March 2013

FDMB2308PZ

Dual Common Drain P-Channel PowerTrench® MOSFET

-20 V, -7 A, 36 mΩ

Features

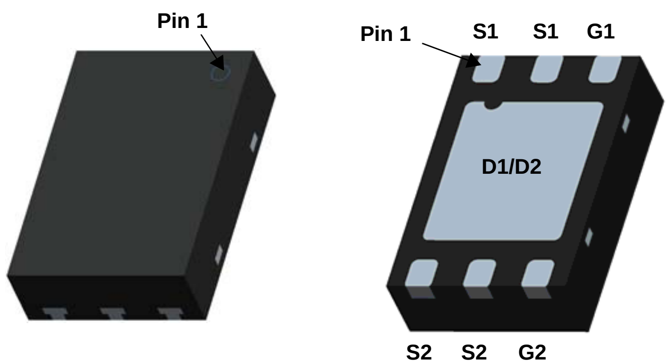
- Max $r_{S1S2(on)}$ = 36 mΩ at V_{GS} = -4.5 V, I_D = -5.7 A
- Max $r_{S1S2(on)}$ = 50 mΩ at V_{GS} = -2.5 V, I_D = -4.6 A
- Low Profile - 0.8 mm maximum - in the new package MicroFET 2x3 mm
- HBM ESD protection level 2.8 kV (Note 3)
- RoHS Compliant

General Description

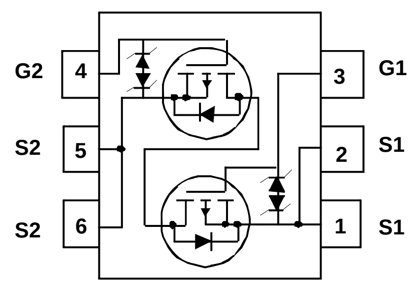
This device is designed specifically as a single package solution for Li-Ion battery pack protection circuit and other ultra-portable applications. It features two common drain P-channel MOSFETs, which enables bidirectional current flow, on Fairchild's advanced PowerTrench® process with state of the art MircoFET Leadframe, the FDMB2308PZ minimizes both PCB space and $r_{S1S2(on)}$.

Application

- Li-Ion Battery Pack



MLP 2x3



MOSFET Maximum Ratings T_A = 25 °C unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{S1S2}	Source1 to Source2 Voltage	-20	V
V_{GS}	Gate to Source Voltage	±12	V
I_{S1S2}	Source1 to Source2 Current -Continuous T_A = 25 °C (Note 1a)	-7	A
	-Pulsed	-30	
P_D	Power Dissipation T_A = 25 °C (Note 1a)	2.2	W
	Power Dissipation T_A = 25 °C (Note 1b)	0.8	
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	°C

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	57	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1b)	161	

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
308	FDMB2308PZ	MLP 2x3	7''	8 mm	3000 units

Electrical Characteristics T_J = 25 °C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units

Off Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
I_{S1S2}	Zero Gate Voltage Source1 to Source2 Current	V_{S1S2} = -16 V, V_{GS} = 0 V			-1	μA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±12 V, V_{S1S2} = 0 V			±10	μA

On Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{S1S2}, I_{S1S2} = -250 μA	-0.6	-0.9	-1.5	V
$r_{S1S2(on)}$	Static Source1 to Source2 On Resistance	V_{GS} = -4.5 V, I_{S1S2} = -5.7 A		27	36	mΩ
		V_{GS} = -2.5 V, I_{S1S2} = -4.6 A		36	50	
		V_{GS} = -4.5 V, I_{S1S2} = -5.7 A , T_J = 125 °C		35	49	
g_{FS}	Forward Transconductance	V_{S1S2} = -5 V, I_{S1S2} = -5.7 A		29		S

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
C_{iss}	Input Capacitance	V_{S1S2} = -10 V, V_{GS} = 0 V, f = 1 MHz		2280	3030	pF
C_{oss}	Output Capacitance			361	540	pF
C_{rss}	Reverse Transfer Capacitance			339	510	pF

Switching Characteristics

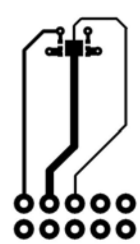
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$t_{d(on)}$	Turn-On Delay Time	V_{S1S2} = -10 V, I_{S1S2} = -5.7 A V_{GS} = -4.5 V, R_{GEN} = 6 Ω		14	25	ns
t_r	Rise Time			33	52	ns
$t_{d(off)}$	Turn-Off Delay Time			74	118	ns
t_f	Fall Time			58	93	ns
Q_g	Total Gate Charge	V_{GS} = -4.5 V, V_{S1S2} = -10 V, I_{S1S2} = -5.7 A		22	30	nC
Q_{gs}	Gate to Source Charge			3.6		nC
Q_{gd}	Gate to Drain "Miller" Charge			7.7		nC

Source1- Source2 Diode Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
I_{fss}	Maximum Continuous Source1-Source2 Diode Forward Current				-5.7	A
V_{fss}	Source1 to Source2 Diode Forward Voltage	V_{G1S1}= 0 V, V_{G2S2}= -4.5 V, I_{fss}= -5.7 A (Note 2)		-1	-1.6	V

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. 57 °C/W when mounted on a 1 in^2 pad of 2 oz copper



b. 161 °C/W when mounted on a minimum pad of 2 oz copper

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

3. The diode connected between the gate and source serves only as protection against ESD. No gate overvoltage rating is implied.

Typical Characteristics T_J = 25 °C unless otherwise noted

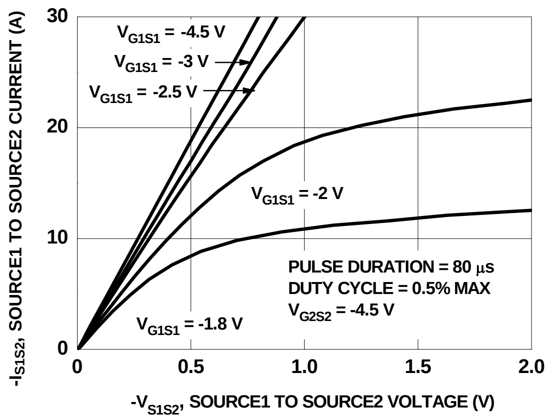


Figure 1. On-Region Characteristics

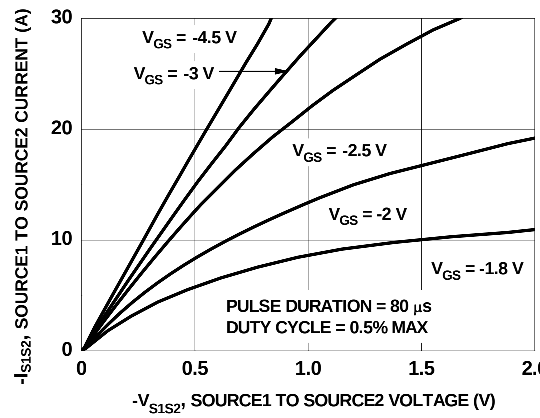


Figure 2. On-Region Characteristics

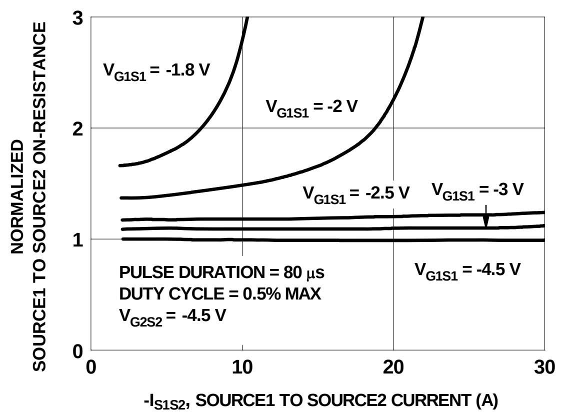


Figure 3. Normalized On-Resistance vs Junction Temperature

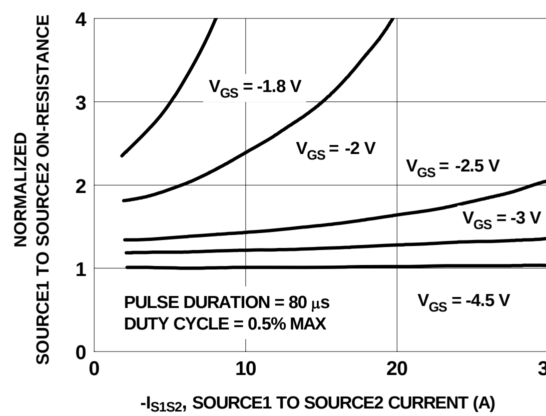


Figure 4. Normalized On-Resistance vs Junction Temperature

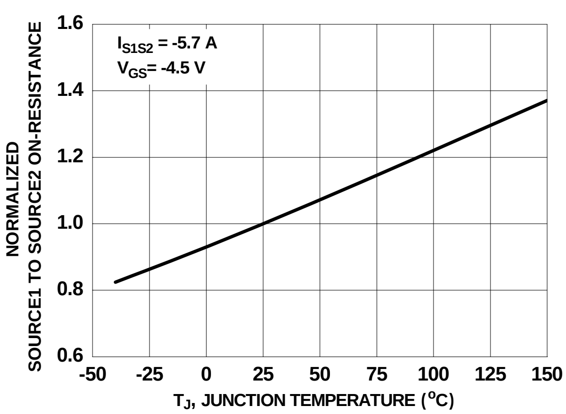


Figure 5. Normalized On Resistance vs Junction Temperature

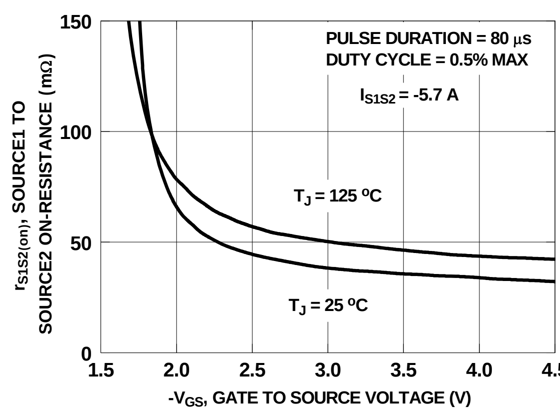


Figure 6. On Resistance vs Gate to Source Voltage

Typical Characteristics T_J = 25 °C unless otherwise noted

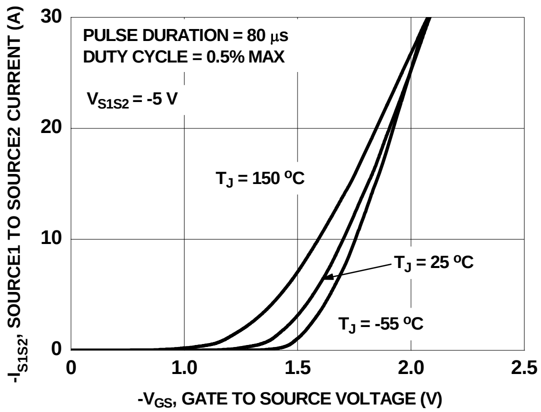


Figure 7. Transfer Characteristics

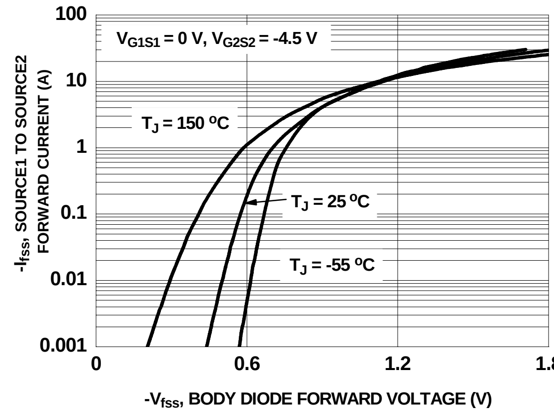


Figure 8. Source1 to Source2 Diode Forward Voltage vs Source Current

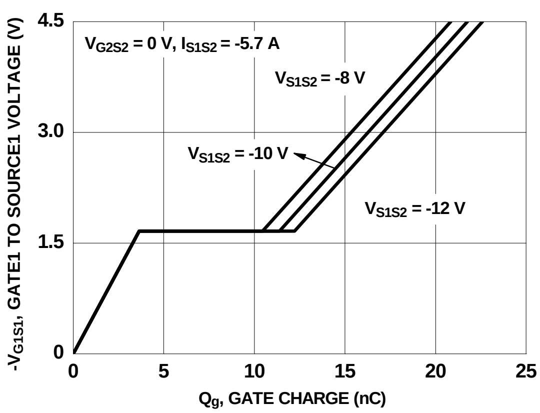


Figure 9. Gate Charge Characteristics

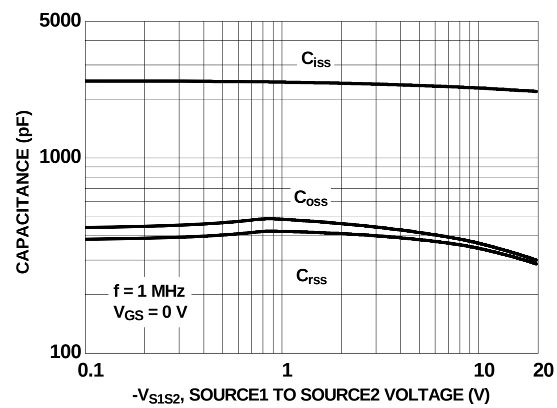


Figure 10. Capacitance vs Source1 to Source2 Voltage

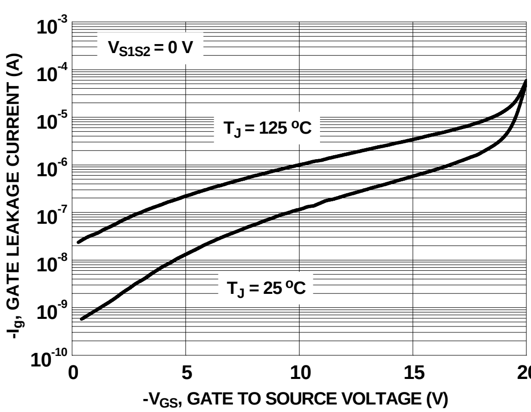


Figure 11. Gate Leakage Current vs Gate to Source Voltage

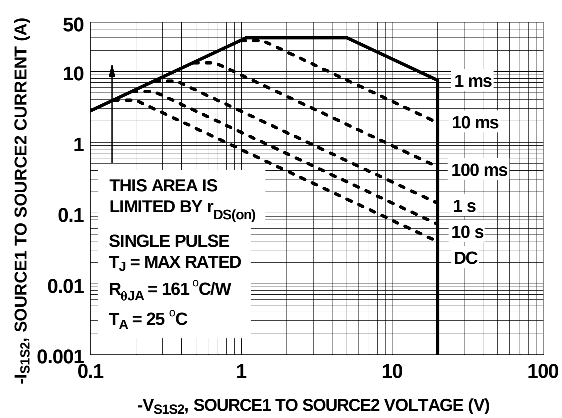


Figure 12. Forward Bias Safe Operating Area

Typical Characteristics T_J = 25 °C unless otherwise noted

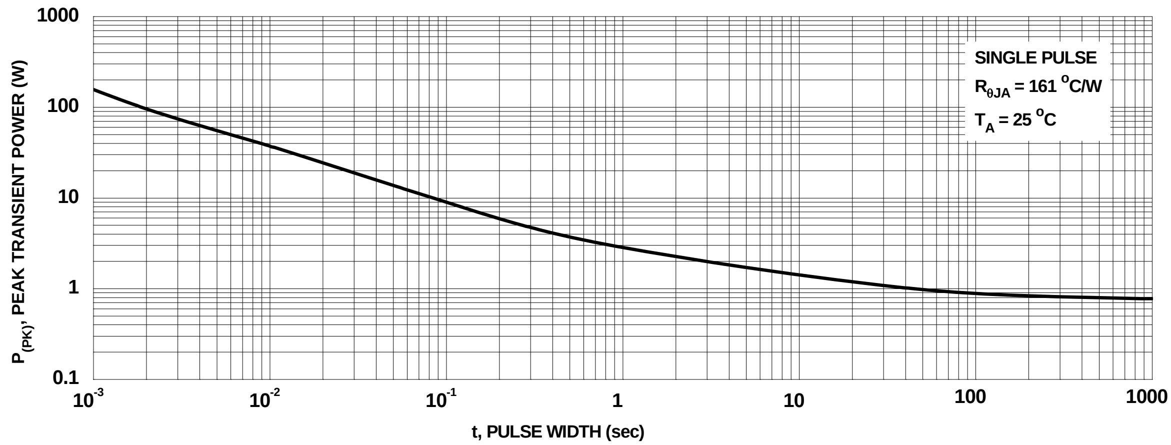


Figure 13. Single Pulse Maximum Power Dissipation

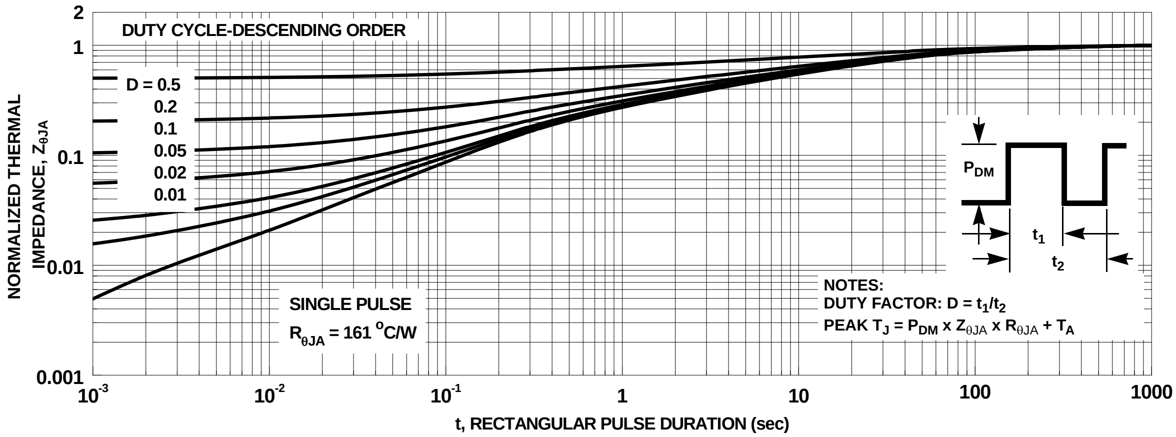
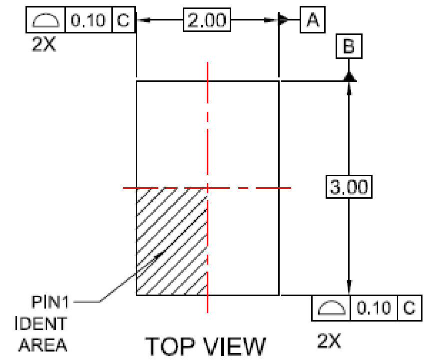
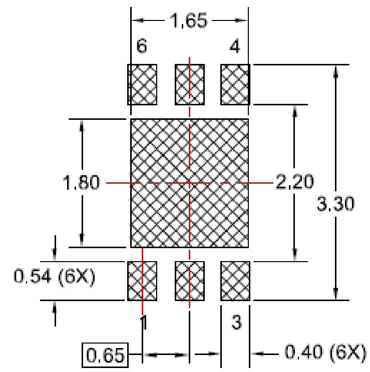


Figure 14. Junction-to-Ambient Transient Thermal Response Curve

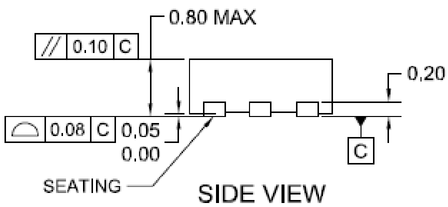
Dimensional Outline and Pad Layout



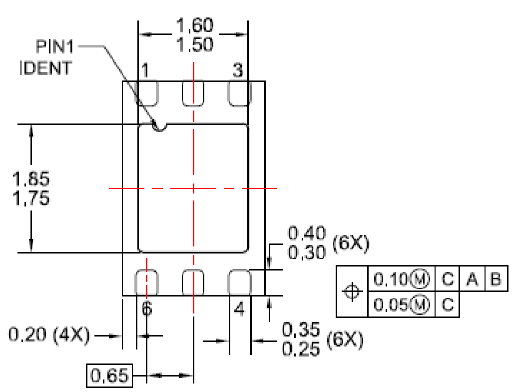
TOP VIEW



RECOMMENDED LAND PATTERN



SIDE VIEW



BOTTOM VIEW

NOTES:

A. PACKAGE CONFORMS TO JEDEC MO-229 EXCEPT WHERE NOTED.

B. DIMENSIONS ARE IN MILLIMETERS.

C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.

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