

FDB082N15A

N-Channel PowerTrench® MOSFET

150 V, 117 A, 8.2 mΩ

Features

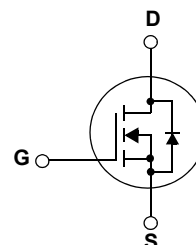
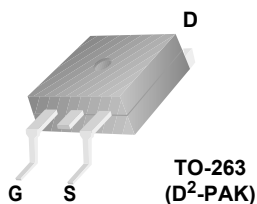
- $R_{DS(on)} = 6.7 \text{ m}\Omega$ (Typ.) @ $V_{GS} = 10 \text{ V}$, $I_D = 75 \text{ A}$
- Fast Switching Speed
- Low Gate Charge, $Q_G = 64.5 \text{ nC}$ (Typ.)
- High Performance Trench Technology for Extremely Low $R_{DS(on)}$
- High Power and Current Handling Capability
- RoHS Compliant

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)	A
		-Continuous ($T_C = 100^\circ\text{C}$, Silicon Limited)	
I_{DM}	Drain Current	- Pulsed (Note 1)	A
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	V/ns
P_D	Power Dissipation	($T_C = 25^\circ\text{C}$)	W
		- Derate above 25°C	W/ $^\circ\text{C}$
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
$\Delta BV_{DSS} / \Delta T_J$	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	m Ω
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	$V_{DS} = 120\text{V}$, $I_D = 75\text{A}$ $V_{GS} = 10\text{V}$ (Note4)	-	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		-	13.5	-	nC
ESR	Equivalent Series Resistance(G-S)	$f=1\text{MHz}$	-	2.5	-	Ω

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 75\text{V}$, $I_D = 75\text{A}$ $V_{GS} = 10\text{V}$, $R_{GEN} = 4.7\Omega$ (Note4)	-	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		-	26	62	ns

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} = 0V, I _{SD} = 75A	-	-	1.25	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0V, I _{SD} = 75A	-	96	-	ns
Q _{rr}	Reverse Recovery Charge	dI _F /dt = 100A/μs	-	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

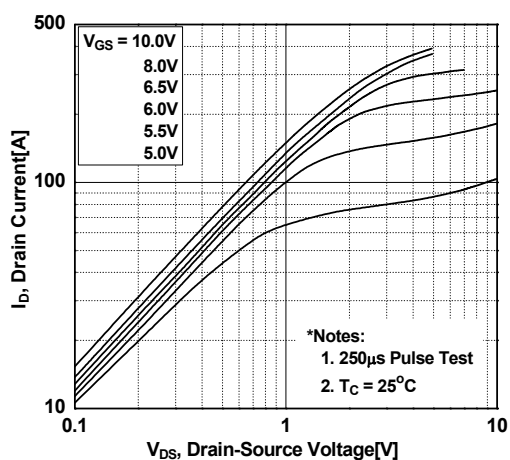


Figure 2. Transfer Characteristics

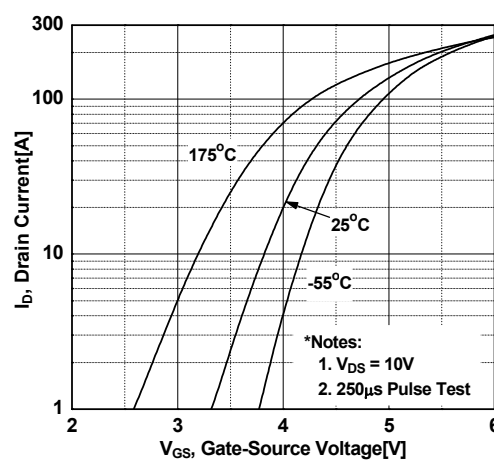


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

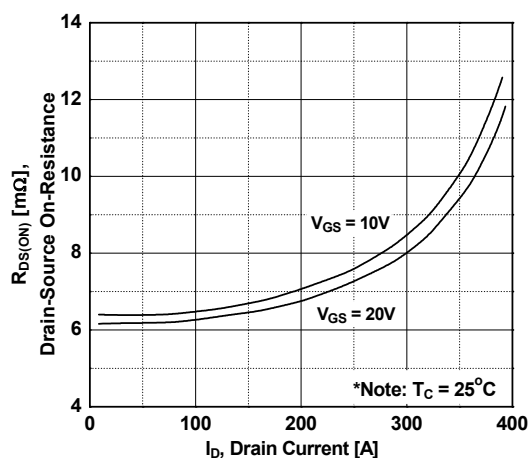


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

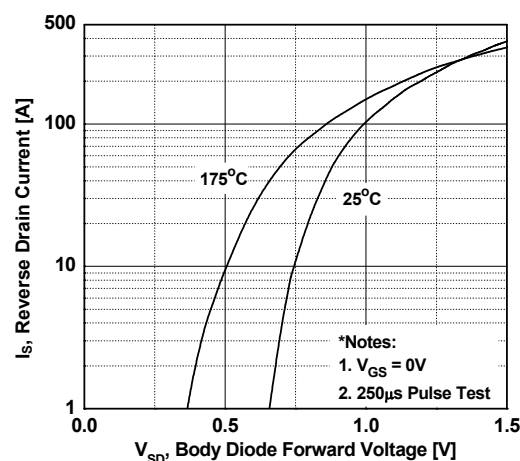


Figure 5. Capacitance Characteristics

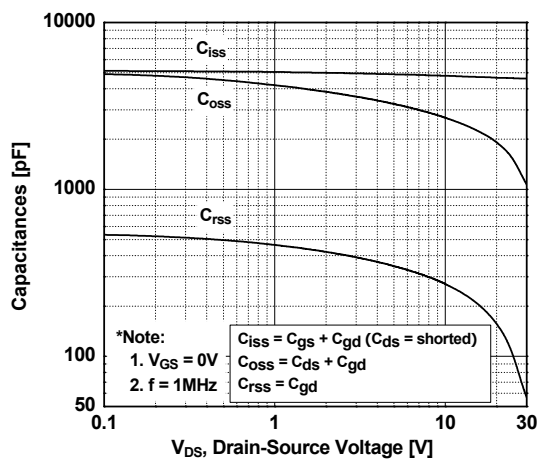
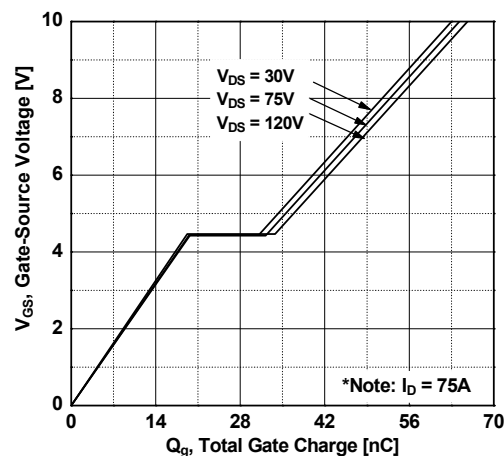


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics (Continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

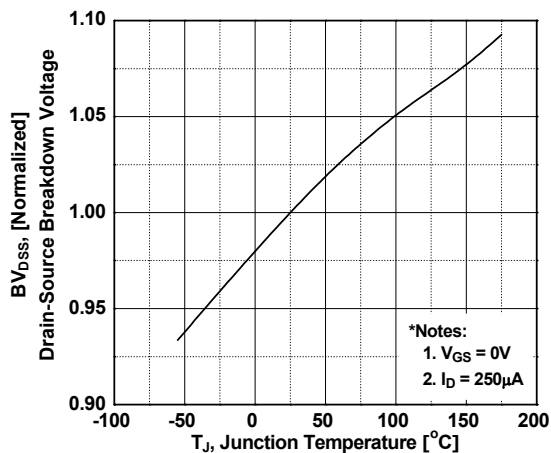


Figure 8. On-Resistance Variation vs. Temperature

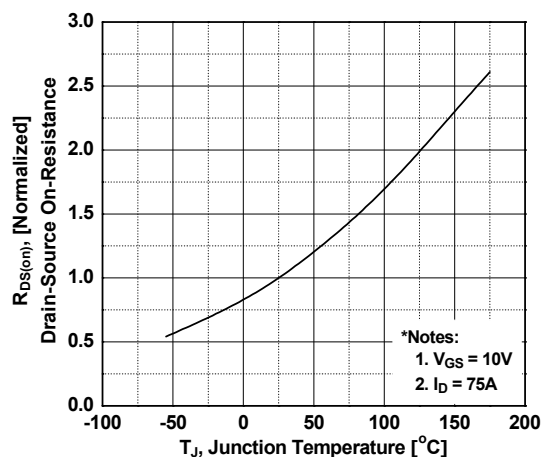


Figure 9. Maximum Safe Operating Area

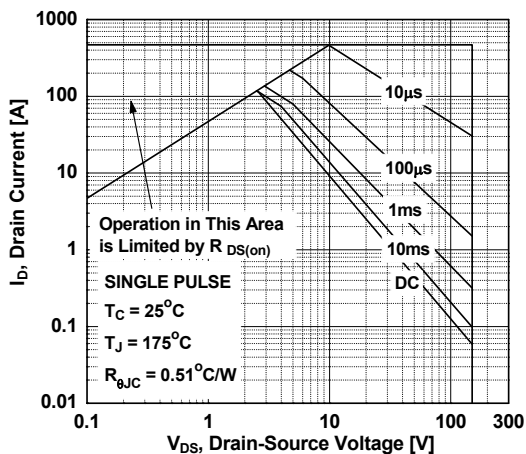


Figure 10. Maximum Drain Current vs. Case Temperature

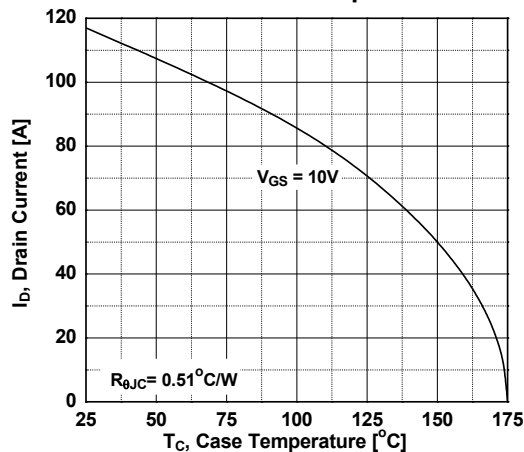
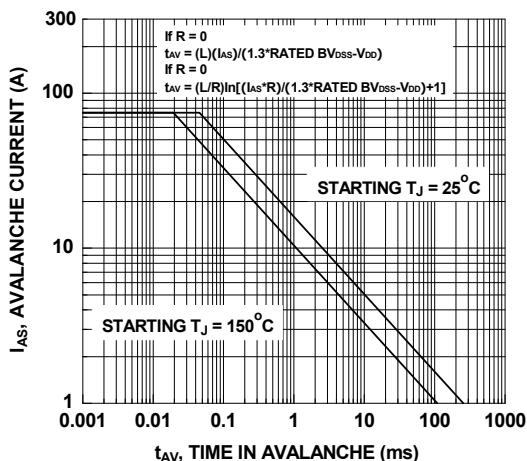
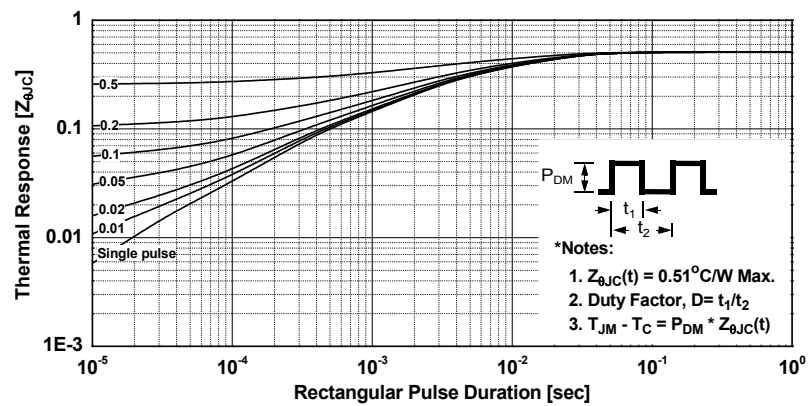


Figure 11. Unclamped Inductive Switching Capability



Typical Performance Characteristics

Figure 12. Transient Thermal Response Curve



Gate Charge Test Circuit & Waveform



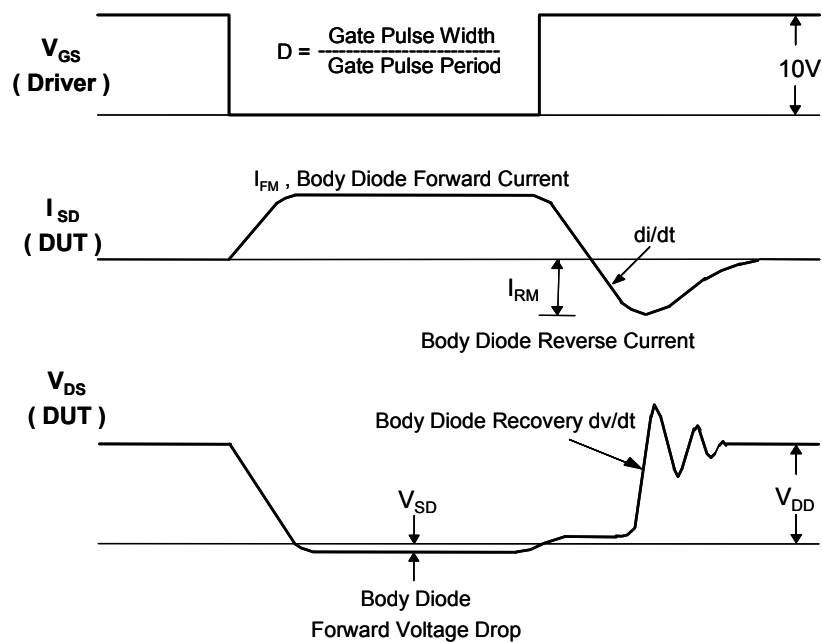
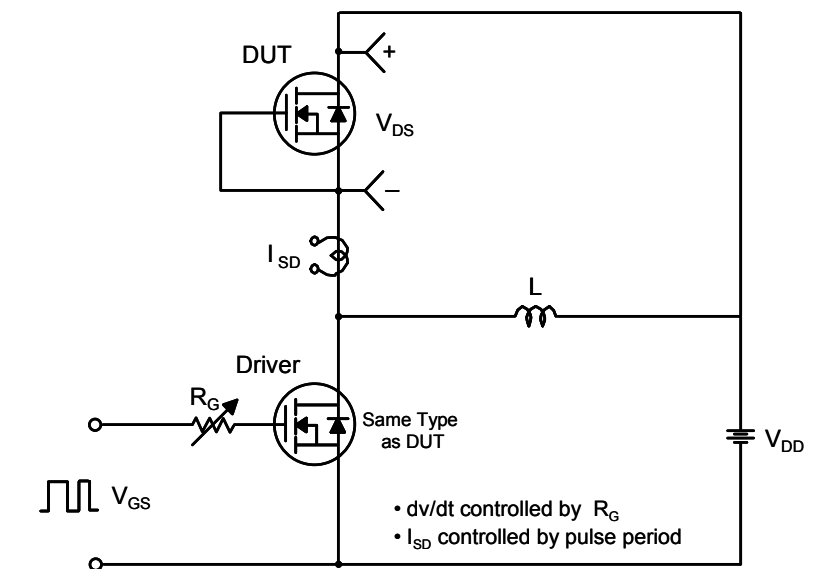
Resistive Switching Test Circuit & Waveforms



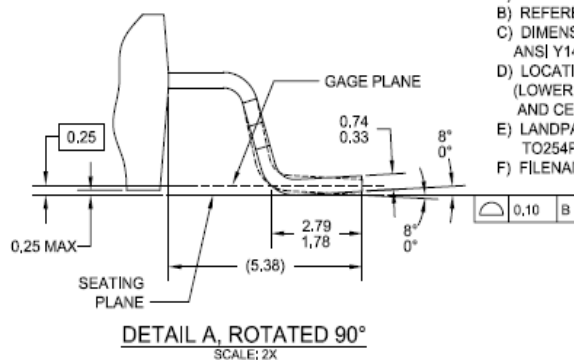
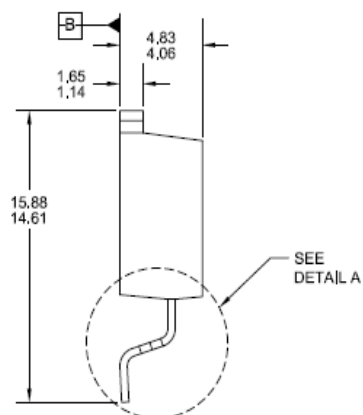
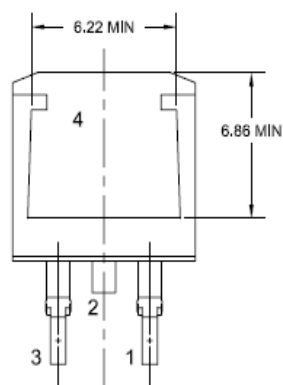
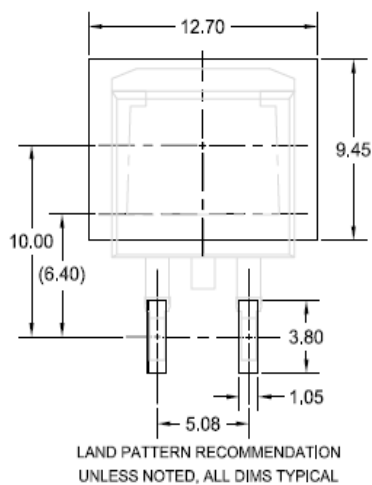
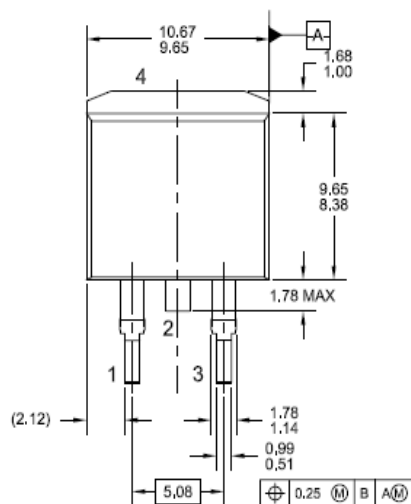
Unclamped Inductive Switching Test Circuit & Waveforms



Peak Diode Recovery dv/dt Test Circuit & Waveforms



Mechanical Dimensions

D²PAK

- NOTES: UNLESS OTHERWISE SPECIFIED
- A) ALL DIMENSIONS ARE IN MILLIMETERS.
 - B) REFERENCE JEDEC, TO-263, VARIATION AB.
 - C) DIMENSIONING AND TOLERANCING PER ANSI Y14.5M - 1994.
 - D) LOCATION OF THE PIN HOLE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF THE PACKAGE).
 - E) LANDPATTERN RECOMMENDATION PER IPC TO254P1524X482-3N
 - F) FILENAME: TO263A02REV6

Dimensions in Millimeters

