October 2010

FDB8160_F085

N-Channel PowerTrench® MOSFET

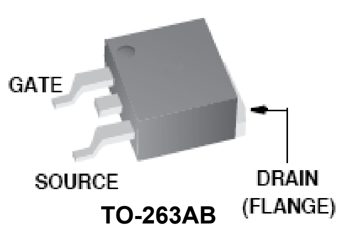
30V, 80A, 1.8mΩ

Features

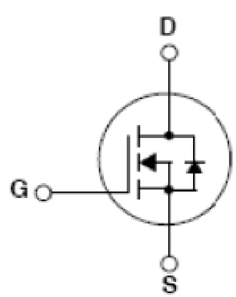
- Typ $r_{DS(on)}$ = 1.5mΩ at V_{GS} = 10V, I_D = 80A
- Typ $Q_{g(10)}$ = 187nC at V_{GS} = 10V
- Low Miller Charge
- Low Qrr Body Diode
- UIS Capability (Single Pulse and Repetitive Pulse)
- Qualified to AEC Q101
- RoHS Compliant

Applications

- 12V Automotive Load Control
- Starter/Alternator Systems
- Electronic Power Steering Systems
- DC/DC converter



TO-263AB
FDB 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 < 160°C, V_{GS} = 10V)		80	A
	Pulsed		See Figure 4	
E_{AS}	Single Pulse Avalanche Energy	(Note 1)	1290	mJ
P_D	Power Dissipation		254	W
	Derate above 25°C		1.7	W/°C
T_J, T_{STG}	Operating and Storage Temperature		-55 to +175	°C

Thermal Characteristics

$R_{\theta JC}$	Maximum Thermal Resistance Junction to Case	0.59	°C/W
$R_{\theta JA}$	Maximum 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
FDB8160	FDB8160_F085	TO-263AB	330mm	24mm	800 units

Electrical Characteristics T_J = 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_J = 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	2.9	4	V
$r_{DS(on)}$	Drain to Source On Resistance	I_D = 80A, V_{GS}= 10V		-	1.5	1.8	mΩ
		I_D = 80A, V_{GS}= 10V, T_J = 175°C		-	2.6	3.1	mΩ
Dynamic Characteristics							
C_{iss}	Input Capacitance	V_{DS} = 15V, V_{GS} = 0V, f = 1MHz		-	11825	-	pF
C_{oss}	Output Capacitance			-	1810	-	pF
C_{rss}	Reverse Transfer Capacitance			-	1240	-	pF
Rg	Gate Resistance	f = 1MHz		-	1.75	-	Ω
$Q_{g(TOT)}$	Total Gate Charge at 10V	V_{GS} = 0 to 10V	V_{DD} = 15V, I_D = 80A	-	187	243	nC
$Q_{g(th)}$	Threshold Gate Charge	V_{GS} = 0 to 2V		-	20	26	nC
Q_{gs}	Gate to Source Gate Charge			-	43	-	nC
Q_{gs2}	Gate Charge Threshold to Plateau			-	23	-	nC
Q_{gd}	Gate to Drain “Miller“ Charge			-	57	-	nC

Electrical Characteristics $T_J = 25^oC$ unless otherwise noted

Switching Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
t_{on}	Turn-On Time	V_{DD} = 15V, I_D = 80A, V_{GS} = 10V, R_{GS} = 1.3Ω	-	-	60	ns
$t_{d(on)}$	Turn-On Delay Time		-	17.2	-	ns
t_r	Turn-On Rise Time		-	18.9	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	60	-	ns
t_f	Turn-Off Fall Time		-	27	-	ns
t_{off}	Turn-Off Time		-	-	137	ns

Drain-Source Diode Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
V_{SD}	Source to Drain Diode Voltage	I_{SD} = 80A	-	0.9	1.25	V
		I_{SD} = 40A	-	0.8	1.0	V
t_{rr}	Reverse Recovery Time	I_F = 80A, dI_{SD}/dt = 100A/µs	-	48	62	ns
Q_{rr}	Reverse Recovery Charge		-	42	55	nC

Notes:
1: Starting $T_J = 25^oC$, L = 0.63mH, I_{AS} = 64A
2: Pulse width = 100s.

This product has been designed to meet the extreme test conditions and environment demanded by the automotive industry. For a copy of the requirements, see AEC Q101 at: http://www.aecouncil.com/
All Fairchild Semiconductor products are manufactured, assembled and tested under ISO9000 and QS9000 quality systems certification.

Typical Characteristics

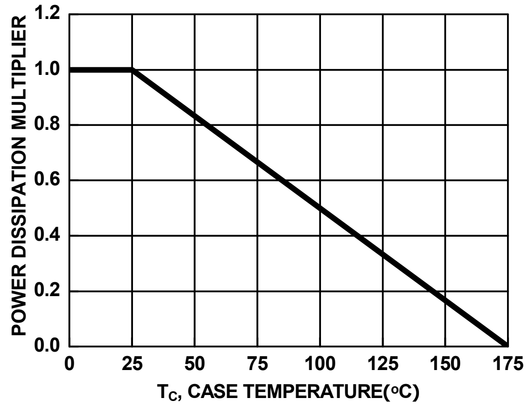


Figure 1. Normalized Power Dissipation vs Case Temperature

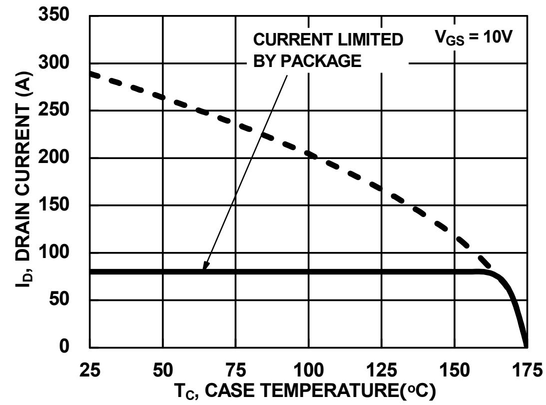


Figure 2. Maximum Continuous Drain Current vs Case Temperature

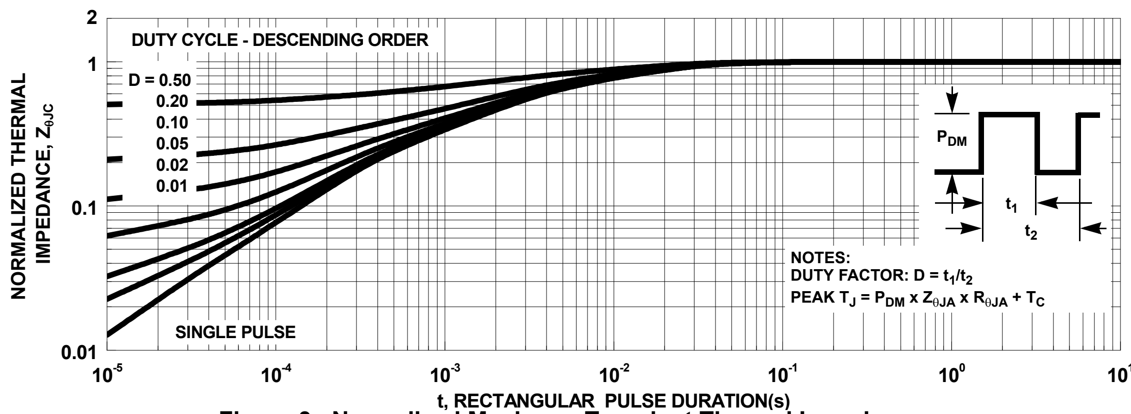


Figure 3. Normalized Maximum Transient Thermal Impedance

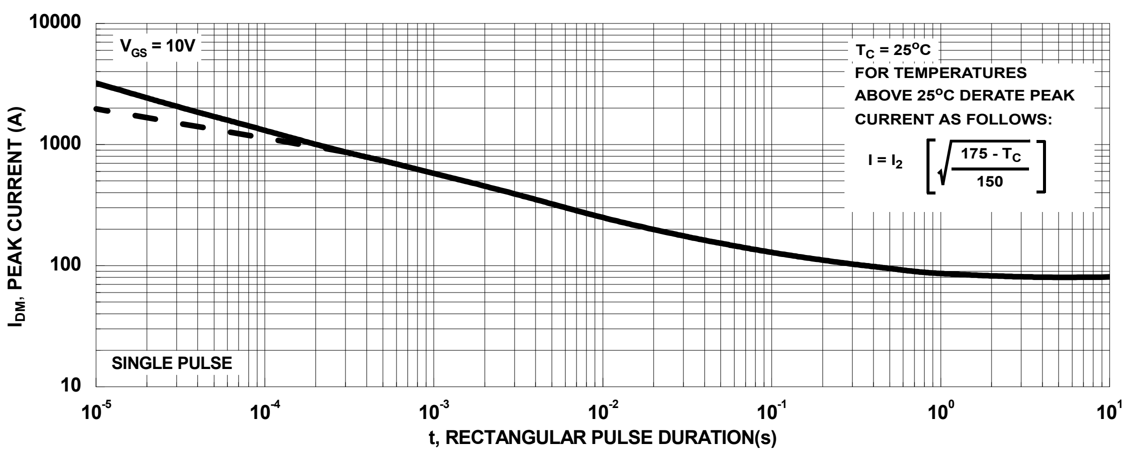


Figure 4. Peak Current Capability

Typical Characteristics

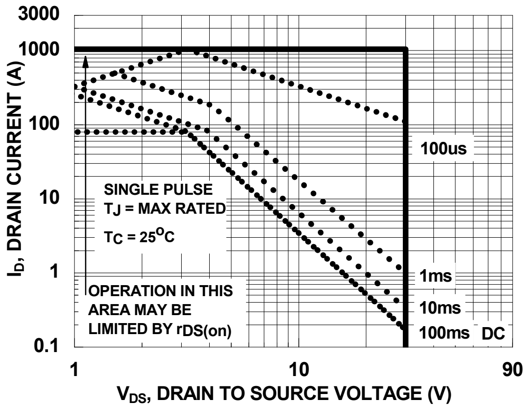
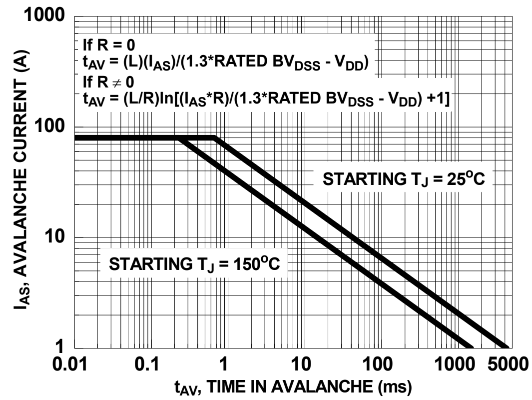


Figure 5. Forward Bias Safe Operating Area



NOTE: Refer to Fairchild Application Notes AN7514 and AN7515

Figure 6. Unclamped Inductive Switching Capability

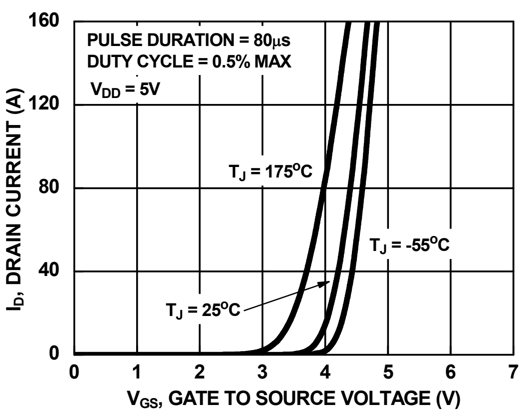


Figure 7. Transfer Characteristics

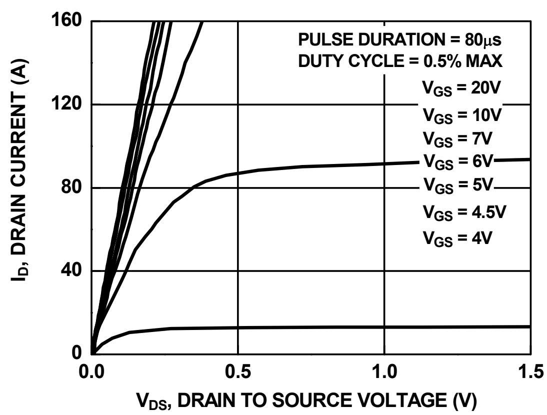


Figure 8. Saturation Characteristics

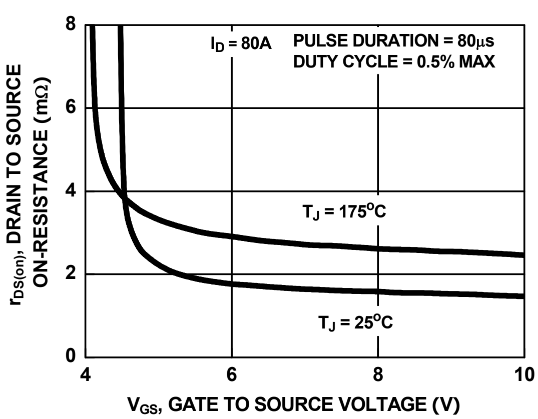


Figure 9. Drain to Source On-Resistance Variation vs Gate to Source Voltage

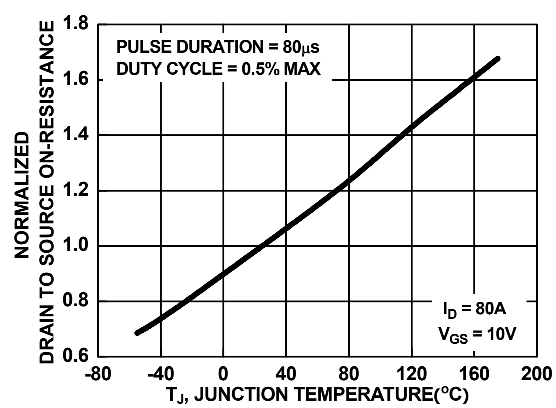


Figure 10. Normalized Drain to Source On Resistance vs Junction Temperature

Typical Characteristics

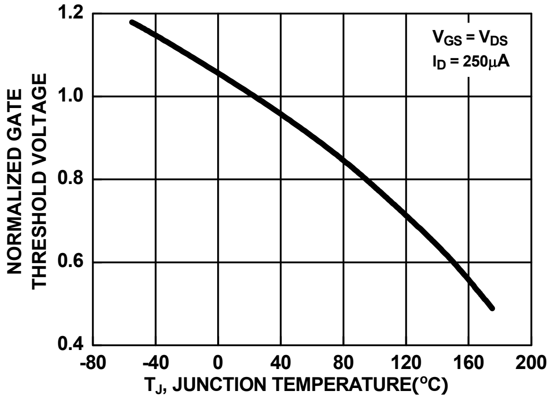


Figure 11. Normalized Gate Threshold Voltage vs Junction Temperature

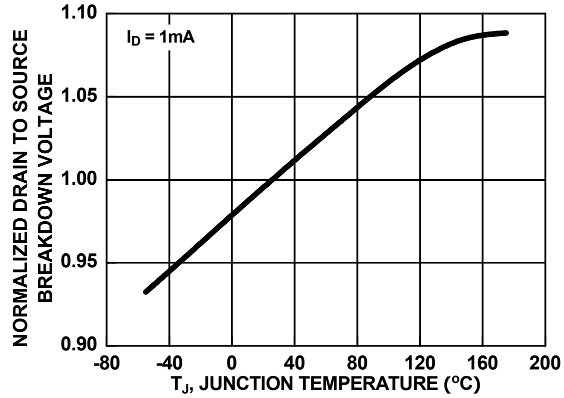


Figure 12. Normalized Drain to Source Breakdown Voltage vs Junction Temperature

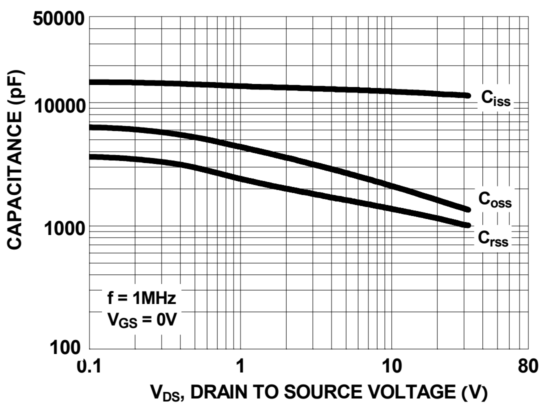


Figure 13. Capacitance vs Drain to Source Voltage

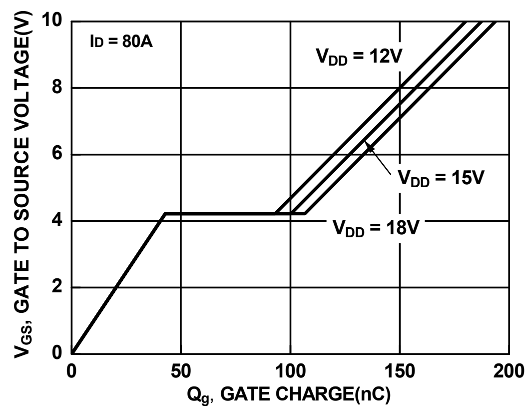


Figure 14. Gate Charge vs Gate to Source Voltage

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