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March 2016

FDB0260N1007L

N-Channel PowerTrench® MOSFET **100 V, 200 A, 2.6 m**Ω

Features

- Max $r_{DS(on)}$ = 2.6 m Ω at V_{GS} = 10 V, I_D = 27 A
- Fast Switching Speed
- Low Gate Charge
- High Performance Trench Technology for Extremely Low
- 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

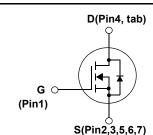


1. Gate

4. Drain 5. Source 6. Source 7. Source



2. Source/Kelvin Sense 3. Source/Kelvin Sense



D2-PAK (TO263)

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

Symbol	Paramet	ter		Ratings	Units
V_{DS}	Drain to Source Voltage			100	V
V_{GS}	Gate to Source Voltage			±20	V
	Drain Current -Continuous	T _C = 25°C	(Note 5)	200	
I_D	-Continuous	T _C = 100°C	(Note 5)	140	Α
	-Pulsed		(Note 4)	1100	
E _{AS}	Single Pulse Avalanche Energy		(Note 3)	912	mJ
В	Power Dissipation	T _C = 25°C		250	w
P_{D}	Power Dissipation	T _A = 25°C	(Note 1a)	3.8	VV
T _J , T _{STG}	Operating and Storage Junction Temperate	ure 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	C/VV

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.

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Units
Off Chara	acteristics					
BV _{DSS}	Drain to Source Breakdown Voltage	$I_D = 250 \mu A, V_{GS} = 0 V$	100			V
$\frac{\Delta BV_{DSS}}{\Delta T_{J}}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μ A, referenced to 25 °C		53		mV/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 80 V, V _{GS} = 0 V			1	μΑ
I _{GSS}	Gate to Source Leakage Current	V _{GS} = ±20 V, V _{DS} = 0 V			±100	nA

On Characteristics (Note 2)

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250 \mu A$	2	2.8	4	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = 250 μ A, referenced to 25 °C		-13		mV/°C
r	Static Drain to Source On Resistance	$V_{GS} = 10 \text{ V}, I_D = 27 \text{ A}$		2.3	2.6	mΩ
r _{DS(on)}	Static Drain to Source On Resistance	$V_{GS} = 10 \text{ V}, I_D = 27 \text{ A}, T_J = 150^{\circ}\text{C}$		4.5	6.6	1115.2
9 _{FS}	Forward Transconductance	V _{DS} = 10 V, I _D = 27 A		59		S

Dynamic Characteristics

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

t _{d(on)}	Turn-On Delay Time		30	48	ns
t _r	Rise Time	V _{DD} = 50 V, I _D = 27 A,	29	46	ns
t _{d(off)}	Turn-Off Delay Time	$V_{GS} = 10 \text{ V}, R_{GEN} = 6 \Omega$	51	81	ns
t _f	Fall Time		19	34	ns
Qg	Total Gate Charge	V 50 V I 07 A	84	118	nC
Q _{gs}	Gate to Source Gate Charge	$V_{DD} = 50 \text{ V, } I_{D} = 27 \text{ A,}$ $V_{GS} = 10 \text{ V}$	25		nC
Q _{gd}	Gate to Drain "Miller" Charge	VGS - 10 V	17		nC

Drain-Source Diode Characteristics

I _S	Maximum Continuous Drain to Source Diode Forward Current				200	Α
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current				1100	Α
V_{SD}	Source to Drain Diode Forward Voltage	$V_{GS} = 0 \text{ V}, I_S = 27 \text{ A}$ (Note 2)		0.8	1.2	V
t _{rr}	Reverse Recovery Time	L = 27 A di/dt = 100 A/us		75	120	ns
Q _{rr}	Reverse Recovery Charge	I _F = 27 A, di/dt = 100 A/μs		97	155	nC

Notes:

^{1.} R_{0,1A} 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_{0,1C} is guaranteed by design while R_{0,1C} is determined by the user's board design.

a) 40 °C/W when mounted on a 1 in² 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 $\mu s,$ Duty cycle < 2.0 %.

^{3.} E_{AS} of 912 is based on starting T_J = 25 $^{\circ}$ 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 $T_J = 25 \, ^{\circ}\text{C}$ unless otherwise noted.

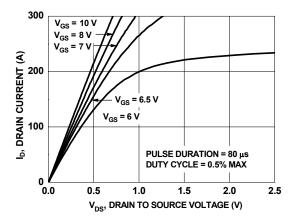


Figure 1. On Region Characteristics

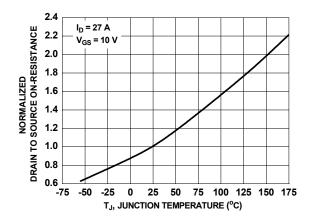


Figure 3. Normalized On Resistance vs. Junction Temperature

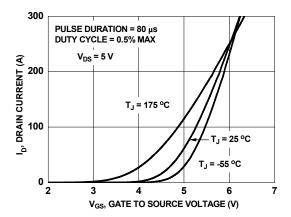


Figure 5. Transfer Characteristics

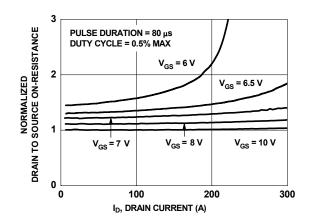


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

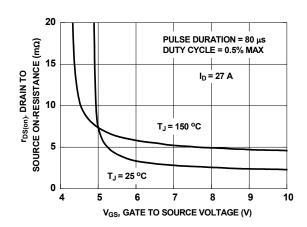


Figure 4. On-Resistance vs. Gate to Source Voltage

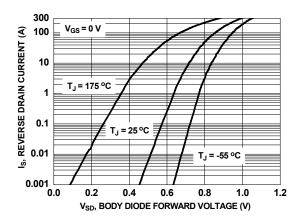


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

Typical Characteristics $T_J = 25$ °C unless otherwise noted.

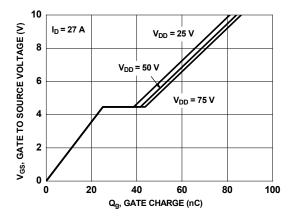


Figure 7. Gate Charge Characteristics

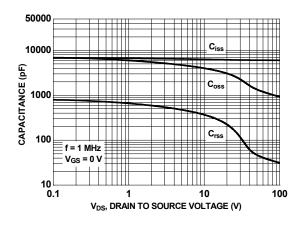


Figure 8. Capacitance vs. Drain to Source Voltage

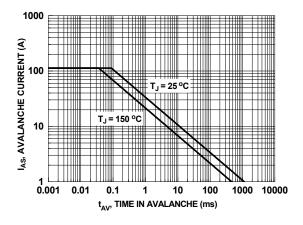


Figure 9. Unclamped Inductive Switching Capability

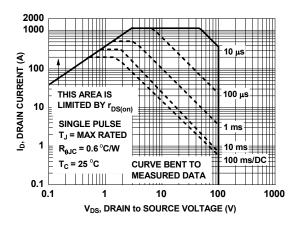


Figure 10. Forward Bias Safe Operating Area

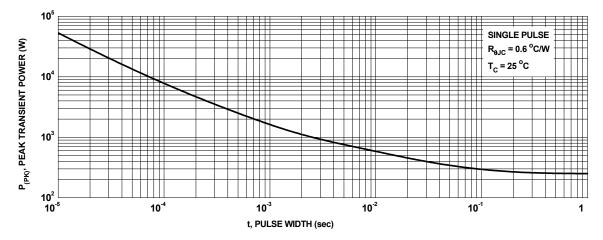


Figure 11. Single Pulse Maximum Power Dissipation

Typical Characteristics $T_J = 25$ °C unless otherwise noted.

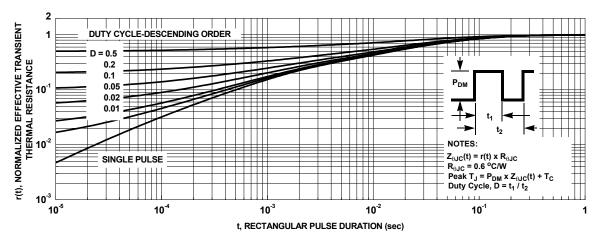
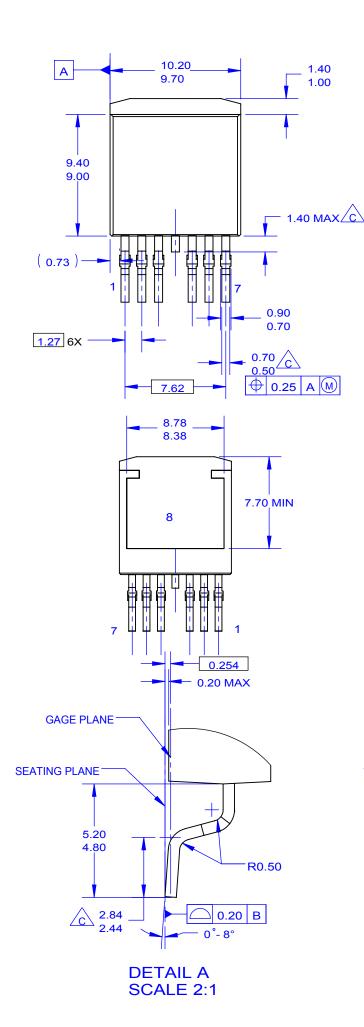
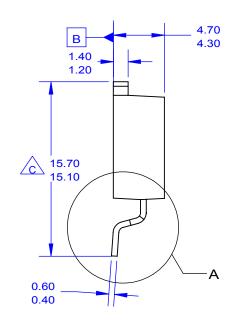


Figure 12. Junction-to-Case Transient Thermal Response Curve



(10.50) (8.40) (10,20) (3.45)(0.95) (1.27) 6X (7.62)

LAND PATTERN RECOMMENDATION



NOTES:

- A. PACKAGE CONFORMS TO JEDEC TO-263 VARIATION CB EXCEPT WHERE NOTED. B. ALL DIMENSIONS ARE IN MILLIMETERS.
- 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.

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