

# MOSFET – N-Channel, Logic Level, **POWERTRENCH**®

**60 V, 1.6 A, 98 mΩ**

## FDN5632N-F085

### Features

- $R_{DS(on)} = 98\text{ m}\Omega$  at  $V_{GS} = 4.5\text{ V}$ ,  $I_D = 1.6\text{ A}$
- $R_{DS(on)} = 82\text{ m}\Omega$  at  $V_{GS} = 10\text{ V}$ ,  $I_D = 1.7\text{ A}$
- Typ  $Q_{g(TOT)} = 9.2\text{ nC}$  at  $V_{GS} = 10\text{ V}$
- Low Miller Charge
- UIS Capability
- AEC-Q101 Qualified and PPAP Capable
- This Device is Pb-Free, Halide Free and is RoHS Compliant

### Applications

- DC/DC Converter
- Motor Drives

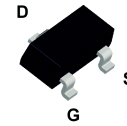
### MOSFET MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)

Symbol	Parameter	Ratings	Unit
$V_{DSS}$	Drain to Source Voltage	60	V
$V_{GS}$	Gate to Source Voltage	$\pm 20$	V
$I_D$	Drain Current Continuous ( $V_{GS} = 10\text{ V}$ )	1.7	A
	Pulsed	10	
$E_{AS}$	Single Pulse Avalanche Energy (Note 1)	74	mJ
$P_D$	Power Dissipation	1.1	W
$T_J, T_{STG}$	Operating and Storage Temperature	-55 to +150	$^\circ\text{C}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	75	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient TO-252, 1 in <sup>2</sup> Copper Pad Area	111	$^\circ\text{C/W}$

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.

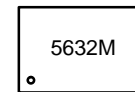
1.  $E_{AS}$  of 74 mJ is 100% test at  $L = 80\text{ mH}$ ,  $I_{AS} = 1.4\text{ A}$ , starting  $T_J = 25^\circ\text{C}$

$V_{DSS}$	$r_{DS(on)}\text{ MAX}$	$I_D\text{ MAX}$
60 V	82 mΩ @ 10 V	1.6 A
	98 mΩ @ 4.5 V	



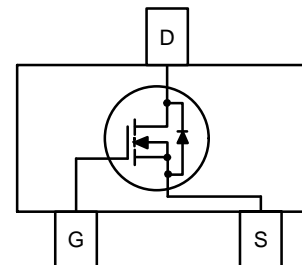
SOT-23/SUPERSOT™ -23, 3 LEAD, 1.4x2.9  
CASE 527AG

### MARKING DIAGRAM



5632 = Specific Device Code  
M = Date Code

### PIN ASSIGNMENT



### ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

# FDN5632N-F085

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
--------	-----------	------------	-----	-----	-----	------

### OFF CHARACTERISTICS

B <sub>V</sub> DSS	Drain to Source Breakdown Voltage	I <sub>D</sub> = 250 μA, V <sub>GS</sub> = 0 V	60	–	–	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 48 V, V <sub>GS</sub> = 0 V	–	–	1	μA
		V <sub>DS</sub> = 48 V, V <sub>GS</sub> = 0 V, T <sub>A</sub> = 125°C	–	–	250	
I <sub>GSS</sub>	Gate to Source Leakage Current	V <sub>GS</sub> = ±20 V	–	–	±100	nA

### ON CHARACTERISTICS

V <sub>GS(th)</sub>	Gate to Source Threshold Voltage	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250 μA	1	2.0	3	V
r <sub>DS(on)</sub>	Drain to Source On Resistance	I <sub>D</sub> = 1.7 A, V <sub>GS</sub> = 10 V	–	57	82	mΩ
		I <sub>D</sub> = 1.6 A, V <sub>GS</sub> = 6 V	–	62	88	
		I <sub>D</sub> = 1.6 A, V <sub>GS</sub> = 4.5 V	–	70	98	
		I <sub>D</sub> = 1.7 A, V <sub>GS</sub> = 10 V, T <sub>A</sub> = 150°C	–	107	135	

### DYNAMIC CHARACTERISTICS

C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0 V, f = 1 MHz	–	475	–	pF
C <sub>OSS</sub>	Output Capacitance		–	60	–	pF
C <sub>rSS</sub>	Reverse Transfer Capacitance		–	30	–	pF
R <sub>G</sub>	Gate Resistance	f = 1MHz	–	1.4	–	Ω
Q <sub>g(TOT)</sub>	Total Gate Charge at 10 V	V <sub>GS</sub> = 0 to 10 V, V <sub>DD</sub> = 20 V, I <sub>D</sub> = 1.7 A	–	9.2	12	nC
Q <sub>gs</sub>	Gate to Source Gate Charge	V <sub>DD</sub> = 20 V, I <sub>D</sub> = 1.7 A	–	1.5	–	nC
Q <sub>gd</sub>	Gate to Drain "Miller" Charge		–	1.4	–	nC

### SWITCHING CHARACTERISTICS

t <sub>on</sub>	Turn-On Time	V <sub>DD</sub> = 30 V, I <sub>D</sub> = 1.0 A V <sub>GS</sub> = 10 V, R <sub>GEN</sub> = 6 Ω	–	–	30	ns
t <sub>d(on)</sub>	Turn-On Delay Time		–	15	–	ns
t <sub>r</sub>	Rise Time		–	1.7	–	ns
t <sub>d(off)</sub>	Turn-Off Delay Time		–	5.2	–	ns
t <sub>f</sub>	Fall Time		–	1.3	–	ns
t <sub>off</sub>	Turn-Off Time		–	–	12.9	ns

### DRAIN-SOURCE DIODE CHARACTERISTICS

V <sub>SD</sub>	Source to Drain Diode Voltage	I <sub>SD</sub> = 1.7 A	–	0.8	1.25	V
		I <sub>SD</sub> = 0.85 A	–	0.8	1.0	
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> = 1.7 A, di <sub>SD</sub> /dt = 100 A/μs	–	16.0	21	ns
Q <sub>rr</sub>	Reverse Recovery Charge		–	7.9	10.3	nC

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.

TYPICAL CHARACTERISTICS

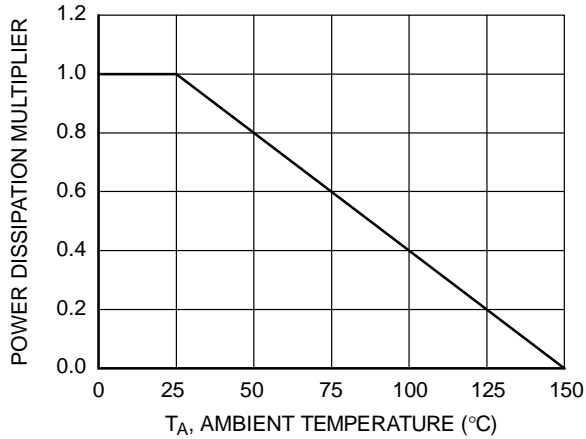


Figure 1. Normalized Power Dissipation vs. Case Temperature

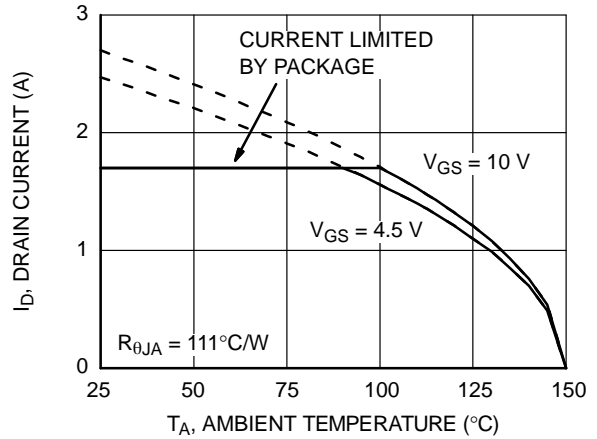


Figure 2. Maximum Continuous Drain Current vs. Case Temperature

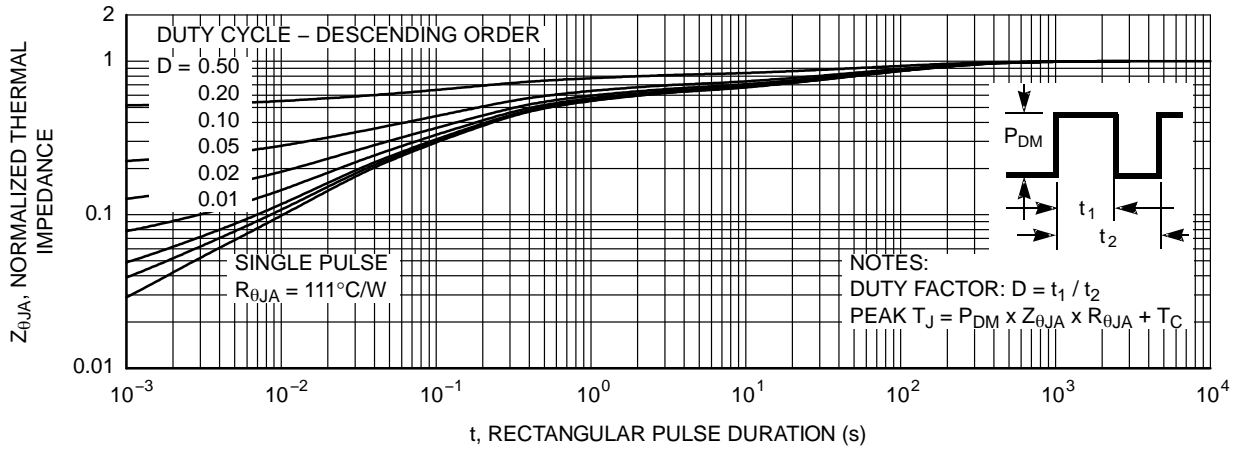


Figure 3. Normalized Maximum Transient Thermal Impedance

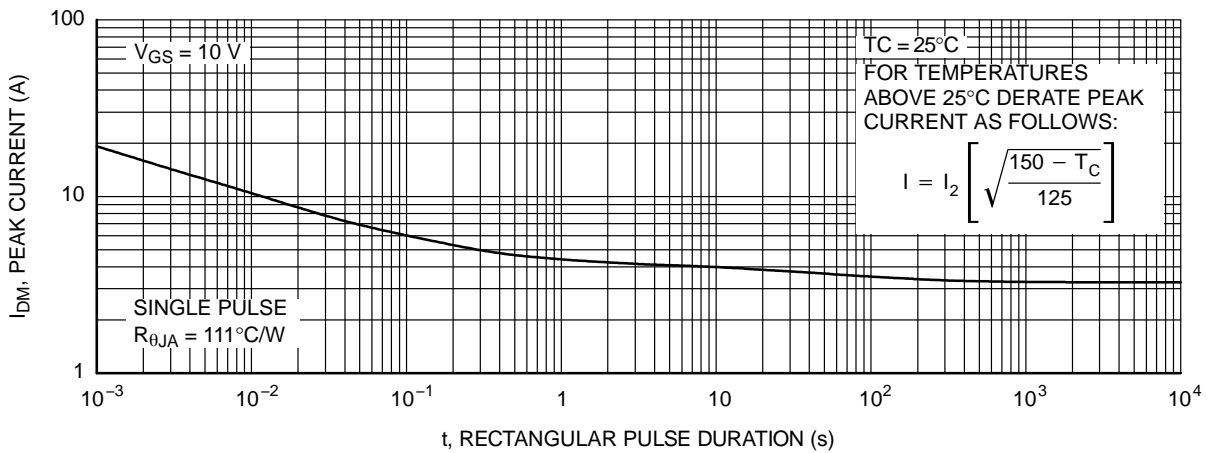


Figure 4. Peak Current Capability

TYPICAL CHARACTERISTICS

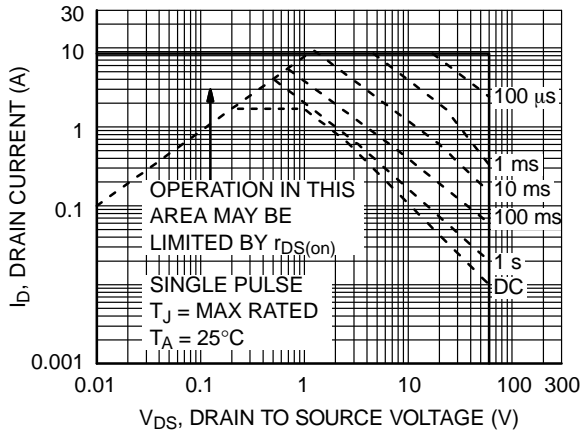


Figure 5. Forward Bias Safe Operating Area

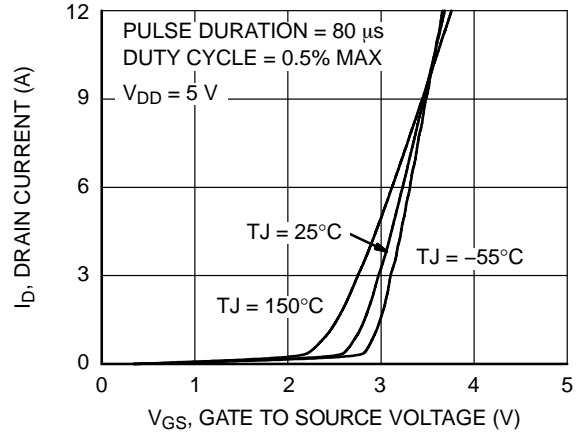


Figure 6. Transfer Characteristics

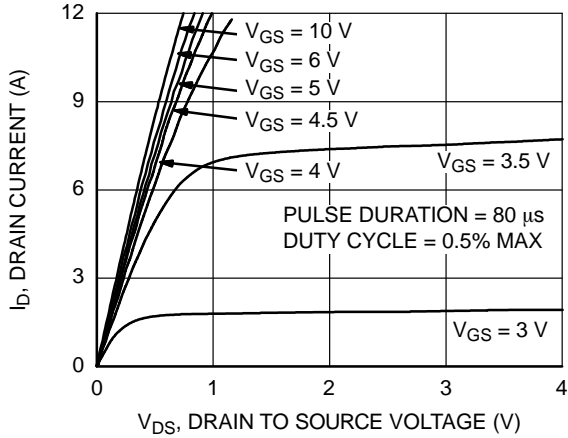


Figure 7. Saturation Characteristics

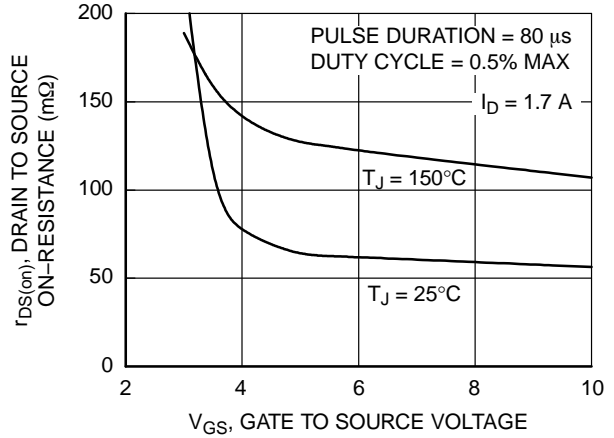


Figure 8. Drain to Source On-Resistance Variation vs. Gate to Source Voltage

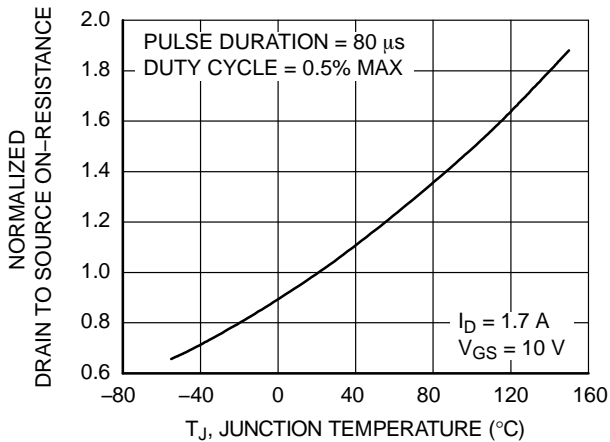


Figure 9. Normalized Drain to Source On-Resistance vs. Junction Temperature

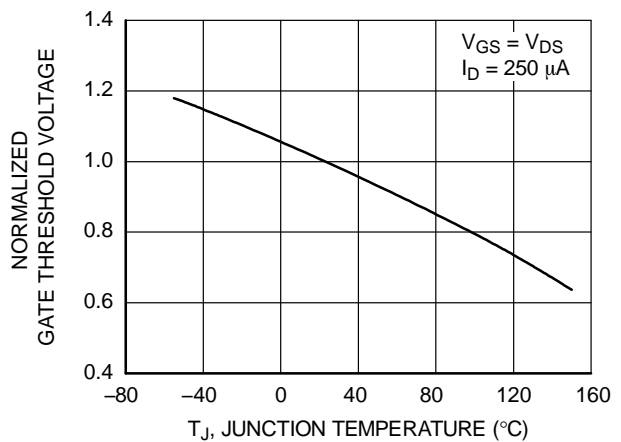
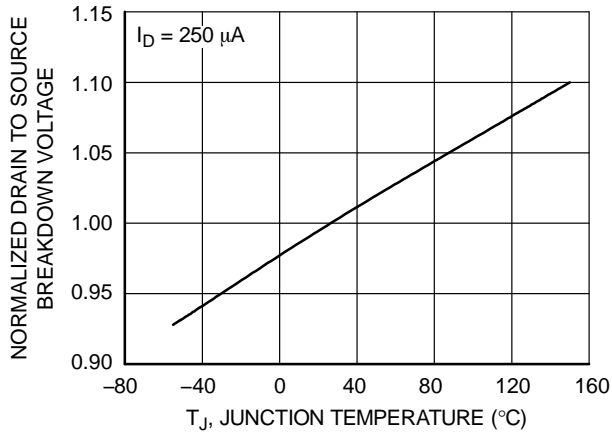


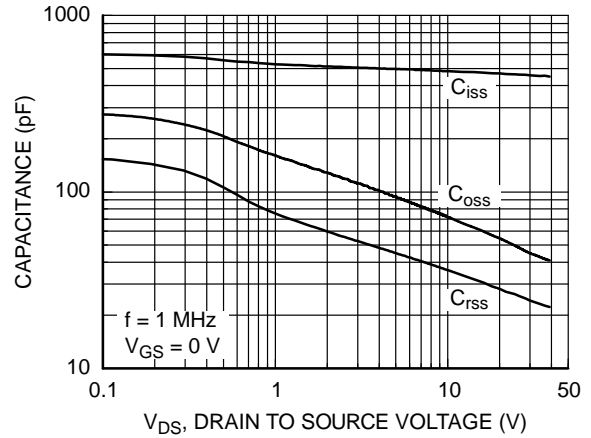
Figure 10. Normalized Gate Threshold Voltage vs. Junction Temperature

# FDN5632N-F085

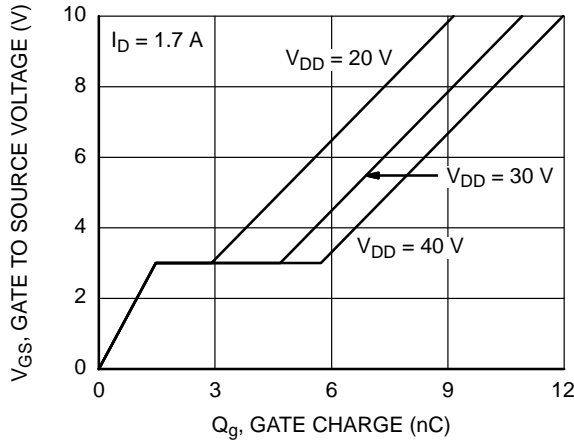
## TYPICAL CHARACTERISTICS



**Figure 11. Normalized Drain to Source Breakdown Voltage vs. Junction Temperature**



**Figure 12. Capacitance vs. Drain to Source Voltage**



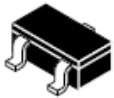
**Figure 13. Gate Charge vs. Gate to Source Voltage**

### PACKAGE MARKING AND ORDERING INFORMATION

Device	Device Marking	Package	Reel Size	Tape Width	Shipping <sup>†</sup>
FDN5632N-F085	5632	SOT-23/SUPERSOT-23, 3 LEAD, 1.4x2.9 (Pb-Free, Halide Free)	7"	8 mm	3000 / Tape & Reel

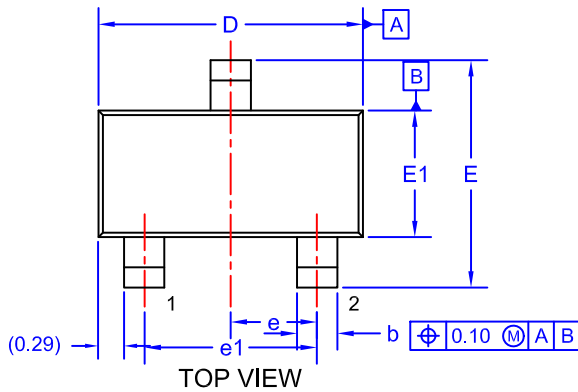
<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

POWERTRENCH is registered trademark of Semiconductor Components Industries, LLC (SCILLC) or its subsidiaries in the United States and/or other countries. SUPERSOT is trademark of Semiconductor Components Industries, LLC dba "onsemi" or its affiliates and/or subsidiaries in the United States and/or other countries.



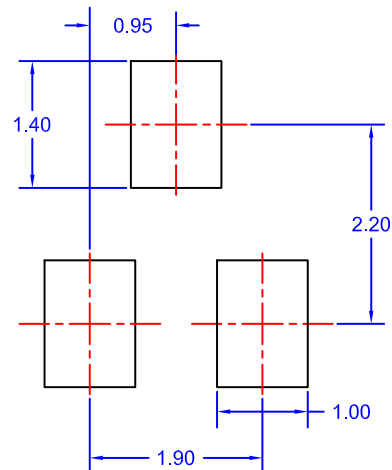
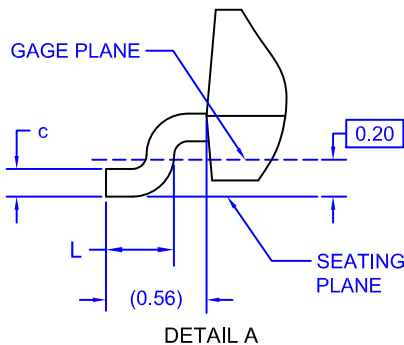
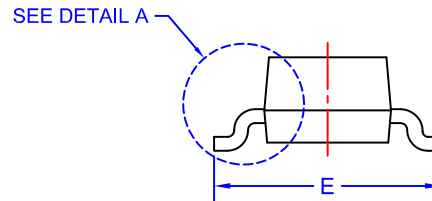
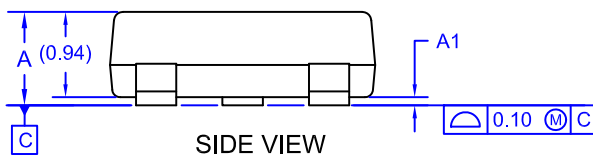
**SOT-23/SUPERSOT™ -23, 3 LEAD, 1.4x2.9**  
CASE 527AG  
ISSUE A

DATE 09 DEC 2019



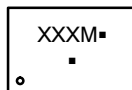
- NOTES: UNLESS OTHERWISE SPECIFIED
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
  2. ALL DIMENSIONS ARE IN MILLIMETERS.
  3. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.

DIM	MIN.	NOM.	MAX.
A	0.85	0.95	1.12
A1	0.00	0.05	0.10
b	0.370	0.435	0.508
c	0.085	0.150	0.180
D	2.80	2.92	3.04
E	2.31	2.51	2.71
E1	1.20	1.40	1.52
e	0.95 BSC		
e1	1.90 BSC		
L	0.33	0.38	0.43



**LAND PATTERN RECOMMENDATION\***  
\*FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

**GENERIC MARKING DIAGRAM\***



- XXX = Specific Device Code
- M = Month Code
- = Pb-Free Package

(Note: Microdot may be in either location)

\*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. Some products may not follow the Generic Marking.

<b>DOCUMENT NUMBER:</b>	<b>98AON34319E</b>	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
<b>DESCRIPTION:</b>	<b>SOT-23/SUPERSOT-23, 3 LEAD, 1.4X2.9</b>	<b>PAGE 1 OF 1</b>

onsemi and ONSEMI are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the 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. onsemi 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](http://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](http://www.onsemi.com/design/resources/technical-documentation)  
onsemi Website: [www.onsemi.com](http://www.onsemi.com)

### ONLINE SUPPORT: [www.onsemi.com/support](http://www.onsemi.com/support)

For additional information, please contact your local Sales Representative at [www.onsemi.com/support/sales](http://www.onsemi.com/support/sales)