FAIRCHILD™

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.

March 2016

FDB0260N1007L

N-Channel PowerTrench® MOSFET

100 V, 200 A, 2.6 mΩ

Features

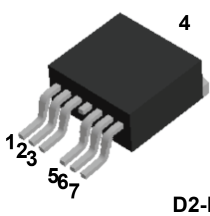
- Max $r_{DS(on)}$ = 2.6 mΩ at V_{GS} = 10 V, I_D = 27 A
- Fast Switching Speed
- Low Gate Charge
- High Performance Trench Technology for Extremely Low $R_{DS(on)}$
- High Power and Current Handling Capability
- RoHS Compliant

General Description

This N-Channel MOSFET is produced using Fairchild Semiconductor's advance PowerTrench® process that has been especially tailored to minimize the on-state resistance while maintaining superior ruggedness and switching performance for industrial applications.

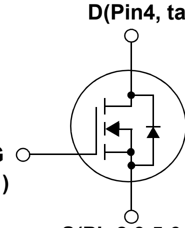
Applications

- Industrial Motor Drive
- Industrial Power Supply
- Industrial Automation
- Battery Operated tools
- Battery Protection
- Solar Inverters
- UPS and Energy Inverters
- Energy Storage
- Load Switch



1. Gate
2. Source/Kelvin Sense
3. Source/Kelvin Sense
4. Drain
5. Source
6. Source
7. Source

D2-PAK (TO263)



MOSFET Maximum Ratings T_C = 25 °C unless otherwise noted.

Symbol	Parameter	Ratings	Units
V_{DS}	Drain to Source Voltage	100	V
V_{GS}	Gate to Source Voltage	±20	V
I_D	Drain Current -Continuous T_C = 25°C (Note 5)	200	A
	-Continuous T_C = 100°C (Note 5)	140	
	-Pulsed (Note 4)	1100	
E_{AS}	Single Pulse Avalanche Energy (Note 3)	912	mJ
P_D	Power Dissipation T_C = 25°C	250	W
	Power Dissipation T_A = 25°C (Note 1a)	3.8	
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +175	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction to Case (Note 1)	0.6	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	40	

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDB0260N1007L	FDB0260N1007L	D2-PAK-7L	330 mm	24 mm	800 units

Electrical Characteristics T_J = 25 °C unless otherwise noted.

Off Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain to Source Breakdown Voltage	I_D = 250 μA, V_{GS} = 0 V	100			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, referenced to 25 °C		53		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 80 V, V_{GS} = 0 V			1	μA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±20 V, V_{DS} = 0 V			±100	nA

On Characteristics (Note 2)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}$, I_D = 250 μA	2	2.8	4	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = 250 μA, referenced to 25 °C		-13		mV/°C
$r_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D = 27 A		2.3	2.6	mΩ
		V_{GS} = 10 V, I_D = 27 A, T_J= 150°C		4.5	6.6	
g_{FS}	Forward Transconductance	V_{DS} = 10 V, I_D = 27 A		59		S

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
C_{iss}	Input Capacitance	V_{DS} = 50 V, V_{GS} = 0 V, f = 1 MHz		6101	8545	pF
C_{oss}	Output Capacitance			1343	1885	pF
C_{rss}	Reverse Transfer Capacitance			46	65	pF
R_g	Gate Resistance			2.7		Ω

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 50 V, I_D = 27 A, V_{GS} = 10 V, R_{GEN} = 6 Ω		30	48	ns
t_r	Rise Time			29	46	ns
$t_{d(off)}$	Turn-Off Delay Time			51	81	ns
t_f	Fall Time			19	34	ns
Q_g	Total Gate Charge	V_{DD} = 50 V, I_D = 27 A, V_{GS} = 10 V		84	118	nC
Q_{gs}	Gate to Source Gate Charge			25		nC
Q_{gd}	Gate to Drain "Miller" Charge			17		nC

Drain-Source Diode Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_S	Maximum Continuous Drain to Source Diode Forward Current				200	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current				1100	A
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0 V, I_S = 27 A (Note 2)		0.8	1.2	V
t_{rr}	Reverse Recovery Time	I_F = 27 A, di/dt = 100 A/μs		75	120	ns
Q_{rr}	Reverse Recovery Charge			97	155	nC

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 $R_{\theta CA}$ is determined by the user's board design.

   a) 40 °C/W when mounted on a 1 in^2 pad of 2 oz copper.
   b) 62.5 °C/W when mounted on a minimum pad of 2 oz copper.

2. Pulse Test: Pulse Width < 300 μs, Duty cycle < 2.0 %.
3. E_{AS} of 912 is based on starting T_J = 25 °C, L = 0.3 mH, I_{AS} = 78 A, V_{DD} = 10 V, V_{GS} = 90 V. 100% test at L = 0.1 mH, I_{AS} = 113 A.
4. Pulsed Id please refer to Figure "Forward Bias Safe Operating Area" for more details.
5. Computed continuous current limited to Max Junction Temperature only, actual continuous current will be limited by thermal & electro-mechanical application board design.

Typical Characteristics T_J = 25 °C unless otherwise noted.

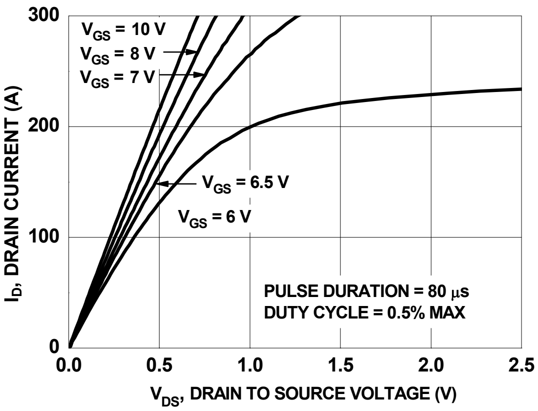


Figure 1. On Region Characteristics

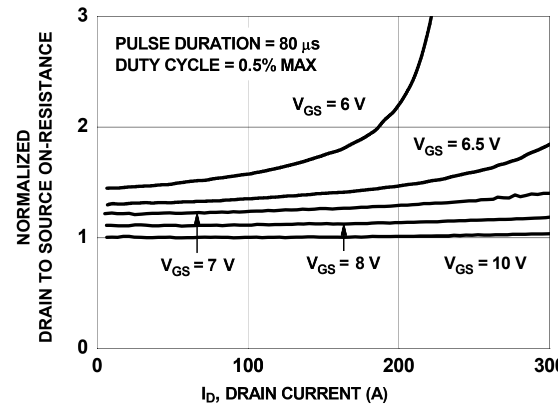


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

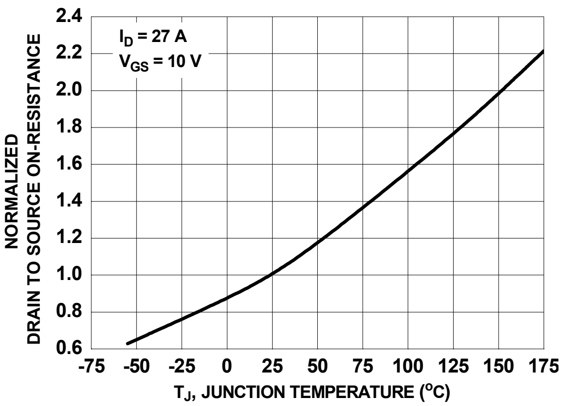


Figure 3. Normalized On Resistance vs. Junction Temperature

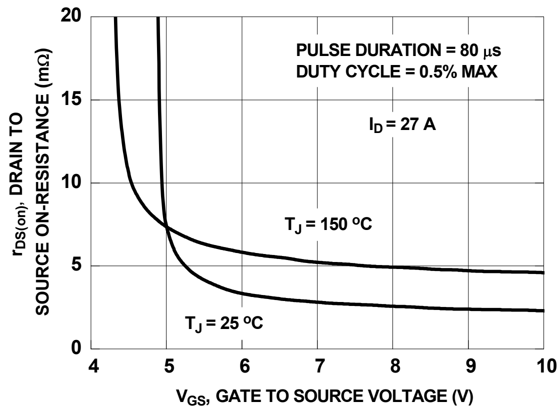


Figure 4. On-Resistance vs. Gate to Source Voltage

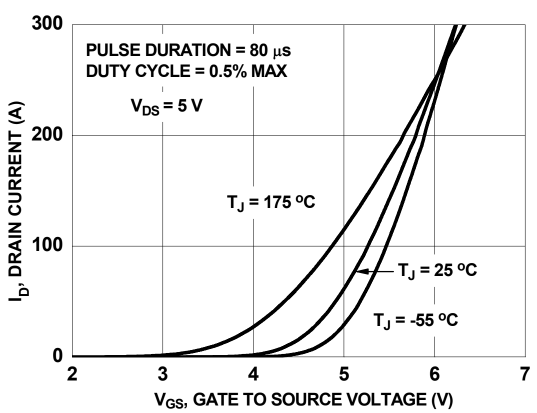


Figure 5. Transfer Characteristics

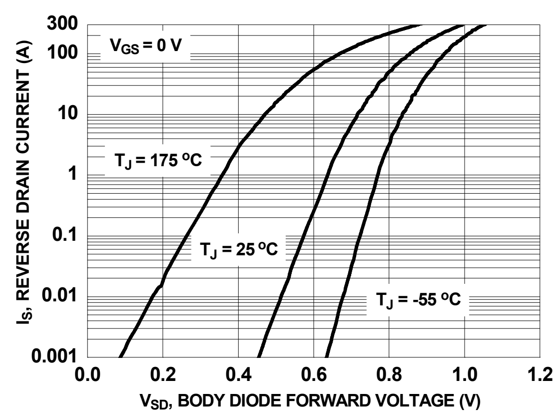


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

Typical Characteristics T_J = 25 °C unless otherwise noted.

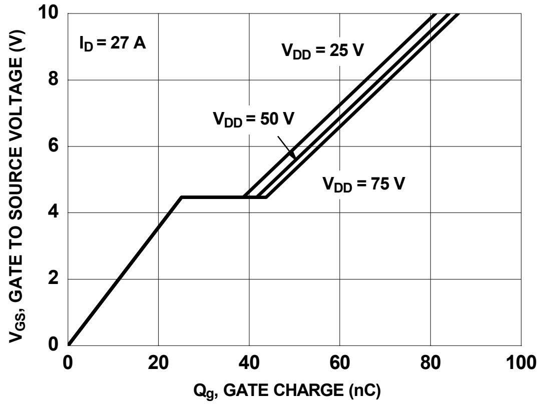


Figure 7. Gate Charge Characteristics

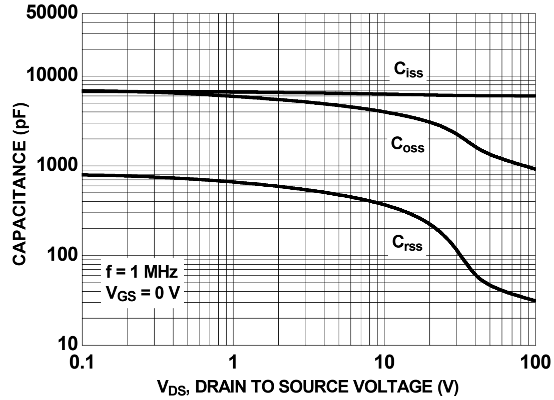


Figure 8. Capacitance vs. Drain to Source Voltage

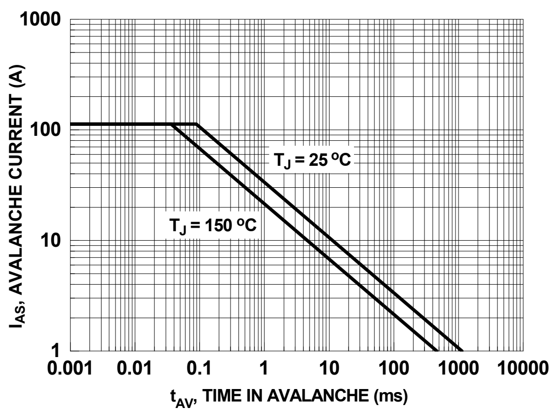


Figure 9. Unclamped Inductive Switching Capability

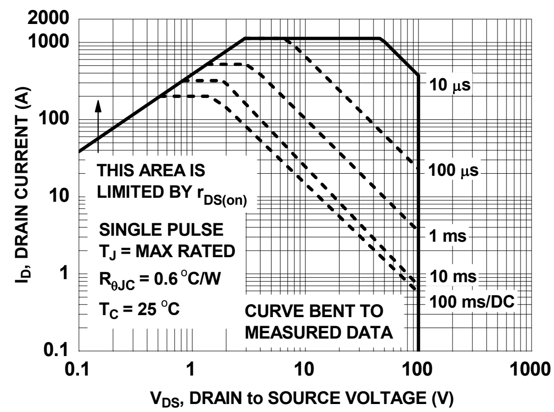


Figure 10. Forward Bias Safe Operating Area

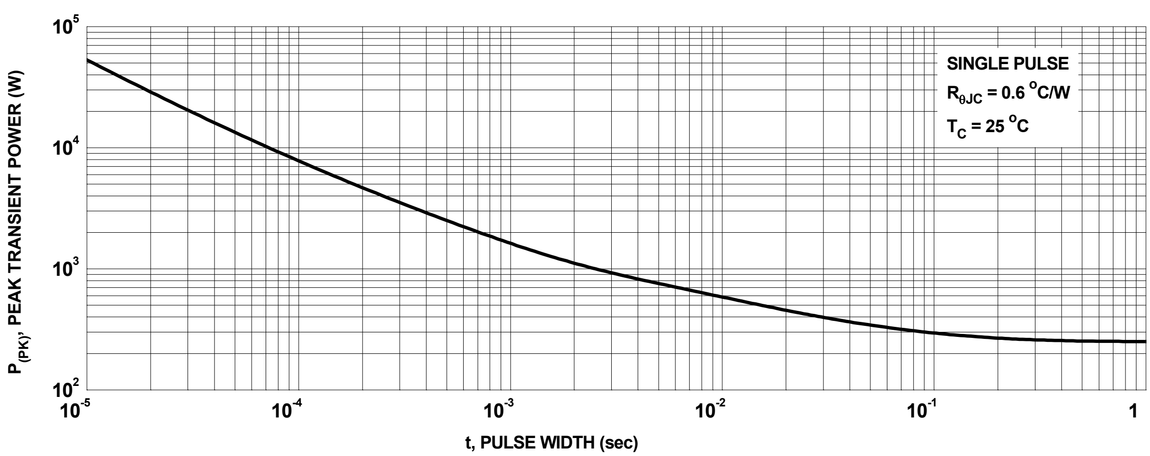


Figure 11. Single Pulse Maximum Power Dissipation

Typical Characteristics T_J = 25 °C unless otherwise noted.

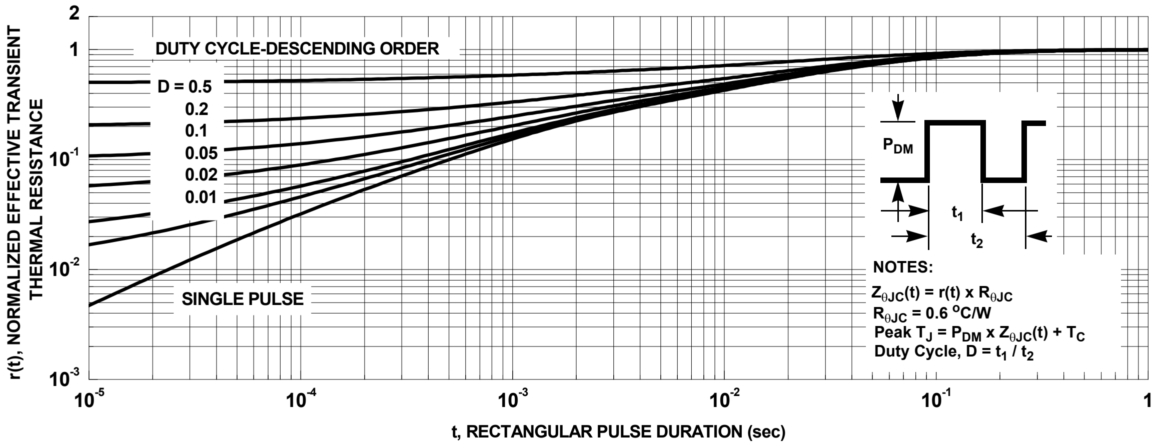
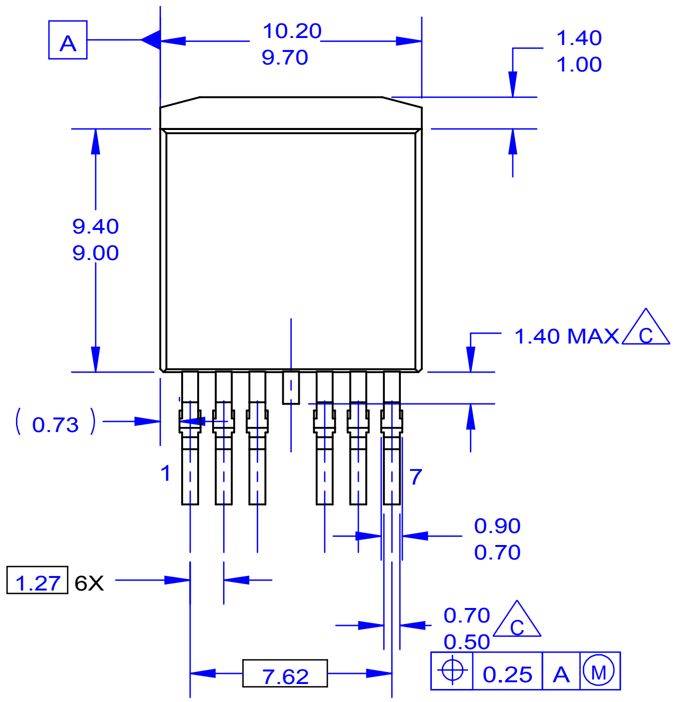
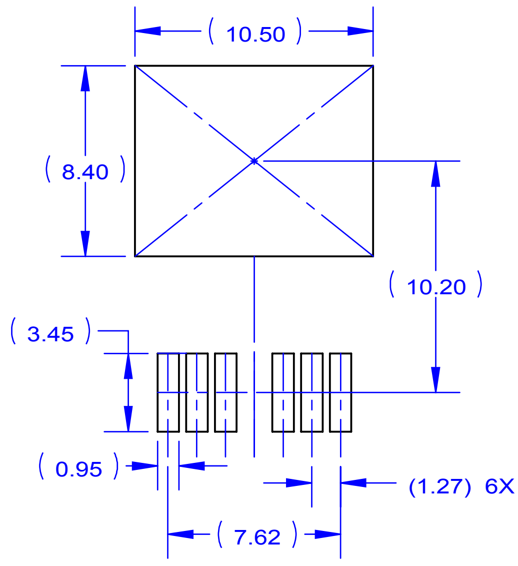
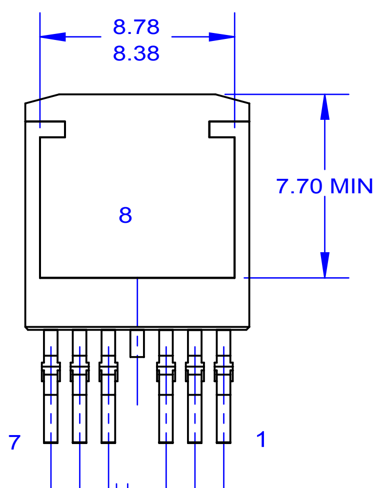


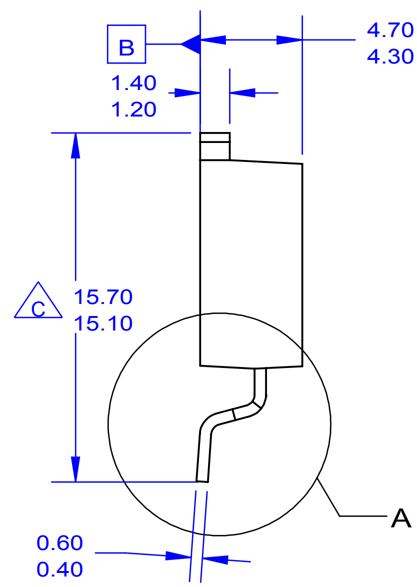
Figure 12. Junction-to-Case Transient Thermal Response Curve

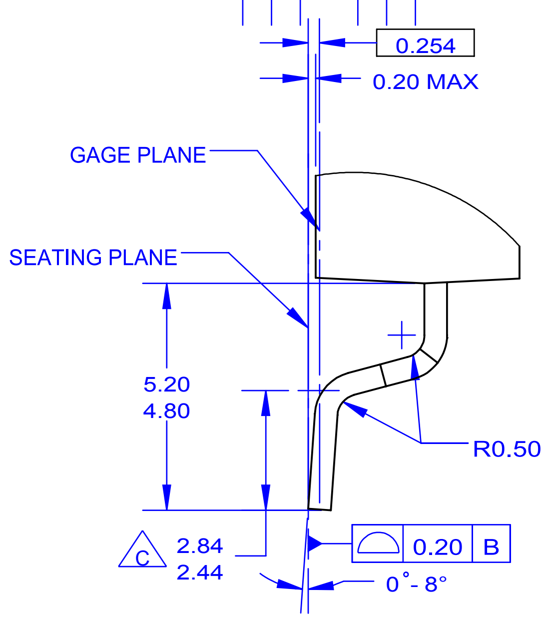




LAND PATTERN RECOMMENDATION







DETAIL A
SCALE 2:1

NOTES:

A. PACKAGE CONFORMS TO JEDEC TO-263 VARIATION CB EXCEPT WHERE NOTED.
B. ALL DIMENSIONS ARE IN MILLIMETERS.
C. OUT OF JEDEC STANDARD VALUE.
D. DIMENSION AND TOLERANCE AS PER ASME Y14.5-1994.
E. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
F. LAND PATTERN RECOMMENDATION PER IPC. TO127P1524X465-8N.
G. DRAWING FILE NAME: TO263A07REV5.

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