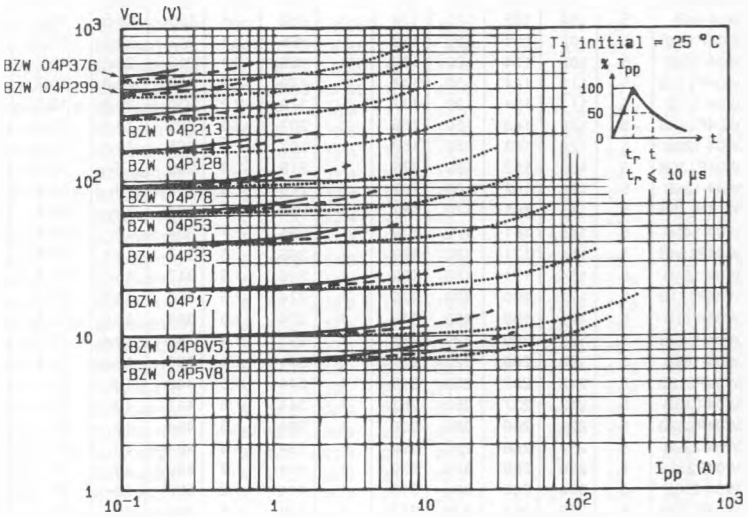


Fig.2 - Clamping voltage versus peak pulse current.
exponential waveform t = 20 µs ·····
t = 1 ms — — —
t = 10 ms ——

Note : The curves of the figure 2 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 : $\Delta V_{(BR)} = \alpha_{T(V(BR))} \times [T_j - 25] \times V_{(BR)}$
For intermediate voltages, extrapolate the given results.

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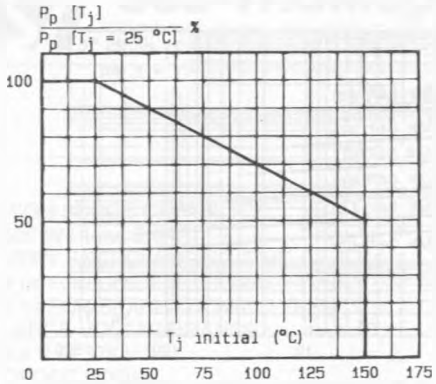


Fig.3 - Allowable power dissipation versus junction temperature.

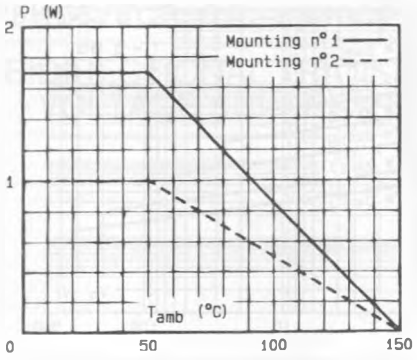


Fig.4 - Power dissipation versus ambient temperature.

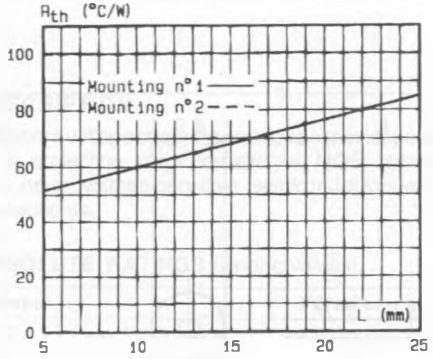
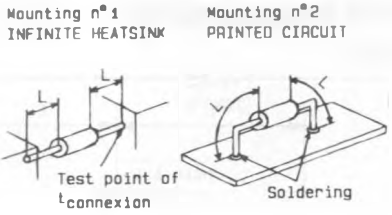


Fig.5 - Thermal resistance versus lead length.



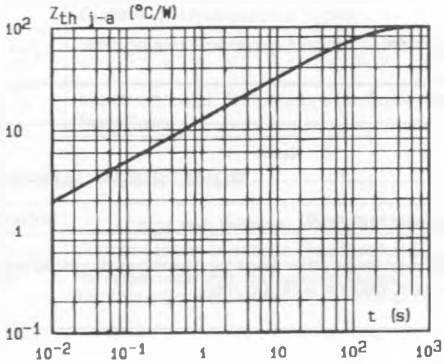


Fig.6 - Transient thermal impedance junction-ambient for mounting n°2 versus pulse duration (L = 10 mm).

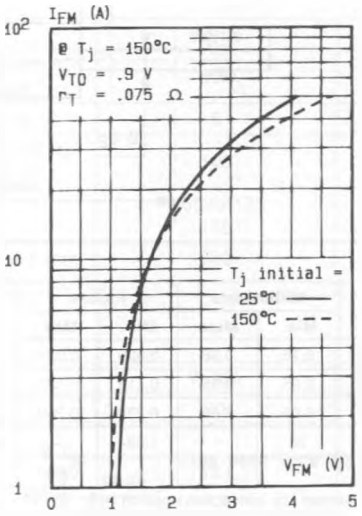


Fig.7 - Peak forward current versus peak forward voltage drop (typical values for unidirectional types).

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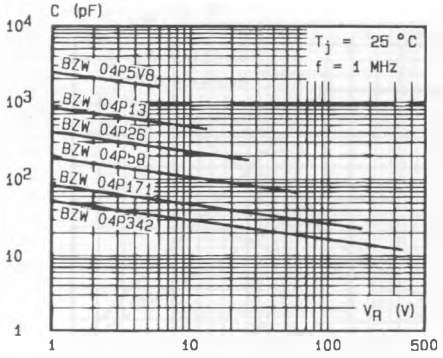

Fig.8a - Capacitance versus reverse applied voltage for unidirectional types (typical values).

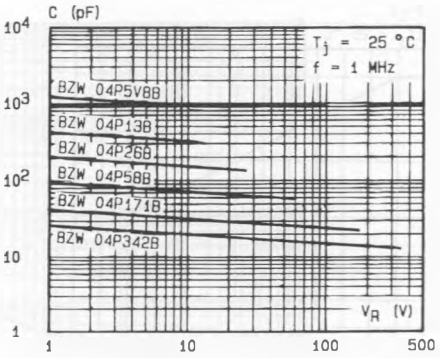

Fig.8b - Capacitance versus reverse applied voltage for bidirectional types (typical values).

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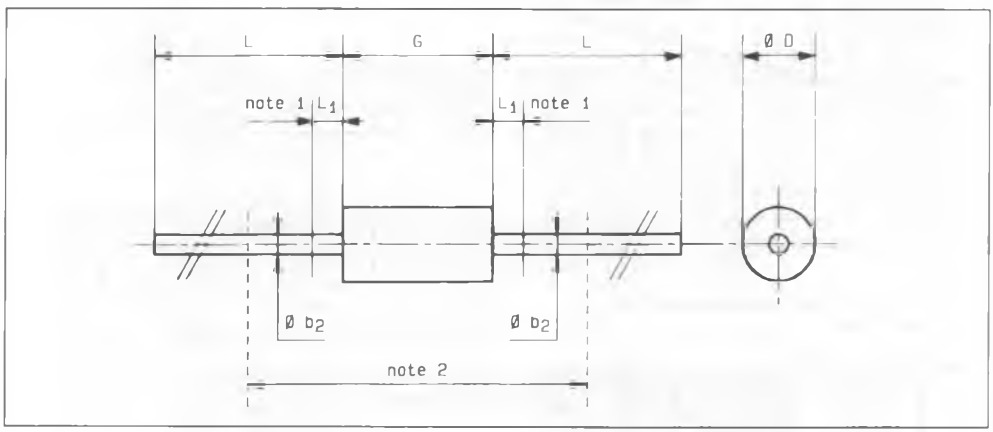
PACKAGE MECHANICAL DATA

F 126 Plastic



Ref.	Millimeters		Inches		Notes
	Min.	Max.	Min.	Max.	
Ø b_2	0.76	0.86	0.029	0.034	1 - The lead diameter Ø b_2 is not controlled over zone L_1. 2 - The minimum axial lengh within which the device may be placed with its leads bent at right angles is 0.59" (15 mm).
Ø D	2.95	3.05	0.116	0.120	
G	6.05	6.35	0.238	0.250	
L	26	–	1.024	–	
L_1	–	1.27	–	0.050	

Cooling method : by convection (method A).
Marking : type number ; white band indicates cathode for unidirectional types.
Weight : 0.4 g.