



Is Now Part of



ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at
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. Please email any questions regarding the system integration to 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. 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.

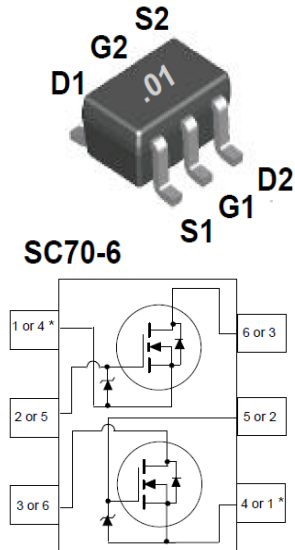


FDG6301N_F085

Dual N-Channel, Digital FET

Features

- 25 V, 0.22 A continuous, 0.65 A peak.
- $R_{DS(ON)} = 4 \Omega @ V_{GS} = 4.5 V$,
- $R_{DS(ON)} = 5 \Omega @ V_{GS} = 2.7 V$.
- Very low level gate drive requirements allowing direct operation in 3 V circuits ($V_{GS(th)} < 1.5 V$).
- Gate-Source Zener for ESD ruggedness (>6kV Human Body Model).
- Compact industry standard SC70-6 surface mount package.
- Qualified to AEC Q101
- RoHS Compliant



Applications

- Low voltage applications as a replacement for bipolar digital transistors and small signal MOSFETs

MOSFET Maximum Ratings $T_A = 25^\circ C$ unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{DSS}	Drain to Source Voltage	25	V
V_{GS}	Gate to Source Voltage	8	V
I_D	Drain Current Continuous	0.22	A
	Pulsed	0.65	
P_D	Power Dissipation	0.3	W
T_J, T_{STG}	Operating and Storage Temperature	-55 to +150	$^\circ C$
ESD	Electrostatic Discharge Rating MIL-STD-883D Human Body Model(100 pF / 1500 W)	6.0	kV
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	415	$^\circ C/W$

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDG6301N	FDG6301N_F085	SC70-6	7"	8mm	3000 units

Notes:

- 1: $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design, while $R_{\theta JA}$ is determined by the board design. $R_{\theta JA} = 415^\circ C/W$ on minimum pad mounting on FR-4 board in still air
- 2: A suffix as "...F085P" has been temporarily introduced in order to manage a double source strategy as Fairchild has officially announced in Aug 2014.
- 3: Pulse Test: Pulse Width < 300 μs , Duty Cycle < 2.0%.

FDG6301N_F085 Dual N-Channel Digital FET

Electrical Characteristics $T_A = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
--------	-----------	-----------------	-----	-----	-----	-------

Off Characteristics

$B_{V_{DSS}}$	Drain to Source Breakdown Voltage	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	25	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 20\text{V},$ $V_{GS} = 0\text{V}$	-	-	1	μA
		$T_J = 55^\circ\text{C}$	-	-	10	
I_{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm 8\text{V}$	-	-	± 100	nA

On Characteristics

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	0.65	0.85	1.5	V
$r_{DS(on)}$	Drain to Source On Resistance	$I_D = 0.22\text{A}, V_{GS} = 4.5\text{V}$	-	2.6	4	Ω
		$I_D = 0.19\text{A}, V_{GS} = 2.7\text{V}$	-	3.7	5	
		$I_D = 0.22\text{A}, V_{GS} = 4.5\text{V}$ $T_J = 125^\circ\text{C}$	-	5.3	7	
$I_{D(on)}$	On-State Drain Current	$V_{GS} = 4.5\text{V}, V_{DS} = 5\text{V}$	0.22	-	-	
g_{FS}	Forward Transconductance	$I_D = 0.22\text{A}, V_{DS} = 5\text{V}$	-	0.2	-	S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V},$ $f = 1\text{MHz}$	-	9.5	-	pF
C_{oss}	Output Capacitance		-	6	-	pF
C_{rss}	Reverse Transfer Capacitance		-	1.3	-	pF
$Q_{g(TOT)}$	Total Gate Charge at -4.5V	$V_{GS} = 0$ to 4.5V	-	0.29	0.4	nC
Q_{gs}	Gate to Source Gate Charge	$V_{DD} = 5\text{V}$ $I_D = 0.22\text{A}$	-	0.12	-	nC
Q_{gd}	Gate to Drain "Miller" Charge		-	0.03	-	nC

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 5\text{V}, I_D = 0.5\text{A}$ $V_{GS} = 4.5\text{V}, R_{GEN} = 50\Omega$	-	5	10	ns
t_r	Rise Time		-	4.5	10	ns
$t_{d(off)}$	Turn-Off Delay Time		-	4	8	ns
t_f	Fall Time		-	3.2	7	ns

Drain-Source Diode Characteristics

I_S	Maximum Continuous Source Current	-	-	0.25	A	
V_{SD}	Source to Drain Diode Voltage	$I_{SD} = 0.25\text{A}, V_{GS} = 0\text{V}$	-	0.8	1.2	V

Typical Characteristics

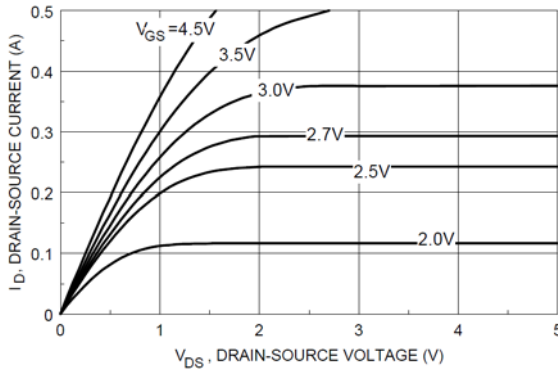


Figure 1. On-Region Characteristics.

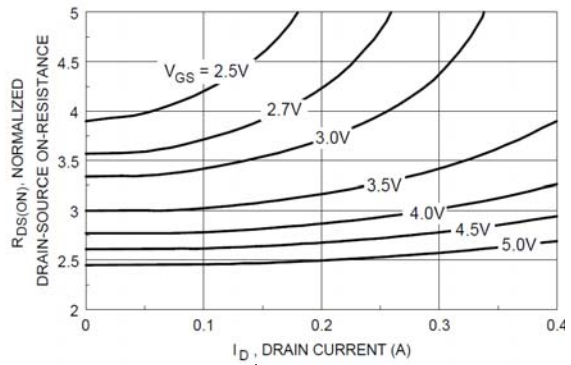


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

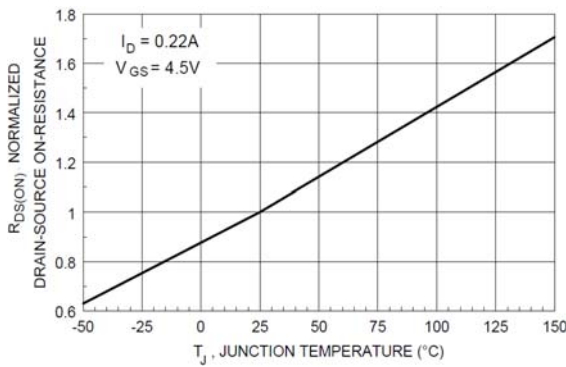


Figure 3. On-Resistance Variation with Temperature.

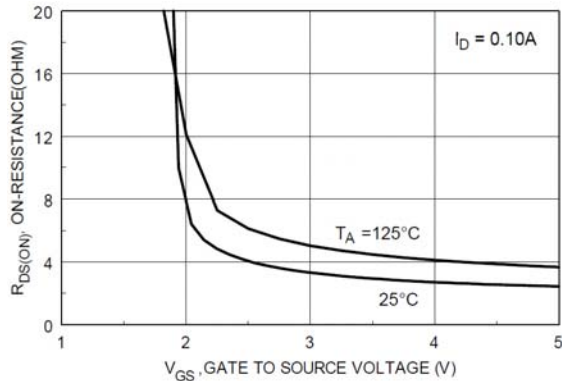


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

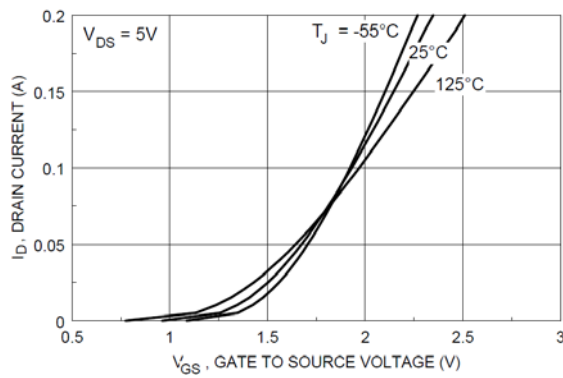


Figure 5. Transfer Characteristics.

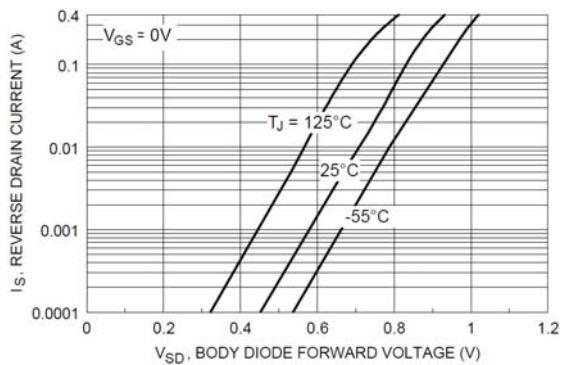


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

Typical Characteristics

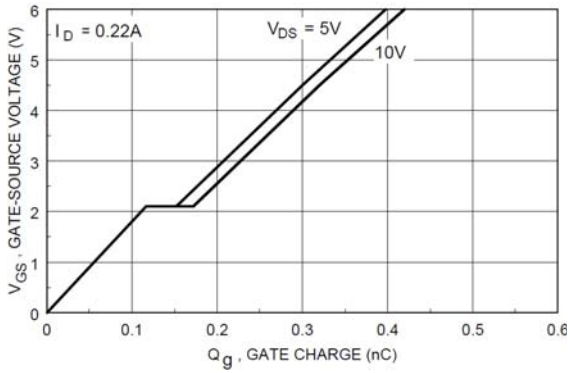


Figure 7. Gate Charge Characteristics.

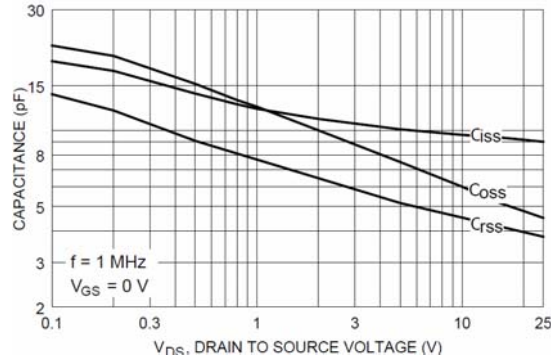


Figure 8. Capacitance Characteristics.

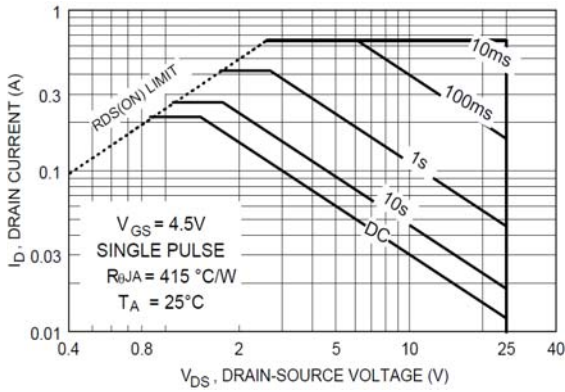


Figure 9. Maximum Safe Operating Area.

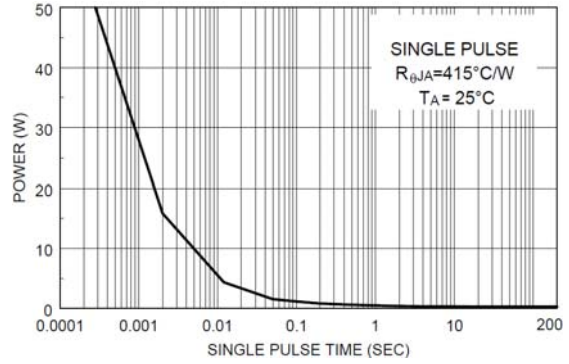


Figure 10. Single Pulse Maximum Power Dissipation.

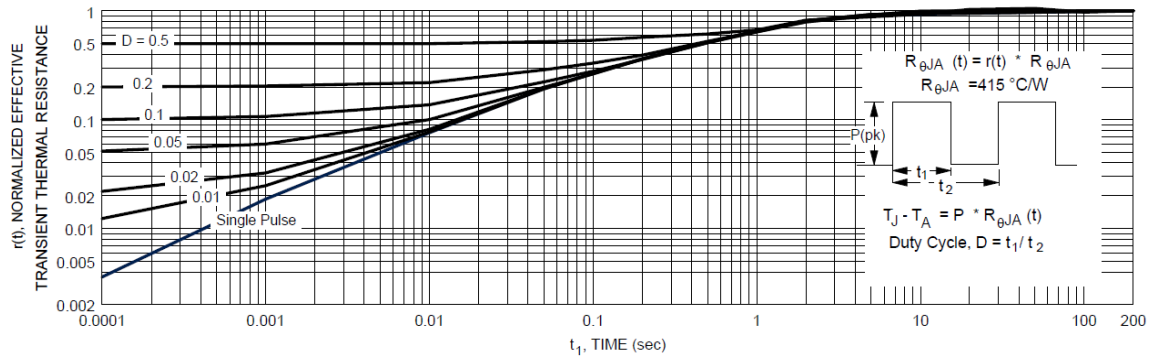
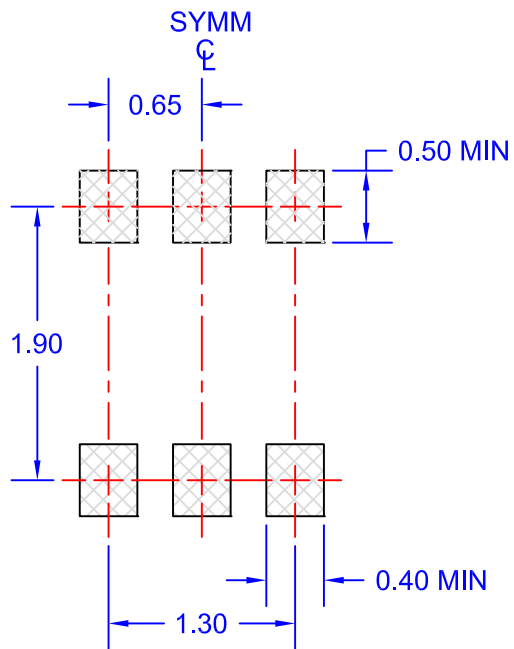
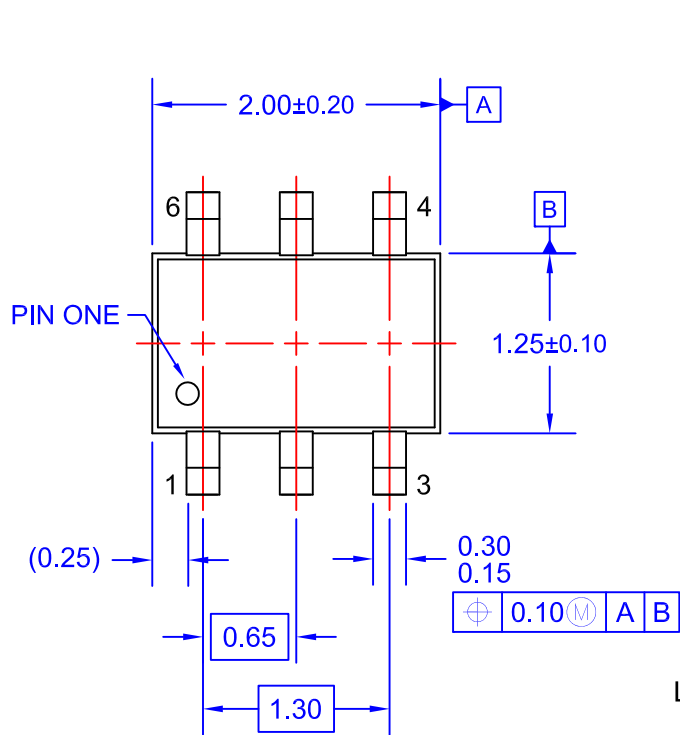
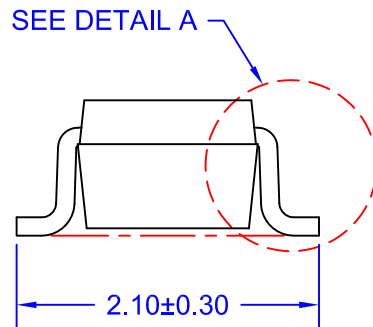
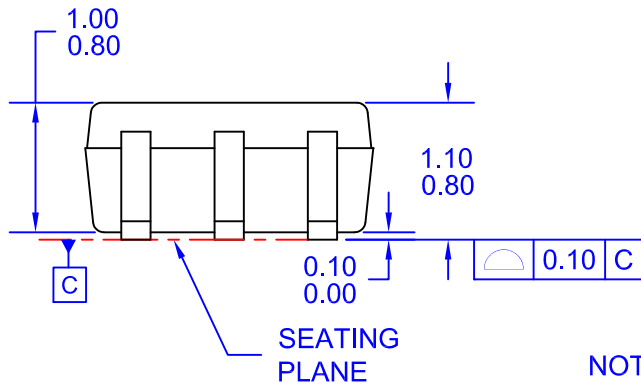


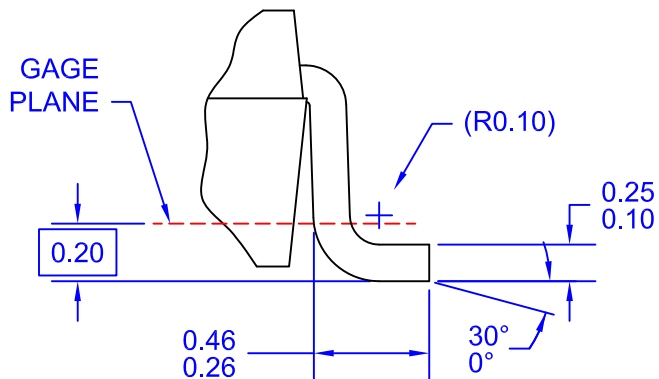
Figure 11. Transient Thermal Response Curve.



LAND PATTERN RECOMMENDATION



- NOTES: UNLESS OTHERWISE SPECIFIED
- A) THIS PACKAGE CONFORMS TO EIAJ SC-88, 1996.
 - B) ALL DIMENSIONS ARE IN MILLIMETERS.
 - C) DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH.
 - D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-2009
 - E) DRAWING FILENAME: MKT-MAA06AREV7



DETAIL A
SCALE: 60X



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. 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

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
Order Literature: <http://www.onsemi.com/orderlit>
For additional information, please contact your local
Sales Representative