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December 2015

FDMD8580

Dual N-Channel PowerTrench[®] MOSFET Q1: 80 V, 82 A, 4.6 m Ω Q2: 80 V, 82 A, 4.6 m Ω

Features

Q1: N-Channel

- Max $r_{DS(on)}$ = 4.6 m Ω at V_{GS} = 10 V, I_D = 16 A
- Max $r_{DS(on)}$ = 6.0 m Ω at V_{GS} = 8 V, I_D = 14 A

Q2: N-Channel

- Max $r_{DS(on)}$ = 4.6 m Ω at V_{GS} = 10 V, I_D = 16 A
- Max $r_{DS(on)}$ = 6.0 m Ω at V_{GS} = 8 V, I_{D} = 14 A
- Ideal for Flexible Layout in Primary Side of Bridge Topology
- 100% UIL Tested
- Kelvin High Side MOSFET Drive Pin-out Capability
- RoHS Compliant

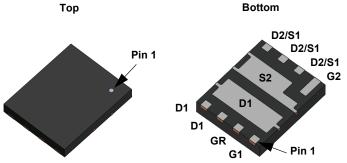
General Description

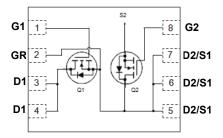
This device includes two 80V N-Channel MOSFETs in a dual power (5 mm X 6 mm) package. HS source and LS drain internally connected for half/full bridge, low source inductance package, low $r_{\rm DS(on)}/{\rm Qg}$ FOM silicon.

Applications

- Synchronous Buck: Primary Switch of Half / Full Bridge Converter for Telecom
- Motor Bridge: Primary Switch of Half / Full Bridge Converter for BLDC Motor
- MV POL: 48V Synchronous Buck Switch
- Half/Full Bridge Secondary Synchronous Rectification







Power 5 x 6

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

Symbol	Paramet	er		Q1	Q2	Units
V_{DS}	Drain to Source Voltage			80	80	V
V_{GS}	Gate to Source Voltage			±20	±20	V
	Drain Current -Continuous	T _C = 25 °C	(Note 5)	82	82	
	-Continuous	T _C = 100 °C	(Note 5)	52	52	
ID	-Continuous	T _A = 25 °C		16 ^{1a}	16 ^{1b}	Α
	-Pulsed		(Note 4)	482	482	
E _{AS}	Single Pulse Avalanche Energy		(Note 3)	337	337	mJ
В	Power Dissipation	T _C = 25 °C		59	59	W
P_{D}	Power Dissipation	T _A = 25 °C		2.3 ^{1a}	2.3 ^{1b}	VV
T _J , T _{STG}	Operating and Storage Junction Temperatu	ıre Range		-55 to	+150	°C

Thermal Characteristics

$R_{ heta JC}$	Thermal Resistance, Junction-to-Case	2.1	2.1	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	55 ^{1a}	55 ^{1b}	C/VV

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDMD8580	FDMD8580	Power 5 x 6	13 "	12 mm	3000 units

Electrical Characteristics T_J = 25 °C unless otherwise noted.

Symbol	Parameter	Test Conditions	Type	Min.	Тур.	Max.	Units
Off Chai	racteristics						
BV _{DSS}	Drain to Source Breakdown Voltage	I _D = 250 μA, V _{GS} = 0 V	Q1 Q2	80 80			V
$\frac{\Delta BV_{DSS}}{\Delta T_{J}}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μ A, referenced to 25 °C	Q1 Q2		50 50		mV/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 64 V, V _{GS} = 0 V	Q1 Q2			1 1	μΑ
I _{GSS}	Gate to Source Leakage Current	V _{GS} = ±20 V, V _{DS} = 0 V	Q1 Q2			±100 ±100	nA

On Characteristics

V _{GS(th)}	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250 \mu A$	Q1 Q2	2.0 2.0	3.4 3.4	4.5 4.5	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = 250 μ A, referenced to 25 °C	Q1 Q2		-10 -10		mV/°C
		V _{GS} = 10 V, I _D = 16 A			3.5	4.6	
		V _{GS} = 8 V, I _D = 14 A	Q1		4.2	6.0	
_	Static Drain to Source On Resistance	V _{GS} = 10 V, I _D = 16 A, T _J = 125 °C			5.3	7.0	mΩ
r _{DS(on)}	Static Drain to Source On Resistance	V _{GS} = 10 V, I _D = 16 A			3.5	4.6	
		V _{GS} = 8 V, I _D = 14 A	Q2		4.2	6.0	
		V _{GS} = 10 V, I _D = 16 A, T _J = 125 °C			5.3	7.0	
9 _{FS}	Forward Transconductance	V _{DD} = 10 V, I _D = 16 A	Q1 Q2		51 51		S

Dynamic Characteristics

C _{iss}	Input Capacitance		Q1 Q2		4195 4195	5875 5875	pF
C _{oss}	Output Capacitance	V _{DS} = 40 V, V _{GS} = 0 V f = 1 MHz	Q1 Q2		602 602	845 845	pF
C _{rss}	Reverse Transfer Capacitance		Q1 Q2		19 19	38 38	pF
R_g	Gate Resistance		Q1 Q2	0.1 0.1	1.7 1.7	3.5 3.5	Ω

Switching Characteristics

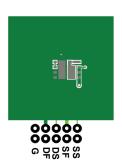
t _{d(on)}	Turn-On Delay Time			Q1 Q2	25 25	40 40	ns
t _r	Rise Time	V _{DD} = 40 V, I _D = 16	A	Q1 Q2	19 19	34 34	ns
t _{d(off)}	Turn-Off Delay Time	V _{GS} = 10 V, R _{GEN} =		Q1 Q2	31 31	50 50	ns
t _f	Fall Time		Q1 Q2	10 10	20 20	ns	
Q _{g(TOT)}	Total Gate Charge	V _{GS} = 0 V to 10 V		Q1 Q2	57 57	80 80	nC
Q _{gs}	Gate to Source Charge		V _{DD} = 40 V, I _D =16 A	Q1 Q2	21 21		nC
Q_{gd}	Gate to Drain "Miller" Charge			Q1 Q2	12 12		nC

Electrical Characteristics $T_J = 25$ °C unless otherwise noted.

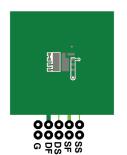
Symbol	Parameter	Test Conditions		Type	Min.	Тур.	Max.	Units
Drain-S	ource Diode Characteristics							
V_{SD}	Source to Drain Diode Forward Voltage	$V_{GS} = 0 \text{ V}, I_S = 16 \text{ A}$ (N	Note 2)	Q1 Q2		0.8 0.8	1.3 1.3	V
V _{SD}	Source to Drain Diode Forward Voltage	$V_{GS} = 0 \text{ V}, I_S = 2 \text{ A}$ (N	Note 2)	Q1 Q2		0.7 0.7	1.2 1.2	٧
t _{rr}	Reverse Recovery Time	1 - 40 0 4:44 - 400 0 / 5		Q1 Q2		46 46	73 73	ns
Q _{rr}	Reverse Recovery Charge	I _F = 16 A, di/dt = 100 A/μs	Ī	Q1 Q2		34 34	55 55	nC

NOTES:

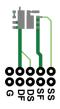
1. $R_{\theta,JA}$ is determined with the device mounted on a 1 in² pad 2 oz copper pad on a 1.5 x 1.5 in. board of FR-4 material. $R_{\theta,JC}$ is guaranteed by design while $R_{\theta,CA}$ is determined by the user's board design.



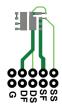
a. 55 °C/W when mounted on a 1 in² pad of 2 oz copper



b. 55 °C/W when mounted on a 1 in² pad of 2 oz copper



c. 155 °C/W when mounted on a minimum pad of 2 oz copper



d. 155 °C/W when mounted on a minimum pad of 2 oz copper

- 2. Pulse Test: Pulse Width < 300 $\mu s,$ Duty cycle < 2.0 %.
- 3. Q1: E_{AS} of 337 mJ is based on starting T_J = 25 °C, L = 3 mH, I_{AS} = 15 A, V_{DD} = 80 V, V_{GS} = 10 V. 100% tested at L = 0.1mH, I_{AS} = 49 A. Q2: E_{AS} of 337 mJ is based on starting T_J = 25 °C, L = 3 mH, I_{AS} = 15 A, V_{DD} = 80 V, V_{GS} = 10 V. 100% tested at L = 0.1mH, I_{AS} = 49 A.
- 4. Pulsed Id please refer to Fig 11 and Fig 24 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 (Q1 N-Channel) T_J = 25°C unless otherwise noted.

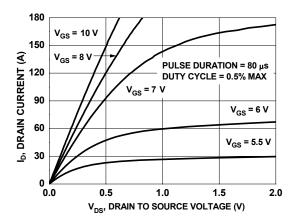


Figure 1. On Region Characteristics

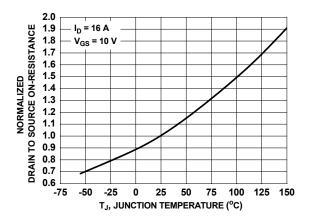


Figure 3. Normalized On Resistance vs. Junction Temperature

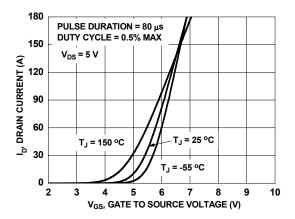


Figure 5. Transfer Characteristics

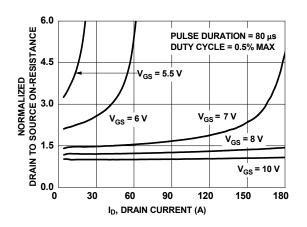


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

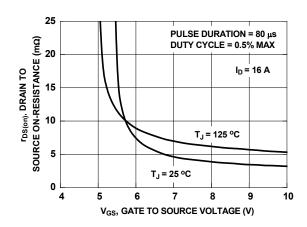


Figure 4. On-Resistance vs. Gate to Source Voltage

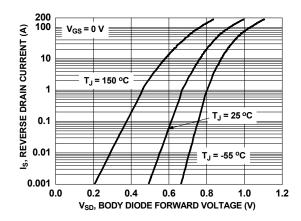


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

Typical Characteristics (Q1 N-Channel) T_J = 25°C unless otherwise noted.

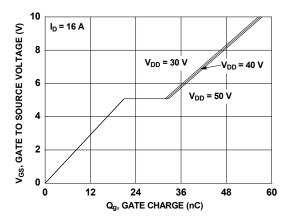


Figure 7. Gate Charge Characteristics

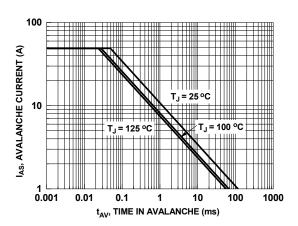


Figure 9. Unclamped Inductive Switching Capability

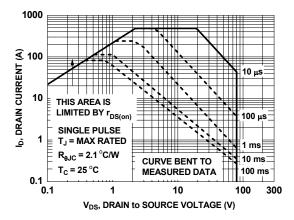


Figure 11. Forward Bias Safe Operating Area

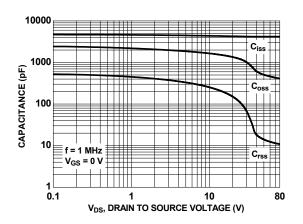


Figure 8. Capacitance vs. Drain to Source Voltage

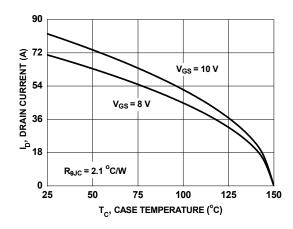


Figure 10. Maximum Continuous Drain Current vs. Case Temperature

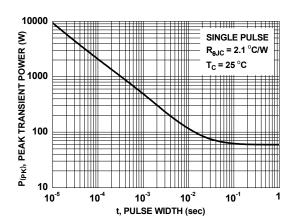


Figure 12. Single Pulse Maximum Power Dissipation

Typical Characteristics (Q1 N-Channel) T_J = 25°C unless otherwise noted.

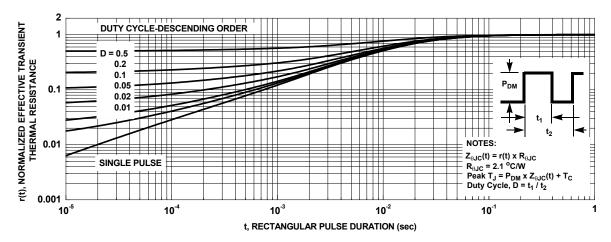


Figure 13. Junction-to-Case Transient Thermal Response Curve

Typical Characteristics (Q2 N-Channel) T_J = 25 °C unless otherwise noted.

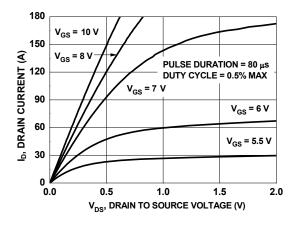


Figure 14. On- Region Characteristics

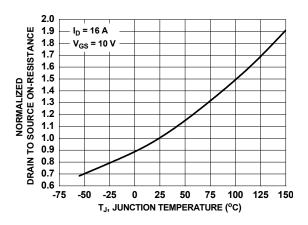


Figure 16. Normalized On-Resistance vs. Junction Temperature

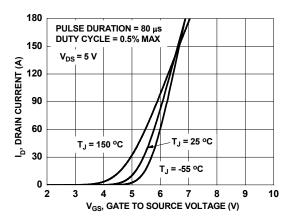


Figure 18. Transfer Characteristics

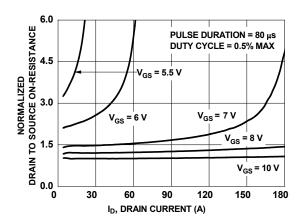


Figure 15. Normalized on-Resistance vs. Drain Current and Gate Voltage

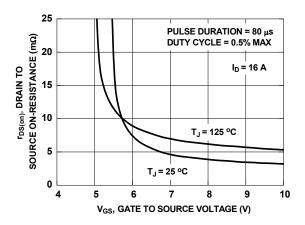


Figure 17. On-Resistance vs. Gate to Source Voltage

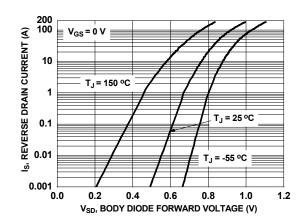


Figure 19. Source to Drain Diode Forward Voltage vs. Source Current

7

Typical Characteristics (Q2 N-Channel) T_{.I} = 25°C unless otherwise noted.

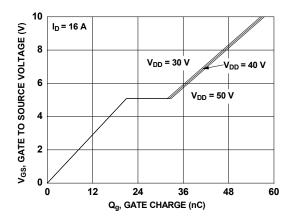


Figure 20. Gate Charge Characteristics

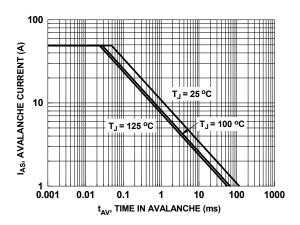


Figure 22. Unclamped Inductive Switching Capability

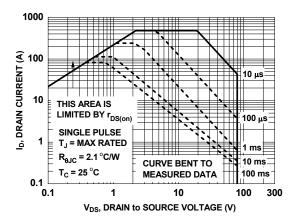


Figure 24. Forward Bias Safe Operating Area

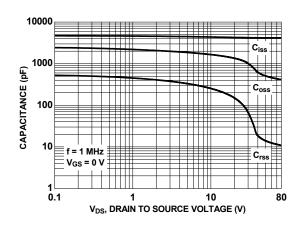


Figure 21. Capacitance vs. Drain to Source Voltage

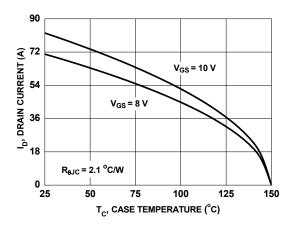


Figure 23. Maximum Continuous Drain Current vs. Case Temperature

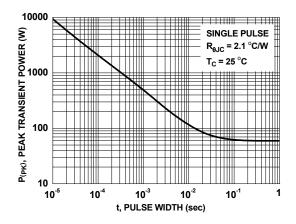


Figure 25. Single Pulse Maximum Power Dissipation

Typical Characteristics (Q2 N-Channel) T_J = 25 °C unless otherwise noted.

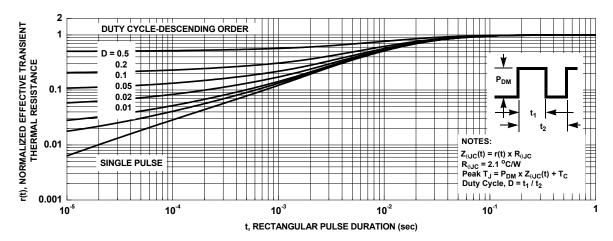
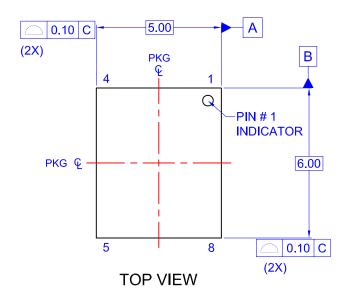
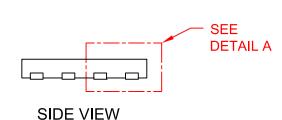
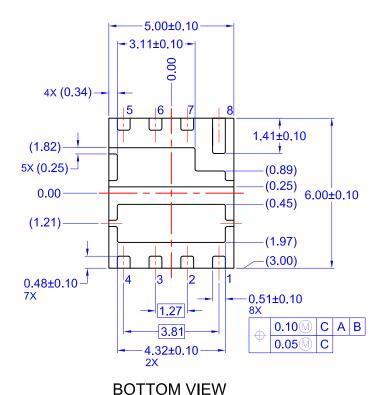
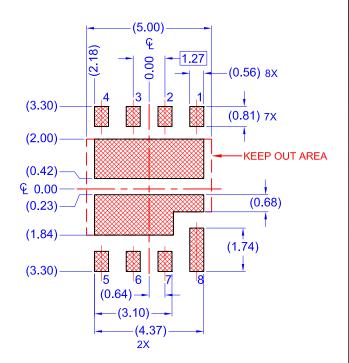


Figure 26. Junction-to-Case Transient Thermal Response Curve

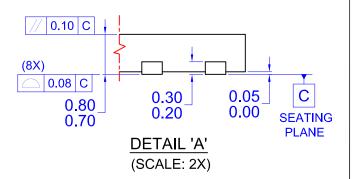








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- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH. MOLD FLASH OR BURRS DOES NOT EXCEED 0.10MM.
- D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-2009.
- E) IT IS RECOMMENDED TO HAVE NO TRACES OR VIAS WITHIN THE KEEP OUT AREA.
- F) DRAWING FILE NAME: MKT-PQFN08QREV2



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