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January 2015

FDMC86260ET150

N-Channel Power Trench® MOSFET

150 V, 25 A, 34 mΩ

Features

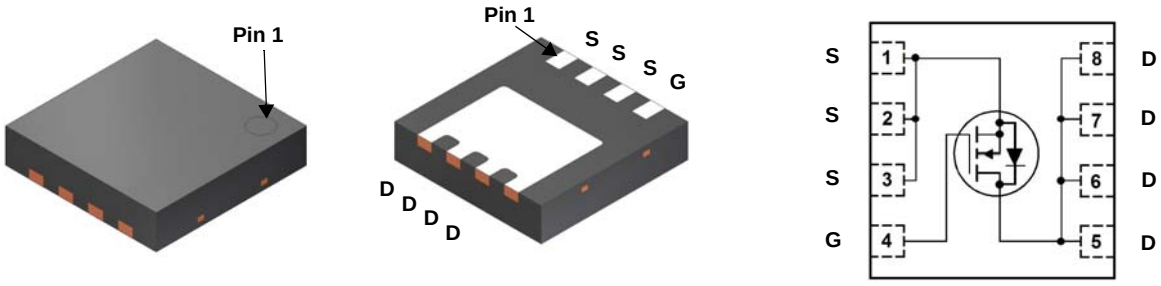
- Extended T_J rating to 175°C
- Max $r_{DS(on)}$ = 34 mΩ at V_{GS} = 10 V, I_D = 5.4 A
- Max $r_{DS(on)}$ = 44 mΩ at V_{GS} = 6 V, I_D = 4.8 A
- High performance technology for extremely low $r_{DS(on)}$
- 100% UIL Tested
- Termination is Lead-free
- RoHS Compliant

General Description

This N-Channel MOSFET is produced using Fairchild Semiconductor's advanced Power Trench® process that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

Application

- DC-DC Conversion



Top Bottom

Power 33

MOSFET Maximum Ratings T_A = 25 °C unless otherwise noted

Symbol	Parameter				Ratings	Units
V_{DS}	Drain to Source Voltage				150	V
V_{GS}	Gate to Source Voltage				±20	V
I_D	Drain Current	-Continuous	T_C = 25 °C	(Note 5)	25	A
		-Continuous	T_C = 100 °C	(Note 5)	18	
		-Continuous	T_A = 25 °C	(Note 1a)	5.4	
		-Pulsed		(Note 4)	116	
E_{AS}	Single Pulse Avalanche Energy			(Note 3)	121	mJ
P_D	Power Dissipation		T_C = 25 °C		65	W
	Power Dissipation		T_A = 25 °C	(Note 1a)	2.8	
T_J, T_{STG}	Operating and Storage Junction Temperature Range				-55 to +175	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction to Case	(Note 1)	2.3	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1a)	53	

Package Marking and Ordering Information

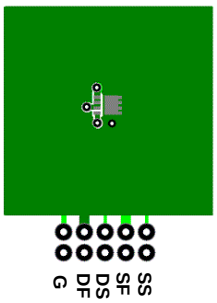
Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDMC86260ET	FDMC86260ET150	Power33	13 "	12 mm	3000 units

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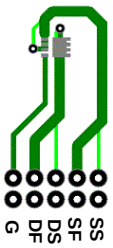
Electrical Characteristics T_J = 25 °C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	I_D = 250 μA, V_{GS} = 0 V	150			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, referenced to 25 °C		110		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 120 V, V_{GS} = 0 V			1	μA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±20 V, V_{DS} = 0 V			±100	nA
On Characteristics						
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = 250 μA	2	2.7	4	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = 250 μA, referenced to 25 °C		-9		mV/°C
$r_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D = 5.4 A		27	34	mΩ
		V_{GS} = 6 V, I_D = 4.8 A		31	44	
		V_{GS} = 10 V, I_D = 5.4 A, T_J = 125 °C		55	69	
g_{FS}	Forward Transconductance	V_{DD} = 10 V, I_D = 5.4 A		19		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 75 V, V_{GS} = 0 V, f = 1 MHz		1000	1330	pF
C_{oss}	Output Capacitance			105	140	pF
C_{rss}	Reverse Transfer Capacitance			4.8	10	pF
R_g	Gate Resistance		0.1	0.6	1.8	Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 75 V, I_D = 5.4 A, V_{GS} = 10 V, R_{GEN} = 6 Ω		9.5	19	ns
t_r	Rise Time			2	10	ns
$t_{d(off)}$	Turn-Off Delay Time			17	30	ns
t_f	Fall Time			3.3	10	ns
$Q_{g(TOT)}$	Total Gate Charge	V_{GS} = 0 V to 10 V; V_{DD} = 75 V, I_D = 5.4 A		15	21	nC
$Q_{g(TOT)}$	Total Gate Charge	V_{GS} = 0 V to 6 V; V_{DD} = 75 V, I_D = 5.4 A		9.7	14	nC
Q_{gs}	Total Gate Charge	V_{DD} = 75 V, I_D = 5.4 A		4.0		nC
Q_{gd}	Gate to Drain “Miller” Charge	V_{DD} = 75 V, I_D = 5.4 A		3.1		nC
Drain-Source Diode Characteristics						
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0 V, I_S = 5.4 A (Note 2)		0.77	1.3	V
		V_{GS} = 0 V, I_S = 1.9 A (Note 2)		0.72	1.2	V
t_{rr}	Reverse Recovery Time	I_F = 5.4 A, di/dt = 100 A/μs		64	102	ns
Q_{rr}	Reverse Recovery Charge			85	137	nC

Notes:
1. $R_{\theta JA}$ is determined with the device mounted on a 1 in^2 pad 2 oz copper pad on a 1.5 x 1.5 in. board of FR-4 material. $R_{\theta CA}$ is determined by the user's board design.



a. 53 °C/W when mounted on a 1 in^2 pad of 2 oz copper



b. 125 °C/W when mounted on a minimum pad of 2 oz copper

2. Pulse Test: Pulse Width < 300 μs, Duty cycle < 2.0%.

3. E_{AS} of 121 mJ is based on starting T_J = 25 °C, L = 3 mH, I_{AS} = 9 A, V_{DD} = 150 V, V_{GS} = 10 V. 100% test at L = 0.1 mH, I_{AS} = 22 A.

4. Pulsed Id please refer to Fig 11 SOA graph for more details.

5. Computed continuous current limited to Max Junction Temperature only, actual continuous current will be limited by thermal & electro-mechanical application board design.

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Typical Characteristics T_J = 25 °C unless otherwise noted

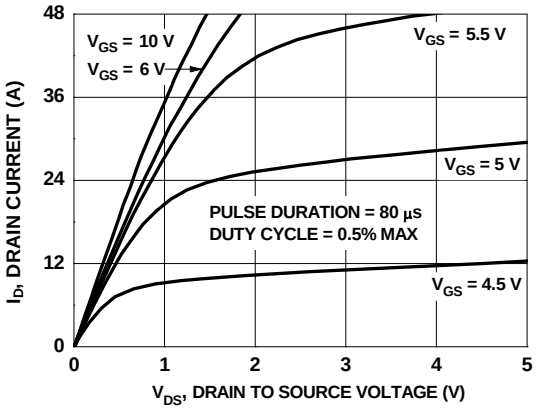


Figure 1. On-Region Characteristics

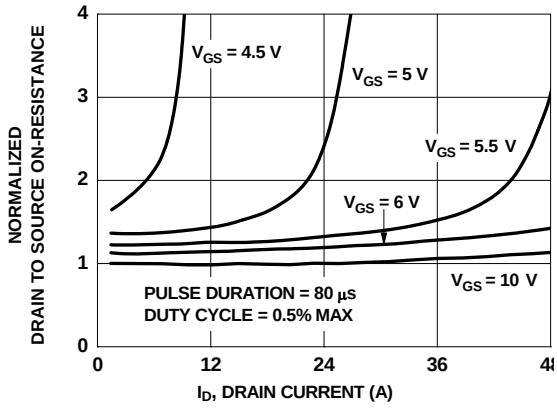


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

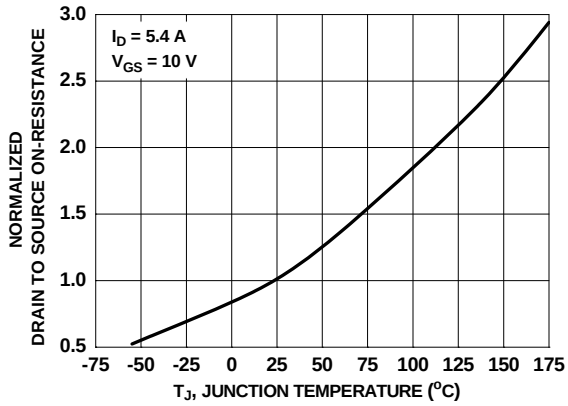


Figure 3. Normalized On-Resistance vs Junction Temperature

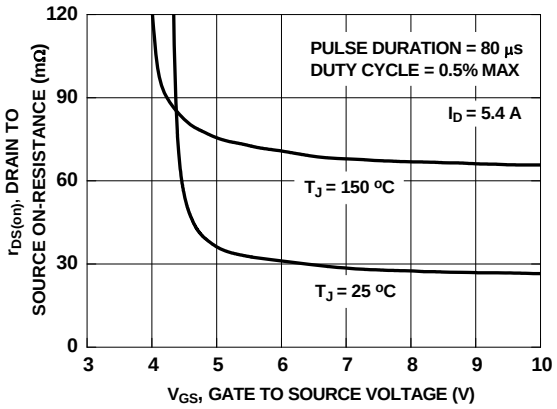


Figure 4. On-Resistance vs Gate to Source Voltage

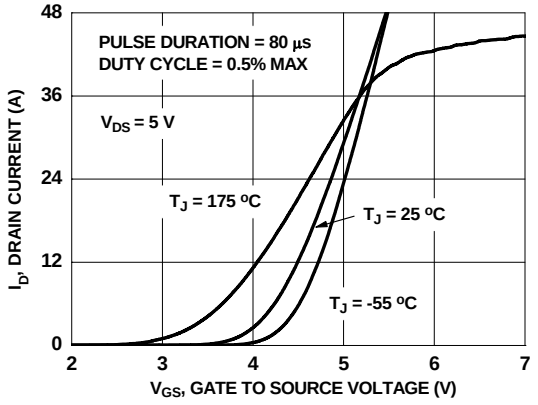


Figure 5. Transfer Characteristics

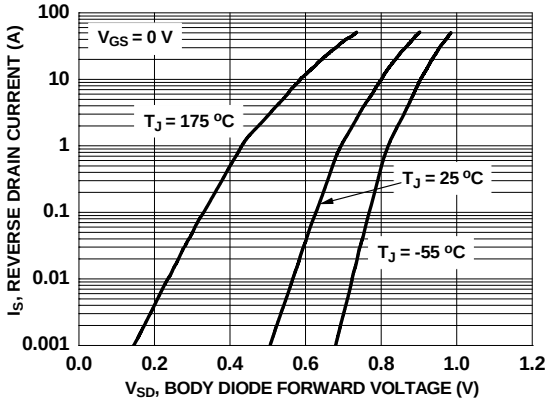


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

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Typical Characteristics T_J = 25 °C unless otherwise noted

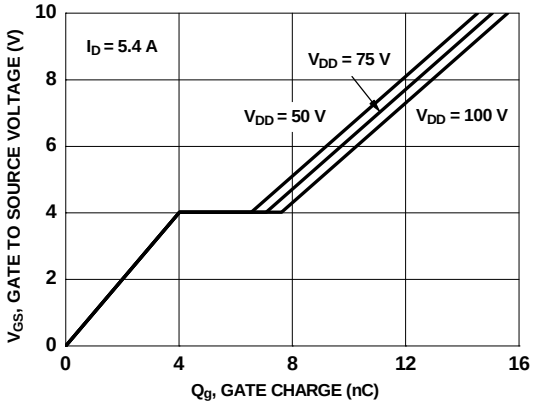


Figure 7. Gate Charge Characteristics

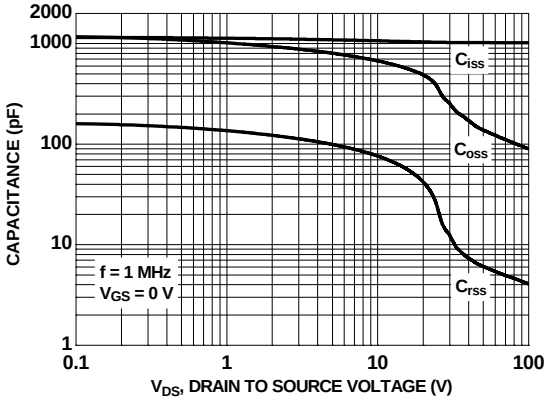


Figure 8. Capacitance vs Drain to Source Voltage

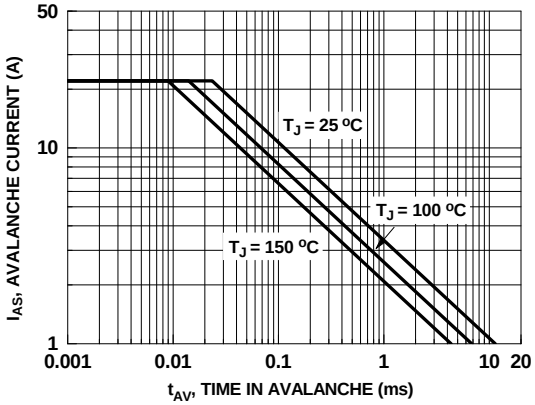


Figure 9. Unclamped Inductive Switching Capability

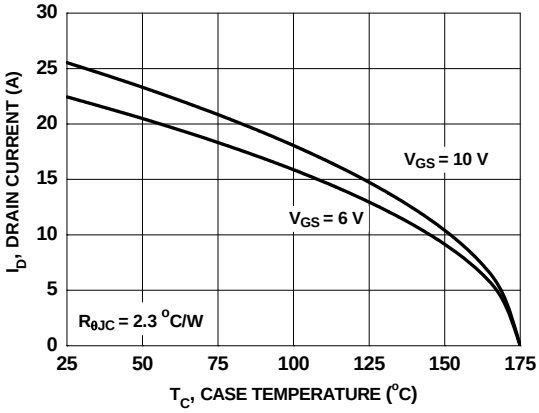


Figure 10. Maximum Continuous Drain Current vs Case Temperature

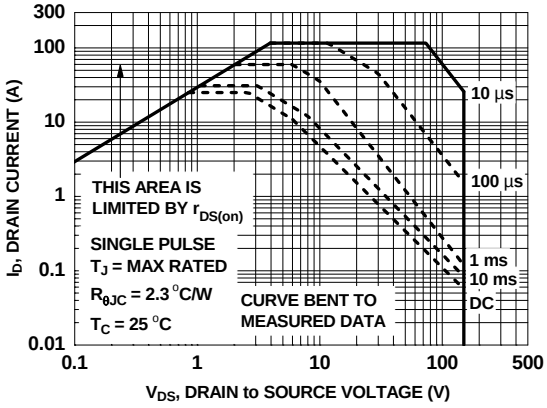


Figure 11. Forward Bias Safe Operating Area

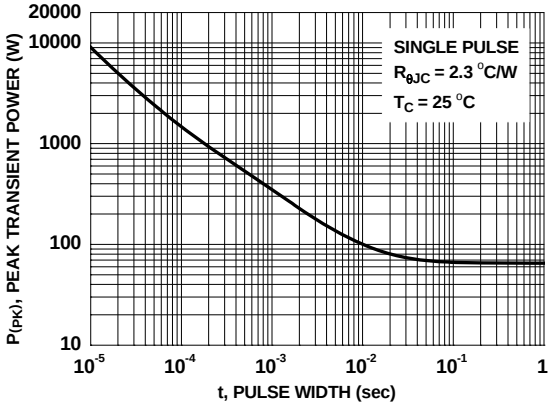


Figure 12. Single Pulse Maximum Power Dissipation

Typical Characteristics T_J = 25 °C unless otherwise noted

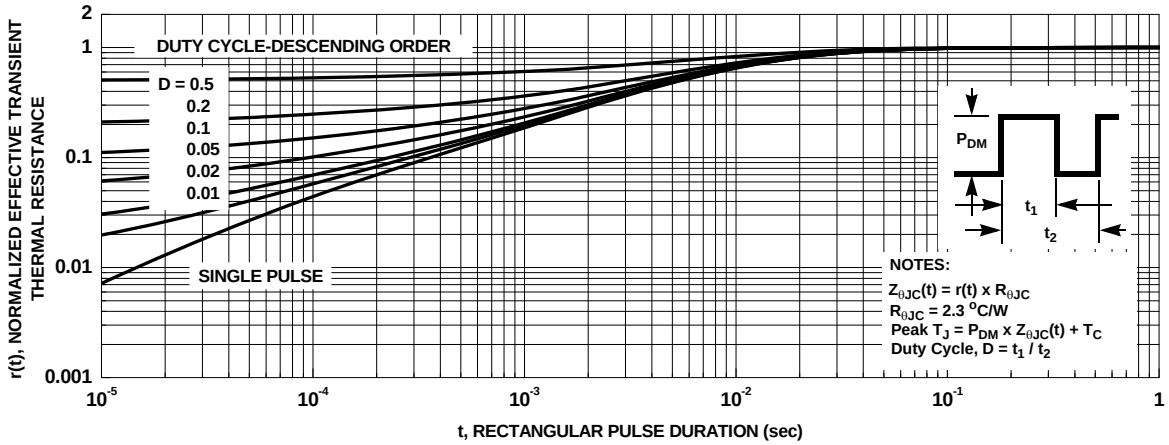
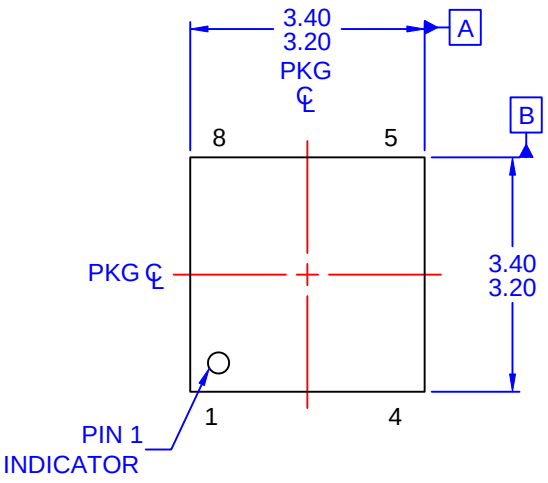
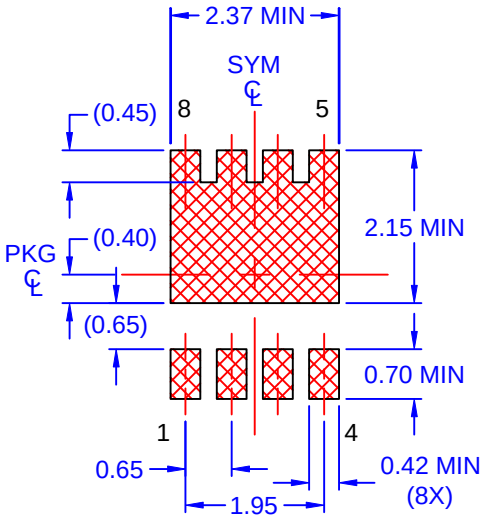
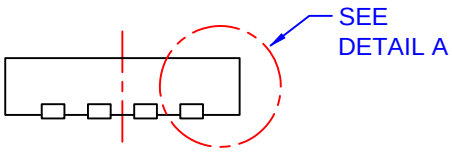


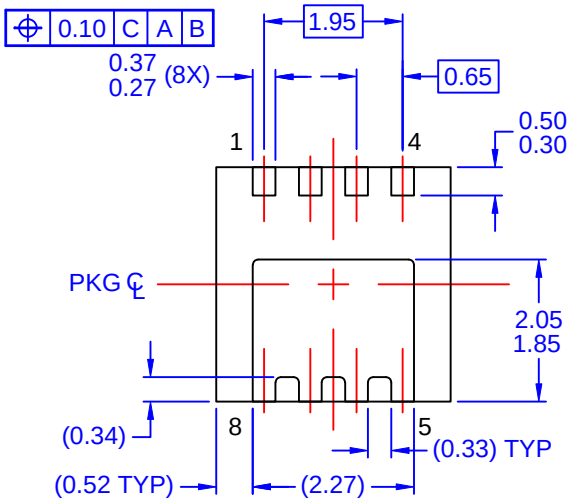
Figure 13. Junction-to-Case Transient Thermal Response Curve





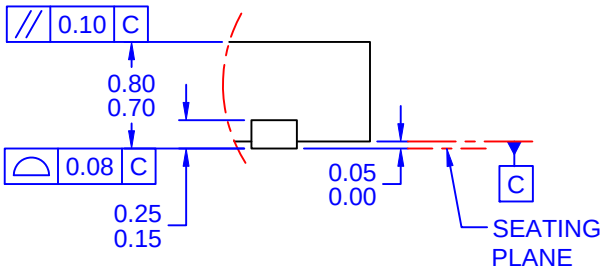
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DETAIL A
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