

Zener Voltage Regulators

500 mW, Low I_Z SOD-523 Surface Mount

MM5Z4xxxTxG Series, SZMM5Z4xxxTxG Series

This series of Zener diodes is packaged in a SOD-523 surface mount package. They are designed to provide voltage regulation protection and are especially attractive in situations where space is at a premium. They are well suited for applications such as cellular phones, hand held portables, and high density PC boards.

Features

- 500 mW Rating on FR-4 or FR-5 Board
- Wide Zener Reverse Voltage Range – 1.8 V to 43 V
- Low Reverse Current (I_{ZT}) – 50 μA
- Package Designed for Optimal Automated Board Assembly
- Small Package Size for High Density Applications
- ESD Rating of Class 3 (> 16 kV) per Human Body Model
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant*

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	Units
Total Power Dissipation on FR-5 Board, (Note 1) @ T _L = 75°C Derated above 75°C	P _D	500 4.0	mW mW/°C
Thermal Resistance, (Note 2) Junction-to-Ambient	R _{θJA}	250	°C/W
Junction and Storage Temperature Range	T _J , T _{stg}	-55 to +150	°C

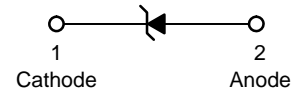
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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

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



SOD-523
CASE 502
STYLE 1



MARKING DIAGRAM



- XX = Specific Device Code
- M = Date Code*
- = Pb-Free Package

(Note: Microdot may be in either location)

*Date Code orientation may vary depending upon manufacturing location.

ORDERING INFORMATION

Device	Package	Shipping†
MM5Z4xxxT1G	SOD-523 (Pb-Free)	3,000 / Tape & Reel
SZMM5Z4xxxT1G	SOD-523 (Pb-Free)	3,000 / Tape & Reel
MM5Z4xxxT5G	SOD-523 (Pb-Free)	8,000 / Tape & Reel
SZMM5Z4xxxT5G	SOD-523 (Pb-Free)	8,000 / Tape & 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

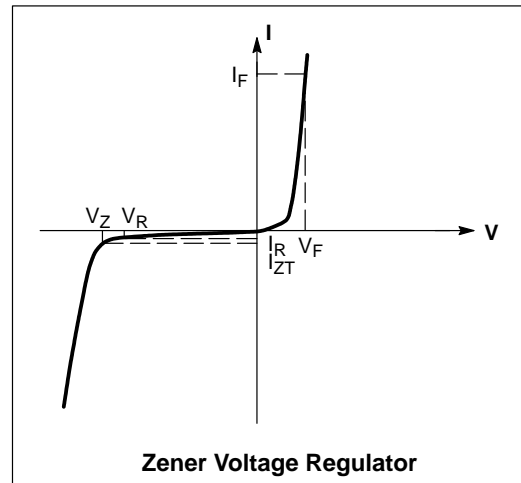
See specific marking information in the device marking column of the Electrical Characteristics table on page 3 of this data sheet.

MM5Z4xxxTxG Series, SZMM5Z4xxxTxG Series

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted, $V_F = 0.9\text{ V Max. @ } I_F = 10\text{ mA}$)

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

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.



MM5Z4xxxTxG Series, SZMM5Z4xxxTxG Series

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted, $V_F = 0.9\text{ V Max.}$ @ $I_F = 10\text{ mA}$)

Device*	Device Marking	Zener Voltage (Note 3)				Leakage Current	
		V _Z (Volts)			@ I _{ZT}	I _R @ V _R	
		Min	Nom	Max	μA	μA	Volts
MM5Z4678T1G/T5G*	4A	1.71	1.8	1.89	50	7.5	1
MM5Z4679T1G/T5G*	42	1.90	2.0	2.10	50	5	1
MM5Z4680T1G/T5G	4C	2.09	2.2	2.31	50	4	1
MM5Z4681T1G/T5G*	4D	2.28	2.4	2.52	50	2	1
MM5Z4682T5G	4E	2.565	2.7	2.835	50	1	1
MM5Z4683T1G/T5G*	4F	2.85	3.0	3.15	50	0.8	1
MM5Z4684T1G/T5G*	4G	3.13	3.3	3.47	50	7.5	1.5
MM5Z4685T1G/T5G	4H	3.42	3.6	3.78	50	7.5	2
MM5Z4686T1G/T5G	43	3.70	3.9	4.10	50	5	2
MM5Z4687T1G/T5G	4J	4.09	4.3	4.52	50	4	2
MM5Z4688T1G/T5G	4K	4.47	4.7	4.94	50	10	3
MM5Z4689T1G/T5G	4L	4.85	5.1	5.36	50	10	3
MM5Z4690T1G/T5G	4M	5.32	5.6	5.88	50	10	4
MM5Z4691T1G/T5G*	4N	5.89	6.2	6.51	50	10	5
MM5Z4692T1G/T5G*	44	6.46	6.8	7.14	50	10	5.1
MM5Z4693T1G/T5G	4P	7.13	7.5	7.88	50	10	5.7
MM5Z4694T5G	4Q	7.79	8.2	8.61	50	1	6.2
MM5Z4695T1G/T5G*	4R	8.27	8.7	9.14	50	1	6.6
MM5Z4696T1G/T5G*	45	8.65	9.1	9.56	50	1	6.9
MM5Z4697T1G/T5G	4T	9.50	10	10.50	50	1	7.6
MM5Z4698T1G/T5G*	4U	10.45	11	11.55	50	0.05	8.4
MM5Z4699T5G	4V	11.40	12	12.60	50	0.05	9.1
MM5Z4700T1G/T5G*	4W	12.35	13	13.65	50	0.05	9.8
MM5Z4701T1G/T5G*	4X	13.30	14	14.70	50	0.05	10.6
MM5Z4702T5G	4Y	14.25	15	15.75	50	0.05	11.4
MM5Z4703T1G/T5G*	4Z	15.20	16	16.80	50	0.05	12.1
MM5Z4704T1G/T5G*	46	16.15	17	17.85	50	0.05	12.9
MM5Z4705T1G/T5G	47	17.10	18	18.90	50	0.05	13.6
MM5Z4706T1G/T5G*	5A	18.05	19	19.95	50	0.05	14.4
MM5Z4707T1G/T5G*	5C	19.00	20	21.00	50	0.01	15.2
MM5Z4708T1G/T5G*	5F	20.90	22	23.10	50	0.01	16.7
MM5Z4709T1G/T5G	5G	22.80	24	25.20	50	0.01	18.2
MM5Z4710T1G/T5G*	5H	23.75	25	26.25	50	0.01	19.0
MM5Z4711T1G/T5G	5K	25.65	27	28.35	50	0.01	20.4
MM5Z4712T1G/T5G*	5L	26.60	28	29.40	50	0.01	21.2
MM5Z4713T1G/T5G*	5N	28.50	30	31.50	50	0.01	22.8
MM5Z4714T1G/T5G	5P	31.35	33	34.65	50	0.01	25.0
MM5Z4715T1G/T5G	5Q	34.20	36	37.80	50	0.01	27.3
MM5Z4716T1G/T5G*	5R	37.05	39	40.95	50	0.01	29.6
MM5Z4717T1G/T5G	5T	40.85	43	45.15	50	0.01	32.6

3. Nominal Zener voltage is measured with the device junction in thermal equilibrium at $T_L = 30^\circ\text{C} \pm 1^\circ\text{C}$.

*Please Contact Sales.

MM5Z4xxxTxG Series, SZMM5Z4xxxTxG Series

TYPICAL CHARACTERISTICS

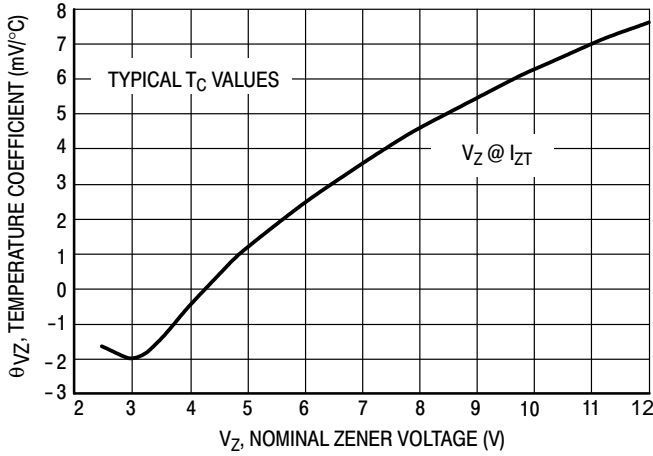


Figure 1. Temperature Coefficients
(Temperature Range -55°C to +150°C)

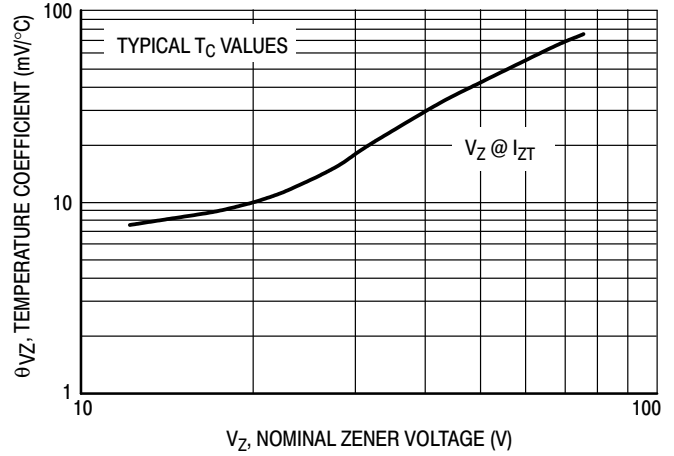


Figure 2. Temperature Coefficients
(Temperature Range -55°C to +150°C)

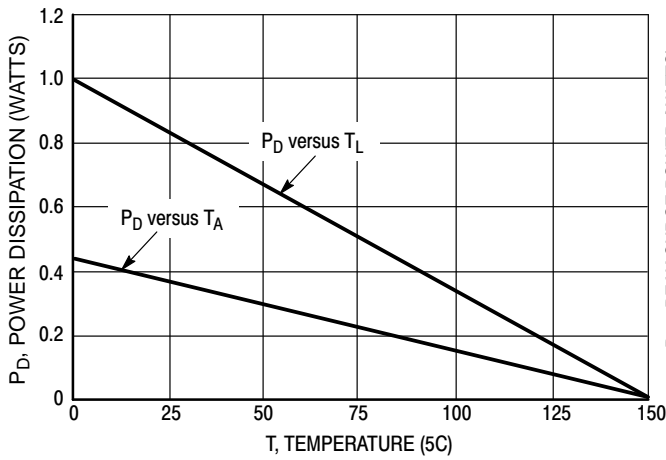


Figure 3. Steady State Power Derating

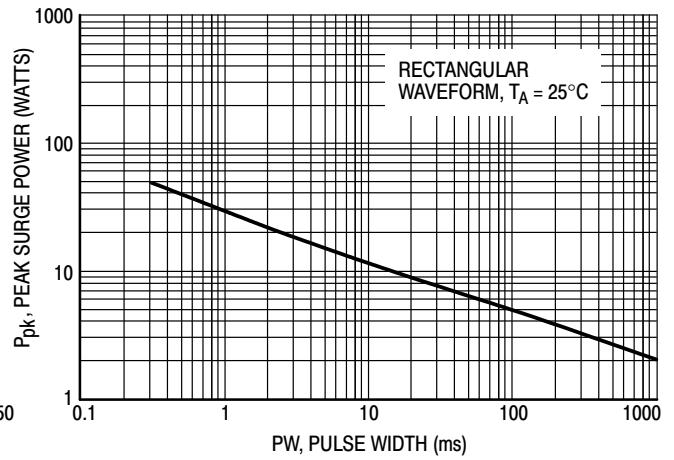


Figure 4. Maximum Nonrepetitive Surge Power

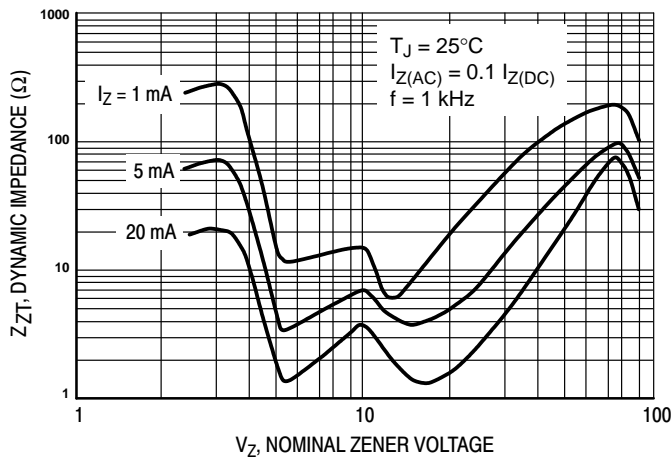


Figure 5. Effect of Zener Voltage on
Zener Impedance

TYPICAL CHARACTERISTICS

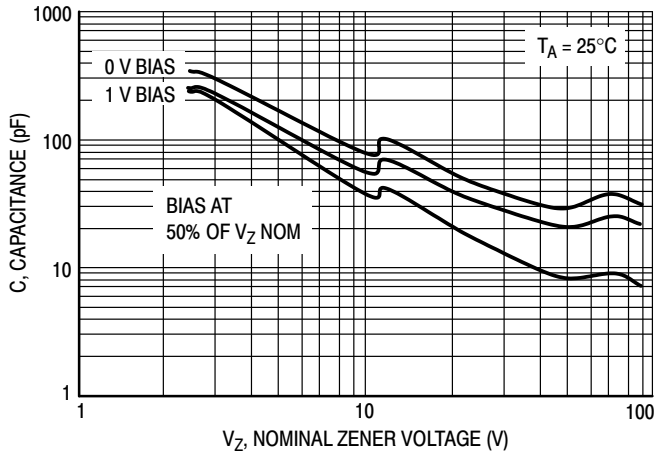


Figure 6. Typical Capacitance

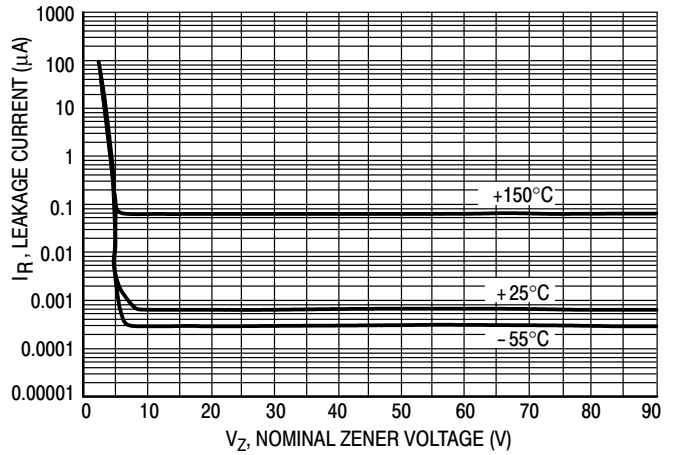


Figure 7. Typical Leakage Current

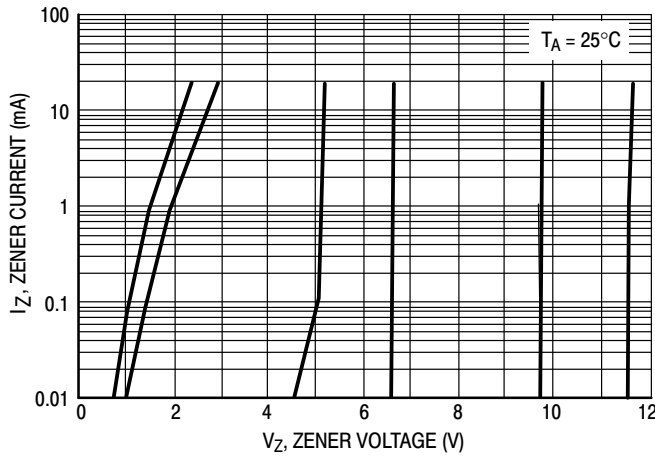


Figure 8. Zener Voltage versus Zener Current (V_Z Up to 12 V)

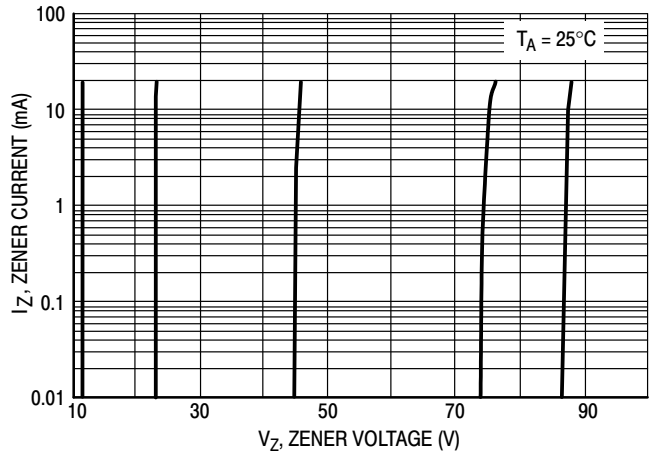
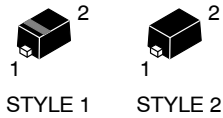


Figure 9. Zener Voltage versus Zener Current (12 V to 91 V)

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

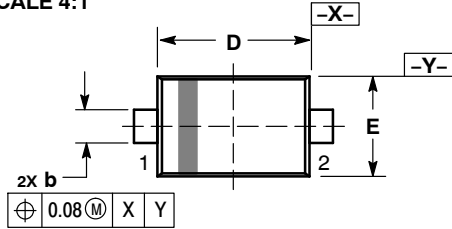
ON Semiconductor®



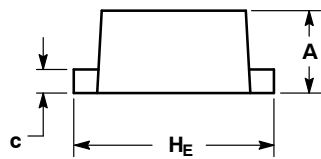
SOD-523
CASE 502-01
ISSUE E

DATE 28 SEP 2010

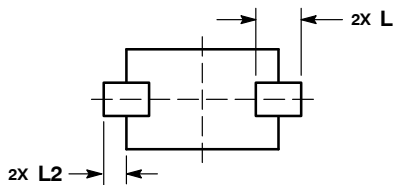
SCALE 4:1



TOP VIEW

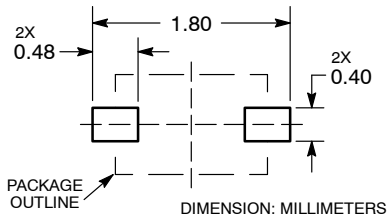


SIDE VIEW



BOTTOM VIEW

RECOMMENDED SOLDERING FOOTPRINT*

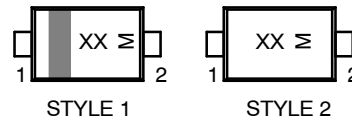


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.50	0.60	0.70
b	0.25	0.30	0.35
c	0.07	0.14	0.20
D	1.10	1.20	1.30
E	0.70	0.80	0.90
H _E	1.50	1.60	1.70
L	0.30 REF		
L2	0.15	0.20	0.25

GENERIC MARKING DIAGRAM*



XX = Specific Device Code
M = Date Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present.

STYLE 1: PIN 1. CATHODE (POLARITY BAND)
2. ANODE

STYLE 2: NO POLARITY

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

DOCUMENT NUMBER:	98AON11524D	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	SOD-523	PAGE 1 OF 1

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 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. ON Semiconductor does not convey any license under its patent rights nor the rights of others.

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** 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 **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** 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. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** 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 **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** 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 **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales