



December 2009

FDME1024NZT

Dual N-Channel Power Trench[®] MOSFET 20 V, 3.4 A, 66 mΩ

Features

- Max $r_{DS(on)}$ = 66 mΩ at $V_{GS} = 4.5$ V, $I_D = 3.4$ A
- Max $r_{DS(on)}$ = 86 mΩ at $V_{GS} = 2.5$ V, $I_D = 2.9$ A
- Max $r_{DS(on)}$ = 113 mΩ at $V_{GS} = 1.8$ V, $I_D = 2.5$ A
- Max $r_{DS(on)}$ = 160 mΩ at $V_{GS} = 1.5$ V, $I_D = 2.1$ 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 > 1600V (Note3)
- RoHS Compliant



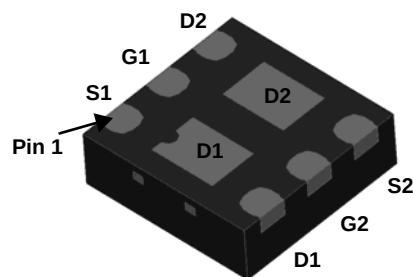
General Description

This device is designed specifically as a single package solution for dual switching requirement in cellular handset and other ultra-portable applications. It features two independent N-Channel MOSFETs with low on-state resistance for minimum conduction losses.

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

Applications

- Baseband Switch
- Load Switch

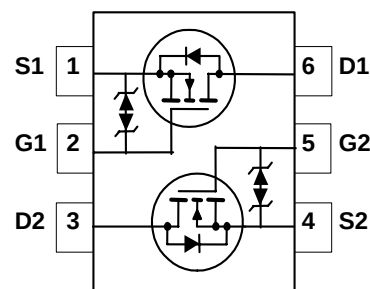


BOTTOM



TOP

MicroFET 1.6x1.6 Thin



MOSFET Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{DS}	Drain to Source Voltage	20	V
V_{GS}	Gate to Source Voltage	± 8	V
I_D	Drain Current -Continuous	$T_A = 25^\circ\text{C}$ (Note 1a)	A
	-Pulsed	6	
P_D	Power Dissipation	$T_A = 25^\circ\text{C}$ (Note 1a)	W
	Power Dissipation	$T_A = 25^\circ\text{C}$ (Note 1b)	
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ\text{C}$

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Single Operation)	(Note 1a)	95	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Single Operation)	(Note 1b)	210	

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
4T	FDME1024NZT	MicroFET 1.6x1.6 Thin	7 "	8 mm	5000 units

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV_{DSS}	Drain to Source Breakdown Voltage	$I_D = 250\text{ }\mu\text{A}$, $V_{GS} = 0\text{ V}$	20			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\text{ }\mu\text{A}$, referenced to $25\text{ }^{\circ}\text{C}$		16		mV/ $^{\circ}\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 16\text{ V}$, $V_{GS} = 0\text{ V}$			1	μA
I_{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm 8\text{ V}$, $V_{DS} = 0\text{ V}$			± 10	μA

On Characteristics

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}$, $I_D = 250\text{ }\mu\text{A}$	0.4	0.7	1.0	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	$I_D = 250\text{ }\mu\text{A}$, referenced to $25\text{ }^{\circ}\text{C}$		-3		mV/ $^{\circ}\text{C}$
$r_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 4.5\text{ V}$, $I_D = 3.4\text{ A}$		55	66	m Ω
		$V_{GS} = 2.5\text{ V}$, $I_D = 2.9\text{ A}$		68	86	
		$V_{GS} = 1.8\text{ V}$, $I_D = 2.5\text{ A}$		85	113	
		$V_{GS} = 1.5\text{ V}$, $I_D = 2.1\text{ A}$		106	160	
		$V_{GS} = 4.5\text{ V}$, $I_D = 3.4\text{ A}$, $T_J = 125\text{ }^{\circ}\text{C}$		76	112	
g_{FS}	Forward Transconductance	$V_{DD} = 4.5\text{ V}$, $I_D = 3.4\text{ A}$		9		S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 10\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$		225	300	pF
C_{oss}	Output Capacitance			40	55	pF
C_{rss}	Reverse Transfer Capacitance			25	40	pF

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 10\text{ V}$, $I_D = 1\text{ A}$, $V_{GS} = 4.5\text{ V}$, $R_{GEN} = 6\text{ }\Omega$		4.5	10	ns
t_r	Rise Time			2	10	ns
$t_{d(off)}$	Turn-Off Delay Time			15	27	ns
t_f	Fall Time			1.7	10	ns
$Q_{g(TOT)}$	Total Gate Charge	$V_{DD} = 10\text{ V}$, $I_D = 3.4\text{ A}$, $V_{GS} = 4.5\text{ V}$		3	4.2	nC
Q_{gs}	Gate to Source Gate Charge			0.4		nC
Q_{gd}	Gate to Drain "Miller" Charge			0.6		nC

Drain-Source Diode Characteristics

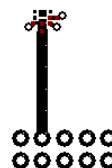
V_{SD}	Source to Drain Diode Forward Voltage	$V_{GS} = 0\text{ V}$, $I_S = 0.9\text{ A}$ (Note 2)		0.7	1.2	V
t_{rr}	Reverse Recovery Time	$I_F = 3.4\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$		8.5	17	ns
Q_{rr}	Reverse Recovery Charge			1.4	10	nC

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. 95 $^{\circ}\text{C}/\text{W}$ when mounted on a 1 in² pad of 2 oz copper.



b. 210 $^{\circ}\text{C}/\text{W}$ 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 ESD. No gate overvoltage rating is implied.

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

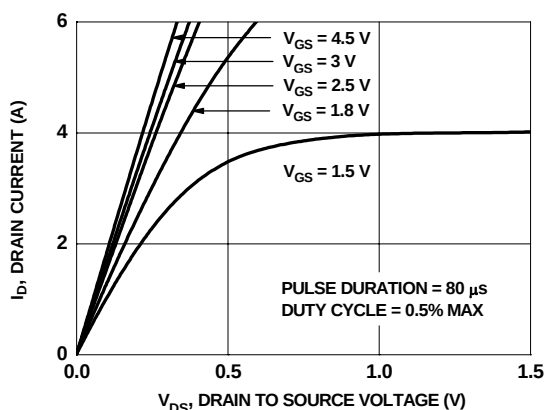


Figure 1. On-Region Characteristics

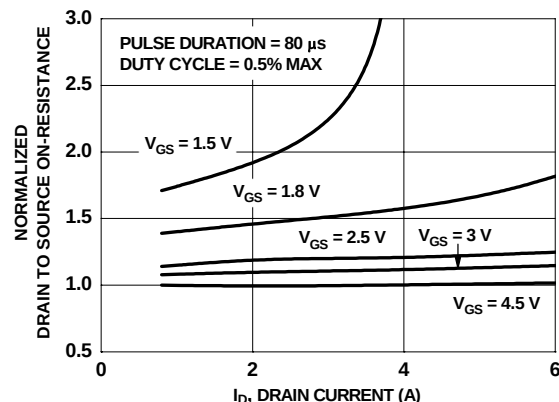


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

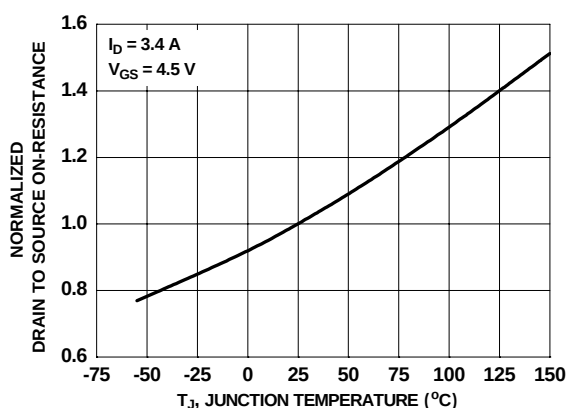


Figure 3. Normalized On-Resistance vs Junction Temperature

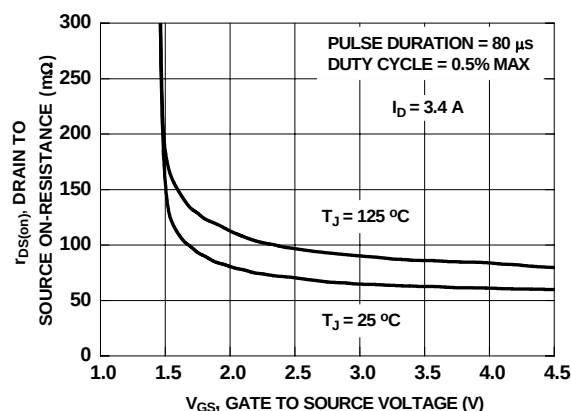


Figure 4. On-Resistance vs Gate to Source Voltage

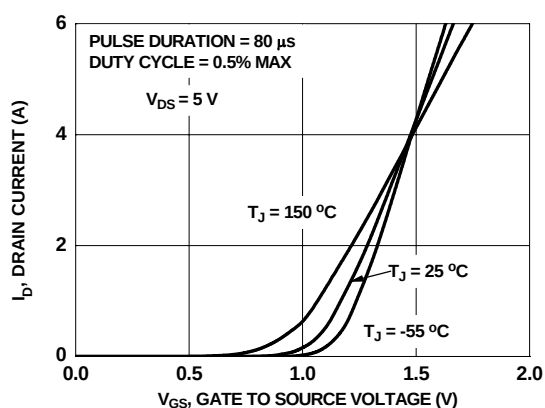


Figure 5. Transfer Characteristics

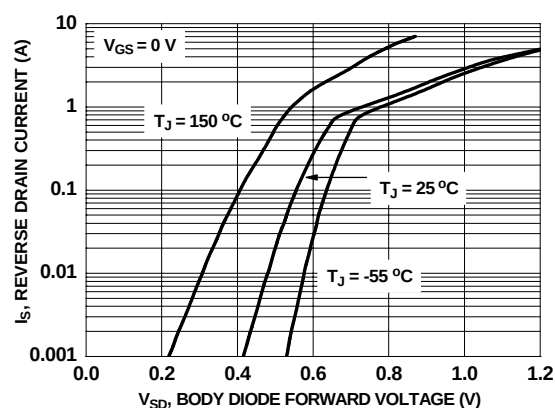


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

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

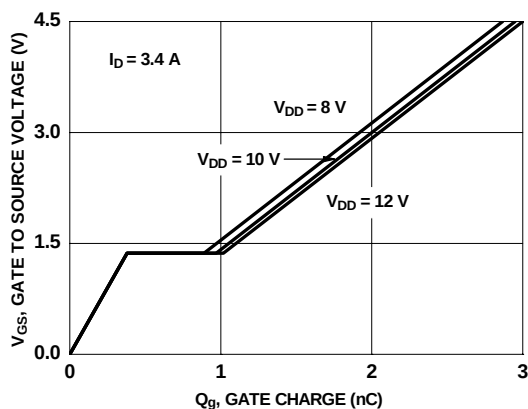


Figure 7. Gate Charge Characteristics

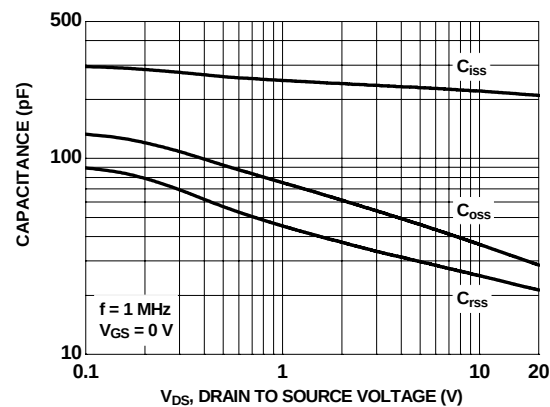


Figure 8. Capacitance vs Drain to Source Voltage

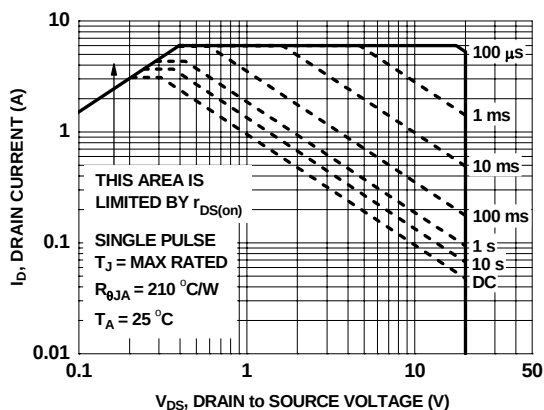


Figure 9. Forward Bias Safe Operating Area

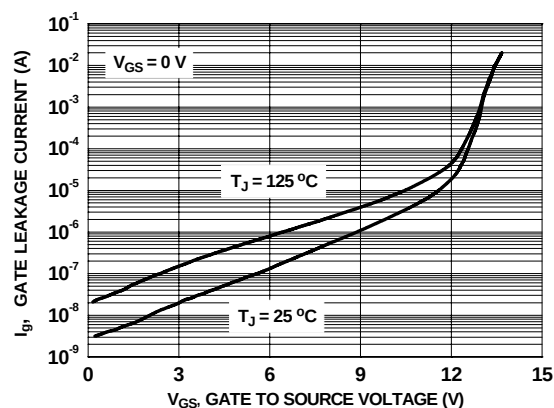


Figure 10. Gate Leakage Current vs Gate to Source Voltage

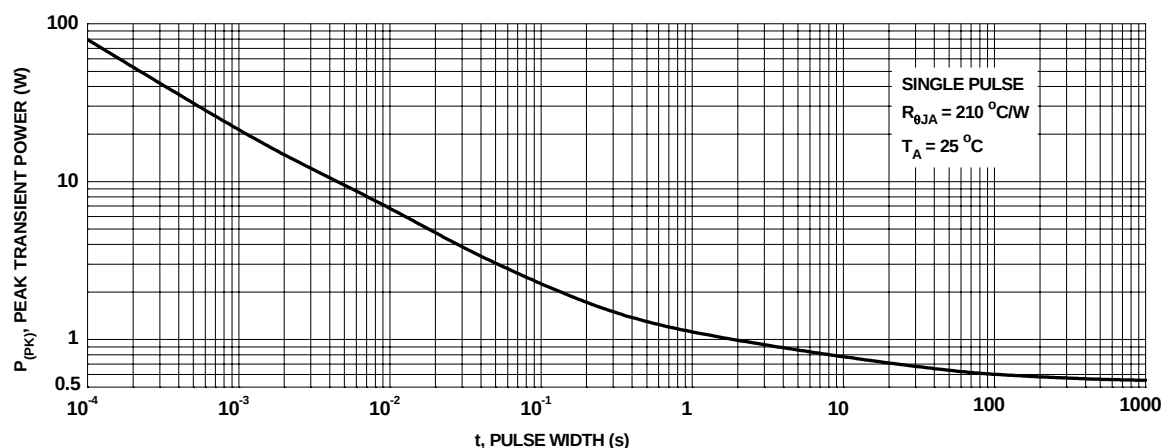
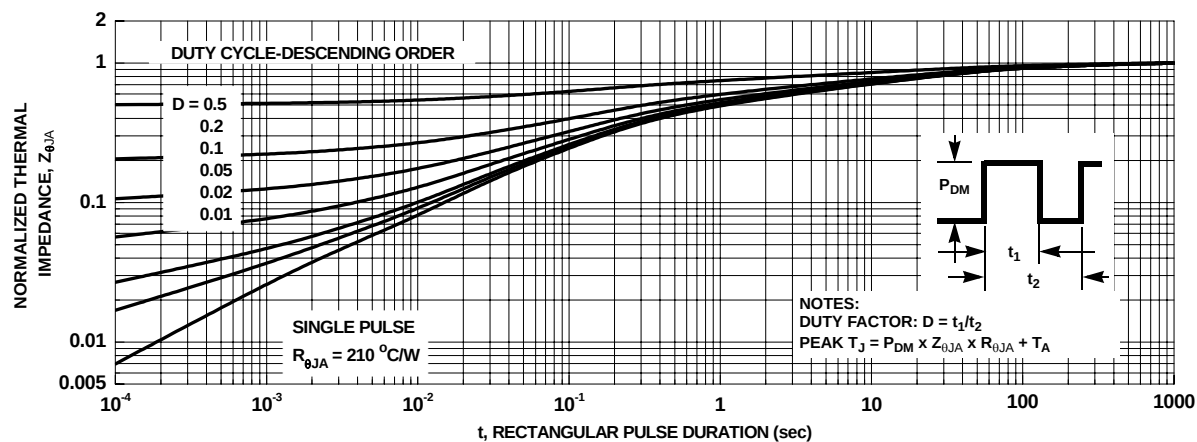
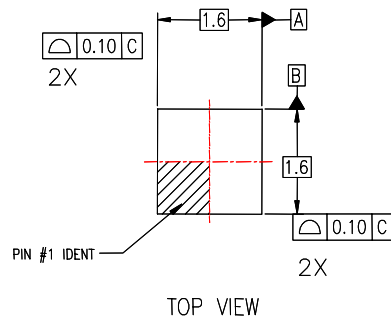


Figure 11. Single Pulse Maximum Power Dissipation

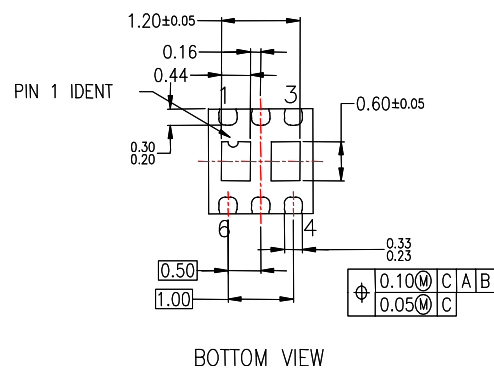
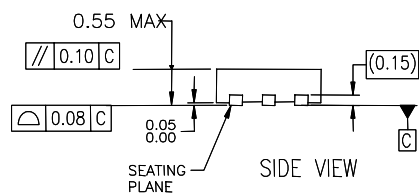
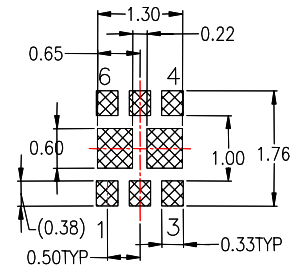
Typical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted



Dimensional Outline and Pad Layout



RECOMMENDED LAND PATTERN



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