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N-Channel PowerTrench[®] MOSFET 30 V, 18.8 A, 4.2 m Ω

Features

- Max $r_{DS(on)}$ = 4.2 m Ω at V_{GS} = 10 V, I_D = 18.8 A
- Max $r_{DS(on)}$ = 5.5 m Ω at V_{GS} = 4.5 V, I_D = 16.1 A
- High performance technology for extremely low r_{DS(on)}
- Termination is Lead-free and RoHS Compliant

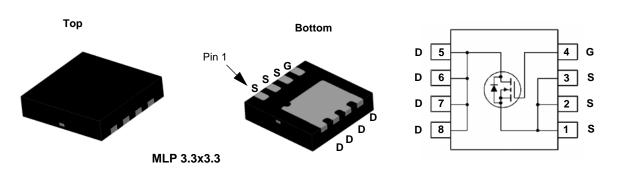


General Description

This N-Channel MOSFET is produced using Fairchild Semiconductor's advanced Power Trench[®] process that has been especially tailored to minimize the on-state resistance. This device is well suited for Power Management and load switching applications common in Notebook Computers and Portable Battery Packs.

Applications

- DC DC Buck Converters
- Notebook battery power management
- Load switch in Notebook



MOSFET Maximum Ratings T_A = 25 °C unless otherwise noted

Symbol	Parameter			Ratings	Units	
V _{DS}	Drain to Source Voltage			30	V	
V _{GS}	Gate to Source Voltage			±20	V	
ID	Drain Current -Continuous	T _C = 25 °C		24		
	-Continuous	T _A = 25 °C	(Note 1a)	18.8	Α	
	-Pulsed			60		
E _{AS}	Single Pulse Avalanche Energy		(Note 3)	188	mJ	
P _D	Power Dissipation	T _C = 25 °C		45	w	
	Power Dissipation	T _A = 25 °C	(Note 1a)	2.3	VV	
T _J , T _{STG}	Operating and Storage Junction Temperature Range			-55 to +150	°C	

Thermal Characteristics

$R_{ ext{ heta}JC}$	Thermal Resistance, Junction to Case	2.8	°C/W
$R_{ extsf{ heta}JA}$	Thermal Resistance, Junction to Ambient (Note 1	a) 53	C/VV

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDMC7664	FDMC7664	MLP 3.3x3.3	13 "	12 mm	3000 units

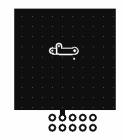
June 2014

FDMC7664
N-Channel
PowerTrench [®]
MOSFET

Symbol	Parameter	Test Conditions	Min	Тур	Max	Units
Off Chara	cteristics					
BV _{DSS}	Drain to Source Breakdown Voltage	I _D = 250 μA, V _{GS} = 0 V	30			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250 \ \mu\text{A}$, referenced to 25 °C		12		mV/°C
I _{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 24 V, V_{GS} = 0 V$			1	μA
		T _J = 125 °C			250	μΛ
I _{GSS}	Gate to Source Leakage Current, Forward	$V_{GS} = 20 \text{ V}, \text{ V}_{DS} = 0 \text{ V}$			100	nA
On Chara	cteristics					
V _{GS(th)}	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250 \ \mu A$	1.0	1.9	3.0	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	$I_D = 250 \ \mu$ A, referenced to 25 °C		-7		mV/°C
	Static Drain to Source On Resistance	V _{GS} = 10 V, I _D = 18.8 A		3.6	4.2	
r _{DS(on)} Static D		V _{GS} = 4.5 V, I _D = 16.1 A		4.5	5.5	mΩ
	State Drain to Source On Resistance	V _{GS} = 10 V, I _D = 18.8 A T _J = 125 °C		4.4	5.4	- 11152
9 _{FS}	Forward Transconductance	V _{DD} = 5 V, I _D = 18.8 A		115		S
C _{iss} C _{oss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V _{DS} = 15 V, V _{GS} = 0 V f = 1 MHz		3655 1100 115	4865 1465 170	pF pF pF
C _{oss} C _{rss}						
R _g	Gate Resistance			0.8	2.2	Ω
Switching	g Characteristics					T
t _{d(on)}	Turn-On Delay Time			15	27	ns
t _r	Rise Time	V _{DD} = 15 V, I _D = 18.8 A		7	14	ns
t _{d(off)}	Turn-Off Delay Time	V_{GS} = 10 V, R_{GEN} = 6 Ω		37	59	ns
t _f	Fall Time			6	12	ns
Q _{g(TOT)}	Total Gate Charge	$V_{GS} = 0 V$ to 10 V		55	76	nC
Qg	Total Gate Charge	$V_{GS} = 0 \text{ V to } 4.5 \text{ V}$ $V_{DD} = 15 \text{ V}$		25	34	nC
Q _{gs}	Gate to Source Charge	I _D = 18.8 A		12		nC
Q _{gd}	Gate to Drain "Miller" Charge			6		nC
Drain-Sou	urce Diode Characteristics					
\ <i>\</i>		V _{GS} = 0 V, I _S = 18.8 A (Note 2)		0.83	1.2	
V _{SD}	Source to Drain Diode Forward Voltage	$V_{GS} = 0 V, I_S = 1.9 A$ (Note 2)		0.71	1.2	V
t _{rr}	Reverse Recovery Time			41	65	ns
	Reverse Recovery Charge	I _F = 18.8 A, di/dt = 100 A/μs		20	35	nC

NOTES:

1. R_{BJA} is determined with the device mounted on a 1 in² pad 2 oz copper pad on a 1.5 x 1.5 in. board of FR-4 material. R_{BJC} is guaranteed by design while R_{BCA} is determined by the user's board design.



a. 53 °C/W when mounted on a 1 in² pad of 2 oz copper

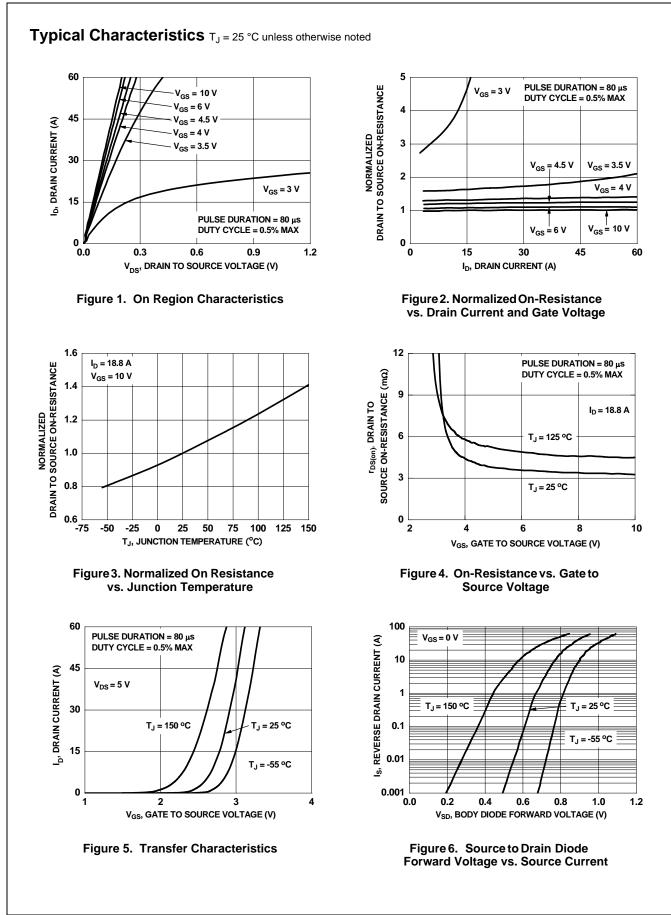
b.125 °C/W when mounted on a minimum pad of 2 oz copper



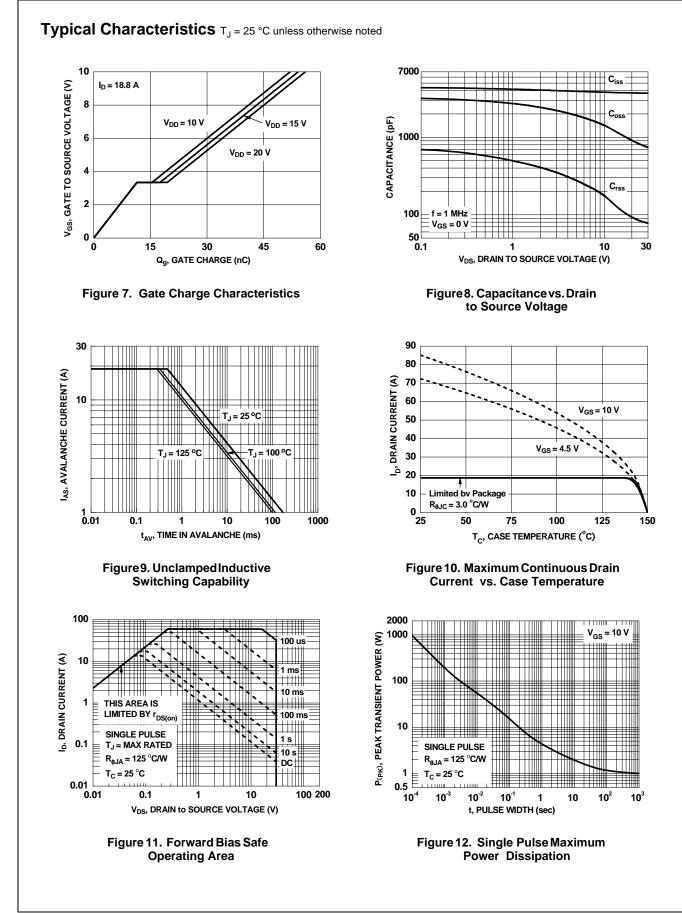
2. Pulse Test: Pulse Width < 300 $\mu s,$ Duty cycle < 2.0 %.

3. $E_{AS}\,$ of 188 mJ is based on starting T_J = 25 $^oC,\,L$ = 1 mH, I_{AS} = 19.4 A, V_{DD} = 27 V, V_{GS} = 10 V.

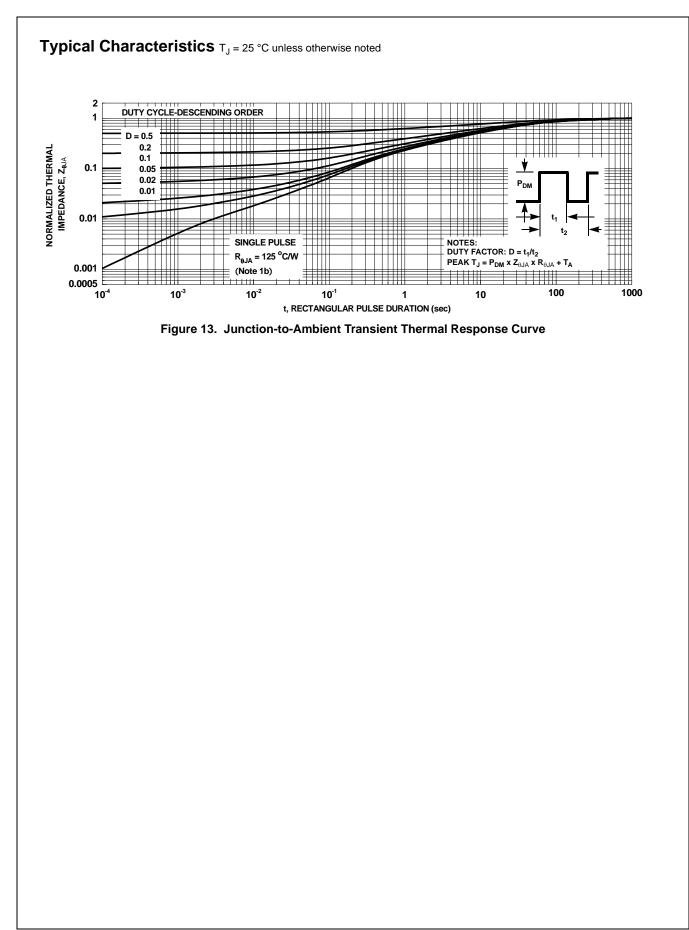
FDMC7664 N-Channel PowerTrench[®] MOSFET

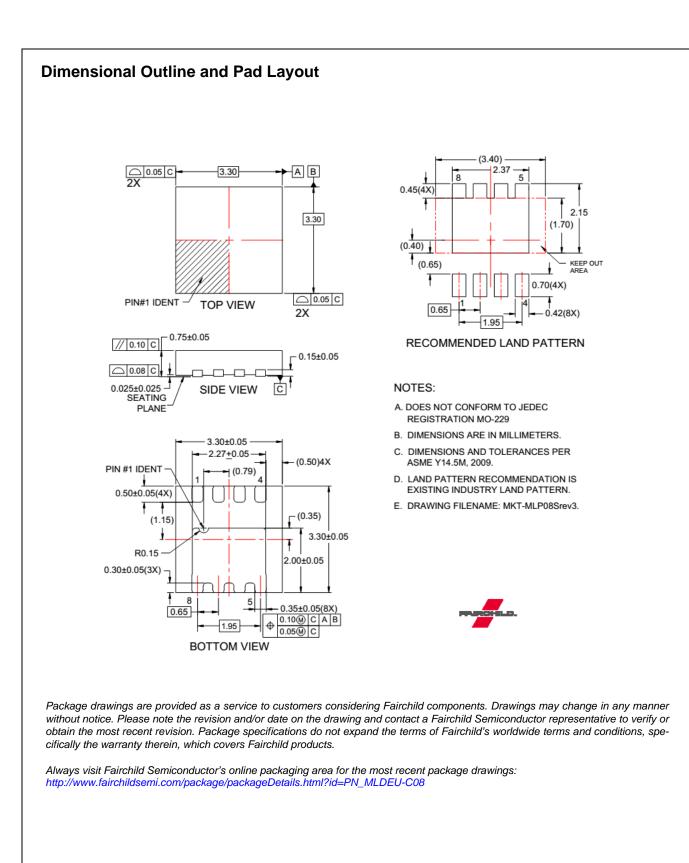






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