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FAIRCHILD SEMICONDUCTOR®

August 2006

FDS2734
N-Channel UltraFET Trench® MOSFET
250V, 3.0A, 117mΩ

Features

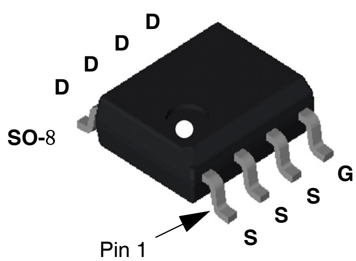
- Max $r_{DS(on)}$ =117mΩ at V_{GS} =10V, I_D = 3.0A
- Max $r_{DS(on)}$ =126mΩ at V_{GS} = 6V, I_D = 2.8A
- Fast switching speed
- High performance trench technology for extremely low $r_{DS(on)}$
- High power and current handling capability
- RoHS compliant

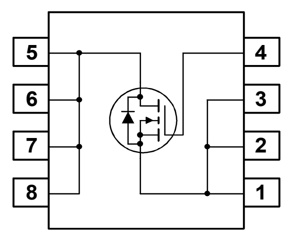
General Descriptions

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		250	V
V_{GS}	Gate to Source Voltage		±20	V
I_D	Drain Current -Continuous	(Note 1a)	3.0	A
	-Pulsed		50	
E_{AS}	Single Pulse Avalanche Energy	(Note 3)	12.5	mJ
P_D	Power dissipation	(Note 1a)	2.5	W
	Power dissipation	(Note 1b)	1.0	
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)	50	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction- to- Ambient	(Note 1b)	125	
$R_{\theta JC}$	Thermal Resistance, Junction -to- Case	(Note 1)	25	

Package Marking and Ordering Information

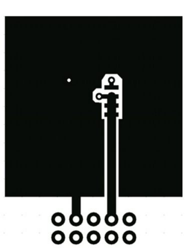
Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDS2734	FDS2734	SO-8	13''	12mm	2500 units

Electrical Characteristics $T_J = 25°C$ unless otherwise noted

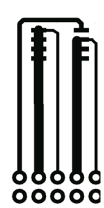
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	$I_D = 250\mu A$, $V_{GS} = 0V$	250			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\mu A$, referenced to 25^oC		157		$mV/^oC$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 200V, V_{GS} = 0 V$			1	μA
		$V_{DS} = 200V$, $V_{GS} = 0V$ $T_J = 55^oC$			10	
I_{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm 20V$, $V_{DS} = 0 V$			±100	nA
On Characteristics (Note 2)						
$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}$, $I_D = 250\mu A$	2	3	4	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	$I_D = 250\mu A$, referenced to 25^oC		-10.7		$mV/^c$
$r_{DS(on)}$	Drain to Source On Resistance	$V_{GS} = 10V$, $I_D = 3.0A$,		97	117	$m\Omega$
		$V_{GS} = 6V$, $I_D = 2.8A$,		101	126	
		$V_{GS} = 10V$, $I_D = 3.0A$, $T_J = 125^oC$		205	225	
g_{FS}	Forward Transconductance	$V_{DS}=10V$, I_D =3.0A,		15.1		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS} = 100V$, $V_{GS} = 0V$, f = 1MHz		1960	2610	pF
C_{oss}	Output Capacitance			85	130	pF
C_{rss}	Reverse Transfer Capacitance			26	40	pF
R_G	Gate Resistance	f = 1MHz		0.7		Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 125V$, $I_D = 3A$ $V_{GS} = 10V$, $R_{GS} = 6\Omega$		23	37	ns
t_r	Rise Time			11	19	ns
$t_{d(off)}$	Turn-Off Delay Time			40	64	ns
t_f	Fall Time			11	19	ns
Q_g	Total Gate Charge	$V_{DS} = 125V$, $V_{GS} = 10V$ $I_D = 3.0A$		32	45	nC
Q_{gs}	Gate to Source Gate Charge			9		nC
Q_{gd}	Gate to Drain Charge			8		nC
Drain-Source Diode Characteristics						
V_{SD}	Source to Drain Diode Voltage	$I_{SD} = 3.0A$		0.74	1.2	V
t_{rr}	Reverse Recovery Time	$I_F = 3.0$ A, $d_{iF}/dt = 100A/\mu s$		72	108	ns
Q_{rr}	Reverse Recovery Charge			185	278	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) 50°C/W when mounted on a $1in^2$ pad of 2 oz copper



b) 125°C/W when mounted on a minimum pad of 2 oz copper

Scale 1 : 1 on letter size paper

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

3: Starting $T_J = 25°C$, L = 1mH, $I_{AS} = 5A$, $V_{DD} = 100V$, $V_{GS} = 10V$

Typical Characteristics T_J = 25°C unless otherwise noted

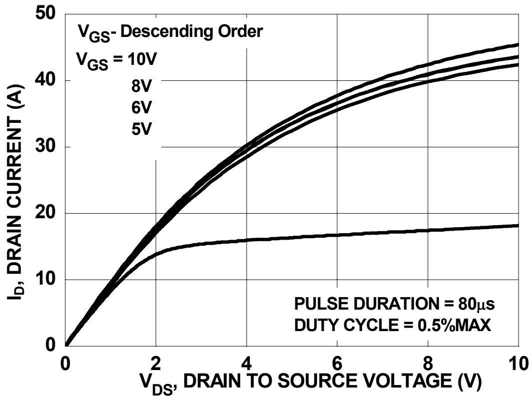


Figure 1. On Region Characteristics

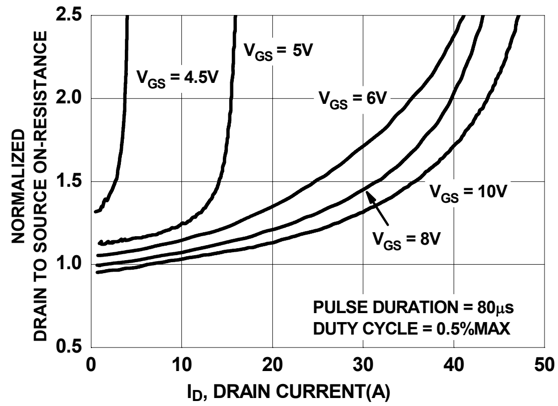


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

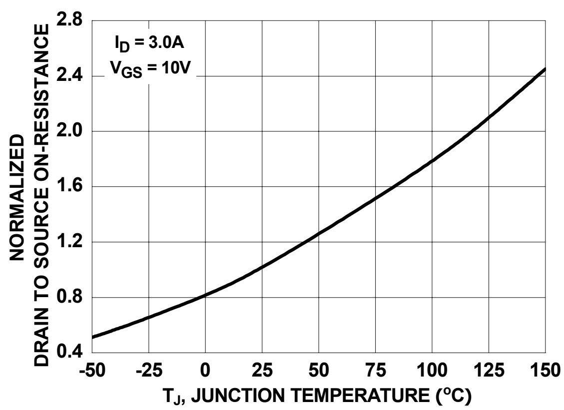


Figure 3. Normalized On Resistance vs Junction Temperature

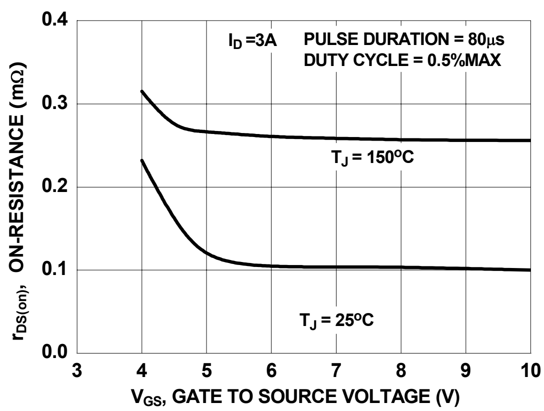


Figure 4. On-Resistance vs Gate to Source Voltage

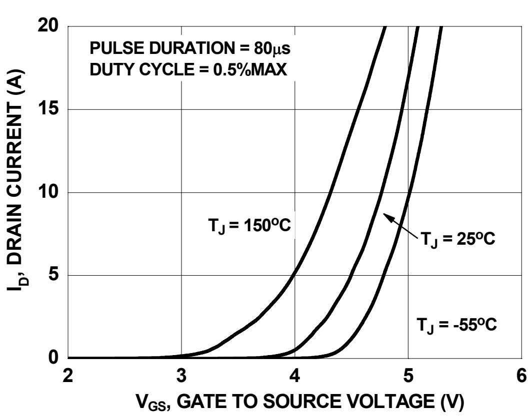


Figure 5. Transfer Characteristics

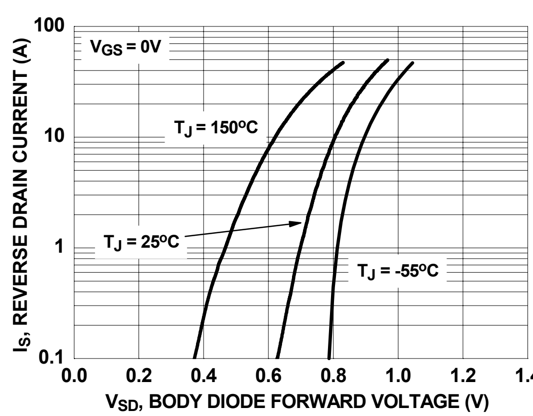


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

Typical Characteristics T_J = 25°C unless otherwise noted

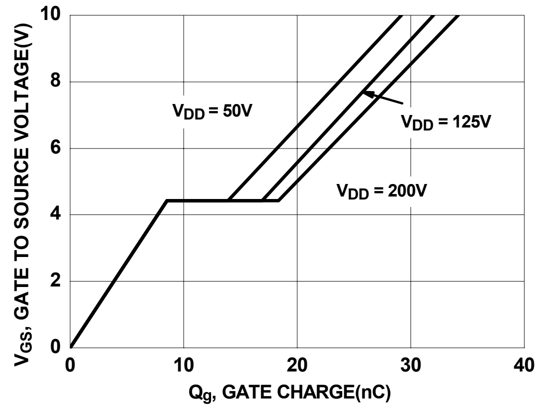


Figure 7. Gate Charge Characteristics

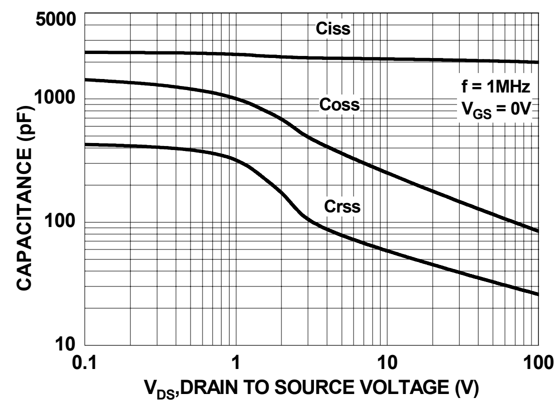


Figure 8. Capacitance vs Drain to Source Voltage

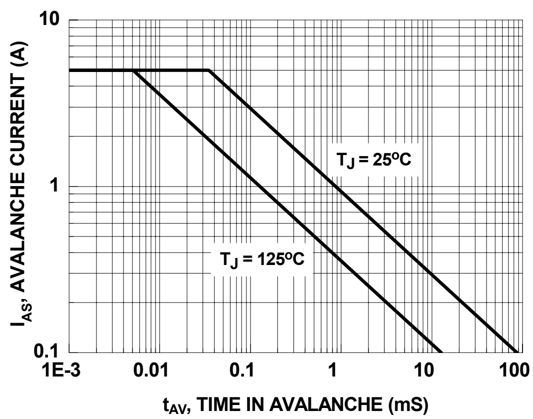


Figure 9. Unclamped Inductive Switching Capability

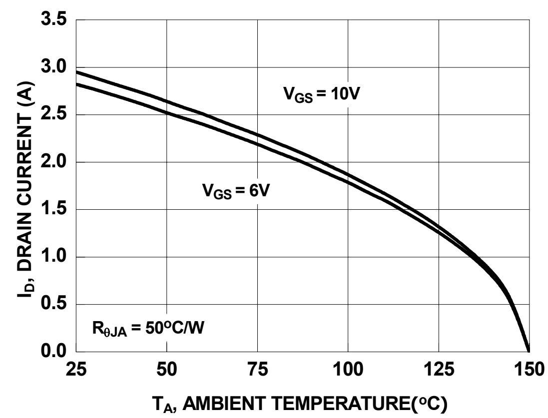


Figure 10. Maximum Continuous Drain Current vs Ambient Temperature

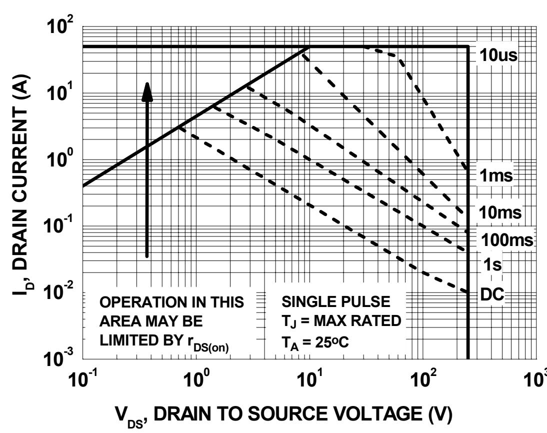


Figure 11. Forward Bias Safe Operating Area

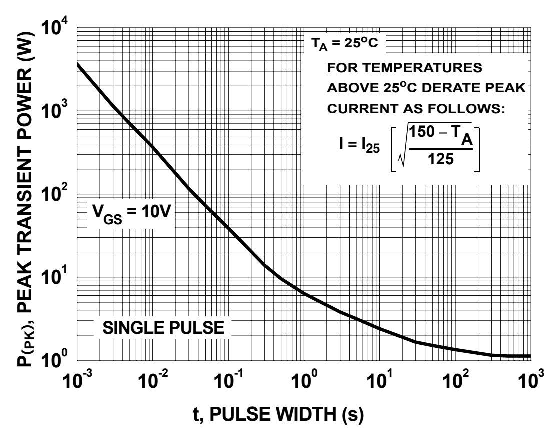


Figure 12. Single Pulse Maximum Power Dissipation

Typical Characteristics T_J = 25°C unless otherwise noted

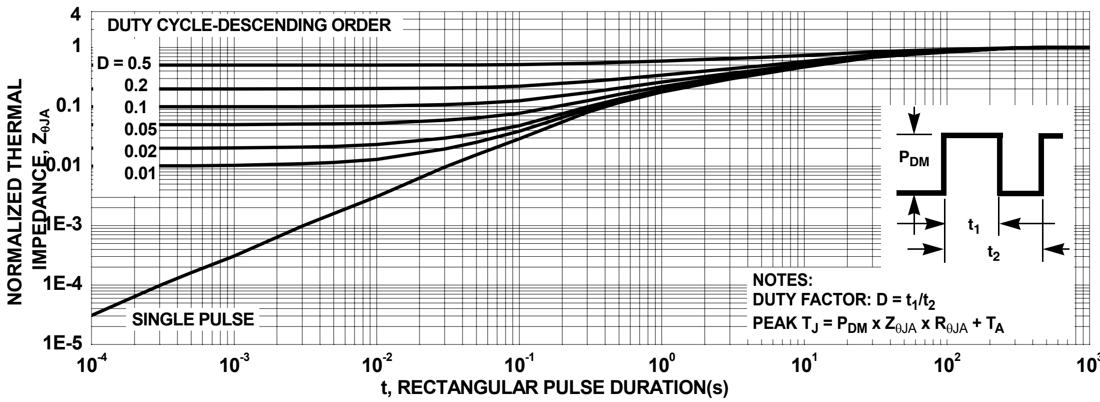


Figure 13. Transient Thermal Response Curve

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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