



Is Now Part of



**ON Semiconductor®**

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

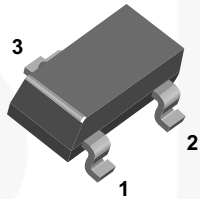
ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual 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.



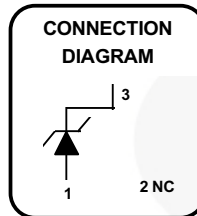
November 2015

# BZX84C3V3 - BZX84C33 Zeners

Tolerance: C = 5%



SOT-23



## 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
$I_{FRM}$	Repetitive Peak Forward Current	250	mA
$I_{ZRM}$	Repetitive Peak Working Current	250	mA
$P_D$	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	$^\circ\text{C}/\text{W}$
$\psi_{JL}$	Junction-to-Lead Thermal Characteristics (with reference to Cathode)	220	$^\circ\text{C}/\text{W}$
$T_{STG}$	Storage Temperature Range	-55 to +150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature	-55 to +150	$^\circ\text{C}$

### Notes:

1. These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
2. These are steady-state limits. Fairchild Semiconductor 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	$I_Z = 5.0 \text{ mA}$			$I_Z = 1.0 \text{ mA}$			$I_Z = 20 \text{ mA}$		
		$V_Z \text{ (V)}$		$Z_Z \text{ (}\Omega\text{)}$	$V_Z \text{ (V)}$		$Z_Z \text{ (}\Omega\text{)}$	$V_Z \text{ (V)}$		$Z_Z \text{ (}\Omega\text{)}$
		Min.	Max.		Min.	Max.		Min.	Max.	
BZX84C3V3	Z14	3.1	3.5	95	2.3	2.9	600	3.6	4.2	40
BZX84C3V6	Z15	3.4	3.8	90	2.7	3.3	600	3.9	4.5	40
BZX84C3V9	Z16	3.7	4.1	90	2.9	3.5	600	4.1	4.7	30
BZX84C4V3	Z17	4.0	4.6	90	3.3	4.0	600	4.4	5.1	30
BZX84C4V7	Z1	4.4	5.0	80	3.7	4.7	500	4.5	5.4	15
BZX84C5V1	Z2	4.8	5.4	60	4.2	5.3	480	5.0	5.9	15
BZX84C5V6	Z3	5.2	6.0	40	4.8	6.0	400	5.2	6.3	10
BZX84C6V2	Z4	5.8	6.6	10	5.6	6.6	150	5.8	6.8	6
BZX84C6V8	Z5	6.4	7.2	15	6.3	7.2	80	6.4	7.4	6
BZX84C7V5	Z6	7.0	7.9	15	6.9	7.9	80	7.0	8.0	6
BZX84C8V2	Z7	7.7	8.7	15	7.6	8.7	80	7.7	8.8	6
BZX84C9V1	Z8	8.5	9.6	15	8.4	9.6	100	8.5	9.7	8
BZX84C10	Z9	9.4	10.6	20	9.3	10.6	150	9.4	10.7	10
BZX84C11	Y1	10.4	11.6	20	10.2	11.6	150	10.4	11.8	10
BZX84C12	Y2	11.4	12.7	25	11.2	12.7	150	11.4	12.9	10
BZX84C13	Y3	12.4	14.1	30	12.3	14.0	170	12.5	14.2	15
BZX84C15	Y4	13.8	15.6	30	13.7	15.5	200	13.9	15.7	20
BZX84C16	Y5	15.3	17.1	40	15.2	17.0	200	15.4	17.2	20
BZX84C18	Y6	16.8	19.1	45	16.7	19.0	225	16.9	19.2	20
BZX84C20	Y7	18.8	21.2	55	18.7	21.1	225	18.9	21.4	20
BZX84C22	Y8	20.8	23.3	55	20.7	23.2	250	20.9	23.4	25
BZX84C24	Y9	22.8	25.6	70	22.7	25.5	250	22.9	25.7	25
BZX84C27	Y10	25.1	28.9	80	25.0	28.9	300	25.2	29.3	45
BZX84C30	Y11	28.0	32.0	80	27.8	32.0	300	28.1	32.4	50
BZX84C33	Y12	31.0	35.0	80	30.8	35.0	325	31.1	35.4	55

$V_F$  Forward Voltage = 0.9 V Maximum at  $I_F = 10 \text{ mA}$  for all BZX84 series

**Electrical Characteristics** (Continued)Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Device	$V_R$ (V)	$I_R$ ( $\mu\text{A}$ )	Cap <sup>(4)</sup> (pF)	$D_{VZ} / D_t$ at 5.0 mA (mV/k)	
				Min.	Max.
BZX84C3V3	1.0	5.0	450	-3.5	0.0
BZX84C3V6	1.0	5.0	450	-3.5	0.0
BZX84C3V9	1.0	5.0	450	-3.5	0.0
BZX84C4V3	1.0	5.0	450	-3.5	0.0
BZX84C4V7	2.0	3	260	-3.5	0.2
BZX84C5V1	2.0	2	225	-2.7	1.2
BZX84C5V6	2.0	1	200	-2.0	2.5
BZX84C6V2	4.0	3	185	0.4	3.7
BZX84C6V8	4.0	2	155	1.2	4.5
BZX84C7V5	5.0	1	140	2.5	5.3
BZX84C8V2	5.0	0.7	135	3.2	6.2
BZX84C9V1	6.0	0.5	130	3.8	7.0
BZX84C10	7.0	0.2	130	4.5	8.0
BZX84C11	8.0	0.1	130	5.4	9.0
BZX84C12	8.0	0.1	130	6.0	10
BZX84C13	8.0	0.1	120	7.0	11
BZX84C15	10.5	0.05	110	9.2	13
BZX84C16	11.2	0.05	105	10.4	14
BZX84C18	12.6	0.05	100	12.4	16
BZX84C20	14	0.05	85	14.4	18
BZX84C22	15.4	0.05	85	16.4	20
BZX84C24	16.8	0.05	80	18.4	22
BZX84C27	18.9	0.05	70	21.4	25.3
BZX84C30	21	0.05	70	24.4	29.4
BZX84C33	23.1	0.05	70	27.4	33.4

**Note:**4. Capacitance at  $V_R = 0.0$  V,  $f = 1.0$  MHz.

Typical Performance Characteristics

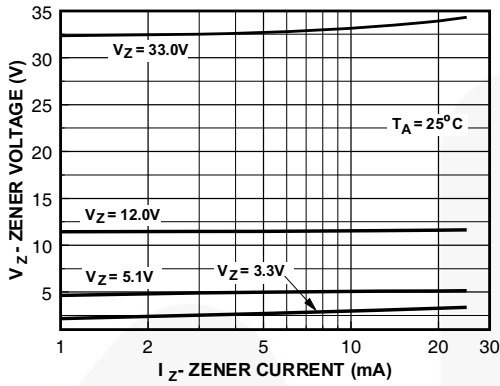


Figure 1. Zener Current vs. Zener Voltage

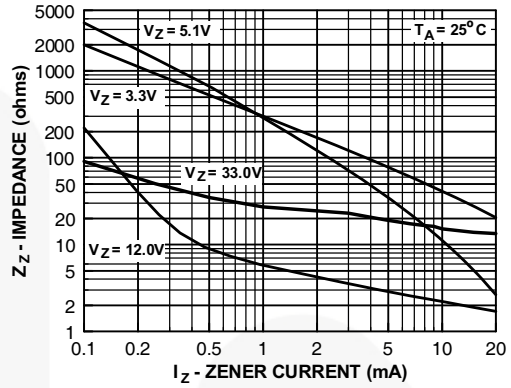


Figure 2. Zener Current vs. Zener Impedance

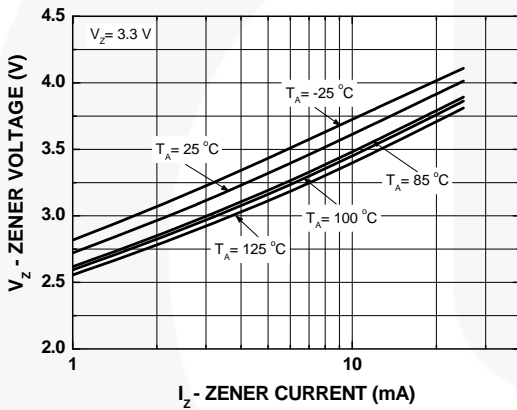


Figure 3. 3.3 V Zener Voltage vs. Temperature

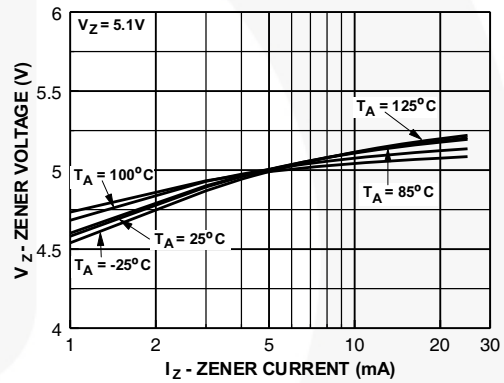


Figure 4. 5.1 V Zener Voltage vs. Temperature

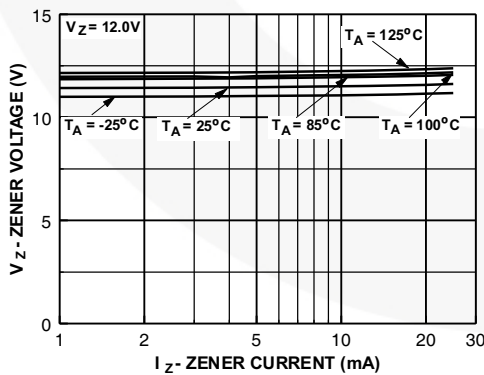


Figure 5. 12 V Zener Voltage vs. Zener Temperature

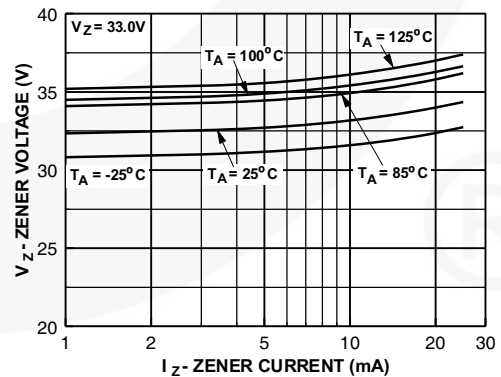


Figure 6. 33 V Zener Voltage vs. Zener Temperature



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