

FDS3570

80V N-Channel PowerTrench® MOSFET

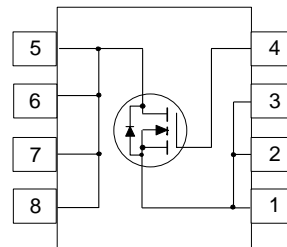
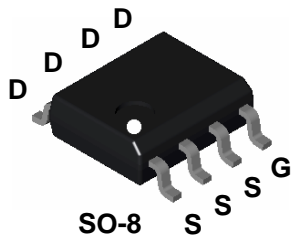
General Description

This N-Channel Logic Level MOSFET has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers.

These MOSFETs feature faster switching and lower gate charge than other MOSFETs with comparable $R_{DS(on)}$ specifications resulting in DC/DC power supply designs with higher overall efficiency.

Features

- 9 A, 80 V. $R_{DS(on)} = 0.020 \Omega @ V_{GS} = 10 \text{ V}$
 $R_{DS(on)} = 0.023 \Omega @ V_{GS} = 6 \text{ V}$.
- Fast switching speed.
- High performance trench technology for extremely low $R_{DS(on)}$.
- High power and current handling capability.



Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Ratings	Units	
V_{DSS}	Drain-Source Voltage	80	V	
V_{GSS}	Gate-Source Voltage	± 20	V	
I_D	Drain Current - Continuous	9	A	
	- Pulsed	50		
P_D	Power Dissipation for Single Operation	(Note 1a)	2.5	W
		(Note 1b)	1.2	
		(Note 1c)	1	
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	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	(Note 1)	25	$^\circ\text{C/W}$

Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape Width	Quantity
FDS3570	FDS3570	13"	12mm	2500 units

Electrical Characteristics T_A = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
--------	-----------	-----------------	-----	-----	-----	-------

Drain-Source Avalanche Ratings (Note 2)

W _{DSS}	Single Pulse Drain-Source Avalanche Energy	V _{DD} = 40 V, I _D = 9 A			360	mJ
I _{AR}	Maximum Drain-Source Avalanche Current				9	A

Off Characteristics

BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	80			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I _D = 250 μA, Referenced to 25°C		77		mV/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 64 V, V _{GS} = 0 V			1	μA
I _{GSSF}	Gate-Body Leakage, Forward	V _{GS} = 20 V, V _{DS} = 0 V			100	nA
I _{GSSR}	Gate-Body Leakage, Reverse	V _{GS} = -20 V, V _{DS} = 0 V			-100	nA

On Characteristics (Note 2)

V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250 μA	2	2.4	4	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	I _D = 250 μA, Referenced to 25°C		-7		mV/°C
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D = 9 A V _{GS} = 10 V, I _D = 9 A, T _J = 125°C V _{GS} = 6 V, I _D = 8.4 A		0.015 0.027 0.016	0.020 0.038 0.023	Ω
I _{D(on)}	On-State Drain Current	V _{GS} = 10 V, V _{DS} = 5 V	25			A
g _{FS}	Forward Transconductance	V _{DS} = 5 V, I _D = 7.6 A		40		S

Dynamic Characteristics

C _{iss}	Input Capacitance	V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0 MHz		2750		pF
C _{oss}	Output Capacitance			280		pF
C _{rss}	Reverse Transfer Capacitance			140		pF

Switching Characteristics (Note 2)

t _{d(on)}	Turn-On Delay Time	V _{DD} = 40 V, I _D = 1 A, V _{GS} = 10 V, R _{GEN} = 6 Ω		20	32	ns
t _r	Turn-On Rise Time			12	24	ns
t _{d(off)}	Turn-Off Delay Time			60	95	ns
t _f	Turn-Off Fall Time			24	38	ns
Q _g	Total Gate Charge	V _{DS} = 40 V, I _D = 9 A, V _{GS} = 10 V		54	76	nC
Q _{gs}	Gate-Source Charge			9.6		nC
Q _{gd}	Gate-Drain Charge			14		nC

Drain-Source Diode Characteristics and Maximum Ratings

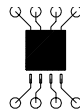
I _S	Maximum Continuous Drain-Source Diode Forward Current			2.1	A	
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 2.1 A (Note 2)		0.72	1.2	V

Notes:

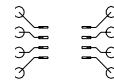
- R_{θJA} is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. R_{θJC} is guaranteed by design while R_{θCA} is determined by the user's board design.



a) 50° C/W when mounted on a 1 in² pad of 2 oz. copper.



b) 105° C/W when mounted on a 0.04 in² pad of 2 oz. copper.



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

Scale 1 : 1 on letter size paper

- Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

Typical Characteristics

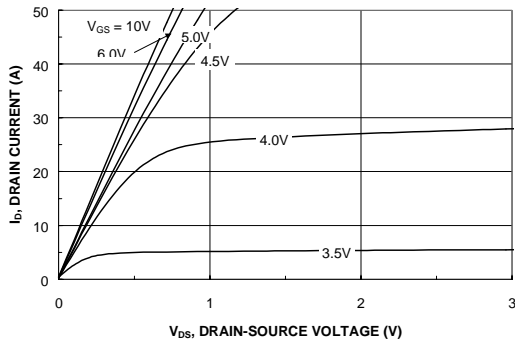


Figure 1. On-Region Characteristics.

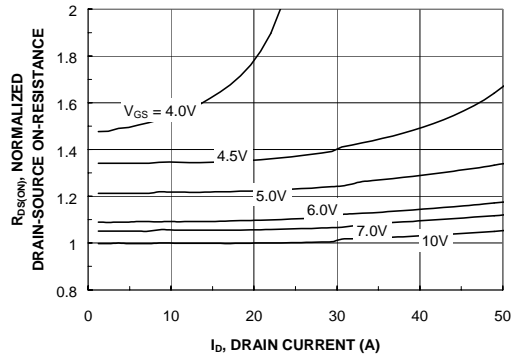


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

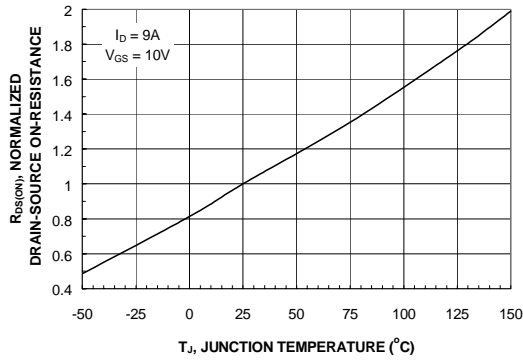


Figure 3. On-Resistance Variation with Temperature.

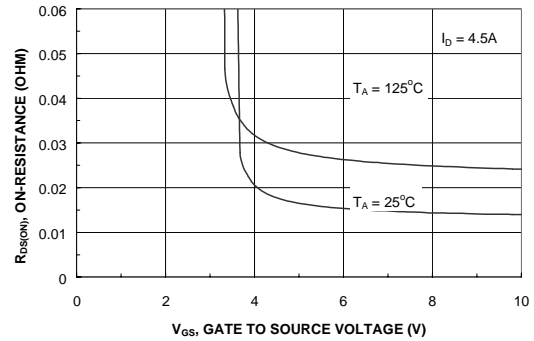


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

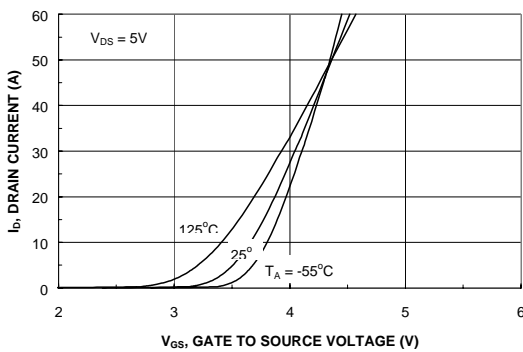


Figure 5. Transfer Characteristics.

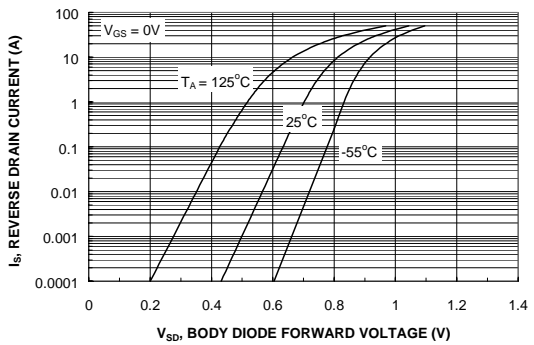
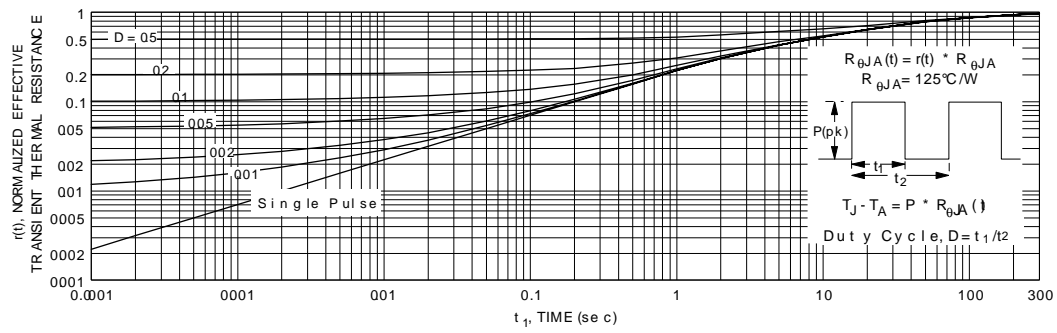
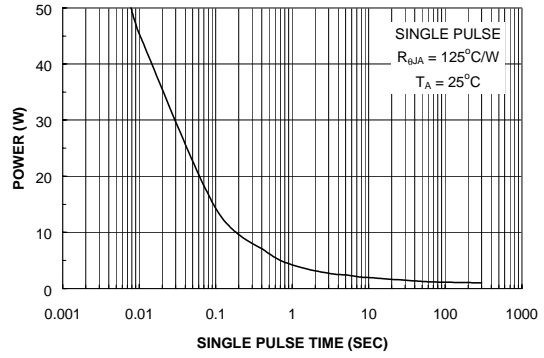
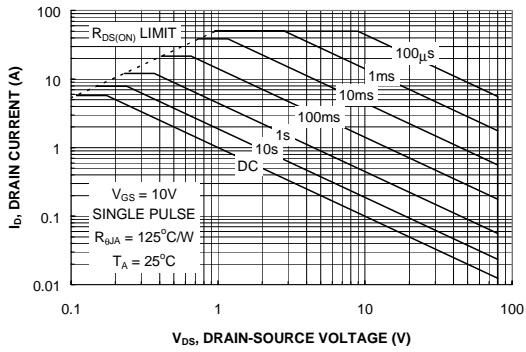
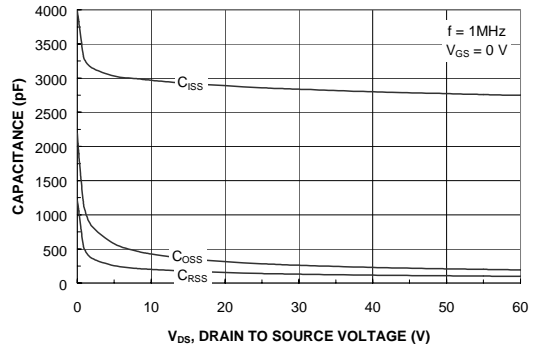
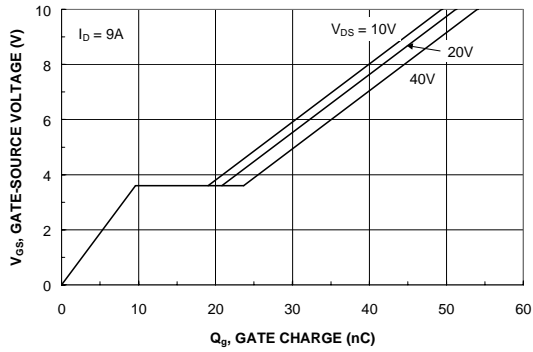


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.



TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACEx™	FASTr™	PowerTrench®	SyncFET™
Bottomless™	GlobalOptoisolator™	QFET™	TinyLogic™
CoolFET™	GTO™	QS™	UHC™
CROSSVOLT™	HiSeC™	QT Optoelectronics™	VCX™
DOME™	ISOPLANAR™	Quiet Series™	
E ² CMOS™	MICROWIRE™	SILENT SWITCHER®	
EnSigna™	OPTOLOGIC™	SMART START™	
FACT™	OPTOPLANAR™	SuperSOT™-3	
FACT Quiet Series™	PACMAN™	SuperSOT™-6	
FAST®	POP™	SuperSOT™-8	

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.



LittleDiode supplies new, hard to find or obsolete electronic components and semiconductors all over the world.

With over two million different components listed you are sure to find the part you need.

Feel free to visit us today at our online store:

LittleDiode.com

Looking forward to providing you with the best possible service.