



Is Now Part of



**ON Semiconductor®**

To learn more about ON Semiconductor, please visit our website at  
[www.onsemi.com](http://www.onsemi.com)

Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (\_), the underscore (\_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (\_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at [www.onsemi.com](http://www.onsemi.com). Please email any questions regarding the system integration to [Fairchild\\_questions@onsemi.com](mailto:Fairchild_questions@onsemi.com).

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

# MMBZ5221B - MMBZ5257B

## Zener Diodes

Tolerance = 5%



### Absolute Maximum Ratings<sup>(1, 2)</sup>

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Value	Unit
$P_D$	Power Dissipation	Referencing $R_{\theta JA}$ , $T_A = 25^\circ\text{C}$	250
		Referencing $\psi_{JL}$ , $T_L = 25^\circ\text{C}$	550
$R_{\theta JA}$	Junction-to-Ambient Thermal Resistance <sup>(3)</sup>	465	$^\circ\text{C/W}$
$\psi_{JL}$	Junction-to-Lead Thermal Characteristics (with reference to Cathode)	220	$^\circ\text{C/W}$
$T_{STG}$	Storage Temperature Range	-55 to +150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature	+150	$^\circ\text{C}$

#### Note:

1. These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.
3. Device mounted on FR-4 PCB, board size = 76.2 mm x 114.3 mm

## Electrical Characteristics

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Device	Mark	$V_Z(\text{V}) @ I_Z(\text{mA})$				$Z_Z(\Omega) @ I_Z(\text{mA})$		$Z_{ZK}(\Omega) @ I_{ZK}(\text{mA})$		$I_R(\mu\text{A}) @ V_R(\text{V})$	
		Min.	Nor.	Max.	$I_Z(\text{mA})$						
MMBZ5221B	18A	2.28	2.4	2.52	20	30	20	1,200	0.25	100	1.0
MMBZ5223B	18C	2.565	2.7	2.835	20	30	20	1,300	0.25	75	1.0
MMBZ5226B	8A	3.135	3.3	3.465	20	28	20	1,600	0.25	25	1.0
MMBZ5227B	8B	3.42	3.6	3.78	20	24	20	1,700	0.25	15	1.0
MMBZ5228B	8C	3.705	3.9	4.095	20	23	20	1,900	0.25	10	1.0
MMBZ5229B	8D	4.085	4.3	4.515	20	22	20	1,000	0.25	5.0	1.0
MMBZ5230B	8E	4.465	4.7	4.935	20	19	20	1,900	0.25	5.0	2.0
MMBZ5231B	8F	4.845	5.1	5.355	20	17	20	1,600	0.25	5.0	2.0
MMBZ5232B	8G	5.32	5.6	5.88	20	11	20	1,600	0.25	5.0	3.0
MMBZ5233B	8H	5.7	6.0	6.3	20	7.0	20	1,600	0.25	5.0	3.5
MMBZ5234B	8J	5.89	6.2	6.51	20	7.0	20	1,000	0.25	5.0	4.0
MMBZ5235B	8K	6.46	6.8	7.14	20	5.0	20	750	0.25	3.0	5.0
MMBZ5236B	8L	7.125	7.5	7.875	20	6.0	20	500	0.25	3.0	6.0
MMBZ5237B	8M	7.79	8.2	8.61	20	8.0	20	500	0.25	3.0	6.5
MMBZ5238B	8N	8.265	8.7	9.135	20	8.0	20	600	0.25	3.0	6.5
MMBZ5239B	8P	8.645	9.1	9.555	20	10	20	600	0.25	3.0	7.0
MMBZ5240B	8Q	9.5	10	10.5	20	17	20	600	0.25	3.0	8.0
MMBZ5241B	8R	10.45	11	11.55	20	22	20	600	0.25	2.0	8.4
MMBZ5242B	8S	11.4	12	12.6	20	30	20	600	0.25	1.0	9.1
MMBZ5243B	8T	12.35	13	13.65	9.5	13	9.5	600	0.25	0.5	9.9
MMBZ5244B	8U	13.3	14	14.7	9.0	15	9.0	600	0.25	0.1	10
MMBZ5245B	8V	14.25	15	15.75	8.5	16	8.5	600	0.25	0.1	11
MMBZ5246B	8W	15.2	16	16.8	7.8	17	7.8	600	0.25	0.1	12
MMBZ5247B	8X	16.15	17	17.85	7.4	19	7.4	600	0.25	0.1	13
MMBZ5248B	8Y	17.1	18	18.9	7.0	21	7.0	600	0.25	0.1	14
MMBZ5249B	8Z	18.05	19	19.95	6.6	23	6.6	600	0.25	0.1	14
MMBZ5250B	81A	19	20	21	6.2	25	6.2	600	0.25	0.1	15
MMBZ5251B	81B	20.9	22	23.1	5.6	29	5.6	600	0.25	0.1	17
MMBZ5252B	81C	22.8	24	25.2	5.2	33	5.2	600	0.25	0.1	18
MMBZ5253B	81D	23.75	25	26.25	5.0	35	5.0	600	0.25	0.1	19
MMBZ5254B	81E	25.65	27	28.35	4.6	41	4.6	600	0.25	0.1	21
MMBZ5255B	81F	26.6	28	29.4	4.5	44	4.5	600	0.25	0.1	21
MMBZ5256B	81G	28.5	30	31.5	4.2	49	4.2	600	0.25	0.1	23
MMBZ5257B	81H	31.35	33	34.65	3.8	58	3.8	600	0.25	0.1	25

$V_F$  Forward Voltage = 0.9 V Maximum at  $I_F = 10 \text{ mA}$  for all MMBZ5200 series

Typical Performance Characteristics

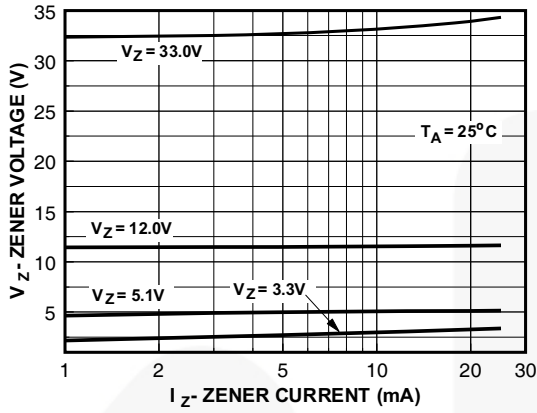


Figure 1. Zener Current vs. Zener Voltage

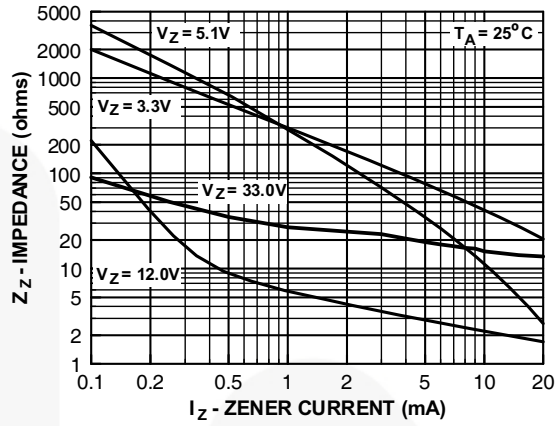


Figure 2. Zener Current vs. Zener Impedance

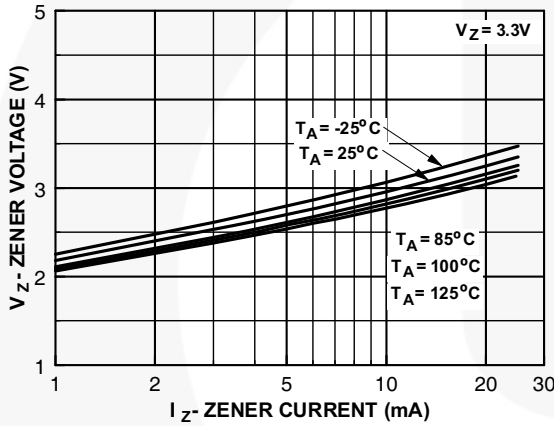


Figure 3. 3.3 Zener Voltage vs. Temperature

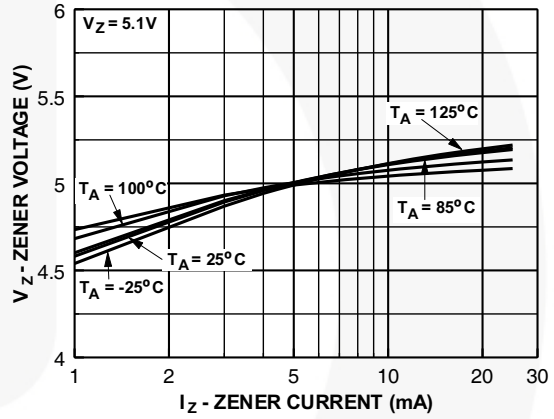


Figure 4. 5.1 Zener Voltage vs. Temperature

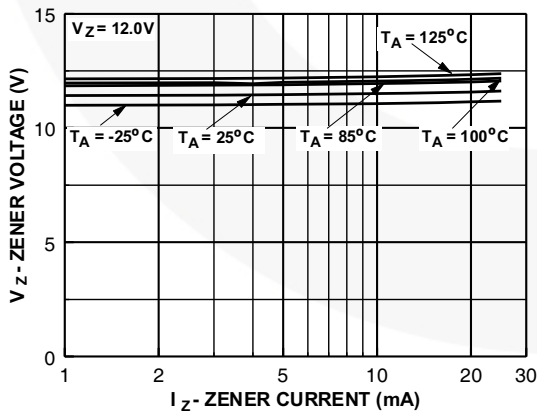
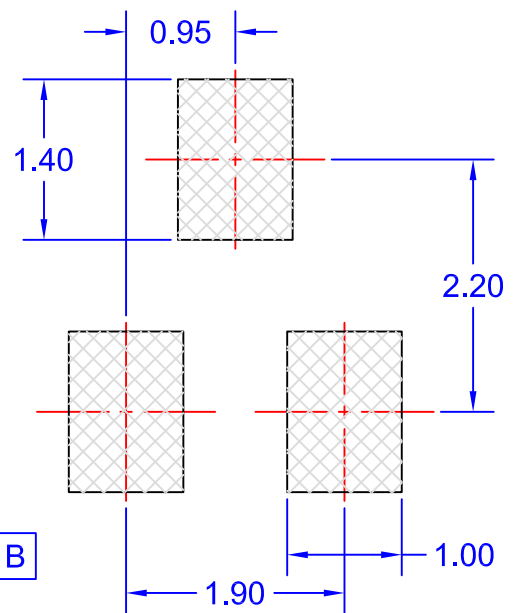
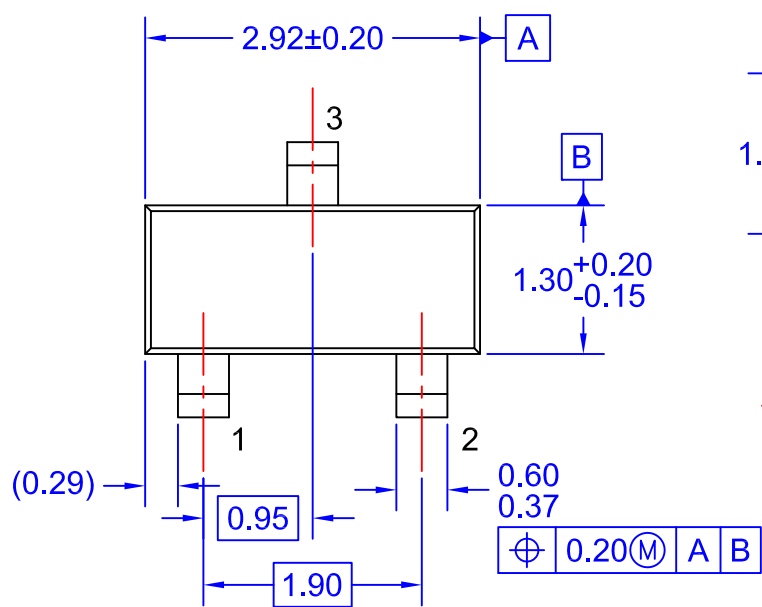


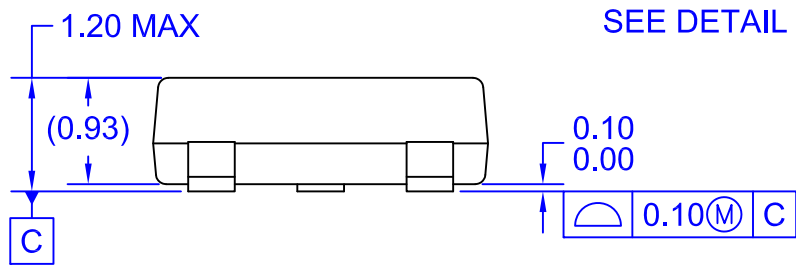
Figure 5. 12 Zener Voltage vs. Zener Temperature



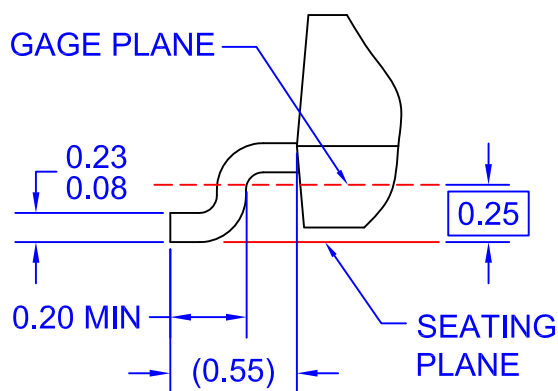
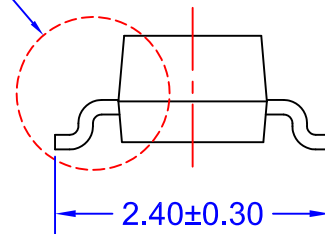
Figure 6. 33 Zener Voltage vs. Zener Temperature



LAND PATTERN  
RECOMMENDATION



SEE DETAIL A



**DETAIL A**  
SCALE: 2X

NOTES: UNLESS OTHERWISE SPECIFIED

- A) REFERENCE JEDEC REGISTRATION TO-236, VARIATION AB, ISSUE H.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
- D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M - 2009.
- E) DRAWING FILE NAME: MA03DREV12



ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA  
**Phone:** 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
**Fax:** 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
**Email:** [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**N. American Technical Support:** 800-282-9855 Toll Free  
USA/Canada  
**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910  
**Japan Customer Focus Center**  
Phone: 81-3-5817-1050

**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)  
**Order Literature:** <http://www.onsemi.com/orderlit>  
For additional information, please contact your local  
Sales Representative