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FAIRCHILD SEMICONDUCTOR®

August 2006

FDS2672
N-Channel UltraFET Trench® MOSFET
200V, 3.9A, 70mΩ

Features

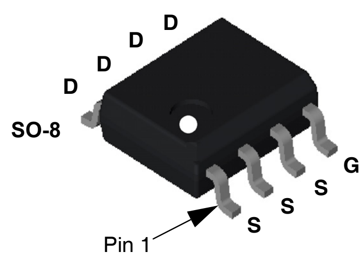
- Max $r_{DS(on)}$ = 70mΩ at V_{GS} = 10V, I_D = 3.9A
- Max $r_{DS(on)}$ = 80mΩ at V_{GS} = 6V, I_D = 3.5A
- Fast switching speed
- High performance trench technology for extremely low $r_{DS(on)}$
- RoHS compliant

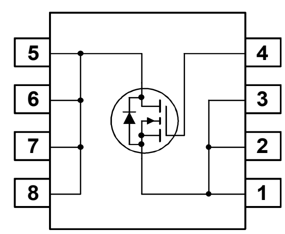
General Description

This single N-Channel MOSFET is produced using Fairchild Semiconductor's advanced UltraFET Trench® process that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

Application

- DC-DC conversion





MOSFET Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter		Ratings	Units
V_{DS}	Drain to Source Voltage		200	V
V_{GS}	Gate to Source Voltage		±20	V
I_D	Drain Current -Continuous	(Note 1a)	3.9	A
	-Pulsed		50	
E_{AS}	Single Pulse Avalanche Energy	(Note 3)	37.5	mJ
P_D	Power Dissipation	(Note 1a)	2.5	W
	Power Dissipation	(Note 1b)	1.0	
T_J, T_{STG}	Operating and Storage Temperature		-55 to 150	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction to Case	(Note 1)	25	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1a)	50	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1b)	125	

Package Marking and Ordering Information

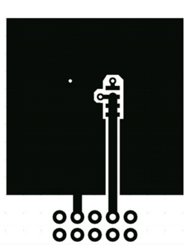
Device Marking	Device	Reel Size	Tape Width	Quantity
FDS2672	FDS2672	13''	12mm	2500 units

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 = 250μA, V_{GS} = 0V	200			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250μA, referenced to 25°C		206		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 160V, V_{GS}=0V			1	μA
		V_{DS} = 160V, V_{GS}=0V T_J = 55°C			10	μA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±20V			±100	nA
On Characteristics (Note 2)						
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = 250μA	2	2.9	4	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = 250μA, referenced to 25°C		-11		mV/°C
$r_{DS(on)}$	Drain to Source On Resistance	V_{GS} = 10V, I_D = 3.9A		59	70	mΩ
		V_{GS} = 6V, I_D = 3.5A		63	80	
		V_{GS} = 10V, I_D = 3.9A, T_J = 125°C		124	148	
g_{FS}	Forward Transcondductance	V_{DS} = 10V,I_D = 3.9A		15		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 100V, V_{GS} = 0V, f = 1MHz		1905	2535	pF
C_{oss}	Output Capacitance			100	135	pF
C_{rss}	Reverse Transfer Capacitance			30	45	pF
R_g	Gate Resistance	f = 1MHz		0.7		Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 100V, I_D = 3.9A V_{GS} = 10V, R_{GEN} = 6Ω		22	35	ns
t_r	Rise Time			10	20	ns
$t_{d(off)}$	Turn-Off Delay Time			35	56	ns
t_f	Fall Time			10	20	ns
$Q_{g(TOT)}$	Total Gate Charge at 10V	V_{DD} =100V I_D = 3.9A		33	46	nC
Q_{gs}	Gate to Source Gate Charge			11		nC
Q_{gd}	Gate to Drain “Miller”Charge			7		nC
Drain-Source Diode Characteristics						
V_{SD}	Source to Drain Diode Voltage	V_{GS} = 0V, I_S = 3.9A		0.75	1.2	V
t_{rr}	Reverse Recovery Time	I_F = 3.9A, di/dt = 100A/μs		67	101	ns
Q_{rr}	Reverse Recovery Charge	I_F = 3.9A, di/dt = 100A/μs		179	269	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.



Scale 1:1 on letter size paper

a) 50°C/W (10 sec) 62.5°C/W steady state when mounted on a 1in^2 pad of 2 oz copper

b) 125°C/W when mounted on a minimum pad .

2: Pulse Test: Pulse Width < 300 us, Duty Cycle < 2.0%.

3: Starting T_J = 25°C, L = 3mH, I_{AS} = 5A, V_{DD} = 100V, V_{GS} = 10V

Typical Characteristics T_J = 25°C unless otherwise noted

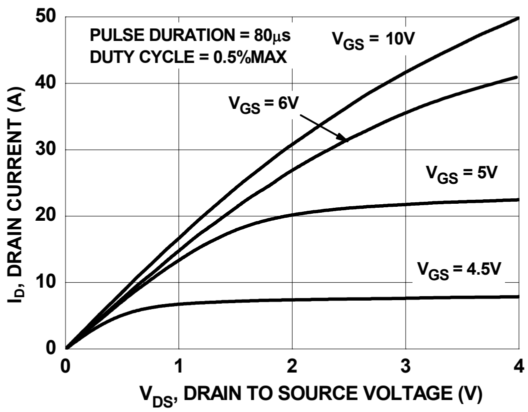


Figure 1. On Region Characteristics

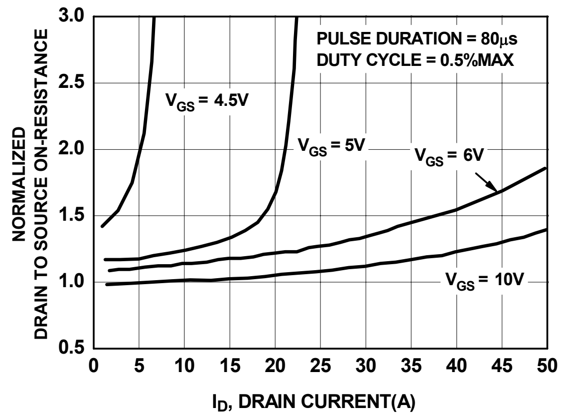


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

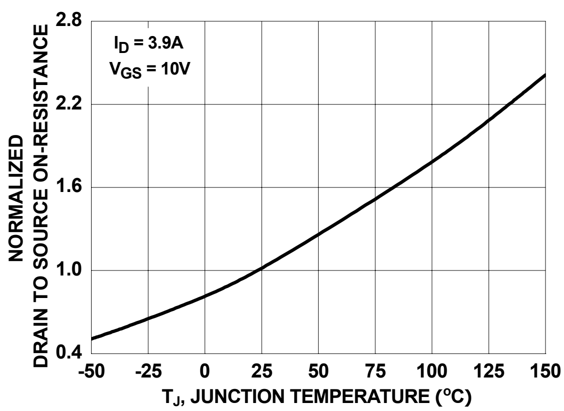


Figure 3. Normalized On Resistance vs Junction Temperature

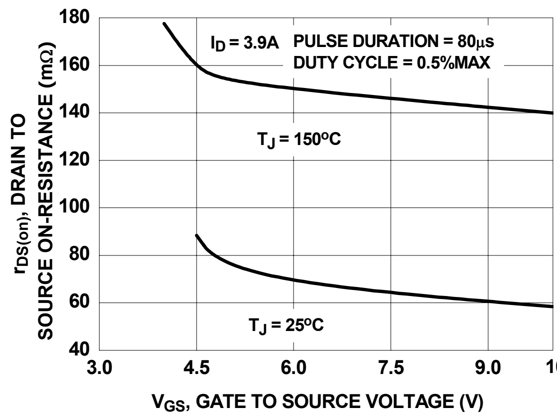


Figure 4. On-Resistance vs Gate to Source Voltage

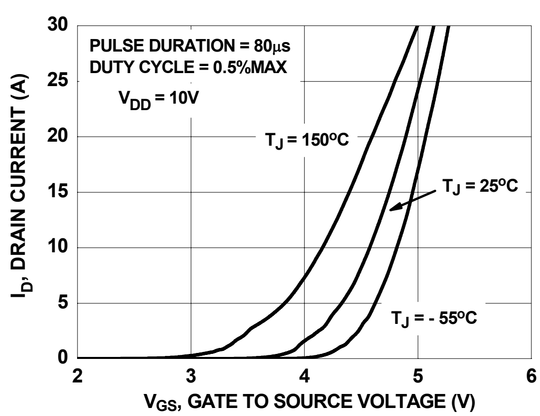


Figure 5. Transfer Characteristics

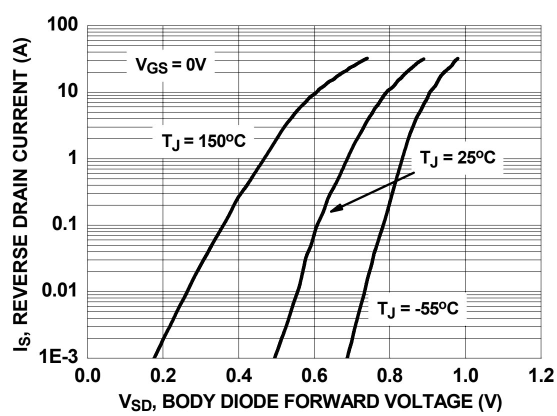


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

Typical Characteristics T_J = 25°C unless otherwise noted

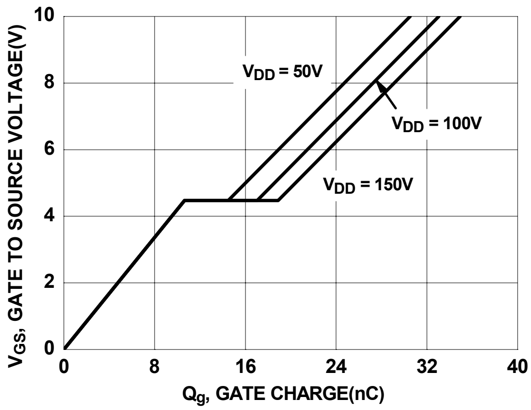


Figure 7. Gate Charge Characteristics

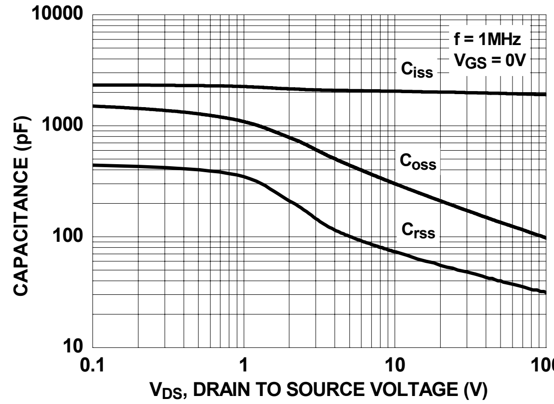


Figure 8. Capacitance vs Drain to Source Voltage

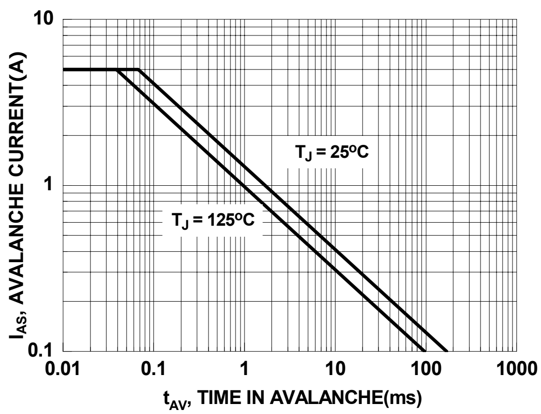


Figure 9. Unclamped Inductive Switching Capability

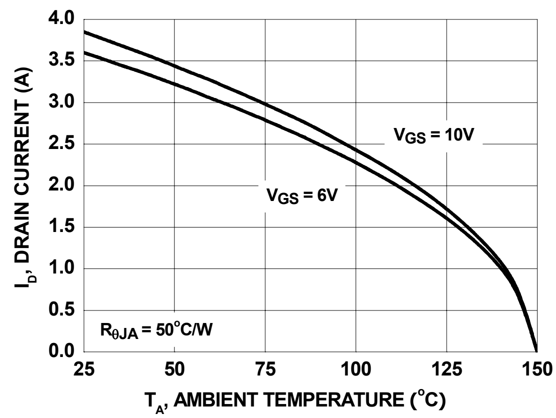


Figure 10. Ambient Continuous Drain Current vs Case Temperature

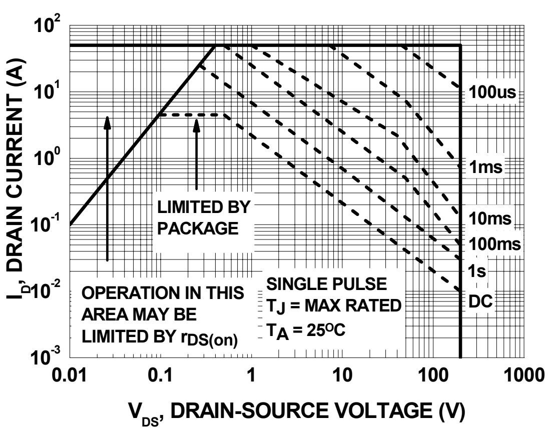


Figure 11. Forward Bias Safe Operating Area

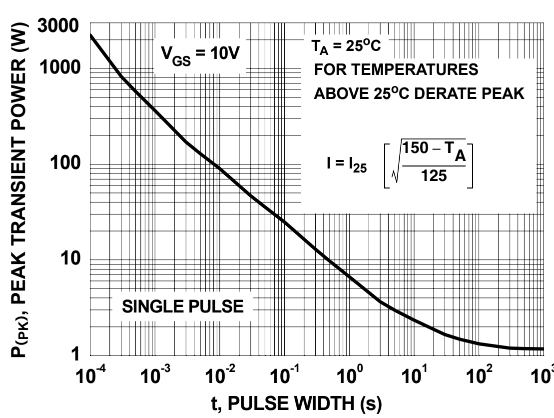


Figure 12. Single Pulse Maximum Power Dissipation

Typical Characteristics T_J = 25°C unless otherwise noted

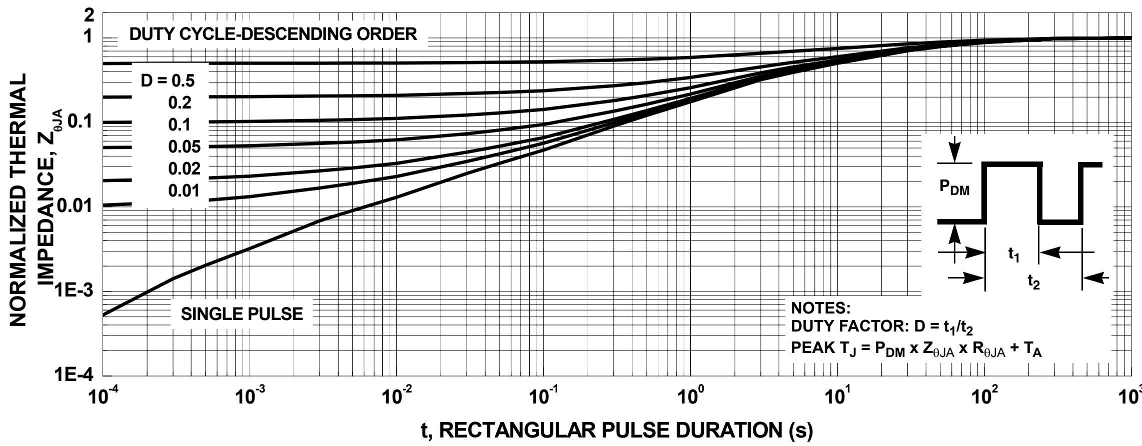


Figure 13. Transient Thermal Response Curve

Thermal characterization performed using the conditions described in Note 1b
Transient thermal response will change depending on the circuit board design

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