May 2014

FDMA86265P

P-Channel PowerTrench® MOSFET

-150 V, -1 A, 1.2 Ω

Features

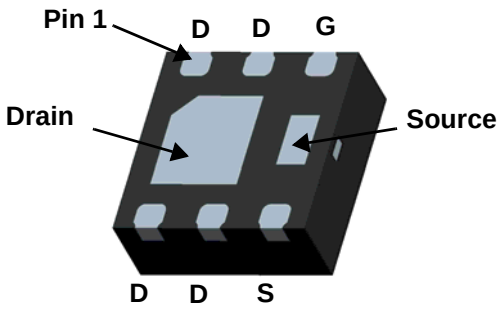
- Max $r_{DS(on)}$ = 1.2 Ω at V_{GS} = -10 V, I_D = -1 A
- Max $r_{DS(on)}$ = 1.4 Ω at V_{GS} = -6 V, I_D = -0.9 A
- Low Profile - 0.8 mm maximum in the new package MicroFET 2x2 mm
- Very low RDS-on mid voltage P-channel silicon technology optimised for low Qg
- This product is optimised for fast switching applications as well as load switch applications
- 100% UIL tested
- RoHS Compliant

General Description

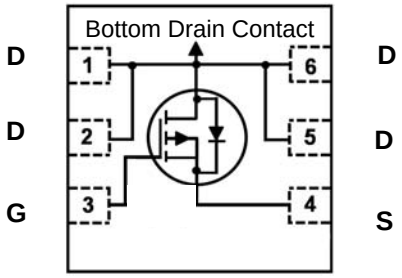
This P-Channel MOSFET is produced using Fairchild Semiconductor's advanced PowerTrench® process that has been optimized for the on-state resistance and yet maintain superior switching performance.

Applications

- Active Clamp Switch
- Load Switch



MicroFET 2X2 (Bottom View)



MOSFET Maximum Ratings T_A = 25 °C unless otherwise noted

Symbol	Parameter			Ratings	Units
V_{DS}	Drain to Source Voltage			-150	V
V_{GS}	Gate to Source Voltage			±25	V
I_D	Drain Current -Continuous	T_A = 25 °C	(Note 1a)	-1	A
	-Pulsed			-2	
E_{AS}	Single Pulse Avalanche Energy		(Note 3)	6	mJ
P_D	Power Dissipation	T_A = 25 °C	(Note 1a)	2.4	W
	Power Dissipation	T_A = 25 °C	(Note 1b)	0.9	
T_J, T_{STG}	Operating and Storage Junction Temperature 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	

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
265	FDMA86265P	MicroFET 2X2	7 ''	12 mm	3000 units

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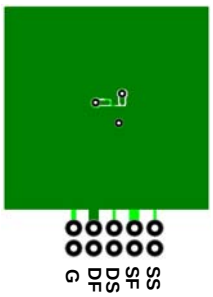
Electrical Characteristics T_J = 25 °C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	I_D = -250 μA, V_{GS} = 0 V	-150			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = -250 μA, referenced to 25 °C		-125		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -120 V, V_{GS} = 0 V			-1	μA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±25 V, V_{DS} = 0 V			±100	nA
On Characteristics						
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = -250 μA	-2	-3.2	-4	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
$r_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = -10 V, I_D = -1 A		0.86	1.2	Ω
		V_{GS} = -6 V, I_D = -0.9 A		0.95	1.4	
		V_{GS} = -10 V, I_D = -1 A, T_J = 125 °C		1.53	2.2	
g_{FS}	Forward Transconductance	V_{DS} = -10 V, I_D = -1 A		1.9		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = -75 V, V_{GS} = 0 V, f = 1 MHz		158	210	pF
C_{oss}	Output Capacitance			16	25	pF
C_{rss}	Reverse Transfer Capacitance			0.7	5	pF
R_g	Gate Resistance		0.1	3	7.5	Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = -75 V, I_D = -1 A, V_{GS} = -10 V, R_{GEN} = 6 Ω		5.8	12	ns
t_r	Rise Time			2.2	10	ns
$t_{d(off)}$	Turn-Off Delay Time			8	16	ns
t_f	Fall Time			6.4	13	ns
$Q_{g(TOT)}$	Total Gate Charge	V_{GS} = 0 V to -10 V; V_{DD} = -75 V, I_D = -1 A		2.8	4	nC
Q_{gs}	Total Gate Charge			0.8		nC
Q_{gd}	Gate to Drain “Miller” Charge			0.7		nC
Drain-Source Diode Characteristics						
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0 V, I_S = -1 A (Note 2)		-0.87	-1.3	V
t_{rr}	Reverse Recovery Time	I_F = -1 A, di/dt = 100 A/μs		50	80	ns
Q_{rr}	Reverse Recovery Charge			78	124	nC

NOTES:

1. $R_{\theta JA}$ is determined with the device mounted on a 1 in^2 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. 52 °C/W when mounted on a 1 in^2 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 μs, Duty cycle < 2.0%.

3. Starting T_J = 25 °C; P-ch: L =3 mH, I_{AS} = -2 A, V_{DD} = -150 V, V_{GS} = -10 V. 100% test at L = 0.1 mH, I_{AS} = -9 A.

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Typical Characteristics T_J = 25 °C unless otherwise noted

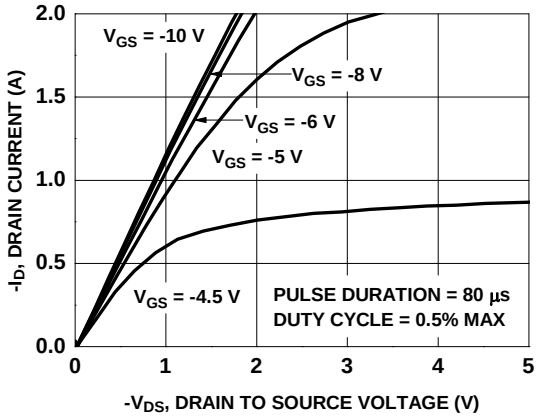

Figure 1. On Region Characteristics

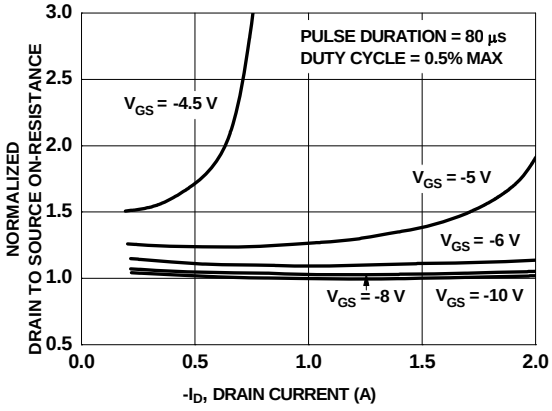

Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

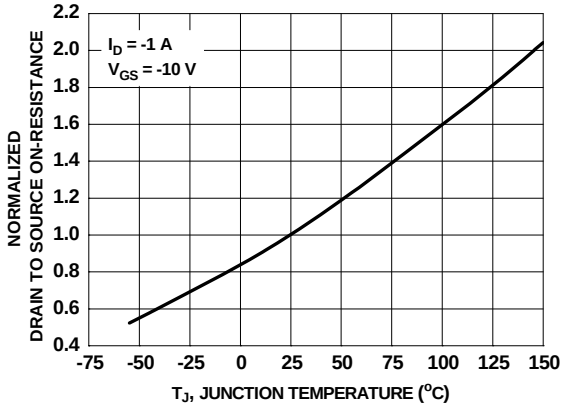

Figure 3. Normalized On Resistance vs Junction Temperature

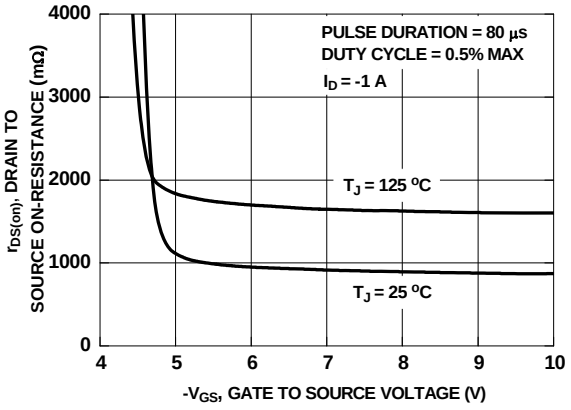

Figure 4. On-Resistance vs Gate to Source Voltage

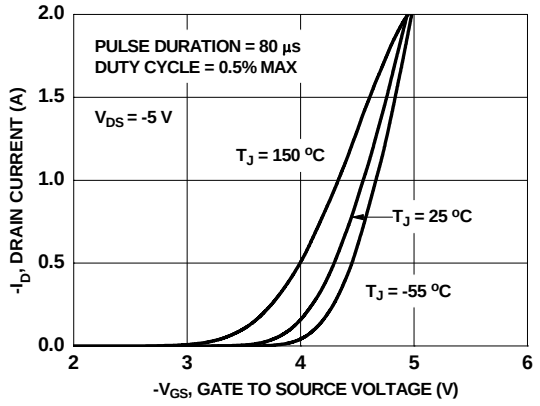

Figure 5. Transfer Characteristics

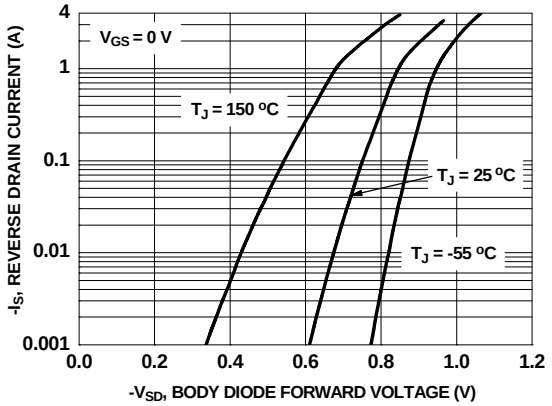

Figure 6. Source to Drain Diode Forward Voltage vs Source Current

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