May 2014

FDN86265P

P-Channel PowerTrench® MOSFET

-150 V, -0.8 A, 1.2 Ω

Features

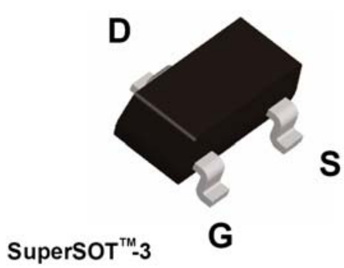
- Max $r_{DS(on)}$ = 1.2 Ω at V_{GS} = -10 V, I_D = -0.8 A
- Max $r_{DS(on)}$ = 1.4 Ω at V_{GS} = -6 V, I_D = -0.7 A
- Very low RDS-on mid voltage P-channel silicon technology optimised for low Qg
- This product is optimised for fast switching applications as well as load switch applications
- 100% UIL tested
- RoHS Compliant

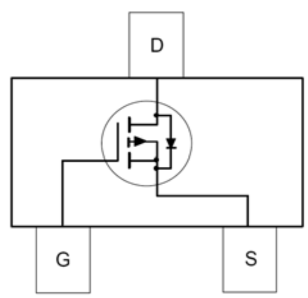
General Description

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





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	-Continuous	(Note 1a)	-0.8	A
	-Pulsed		-5	
E_{AS}	Single Pulse Avalanche Energy	(Note 3)	6	mJ
P_D	Power Dissipation	(Note 1a)	1.5	W
	Power Dissipation	(Note 1b)	0.6	
T_J, T_{STG}	Operating and Storage Junction Temperature Range		-55 to +150	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction to Case	(Note 1)	75	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1a)	80	

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
265	FDN86265P	SSOT-3	7 ”	8 mm	3000 units

Electrical Characteristics T_J = 25 °C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units

Off Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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		-129		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 (Note 2)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = -250 μA	-2	-3.3	-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 = -0.8 A		0.85	1.2	Ω
		V_{GS} = -6 V, I_D = -0.7 A		0.96	1.4	
		V_{GS} = -10 V, I_D = -0.8 A, T_J = 125 °C		1.54	2.2	
g_{FS}	Forward Transconductance	V_{DS} = -10 V, I_D = -0.8 A		1.5		S

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
C_{iss}	Input Capacitance	V_{DS} = -75 V, V_{GS} = 0 V, f = 1 MHz		158	210	pF
C_{oss}	Output Capacitance			17	25	pF
C_{rss}	Reverse Transfer Capacitance			1.6	5	pF
R_g	Gate Resistance		0.1	3.3	6.7	Ω

Switching Characteristics

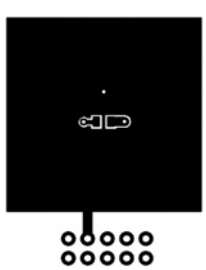
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = -75 V, I_D = -0.8 A, V_{GS} = -10 V, R_{GEN} = 6 Ω		5.7	12	ns
t_r	Rise Time			2.2	10	ns
$t_{d(off)}$	Turn-Off Delay Time			7.9	16	ns
t_f	Fall Time			9.9	20	ns
Q_g	Total Gate Charge	V_{GS} = 0 V to -10 V; V_{DD} = -75 V, I_D = -0.8 A		2.9	4.1	nC
Q_{gs}	Gate to Source Gate Charge			0.8		nC
Q_{gd}	Gate to Drain “Miller” Charge			0.8		nC

Drain-Source Diode Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0 V, I_S = -0.8 A (Note 2)		-0.86	-1.3	V
t_{rr}	Reverse Recovery Time	I_F = -0.8 A, di/dt = 100 A/μs		49	78	ns
Q_{rr}	Reverse Recovery Charge			70	112	nC

Notes:

1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a) 80 °C/W when mounted on a 1 in^2 pad of 2 oz copper

b) 180 °C/W when mounted on a minimum pad.

2. Pulse Test: Pulse Width < 300 μs, Duty cycle < 2.0%.
3. Starting T_J = 25 °C; N-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.

Typical Characteristics T_J = 25 °C unless otherwise noted

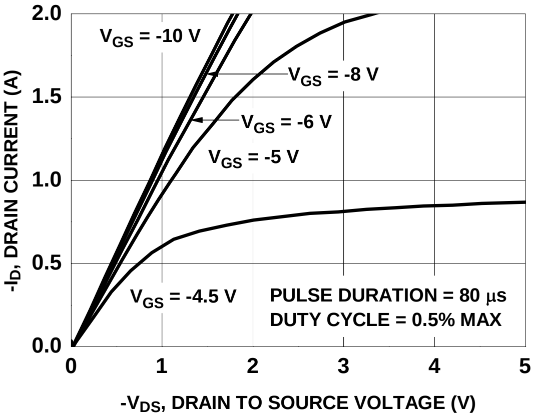


Figure 1. On Region Characteristics

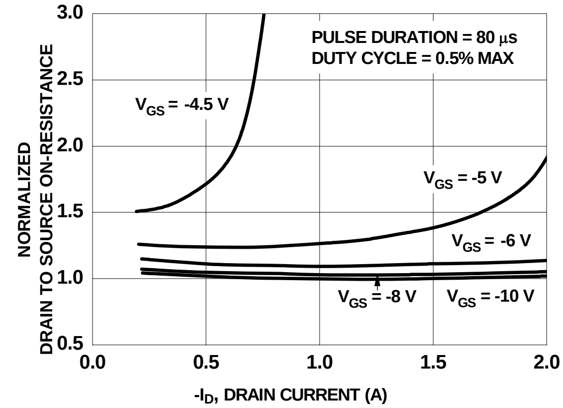


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

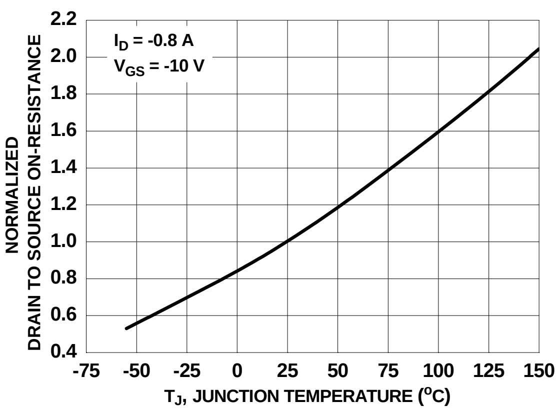


Figure 3. Normalized On Resistance vs Junction Temperature

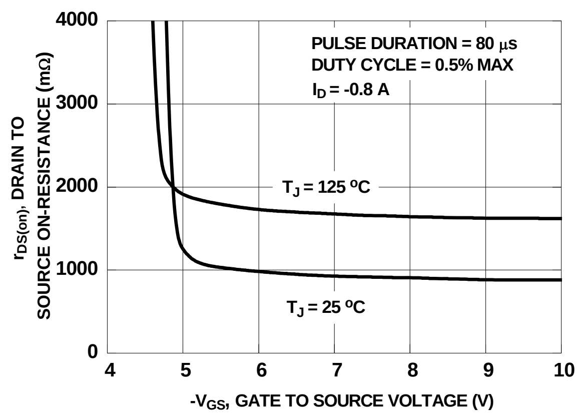


Figure 4. On-Resistance vs Gate to Source Voltage

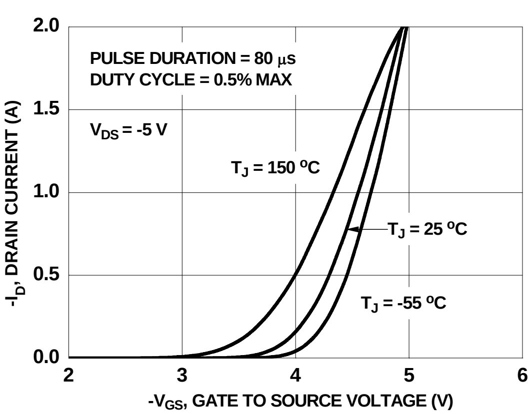


Figure 5. Transfer Characteristics

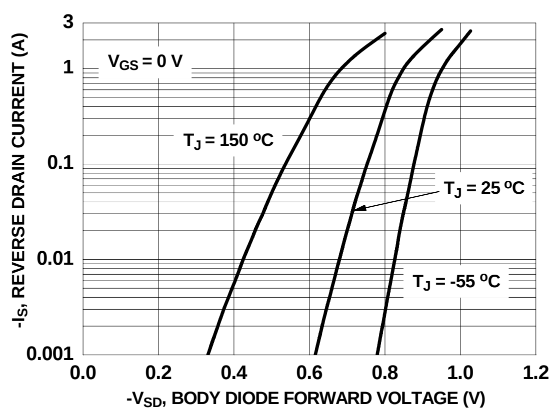


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

Typical Characteristics T_J = 25 °C unless otherwise noted

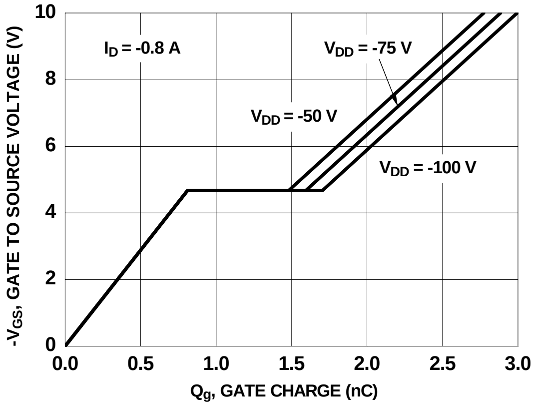


Figure 7. Gate Charge Characteristics

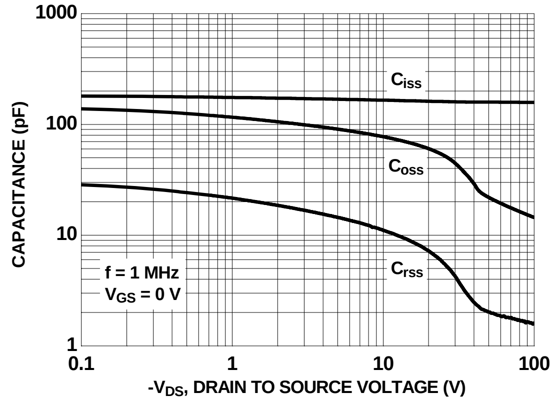


Figure 8. Capacitance vs Drain to Source Voltage

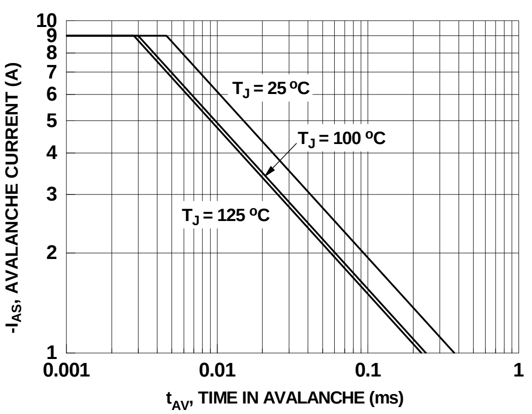


Figure 9. Unclamped Inductive Switching Capability

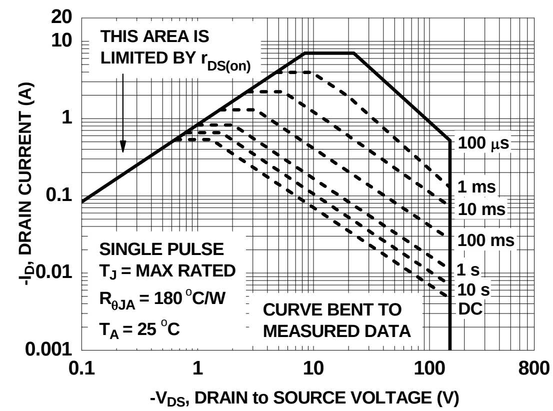


Figure 10. Forward Bias Safe Operating Area

Figure 11. Single Pulse Maximum Power Dissipation

Typical Characteristics T_J = 25 °C unless otherwise noted

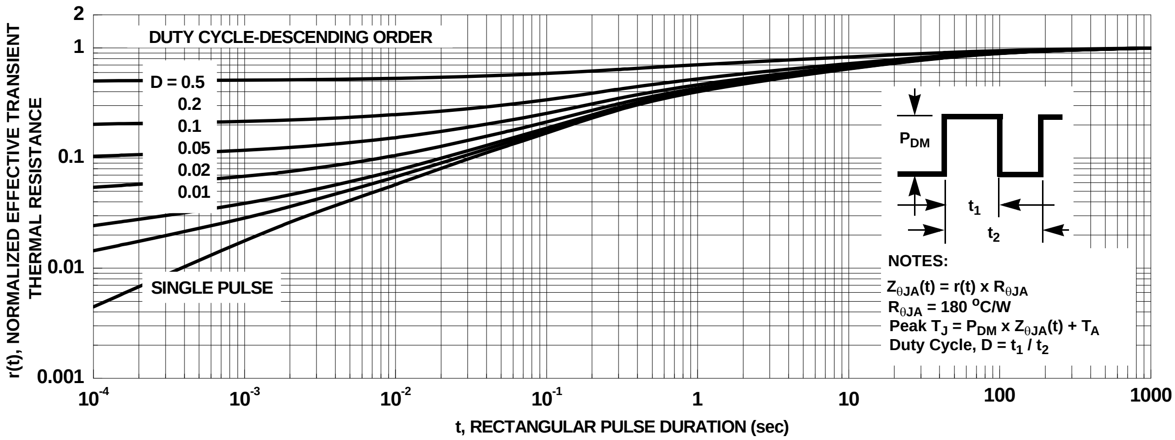


Figure 12. Junction-to-Ambient Transient Thermal Response Curve

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