FAIRCHILD

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FDP8030L/FDB8030L

N-Channel Logic Level PowerTrench® 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 $R_{DS(on)}$ 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.

Features

- 80 A, 30 V. $R_{DS(ON)} = 0.0035\ \Omega$ @ $V_{GS} = 10$ V
  $R_{DS(ON)} = 0.0045\ \Omega$ @ $V_{GS} = 4.5$ V

- Critical DC electrical parameters specified at elevated temperature

- Rugged internal source-drain diode can eliminate the need for an external Zener diode transient suppressor

- High performance trench technology for extremely low $R_{DS(ON)}$

- 175°C maximum junction temperature rating
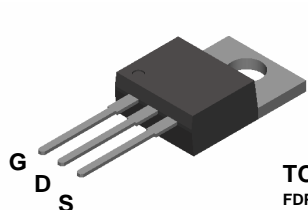
TO-220
FDP Series
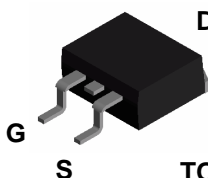
TO-263AB
FDB Series
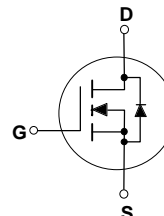
Absolute Maximum Ratings T_A=25°C unless otherwise noted

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)	80	A
	– Pulsed	(Note 1)	300	
P_D	Total Power Dissipation @# T_C = 25°C		187	W
	Derate above 25°C		1.25	W°C
T_J, T_{STG}	Operating and Storage Junction Temperature Range		-65 to +175	°C
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		275	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		0.8	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient		62.5	°C/W

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FDP8030L Rev C(W)

Electrical Characteristics

$T_A = 25°C$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Drain-Source Avalanche Ratings (Note 1)						
W_{DSS}	Single Pulse Drain-Source Avalanche Energy	$V_{DD} = 20$ V, $I_D = 80$ A			1500	mJ
I_{AR}	Maximum Drain-Source Avalanche Current				80	A
Off Characteristics						
BV_{DSS}	Drain–Source Breakdown Voltage	$V_{GS} = 0$ V, $I_D = 250$ μA	30			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250$ μA, Referenced to 25°C		23		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 24$ V, $V_{GS} = 0$ V			10	μA
I_{GSSF}	Gate–Body Leakage, Forward	$V_{GS} = 20$ V, $V_{DS} = 0$ V			100	nA
I_{GSSR}	Gate–Body Leakage, Reverse	$V_{GS} = -20$ V $V_{DS} = 0$ V			−100	nA
On Characteristics (Note 2)						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 250$ μA	1	1.5	2	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	$I_D = 250$ μA, Referenced to 25°C		−5		mV/°C
$R_{DS(on)}$	Static Drain–Source On–Resistance	$V_{GS} = 10$ V, $I_D = 80$ A $T_J = 125°C$		3.1 4.0	3.5 5.6	mΩ
		$V_{GS} = 4.5$ V, $I_D = 70$ A		3.6	4.5	
$I_{D(on)}$	On–State Drain Current	$V_{GS} = 10$ V, $V_{DS} = 10$ V	60			A
g_{FS}	Forward Transconductance	$V_{DS} = 10$ V, $I_D = 80$ A		170		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS} = 15$ V, $V_{GS} = 0$ V, f = 1.0 MHz		10500		pF
C_{oss}	Output Capacitance			2700		pF
C_{rss}	Reverse Transfer Capacitance			1650		pF
Switching Characteristics (Note 2)						
$t_{D(on)}$	Turn–On Delay Time	$V_{DD} = 15$ V, $I_D = 50$ A, $V_{GS} = 4.5$ V, $R_{GEN} = 10$ Ω $R_{GS} = 10$ Ω		20	35	ns
t_r	Turn–On Rise Time			185	225	ns
$t_{D(off)}$	Turn–Off Delay Time			160	200	ns
t_f	Turn–Off Fall Time			200	240	ns
Q_g	Total Gate Charge	$V_{DS} = 15$ V, $I_D = 80$ A, $V_{GS} = 5$ V		120	170	nC
Q_{gs}	Gate–Source Charge			27		nC
Q_{gd}	Gate–Drain Charge			48		nC
Drain–Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain–Source Diode Forward Current (Note 1)				80	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current (Note 1)				300	A
V_{SD}	Drain–Source Diode Forward Voltage	$V_{GS} = 0$ V, $I_S = 80$ A (Note 1)		1	1.3	V

Notes:

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

FDP8030L Rev C(W)

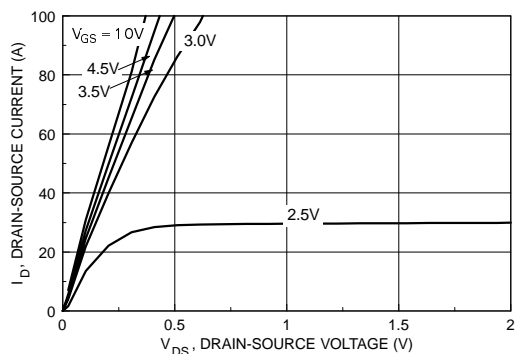## Typical Characteristics

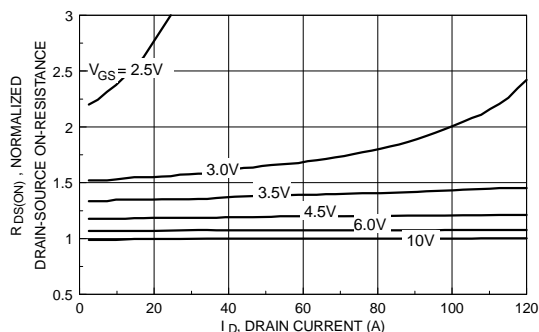Figure 1. On-Region Characteristics.

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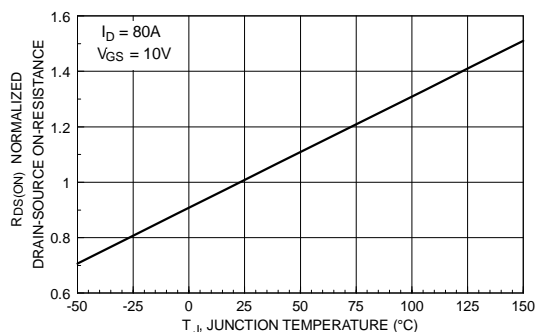Drain Current and Gate Voltage.

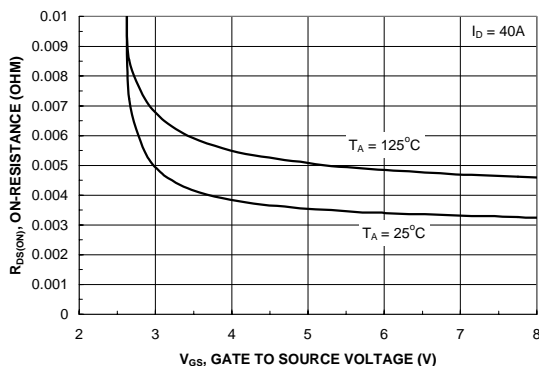Figure 3. On-Resistance Variation with
Temperature.

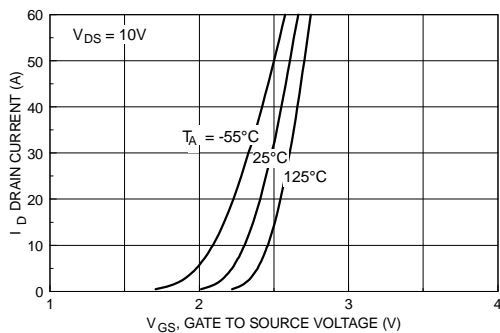Figure 4. On-Resistance Variation with
Gate-to-Source Voltage.
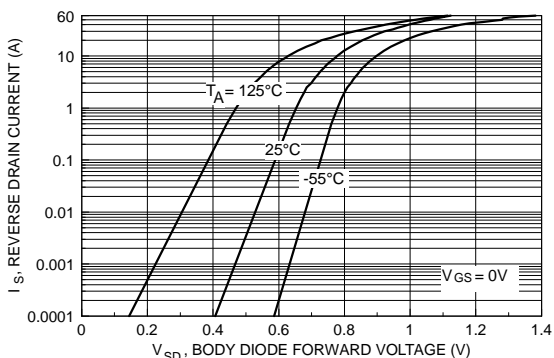

Figure 5. Transfer Characteristics.

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

FDP8030L Rev C(W)

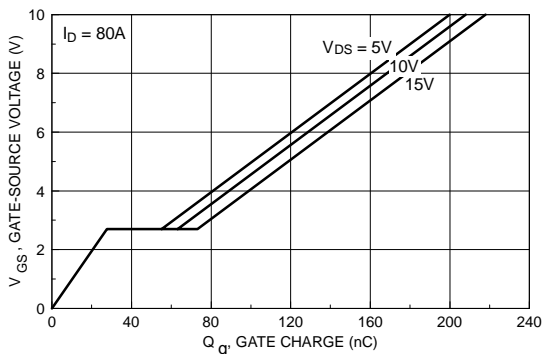## Typical Characteristics

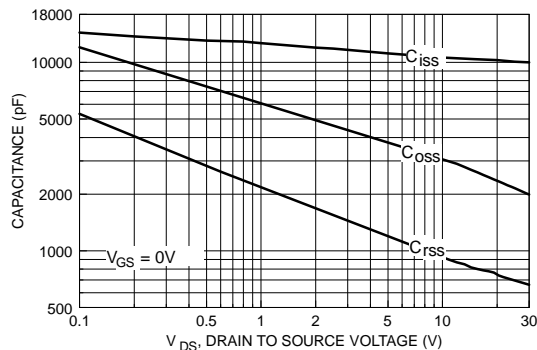**Figure 7. Gate Charge Characteristics.**

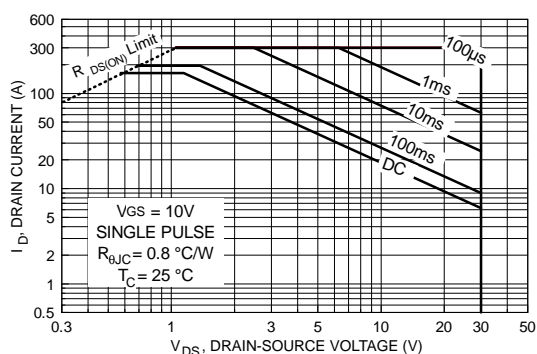**Figure 8. Capacitance Characteristics.**

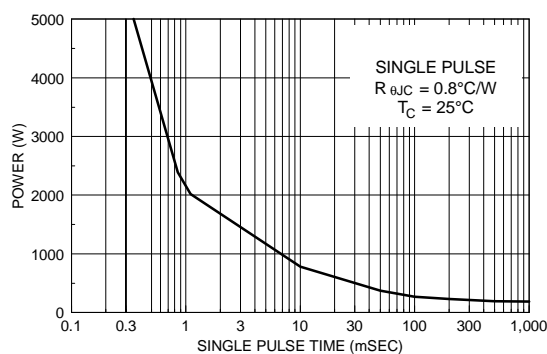**Figure 9. Maximum Safe Operating Area.**

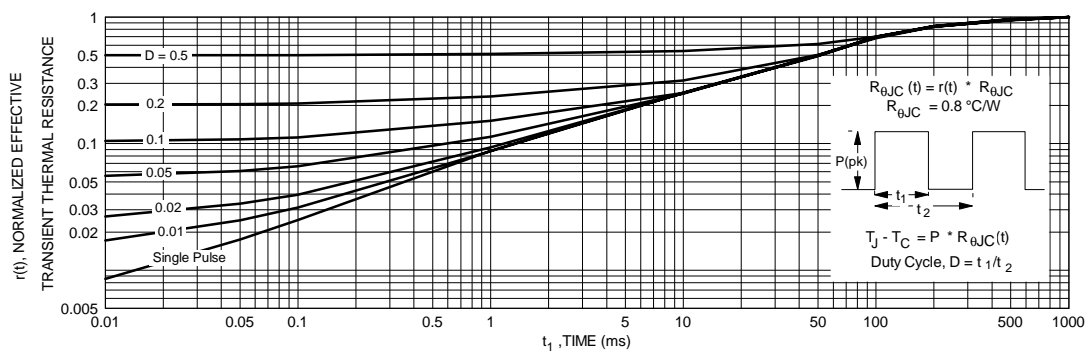**Figure 10. Single Pulse Maximum Power Dissipation.**

Figure 11. Transient Thermal Response Curve.

**Thermal characterization performed using the conditions described in Note 1c.
Transient thermal response will change depending on the circuit board design.**

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