

SECTION 4.2.4 DATA SHEETS
ZENER VOLTAGE REGULATOR DIODES — continued

Section 4.2.4.2 Surface Mounted

SECTION 4.2.4.2.1 225 mW SOT-23

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DATA SHEETS

Devices	Page No.
General Data — 225 mW SOT-23	4-2-64
BZX84C2V4L thru BZX84C75L	4-2-65
MMBZ5221BL thru MMBZ5270BL	4-2-66

MULTIPLE PACKAGE QUANTITY (MPQ)
REQUIREMENTS

Package Option	Type No. Suffix	MPQ (Units)
Tape and Reel	T1, T2(1)	3K
Tape and Reel	T3, T4(1)	10K
Bulk	(None)	1K

NOTE 1 The numbers on the suffixes indicate the following
1 7" Reel Cathode lead toward sprocket hole
2 7" Reel Cathode lead away from sprocket hole
3 13" Reel Cathode lead toward sprocket hole
4 13" Reel Cathode lead away from sprocket hole

4.2

MOTOROLA

SEMICONDUCTOR

TECHNICAL DATA

225 mW SOT-23

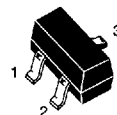
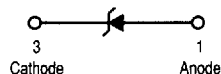
Zener Voltage Regulator Diodes

GENERAL DATA APPLICABLE TO ALL SERIES IN THIS GROUP

**Zener Voltage
Regulator Diodes**

GENERAL DATA

225 mW
SOT-23



CASE 318-07, STYLE 8
SOT-23 (TO-236AB)
PLASTIC

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board,* $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	225 1.8	mW mW/ $^\circ\text{C}$
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	556	$^\circ\text{C/W}$
Total Device Dissipation Alumina Substrate,** $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	300 2.4	mW mW/ $^\circ\text{C}$
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	417	$^\circ\text{C/W}$
Junction and Storage Temperature	T_J, T_{stg}	150	$^\circ\text{C}$

*FR-5 = 1.0 x 0.75 x 0.62 in.

**Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina

ELECTRICAL CHARACTERISTICS (Pinout: 1-Anode, 2-NC, 3-Cathode) ($V_F = 0.9$ V Max @ $I_F = 10$ mA for all types)

Type Number	Marking	Zener Voltage V_{Z1} (Volts) @ $I_{ZT1} = 5$ mA (Note 1)			Max Zener Impedance Z_{ZT1} (Ohms) @ $I_{ZT1} = 5$ mA	Max Reverse Leakage Current I_R @ V_R μA Volts		Zener Voltage V_{Z2} (Volts) @ $I_{ZT2} = 1$ mA (Note 1)		Max Zener Impedance Z_{ZT2} (Ohms) @ $I_{ZT2} = 1$ mA	Zener Voltage V_{Z3} (Volts) @ $I_{ZT3} = 20$ mA (Note 1)		Max Zener Impedance Z_{ZT3} (Ohms) @ $I_{ZT3} = 20$ mA	Max Zener Impedance Z_{ZT4} (Ohms) @ $I_{ZT4} = 2$ mA		dV/dI (mV/k) @ $I_{ZT1} = 5$ mA		C pF Max @ $V_R = 0$ $f = 1$ MHz
		Nom	Min	Max				Min	Max		Min	Max		Min	Max	Min	Max	
BZX84C2V4L	Z11	2.4	2.2	2.6	100	50	1	1.7	2.1	600	2.6	3.2	50	-3.5	0	450		
BZX84C2V7L	Z12	2.7	2.5	2.9	100	20	1	1.9	2.4	600	3	3.6	50	-3.5	0	450		
BZX84C3V0L	Z13	3	2.8	3.2	95	10	1	2.1	2.7	600	3.3	3.9	50	-3.5	0	450		
BZX84C3V3L	Z14	3.3	3.1	3.5	95	5	1	2.3	2.9	600	3.6	4.2	40	-3.5	0	450		
BZX84C3V6L	Z15	3.6	3.4	3.8	90	5	1	2.7	3.3	600	3.9	4.5	40	-3.5	0	450		
BZX84C3V9L	Z16	3.9	3.7	4.1	90	3	1	2.9	3.5	600	4.1	4.7	30	-3.5	-2.5	450		
BZX84C4V3L	W9	4.3	4	4.6	90	3	1	3.3	4	600	4.4	5.1	30	-3.5	0	450		
BZX84C4V7L	Z1	4.7	4.4	5	80	3	2	3.7	4.7	500	4.5	5.4	15	-3.5	0.2	260		
BZX84C5V1L	Z2	5.1	4.8	5.4	80	2	2	4.2	5.3	480	5	5.9	15	-2.7	1.2	225		
BZX84C5V6L	Z3	5.6	5.2	6	40	1	2	4.8	6	400	5.2	6.3	10	-2.0	2.5	200		
BZX84C6V2L	Z4	6.2	5.8	6.6	10	3	4	5.8	6.6	150	5.8	6.8	8	0.4	3.7	185		
BZX84C6V8L	Z5	6.8	6.4	7.2	15	2	4	6.3	7.2	80	6.4	7.4	8	1.2	4.5	155		
BZX84C7V5L	Z6	7.5	7	7.9	15	1	5	6.9	7.9	80	7	8	8	2.5	5.3	140		
BZX84C8V2L	Z7	8.2	7.7	8.7	15	0.7	5	7.6	8.7	80	7.7	8.8	8	3.2	6.2	135		
BZX84C9V1L	Z8	9.1	8.5	9.6	15	0.5	6	8.4	9.6	100	8.5	9.7	8	3.8	7.0	130		
BZX84C10L	Z9	10	9.4	10.6	20	0.2	7	9.3	10.6	150	9.4	10.7	10	4.5	8.0	130		
BZX84C11L	Y1	11	10.4	11.6	20	0.1	8	10.2	11.6	150	10.4	11.8	10	5.4	9.0	130		
BZX84C12L	Y2	12	11.4	12.7	25	0.1	8	11.2	12.7	150	11.4	12.9	10	6.0	10.0	130		
BZX84C13L	Y3	13	12.4	14.1	30	0.1	8	12.3	14	170	12.5	14.2	15	7.0	11.0	120		
BZX84C15L	Y4	15	13.8	15.6	30	0.05	10.5	13.7	15.5	200	13.8	15.7	20	9.2	13.0	110		
BZX84C18L	Y5	16	15.3	17.1	40	0.05	11.2	15.2	17	200	15.4	17.2	20	10.4	14.0	105		
BZX84C18L	Y6	18	16.8	19.1	45	0.05	12.6	16.7	19	225	16.9	19.2	20	12.4	16.0	100		
BZX84C20L	Y7	20	18.8	21.2	55	0.05	14	18.7	21.1	225	18.9	21.4	20	14.4	18.0	85		
BZX84C22L	Y8	22	20.8	23.3	55	0.05	15.4	20.7	23.2	250	20.9	23.4	25	16.4	20.0	85		
BZX84C24L	Y9	24	22.8	25.6	70	0.05	16.8	22.7	25.5	250	22.9	25.7	25	18.4	22.0	80		
		V_{Z1} Below @ $I_{ZT1} = 2$ mA			Z_{ZT1} Below @ $I_{ZT1} = 2$ mA			V_{Z2} Below @ $I_{ZT2} = 0.1$ mA		Z_{ZT2} Below @ $I_{ZT2} = 0.5$ mA (Note 2)	V_{Z3} Below @ $I_{ZT3} = 10$ mA		Z_{ZT3} Below @ $I_{ZT3} = 10$ mA		dV/dI (mV/k) Below @ $I_{ZT1} = 2$ mA			
BZX84C27L	Y10	27	25.1	28.9	80	0.05	18.9	25	28.9	300	25.2	29.3	45	21.4	25.3	70		
BZX84C30L	Y11	30	28	32	80	0.05	21	27.6	32	300	28.1	32.4	50	24.4	28.4	70		
BZX84C33L	Y12	33	31	35	80	0.05	23.1	30.8	35	325	31.1	35.4	55	27.4	31.4	70		
BZX84C36L	Y13	36	34	38	90	0.05	25.2	33.8	38	350	34.1	38.4	60	30.4	34.4	70		
BZX84C39L	Y14	39	37	41	130	0.05	27.3	36.7	41	350	37.1	41.5	70	33.4	37.4	45		
BZX84C43L	Y15	43	40	46	150	0.05	30.1	39.7	46	375	40.1	46.5	80	37.6	41.6	40		
BZX84C47L	Y16	47	44	50	170	0.05	32.9	43.7	50	375	44.1	50.5	90	42.0	46.0	40		
BZX84C51L	Y17	51	48	54	180	0.05	35.7	47.6	54	400	48.1	54.6	100	46.6	50.6	40		
BZX84C56L	Y18	56	52	60	200	0.05	39.2	51.5	60	425	52.1	60.8	110	52.2	56.2	40		
BZX84C62L	Y19	62	58	66	215	0.05	43.4	57.4	66	450	56.2	67	120	56.8	60.8	35		
BZX84C68L	Y20	68	64	72	240	0.05	47.6	63.4	72	475	64.2	73.2	130	65.6	69.6	35		
BZX84C75L	Y21	75	70	79	255	0.05	52.5	69.4	79	500	70.3	80.2	140	73.4	77.4	35		

⇒ Preferred part

NOTES: 1 Zener voltage is measured with a pulse test current (I_Z) applied at an ambient temperature of 25°C

2 The zener impedance, Z_{ZT2} , for the 27 through 75 volt types is tested at 0.5 mA rather than the test current of 0.1 mA used for Z_{ZT2}

ELECTRICAL CHARACTERISTICS (Pinout: 1-Anode, 2-NC, 3-Cathode) ($V_F = 0.9\text{ V Max}$ @ $I_F = 10\text{ mA}$ for all types)

Device	Marking	Test Current I_{ZT} mA	Zener Voltage V_Z ($\pm 5\%$) Nominal (Note 1)	Z_{ZK} $I_Z = 0.25\text{ mA}$ Ω Max	Z_{ZT} $I_Z = I_{ZT}$ @ 10% Mod Ω Max	Max I_R μA	@	V_R V
MMBZ5221BL	18A	20	2.4	1200	30	100		1
MMBZ5222BL	18B	20	2.5	1250	30	100		1
MMBZ5223BL	18C	20	2.7	1300	30	75		1
MMBZ5224BL	18D	20	2.8	1400	30	75		1
MMBZ5225BL	18E	20	3	1600	29	50		1
⇒ MMBZ5226BL	8A	20	3.3	1600	28	25		1
MMBZ5227BL	8B	20	3.6	1700	24	15		1
MMBZ5228BL	8C	20	3.9	1900	23	10		1
⇒ MMBZ5229BL	8D	20	4.3	2000	22	5		1
⇒ MMBZ5230BL	8E	20	4.7	1900	19	5		2
⇒ MMBZ5231BL	8F	20	5.1	1600	17	5		2
⇒ MMBZ5232BL	8G	20	5.6	1600	11	5		3
MMBZ5233BL	8H	20	6	1600	7	5		3.5
⇒ MMBZ5234BL	8J	20	6.2	1000	7	5		4
⇒ MMBZ5235BL	8K	20	6.8	750	5	3		5
⇒ MMBZ5236BL	8L	20	7.5	500	6	3		6
⇒ MMBZ5237BL	8M	20	8.2	500	8	3		6.5
MMBZ5238BL	8N	20	8.7	600	8	3		6.5
⇒ MMBZ5239BL	8P	20	9.1	600	10	3		7
⇒ MMBZ5240BL	8Q	20	10	600	17	3		8
MMBZ5241BL	8R	20	11	600	22	2		8.4
⇒ MMBZ5242BL	8S	20	12	600	30	1		9.1
MMBZ5243BL	8T	9.5	13	600	13	0.5		9.9
MMBZ5244BL	8U	9	14	600	15	0.1		10
⇒ MMBZ5245BL	8V	8.5	15	600	16	0.1		11
MMBZ5246BL	8W	7.8	16	600	17	0.1		12
MMBZ5247BL	8X	7.4	17	600	19	0.1		13
MMBZ5248BL	8Y	7	18	600	21	0.1		14
MMBZ5249BL	8Z	6.6	19	600	23	0.1		14
MMBZ5250BL	81A	6.2	20	600	25	0.1		15
MMBZ5251BL	81B	5.6	22	600	29	0.1		17
MMBZ5252BL	81C	5.2	24	600	33	0.1		18
MMBZ5253BL	81D	5	25	600	35	0.1		19
⇒ MMBZ5254BL	81E	4.6	27	600	41	0.1		21
⇒ MMBZ5255BL	81F	4.5	28	600	44	0.1		21
MMBZ5256BL	81G	4.2	30	600	49	0.1		23
MMBZ5257BL	81H	3.8	33	700	58	0.1		25
MMBZ5258BL	81J	3.4	36	700	70	0.1		27
MMBZ5259BL	81K	3.2	39	800	80	0.1		30
MMBZ5260BL	18F	3	43	900	93	0.1		33
MMBZ5261BL	18G	2.7	47	1000	105	0.1		36
MMBZ5262BL	81L	2.5	51	1100	125	0.1		39
MMBZ5263BL	81M	2.2	56	1300	150	0.1		43
MMBZ5264BL	81N	2.1	60	1400	170	0.1		46
MMBZ5265BL	18H	2	62	1400	185	0.1		47
MMBZ5266BL	81P	1.8	68	1600	230	0.1		52
MMBZ5267BL	18J	1.7	75	1700	270	0.1		56
MMBZ5268BL	18K	1.5	82	2000	330	0.1		62
MMBZ5269BL	18L	1.4	87	2200	370	0.1		68
MMBZ5270BL	81Q	1.4	91	2300	400	0.1		69

⇒ Preferred part

NOTE 1 Zener voltage is measured with a pulse test current (I_{ZT}) applied at an ambient temperature of 25 °C