August 2018

FDMA86265P

P-Channel PowerTrench® MOSFET

-150 V, -1 A, 1.2 Ω

Features

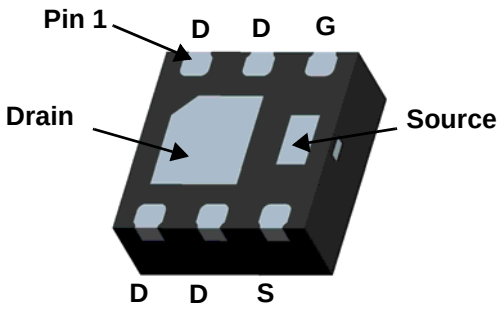
- Max $r_{DS(on)}$ = 1.2 Ω at V_{GS} = -10 V, I_D = -1 A
- Max $r_{DS(on)}$ = 1.4 Ω at V_{GS} = -6 V, I_D = -0.9 A
- Low Profile - 0.8 mm maximum in the new package MicroFET 2x2 mm
- Very low RDS-on mid voltage P-channel silicon technology optimised for low Qg
- This product is optimised for fast switching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

General Description

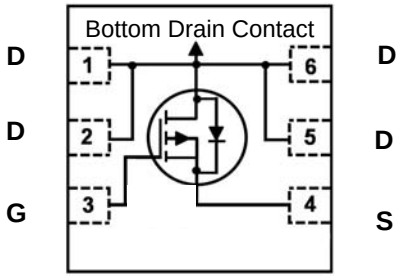
This P-Channel MOSFET is produced using Fairchild Semiconductor's advanced PowerTrench® process that has been optimized for the on-state resistance and yet maintain superior switching performance.

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

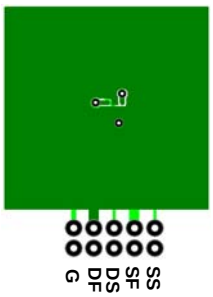
Device Marking	Device	Package	Reel Size	Tape Width	Quantity
265	FDMA86265P	MicroFET 2X2	7 ''	12 mm	3000 units

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.

Typical Characteristics T_J = 25 °C unless otherwise noted

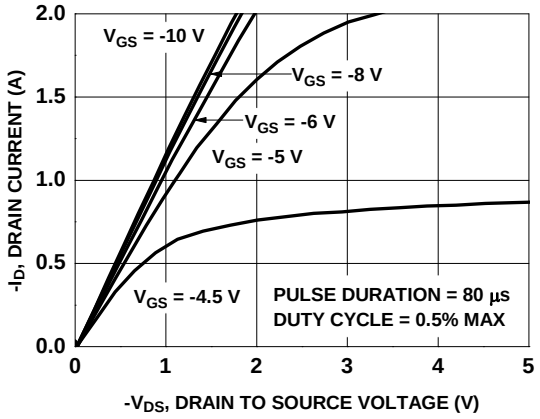


Figure 1. On Region Characteristics

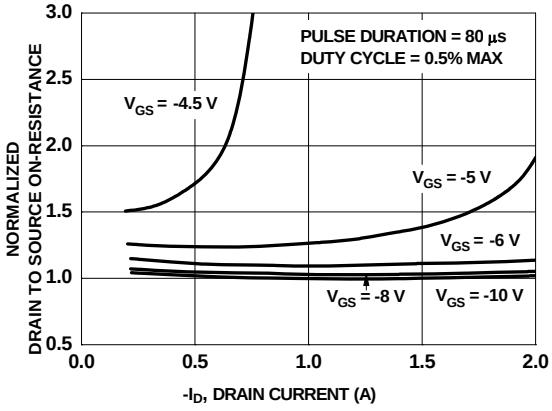


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

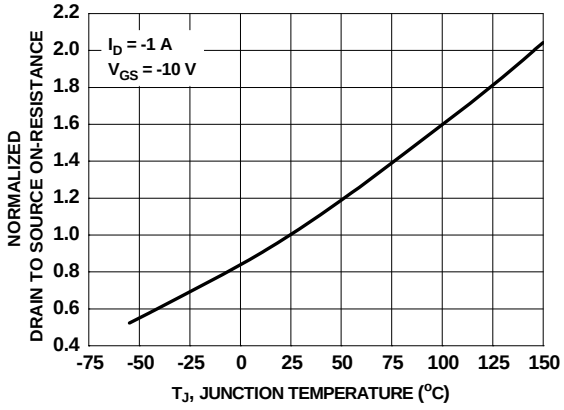


Figure 3. Normalized On Resistance vs Junction Temperature

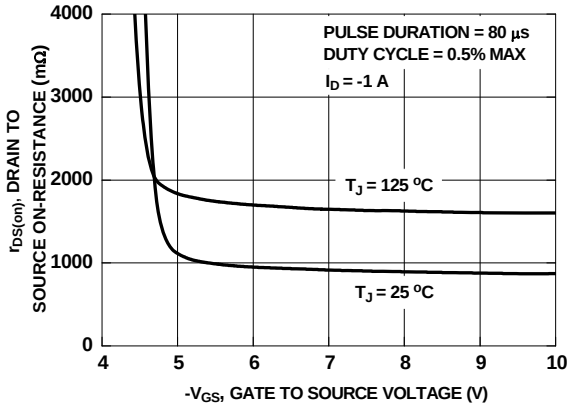


Figure 4. On-Resistance vs Gate to Source Voltage

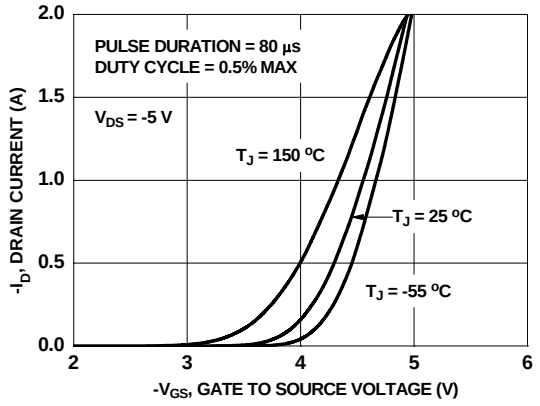


Figure 5. Transfer Characteristics

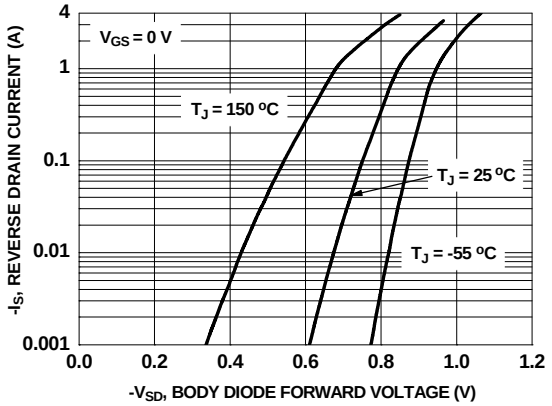


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

Typical Characteristics T_J = 25 °C unless otherwise noted

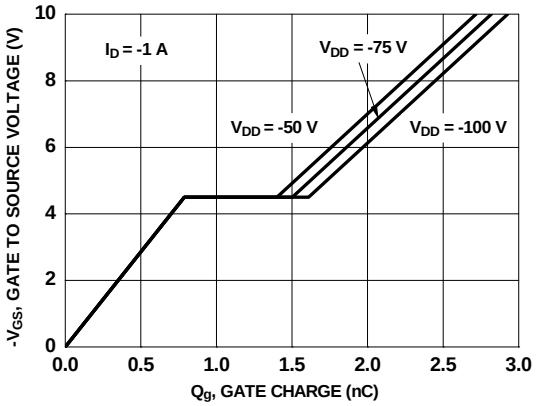


Figure 7. Gate Charge Characteristics

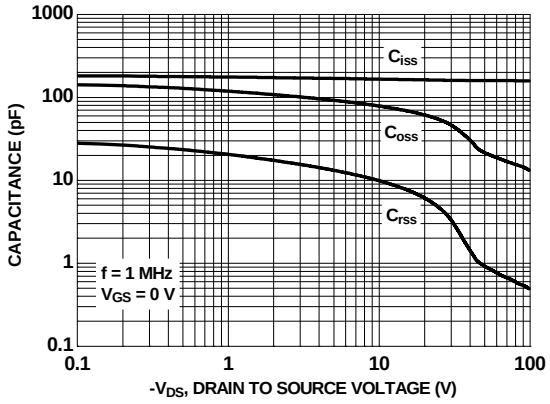


Figure 8. Capacitance vs Drain to Source Voltage

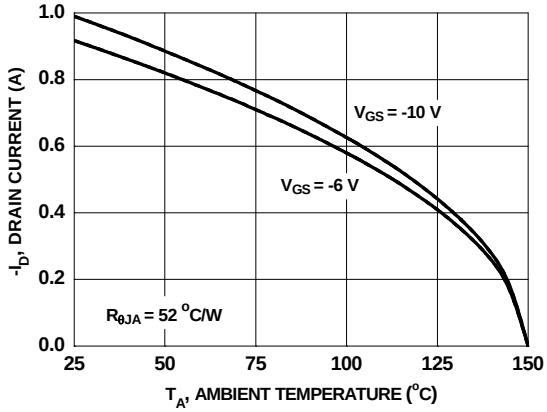


Figure 9. Maximum Continuous Drain Current vs Ambient Temperature

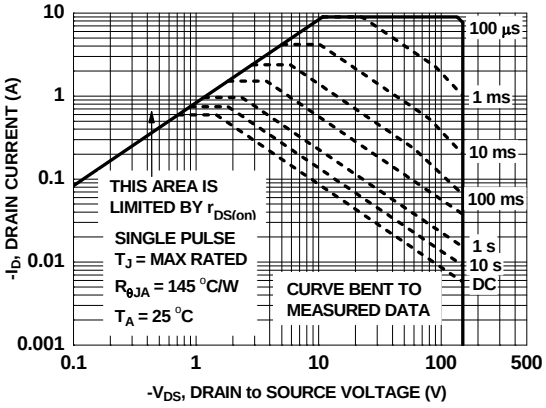


Figure 10. Forward Bias Safe Operating Area

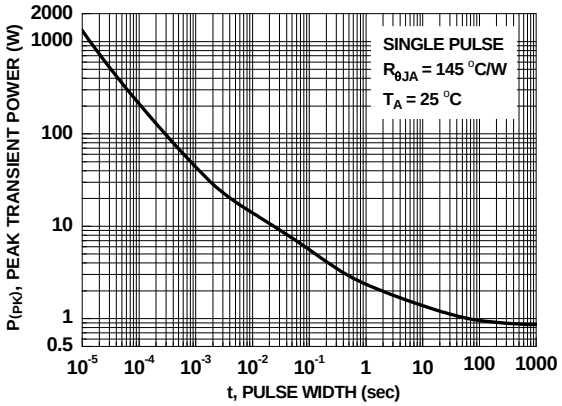


Figure 11. Single Pulse Maximum Power Dissipation

Typical Characteristics T_J = 25 °C unless otherwise noted

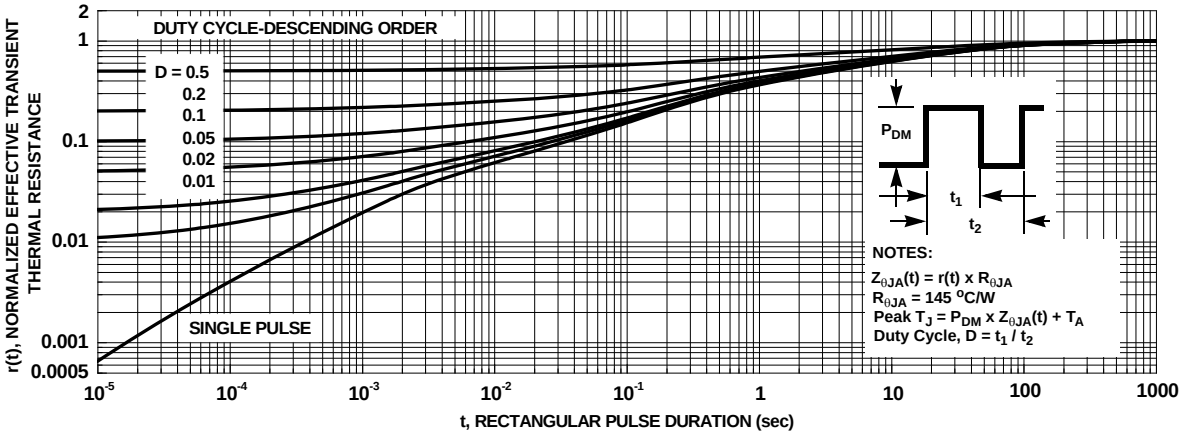
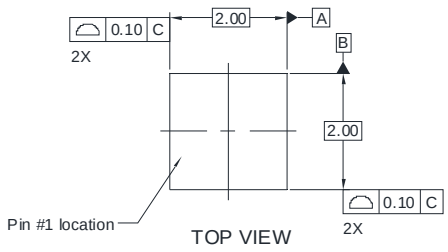
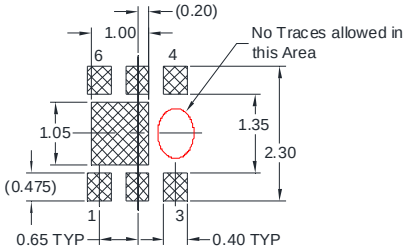


Figure 12. Junction-to-Ambient Transient Thermal Response Curve

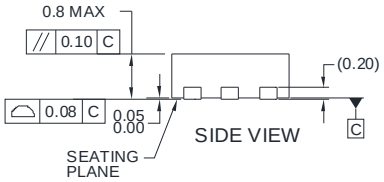
Dimensional Outline and Pad Layout



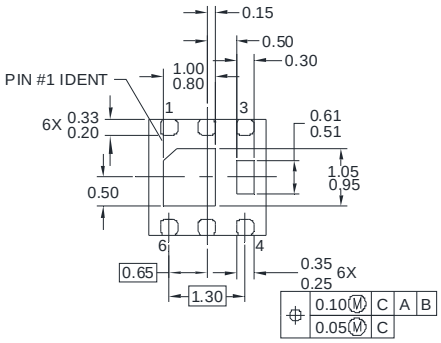
TOP VIEW



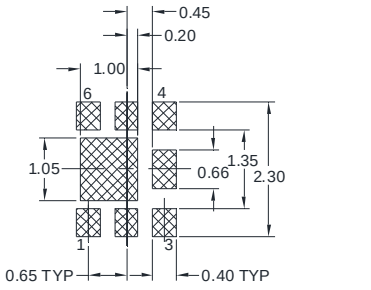
RECOMMENDED LAND PATTERN OPT 1



SIDE VIEW



BOTTOM VIEW



RECOMMENDED LAND PATTERN OPT 2

NOTES:

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C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994
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Rev. I68

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