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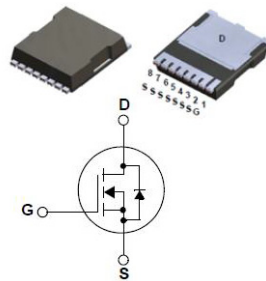
# FDBL86063-F085 N-Channel Power Trench® MOSFET 100 V, 240 A, 2.6 mΩ

## 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
- RoHS Compliant
- Qualified to AEC Q101

## Applications

- Automotive Engine Control
- Powertrain Management
- Solenoid and Motor Drivers
- Electronic Steering
- Integrated Starter/Alternator
- Distributed Power Architectures and VRM
- Primary Switch for 12V Systems



## 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 ( $V_{GS}=10$ ) (Note 1)	$T_C = 25^\circ\text{C}$ 240	A
	Pulsed Drain Current	$T_C = 25^\circ\text{C}$ 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	$\text{W}/^\circ\text{C}$
$T_J, T_{STG}$	Operating and Storage Temperature	-55 to + 175	$^\circ\text{C}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.42	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Maximum Thermal Resistance, Junction to Ambient (Note 3)	43	$^\circ\text{C}/\text{W}$

## Package Marking and Ordering Information Notes:

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDBL86063	FDBL86063-F085	MO-299A	13"	24mm	2000 units

### Notes:

- 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 2oz copper.

## Electrical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
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### Off Characteristics

$B_{V_{DS}}$	Drain-to-Source Breakdown Voltage	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	100	-	-	V
$I_{DSS}$	Drain-to-Source Leakage Current	$V_{DS} = 100\text{V}, T_J = 25^\circ\text{C}$	-	-	1	$\mu\text{A}$
		$V_{GS} = 0\text{V}, T_J = 175^\circ\text{C}$ (Note 4)	-	-	1.5	mA
$I_{GSS}$	Gate-to-Source Leakage Current	$V_{GS} = \pm 20\text{V}$	-	-	$\pm 100$	nA

### On Characteristics

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	2	2.9	4	V
$r_{DS(on)}$	Drain-to-Source On-Resistance	$I_D = 80\text{A}, T_J = 25^\circ\text{C}$	-	2.0	2.6	$\text{m}\Omega$
		$V_{GS} = 10\text{V}, T_J = 175^\circ\text{C}$ (Note 4)	-	4.2	5.6	$\text{m}\Omega$

### Dynamic Characteristics

$C_{iss}$	Input Capacitance	$V_{DS} = 50\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$	-	5120	-	pF
$C_{oss}$	Output Capacitance		-	3220	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	32	-	pF
$R_g$	Gate Resistance	$V_{GS} = 0.5\text{V}, f = 1\text{MHz}$	-	0.4	-	$\Omega$
$Q_{g(ToT)}$	Total Gate Charge	$V_{GS} = 0$ to 10V	-	73	95	nC
$Q_{g(th)}$	Threshold Gate Charge	$V_{GS} = 0$ to 2V	-	9	-	nC
$Q_{gs}$	Gate-to-Source Gate Charge	$V_{DD} = 50\text{V}, I_D = 80\text{A}$	-	22	-	nC
$Q_{gd}$	Gate-to-Drain "Miller" Charge		-	17	-	nC

### Switching Characteristics

$t_{on}$	Turn-On Time	$V_{DD} = 50\text{V}, I_D = 80\text{A}, V_{GS} = 10\text{V}, R_{GEN} = 6\Omega$	-	-	53	ns
$t_{d(on)}$	Turn-On Delay		-	25	-	ns
$t_r$	Rise Time		-	16	-	ns
$t_{d(off)}$	Turn-Off Delay		-	32	-	ns
$t_f$	Fall Time		-	8	-	ns
$t_{off}$	Turn-Off Time		-	-	51	ns

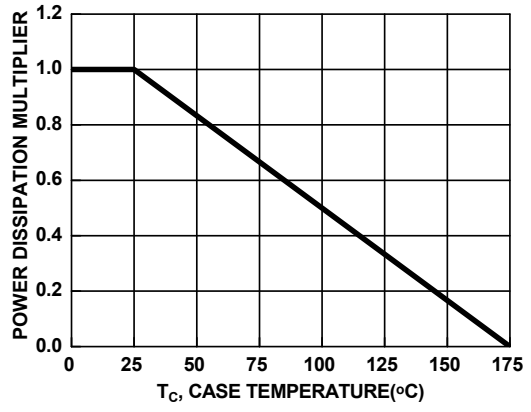
### Drain-Source Diode Characteristics

$V_{SD}$	Source-to-Drain Diode Voltage	$I_{SD} = 80\text{A}, V_{GS} = 0\text{V}$	-	0.9	1.25	V
		$I_{SD} = 40\text{A}, V_{GS} = 0\text{V}$	-	0.8	1.2	V
$t_{rr}$	Reverse-Recovery Time	$I_F = 80\text{A}, dI_{SD}/dt = 100\text{A}/\mu\text{s}$	-	107	139	ns
$Q_{rr}$	Reverse-Recovery Charge		-	175	260	nC

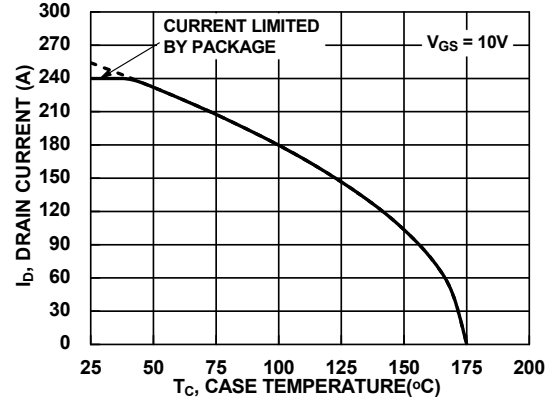
#### Note:

4: The maximum value is specified by design at  $T_J = 175^\circ\text{C}$ . Product is not tested to this condition in production.

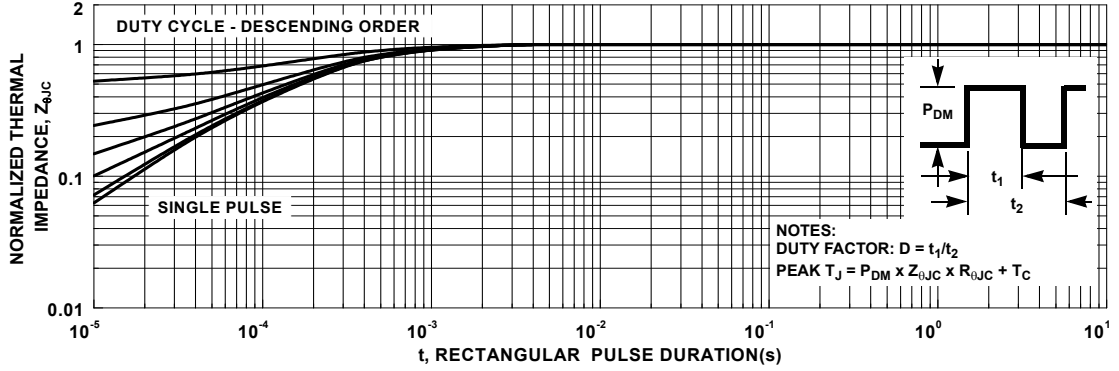
**Typical Characteristics**



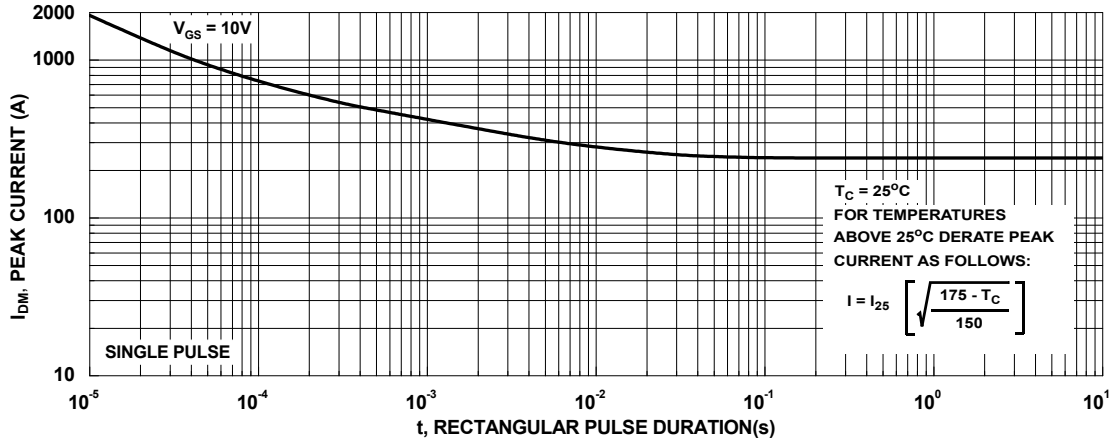
**Figure 1. Normalized Power Dissipation vs. Case Temperature**



**Figure 2. Maximum Continuous Drain Current vs. Case Temperature**



**Figure 3. Normalized Maximum Transient Thermal Impedance**



**Figure 4. Peak Current Capability**

## Typical Characteristics

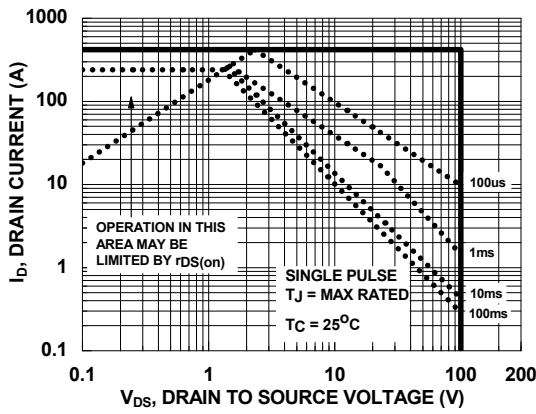
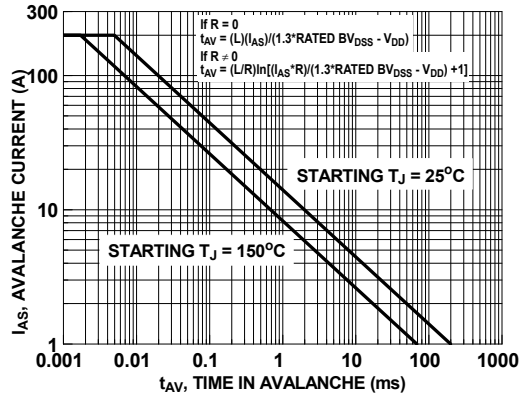


Figure 5. Forward Bias Safe Operating Area



NOTE: Refer to S u t Application Notes AN7514 and AN7515

Figure 6. Unclamped Inductive Switching Capability

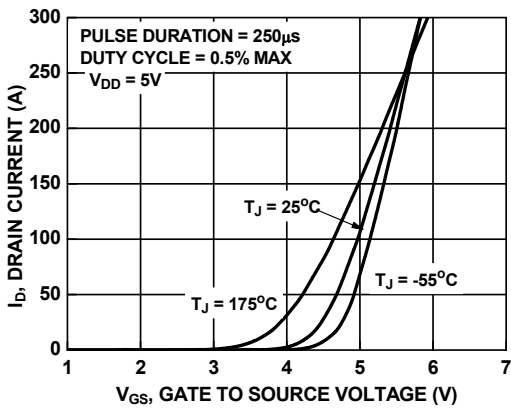


Figure 7. Transfer Characteristics

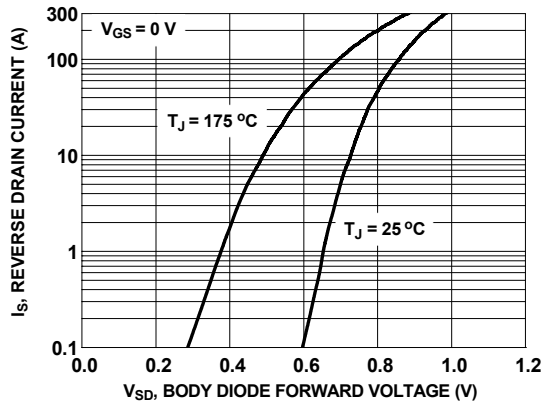


Figure 8. Forward Diode Characteristics

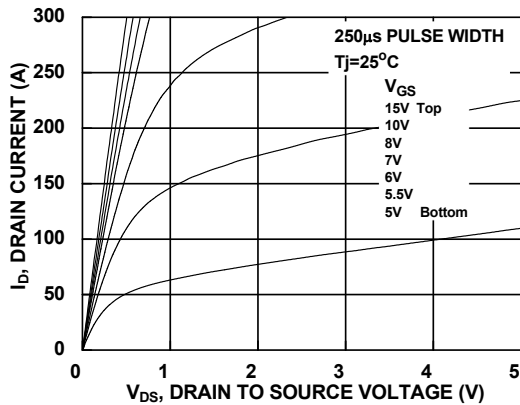


Figure 9. Saturation Characteristics

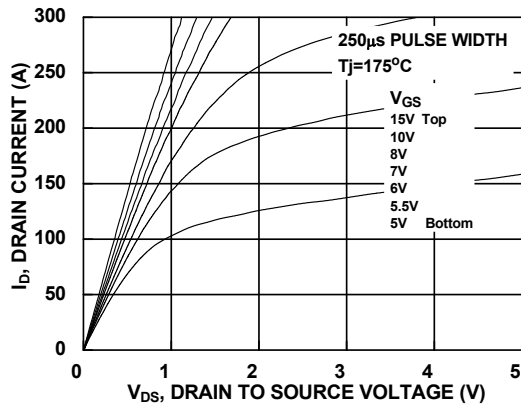


Figure 10. Saturation Characteristics

## Typical Characteristics

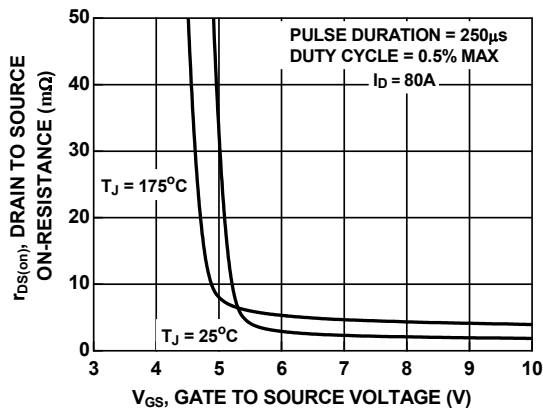


Figure 11.  $R_{DS(on)}$  vs. Gate Voltage

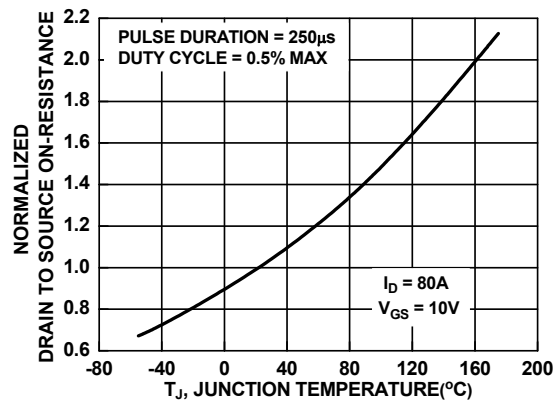


Figure 12. Normalized  $R_{DS(on)}$  vs. Junction Temperature

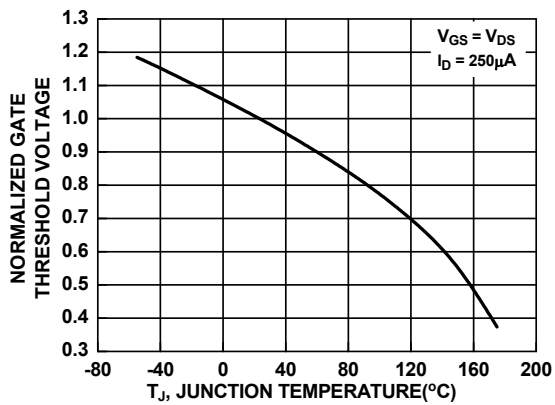


Figure 13. Normalized Gate Threshold Voltage vs. Temperature

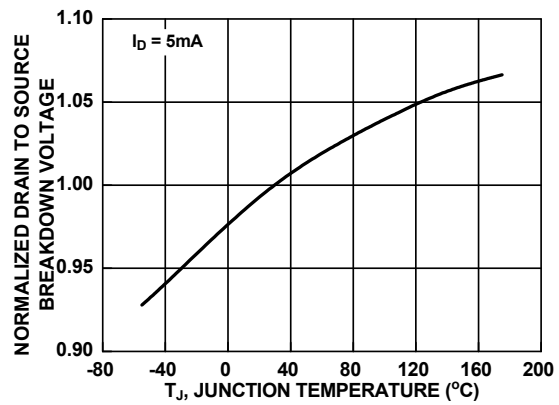


Figure 14. Normalized Drain to Source Breakdown Voltage vs. Junction Temperature

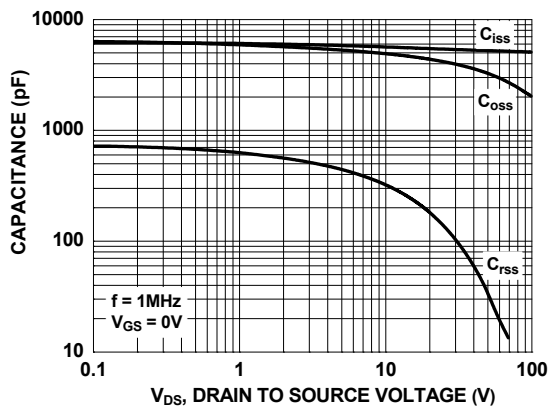


Figure 15. Capacitance vs. Drain to Source Voltage

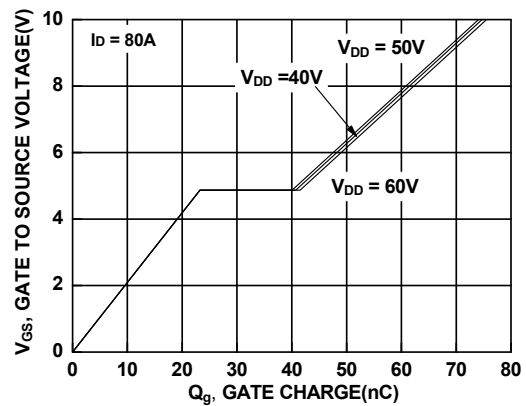


Figure 16. Gate Charge vs. Gate to Source Voltage

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