MMSZ5221BT1 Series

Preferred Device

Zener Voltage Regulators

500 mW SOD−123 Surface Mount

Three complete series of Zener diodes are offered in the convenient, surface mount plastic SOD−123 package. These devices provide a convenient alternative to the leadless 34−package style.

Features

- Pb−Free Packages are Available
- 500 mW Rating on FR−4 or FR−5 Board
- Wide Zener Reverse Voltage Range − 2.4 V to 110 V
- Package Designed for Optimal Automated Board Assembly
- Small Package Size for High Density Applications
- General Purpose, Medium Current
- ESD Rating of Class 3 (>16 kV) per Human Body Model

Mechanical Characteristics

CASE: Void-free, transfer-molded, thermosetting plastic case
FINISH: Corrosion resistant finish, easily solderable
MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES: 260°C for 10 Seconds
POLARITY: Cathode indicated by polarity band
FLAMMABILITY RATING: UL 94 V−0

MAXIMUM RATINGS

Rating	Symbol	Max	Unit
Total Power Dissipation on FR−5 Board, (Note 1) @ T_L = 75°C Derated above 75°C	P_D	500 6.7	mW mW/°C
Thermal Resistance, (Note 2) Junction−to−Ambient	$R_{\theta JA}$	340	°C/W
Thermal Resistance, (Note 2) Junction−to−Lead	$R_{\theta JL}$	150	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	−55 to +150	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

1. FR−5 = 3.5 X 1.5 inches, using the minimum recommended footprint.
2. Thermal Resistance measurement obtained via infrared Scan Method.

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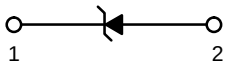
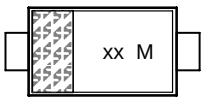
http://onsemi.com



SOD−123
CASE 425
STYLE 1

MARKING DIAGRAM



xx = Specific Device Code
M = Date Code

ORDERING INFORMATION

Device**	Package	Shipping†
MMSZ52xxBT1	SOD−123	3000/Tape & Reel
MMSZ52xxBT1G	SOD−123 (Pb−Free)	3000/Tape & Reel
MMSZ52xxBT3	SOD−123	10,000/Tape & Reel
MMSZ52xxBT3G	SOD−123 (Pb−Free)	10,000/Tape & Reel

**The “T1” suffix refers to an 8 mm, 7 inch reel.
The “T3” suffix refers to an 8 mm, 13 inch reel.

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

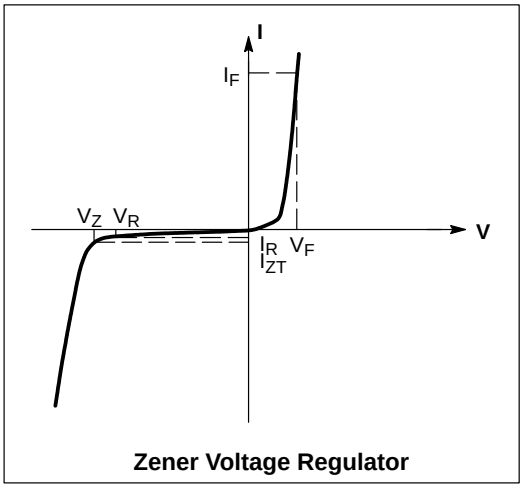
DEVICE MARKING INFORMATION

See specific marking information in the device marking column of the Electrical Characteristics table on page 3 of this data sheet.

Devices listed in ***bold, italic*** are ON Semiconductor **Preferred** devices. **Preferred** devices are recommended choices for future use and best overall value.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted, V_F = 0.95 V Max. @ I_F = 10 mA)

Symbol	Parameter
V_Z	Reverse Zener Voltage @ I_{ZT}
I_{ZT}	Reverse Current
Z_{ZT}	Maximum Zener Impedance @ I_{ZT}
I_{ZK}	Reverse Current
Z_{ZK}	Maximum Zener Impedance @ I_{ZK}
I_R	Reverse Leakage Current @ V_R
V_R	Reverse Voltage
I_F	Forward Current
V_F	Forward Voltage @ I_F



Zener Voltage Regulator

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted, V_F = 0.9 V Max. @ I_F = 10 mA)

Device	Device Marking	Zener Voltage (Notes 3 and 4)				Zener Impedance (Note 5)			Leakage Current	
		V_Z (Volts)			@ I_{ZT}	Z_{ZT} @ I_{ZT}	Z_{ZK} @ I_{ZK}		I_R @ V_R	
		Min	Nom	Max	mA	Ω	Ω	mA	μA	Volts
MMSZ5221BT1	***C1***	***2.28***	***2.4***	***2.52***	***20***	***30***	***1200***	***0.25***	***100***	***1***
MMSZ5222BT1	***C2***	***2.38***	***2.5***	***2.63***	***20***	***30***	***1250***	***0.25***	***100***	***1***
MMSZ5223BT1, G	C3	2.57	2.7	2.84	20	30	1300	0.25	75	1
MMSZ5224BT1	C4	2.66	2.8	2.94	20	30	1400	0.25	75	1
MMSZ5225BT1	***C5***	***2.85***	***3.0***	***3.15***	***20***	***29***	***1600***	***0.25***	***50***	***1***
MMSZ5226BT1, G	D1	3.14	3.3	3.47	20	28	1600	0.25	25	1
MMSZ5227BT1, G	D2	3.42	3.6	3.78	20	24	1700	0.25	15	1
MMSZ5228BT1, G	D3	3.71	3.9	4.10	20	23	1900	0.25	10	1
MMSZ5229BT1	***D4***	***4.09***	***4.3***	***4.52***	***20***	***22***	***2000***	***0.25***	***5***	***1***
MMSZ5230BT1	***D5***	***4.47***	***4.7***	***4.94***	***20***	***19***	***1900***	***0.25***	***5***	***2***
MMSZ5231BT1	***E1***	***4.85***	***5.1***	***5.36***	***20***	***17***	***1600***	***0.25***	***5***	***2***
MMSZ5232BT1	***E2***	***5.32***	***5.6***	***5.88***	***20***	***11***	***1600***	***0.25***	***5***	***3***
MMSZ5233BT1, G	E3	5.70	6.0	6.30	20	7	1600	0.25	5	3.5
MMSZ5234BT1, G	***E4***	***5.89***	***6.2***	***6.51***	***20***	***7***	***1000***	***0.25***	***5***	***4***
MMSZ5235BT1	E5	6.46	6.8	7.14	20	5	750	0.25	3	5
MMSZ5236BT1	F1	7.13	7.5	7.88	20	6	500	0.25	3	6
MMSZ5237BT1, G	F2	7.79	8.2	8.61	20	8	500	0.25	3	6.5
MMSZ5238BT1	F3	8.27	8.7	9.14	20	8	600	0.25	3	6.5
MMSZ5239BT1	F4	8.65	9.1	9.56	20	10	600	0.25	3	7
MMSZ5240BT1, G	***F5***	***9.50***	***10***	***10.50***	***20***	***17***	***600***	***0.25***	***3***	***8***
MMSZ5241BT1	H1	10.45	11	11.55	20	22	600	0.25	2	8.4
MMSZ5242BT1, G	***H2***	***11.40***	***12***	***12.60***	***20***	***30***	***600***	***0.25***	***1***	***9.1***
MMSZ5243BT1, G	H3	12.35	13	13.65	9.5	13	600	0.25	0.5	9.9
MMSZ5244BT1, G	H4	13.30	14	14.70	9.0	15	600	0.25	0.1	10
MMSZ5245BT1	***H5***	***14.25***	***15***	***15.75***	***8.5***	***16***	***600***	***0.25***	***0.1***	***11***
MMSZ5246BT1	***J1***	***15.20***	***16***	***16.80***	***7.8***	***17***	***600***	***0.25***	***0.1***	***12***
MMSZ5247BT1, G	J2	16.15	17	17.85	7.4	19	600	0.25	0.1	13
MMSZ5248BT1	***J3***	***17.10***	***18***	***18.90***	***7.0***	***21***	***600***	***0.25***	***0.1***	***14***
MMSZ5250BT1	J5	19.00	20	21.00	6.2	25	600	0.25	0.1	15
MMSZ5251BT1, G	K1	20.90	22	23.10	5.6	29	600	0.25	0.1	17
MMSZ5252BT1	***K2***	***22.80***	***24***	***25.20***	***5.2***	***33***	***600***	***0.25***	***0.1***	***18***
MMSZ5253BT1	K3	23.75	25	26.25	5.0	35	600	0.25	0.1	19
MMSZ5254BT1	K4	25.65	27	28.35	4.6	41	600	0.25	0.1	21
MMSZ5255BT1	K5	26.60	28	29.40	4.5	44	600	0.25	0.1	21
MMSZ5256BT1	M1	28.50	30	31.50	4.2	49	600	0.25	0.1	23
MMSZ5257BT1	M2	31.35	33	34.65	3.8	58	700	0.25	0.1	25
MMSZ5258BT1	M3	34.20	36	37.80	3.4	70	700	0.25	0.1	27
MMSZ5259BT1	M4	37.05	39	40.95	3.2	80	800	0.25	0.1	30
MMSZ5260BT1	M5	40.85	43	45.15	3.0	93	900	0.25	0.1	33
MMSZ5261BT1	***N1***	***44.65***	***47***	***49.35***	***2.7***	***105***	***1000***	***0.25***	***0.1***	***36***
MMSZ5262BT1	N2	48.45	51	53.55	2.5	125	1100	0.25	0.1	39
MMSZ5263BT1	N3	53.20	56	58.80	2.2	150	1300	0.25	0.1	43
MMSZ5264BT1	N4	57.00	60	63.00	2.1	170	1400	0.25	0.1	46
MMSZ5265BT1	N5	58.90	62	65.10	2.0	185	1400	0.25	0.1	47
MMSZ5266BT1, G	P1	64.60	68	71.40	1.8	230	1600	0.25	0.1	52
MMSZ5267BT1, G	P2	71.25	75	78.75	1.7	270	1700	0.25	0.1	56
MMSZ5268BT1, G	P3	77.90	82	86.10	1.5	330	2000	0.25	0.1	62
MMSZ5269BT1	P4	82.65	87	91.35	1.4	370	2200	0.25	0.1	68
MMSZ5270BT1, G	P5	86.45	91	95.55	1.4	400	2300	0.25	0.1	69
MMSZ5272BT1	R2	104.5	110	115.5	1.1	750	3000	0.25	0.1	84

3. The type numbers shown have a standard tolerance of ±5% on the nominal Zener voltage.
4. Nominal Zener voltage is measured with the device junction in thermal equilibrium at T_L = 30°C ±1°C.
5. Z_{ZT} and Z_{ZK} are measured by dividing the AC voltage drop across the device by the ac current applied. The specified limits are for $I_{Z(AC)}$ = 0.1 $I_{Z(dc)}$ with the AC frequency = 1 KHz.

TYPICAL CHARACTERISTICS

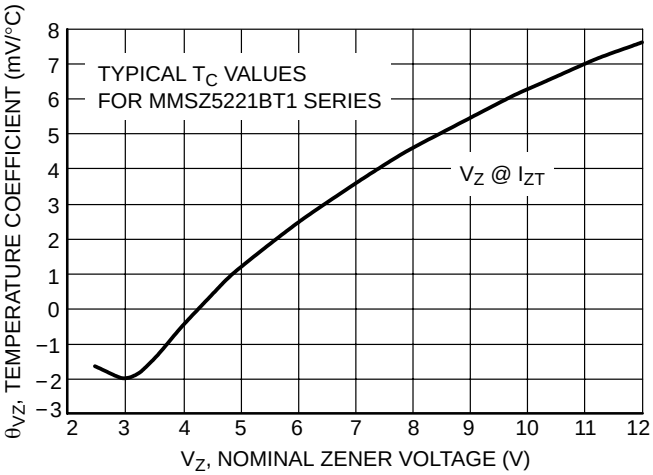


Figure 1. Temperature Coefficients (Temperature Range −55°C to +150°C)

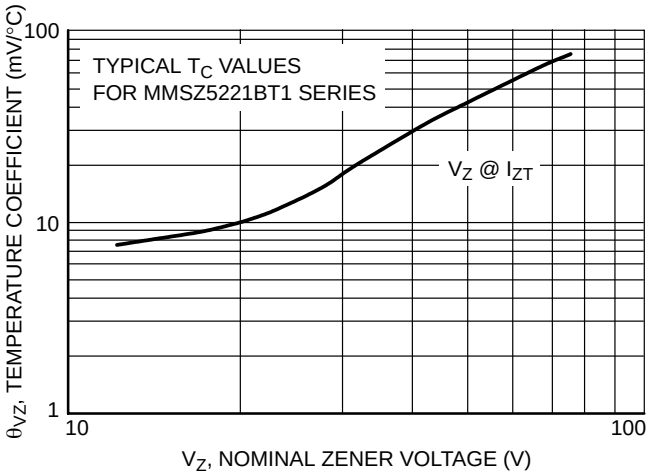


Figure 2. Temperature Coefficients (Temperature Range −55°C to +150°C)

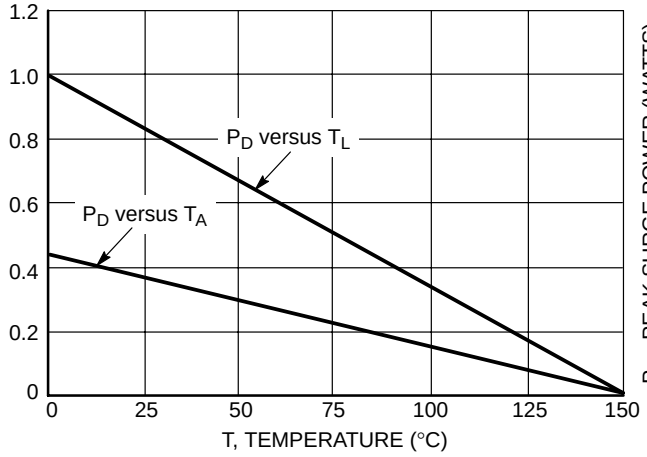


Figure 3. Steady State Power Derating

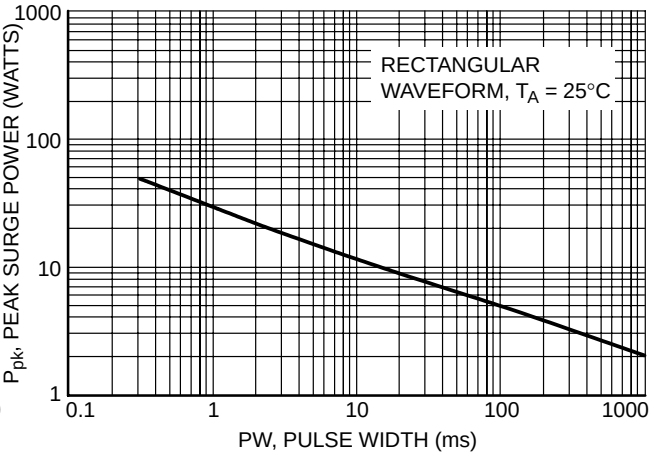


Figure 4. Maximum Nonrepetitive Surge Power

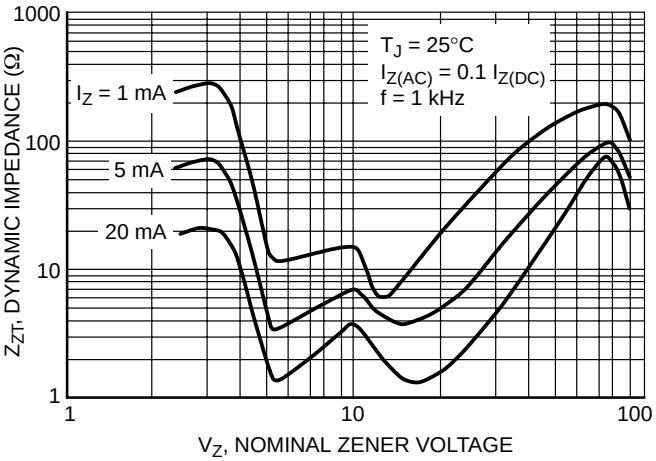


Figure 5. Effect of Zener Voltage on Zener Impedance

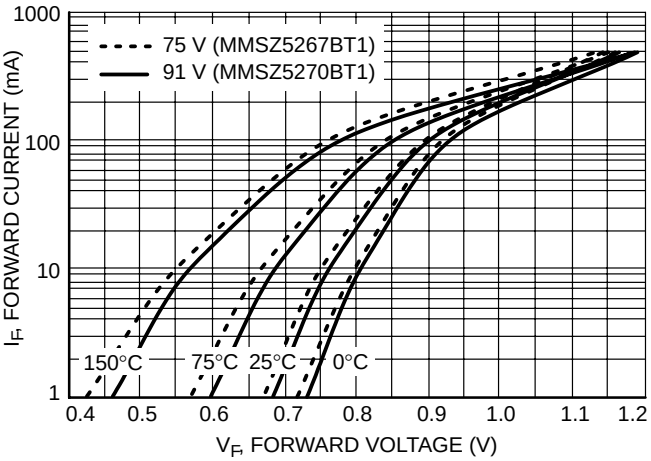


Figure 6. Typical Forward Voltage

TYPICAL CHARACTERISTICS

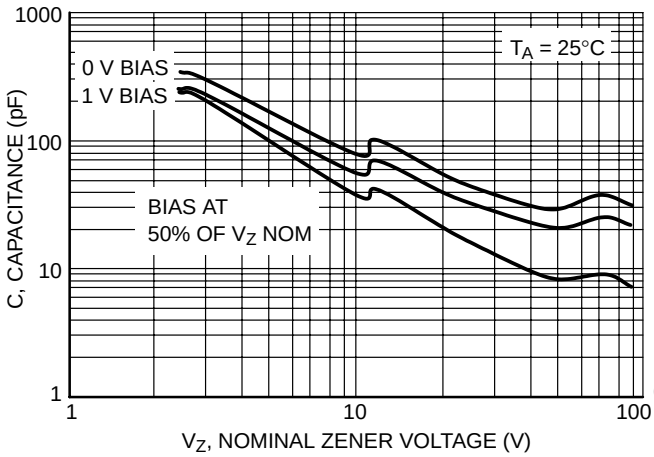


Figure 7. Typical Capacitance

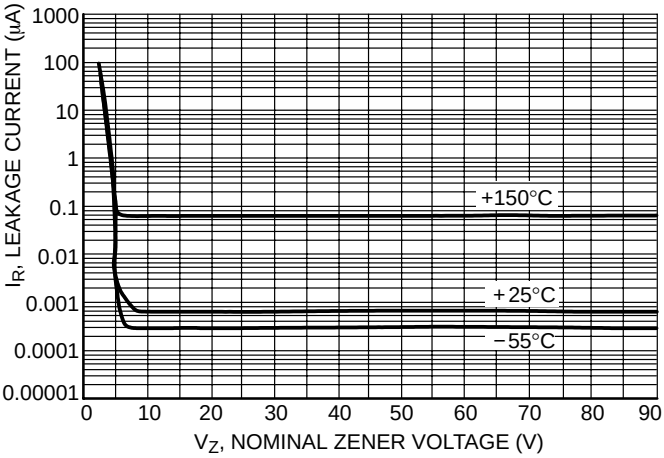


Figure 8. Typical Leakage Current

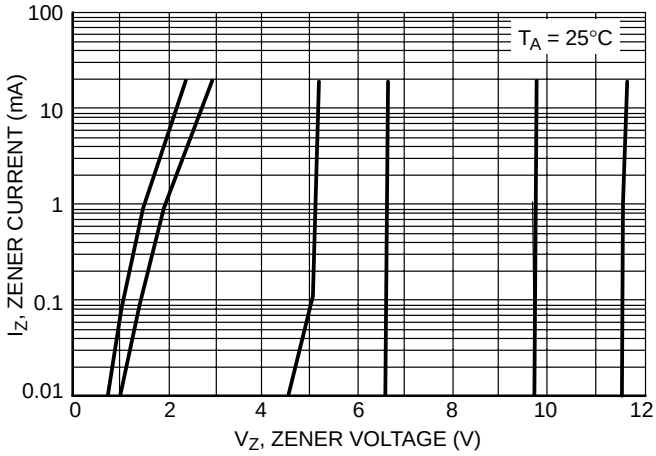


Figure 9. Zener Voltage versus Zener Current (V_Z Up to 12 V)

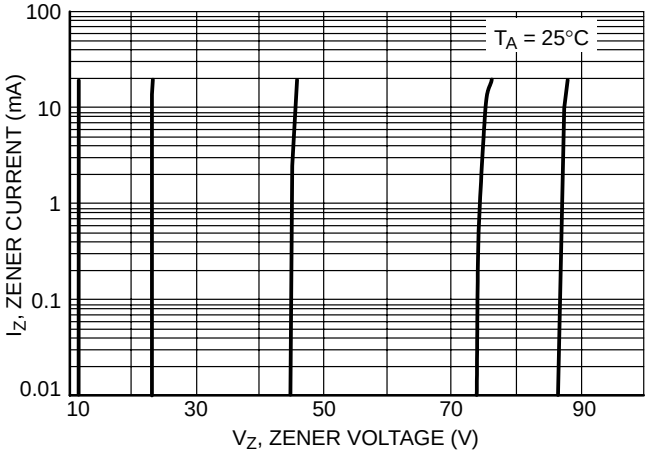
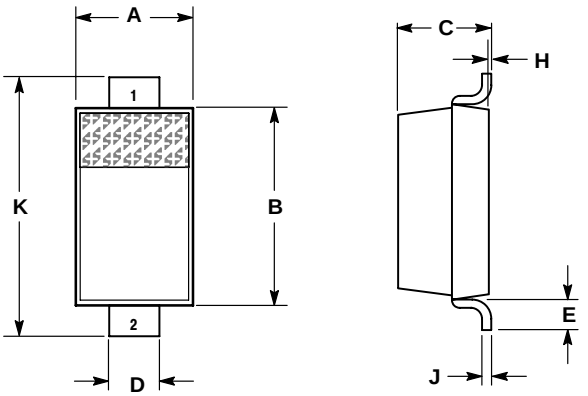


Figure 10. Zener Voltage versus Zener Current (12 V to 91 V)

PACKAGE DIMENSIONS

SOD−123
CASE 425−04
ISSUE C

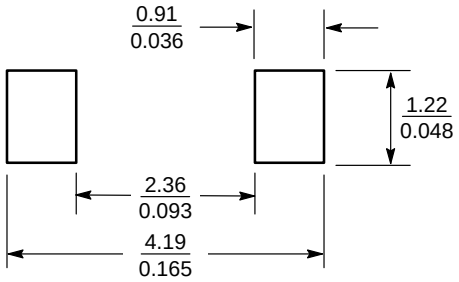


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.055	0.071	1.40	1.80
B	0.100	0.112	2.55	2.85
C	0.037	0.053	0.95	1.35
D	0.020	0.028	0.50	0.70
E	0.01	−−−	0.25	−−−
H	0.000	0.004	0.00	0.10
J	−−−	0.006	−−−	0.15
K	0.140	0.152	3.55	3.85

STYLE 1:
PIN 1. CATHODE
2. ANODE

SOLDERING FOOTPRINT*



SCALE 10:1 $\left(\frac{\text{mm}}{\text{inches}}\right)$

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 61312, Phoenix, Arizona 85082−1312 USA
Phone: 480−829−7710 or 800−344−3860 Toll Free USA/Canada
Fax: 480−829−7709 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center
2−9−1 Kamimeguro, Meguro−ku, Tokyo, Japan 153−0051
Phone: 81−3−5773−3850

ON Semiconductor Website: http://onsemi.com

Order Literature: http://www.onsemi.com/litorder

For additional information, please contact your local Sales Representative.

MMSZ5221BT1/D

MMSZ5233B: Zener Regulator 6.0V

Datasheets | Product Change Notifications | Reliablility Data

Parametric Table

Orderable Part	V_Z Typ (V)	P Max (W)	Package Style	Package	Packing
MMSZ5233BT1	6 *	0.5 *	Surface Mount	SOD123	Tape and Reel *
MMSZ5233BT3	6 *	0.5 *	Surface Mount	SOD123	Tape and Reel *
MMSZ5233ET1	6 *	0.5 *	Surface Mount	SOD123	Tape and Reel *
View all Zener Diodes					

Orderable Devices

Product	Status	Package			MSL*	Container		Budgetary Price	Action
		Type	Pins	Case Outline		Type	Qty.		
MMSZ5233ET1	Active	SOD-123	2	425-04	1	Tape and Reel	3000	$0.0693	Order Samples
MMSZ5233BT3	Active	SOD-123	2	425-04	1	Tape and Reel	10000	$0.04	Order Samples
MMSZ5233ET3	Active	SOD-123	2	425-04	1	Tape and Reel	10000	$0.0693	Order Samples
MMSZ5233BT1G	Active	SOD-123	2	425-04	1	Tape and Reel	3000	$0.04	Order Samples
MMSZ5233BT1	Active	SOD-123	2	425-04	1	Tape and Reel	3000	$0.04	Order Samples Availability/Buy

Symbol denotes 2nd Level Interconnect lead (Pb) free content. 2nd Level Interconnect refers to leads, balls or other electrical contact mechanisms of a part

Moisture Sensitivity level (MSL) for surface mount devices (lead free measured at 260°C reflow, non lead free at 235°C reflow)

Features

- 500 mW Rating on FR-4 or FR-5 Board
- Peak Power − 225 Watt (8 X 20 s)
- Wide Zener Reverse Voltage Range - 2.4 V to 110 V
- ESD Rating of Class 3 (>16 KV) per Human Body Model
- Package Designed for Optimal Automated Board Assembly
- Small Package Size for High Density Applications
- General Purpose, Medium Current
- ESD Rating of Class 3 (exceeding 16 kV) per the Human Body Model

Mechanical Characteristics:

- CASE: Void-free, transfer-molded, thermosetting plastic case
- FINISH: Corrosion resistant finish, easily solderable
- MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES: 260?C for 10 Seconds
- POLARITY: Cathode indicated by polarity band
- FLAMMABILITY RATING: UL94 V-0
- Pb-Free Packages are Available

This series of Energy Rated Zener diodes is offered in the convenient, surface mount plastic SOT−23 package. These devices are designed to provide voltage regulation with minimum space requirement. They are well suited for applications such as cellular phones, hand held portables, and high density PC boards.

Data Sheet

Type	Document Title	Document ID/Size	Rev
Data Sheet	Energy (Surge) Rated Zener Voltage Regulators in Sot-23 Package	MMBZ5221ELT1/D - 74.0 KB	3
Data Sheet	Surface Mount Silicon Zener Diodes	MMSZ5221BT1/D - 75.0 KB	4

Catalog

Discrete > Diodes > Zener Diodes

MMSZ5254B: Zener Regulator 27V

Datasheets | Models | Product Change Notifications | Reliablility Data

Parametric Table

Orderable Part	V_Z Typ (V)	P Max (W)	Package Style	Package	Packing
MMSZ5254BT1	27 *	0.5 *	Surface Mount	SOD123	Tape and Reel *
MMSZ5254ET1	27 *	0.5 *	Surface Mount	SOD123	Tape and Reel *
View all Zener Diodes					

Orderable Devices

Product	Status	Package			MSL*	Container		Budgetary Price	Action
		Type	Pins	Case Outline		Type	Qty.		
MMSZ5254BT1	Active	SOD-123	2	425-04	1	Tape and Reel	3000	$0.04	Order Samples Availability/Buy
MMSZ5254ET1	Active	SOD-123	2	425-04	1	Tape and Reel	3000	$0.0693	Order Samples

Moisture Sensitivity level (MSL) for surface mount devices (lead free measured at 260°C reflow, non lead free at 235°C reflow)

Features

- 500 mW Rating on FR-4 or FR-5 Board
- Peak Power — 225 Watt (8 X 20 s)
- Wide Zener Reverse Voltage Range - 2.4 V to 110 V
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- Package Designed for Optimal Automated Board Assembly
- Small Package Size for High Density Applications
- General Purpose, Medium Current
- ESD Rating of Class 3 (exceeding 16 kV) per the Human Body Model

Mechanical Characteristics:

- CASE: Void-free, transfer-molded, thermosetting plastic case
- FINISH: Corrosion resistant finish, easily solderable
- MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES: 260?C for 10 Seconds
- POLARITY: Cathode indicated by polarity band
- FLAMMABILITY RATING: UL94 V-0
- Pb-Free Packages are Available

This series of Energy Rated Zener diodes is offered in the convenient, surface mount plastic SOT—23 package. These devices are designed to provide voltage regulation with minimum space requirement. They are well suited for applications such as cellular phones, hand held portables, and high density PC boards.

Data Sheet

Type	Document Title	Document ID/Size	Rev
Data Sheet	Energy (Surge) Rated Zener Voltage Regulators in Sot-23 Package	MMBZ5221ELT1/D - 74.0 KB	3
Data Sheet	Surface Mount Silicon Zener Diodes	MMSZ5221BT1/D - 75.0 KB	4

Models

Type	Document Title	Document ID/Size	Rev
Models	SPICE 3 Model	MMSZ5254BT1.SP3 - 1.0 KB	0
Models	PSpice Model	MMSZ5254BT1.LIB - 1.0 KB	0

MMSZ5230B: Zener Regulator 4.7V

Datasheets | Product Change Notifications | Reliablility Data

Parametric Table

Orderable Part	V_Z Typ (V)	P Max (W)	Package Style	Package	Packing
MMSZ5230BT1	4.7 *	0.5 *	Surface Mount	SOD123	Tape and Reel *
MMSZ5230BT3	4.7 *	0.5 *	Surface Mount	SOD123	Tape and Reel *
MMSZ5230ET1	4.7 *	0.5 *	Surface Mount	SOD123	Tape and Reel *

View all Zener Diodes

Orderable Devices

Product	Status	Package			MSL*	Container		Budgetary Price	Action
		Type	Pins	Case Outline		Type	Qty.		
MMSZ5230BT3	Active	SOD-123	2	425-04	1	Tape and Reel	10000	$0.04	Order Samples
MMSZ5230BT1	Active	SOD-123	2	425-04	1	Tape and Reel	3000	$0.04	Order Samples Availability/Buy
MMSZ5230ET1	Active	SOD-123	2	425-04	1	Tape and Reel	3000	$0.0693	Order Samples
MMSZ5230ET3	Active	SOD-123	2	425-04	1	Tape and Reel	10000	$0.0693	Order Samples

Moisture Sensitivity level (MSL) for surface mount devices (lead free measured at 260°C reflow, non lead free at 235°C reflow)

Features

- 500 mW Rating on FR-4 or FR-5 Board
- 500 mW Rating on FR−4 or FR−5 Board
- Wide Zener Reverse Voltage Range - 2.4 V to 110 V
- Wide Zener Reverse Voltage Range − 2.4 V to 110 V
- Package Designed for Optimal Automated Board Assembly
- Package Designed for Optimal Automated Board Assembly
- Small Package Size for High Density Applications
- Small Package Size for High Density Applications
- General Purpose, Medium Current
- ESD Rating of Class 3 (>16 KV) per Human Body Model
- ESD Rating of Class 3 (exceeding 16 kV) per the Human Body Model

Mechanical Characteristics:

- Pb-Free Packages are Available
- CASE: Void-free, transfer-molded, thermosetting plastic case
- FINISH: Corrosion resistant finish, easily solderable
- MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES: 260?C for 10 Seconds
- POLARITY: Cathode indicated by polarity band
- FLAMMABILITY RATING: UL94 V-0
- Pb-Free Packages are Available

500 mW SOD?123 Surface Mount
Three complete series of Zener diodes are offered in the convenient, surface mount plastic SOD?123 package. These devices provide a convenient alternative to the leadless 34?package style.

Data Sheet

Type	Document Title	Document ID/Size	Rev
Data Sheet	Energy Rated Zener Voltage Regulators	MMSZ5221ET1/D - 75.0 KB	3
Data Sheet	Surface Mount Silicon Zener Diodes	MMSZ5221BT1/D - 75.0 KB	4

Catalog

Discrete > Diodes > Zener Diodes