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March 2015

FDMA86108LZ

Single N-Channel PowerTrench[®] MOSFET 100 V, 2.2 A, 243 m Ω

Features

- Max $r_{DS(on)}$ = 243 m Ω at V_{GS} = 10 V, I_D = 2.2 A
- Max $r_{DS(on)}$ = 366 m Ω at V_{GS} = 4.5 V, I_D = 1.8 A
- Low Profile 0.8 mm Maximum in the New Package MicroFET 2x2 mm
- Free from Halogenated Compounds and Antimony Oxides
- RoHS Compliant

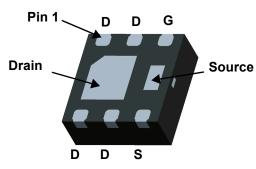
General Description

This device has been designed to provide maximum efficiency and thermal performance for synchronous buck converters. The low $r_{\text{DS(on)}}$ and gate charge provide excellent switching performance.

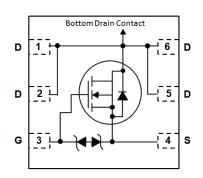
Application

■ DC – DC Buck Converters





MicroFET 2X2 (Bottom View)



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

Symbol	Param	eter		Ratings	Units
V _{DS}	Drain to Source Voltage			100	V
V _{GS}	Gate to Source Voltage			±20	V
	Drain Current -Continuous	T _A = 25 °C	(Note 1a)	2.2	۸
ID	-Pulsed		(Note 3)	6	Α
D	Power Dissipation	T _A = 25 °C	(Note 1a)	2.4	w
P_{D}	Power Dissipation	issipation $T_A = 25 ^{\circ}\text{C}$ (Note 1b)		0.9	VV
T _J , T _{STG}	Operating and Storage Junction Tempera	ature Range		-55 to +150	°C

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	(Note 1a)	52	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	(Note 1b)	145	C/VV

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
108	FDMA86108LZ	MicroFET 2X2	7 "	8 mm	3000 units

Electrical Characteristics T_J = 25 °C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Units
Off Chara	acteristics					
BV_{DSS}	Drain to Source Breakdown Voltage	$I_D = 250 \mu A, V_{GS} = 0 V$	100			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I _D = 250 μA, referenced to 25 °C		74		mV/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 80 V, V _{GS} = 0 V			1	μА
I _{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm 20 \text{ V}, V_{DS} = 0 \text{ V}$			±10	μΑ

On Characteristics

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250 \mu A$	1.0	2.2	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		-5		mV/°C
	Static Drain to Source On Resistance	V _{GS} = 10 V, I _D = 2.2 A		188	243	mΩ
r		$V_{GS} = 4.5 \text{ V}, I_D = 1.8 \text{ A}$		275	366	
r _{DS(on)}		$V_{GS} = 10 \text{ V}, I_D = 2.2 \text{ A},$ $T_J = 125 ^{\circ}\text{C}$		345	446	
g _{FS}	Forward Transconductance	V _{DD} = 5 V, I _D = 2.2 A		3.7		S

Dynamic Characteristics

C _{iss}	Input Capacitance	V - 50 V V - 0 V		116	163	pF
C _{oss}	Output Capacitance	V _{DS} = 50 V, V _{GS} = 0 V, f = 1 MHz		23	35	pF
C _{rss}	Reverse Transfer Capacitance	1 - 1 IVII 12		1	5	pF
R_g	Gate Resistance		0.1	1.0	3.0	Ω

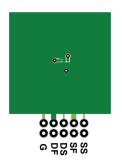
Switching Characteristics

t _{d(on)}	Turn-On Delay Time		4.2	10	ns
t _r	Rise Time	$V_{DD} = 50V, I_D = 2.2 A,$	1.7	10	ns
t _{d(off)}	Turn-Off Delay Time	$V_{GS} = 10 \text{ V}, R_{GEN} = 6 \Omega$	7.6	15	ns
t _f	Fall Time		1.7	10	ns
$Q_{g(TOT)}$	Total Gate Charge	V _{GS} = 0 V to 10 V	2.1	3.0	nC
$Q_{g(TOT)}$	Total Gate Charge	$V_{GS} = 0 \text{ V to } 4.5 \text{ V}$ $V_{DD} = 50 \text{ V}$	1.1	1.6	nC
Q_{gs}	Gate to Source Charge	I _D = 2.2 A	0.5		nC
Q_{gd}	Gate to Drain "Miller" Charge		0.5		nC

Drain-Source Diode Characteristics

V_{SD}	Source to Drain Diode Forward Voltage	V _{GS} = 0 V, I _S = 2.2 A (Note 2)		0.9	1.2	V
t _{rr}	Reverse Recovery Time	L = 2.2 A di/dt = 100 A/v.o		32	51	ns
Q _{rr}	Reverse Recovery Charge	I _F = 2.2 A, di/dt = 100 A/μs		20	32	nC

^{1.8} $_{\rm BJA}$ 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. $R_{\rm BJC}$ is guaranteed by design while $R_{\rm BJA}$ is determined by the user's board design.



a. 52 °C/W when mounted on a 1 in² pad of 2 oz copper.

b. 145 °C/W when mounted on a minimum pad of 2 oz copper.

SF DS DF G

- 2. Pulse Test: Pulse Width < 300 μ s, Duty cycle < 2.0%. 3. Pulse Id measured at 250 μ s, refer to Fig 11 SOA graph for more details.

Typical Characteristics T_J = 25 °C unless otherwise noted

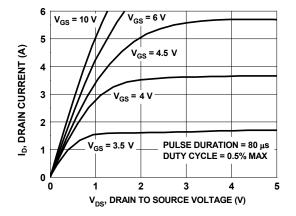


Figure 1. On Region Characteristics

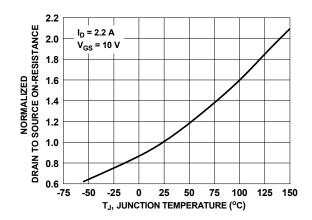


Figure 3. Normalized On Resistance vs. Junction Temperature

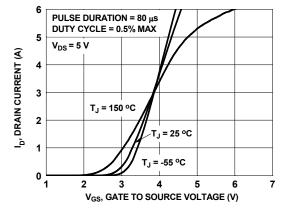


Figure 5. Transfer Characteristics

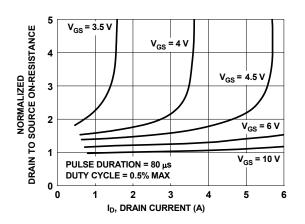


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

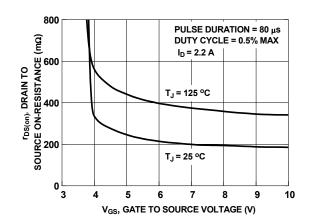


Figure 4. On-Resistance vs. Gate to Source Voltage

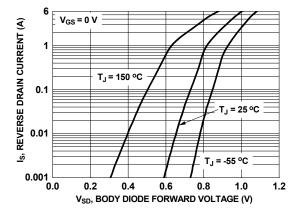
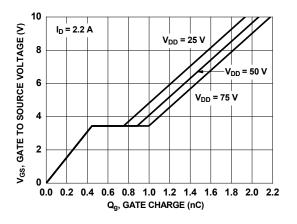


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

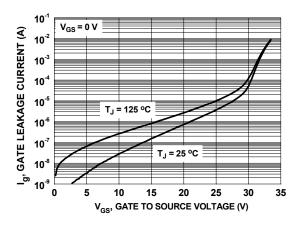
Typical Characteristics T_J = 25 $^{\circ}$ C unless otherwise noted



200 100 100 C_{iss} C_{oss} 10 10 C_{rss} 10 C_{rss} 10 0.1 1 10 100 V_{DS}, DRAIN TO SOURCE VOLTAGE (V)

Figure 7. Gate Charge Characteristics

Figure 8. Capacitance vs. Drain to Source Voltage



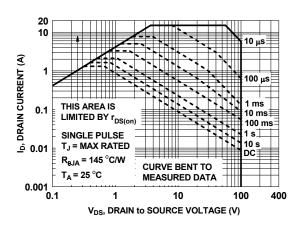


Figure 9. Gate Leakage Current vs. Gate to Source Voltage

Figure 10. Forward Bias Safe Operating Area

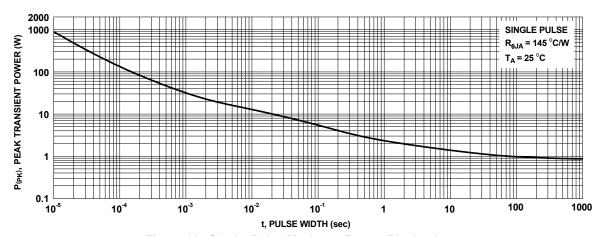


Figure 11. Single Pulse Maximum Power Dissipation

Typical Characteristics T_J = 25 °C unless otherwise noted

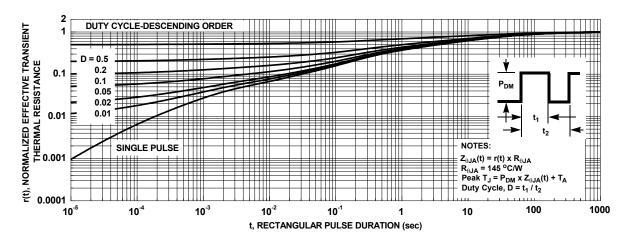
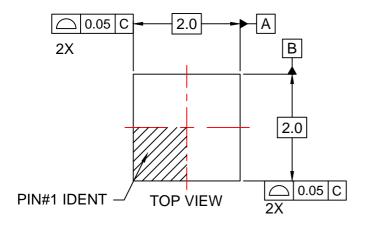
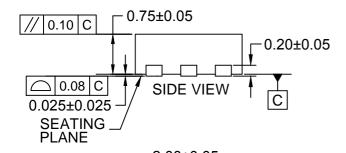
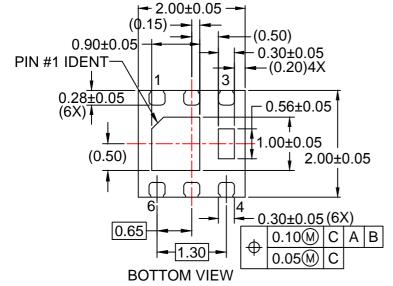


Figure 12. Junction-to-Ambient Transient Thermal Response Curve

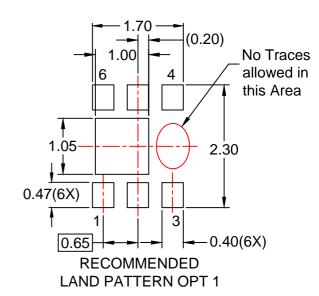


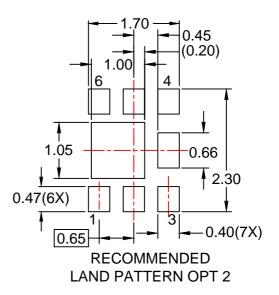




NOTES:

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