

# MOSFET - POWERTRENCH<sup>®</sup>, N-Channel

100 V, 240 A, 2.6 mΩ

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## FDBL86063

### Features

- Typical  $R_{DS(on)} = 2\text{ m}\Omega$  at  $V_{GS} = 10\text{ V}$ ,  $I_D = 80\text{ A}$
- Typical  $Q_{g(tot)} = 73\text{ nC}$  at  $V_{GS} = 10\text{ V}$ ,  $I_D = 80\text{ A}$
- UIS Capability
- This Device is Pb-Free and is RoHS Compliant

### Typical Applications

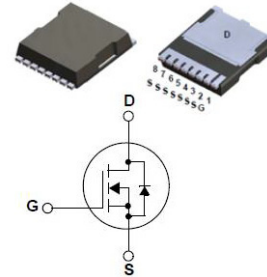
- Industrial Battery Switch
- Primary Switch for 12 V Systems



**ON Semiconductor<sup>®</sup>**

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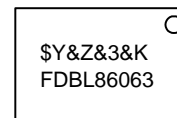
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H-PSOF8L 11.68x9.80  
CASE 100CU

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### MARKING DIAGRAM



\$Y	= ON Semiconductor Logo
&Z	= Assembly Plant Code
&3	= Numeric Date Code
&K	= Lot Code
FDBL86063	= Specific Device Code

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### ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

# FDBL86063

## MOSFET MAXIMUM RATINGS ( $T_J = 25^\circ\text{C}$ , Unless otherwise noted)

Symbol	Parameter	Ratings	Units
$V_{DSS}$	Drain-to-Source Voltage	100	V
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$I_D$	Drain Current –Continuous ( $V_{GS} = 10\text{ V}$ ) (Note 1) $T_C = 25^\circ\text{C}$	240	A
	–Pulsed $T_C = 25^\circ\text{C}$	See Figure 4	
$E_{AS}$	Single Pulse Avalanche Energy (Note 2)	160	mJ
$P_D$	Power Dissipation	357	W
	Derate Above $25^\circ\text{C}$	2.38	W/ $^\circ\text{C}$
$T_J, T_{STG}$	Operating and Storage Temperature	$-55$ to $+175$	$^\circ\text{C}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.42	$^\circ\text{C/W}$
$R_{\theta JA}$	Maximum Thermal Resistance, Junction to Ambient (Note 3)	43	$^\circ\text{C/W}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Current is limited by bondwire configuration.
2. Starting  $T_J = 25^\circ\text{C}$ ,  $L = 50\ \mu\text{H}$ ,  $I_{AS} = 80\text{ A}$ ,  $V_{DD} = 100\text{ V}$  during inductor charging and  $V_{DD} = 0\text{ V}$  during time in avalanche.
3.  $R_{\theta JA}$  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 board design. The maximum rating presented here is based on mounting on a  $1\text{ in}^2$  pad of 2 oz copper.

## PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Package	Shipping <sup>†</sup>
FDBL86063	FDBL86063	H-PSOF8L 11.68x9.80 (Pb-Free)	2000 units / Tape & Reel

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D

# FDBL86063

## ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
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### OFF CHARACTERISTICS

B <sub>V</sub> DSS	Drain-to-Source Breakdown Voltage	I <sub>D</sub> = 250 μA, V <sub>GS</sub> = 0 V	100			V
I <sub>DSS</sub>	Drain-to-Source Leakage Current	V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 25°C			1	μA
		V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175°C (Note 4)			1.5	mA
I <sub>GSS</sub>	Gate-to-Source Leakage Current	V <sub>GS</sub> = ±20 V			±100	nA

### ON CHARACTERISTICS

V <sub>GS(th)</sub>	Gate to Source Threshold Voltage	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250 μA	2.0	2.9	4.0	V
R <sub>DS(on)</sub>	Drain-to-Source On-Resistance	I <sub>D</sub> = 80 A, V <sub>GS</sub> = 10 V, T <sub>J</sub> = 25°C		2.0	2.6	mΩ
		I <sub>D</sub> = 80 A, V <sub>GS</sub> = 10 V, T <sub>J</sub> = 175°C (Note 4)		4.2	5.6	

### DYNAMIC CHARACTERISTICS

C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 0 V, f = 1 MHz			5120		pF
C <sub>oss</sub>	Output Capacitance				3220		pF
C <sub>rss</sub>	Reverse Transfer Capacitance				32		pF
R <sub>g</sub>	Gate Resistance	V <sub>GS</sub> = 0.5 V, f = 1 MHz			0.4		Ω
Q <sub>g(TOT)</sub>	Total Gate Charge	V <sub>GS</sub> = 0 V to 10 V	V <sub>DD</sub> = 50 V, I <sub>D</sub> = 80 A		73	95	nC
Q <sub>g(th)</sub>	Threshold Gate Charge	V <sub>GS</sub> = 0 V to 2 V			9		nC
Q <sub>gs</sub>	Gate-to-Source Gate Charge				22		nC
Q <sub>gd</sub>	Gate-to-Drain "Miller" Charge				17		nC

### SWITCHING CHARACTERISTICS

t <sub>on</sub>	Turn-On Time	V <sub>DD</sub> = 50 V, I <sub>D</sub> = 80 A, V <sub>GS</sub> = 10V, R <sub>GEN</sub> = 6 Ω			53	ns
t <sub>d(on)</sub>	Turn-On Delay			25		ns
t <sub>r</sub>	Rise Time			16		ns
t <sub>d(off)</sub>	Turn-Off Delay			32		ns
t <sub>f</sub>	Fall Time			8		ns
t <sub>off</sub>	Turn-Off Time				51	ns

### DRAIN-SOURCE DIODE CHARACTERISTICS

V <sub>SD</sub>	Source-to-Drain Diode Voltage	V <sub>GS</sub> = 0 V, I <sub>SD</sub> = 80 A V <sub>GS</sub> = 0 V, I <sub>SD</sub> = 40 A		0.9 0.8	1.25 1.2	V
t <sub>rr</sub>	Reverse-Recovery Time	I <sub>F</sub> = 80 A, ΔI <sub>SD</sub> /Δt = 100 A/μs		107	139	ns
Q <sub>rr</sub>	Reverse-Recovery Charge			175	260	nC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

4. The maximum value is specified by design at T<sub>J</sub> = 175°C. Product is not tested to this condition in production.

TYPICAL CHARACTERISTICS

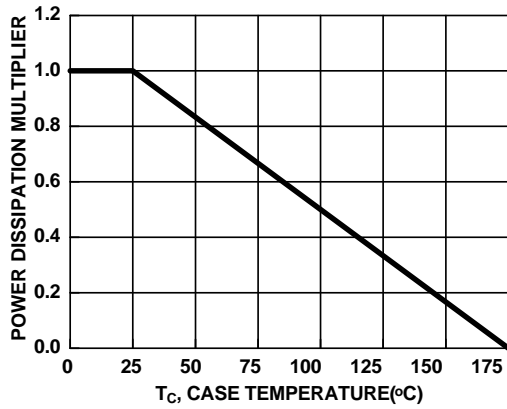


Figure 1. Normalized Power Dissipation vs. Case Temperature

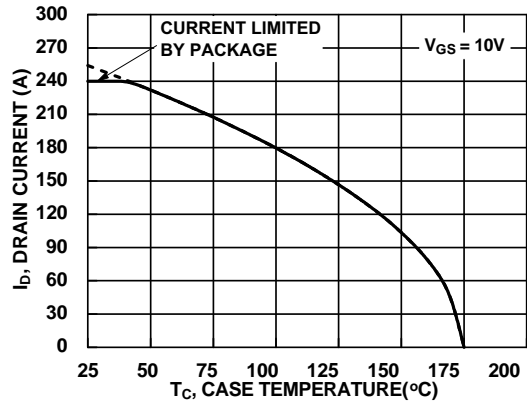


Figure 2. Maximum Continuous Drain Current vs. Case Temperature

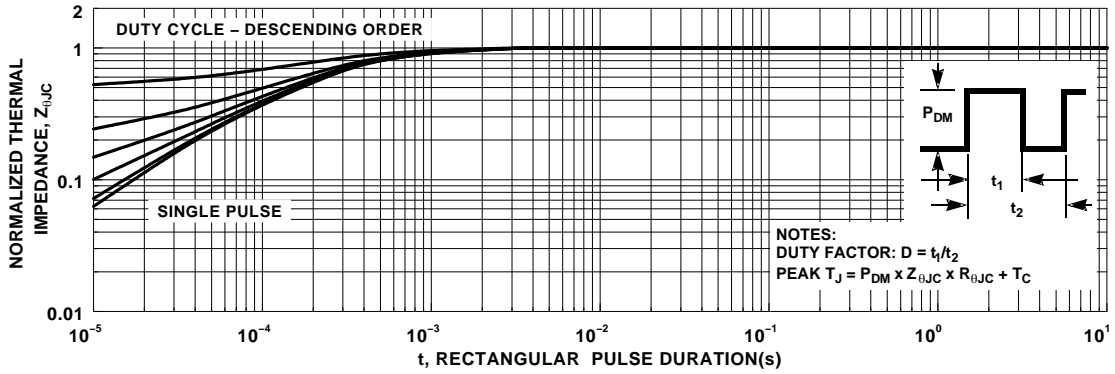


Figure 3. Normalized Maximum Transient Thermal Impedance

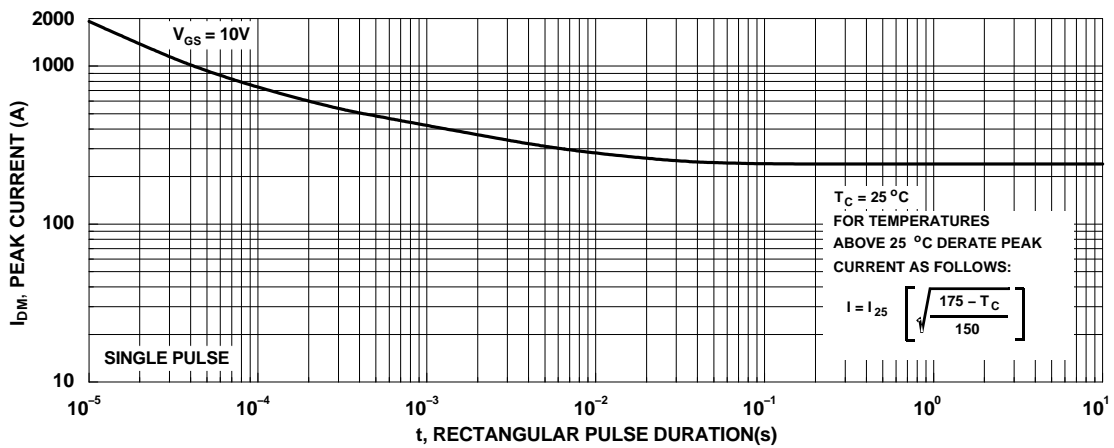


Figure 4. Peak Current Capability

TYPICAL CHARACTERISTICS

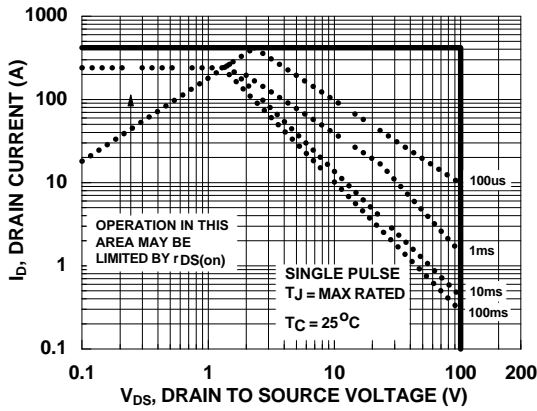
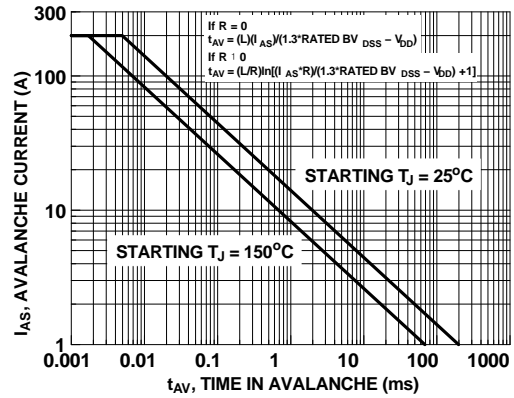


Figure 5. Forward Bias Safe Operating Area



NOTE: Refer to ON Semiconductor Application Notes AN7514 and AN7515

Figure 6. Unclamped Inductive Switching Capability

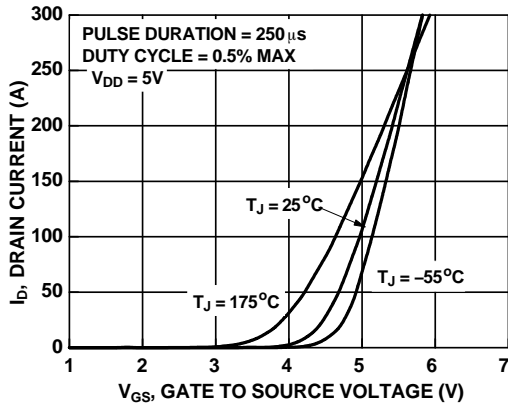


Figure 7. Transfer Characteristics

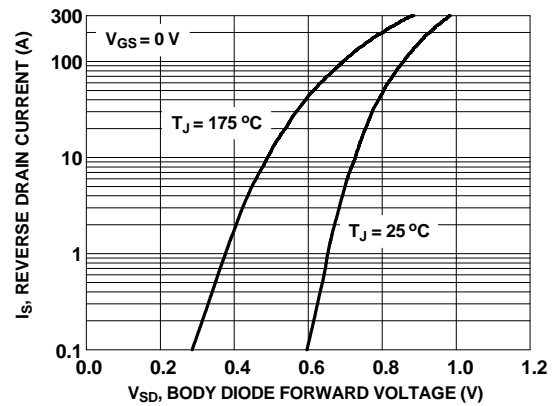


Figure 8. Forward Diode Characteristics

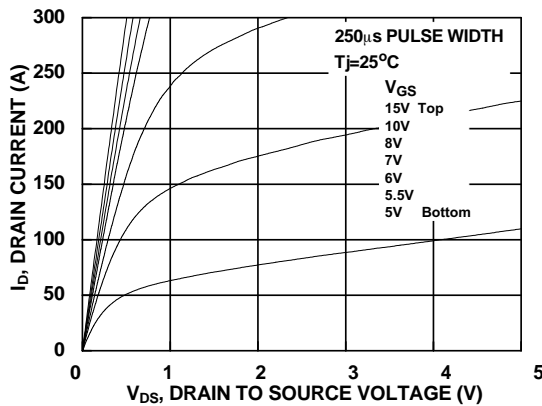


Figure 9. Saturation Characteristics

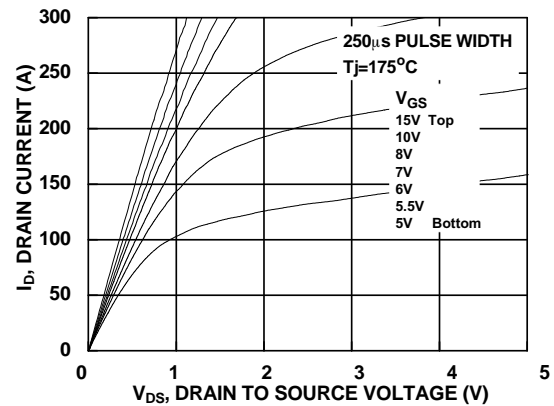


Figure 10. Saturation Characteristics

TYPICAL CHARACTERISTICS

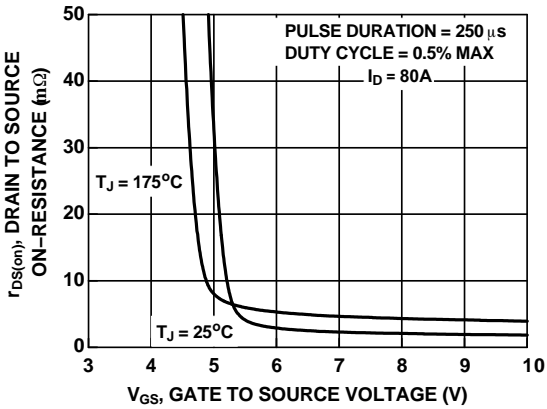


Figure 11.  $R_{DS(on)}$  vs. Gate Voltage

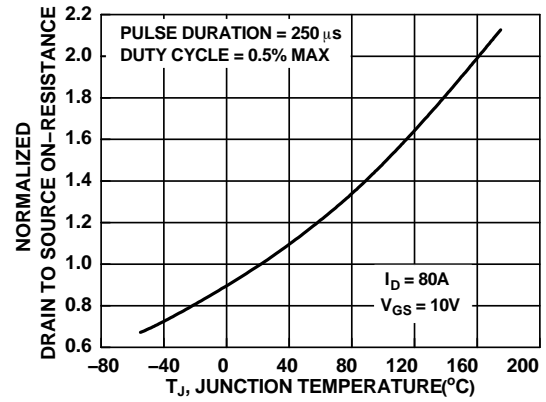


Figure 12. Normalized  $R_{DS(on)}$  vs. Junction Temperature

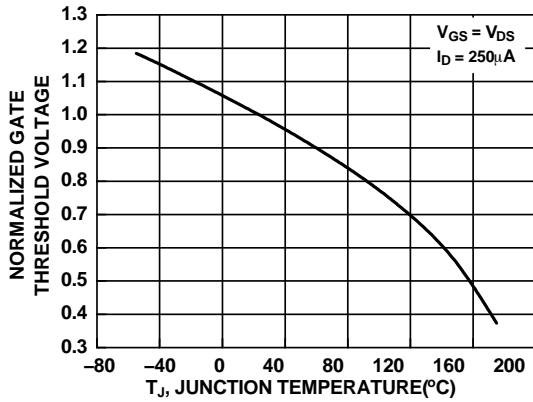


Figure 13. Normalized Gate Threshold Voltage vs. Temperature

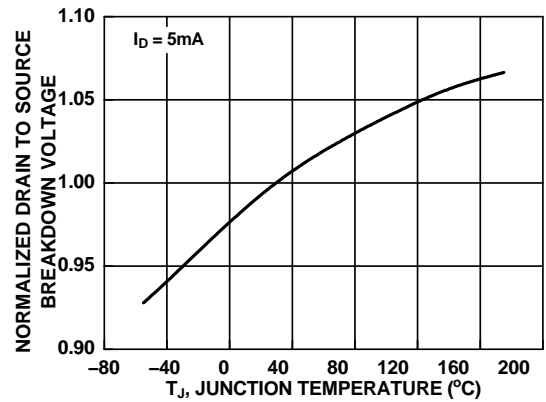


Figure 14. Normalized Drain to Source Breakdown Voltage vs. Junction Temperature

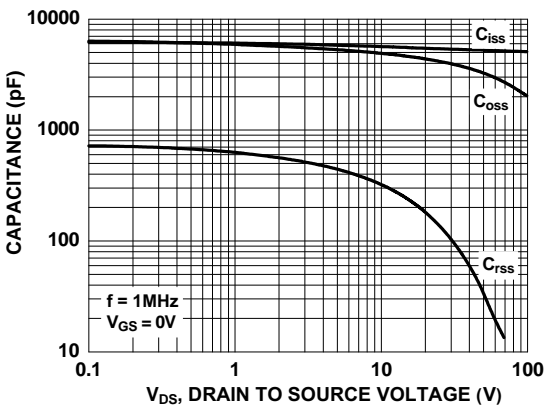


Figure 15. Capacitance vs. Drain to Source Voltage

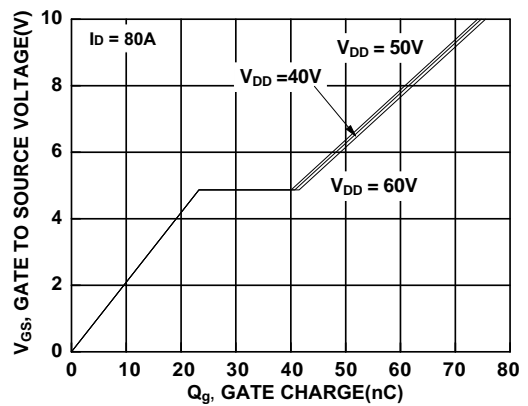



Figure 16. Gate Charge vs. Gate to Source Voltage



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