FDP8880 / FDB8880
N-Channel PowerTrench® MOSFET
30V, 54A, 11.6mΩ

Features

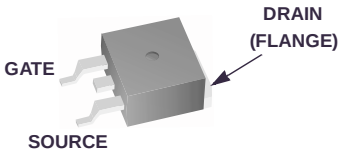
- $r_{DS(ON)}$ = 14.5mΩ, V_{GS} = 4.5V, I_D = 40A
- $r_{DS(ON)}$ = 11.6mΩ, V_{GS} = 10V, I_D = 40A
- High performance trench technology for extremely low $r_{DS(ON)}$
- Low gate charge
- High power and current handling capability

Applications

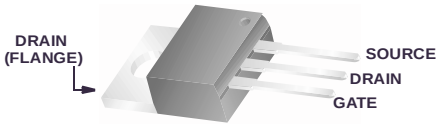
- DC/DC converters

General Description

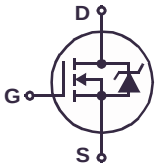
This N-Channel MOSFET has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for low gate charge, low $r_{DS(ON)}$ and fast switching speed.



TO-263AB
FDB SERIES



TO-220AB
FDP SERIES



MOSFET Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{DSS}	Drain to Source Voltage	30	V
V_{GS}	Gate to Source Voltage	±20	V
I_D	Drain Current Continuous (T_C = 25°C, V_{GS} = 10V)	54	A
	Continuous (T_C = 25°C, V_{GS} = 4.5V)	48	A
	Continuous (T_{amb} = 25°C, V_{GS} = 10V, with $R_{\theta JA}$ = 43°C/W)	11	A
	Pulsed	Figure 4	A
E_{AS}	Single Pulse Avalanche Energy (Note 1)	31	mJ
P_D	Power dissipation	55	W
	Derate above 25°C	0.37	W/°C
T_J, T_{STG}	Operating and Storage Temperature	-55 to 175	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance Junction to Case TO-220,TO-263	2.73	°C/W
$R_{\theta JA}$	Thermal Resistance Junction to Ambient TO-220,TO-262 (Note 2)	62	°C/W
$R_{\theta JA}$	Thermal Resistance Junction to Ambient TO-263, 1in^2 copper pad area	43	°C/W

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDP8880	FDP8880	TO-220AB	Tube	N/A	50 units
FDB8880	FDB8880	TO-263AB	330mm	24mm	800 units
FDP8880	FDP8880_NL (Note 3)	TO-220AB	Tube	N/A	50 units
FDB8880	FDB8880_NL (Note 3)	TO-263AB	330mm	24mm	800 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		30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 24V V_{GS} = 0V		-	-	1	µA
			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		1.2	-	2.5	V
$r_{DS(ON)}$	Drain to Source On Resistance	I_D = 40A, V_{GS} = 10V		-	0.0095	0.0116	Ω
		I_D = 40A, V_{GS} = 4.5V		-	0.012	0.0145	
		I_D = 40A, V_{GS} = 10V, T_J = 175°C		-	0.015	0.019	

Dynamic Characteristics

C_{ISS}	Input Capacitance	V_{DS} = 15V, V_{GS} = 0V, f = 1MHz	-	1240	-	pF
C_{OSS}	Output Capacitance		-	255	-	pF
C_{RSS}	Reverse Transfer Capacitance		-	147	-	pF
R_G	Gate Resistance	V_{GS} = 0.5V, f = 1MHz	-	2.7	-	Ω
$Q_{g(TOT)}$	Total Gate Charge at 10V	V_{GS} = 0V to 10V; V_{DD} = 15V, I_D = 40A, I_g = 1.0mA	-	22	29	nC
$Q_{g(5)}$	Total Gate Charge at 5V	V_{GS} = 0V to 5V	-	12	16	nC
$Q_{g(TH)}$	Threshold Gate Charge	V_{GS} = 0V to 1V	-	1.6	2.1	nC
Q_{gs}	Gate to Source Gate Charge		-	3.2	-	nC
Q_{gs2}	Gate Charge Threshold to Plateau		-	2.0	-	nC
Q_{gd}	Gate to Drain “Miller” Charge		-	4.8	-	nC

Switching Characteristics (V_{GS} = 10V)

t_{ON}	Turn-On Time	V_{DD} = 15V, I_D = 40A, V_{GS} = 10V, R_{GS} = 13.6Ω	-	-	171	ns
$t_{d(ON)}$	Turn-On Delay Time		-	8	-	ns
t_r	Rise Time		-	107	-	ns
$t_{d(OFF)}$	Turn-Off Delay Time		-	47	-	ns
t_f	Fall Time		-	51	-	ns
t_{OFF}	Turn-Off Time		-	-	147	ns

Drain-Source Diode Characteristics

V_{SD}	Source to Drain Diode Voltage	I_{SD} = 40A	-	-	1.25	V
		I_{SD} = 3.5A	-	-	1.0	V
t_{rr}	Reverse Recovery Time	I_{SD} = 40A, dI_{SD}/dt = 100A/µs	-	-	27	ns
Q_{RR}	Reverse Recovered Charge	I_{SD} = 40A, dI_{SD}/dt = 100A/µs	-	-	18	nC

Notes:
1: Starting T_J = 25°C, L = 34uH, I_{AS} = 43A,Vdd = 27V, Vgs = 10V.
2: Pulse width = 100s.
3: FDP8880_NL / FDB8880_NL is lead free product.
FDP8880_NL / FDB8880_NL marking will appear on the reel label.

Typical Characteristics T_C = 25°C unless otherwise noted

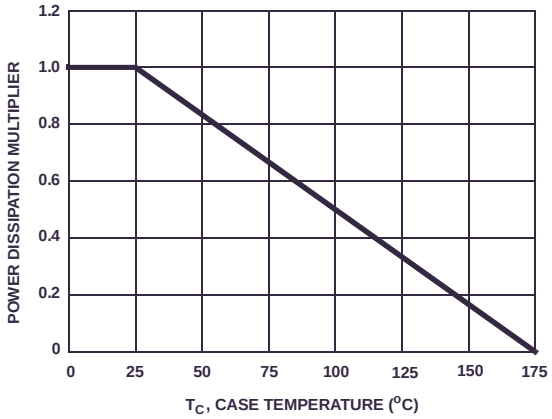


Figure 1. Normalized Power Dissipation vs Case Temperature

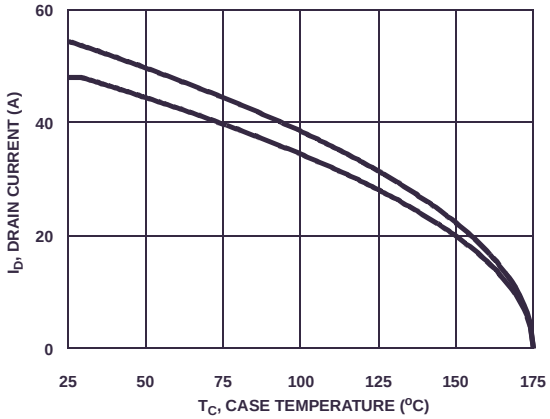


Figure 2. Maximum Continuous Drain Current vs Case Temperature

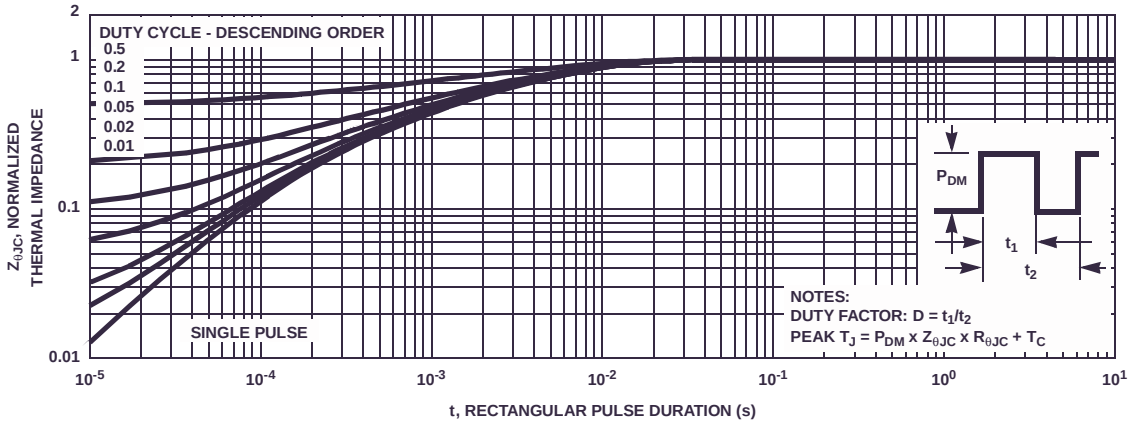


Figure 3. Normalized Maximum Transient Thermal Impedance

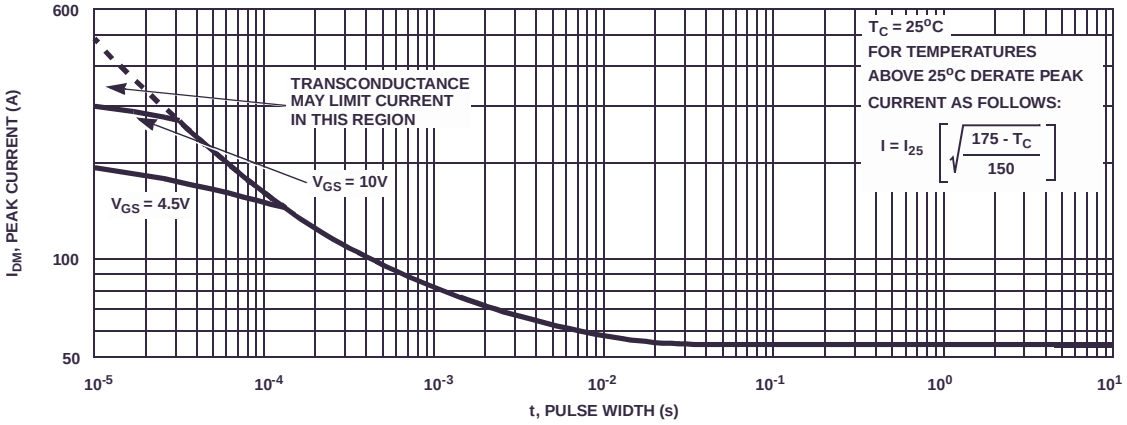


Figure 4. Peak Current Capability