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FDS2734

N-Channel UltraFET Trench[®] MOSFET 250V, 3.0A, $117m\Omega$

Features

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

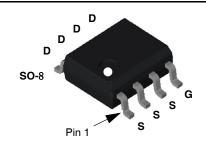


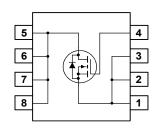
General Descriptions

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		3.0	۸
	-Pulsed		50	- A
E _{AS}	Single Pulse Avalanche Energy	(Note 3)	12.5	mJ
D	Power dissipation	(Note 1a)	2.5	w
P_{D}	Power dissipation (Note 1b)		1.0	VV
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	
$R_{\theta JA}$	Thermal Resistance, Junction- to- Ambient	(Note 1b)	125	°C/W
$R_{\theta JC}$	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	Тур	Max	Units		
Off Characteristics								
BV _{DSS}	Drain to Source Breakdown Voltage	$I_D = 250 \mu A, V_{GS} = 0 V$	250			V		
$\frac{\Delta BV_{DSS}}{\Delta \; T_{\mathsf{J}}}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\mu\text{A}$, referenced to 25°C		157		mV/°C		
I _{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 200V, V_{GS} = 0 V$ $V_{DS} = 200V, V_{GS} = 0V$ $T_{J} = 55^{\circ}C$			10	μΑ		
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 = 250μA, referenced to 25°C		-10.7		mV/ ^c
		$V_{GS} = 10V, I_D = 3.0A,$		97	117	
r _{DS(on)}	Drain to Source On Resistance	$V_{GS} = 6V$, $I_{D} = 2.8A$,		101	126	mΩ
		$V_{GS} = 10V, I_D = 3.0A, T_J = 125^{\circ}C$		205	225	
g _{FS}	Forward Transconductance	V _{DS} =10V, I _D =3.0A,		15.1		S

Dynamic Characteristics

C _{iss}	Input Capacitance	100// // 0//	1960	2610	pF
C _{oss}	Output Capacitance	V _{DS} = 100V, V _{GS} = 0V, f = 1MHz	85	130	pF
C _{rss}	Reverse Transfer Capacitance	1 - 1141112	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	$V_{GS} = 10V$, $H_{GS} = 002$	40	64	ns
t _f	Fall Time		11	19	ns
Q_g	Total Gate Charge	V _{DS} = 125V, V _{GS} = 10V	32	45	nC
Q_{gs}	Gate to Source Gate Charge	I _D = 3.0A	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	$I_F = 3.0 \text{ A}, d_{iF}/dt = 100 \text{A}/\mu\text{s}$	72	108	ns
Q _{rr}	Reverse Recovery Charge		185	278	nC

Notes:

13 R_{B,IA} 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_{B,IC} is guaranteed by design while R_{B,CA} is determined by the user's board design.



a) 50°C/W when mounted on a 1in² 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 <300 μ S, 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

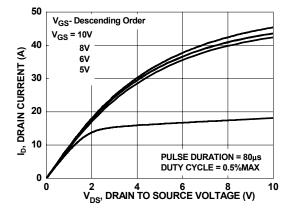


Figure 1. On Region Characteristics

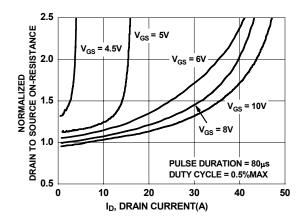


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

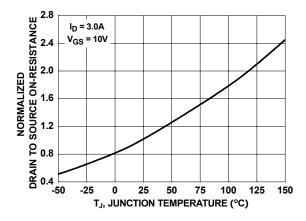


Figure 3. Normalized On Resistance vs Junction Temperature

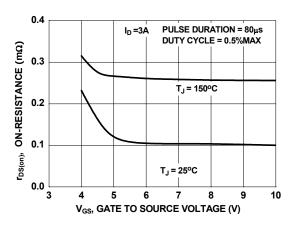


Figure 4. On-Resistance vs Gate to Source Voltage

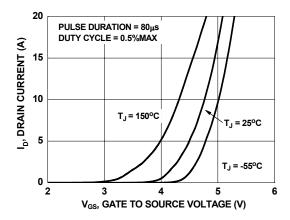


Figure 5. Transfer Characteristics

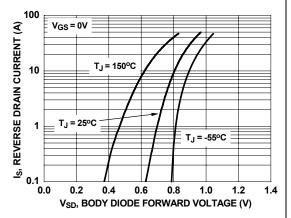


Figure 6. Source to Drain Diode Forward Voltage vs Source Current



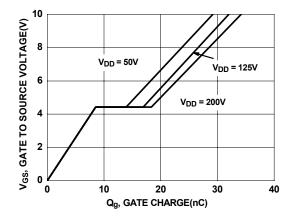


Figure 7. Gate Charge Characteristics

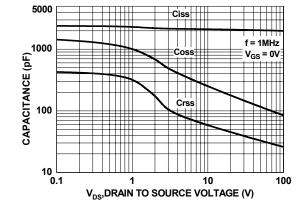


Figure 8. Capacitance vs Drain to Source Voltage

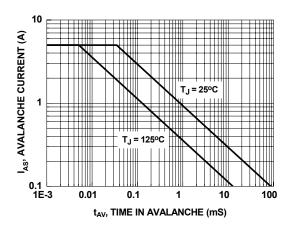


Figure 9. Unclamped Inductive Switching Capability

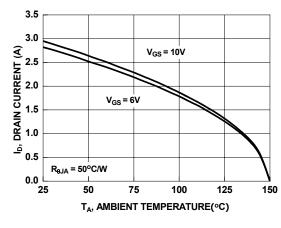


Figure 10. Maximum Continuous Drain Current vs
Ambient Temperature

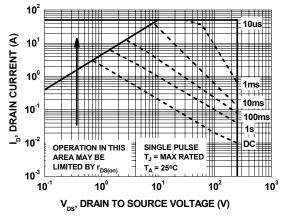


Figure 11. Forward Bias Safe Operating Area

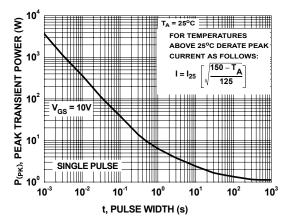


Figure 12. Single Pulse Maximum Power Dissipation



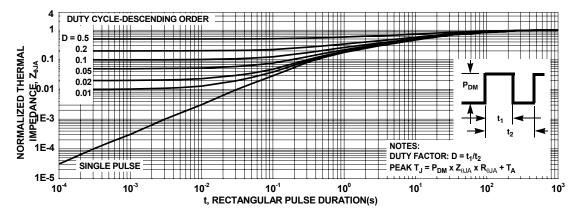


Figure 13. Transient Thermal Response Curve

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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