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FAIRCHILD SEMICONDUCTOR®

November 2007

FDC365P

P-Channel PowerTrench® MOSFET

-35V, -4.3A, 55mΩ

Features

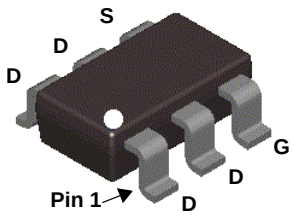
- Max $r_{DS(on)}$ = 55mΩ at V_{GS} = -10V, I_D = -4.2A
- Max $r_{DS(on)}$ = 80mΩ at V_{GS} = -4.5V, I_D = -3.2A
- RoHS Compliant

General Description

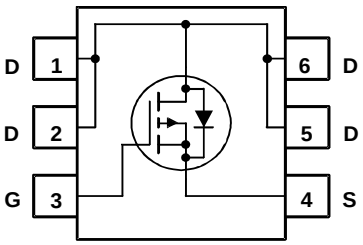
This P-Channel MOSFET has been produced using Fairchild Semiconductor's proprietary PowerTrench® technology to deliver low $r_{DS(on)}$ and optimized Bvdss capability to offer superior performance benefit in the applications.

Applications

- Inverter
- Power Supplies



SuperSOT™ -6



MOSFET Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter		Ratings	Units
V_{DS}	Drain to Source Voltage		-35	V
V_{GS}	Gate to Source Voltage		±20	V
I_D	-Continuous	(Note 1a)	-4.3	A
	-Pulsed		-20	
P_D	Power Dissipation	(Note 1a)	1.6	W
	Power Dissipation	(Note 1b)	0.8	
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)	78	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1b)	156	

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
.365P	FDC365P	SSOT6	7''	8mm	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 = -250μA, V_{GS} = 0V	-35			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = -250μA, referenced to 25°C		-26		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -28V, V_{GS} = 0V			-1	μA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
On Characteristics						
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = -250μA	-1	-1.8	-3	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = -250μA, referenced to 25°C		5.0		mV/°C
$r_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = -10V, I_D = -4.2A		45	55	mΩ
		V_{GS} = -4.5V, I_D = -3.2A		70	80	
		V_{GS} = -10V, I_D = -4.2A, T_J = 125°C		69	90	
g_{FS}	Forward Transconductance	V_{DS} = -10V, I_D = -4.2A		8.7		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = -20V, V_{GS} = 0V, f = 1MHz		530	705	pF
C_{oss}	Output Capacitance			105	135	pF
C_{rss}	Reverse Transfer Capacitance			55	80	pF
R_g	Gate Resistance	f = 1MHz		6.1		Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = -20V, I_D = -4.2A, V_{GS} = -10V, R_{GEN} = 6Ω		7	13	ns
t_r	Rise Time			3	10	ns
$t_{d(off)}$	Turn-Off Delay Time			15	28	ns
t_f	Fall Time			3	10	ns
Q_g	Total Gate Charge	V_{GS} = 0V to -10V; V_{DD} = -20V, I_D = -4.2A		11	15	nC
Q_g	Total Gate Charge	V_{GS} = 0V to -5V; V_{DD} = -20V, I_D = -4.2A		6	9	nC
Q_{gs}	Gate to Source Charge	V_{DD} = -20V, I_D = -4.2A		1.7		nC
Q_{gd}	Gate to Drain “Miller” Charge	V_{DD} = -20V, I_D = -4.2A		2.2		nC
Drain-Source Diode Characteristics						
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0V, I_S = -1.3A (Note 2)		-0.8	-1.2	V
t_{rr}	Reverse Recovery Time	I_F = -4.2A, di/dt = 100A/μs		16	29	ns
Q_{rr}	Reverse Recovery Charge	I_F = -4.2A, di/dt = 100A/μs		7	14	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 $R_{\theta JA}$ is determined by the user's board design.



a. 78°C/W when mounted on a 1 in^2 pad of 2 oz copper on FR-4 board.



b. 156°C/W when mounted on a minimum pad of 2 oz copper.

2: Pulse Test: Pulse Width < 300μs, Duty cycle < 2.0%.

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Typical Characteristics T_J = 25°C unless otherwise noted

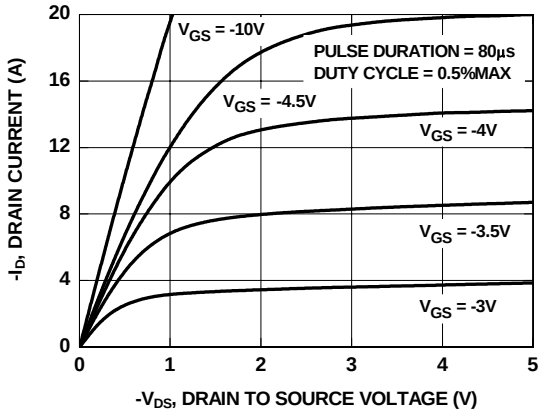


Figure 1. On-Region Characteristics

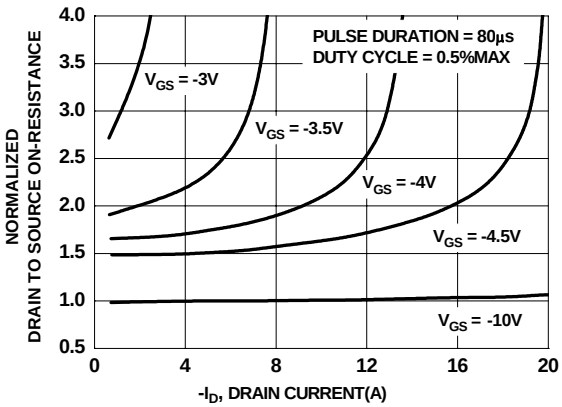


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

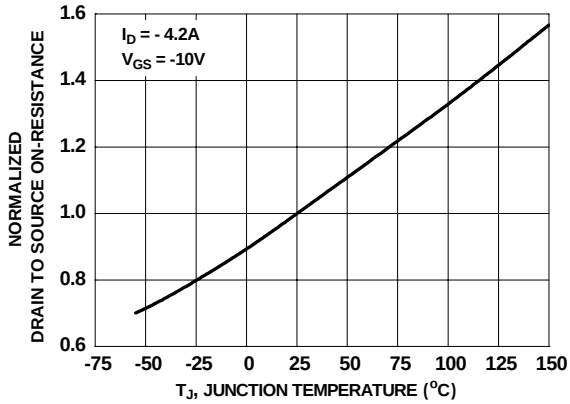


Figure 3. Normalized On-Resistance vs Junction Temperature

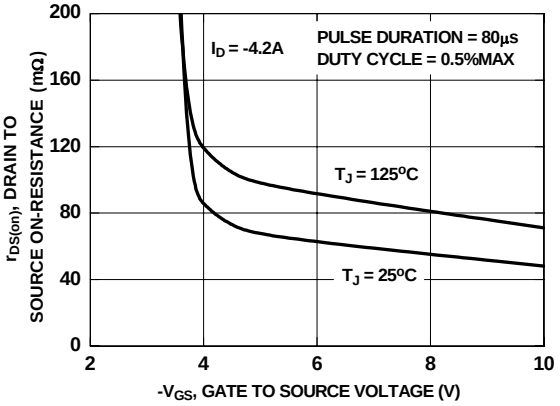


Figure 4. On-Resistance vs Gate to Source Voltage

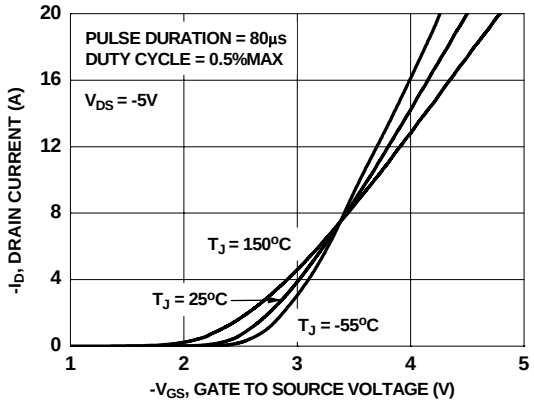


Figure 5. Transfer Characteristics

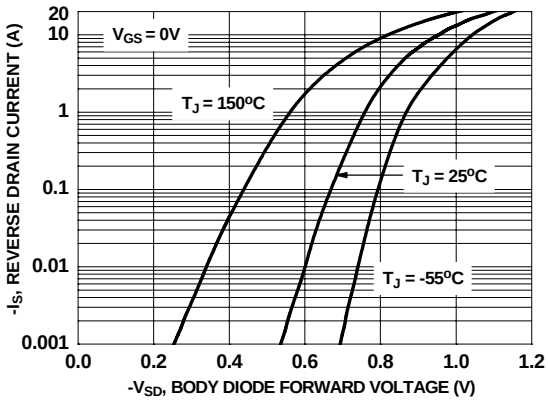


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

Typical Characteristics T_J = 25°C unless otherwise noted

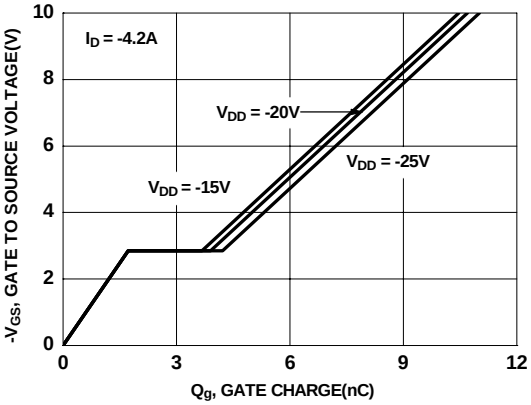


Figure 7. Gate Charge Characteristics

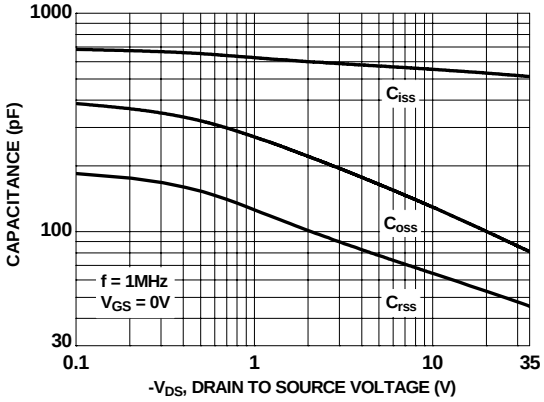


Figure 8. Capacitance vs Drain to Source Voltage

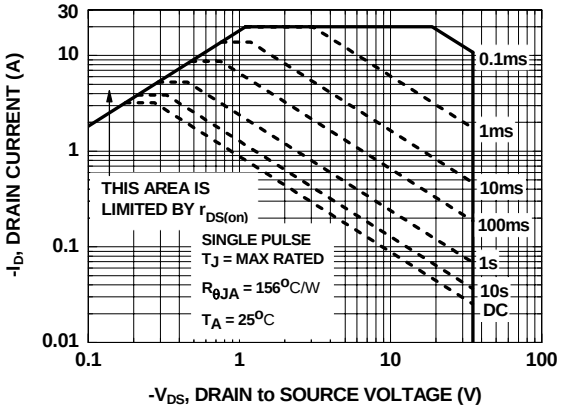


Figure 9. Forward Bias Safe Operating Area

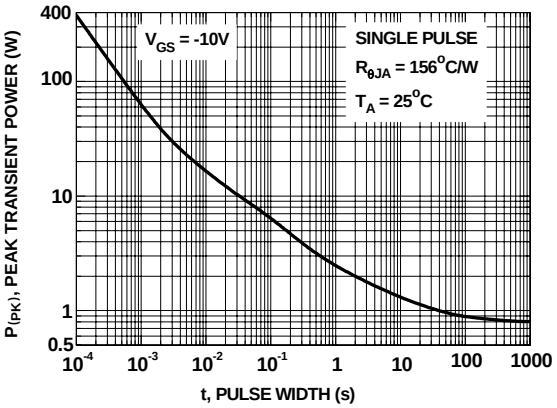


Figure 10. Single Pulse Maximum Power Dissipation

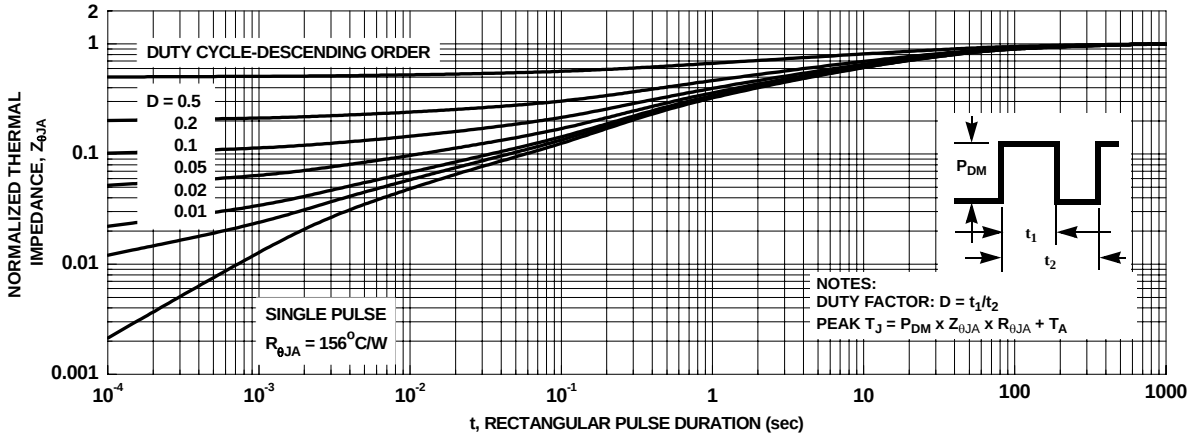
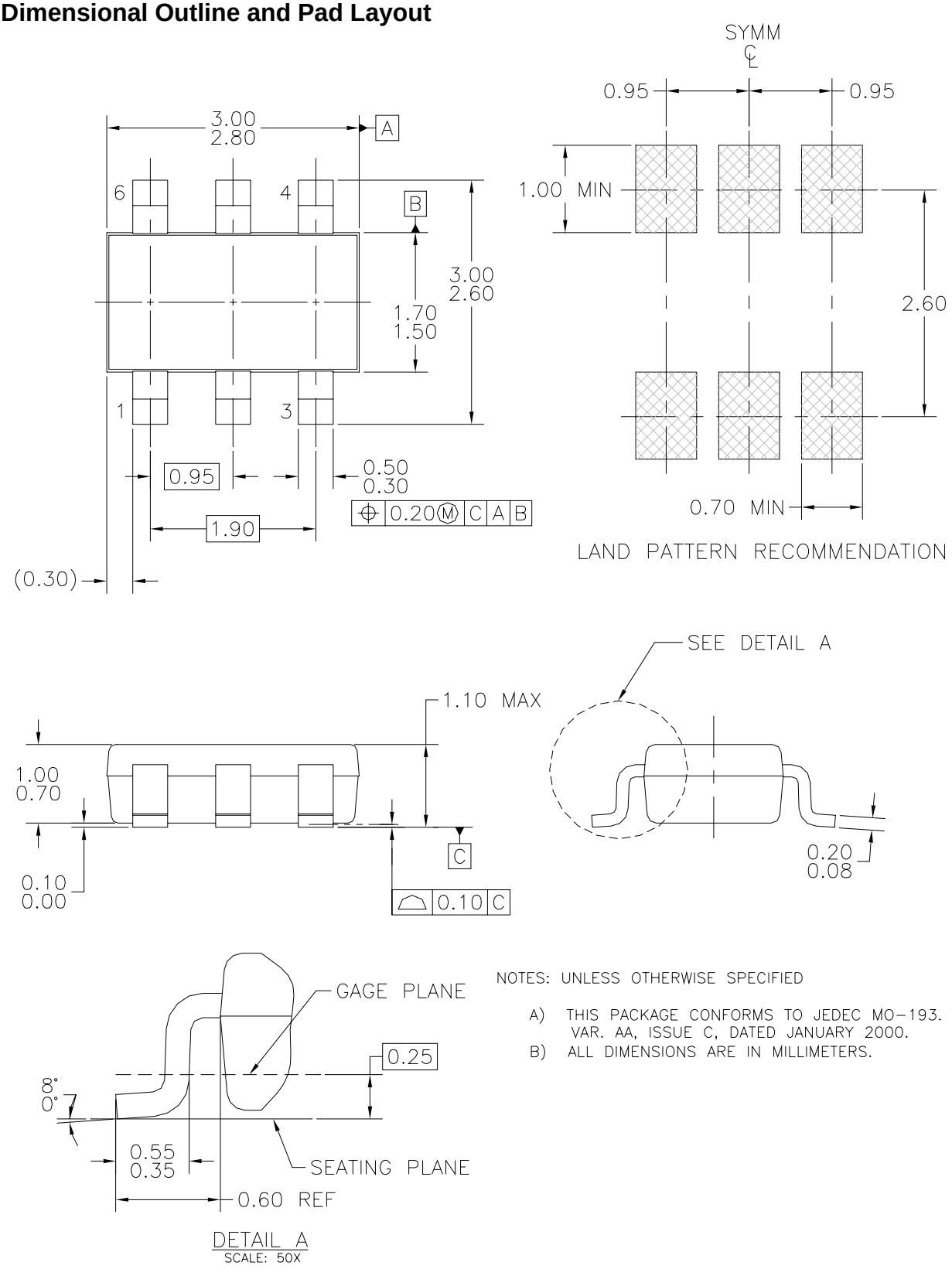


Figure 11. Transient Thermal Response Curve

Dimensional Outline and Pad Layout



NOTES: UNLESS OTHERWISE SPECIFIED

A) THIS PACKAGE CONFORMS TO JEDEC MO-193. VAR. AA, ISSUE C, DATED JANUARY 2000.

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