

Voltage regulator diodes

BZD23 series

DESCRIPTION

Glass-passivated diodes in hermetically sealed axial-leaded implosion diode (ID) glass envelopes. They are intended for use as voltage regulator and transient suppressor diodes in medium power regulation and transient suppression circuits.

The series consists of BZD23-C3V6 to C6V8 and BZD23-C7V5 to C510, in the normalized E24 range.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	NOM.	MAX.	UNIT
V_Z	voltage regulator working voltage range			
	C3V6 - C6V8	3.6 to 6.8	—	V
	C7V5 - C270	7.5 to 270	—	V
P_{tot}	total power dissipation			
	C3V6 - C6V8	—	2	W
	C7V5 - C510	—	2.5	W
V_R	transient suppressor stand-off voltage			
	C7V5 - C510	6.2 to 430	—	V
P_{RSM}	non-repetitive peak reverse power dissipation	—	300	W

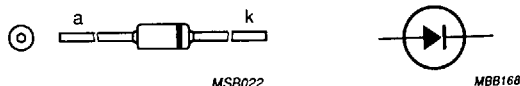


Fig.1 Simplified outline (SOD81) and symbol.

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LIMITING VALUES

In accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
P_{tot}	total power dissipation	$T_{ip} = 25\text{ °C}$; lead length 10 mm			
	C3V6 - C6V8		—	2	W
	C7V5 - C510		—	2.5	W
		$T_{amb} = 55\text{ °C}$; PCB mounting; see Fig.2			
	C3V6 - C6V8		—	1	W
	C7V5 - C510		—	1	W
P_{RSM}	non-repetitive peak reverse power dissipation	$t_p = 100\text{ }\mu\text{s}$, square pulse; $T_i = 25\text{ °C}$ (prior to surge); see also Fig.7			
	C3V6 - C6V8	see also Fig.8	—	300	W
	C7V5 - C510		—	300	W
		$T_i = 25\text{ °C}$ (prior to surge); waveform 10/1000 exponential pulse; see Fig.3			
	C7V5 - C510		—	150	W
T_{stg}	storage temperature range				
	C3V6 - C6V8		—65	200	°C
	C7V5 - C510		—65	175	°C
T_j	junction temperature				
	C3V6 - C6V8		—	200	°C
	C7V5 - C510		—	175	°C

THERMAL RESISTANCE

SYMBOL	PARAMETER	CONDITIONS	THERMAL RESISTANCE
$R_{th\ jtp}$	from junction to tie-point	note 1	
	C3V6 - C6V8		87 K/W
	C7V5 - C510		60 K/W
$R_{th\ ja}$	from junction to ambient	note 2	
	C3V6 - C6V8		145 K/W
	C7V5 - C510		120 K/W

Notes

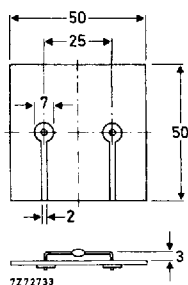
- Lead length 10 mm.
- Mounted on a 1.5 mm thick epoxy-glass printed circuit board; thickness of copper $\geq 40\text{ }\mu\text{m}$; see Fig.2.

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Dimensions in mm.

Fig.2 Printed circuit board mounting.

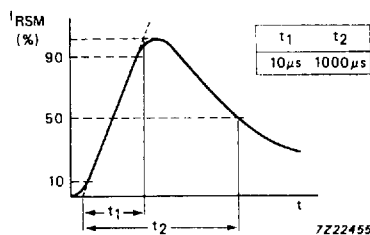
 $t_1 = 10 \mu\text{s}$. $t_2 = 1000 \mu\text{s}$.

Fig.3 Current pulse (in accordance with IEC 60-2, section 6).

CHARACTERISTICS

 $T_j = 25^\circ\text{C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	$I_F = 0.2 \text{ A}$; note 1		
	C3V6 - C6V8		1.2	V
	C7V5 - C510		1.2	V

Note

1. Measured under pulse conditions to avoid excessive dissipation.

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CHARACTERISTICS

When used as voltage regulator diodes.

BZD23 XXXXX	WORKING VOLTAGE			DIFFERENTIAL RESISTANCE		TEMPERATURE COEFFICIENT		TEST CURRENT	REVERSE CURRENT at REVERSE VOLTAGE	
	V_Z (V)			r_{diff} (Ω)		S_Z (%/K)		I_Z (mA)	I_R (μ A)	V_R (V)
	MIN.	NOM.	MAX.	TYP.	MAX.	MIN.	MAX.		MAX.	
C3V6	3.4	3.6	3.8	4	8	-0.14	-0.04	100	100	1
C3V9	3.7	3.9	4.1	4	8	-0.14	-0.04	100	50	1
C4V3	4.0	4.3	4.6	4	7	-0.12	-0.02	100	25	1
C4V7	4.4	4.7	5	3	7	-0.10	0	100	10	1
C5V1	4.8	5.1	5.4	3	6	-0.08	-0.02	100	5	1
C5V6	5.2	5.6	6	2	4	-0.04	0.04	100	10	2
C6V2	5.8	6.2	6.6	2	3	-0.01	0.06	100	5	2
C6V8	6.4	6.8	7.2	1	3	0	0.07	100	10	3
C7V5	7	7.5	7.9	1	2	0	0.07	100	50	3
C8V2	7.7	8.2	8.7	1	2	0.03	0.08	100	10	3
C9V1	8.5	9.1	9.6	2	4	0.03	0.08	50	10	5
C10	9.4	10	10.6	2	4	0.05	0.09	50	7	7.5
C11	10.4	11	11.6	4	7	0.05	0.10	50	3	8.2
C12	11.4	12	12.7	4	7	0.05	0.10	50	2	9.1
C13	12.4	13	14.1	5	10	0.05	0.10	50	1	10
C15	13.8	15	15.6	5	10	0.05	0.10	50	1	11
C16	15.3	16	17.1	6	15	0.06	0.11	25	1	12
C18	16.8	18	19.1	6	15	0.06	0.11	25	1	13
C20	18.8	20	21.2	6	15	0.06	0.11	25	1	15
C22	20.8	22	23.3	6	15	0.06	0.11	25	1	16
C24	22.8	24	25.6	7	15	0.06	0.11	25	1	18
C27	25.1	27	28.9	7	15	0.06	0.11	25	1	20
C30	28	30	32	8	15	0.06	0.11	25	1	22
C33	31	33	35	8	15	0.06	0.11	25	1	24
C36	34	36	38	21	40	0.06	0.11	10	1	27
C39	37	39	41	21	40	0.06	0.11	10	1	30
C43	40	43	46	24	45	0.07	0.12	10	1	33
C47	44	47	50	24	45	0.07	0.12	10	1	36
C51	48	51	54	25	60	0.07	0.12	10	1	39
C56	52	56	60	25	60	0.07	0.12	10	1	43
C62	58	62	66	25	80	0.08	0.13	10	1	47
C68	64	68	72	25	80	0.08	0.13	10	1	51
C75	70	75	79	30	100	0.08	0.13	10	1	56
C82	77	82	87	30	100	0.08	0.13	10	1	62

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BZD23 XXXXX	WORKING VOLTAGE			DIFFERENTIAL RESISTANCE		TEMPERATURE COEFFICIENT		TEST CURRENT	REVERSE CURRENT at REVERSE VOLTAGE	
	V_Z (V)			r_{diff} (Ω)		S_Z (%/K)		I_Z (mA)	I_R (μ A)	V_R (V)
	MIN.	NOM.	MAX.	TYP.	MAX.	MIN.	MAX.		MAX.	
C91	85	91	96	60	200	0.09	0.13	5	1	68
C100	94	100	106	60	200	0.09	0.13	5	1	75
C110	104	110	116	80	250	0.09	0.13	5	1	82
C120	114	120	127	80	250	0.09	0.13	5	1	91
C130	124	130	141	110	300	0.09	0.13	5	1	100
C150	138	150	156	130	300	0.09	0.13	5	1	110
C160	153	160	171	150	350	0.09	0.13	5	1	120
C180	168	180	191	180	400	0.09	0.13	5	1	130
C200	188	200	212	200	500	0.09	0.13	5	1	150
C220	208	220	233	350	750	0.09	0.13	2	1	160
C240	228	240	256	400	850	0.09	0.13	2	1	180
C270	251	270	289	450	1000	0.09	0.13	2	1	200

CHARACTERISTICS

When used as transient suppressor diodes; $T_j = 25^\circ\text{C}$.

BZD23 XXXXX	CLAMPING VOLTAGE at NON-REPETITIVE PEAK (10/1000 PULSE) REVERSE CURRENT		REVERSE CURRENT AT RECOMMENDED STAND-OFF VOLTAGE	
	$V_{(CL)R}$ (V)	I_{RSM} (A)	I_R (μ A)	V_R (V)
	MAX.		MAX.	
C7V5	11.3	13.3	1500	6.2
C8V2	12.3	12.2	1200	6.8
C9V1	13.3	11.3	100	7.5
C10	14.8	10.1	20	8.2
C11	15.7	9.6	5	9.1
C12	17	8.8	5	10
C13	18.9	7.9	5	11
C15	20.9	7.2	5	12
C16	22.9	6.6	5	13
C18	25.6	5.9	5	15
C20	28.4	5.3	5	16
C22	31	4.8	5	18
C24	33.8	4.4	5	20
C27	38.1	3.9	5	22
C30	42.2	3.6	5	24

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BZD23 XXXXX	CLAMPING VOLTAGE at NON-REPETITIVE PEAK (10/1000 PULSE) REVERSE CURRENT		REVERSE CURRENT AT RECOMMENDED STAND-OFF VOLTAGE	
	$V_{(CL,R)}$ (V)	I_{RSM} (A)	I_R (μ A)	V_R (V)
	MAX.		MAX.	
C33	46.2	3.2	5	27
C36	50.1	3	5	30
C39	54.1	2.8	5	33
C43	60.7	2.5	5	36
C47	65.5	2.3	5	39
C51	70.8	2.1	5	43
C56	78.6	1.9	5	47
C62	86.5	1.7	5	51
C68	94.4	1.6	5	56
C75	103.5	1.5	5	62
C82	114	1.3	5	68
C91	126	1.2	5	75
C100	139	1.1	5	82
C110	152	1	5	91
C120	167	0.90	5	100
C130	185	0.81	5	110
C150	204	0.73	5	120
C160	224	0.67	5	130
C180	249	0.60	5	150
C200	276	0.54	5	160
C220	305	0.50	5	180
C240	336	0.45	5	200
C270	380	0.40	5	220
C300	419	0.36	5	240
C330	459	0.33	5	270
C360	498	0.30	5	300
C390	537	0.28	5	330
C430	603	0.25	5	360
C470	655	0.23	5	390
C510	707	0.21	5	430

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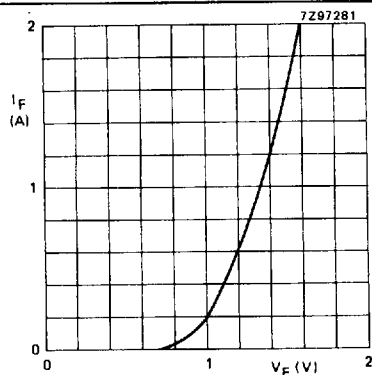
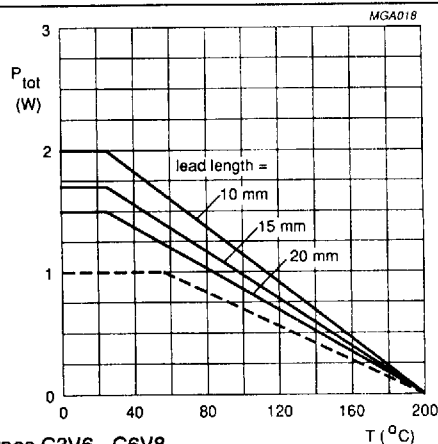
 $T_j = 25^\circ\text{C}$.

Fig.4 Forward current as a function of forward voltage, typical values.

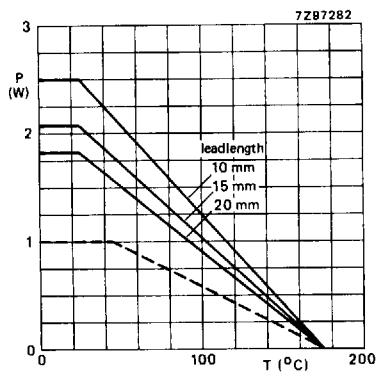


Types C3V6 - C6V8.

Solid line = tie-point temperature.

Dotted line = ambient temperature with device mounted as shown in Fig.2.

Fig.5 Maximum total power dissipation as a function of temperature.



Types C7V5 - C270.

Solid line = tie-point temperature.

Dotted line = ambient temperature with device mounted as shown in Fig.2.

Fig.6 Maximum total power dissipation as a function of temperature.

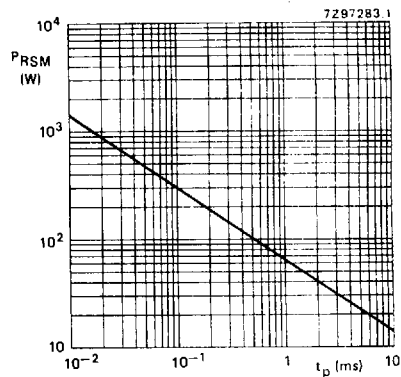
 $T_j = 25^\circ\text{C}$.

Fig.7 Maximum non-repetitive peak reverse power dissipation (square pulse), prior to surge.

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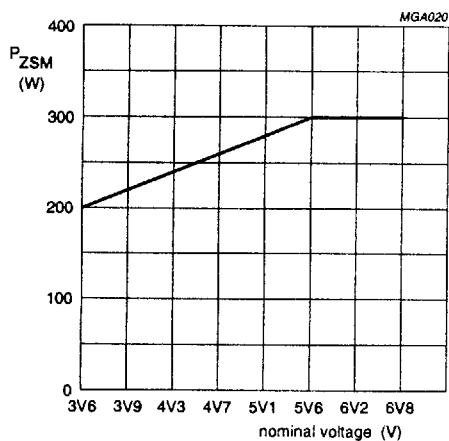


Fig.8 Non-repetitive peak reverse power dissipation as a function of nominal voltage.

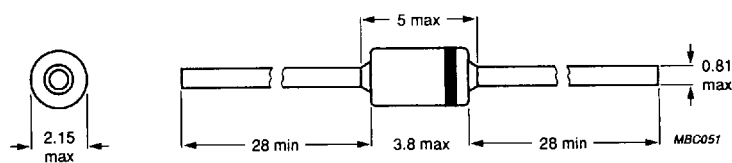
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PACKAGE OUTLINE



Dimensions in mm.

Marking band indicates the cathode.

Fig.9 SOD81.