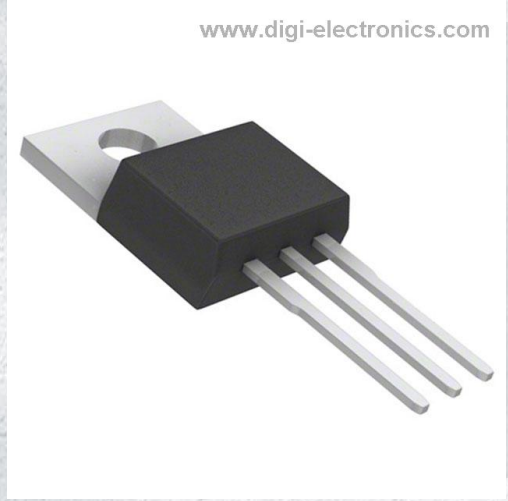
FDP8443-F085 Datasheet



DiGi Electronics Part Number	FDP8443-F085-DG
Manufacturer	onsemi
Manufacturer Product Number	FDP8443-F085
Description	MOSFET N-CH 40V 20A/80A TO220-3
Detailed Description	N-Channel 40 V 20A (Ta), 80A (Tc) 188W (Tc) Through Hole TO-220-3

https://www.DiGi-Electronics.com

Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
FDP8443-F085	onsemi
Series:	Product Status:
PowerTrench®	Obsolete
FET Type:	Technology:
N-Channel	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	Current - Continuous Drain (Id) @ 25°C:
40 V	20A (Ta), 80A (Tc)
Drive Voltage (Max Rds On, Min Rds On):	Rds On (Max) @ Id, Vgs:
10V	3.5mOhm @ 80A, 10V
Vgs(th) (Max) @ Id:	Gate Charge (Qg) (Max) @ Vgs:
4V @ 250µA	185 nC @ 10 V
Vgs (Max):	Input Capacitance (Ciss) (Max) @ Vds:
±20V	9310 pF @ 25 V
FET Feature:	Power Dissipation (Max):
-	188W (Tc)
Operating Temperature:	Grade:
-55°C ~ 175°C (TJ)	Automotive
Qualification:	Mounting Type:
AEC-Q101	Through Hole
Supplier Device Package:	Package / Case:
TO-220-3	TO-220-3
Base Product Number:	
FDP84	

Environmental & Export classification

Moisture Sensitivity Level (MSL):	REACH Status:
1 (Unlimited)	REACH Unaffected
ECCN:	HTSUS:
EAR99	8541.29.0095

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FDP8443-F085

N-Channel PowerTrench® MOSFET

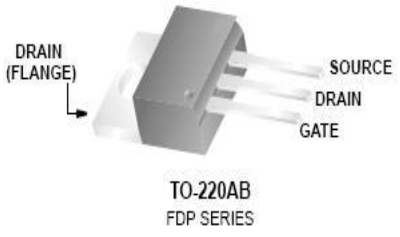
40V, 80A, 3.5mΩ

Features

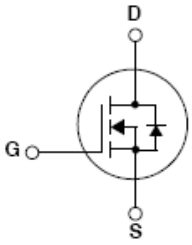
- Typ $r_{DS(on)}$ = 2.7mΩ at V_{GS} = 10V, I_D = 80A
- Typ $Q_{g(10)}$ = 142nC at V_{GS} = 10V
- Low Miller Charge
- Low Q_{rr} Body Diode
- UIS Capability (Single Pulse and Repetitive Pulse)
- Qualified to AEC Q101
- RoHS Compliant

Applications

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



TO-220AB
FDP SERIES



September-2017, Rev. 1

Publication Order Number:
FDP8443-F085/D

MOSFET Maximum Ratings T_C = 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 (T_C < 144°C, V_{GS} = 10V)	80	A
	Continuous (T_{amb} = 25°C, V_{GS} = 10V, with $R_{\theta JA}$ = 62°C/W)	20	
	Pulsed	See Figure 4	
E_{AS}	Single Pulse Avalanche Energy (Note 1)	531	mJ
P_D	Power Dissipation	188	W
	Derate above 25°C	1.25	W/°C
T_J, T_{STG}	Operating and Storage Temperature	-55 to +175	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance Junction to Case	0.8	°C/W
$R_{\theta JA}$	Thermal Resistance Junction to Ambient (Note 2)	62	°C/W

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDP8443	FDP8443-F085	TO-220AB	Tube	N/A	50 units

Electrical Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
B_{VDSS}	Drain to Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 32V, V_{GS} = 0V	-	-	1	μA
		V_{DS} = 32V, V_{GS} = 0V, T_C = 150°C	-	-	250	
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = 250μA	2	2.8	4	V
$r_{DS(on)}$	Drain to Source On Resistance	I_D = 80A, V_{GS}= 10V	-	2.7	3.5	mΩ
		I_D = 80A, V_{GS}= 10V, T_J = 175°C	-	4.7	6.1	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1MHz	-	9310	-	pF
C_{oss}	Output Capacitance		-	800	-	pF
C_{rss}	Reverse Transfer Capacitance		-	510	-	pF
R_G	Gate Resistance	V_{GS} = 0.5V, f = 1MHz	-	0.9	-	Ω
$Q_{g(TOT)}$	Total Gate Charge at 10V	V_{GS} = 0 to 10V, V_{DD} = 20V, I_D = 35A, I_g = 1mA	-	142	185	nC
$Q_{g(TH)}$	Threshold Gate Charge	V_{GS} = 0 to 2V, V_{DD} = 20V, I_D = 35A, I_g = 1mA	-	17.5	23	nC
Q_{gs}	Gate to Source Gate Charge	V_{DD} = 20V, I_D = 35A, I_g = 1mA	-	36	-	nC
Q_{gs2}	Gate Charge Threshold to Plateau	V_{DD} = 20V, I_D = 35A, I_g = 1mA	-	18.8	-	nC
Q_{gd}	Gate to Drain “Miller“ Charge	V_{DD} = 20V, I_D = 35A, I_g = 1mA	-	32	-	nC

Electrical Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units

Switching Characteristics (V_{GS} = 10V)

t_{on}	Turn-On Time	V_{DD} = 20V, I_D = 35A V_{GS} = 10V, R_{GS} = 2Ω	-	-	58	ns
$t_{d(on)}$	Turn-On Delay Time		-	18.4	-	ns
t_r	Rise Time		-	17.9	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	55	-	ns
t_f	Fall Time		-	13.5	-	ns
t_{off}	Turn-Off Time		-	-	109	ns

Drain-Source Diode Characteristics

V_{SD}	Source to Drain Diode Voltage	I_{SD} = 35A	-	0.8	1.25	V
		I_{SD} = 15A	-	0.8	1.0	
t_{rr}	Reverse Recovery Time	I_{SD} = 35A, dI_{SD}/dt = 100A/μs	-	42	55	ns
Q_{rr}	Reverse Recovery Charge		-	48	62	nC

Notes:

1: Starting T_J = 25°C, L = 0.26mH, I_{AS} = 64A.

2: Pulse width = 100s.

Typical Characteristics

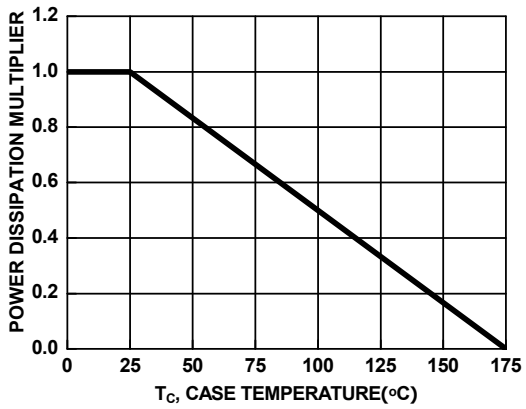


Figure 1. Normalized Power Dissipation vs Case Temperature

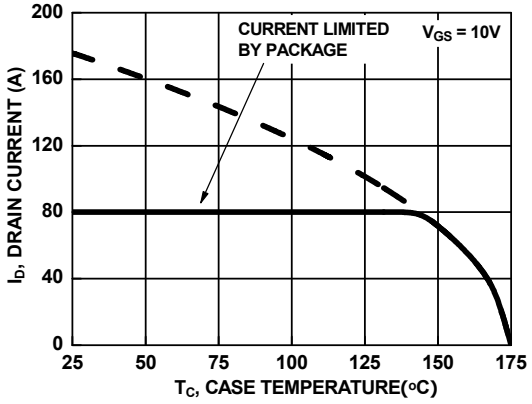


Figure 2. Maximum Continuous Drain Current vs Case Temperature

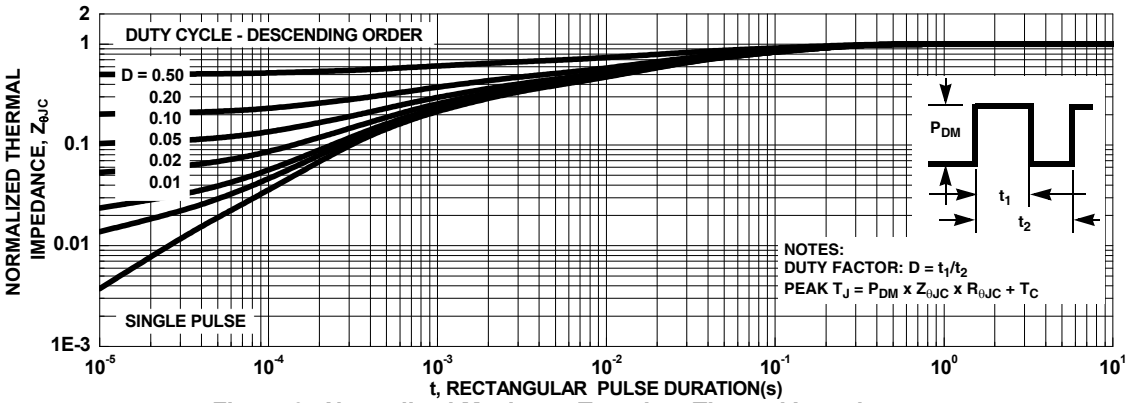


Figure 3. Normalized Maximum Transient Thermal Impedance

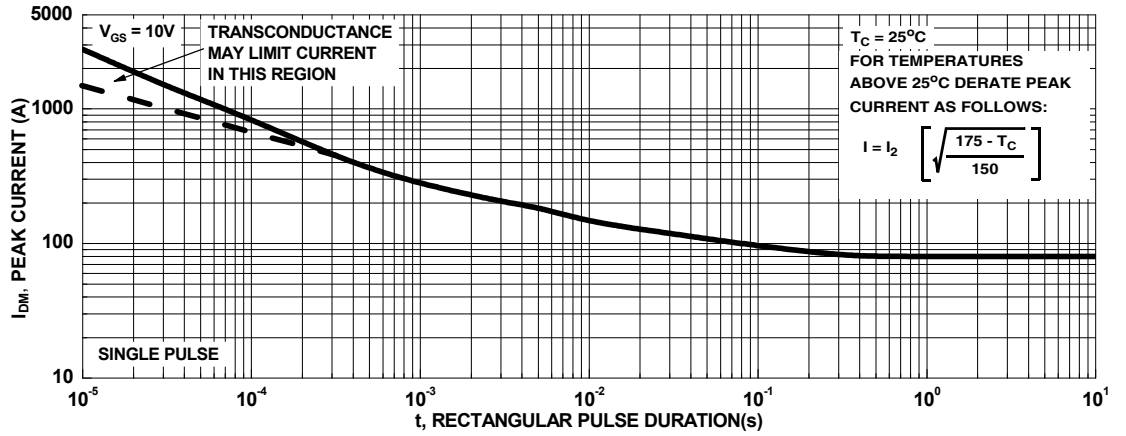


Figure 4. Peak Current Capability

Typical Characteristics

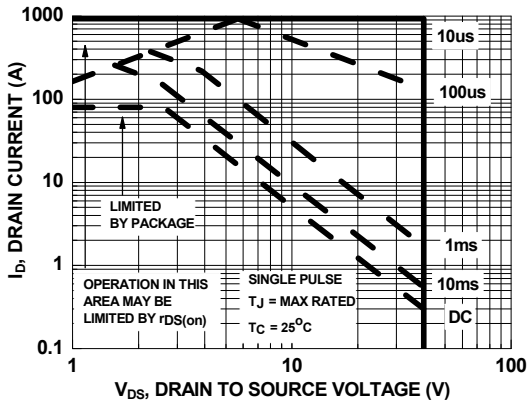


Figure 5. Forward Bias Safe Operating Area

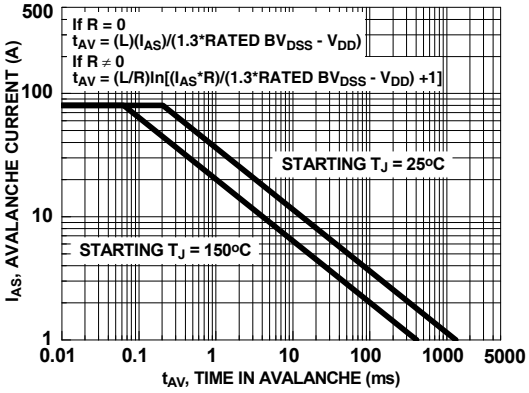


Figure 6. Unclamped Inductive Switching Capability

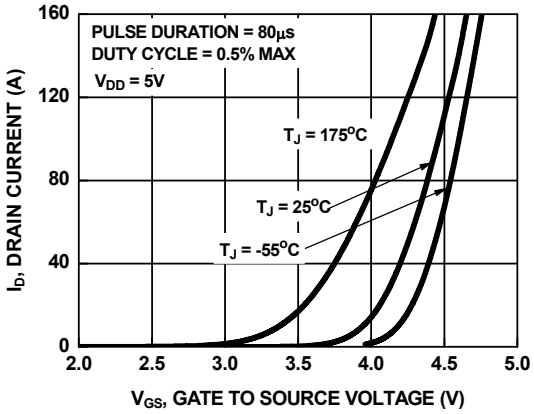


Figure 7. Transfer Characteristics

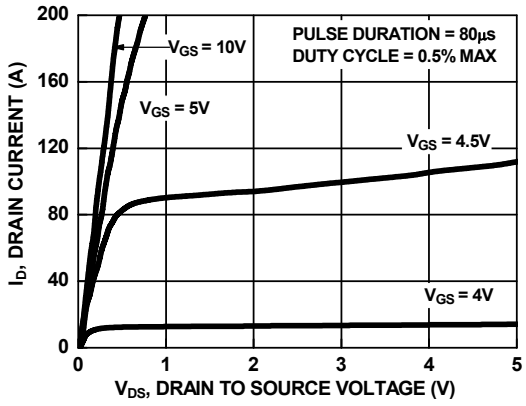


Figure 8. Saturation Characteristics

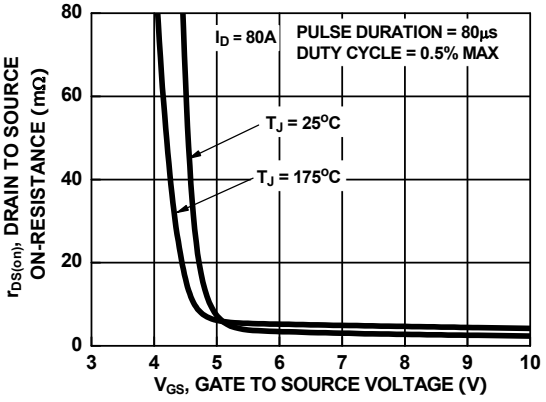


Figure 9. Drain to Source On-Resistance Variation vs Gate to Source Voltage

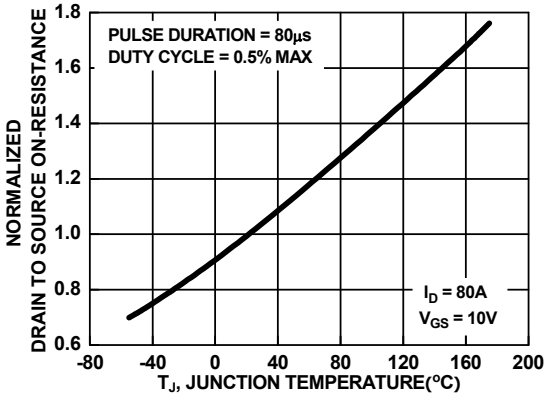


Figure 10. Normalized Drain to Source On Resistance vs Junction Temperature

Typical Characteristics

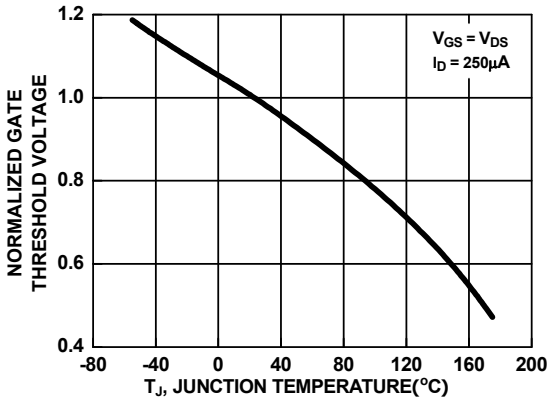


Figure 11. Normalized Gate Threshold Voltage vs Junction Temperature

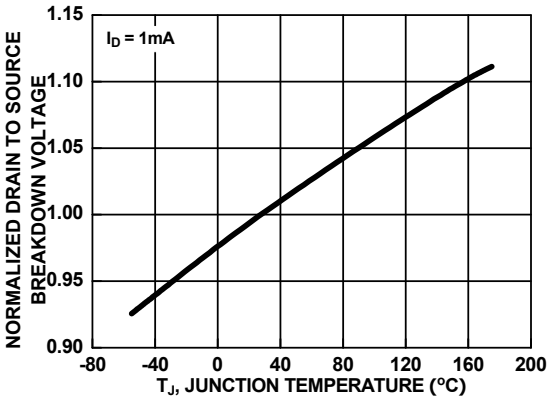


Figure 12. Normalized Drain to Source Breakdown Voltage vs Junction Temperature

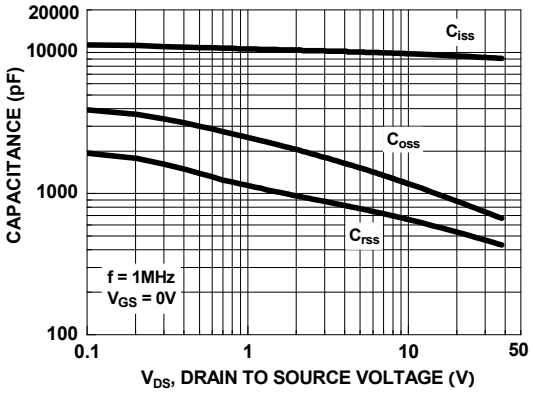


Figure 13. Capacitance vs Drain to Source Voltage

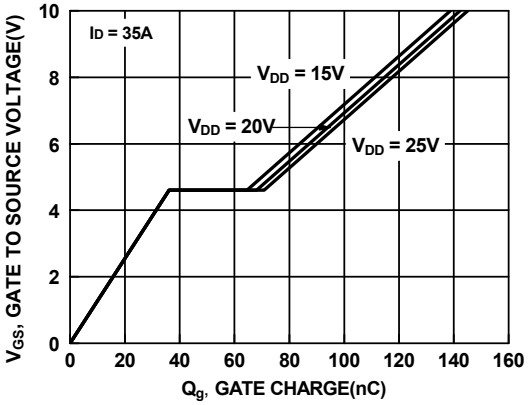


Figure 14. Gate Charge vs Gate to Source Voltage

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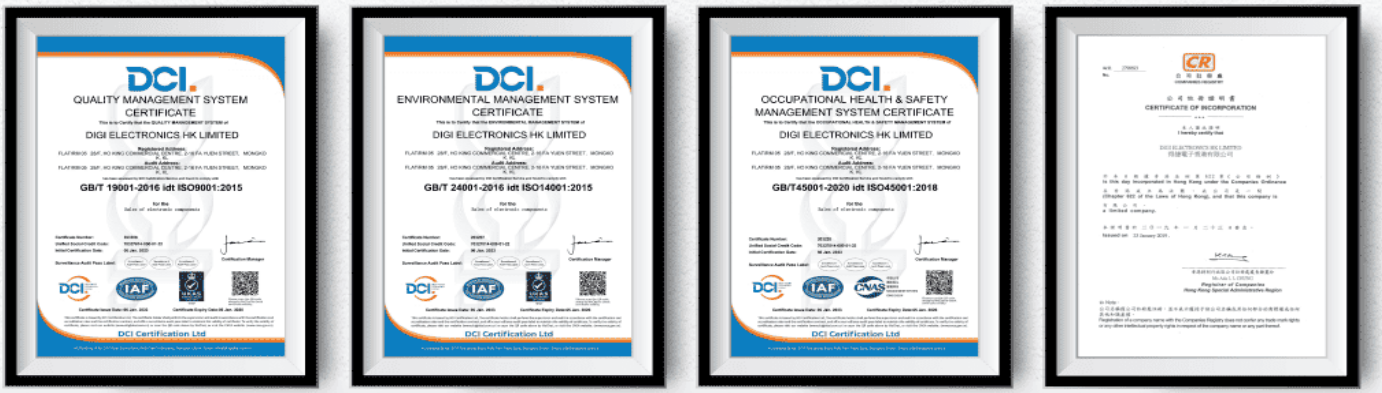

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