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# FDD8447L-F085 N-Channel PowerTrench<sup>®</sup> MOSFET 40V, 50A, 11.0mΩ

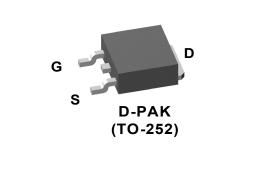
# Features

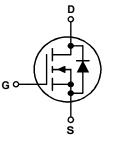
- Typ  $r_{DS(on)}$  = 7.0m $\Omega$  at V<sub>GS</sub> = 10V, I<sub>D</sub> = 14A
- Typ  $r_{DS(on)}$  = 8.5m $\Omega$  at V<sub>GS</sub> = 4.5V, I<sub>D</sub> = 11A
- Fast Switching
- Qualified to AEC Q101
- RoHS Compliant

# Applications

- Inverter
- Power Supplies
- Automotive Engine Control
- Power Train Management
- Solenoid and Motor Drivers
- Electronic Transmission
- Primary Switch for 12V and 24V Systems







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

Symbol	Parameter		Ratings	Units
V <sub>DSS</sub>	Drain to Source Voltage	(Note 1)	40	V
V <sub>GS</sub>	Gate to Source Voltage		±20	V
$I_{D} = \frac{\text{Drain Current Continuous (T_{C} < 80^{\circ}\text{C}, V_{GS} = 10\text{V})}{\text{Dubod}}$		50	٨	
D	Pulsed		See Figure 4	— A
E <sub>AS</sub>	Single Pulse Avalanche Energy	(Note 2)	40	mJ
D	Power Dissipation		65	W
P <sub>D</sub>	Dreate above 25°C		0.43	W/ºC
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Temperature		-55 to + 175	°C

### **Thermal Characteristics**

$R_{\theta JC}$	Maximum Thermal Resistance Junction to Case	2.3	°C/W
$R_{\thetaJA}$	Thermal Resistance Junction to Ambient TO-252, 1in <sup>2</sup> copper pad area	40	°C/W

# Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDD8447L	FDD8447L-F085	D-PAK(TO-252)	13"	12mm	2500 units

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

Symbol	Parameter	Test Conditions	Min	Тур	Max	Units

### Off Characteristics

B <sub>VDSS</sub>	Drain to Source Breakdown Voltage	$I_D = 250 \mu A, V_{GS} = 0V$	40	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 32V, V <sub>GS</sub> = 0V	-	-	1	μA
I <sub>GSS</sub>	Gate to Source Leakage Current	$V_{GS}$ = ±20V, $V_{GS}$ = 0V	-	-	±100	nA

### **On Characteristics**

V <sub>GS(th)</sub>	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250 \mu A$	1.0	1.9	3.0	V
		I <sub>D</sub> = 14A, V <sub>GS</sub> = 10V	-	7.0	8.5	
r <sub>DS(on)</sub>	Drain to Source On Resistance	I <sub>D</sub> = 11A, V <sub>GS</sub> = 4.5V	-	8.5	11.0	mΩ
		I <sub>D</sub> = 14A, V <sub>GS</sub> = 10V, T <sub>J</sub> = 125°C	-	10.4	14.0	
9 <sub>FS</sub>	Forward Transconductance	I <sub>D</sub> = 14A, V <sub>DS</sub> = 5V	-	58	-	S

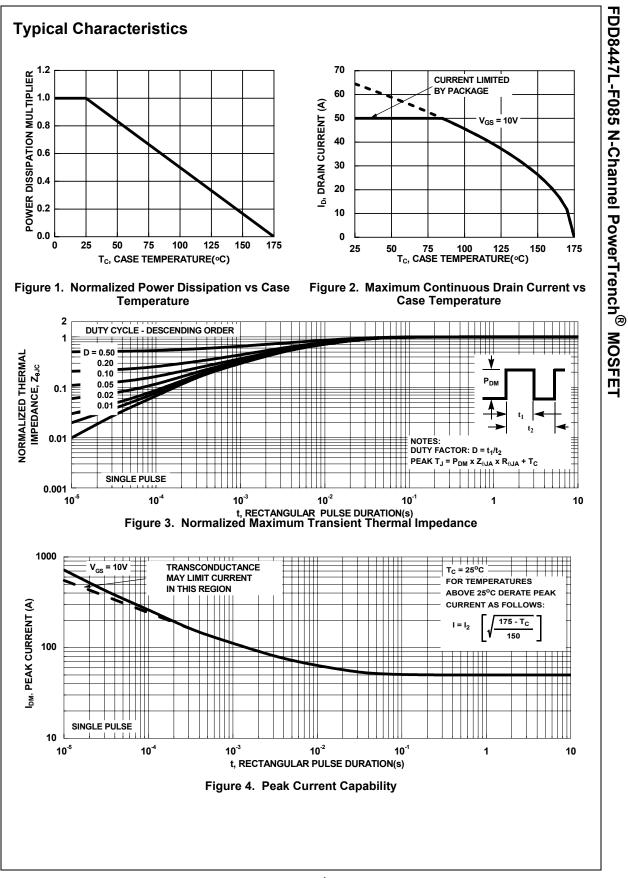
### **Dynamic Characteristics**

C <sub>iss</sub>	Input Capacitance	N 00X/ N			1970	-	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> = 20V, V <sub>GS</sub> = f = 1MHz	· UV,	-	250	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance			-	150	-	pF
Rg	Gate Resistance	f = 1MHz		-	1.27	-	Ω
Q <sub>g(TOT)</sub>	Total Gate Charge at 10V	V <sub>GS</sub> = 0 to 10V		-	37	52	nC
Q <sub>g(5)</sub>	Total Gate Charge at 5V	$V_{GS}$ = 0 to 5V	$V_{DD} = 20V$ $I_D = 14A$	-	20	28	nC
Q <sub>gs</sub>	Gate to Source Gate Charge		$V_{GS} = 10V$	-	6	-	nC
Q <sub>gd</sub>	Gate to Drain "Miller" Charge		.63 .01	-	7	-	nC

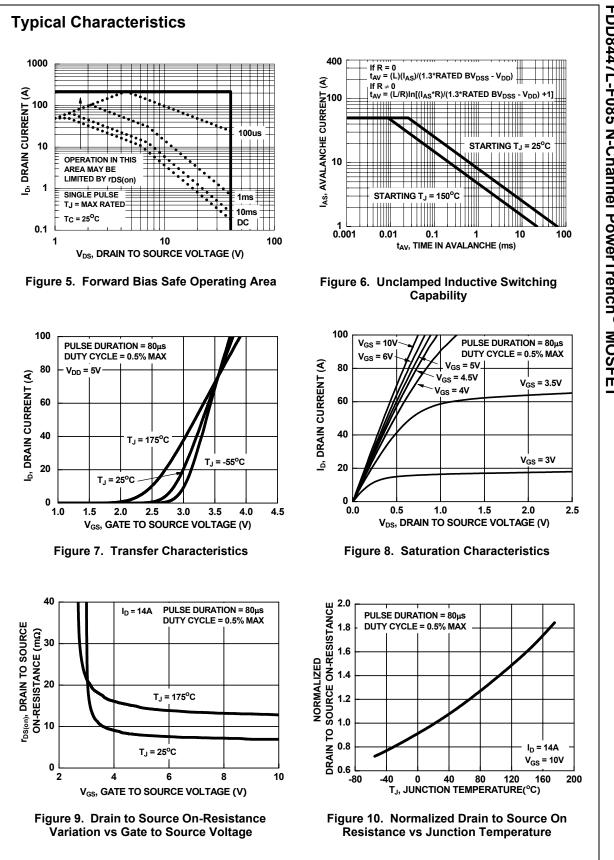
	Test Conditions	Min	Тур	Max	Units
ing Characteristics					
Turn-On Delay Time		-	12	21	ns
Rise Time	V <sub>DD</sub> = 20 V, I <sub>D</sub> = 1 A,	-	12	21	ns
Turn-Off Delay Time	V <sub>GS</sub> = 10 V, R <sub>GEN</sub> = 6 Ω	-	38	61	ns
Fall Time		-	9	18	ns
			0.8	12	V
0					ns
Reverse Recovery Charge	$I_{\rm E} = 14$ A, dI <sub>SD</sub> /dt = 100A/µs	-	22	29	115
	Turn-On Delay Time Rise Time Turn-Off Delay Time Fall Time	Turn-On Delay Time $V_{DD} = 20 \text{ V}, \text{ I}_D = 1 \text{ A},$ Rise Time $V_{GS} = 10 \text{ V}, \text{ R}_{GEN} = 6 \Omega$ Fall Time Fall Time   Durce Diode Characteristics   Source to Drain Diode Voltage   Isource Recovery Time	Turn-On Delay Time -   Rise Time V <sub>DD</sub> = 20 V, I <sub>D</sub> = 1 A, -   Turn-Off Delay Time V <sub>GS</sub> = 10 V, R <sub>GEN</sub> = 6 Ω -   Fall Time - -   Durce Diode Characteristics - -   Source to Drain Diode Voltage I <sub>SD</sub> = 14A -   Reverse Recovery Time - -	Turn-On Delay Time-12Rise Time $V_{DD} = 20 \text{ V}, \text{ I}_D = 1 \text{ A},$ -12Turn-Off Delay Time $V_{GS} = 10 \text{ V}, \text{ R}_{GEN} = 6 \Omega$ -38Fall Time-9Durce Diode CharacteristicsSource to Drain Diode Voltage $I_{SD} = 14A$ -0.8Reverse Recovery Time-22	Turn-On Delay Time-1221Rise Time $V_{DD} = 20 \text{ V}, \text{ I}_D = 1 \text{ A},$ -1221Turn-Off Delay Time $V_{GS} = 10 \text{ V}, \text{ R}_{GEN} = 6 \Omega$ -3861Fall Time-918Durce Diode CharacteristicsSource to Drain Diode Voltage $I_{SD} = 14A$ -0.81.2Reverse Recovery Time

Notes:

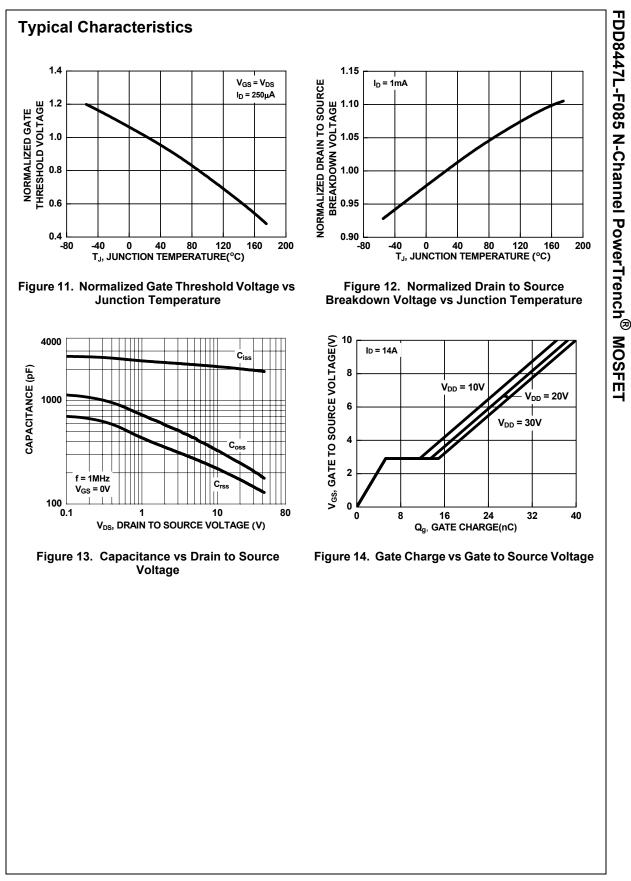
1: Starting  $T_J = 25^{\circ}C$  to  $175^{\circ}C$ . 2: Starting  $T_J = 25^{\circ}C$ , L = 0.05mH,  $I_{AS} = 40A$ 



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