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July 2010

FDME1034CZT

Complementary PowerTrench® MOSFET

N-channel: 20 V, 3.8 A, 66 m Ω P-channel: -20 V, -2.6 A, 142 m Ω

Features

Q1: N-Channel

- Max $r_{DS(on)}$ = 66 m Ω at V_{GS} = 4.5 V, I_D = 3.4 A
- Max $r_{DS(on)} = 86 \text{ m}\Omega$ at $V_{GS} = 2.5 \text{ V}$, $I_D = 2.9 \text{ A}$
- Max $r_{DS(on)} = 113 \text{ m}\Omega$ at $V_{GS} = 1.8 \text{ V}$, $I_D = 2.5 \text{ A}$
- Max $r_{DS(on)} = 160 \text{ m}\Omega$ at $V_{GS} = 1.5 \text{ V}$, $I_D = 2.1 \text{ A}$

Q2: P-Channel

- Max $r_{DS(on)}$ = 142 m Ω at V_{GS} = -4.5 V, I_D = -2.3 A
- Max $r_{DS(on)} = 213 \text{ m}\Omega$ at $V_{GS} = -2.5 \text{ V}$, $I_D = -1.8 \text{ A}$
- Max $r_{DS(on)} = 331 \text{ m}\Omega$ at $V_{GS} = -1.8 \text{ V}$, $I_D = -1.5 \text{ A}$
- Max $r_{DS(on)}$ = 530 m Ω at V_{GS} = -1.5 V, I_D = -1.2 A
- Low profile: 0.55 mm maximum in the new package MicroFET 1.6x1.6 **Thin**
- Free from halogenated compounds and antimony oxides
- HBM ESD protection level > 1600 V (Note 3)
- RoHS Compliant



This device is designed specifically as a single package solution for a DC/DC 'Switching' MOSFET in cellular handset and other ultra-portable applications. It features an independent N-Channel & P-Channel MOSFET with low on-state resistance for minimum conduction losses. The gate charge of each MOSFET is also minimized to allow high frequency switching directly from the controlling device.

The MicroFET 1.6x1.6 **Thin** package offers exceptional thermal performance for it's physical size and is well suited to switching and linear mode applications.

Applications

- DC-DC Conversion
- Level Shifted Load Switch



MicroFET 1.6x1.6 Thin

MOSFET Maximum Ratings T_A = 25 °C unless otherwise noted

Symbol	Paramet	Parameter			Q2	Units
V _{DS}	Drain to Source Voltage	Drain to Source Voltage			-20	V
V _{GS}	Gate to Source Voltage			±8	±8	V
	Drain Current -Continuous	T _A = 25 °C	(Note 1a)	3.8	-2.6	۸
ID	-Pulsed			6	-6	A
n	Power Dissipation for Single Operation	(Note 1a)		1.4	W	
P_{D}	Power Dissipation for Single Operation $T_A = 25 ^{\circ}\text{C}$ (Note 1b) 0.6		0.6	VV		
T _J , T _{STG}	Operating and Storage Junction Tempera	ature Range		-55 1	to +150	°C

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Single Operation)	(Note 1a)	90	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Single Operation)	(Note 1b)	195	C/VV

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
5T	FDME1034CZT	MicroFET 1.6x1.6 Thin	7 "	8 mm	5000 units

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

Symbol	Parameter	Test Conditions	Туре	Min	Тур	Max	Units
Off Chara	cteristics						
BV _{DSS}	Drain to Source Breakdown Voltage	$I_D = 250 \mu A, V_{GS} = 0 V$	Q1	20			V
Diam to Source Bleakdown vo	Drain to Source Breakdown voltage	$I_D = -250 \mu A, V_{GS} = 0 V$	Q2	-20			V
ΔBV _{DS} S ΔΤ _J		$I_D = 250 \mu A$, referenced to 25 °C	Q1		16		mV/°C
ΔT_{J}	Coefficient	I_D = -250 μ A, referenced to 25 °C	Q2		-12		IIIV/ C
	Zero Gate Voltage Drain Current	V _{DS} = 16 V, V _{GS} = 0 V	Q1			1	μА
I _{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -16 \ V, \ V_{GS} = 0 \ V$	Q2			-1	μΑ
I _{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm 8 \text{ V}, V_{DS} = 0 \text{ V}$	All			±10	μΑ

On Characteristics

V _{GS(th)}	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, \ I_D = 250 \ \mu A$ $V_{GS} = V_{DS}, \ I_D = -250 \ \mu A$	Q1 Q2	0.4 -0.4	0.7 -0.6	1.0 -1.0	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	Q1 Q2		-3 2		mV/°C
		$V_{GS} = 4.5 \text{ V}, I_D = 3.4 \text{ A}$			55	66	
		$V_{GS} = 2.5 \text{ V}, I_D = 2.9 \text{ A}$			68	86	
		$V_{GS} = 1.8 \text{ V}, I_D = 2.5 \text{ A}$	Q1 Q2		85	113	- mΩ
		$V_{GS} = 1.5 \text{ V}, I_D = 2.1 \text{ A}$			106	160	
_	Drain to Source On Resistance	$V_{GS} = 4.5 \text{ V}, I_D = 3.4 \text{ A},$ $T_J = 125 ^{\circ}\text{C}$			76	112	
DS(on)		$V_{GS} = -4.5 \text{ V}, I_D = -2.3 \text{ A}$			95	142	
		$V_{GS} = -2.5 \text{ V}, I_D = -1.8 \text{ A}$			120	213	
		$V_{GS} = -1.8 \text{ V}, I_D = -1.5 \text{ A}$			150	331	
		$V_{GS} = -1.5 \text{ V}, I_D = -1.2 \text{ A}$	QZ		190	530	
		$V_{GS} = -4.5 \text{ V}, I_D = -2.3 \text{ A},$ $T_J = 125 ^{\circ}\text{C}$			128	190	
9 _{FS}	Forward Transconductance	$V_{DS} = 4.5 \text{ V}, I_{D} = 3.4 \text{ A}$ $V_{DS} = -4.5 \text{ V}, I_{D} = -2.3 \text{ A}$	Q1 Q2		9 7		S

Dynamic Characteristics

C _{iss}	Input Capacitance	Q1	Q1 Q2	225 305	300 405	pF
C _{oss}	Output Capacitance	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz Q2	Q1 Q2	40 55	55 75	pF
C _{rss}	Reverse Transfer Capacitance	$V_{DS} = -10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	Q1 Q2	25 50	40 75	pF

Switching Characteristics

t _{d(on)}	Turn-On Delay Time	Q1	Q1 Q2	4.5 4.7	10 10	
t _r	Rise Time	$V_{DD} = 10 \text{ V}, I_{D} = 1 \text{ A},$ $V_{GS} = 4.5 \text{ V}, R_{GEN} = 6 \Omega$	Q1 Q2	2.0 4.8	10 10	ns
t _{d(off)}	Turn-Off Delay Time	Q2 V _{DD} = -10 V, I _D = -1 A,	Q1 Q2	15 33	27 53	
t _f	Fall Time	$V_{GS} = -4.5 \text{ V}, R_{GEN} = 6 \Omega$	Q1 Q2	1.7 16	10 29	
Qg	Total Gate Charge	Q1 V _{DD} = 10 V, I _D = 3.4 A,	Q1 Q2	3 5.5	4.2 7.7	
Q _{gs}	Gate to Source Gate Charge	V _{GS} = 4.5 V Q2	Q1 Q2	0.4 0.6		nC
Q _{gd}	Gate to Drain "Miller" Charge	$V_{DD} = -10 \text{ V}, I_{D} = -2.3 \text{ A}, V_{GS} = -4.5 \text{ V}$	Q1 Q2	0.6 1.4		

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

Parameter

Drain-Source Diode Characteristics							
V	Source to Drain Diode Forward	$V_{GS} = 0 \text{ V}, I_S = 0.9 \text{ A}$ (Note 2)	Q1		0.7	1.2	V
V_{SD}	Voltage	$V_{GS} = 0 \text{ V}, I_S = -0.9 \text{ A}$ (Note 2)	Q2		-0.8	-1.2	V
+	Reverse Recovery Time	Q1	Q1		8.5	17	ns
^L rr	Reverse Recovery Time	$I_F = 3.4 \text{ A}, \text{ di/dt} = 100 \text{ A/}\mu\text{S}$	Q2		16	29	115
0	Reverse Recovery Time	Q2	Q1		1.4	10	nC
Q_{rr}	Reverse Recovery Time	$I_F = -2.3 \text{ A}, \text{ di/dt} = 100 \text{ A/}\mu\text{s}$	Q2		4.4	10	iiC

Test Conditions

Notes

Symbol

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. 90 °C/W when mounted on a 1 in² pad of 2 oz copper.



b. 195 °C/W when mounted on a minimum pad of 2 oz copper.

Type Min

Тур

Max

Units

- 2. Pulse Test: Pulse Width < 300 μ s, Duty cycle < 2.0%.
- 3. The diode connected between the gate and source serves only as protection ESD. No gate overvoltage rating is implied.

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

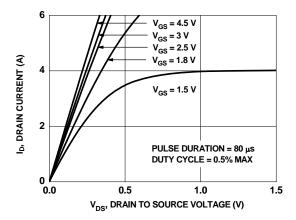
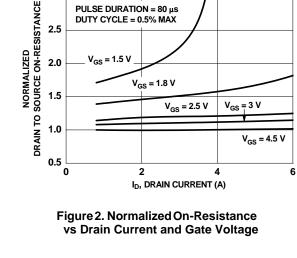


Figure 1. On Region Characteristics



PULSE DURATION = 80 μs

3.0

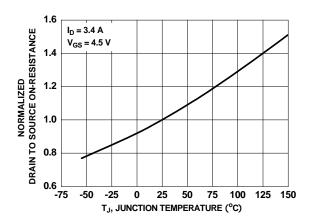


Figure 3. Normalized On Resistance vs Junction Temperature

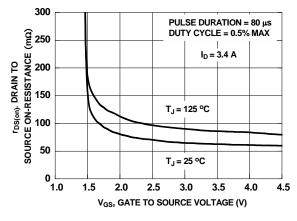


Figure 4. On-Resistance vs Gate to Source Voltage

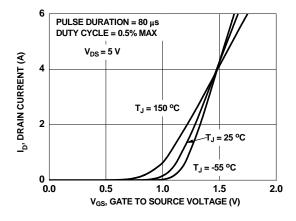


Figure 5. Transfer Characteristics

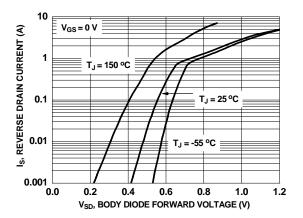


Figure 6. Source to Drain Diode **Forward Voltage vs Source Current**

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

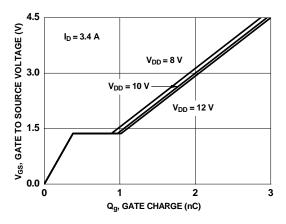


Figure 7. Gate Charge Characteristics

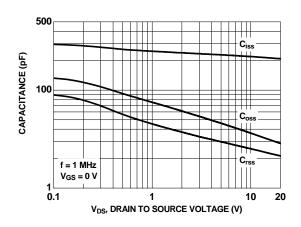


Figure 8. Capacitance vs Drain to Source Voltage

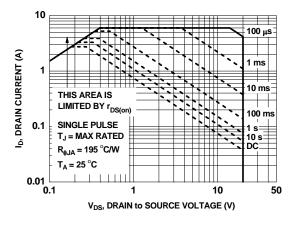


Figure 9. Forward Bias Safe Operating Area

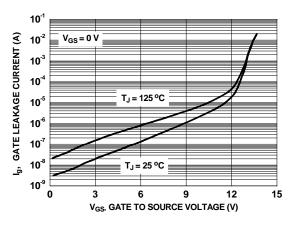


Figure 10. Gate Leakage Current vs Gate to Source Voltage

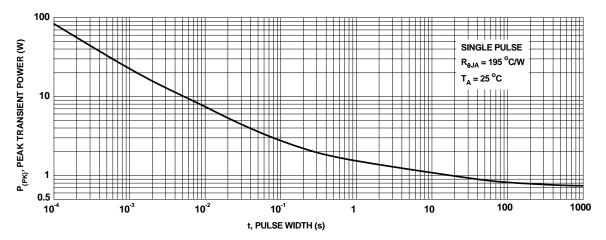


Figure 11. Single Pulse Maximum Power Dissipation

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

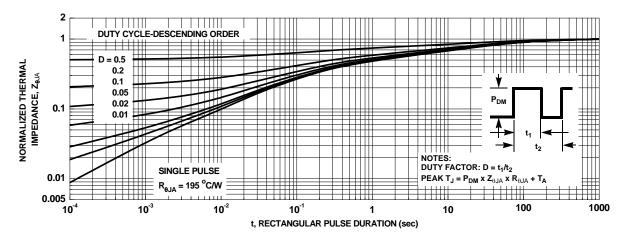


Figure 12. Junction-to-Ambient Transient Thermal Response Curve

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

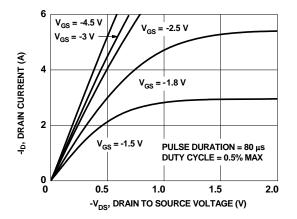


Figure 13. On- Region Characteristics

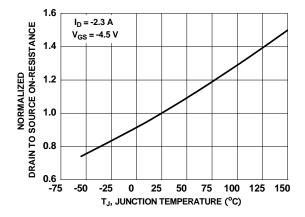


Figure 15. Normalized On-Resistance vs Junction Temperature

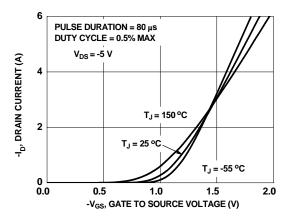


Figure 17. Transfer Characteristics

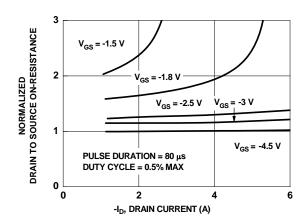


Figure 14. Normalized on-Resistance vs Drain Current and Gate Voltage

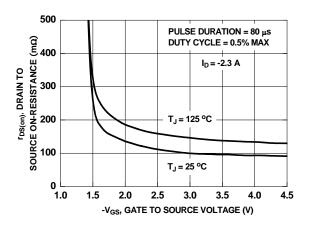


Figure 16. On-Resistance vs Gate to Source Voltage

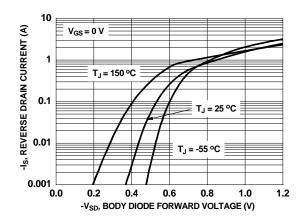


Figure 18. Source to Drain Diode Forward Voltage vs Source Current

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

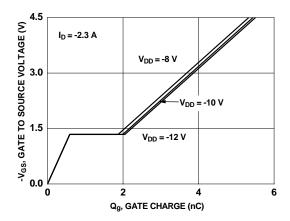


Figure 19. Gate Charge Characteristics

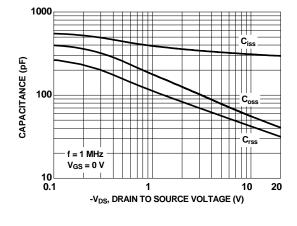


Figure 20. Capacitance vs Drain to Source Voltage

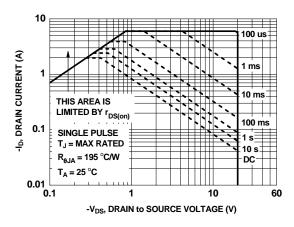


Figure 21. Forward Bias Safe Operating Area

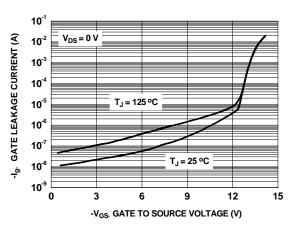


Figure 22. Gate Leakage Current vs Gate to Source Voltage

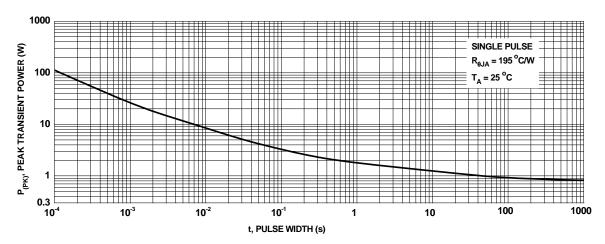


Fig 23. Single Pulse Maximum Power Dissipation

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

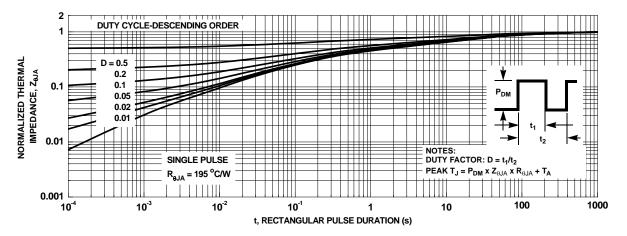
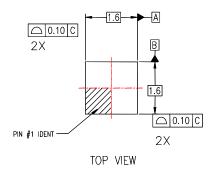
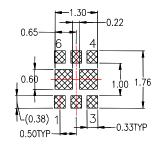


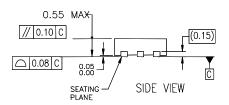
Figure 24. Junction-to-Ambient Transient Thermal Response Curve

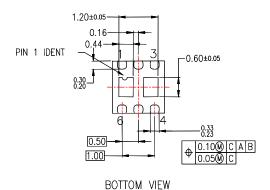
Dimensional Outline and Pad Layout





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ПОСТАВКА ЭЛЕКТРОННЫХ КОМПОНЕНТОВ

многоканальный

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001 Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

Данный компонент на территории Российской Федерации Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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