FAIRCHILD
SEMICONDUCTOR®

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FDS8817NZ

## N-Channel PowerTrench® MOSFET
30V, 15A, 7.0mΩ

Features

- Max $r_{DS(on)} = 7m\Omega$ at $V_{GS} = 10V$, $I_D = 15A$
- Max $r_{DS(on)} = 10m\Omega$ at $V_{GS} = 4.5V$, $I_D = 12.6A$
- HBM ESD protection level of 3.8KV typical (note 3)
- 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 advanced PowerTrench® process that has been especially tailored to minimize the on-state resistance.

This device is well suited for Power Management and load switching applications common in Notebook Computers and Portable Battery Packs.

SO-8

Pin 1
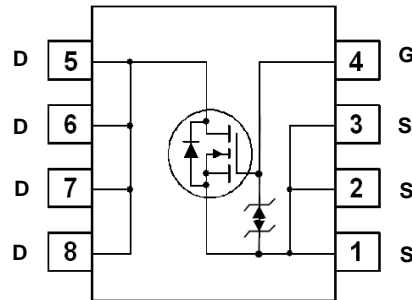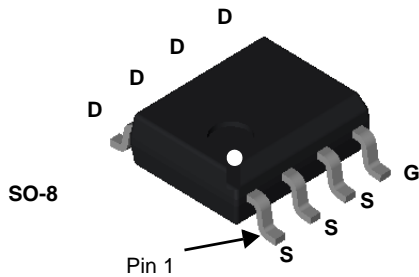
MOSFET Maximum Ratings $T_A = 25°C$ unless otherwise noted

Symbol	Parameter		Ratings	Units
V_{DS}	Drain to Source Voltage		30	V
V_{GS}	Gate to Source Voltage		±20	V
I_D	Drain Current -Continuous	(Note 1a)	15	A
	-Pulsed		60	
E_{AS}	Single Pulse Avalanche Energy	(Note 4)	181	mJ
P_D	Power Dissipation	(Note 1a)	2.5	W
	Power Dissipation	(Note 1b)	1.0	
T_J, T_{STG}	Operating and Storage Junction Temperature Range		-55 to +150	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction to Case	(Note 1)	25	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1a)	50	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1b)	125	

Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape Width	Quantity
FDS8817NZ	FDS8817NZ	13"	12mm	2500 units

Electrical Characteristics T_J = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	$I_D = 250\mu A$, $V_{GS} = 0V$	30			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\mu A$, referenced to 25°C		20		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 24V$, $V_{GS} = 0V$			1	μA
I_{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm20V$, $V_{DS} = 0V$			±10	μA
On Characteristics (Note 2)						
$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}$, $I_D = 250\mu A$	1	1.8	3	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	$I_D = 250\mu A$, referenced to 25°C		−6		mV/°C
$r_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 10V$, $I_D = 15A$		5.4	7	mΩ
		$V_{GS} = 4.5V$, $I_D = 12.6A$		7.0	10	
		$V_{GS} = 10V$, $I_D = 15A$ $T_J = 125°C$		7.5	11	
g_{FS}	Forward Transconductance	$V_{DS} = 5V$, $I_D = 15A$		54		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS} = 15V$, $V_{GS} = 0V$, f = 1MHz		1805	2400	pF
C_{oss}	Output Capacitance			335	445	pF
C_{rss}	Reverse Transfer Capacitance			200	300	pF
R_g	Gate Resistance	f = 1MHz		1.4		Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 15V$, $I_D = 15A$ $V_{GS} = 10V$, $R_{GEN} = 6\Omega$		11	22	ns
t_r	Rise Time			13	26	ns
$t_{d(off)}$	Turn-Off Delay Time			25	40	ns
t_f	Fall Time			7	14	ns
Q_g	Total Gate Charge	$V_{GS} = 0V$ to 10V $\quad$ $V_{DD} = 15V$ $I_D = 15A$		32	45	nC
Q_g	Total Gate Charge	$V_{GS} = 0V$ to 5V		17	24	nC
Q_{gs}	Gate to Source Charge			6		nC
Q_{gd}	Gate to Drain "Miller" Charge			7		nC
Drain-Source Diode Characteristics						
V_{SD}	Source to Drain Diode Forward Voltage	$V_{GS} = 0V$, $I_S = 2.1A$ (Note 2)		0.8	1.2	V
t_{rr}	Reverse Recovery Time	$I_F = 15A$, di/dt = 100A/μs		24	36	ns
Q_{rr}	Reverse Recovery Charge			15	23	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 $R_{\theta JA}$ is determined by the user's board design.

a) 50°C/W when mounted on a 1in^2 pad of 2 oz copper.

b) 125°C/W when mounted on a minimum pad .

2. Pulse Test: Pulse Width < 300 us, Duty Cycle < 2%.
3. The diode connected between the gate and source serves only as protection against ESD . No gate overvoltage rating is implied.
4. Starting $T_J = 25°C$, L = 3mH, $I_{AS} = 11A$, $V_{DD} = 30V$, $V_{GS} = 10V$.

Typical Characteristics T_J = 25°C unless otherwise noted
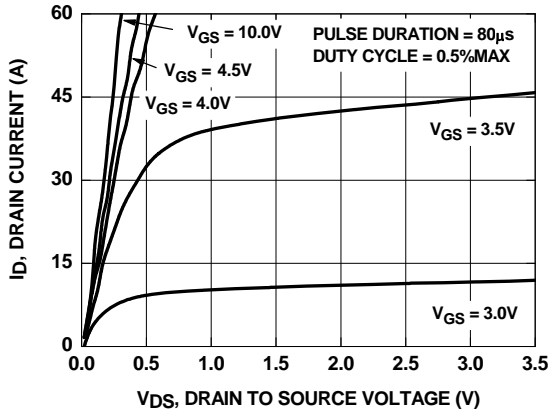

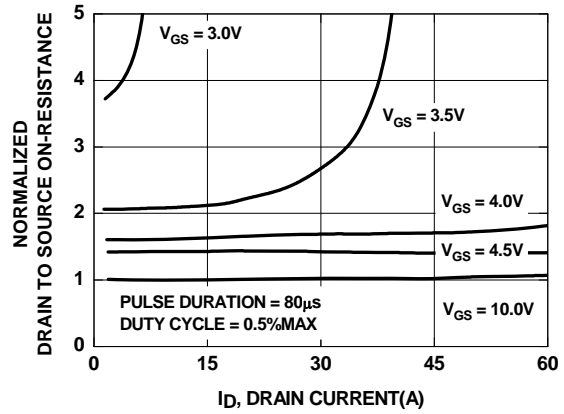**Figure 1. On-Region Characteristics**

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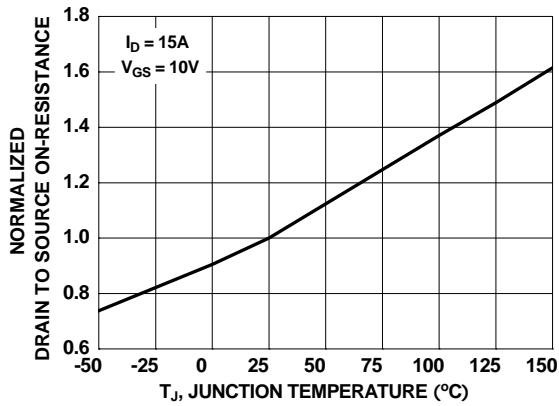

Figure 3. Normalized On-Resistance vs Junction Temperature
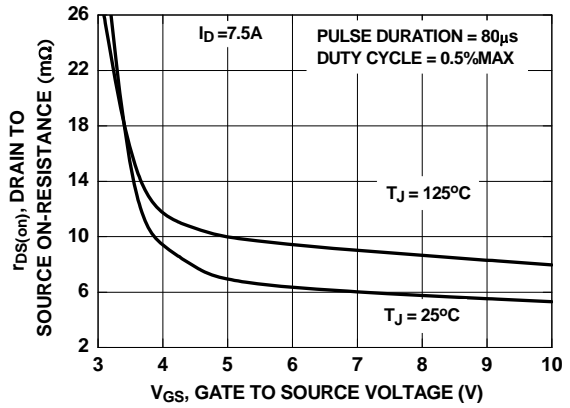

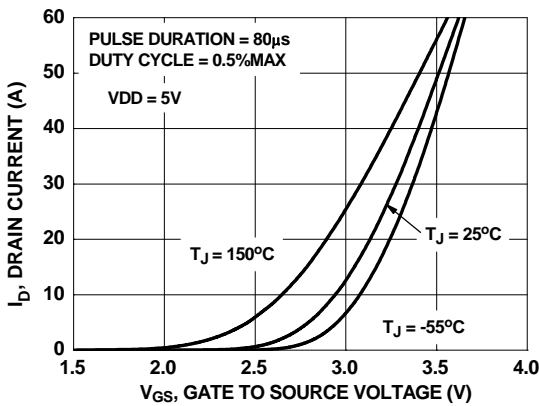
Figure 4. On-Resistance vs Gate to Source Voltage
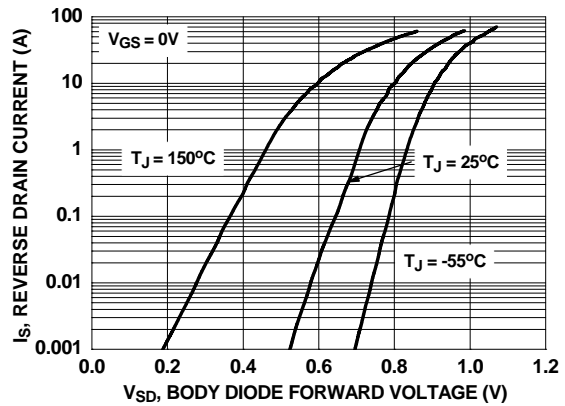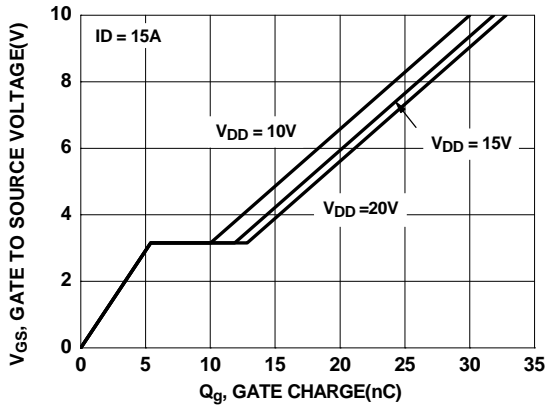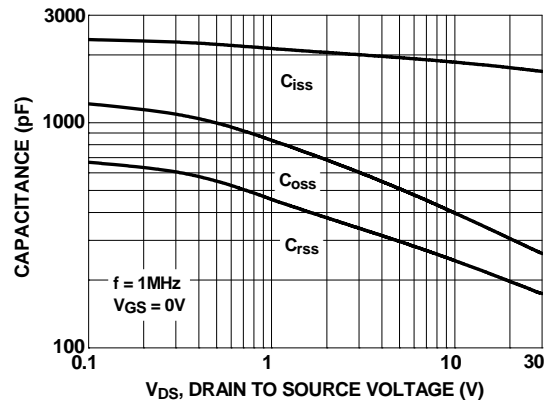

Figure 5. Transfer Characteristics
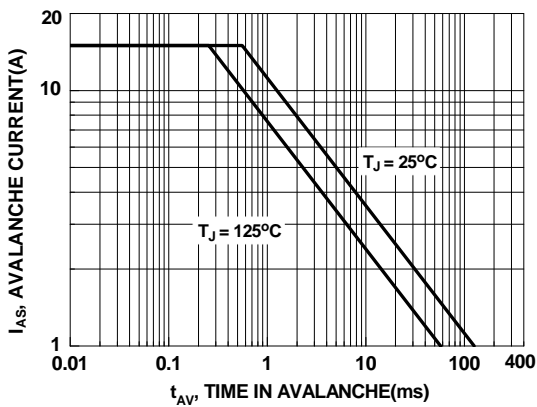

Figure 6. Source to Drain Diode Forward Voltage vs Source Current

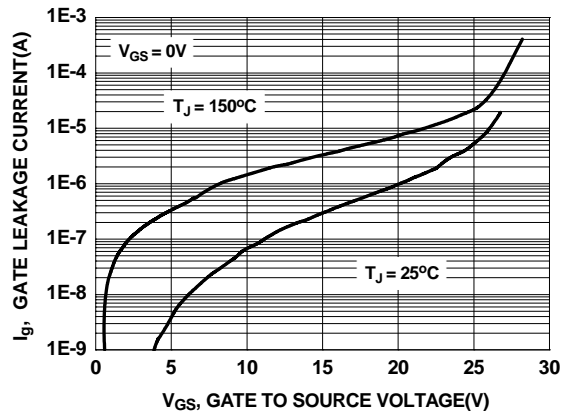## Typical Characteristics T_J = 25°C unless otherwise noted

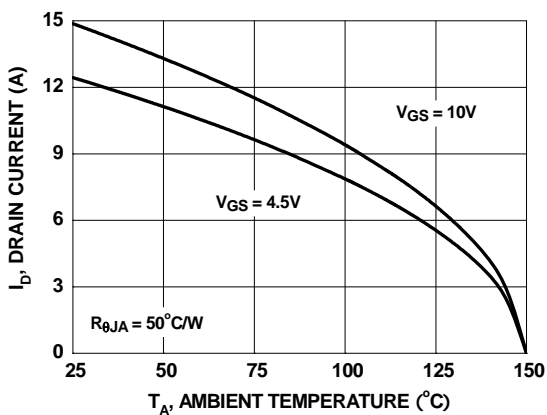**Figure 7. Gate Charge Characteristics**

Figure 8. Capacitance vs Drain to Source Voltage
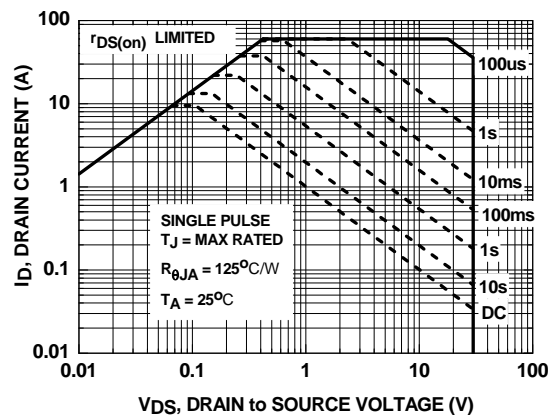

Figure 9. Unclamped Inductive Switching Capability

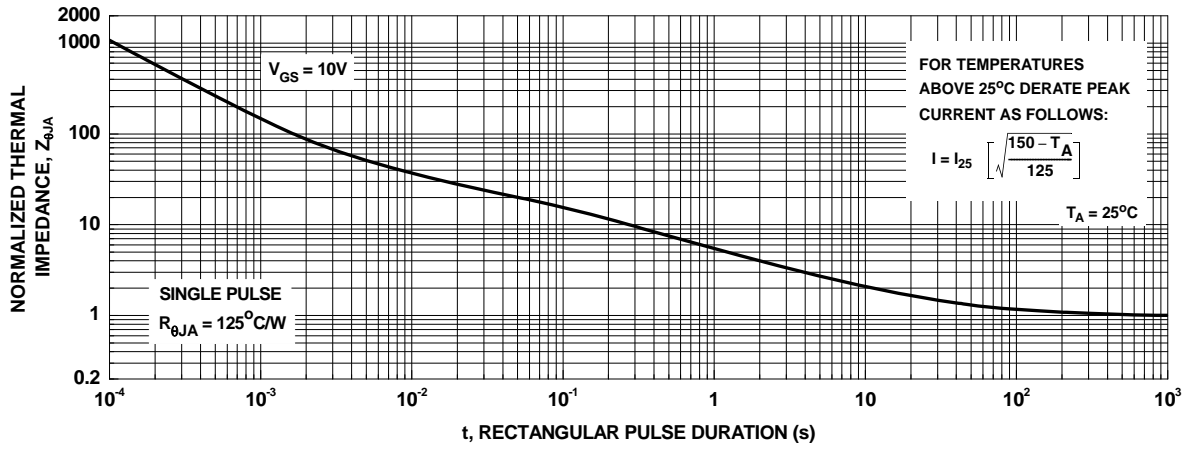**Figure 10. Gate Leakage Current vs Gate to Source Voltage**

Figure 11. Maximum Continuous Drain Current vs Ambient Temperature
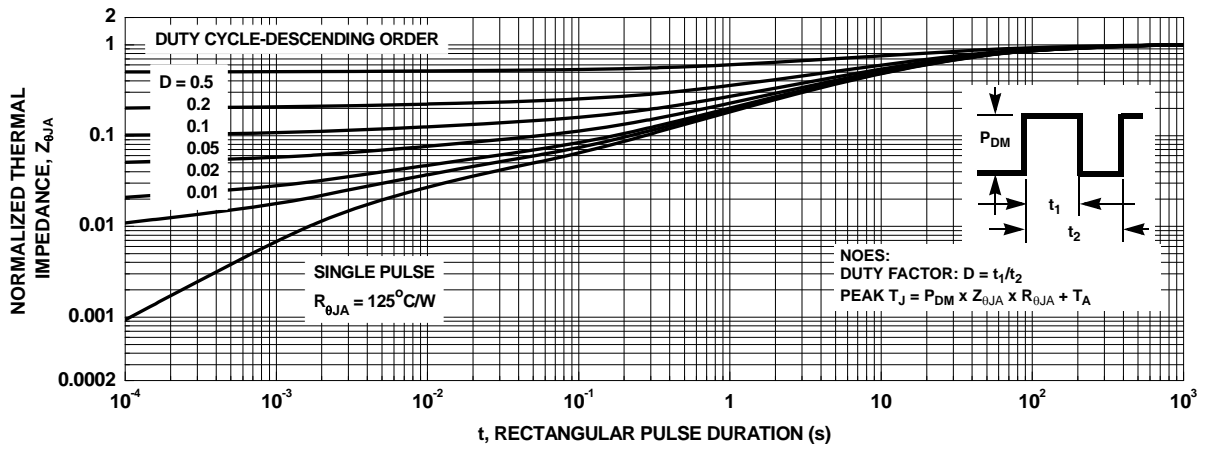

Figure 12. Forward Bias Safe Operating Area

Typical Characteristics T_J = 25°C unless otherwise noted

Figure 13. Single Pulse Maximum Power Dissipation

Figure 14. Transient Thermal Response Curve

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