

FDB082N15A

N-Channel PowerTrench[®] MOSFET

150 V, 117 A, 8.2 mΩ

Features

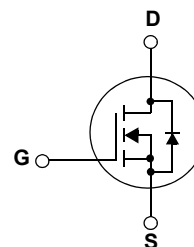
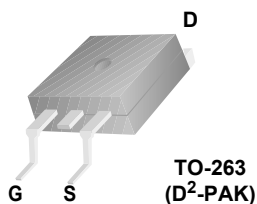
- $R_{DS(on)} = 6.7 \text{ m}\Omega$ (Typ.)@ $V_{GS} = 10 \text{ V}$, $I_D = 75 \text{ A}$
- Fast Switching Speed
- Low Gate Charge, $Q_G = 64.5 \text{ nC}$ (Typ.)
- High Performance Trench Technology for Extremely Low $R_{DS(on)}$
- High Power and Current Handling Capability
- RoHS Compliant

Description

This N-Channel MOSFET is produced using Fairchild Semiconductor[®]'s advanced PowerTrench[®] process that has been tailored to minimize the on-state resistance while maintaining superior switching performance.

Applications

- Synchronous Rectification for ATX / Server / Telecom PSU
- Battery Protection Circuit
- Motor Drives and Uninterruptible Power Supplies
- Micro Solar Inverter



MOSFET Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	FDB082N15A	Unit
V_{DSS}	Drain to Source Voltage	150	V
V_{GSS}	Gate to Source Voltage	± 20	V
I_D	Drain Current	-Continuous ($T_C = 25^\circ\text{C}$, Silicon Limited)	117
		-Continuous ($T_C = 100^\circ\text{C}$, Silicon Limited)	83
I_{DM}	Drain Current	- Pulsed (Note 1)	468
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	542
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	6
P_D	Power Dissipation	($T_C = 25^\circ\text{C}$)	294
		- Derate above 25°C	1.96
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +175	$^\circ\text{C}$
T_L	Maximum Lead Temperature for Soldering Purpose, 1/8" from Case for 5 Seconds	300	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	FDB082N15A	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	0.51	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max.	62.5	

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDB082N15A	FDB082N15A	D ² -PAK	330mm	24mm	800

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
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Off Characteristics

BV_{DSS}	Drain to Source Breakdown Voltage	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$, $T_C = 25^\circ\text{C}$	150	-	-	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\mu\text{A}$, Referenced to 25°C	-	0.08	-	$V/^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 120\text{V}$, $V_{GS} = 0\text{V}$ $V_{DS} = 120\text{V}$, $T_C = 150^\circ\text{C}$	-	-	1 500	μA
I_{GSS}	Gate to Body Leakage Current	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$	-	-	± 100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}$, $I_D = 250\mu\text{A}$	2.0	-	4.0	V
$R_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 10\text{V}$, $I_D = 75\text{A}$	-	6.7	8.20	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS} = 10\text{V}$, $I_D = 75\text{A}$	-	139	-	S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 25\text{V}$, $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$	-	4645	6040	pF
C_{oss}	Output Capacitance		-	1445	1880	pF
C_{rss}	Reverse Transfer Capacitance		-	100	-	pF
C_{iss}	Input Capacitance	$V_{DS} = 75\text{V}$, $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$	-	4570	6040	pF
C_{oss}	Output Capacitance		-	460	1880	pF
C_{rss}	Reverse Transfer Capacitance		-	20	-	pF
$Q_{g(tot)}$	Total Gate Charge at 10V	$V_{DS} = 120\text{V}$, $I_D = 75\text{A}$ $V_{GS} = 10\text{V}$	-	64.5	84	nC
Q_{gs}	Gate to Source Gate Charge		-	19.1	-	nC
Q_{gs2}	Gate Charge Threshold to Plateau		-	8.7	-	nC
Q_{gd}	Gate to Drain "Miller" Charge		(Note4)	-	13.5	-
ESR	Equivalent Series Resistance(G-S)	$f=1\text{MHz}$	-	2.5	-	Ω

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 75\text{V}$, $I_D = 75\text{A}$ $V_{GS} = 10\text{V}$, $R_{GEN} = 4.7\Omega$	-	22	54	ns
t_r	Turn-On Rise Time		-	58	126	ns
$t_{d(off)}$	Turn-Off Delay Time		-	61	132	ns
t_f	Turn-Off Fall Time		(Note4)	-	26	62

Drain-Source Diode Characteristics

I_S	Maximum Continuous Drain to Source Diode Forward Current	-	-	117	A	
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current	-	-	468	A	
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS} = 0\text{V}$, $I_{SD} = 75\text{A}$	-	-	1.25	V
t_{rr}	Reverse Recovery Time	$V_{GS} = 0\text{V}$, $I_{SD} = 75\text{A}$	-	96	-	ns
Q_{rr}	Reverse Recovery Charge	$di_F/dt = 100\text{A}/\mu\text{s}$	-	268	-	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Starting $T_J = 25^\circ\text{C}$, $L = 3\text{mH}$, $I_{SD} = 19\text{A}$
3. $I_{SD} \leq 75\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$
4. Essentially Independent of Operating Temperature Typical Characteristics

Typical Performance Characteristics

Figure 1. On-Region Characteristics

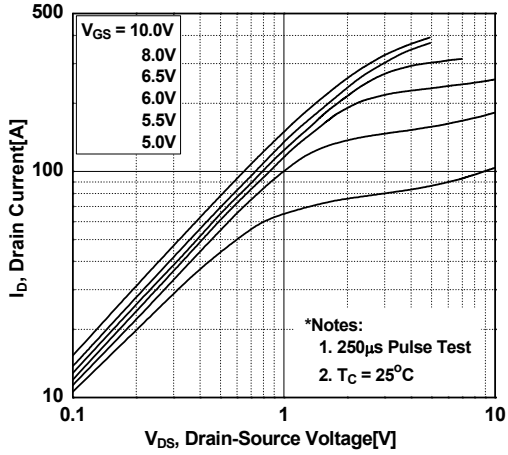


Figure 2. Transfer Characteristics

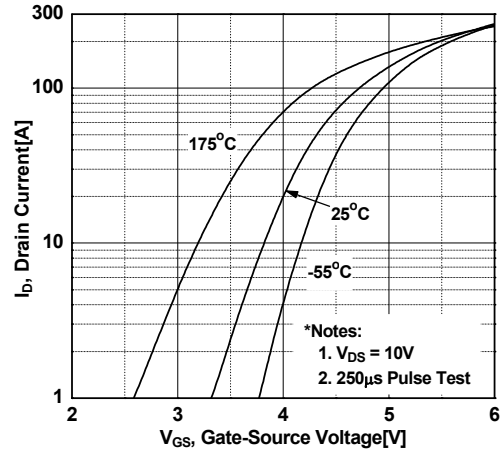


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

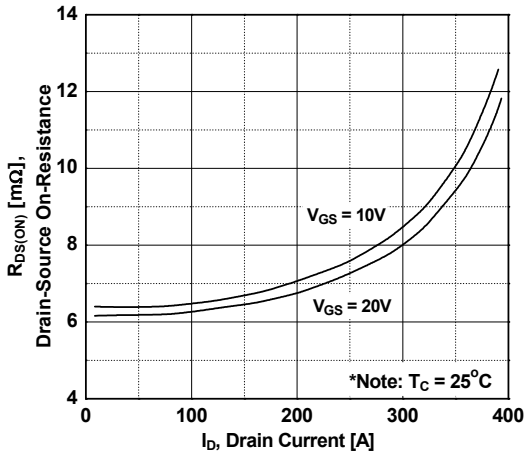


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

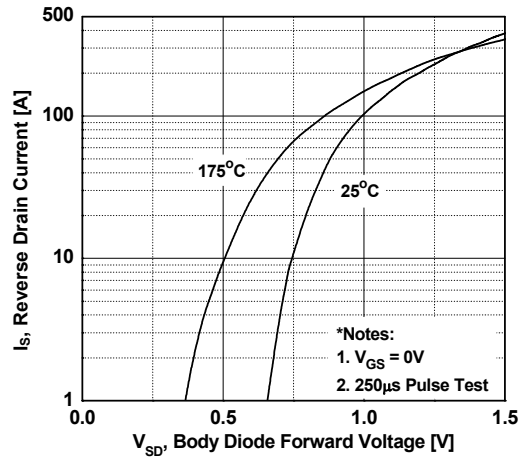


Figure 5. Capacitance Characteristics

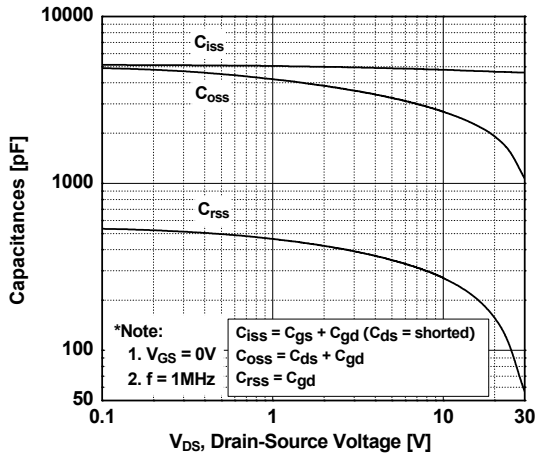


Figure 6. Gate Charge Characteristics

