

FDP7030BL/FDB7030BL

N-Channel Logic Level PowerTrench^o MOSFET

General Description

This N-Channel Logic Level MOSFET has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers.

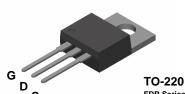
These MOSFETs feature faster switching and lower gate charge than other MOSFETs with comparable $R_{\text{DS(ON)}}\text{specifications}.$

The result is a MOSFET that is easy and safer to drive (even at very high frequencies), and DC/DC power supply designs with higher overall efficiency.

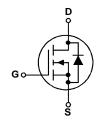
It has been optimized for low gate charge, low $R_{\text{DS}(\text{ON})}$ and fast switching speed.

Features

- 60 A, 30 V $R_{DS(ON)} = 9 \text{ m}\Omega @ V_{GS} = 10 \text{ V}$ $R_{DS(ON)} = 12 \text{ m}\Omega @ V_{GS} = 4.5 \text{ V}$
- Critical DC electrical parameters specified at elevated temperature
- High performance trench technology for extremely low $R_{\text{DS}(\text{ON})}$
- 175°C maximum junction temperature rating







TO-220 S TO-263AB FDP Series FDB Series

Absolute Maximum Ratings T_A=25°C unless otherwise noted

Symbol	Parameter		Ratings	Units
V _{DSS}	Drain-Source Voltage		30	V
V _{GSS}	Gate-Source Voltage		± 20	V
I _D	Drain Current - Continuous	(Note 1)	60	A
	Pulsed	(Note 1)	180	
P _D	Total Power Dissipation @ T _C = 25°C		60	W
	Derate above 25°C		0.4	W/°C
T _J , T _{STG}	Operating and Storage Junction Temperature Range		-65 to +175	°C

Thermal Characteristics

$R_{ heta JC}$	Thermal Resistance, Junction-to-Case	2.5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	°C/W

Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape width	Quantity
FDB7030BL	FDB7030BL	13"	24mm	800 units
FDP7030BL	FDP7030BL	Tube	n/a	45

Symbol	Parameter	Test Conditions	Min	Тур	Max	Units
Drain-Sc	ource Avalanche Ratings (Note	1)		•		•
W _{DSS}	Single Pulse Drain-Source Avalanche Energy	$V_{DD} = 15 \text{ V}, \qquad I_{D} = 60 \text{ A}$			73	mJ
I _{AR}	Maximum Drain-Source Avalanche Current				60	Α
Off Char	acteristics		<u> </u>	ı	l .	I
BV _{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0 \text{ V}, \qquad I_{D} = 250 \mu\text{A}$	30			V
ΔBV _{DSS} ΔT _J	Breakdown Voltage Temperature Coefficient	I_D = 250 μ A, Referenced to 25°C		22		mV/°C
I _{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 24 \text{ V}, \qquad V_{GS} = 0 \text{ V}$			1	μΑ
I _{GSS}	Gate-Body Leakage	$V_{GS} = \pm 20 \text{ V}, V_{DS} = 0 \text{ V}$			± 100	nA
On Char	acteristics (Note 2)					
V _{GS(th)}	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 250 \mu A$	1	1.9	3	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	I_D = 250 μ A, Referenced to 25°C		-5		mV/°C
R _{DS(on)}	Static Drain–Source On– Resistance	$V_{GS} = 10 \text{ V}, \qquad I_D = 30 \text{ A}$ $V_{GS} = 4.5 \text{ V}, \qquad I_D = 25 \text{ A}$ $V_{GS} = 10 \text{ V}, I_D = 30 \text{ A}, T_J = 125^{\circ}\text{C}$		6.8 8.5 10.1	9 12 18	mΩ
I _{D(on)}	On-State Drain Current	$V_{GS} = 10 \text{ V}, \qquad V_{DS} = 10 \text{ V}$	30			Α
g FS	Forward Transconductance	$V_{DS} = 10V$, $I_{D} = 30 \text{ A}$		85		S
	Characteristics	1		l.		I
C _{iss}	Input Capacitance	$V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V},$		1760		pF
Coss	Output Capacitance	f = 1.0 MHz		440		pF
C _{rss}	Reverse Transfer Capacitance	1		185		pF
R _G	Gate Resistance	V _{GS} = 15 mV, f = 1.0 MHz		1.2		Ω
Switchin	g Characteristics (Note 2)		•	•		
t _{d(on)}	Turn-On Delay Time	$V_{DD} = 15V$, $I_{D} = 1 A$,		12	22	ns
t _r	Turn-On Rise Time	$V_{GS} = 10 \text{ V}, \qquad R_{GEN} = 6 \Omega$		12	22	ns
$t_{d(off)}$	Turn-Off Delay Time	1		30	48	ns
t _f	Turn-Off Fall Time			19	33	ns
Q _g	Total Gate Charge	$V_{DS} = 15 \text{ V}, \qquad I_{D} = 30 \text{ A},$		17	24	nC
Q _{gs}	Gate-Source Charge	$V_{GS} = 5 V$		5.4		nC
Q_{gd}	Gate-Drain Charge	1		6.4		nC
	ource Diode Characteristics	and Maximum Ratings				
I _s	Maximum Continuous Drain–Source				60	Α
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 30 A (Note 1)		0.92	1.3	V
t _{rr}	Diode Reverse Recovery Time	I _F = 30 A,			30	nS
Q _{rr}	Diode Reverse Recovery Charge	$d_{iF}/d_t = 100 \text{ A/}\mu\text{s}$			20	nC

Notes

^{1.} Pulse Test: Pulse Width < 300μs, Duty Cycle < 2.0%

Typical Characteristics

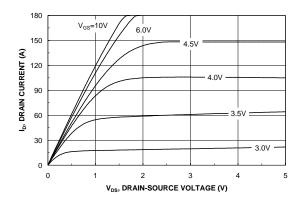


Figure 1. On-Region Characteristics.

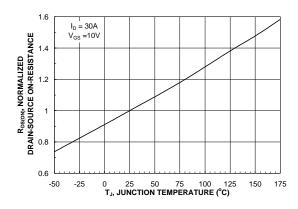


Figure 3. On-Resistance Variation with Temperature.

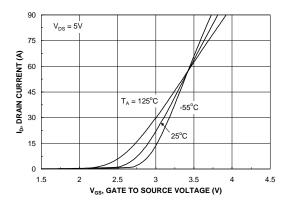


Figure 5. Transfer Characteristics.

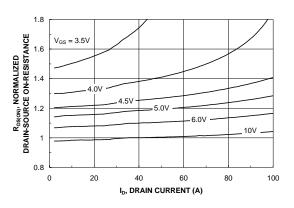


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

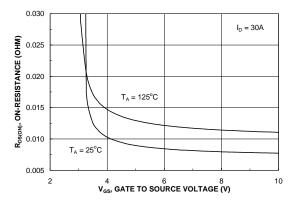


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

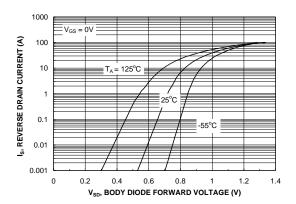
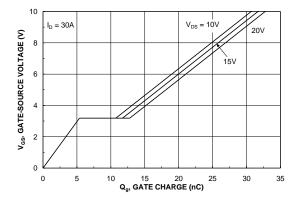


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

Typical Characteristics



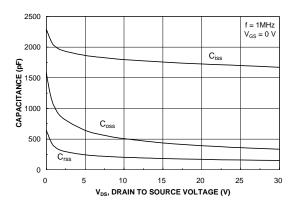
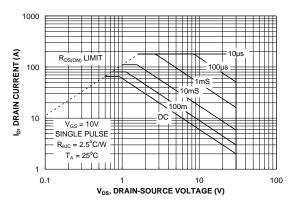


Figure 7. Gate Charge Characteristics.





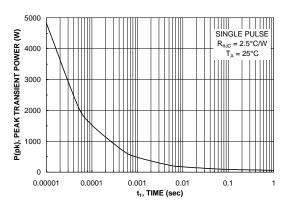


Figure 9. Maximum Safe Operating Area.

Figure 10. Single Pulse Maximum Power Dissipation.

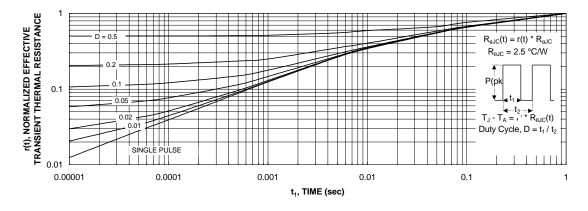


Figure 11. Transient Thermal Response Curve.

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