

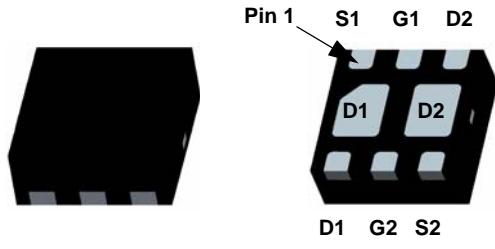
FDMA6023PZT

Dual P-Channel PowerTrench® MOSFET

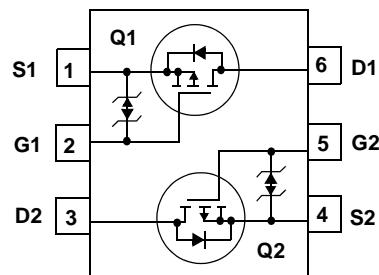
-20 V, -3.6 A, 60 mΩ

Features

- Max $r_{DS(on)}$ = 60 mΩ at $V_{GS} = -4.5$ V, $I_D = -3.6$ A
- Max $r_{DS(on)}$ = 80 mΩ at $V_{GS} = -2.5$ V, $I_D = -3.0$ A
- Max $r_{DS(on)}$ = 110 mΩ at $V_{GS} = -1.8$ V, $I_D = -2.0$ A
- Max $r_{DS(on)}$ = 170 mΩ at $V_{GS} = -1.5$ V, $I_D = -1.0$ A
- Low Profile-0.55 mm maximum - in the new package MicroFET 2x2 mm Thin
- HBM ESD protection level > 2.4 kV typical (Note 3)
- RoHS Compliant
- Free from halogenated compounds and antimony oxides



MicroFET 2x2



MOSFET Maximum Ratings $T_A = 25$ °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	-Continuous $T_A = 25$ °C (Note 1a)	-3.6	A
	-Pulsed	-15	
P_D	Power Dissipation $T_A = 25$ °C (Note 1a)	1.4	W
	Power Dissipation $T_A = 25$ °C (Note 1b)	0.7	
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	°C

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance for Single Operation, Junction to Ambient (Note 1a)	86	°C/W
$R_{\theta JA}$	Thermal Resistance for Single Operation, Junction to Ambient (Note 1b)	173	
$R_{\theta JA}$	Thermal Resistance for Dual Operation, Junction to Ambient (Note 1c)	69	
$R_{\theta JA}$	Thermal Resistance for Dual Operation, Junction to Ambient (Note 1d)	151	

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
623	FDMA6023PZT	MicroFET 2X2 Thin	7 "	8mm	3000 units

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV_{DSS}	Drain to Source Breakdown Voltage	$I_D = -250 \mu\text{A}, V_{GS} = 0 \text{ V}$	-20			V
$\frac{\Delta \text{BV}_{\text{DSS}}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = -250 \mu\text{A}$, referenced to 25°C		-12		$\text{mV/}^\circ\text{C}$
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

$V_{GS(\text{th})}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = -250 \mu\text{A}$	-0.4	-0.5	-1.5	V
$\frac{\Delta V_{GS(\text{th})}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	$I_D = -250 \mu\text{A}$, referenced to 25°C		-2.7		$\text{mV/}^\circ\text{C}$
$r_{DS(\text{on})}$	Drain to Source On Resistance	$V_{GS} = -4.5 \text{ V}, I_D = -3.6 \text{ A}$		40	60	$\text{m}\Omega$
		$V_{GS} = -2.5 \text{ V}, I_D = -3.0 \text{ A}$		49	80	
		$V_{GS} = -1.8 \text{ V}, I_D = -2.0 \text{ A}$		60	110	
		$V_{GS} = -1.5 \text{ V}, I_D = -1.0 \text{ A}$		70	170	
		$V_{GS} = -4.5 \text{ V}, I_D = -3.6 \text{ A}, T_J = 125^\circ\text{C}$		58	72	
g_{FS}	Forward Transconductance	$V_{DD} = -5 \text{ V}, I_D = -3.6 \text{ A}$		15		S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = -10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		665	885	pF
C_{oss}	Output Capacitance			115	155	pF
C_{rss}	Reverse Transfer Capacitance			100	150	pF

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = -10 \text{ V}, I_D = -3.6 \text{ A}, V_{GS} = -4.5 \text{ V}, R_{\text{GEN}} = 6 \Omega$		13	23	ns
t_r	Rise Time			11	20	ns
$t_{d(off)}$	Turn-Off Delay Time			75	120	ns
t_f	Fall Time			47	75	ns
Q_g	Total Gate Charge	$V_{GS} = 0 \text{ V to } -4.5 \text{ V}$		12	17	nC
Q_{gs}	Gate to Source Charge		$V_{DD} = -10 \text{ V}, I_D = -3.6 \text{ A}$	1.4		nC
Q_{gd}	Gate to Drain "Miller" Charge			5.2		nC

Drain-Source Diode Characteristics

I_S	Maximum Continuous Drain-Source Diode Forward Current			-1.1	A	
V_{SD}	Source to Drain Diode Forward Voltage	$V_{GS} = 0 \text{ V}, I_S = -1.1 \text{ A}$ (Note 2)		-0.7	-1.2	V
t_{rr}	Reverse Recovery Time			33	53	ns
Q_{rr}	Reverse Recovery Charge	$I_F = -3.6 \text{ A}, di/dt = 100 \text{ A}/\mu\text{s}$		15	27	nC

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

Notes:

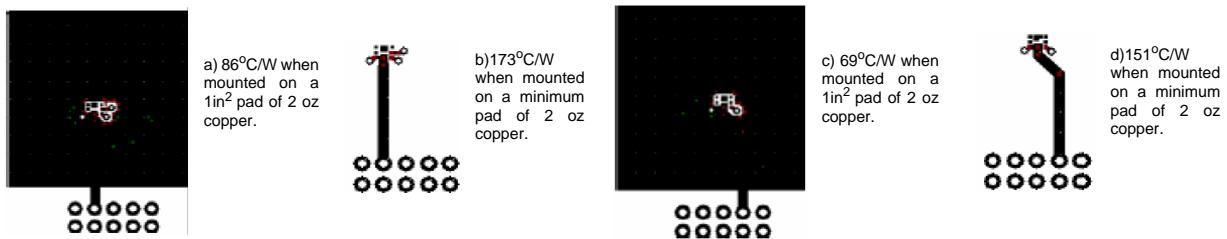
1. R_{QJA} is determined with the device mounted on a 1 in² oz. copper pad on a 1.5 x 1.5 in. board of FR-4 material. R_{QJC} is guaranteed by design while R_{QJA} is determined by the user's board design.

(a) $R_{QJA} = 86^\circ\text{C/W}$ when mounted on a 1 in² pad of 2 oz copper, 1.5 " x 1.5 " x 0.062 " thick PCB. For single operation.

(b) $R_{QJA} = 173^\circ\text{C/W}$ when mounted on a minimum pad of 2 oz copper. For single operation.

(c) $R_{QJA} = 69^\circ\text{C/W}$ when mounted on a 1 in² pad of 2 oz copper, 1.5 " x 1.5 " x 0.062 " thick PCB. For dual operation.

(d) $R_{QJA} = 151^\circ\text{C/W}$ when mounted on a minimum pad of 2 oz copper. For dual operation.



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

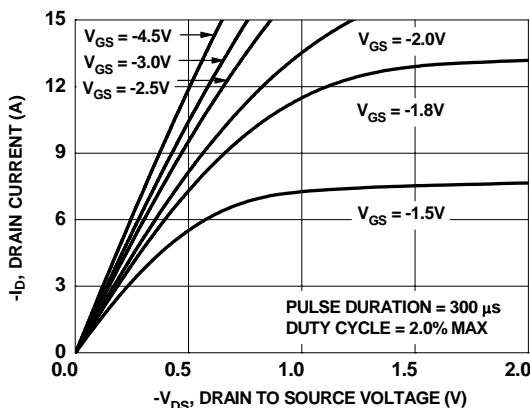


Figure 1. On-Region Characteristics

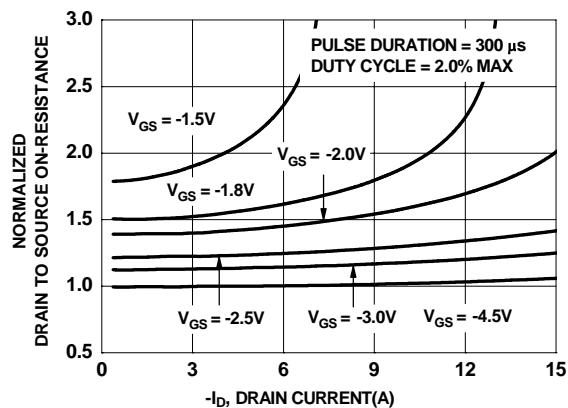


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

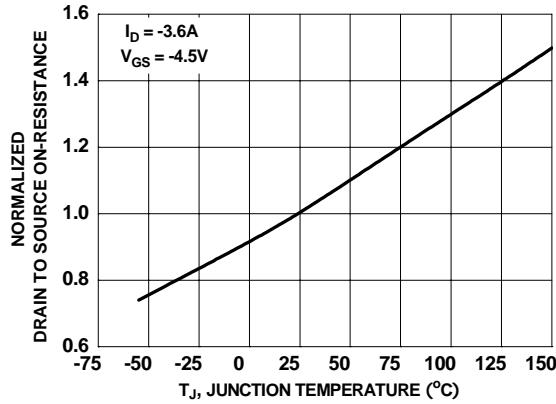


Figure 3. Normalized On-Resistance vs Junction Temperature

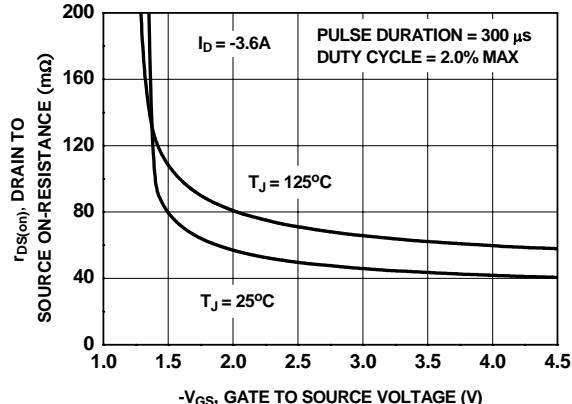


Figure 4. On-Resistance vs Gate to Source Voltage

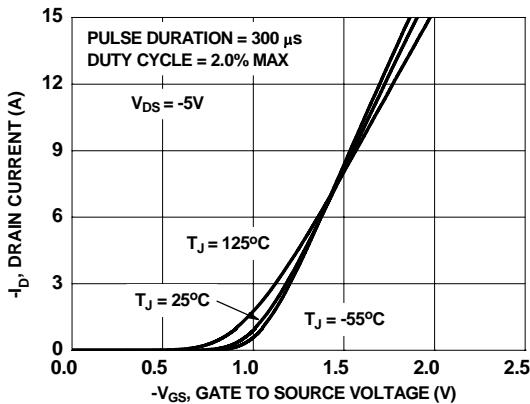


Figure 5. Transfer Characteristics

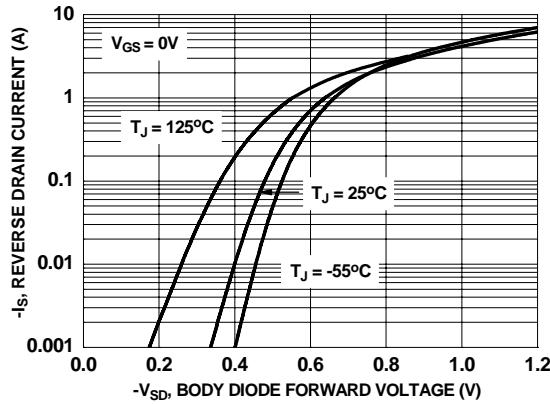


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

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

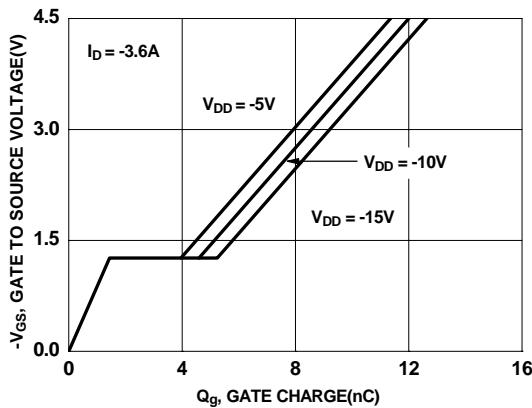


Figure 7. Gate Charge Characteristics

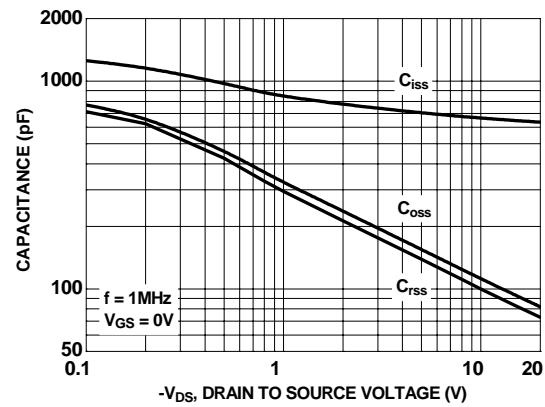


Figure 8. Capacitance vs Drain to Source Voltage

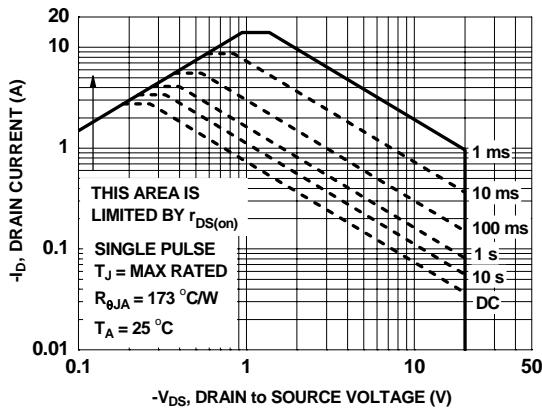


Figure 9. Forward Bias Safe Operation Area

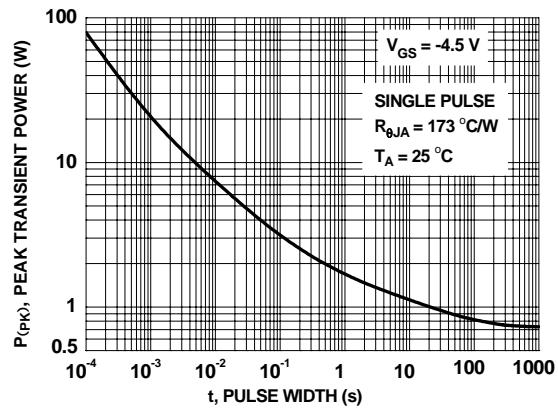


Figure 10. Single Pulse Maximum Power Dissipation

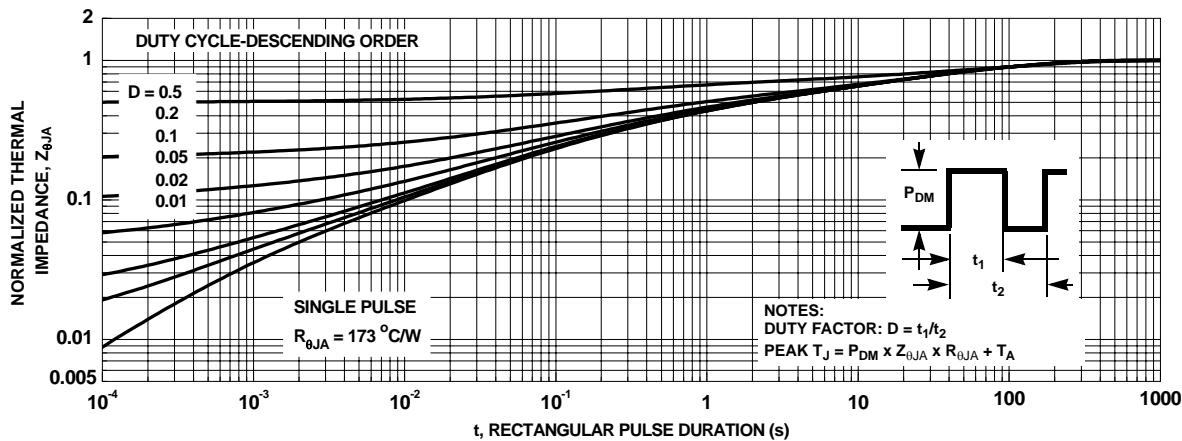
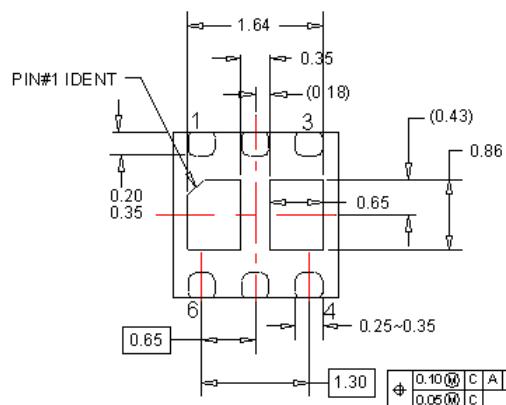
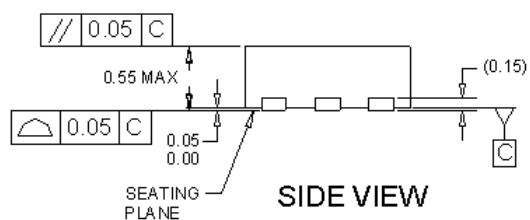
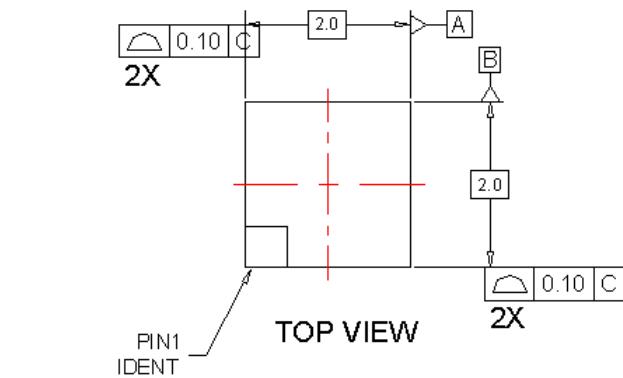
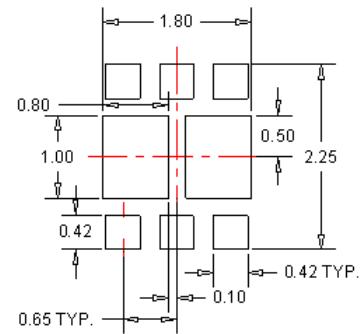


Figure 11. Junction-to-Ambient Transient Thermal Response Curve

Dimensional Outline and Pad Layout



BOTTOM VIEW



RECOMMENDED LAND PATTERN

NOTES:

- NO JEDEC STANDARD APPLIES
- DIMENSIONS ARE IN MILLIMETERS.
- DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994
- DRAWING FILENAME: MKT-UMLP06Brev1.



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