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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

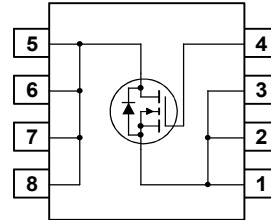
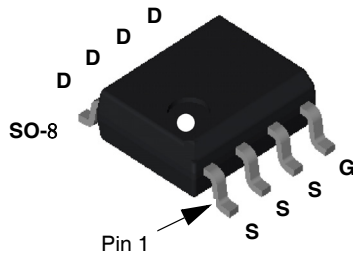


General Descriptions

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 $T_A = 25^\circ\text{C}$ 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	$^\circ\text{C}$

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction- to -Ambient (Note 1a)	50	$^\circ\text{C/W}$
$R_{\theta JA}$	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

FDS2734 Single N-Channel UltraFET Trench® MOSFET

Electrical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV_{DSS}	Drain to Source Breakdown Voltage	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	250			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\mu\text{A}$, referenced to 25°C		157		mV/ $^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 200\text{V}, V_{GS} = 0\text{V}$ $V_{DS} = 200\text{V}, V_{GS} = 0\text{V}, T_J = 55^\circ\text{C}$			1 10	μA
I_{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$			± 100	nA

On Characteristics (Note 2)

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	2	3	4	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	$I_D = 250\mu\text{A}$, referenced to 25°C		-10.7		mV/ $^\circ\text{C}$
$r_{DS(on)}$	Drain to Source On Resistance	$V_{GS} = 10\text{V}, I_D = 3.0\text{A}$, $V_{GS} = 6\text{V}, I_D = 2.8\text{A}$, $V_{GS} = 10\text{V}, I_D = 3.0\text{A}, T_J = 125^\circ\text{C}$		97 101 205	117 126 225	m Ω
g_{FS}	Forward Transconductance	$V_{DS} = 10\text{V}, I_D = 3.0\text{A}$		15.1		S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 100\text{V}, V_{GS} = 0\text{V}$, $f = 1\text{MHz}$		1960	2610	pF
C_{oss}	Output Capacitance			85	130	pF
C_{rss}	Reverse Transfer Capacitance			26	40	pF
R_G	Gate Resistance	$f = 1\text{MHz}$		0.7		Ω

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 125\text{V}, I_D = 3\text{A}$ $V_{GS} = 10\text{V}, R_{GS} = 6\Omega$		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		$V_{DS} = 125\text{V}, V_{GS} = 10\text{V}$ $I_D = 3.0\text{A}$		32	45
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	$I_{SD} = 3.0\text{A}$		0.74	1.2	V
t_{rr}	Reverse Recovery Time	$I_F = 3.0\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$		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) $50^\circ\text{C}/\text{W}$ when mounted on a 1in^2 pad of 2 oz copper



b) $125^\circ\text{C}/\text{W}$ when mounted on a minimum pad of 2 oz copper

Scale 1 : 1 on letter size paper

2: Pulse Test Width $<300\mu\text{s}$, Duty Cycle $<2\%$.
3: Starting $T_J = 25^\circ\text{C}$, $L = 1\text{mH}$, $I_{AS} = 5\text{A}$, $V_{DD} = 100\text{V}$, $V_{GS} = 10\text{V}$

Typical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted

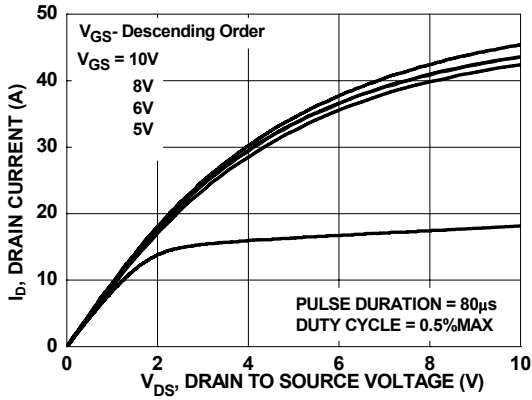


Figure 1. On Region Characteristics

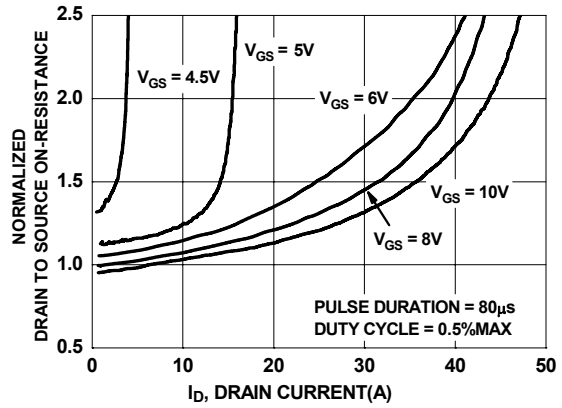


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

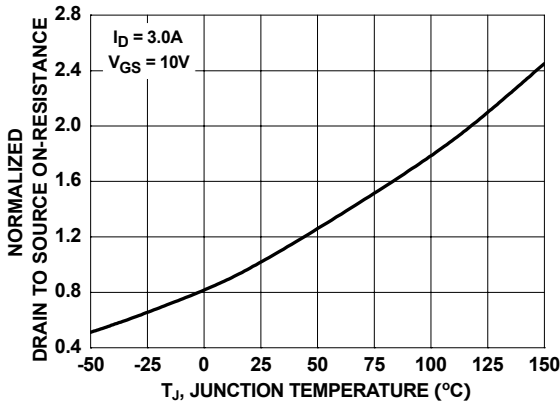


Figure 3. Normalized On Resistance vs Junction Temperature

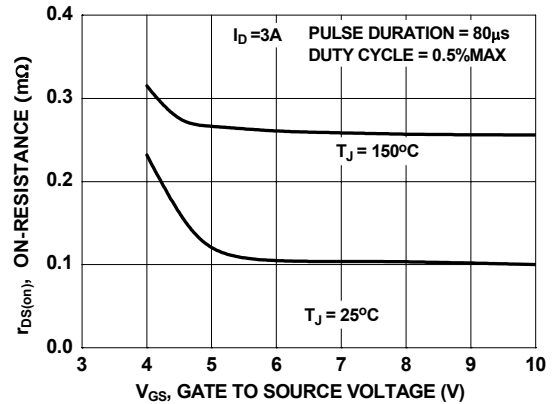


Figure 4. On-Resistance vs Gate to Source Voltage

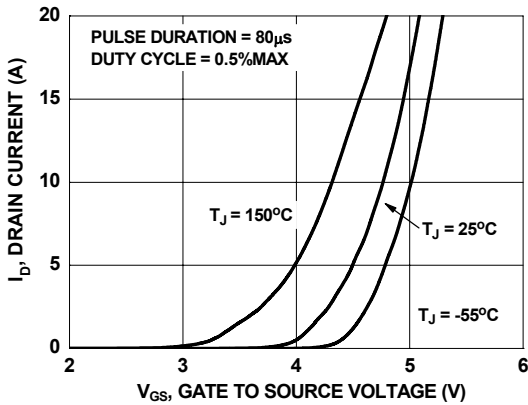


Figure 5. Transfer Characteristics

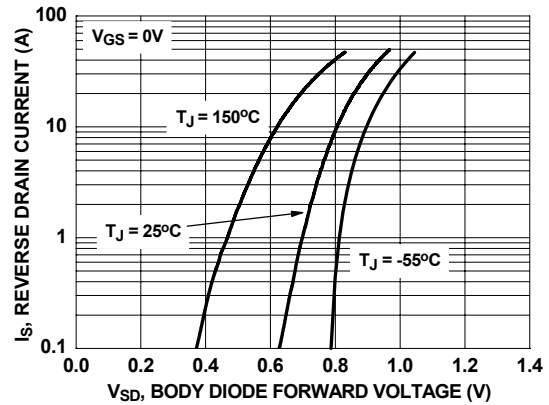


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

Typical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted

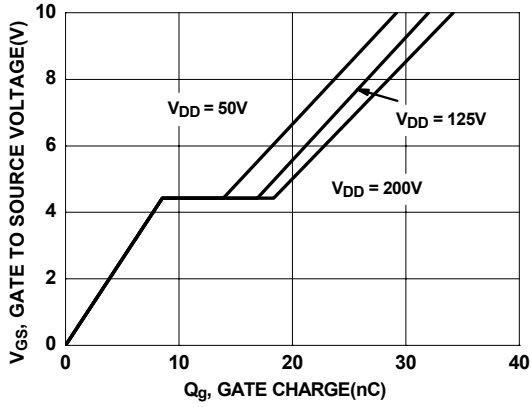


Figure 7. Gate Charge Characteristics

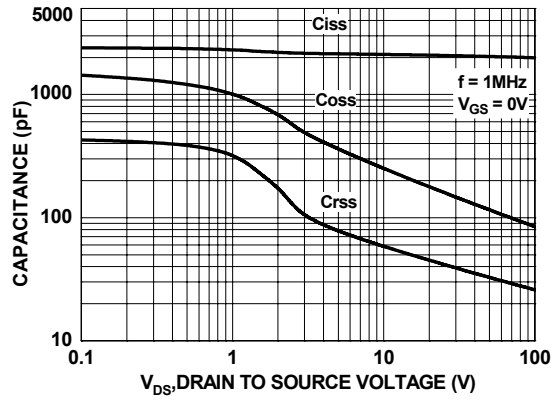


Figure 8. Capacitance vs Drain to Source Voltage

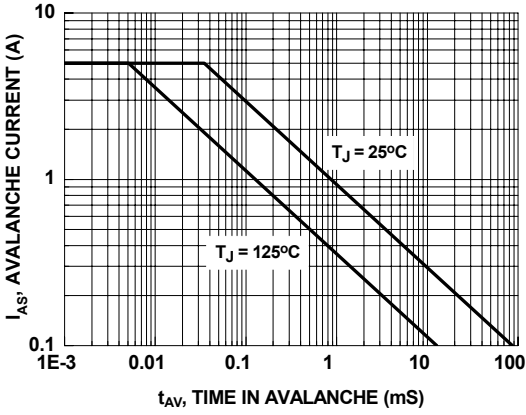


Figure 9. Unclamped Inductive Switching Capability

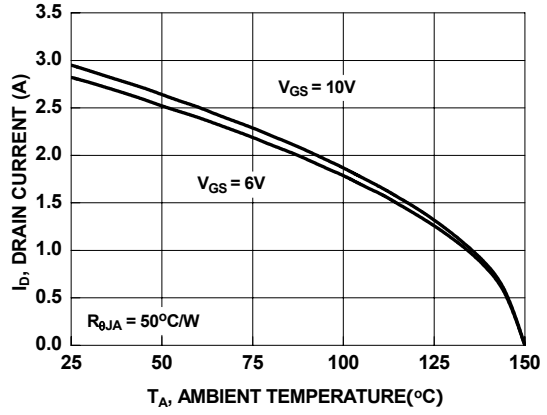


Figure 10. Maximum Continuous Drain Current vs Ambient Temperature

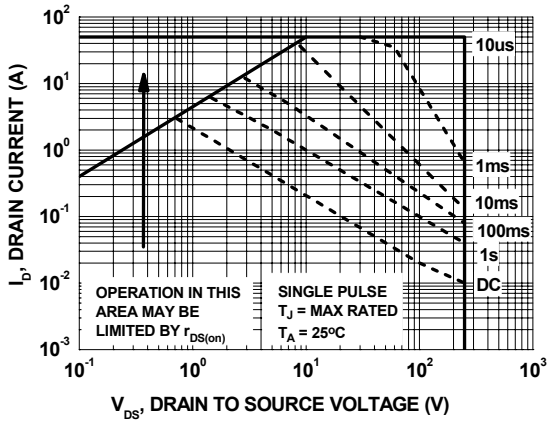


Figure 11. Forward Bias Safe Operating Area

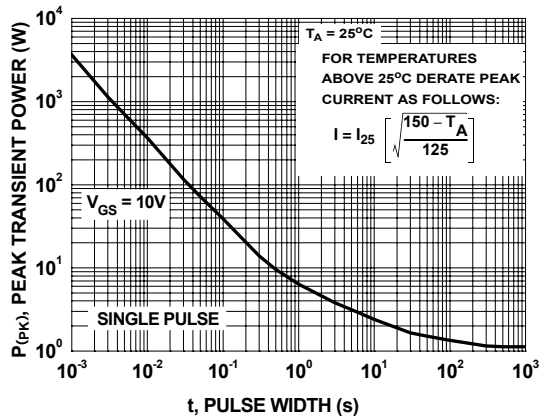


Figure 12. Single Pulse Maximum Power Dissipation

Typical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted

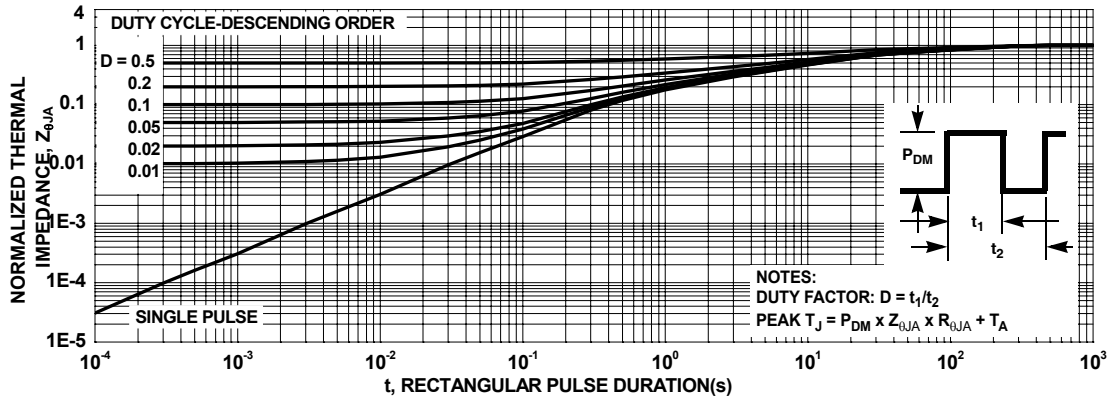


Figure 13. Transient Thermal Response Curve

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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