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May 2014

FDMA7630

Single N-Channel PowerTrench® MOSFET

30 V, 11 A, 13 m Ω

Features

- Max $r_{DS(on)}$ = 13 m Ω at V_{GS} = 10 V, I_D = 11 A
- Max $r_{DS(on)} = 20 \text{ m}\Omega$ at $V_{GS} = 4.5 \text{ V}$, $I_D = 9 \text{ A}$
- Low Profile 0.8 mm maximum in the new package MicroFET 2x2 mm
- Free from halogenated compounds and antimony oxides
- RoHS compliant

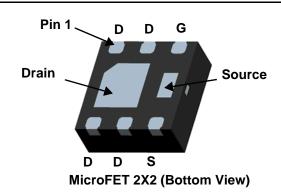


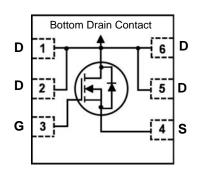
General Description

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





MOSFET Maximum Ratings T_A = 25 °C unless otherwise noted

Symbol		Parameter		Ratings	Units
V _{DSS}	Drain to Source Voltage			30	V
V _{GSS}	Gate to Source Voltage			±20	V
I _D	Drain Current -Continuous	T _A = 25 °C	(Note 1a)	11	۸
	-Pulsed			24	— A
P_{D}	Power Dissipation	T _A = 25 °C	(Note 1a)	2.4	W
	Power Dissipation	T _A = 25 °C	(Note 1b)	0.9	VV
T _J , T _{STG}	Operating and Storage Junction Te	emperature 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
630	FDMA7630	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 Char	acteristics					
BV _{DSS}	Drain to Source Breakdown Voltage	$I_D = 250 \mu A, V_{GS} = 0 V$	30			V
$\frac{\Delta BV_{DSS}}{\Delta T_{J}}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μ A, referenced to 25 °C		15		mV/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 24 V, V _{GS} = 0 V			1	μΑ
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	$V_{GS} = V_{DS}, I_D = 250 \mu A$	1.0	2.0	3.0	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		-6		mV/°C
		V _{GS} = 10 V, I _D = 11 A		10	13	
r _{DS(on)}	Static Drain to Source On Resistance	$V_{GS} = 4.5 \text{ V}, I_D = 9 \text{ A}$		14	20	mΩ
, ,		$V_{GS} = 10 \text{ V}, I_D = 11 \text{ A}, T_J = 125 \text{ °C}$		14	18	
9 _{FS}	Forward Transconductance	V _{DS} = 5 V, I _D = 11 A		36		S

Dynamic Characteristics

C _{iss}	Input Capacitance	V 45 V V 6 V	1020	1360	pF
Coss	Output Capacitance	$V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}$ f = 1.0 MHz	315	415	pF
C _{rss}	Reverse Transfer Capacitance	1 = 1.0 WH12	35	55	pF
R_q	Gate Resistance		1.7		Ω

Switching Characteristics

t _{d(on)}	Turn-On Delay Time				8	15	ns
t _r	Rise Time	V _{DD} = 15 V, I _D = 11 A	$V_{DD} = 15 \text{ V}, I_{D} = 11 \text{ A}$ $V_{GS} = 10 \text{ V}, R_{GEN} = 6 \Omega$		3	10	ns
t _{d(off)}	Turn-Off Delay Time	V _{GS} = 10 V, R _{GEN} =			19	34	ns
t _f	Fall Time				3	10	ns
Qg	Total Gate Charge	V _{GS} = 0 V to 10 V			16	22	nC
Q_{g}	Total Gate Charge	V _{GS} = 0 V to 4.5 V	V _{DD} = 15 V,		8	10	nC
Q_{gs}	Gate to Source Gate Charge		I _D = 11 A		3.0		nC
Q _{qd}	Gate to Drain "Miller" Charge				2.2		nC

Drain-Source Diode Characteristics

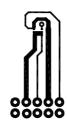
I _S	Maximum Continuous Drain-Source Diode Forward Current				2	Α
V _{SD}	Source to Drain Diode Forward Voltage	$V_{GS} = 0 \text{ V}, I_{S} = 2 \text{ A}$	(Note 2)	0.8	1.2	V
t _{rr}	Reverse Recovery Time	I _E = 11 A, di/dt = 100 A/μs		21	33	ns
Q _{rr}	Reverse Recovery Charge	$-1_{\rm F} = 11$ A, di/dt = 100 A/ μ s		6	12	nC

NOTES

1. R_{0JA} 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_{0JC} is guaranteed by design while R_{0CA} 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.

^{2.} Pulse Test: Pulse Width < 300 $\mu\text{s},$ Duty cycle < 2.0%.

Typical Characteristics T_{.I} = 25°C unless otherwise noted

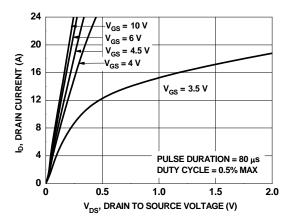


Figure 1. On-Region Characteristics

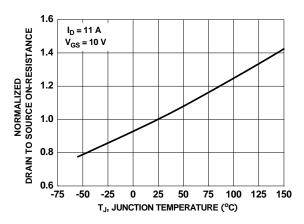


Figure 3. Normalized On-Resistance vs Junction Temperature

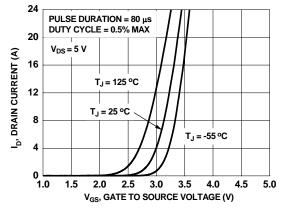


Figure 5. Transfer Characteristics

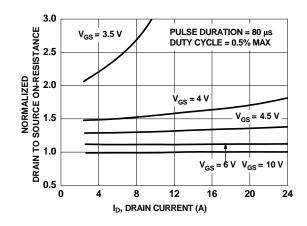


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

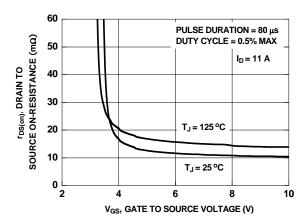


Figure 4. On-Resistance vs Gate to Source Voltage

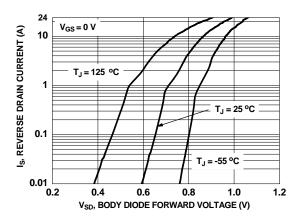


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

Typical Characteristics T_J = 25°C unless otherwise noted

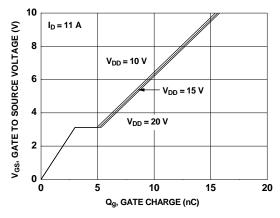


Figure 7. Gate Charge Characteristics

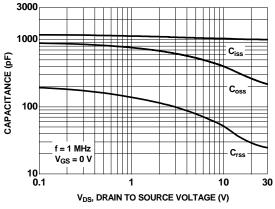


Figure 8. Capacitance vs Drain to Source Voltage

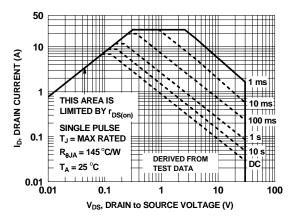


Figure 9. Forward Bias Safe Operating Area

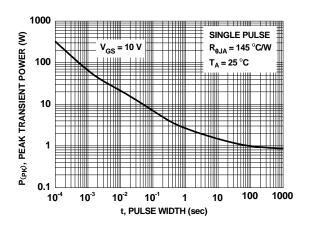


Figure 10. Single Pulse Maximum Power Dissipation

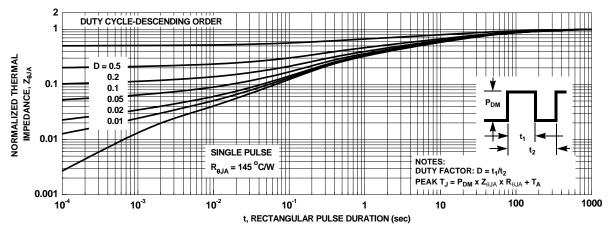
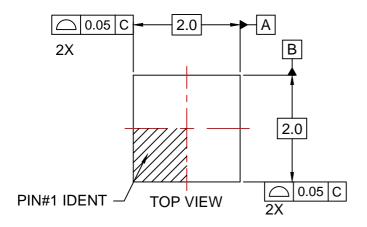
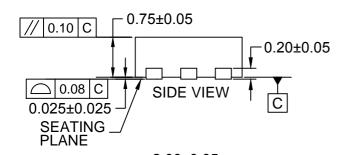
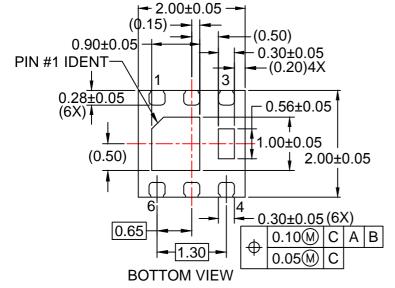


Figure 11. Transient Thermal Response Curve

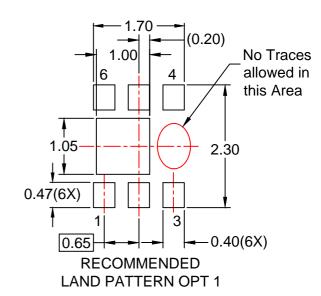


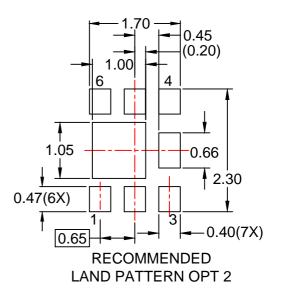




NOTES:

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