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FDS8449-F085

N-Channel PowerTrench® MOSFET
40V, 7.6A, 29mΩ

Features

- Typ $R_{DS(on)}$ = 21mΩ at V_{GS} = 10V, I_D = 7.6A
- Typ $R_{DS(on)}$ = 26mΩ at V_{GS} = 4.5V, I_D = 6.8A
- Typ $Q_{g(5)}$ = 7.7nC at V_{GS} = 5V, I_D = 7.6A
- RoHS Compliant
- Qualified to AEC Q101

Applications

- Inverter
- Power Supplies

SO-8

Pin 1
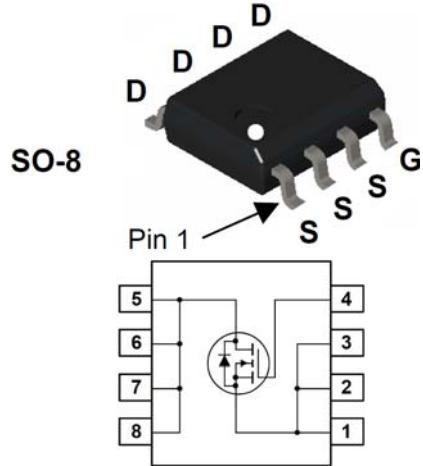
MOSFET Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter		Ratings	Units
V_{DSS}	Drain to Source Voltage		40	V
V_{GS}	Gate to Source Voltage		±20	V
I_D	Drain Current Continuous (V_{GS} = 10V)		7.6	A
	Pulsed		50	
E_{AS}	Single Pulse Avalanche Energy	(Note 1)	27	mJ
P_D	Power Dissipation		5	W
	Derate above 25°C		0.04	W/°C
T_J, T_{STG}	Operating and Storage Temperature		-55 to +150	°C
$R_{\theta JC}$	Thermal Resistance Junction to Case		25	°C/W
$R_{\theta JA}$	Thermal Resistance Junction to Ambient, 1in² copper pad area		50	°C/W

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDS8449	FDS8449-F085	SO-8	13"	12mm	2500 units

Notes:
1: Starting T_J = 25°C, L = 1mH, I_{AS} = 7.3A, V_{DD} = 40V.
2: A suffix as "…F085P" has been temporarily introduced in order to manage a double source strategy as ON Semiconductor has officially announced in Aug 2014.

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Electrical Characteristics $T_A = 25°C$ unless otherwise noted

Symbol	Parameter	Test Conditions		Min	Typ	Max	Units

Off Characteristics

Symbol	Parameter	Test Conditions		Min	Typ	Max	Units
B_{VDSS}	Drain to Source Breakdown Voltage	$I_D = 250\mu A$, $V_{GS} = 0V$		40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 32V$, $V_{GS} = 0V$		-	-	1	μA
			$T_A = 150°C$	-	-	250	
I_{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm20V$		-	-	±100	nA

On Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}$, $I_D = 250\mu A$	1	1.9	3	V
$r_{DS(on)}$	Drain to Source On Resistance	$I_D = 7.6A$, $V_{GS} = 10V$	-	21	29	$m\Omega$
		$I_D = 6.8A$, $V_{GS} = 4.5V$	-	26	36	
		$I_D = 7.6A$, $V_{GS} = 10V$ $T_J = 125°C$	-	29	43	
g_{FS}	Forward Transconductance	$V_{DS} = 10V$, $I_D = 7.6A$	-	21	-	S

Dynamic Characteristics

Symbol	Parameter	Test Conditions		Min	Typ	Max	Units
C_{iss}	Input Capacitance	$V_{DS} = 20V$, $V_{GS} = 0V$, f = 1MHz		-	760	-	pF
C_{oss}	Output Capacitance			-	100	-	pF
C_{rss}	Reverse Transfer Capacitance			-	60	-	pF
R_G	Gate Resistance	f = 1MHz		-	1.2	-	Ω
$Q_{g(TOT)}$	Total Gate Charge at 10V	$V_{GS} = 0$ to 5V	$V_{DD} = 20V$ $I_D = 7.6A$	-	7.7	11	nC
Q_{gs}	Gate to Source Gate Charge			-	2.4	-	nC
Q_{gd}	Gate to Drain "Miller" Charge			-	2.8	-	nC

Switching Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
t_{on}	Turn-On Time	$V_{DD} = 20V$, $I_D = 1A$ $V_{GS} = 10V$, $R_{GEN} = 6\Omega$	-	-	21	ns
$t_{d(on)}$	Turn-On Delay Time		-	9	-	ns
t_r	Rise Time		-	5	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	23	-	ns
t_f	Fall Time		-	3	-	ns
t_{off}	Turn-Off Time		-	-	39	ns

Drain-Source Diode Characteristics

| Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
V_{SD}	Source to Drain Diode Voltage	$I_{SD} = 2.1A$	-	0.76	1.2	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 7.6A$, $dI_{SD}/dt = 100A/\mu s$	-	17	-	ns
Q_{rr}	Reverse Recovery Charge		-	7	-	nC

Typical Characteristics
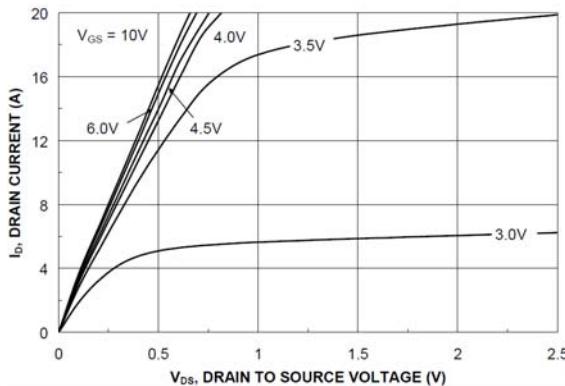

Figure 1. On-Region Characteristics
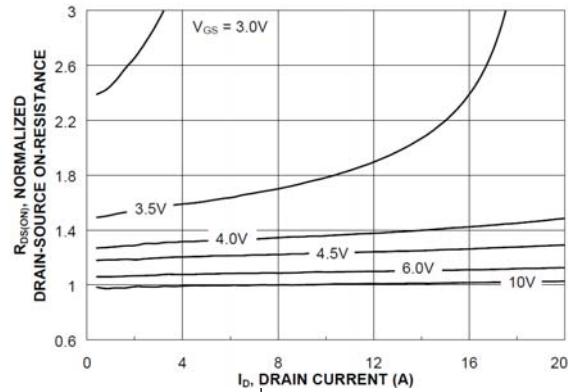
Figure 2. On-Resistance Variation with Drain Current and Gate Voltage
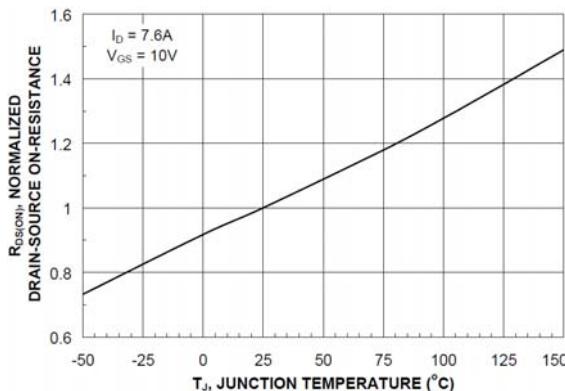

Figure 3. On-Resistance Variation with Temperature
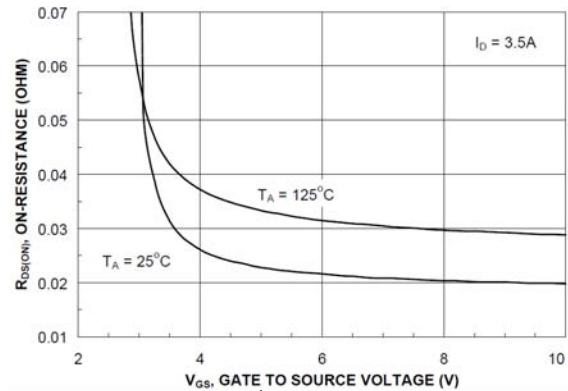

Figure 4. On-Resistance Variation with Gate-to-Source Voltage
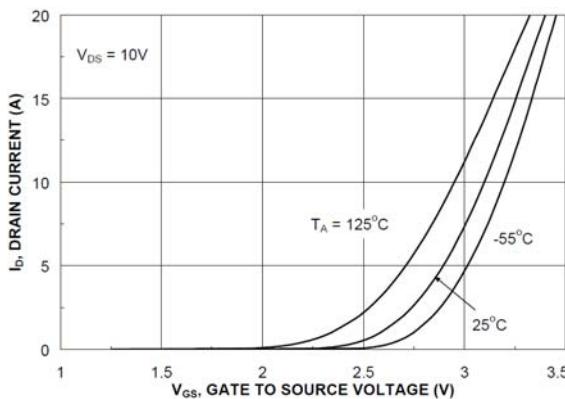
Figure 5. Transfer Characteristics
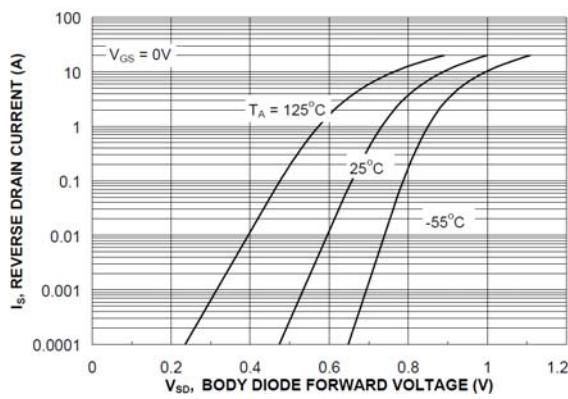
Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

## Typical Characteristics
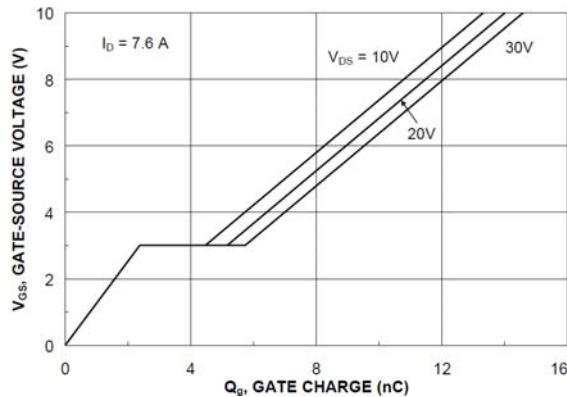

Figure 7. Gate Charge Characteristics
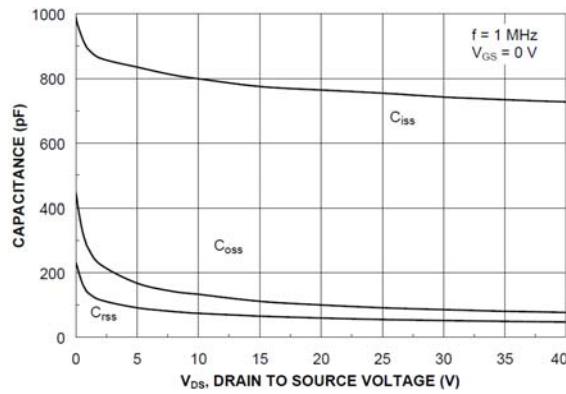
Figure 8. Capacitance Characteristics
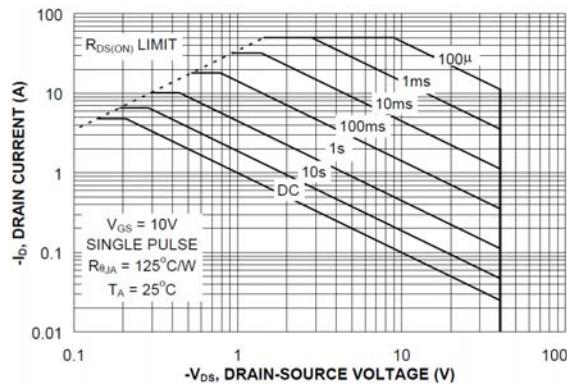
Figure 9. Maximum Safe Operating Area
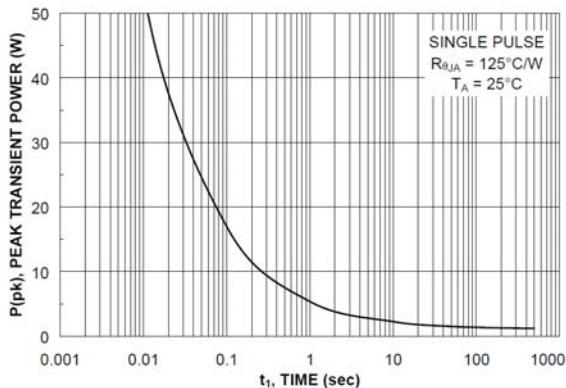
Figure 10. Single Pulse Maximum Power Dissipation
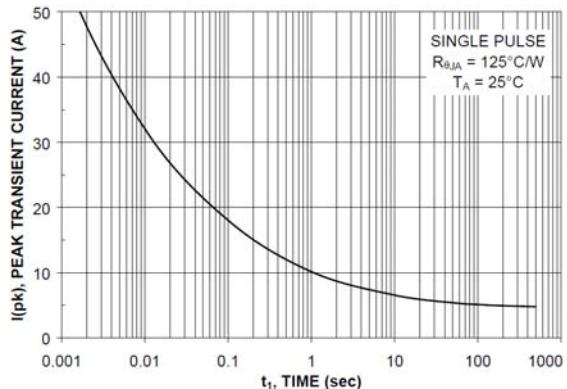
Figure 11. Single Pulse Maximum Peak Current
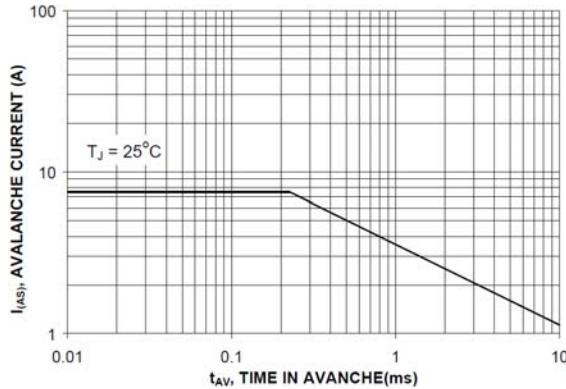
Figure 12. Unclamped Inductive Switching Capability

Typical Characteristics

$$R_{\theta JA}(t) = r(t) * R_{\theta JA}$$

$$R_{\theta JA} = 125^\circ C/W$$

$$T_J - T_A = P * R_{\theta JA}(t)$$

Duty Cycle, $D = t_1 / t_2$
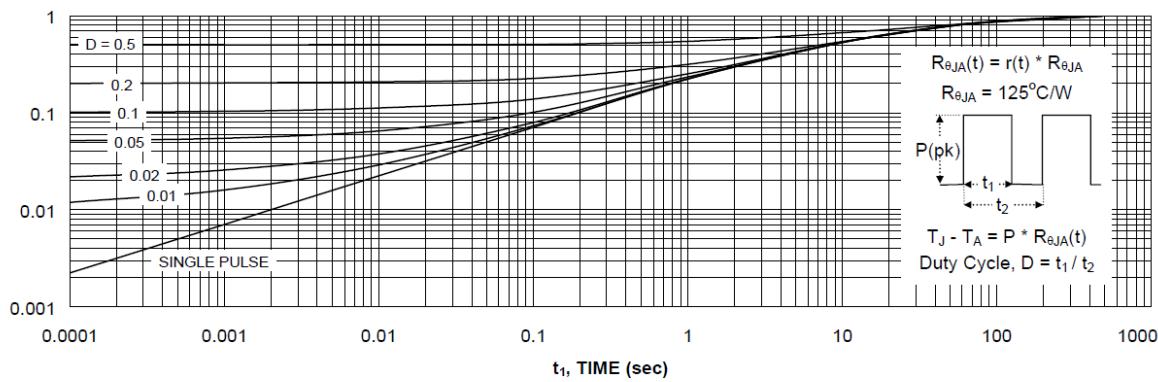
Figure 13. Transient Thermal Response Curve

PUBLICATION ORDERING INFORMATION

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