Is Now Part of

ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at
www.onsemi.com

September 2015

FDMC8360LET40

N-Channel Shielded Gate Power Trench® MOSFET

40 V, 141 A, 2.1 mΩ

Features

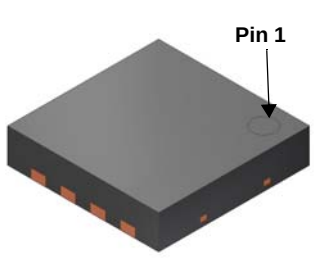
- Shielded Gate MOSFET Technology
- Max $r_{DS(on)}$ = 2.1 mΩ at V_{GS} = 10 V, I_D = 27 A
- Max $r_{DS(on)}$ = 3.1 mΩ at V_{GS} = 4.5 V, I_D = 22 A
- High Performance Technology for Extremely Low $r_{DS(on)}$
- Termination is Lead-free
- 100% UIL Tested
- RoHS Compliant

General Description

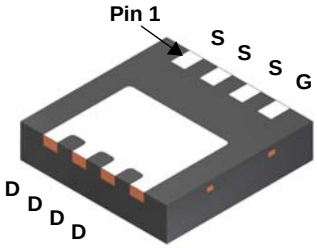
This N-Channel MOSFET is produced using Fairchild Semiconductor's advanced PowerTrench® process that incorporates shielded gate technology. This process has been optimized for the on-state resistance and yet maintain superior switching performance.

Application

- DC-DC Conversion

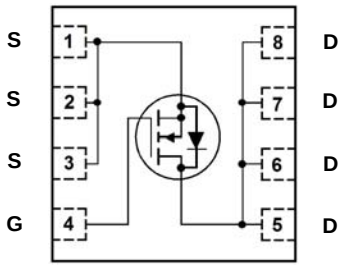


Top



Bottom

Power33



MOSFET Maximum Ratings T_A = 25 °C unless otherwise noted.

Symbol	Parameter				Ratings	Units
V_{DS}	Drain to Source Voltage				40	V
V_{GS}	Gate to Source Voltage				±20	V
I_D	Drain Current	-Continuous	T_C = 25 °C	(Note 5)	141	A
		-Continuous	T_C = 100 °C	(Note 5)	100	
		-Continuous	T_A = 25 °C	(Note 1a)	27	
		-Pulsed		(Note 4)	658	
E_{AS}	Single Pulse Avalanche Energy			(Note 3)	253	mJ
P_D	Power Dissipation		T_C = 25 °C		75	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)	2.0	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1a)	53	

Package Marking and Ordering Information

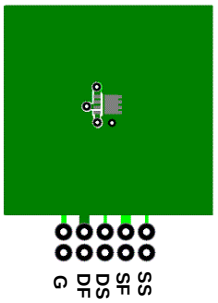
Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDMC8360LET	FDMC8360LET40	Power33	13 ”	12 mm	3000 units

Electrical Characteristics T_J = 25 °C unless otherwise noted.

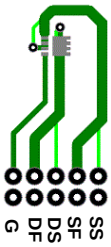
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	I_D = 250 μA, V_{GS} = 0 V	40			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, referenced to 25 °C		20		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 32 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	1.0	1.7	3.0	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = 250 μA, referenced to 25 °C		-6		mV/°C
$r_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D = 27 A		1.4	2.1	mΩ
		V_{GS} = 4.5 V, I_D = 22 A		2.1	3.1	
		V_{GS} = 10 V, I_D = 27 A, T_J = 150 °C		2.3	3.5	
g_{FS}	Forward Transconductance	V_{DD} = 5 V, I_D = 27 A		138		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 20 V, V_{GS} = 0 V, f = 1 MHz		3785	5300	pF
C_{oss}	Output Capacitance			1220	1710	pF
C_{rss}	Reverse Transfer Capacitance			57	80	pF
R_g	Gate Resistance		0.1	0.8	1.6	Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 20 V, I_D = 27 A, V_{GS} = 10 V, R_{GEN} = 6 Ω		14	26	ns
t_r	Rise Time			8	16	ns
$t_{d(off)}$	Turn-Off Delay Time			35	57	ns
t_f	Fall Time			7	14	ns
$Q_{g(TOT)}$	Total Gate Charge	V_{GS} = 0 V to 10 V; V_{DD} = 20 V, I_D = 27 A		57	80	nC
$Q_{g(TOT)}$	Total Gate Charge	V_{GS} = 0 V to 4.5 V; V_{DD} = 20 V, I_D = 27 A		27	38	nC
Q_{gs}	Gate to Source Charge	V_{DD} = 20 V, I_D = 27 A		9.9		nC
Q_{gd}	Gate to Drain “Miller” Charge	V_{DD} = 20 V, I_D = 27 A		8.1		nC
Drain-Source Diode Characteristics						
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0 V, I_S = 27 A (Note 2)		0.8	1.3	V
		V_{GS} = 0 V, I_S = 1.9 A (Note 2)		0.7	1.2	V
t_{rr}	Reverse Recovery Time	I_F = 27 A, di/dt = 100 A/μs		47	76	ns
Q_{rr}	Reverse Recovery Charge			30	48	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. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ 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

2. Pulse Test: Pulse Width < 300 μs, Duty cycle < 2.0%.
3. E_{AS} of 253 mJ is based on starting T_J = 25 °C, L = 3 mH, I_{AS} = 13 A, V_{DD} = 40 V, V_{GS} = 10 V. 100% test at L = 0.1 mH, I_{AS} = 42 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.

Typical Characteristics T_J = 25°C unless otherwise noted.

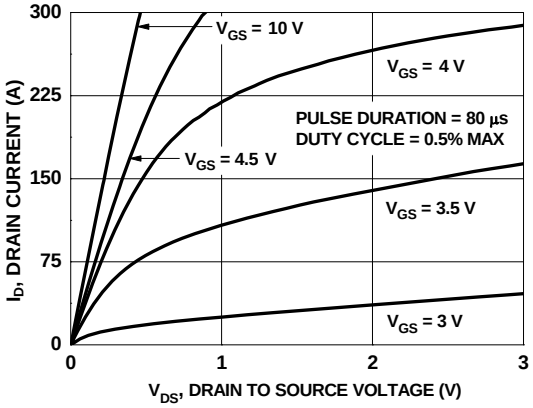


Figure 1. On Region Characteristics

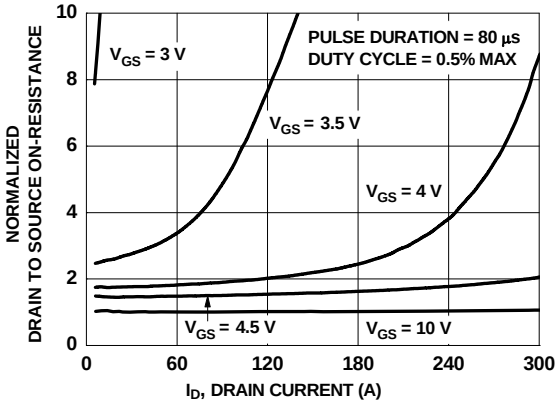


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

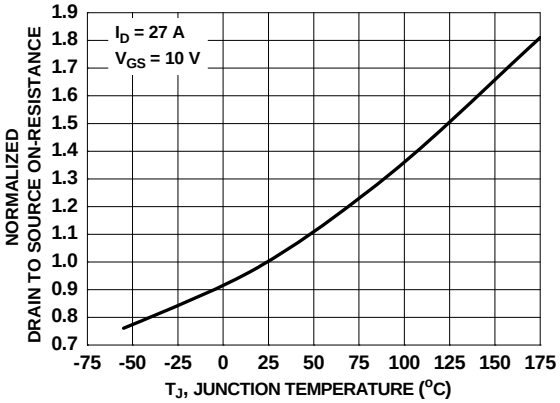


Figure 3. Normalized On Resistance vs. Junction Temperature

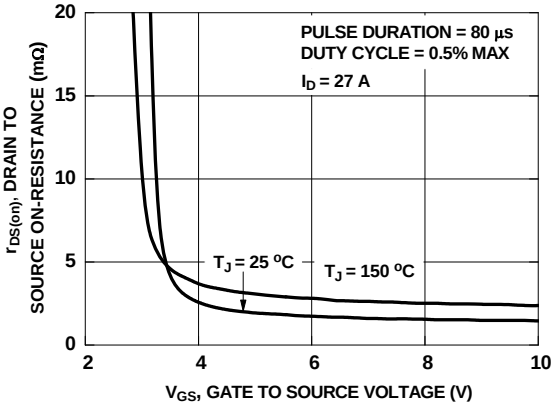


Figure 4. On-Resistance vs. Gate to Source Voltage

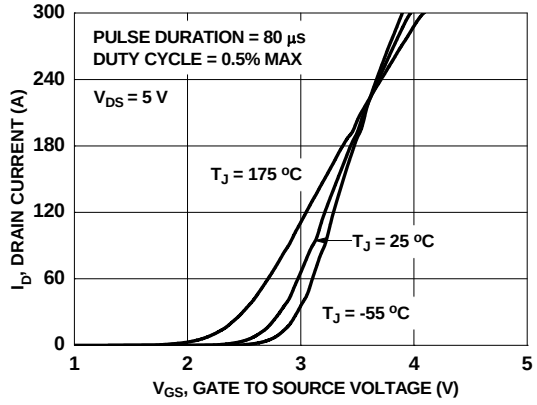


Figure 5. Transfer Characteristics

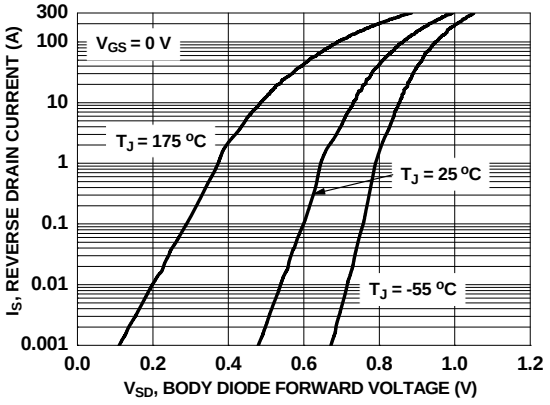


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

Typical Characteristics T_J = 25°C unless otherwise noted.

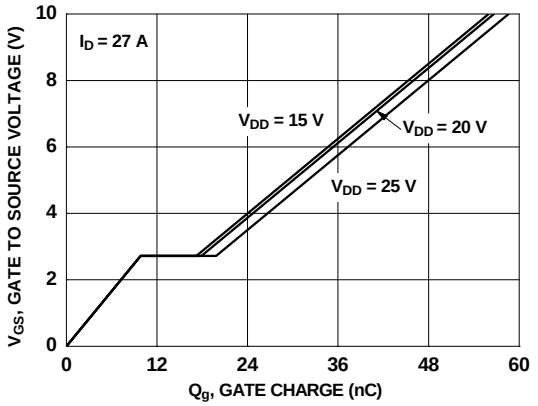


Figure 7. Gate Charge Characteristics

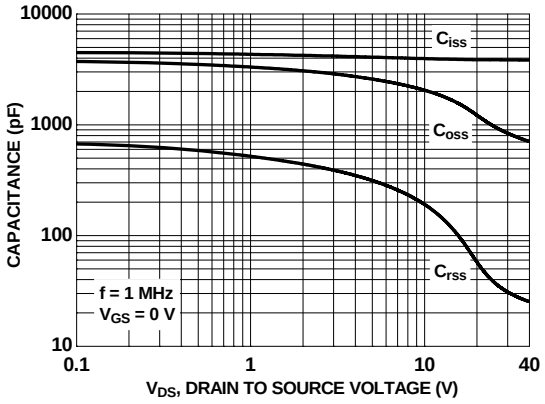


Figure 8. Capacitance vs. Drain to Source Voltage

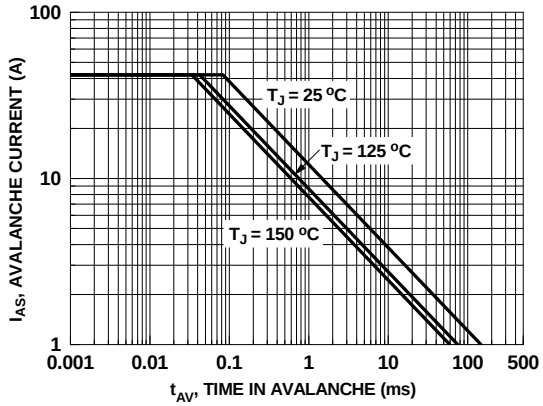


Figure 9. Unclamped Inductive Switching Capability

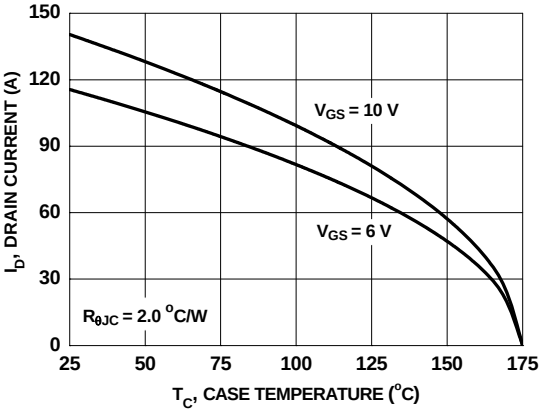


Figure 10. Maximum Continuous Drain Current vs. Case Temperature

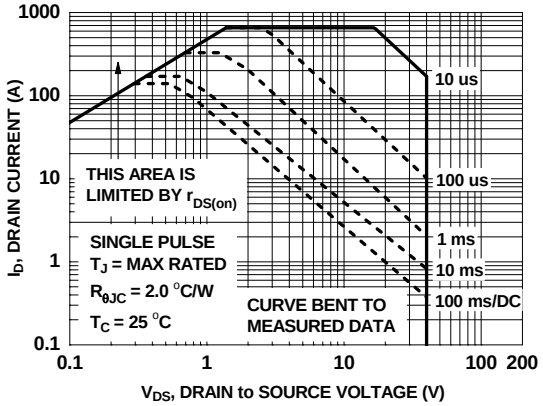


Figure 11. Forward Bias Safe Operating Area

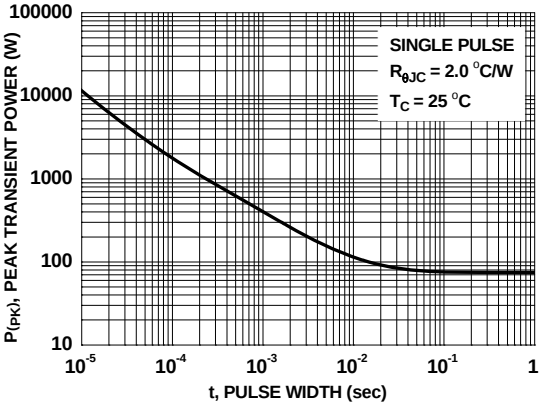


Figure 12. Single Pulse Maximum Power Dissipation

Typical Characteristics T_J = 25°C unless otherwise noted.

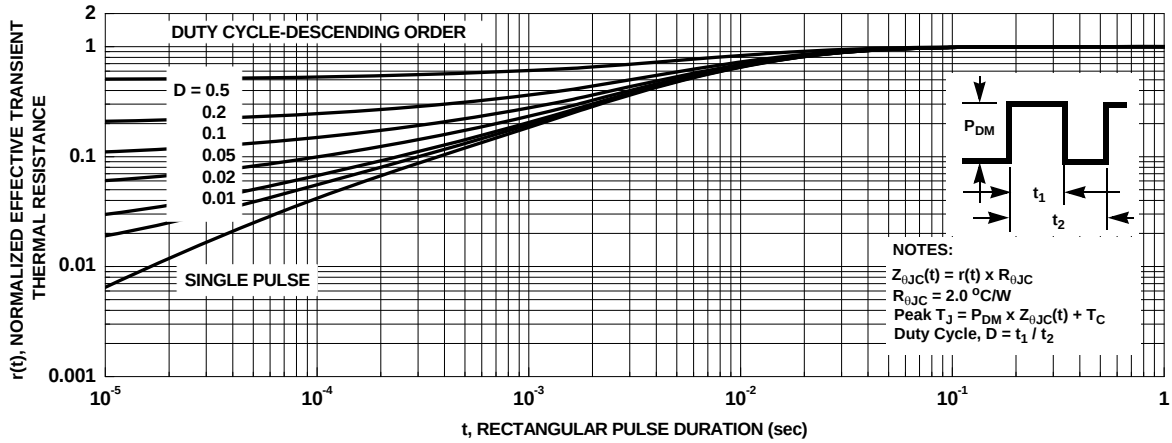
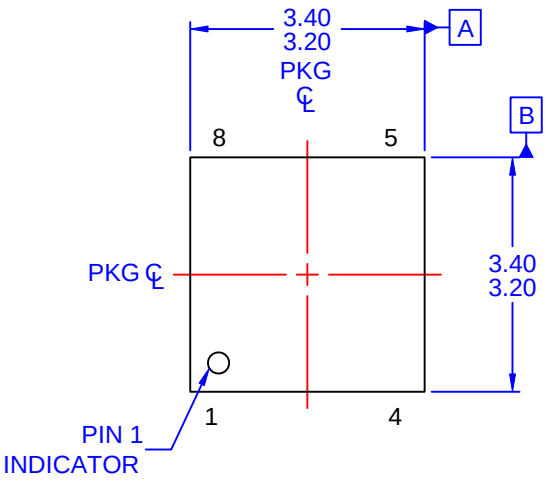
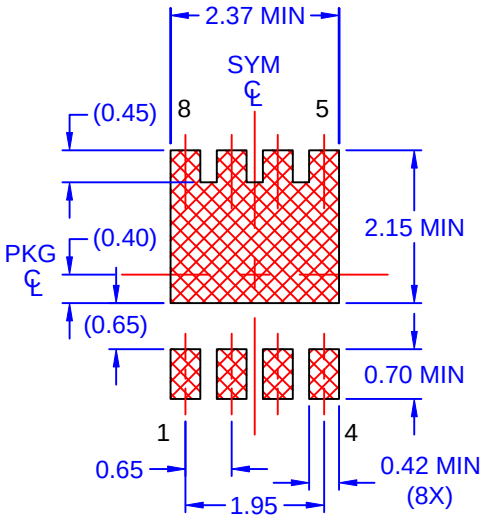
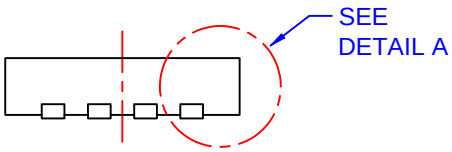


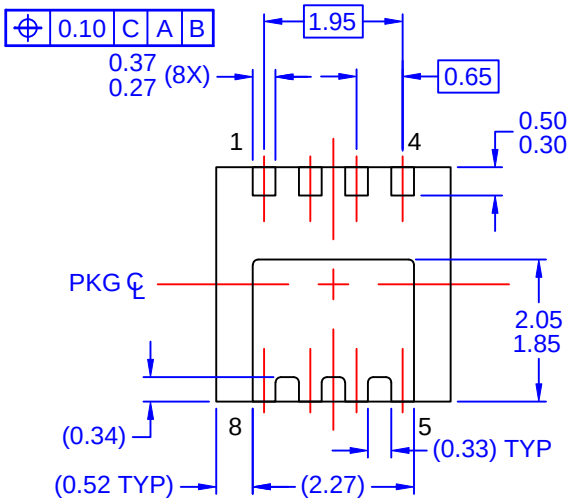
Figure 13. Junction-to-Case Transient Thermal Response Curve





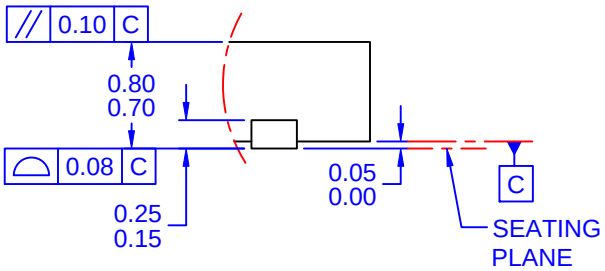
LAND PATTERN
RECOMMENDATION





NOTES: UNLESS OTHERWISE SPECIFIED

A) PACKAGE STANDARD REFERENCE:
JEDEC MO-240, ISSUE A, VAR. BA,
DATED OCTOBER 2002.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS DO NOT INCLUDE BURRS
OR MOLD FLASH. MOLD FLASH OR
BURRS DOES NOT EXCEED 0.10MM.
D) DIMENSIONING AND TOLERANCING PER
ASME Y14.5M-1994.
E) DRAWING FILE NAME: PQFN08HREV1



DETAIL A
SCALE: 2X

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81−3−5817−1050

ON Semiconductor Website: **www.onsemi.com**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative