FAIRCHILD
SEMICONDUCTOR ™

FDS9945

60V N-Channel PowerTrench$^{\text{Ò}}$ MOSFET

General Description

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

The MOSFET feature faster switching and lower gate charge than other MOSFET with comparable RDS(on) specifications.

The result is a MOSFET that is easy and safer to drive (even at very high frequencies), and DC/DC power supply designs with higher overall efficiency.

Features

- 3.5 A, 60 V. $R_{DS(ON)}$ = 0.100Ω @ V_{GS} = 10 V
  $R_{DS(ON)}$ = 0.200Ω @ V_{GS} = 4.5V

- Optimized for use in switching DC/DC converters with PWM controllers

- Very fast switching

- Low gate charge.

SO-8

Pin 1
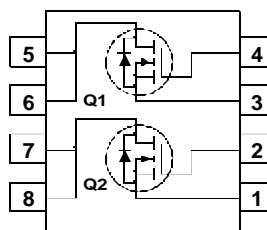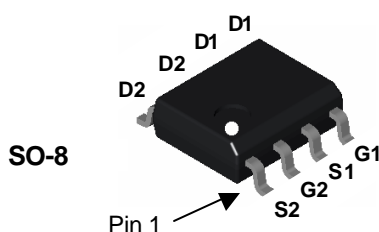
Absolute Maximum Ratings T_A=25°C unless otherwise noted

Symbol	Parameter		Ratings	Units
V_{DSS}	Drain-Source Voltage		60	V
V_{GSS}	Gate-Source Voltage		±20	V
I_D	Drain Current – Continuous	(Note 1a)	3.5	A
	– Pulsed		10	
P_D	Power Dissipation for Single Operation	(Note 1a)	2	W
		(Note 1b)	1.6	
		(Note 1c)	1.0	
T_J, T_{STG}	Operating and Storage Junction Temperature Range		-55 to +175	$^{\circ}$C

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	(Note 1a)	78 (steady state), 50 (10 sec)	$^{\circ}$C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	(Note 1c)	135	$^{\circ}$C/W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	(Note 1)	40	$^{\circ}$C/W

Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape width	Quantity
FDS9945	FDS9945	13”	12mm	2500 units

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

| Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain–Source Breakdown Voltage	$V_{GS} = 0$ V, $I_D = 250$ μA	60			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250$ μA, Referenced to 25°C		62.5		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 48$ 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	1	2.5	3	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	$I_D = 250$ μA, Referenced to 25°C		–6		mV/°C
$R_{DS(on)}$	Static Drain–Source On–Resistance	$V_{GS} = 10$ V, $I_D = 3.5$ A		74	100	mΩ
		$V_{GS} = 4.5$V, $I_D = 2.5$ A		103	200	
		$V_{GS}= 10$ V, $I_D =3.5$A, $T_J=125$°C		126	170	
$I_{D(on)}$	On–State Drain Current	$V_{GS} = 10$ V, $= V_{DS} =30$ V	10			A
g_{FS}	Forward Transconductance	$V_{DS} = 5$V, $I_D = 3.5$ A		8.6		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS} = 30$ V, $V_{GS} = 0$ V,		420		pF
C_{oss}	Output Capacitance	$f = 1.0$ MHz		48		pF
C_{rss}	Reverse Transfer Capacitance			20		pF
Switching Characteristics (Note 2)						
$t_{d(on)}$	Turn–On Delay Time	$V_{DD} = 30$ V, $I_D = 1$ A,		7	14	ns
t_r	Turn–On Rise Time	$V_{GS} = 10$ V, $R_{GEN} = 6$ Ω		4.3	8.6	ns
$t_{d(off)}$	Turn–Off Delay Time			19	34	ns
t_f	Turn–Off Fall Time			3	6	ns
Q_g	Total Gate Charge	$V_{DS} = 30$ V, $I_D = 3.5$ A,		8	13	nC
Q_{gs}	Gate–Source Charge	$V_{GS} = 5$ V		4		nC
Q_{gd}	Gate–Drain Charge			2.5		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)		0.8	1.2	V

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.
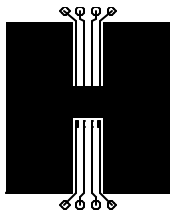
a) 78°/W when mounted on a 0.5in^2 pad of 2 oz copper
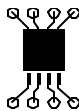
b) 125°/W when mounted on a 0.02 in^2 pad of 2 oz copper
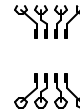
c) 135°/W when mounted on a minimum pad.

Scale 1 : 1 on letter size paper

2. Pulse Test: Pulse Width < 300μs, Duty Cycle < 2.0%

FDS9945 Rev B(W)

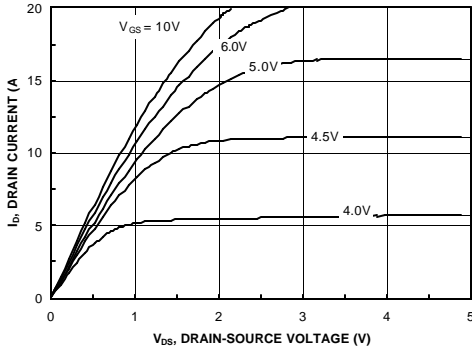## Typical Characteristics

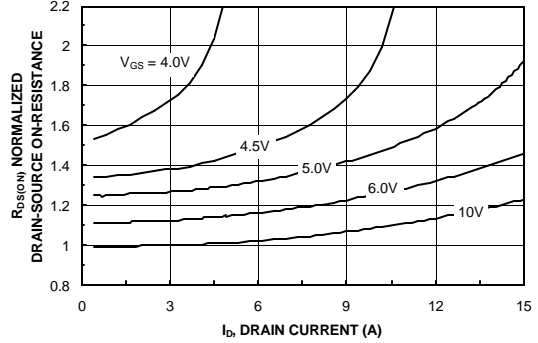**Figure 1. On-Region Characteristics.**

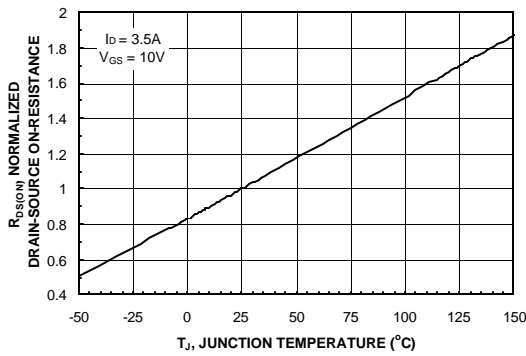**Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.**

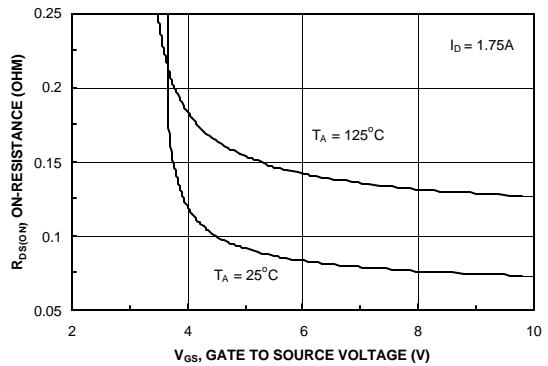**Figure 3. On-Resistance Variation withTemperature.**
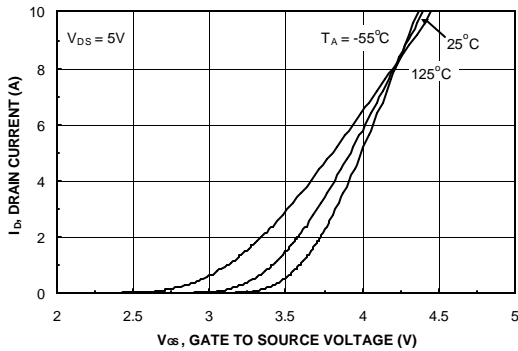
Figure 4. On-Resistance Variation with Gate-to-Source Voltage.
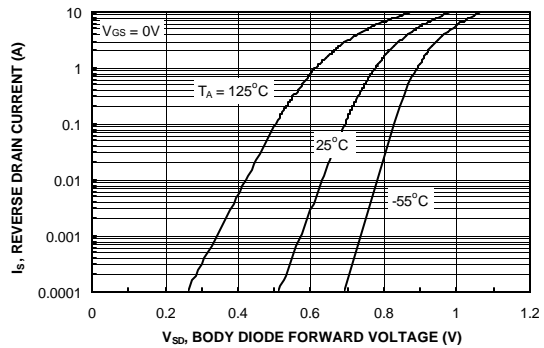
Figure 5. Transfer Characteristics.

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

FDS9945 Rev B(W)
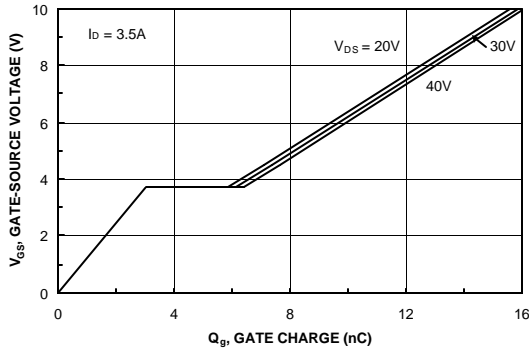
Typical Characteristics

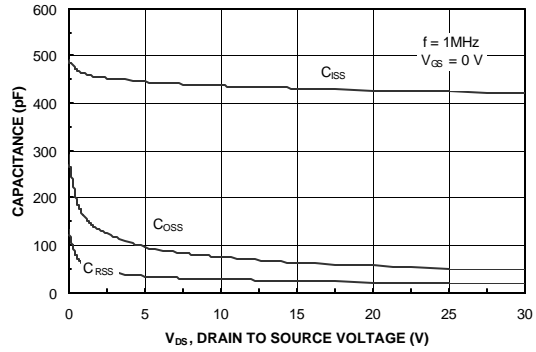Figure 7. Gate Charge Characteristics.
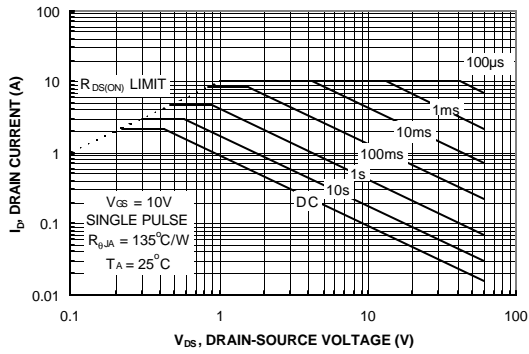

Figure 8. Capacitance Characteristics.

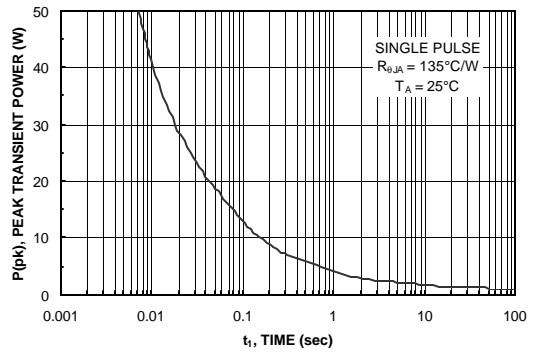Figure 9. Maximum Safe Operating Area.
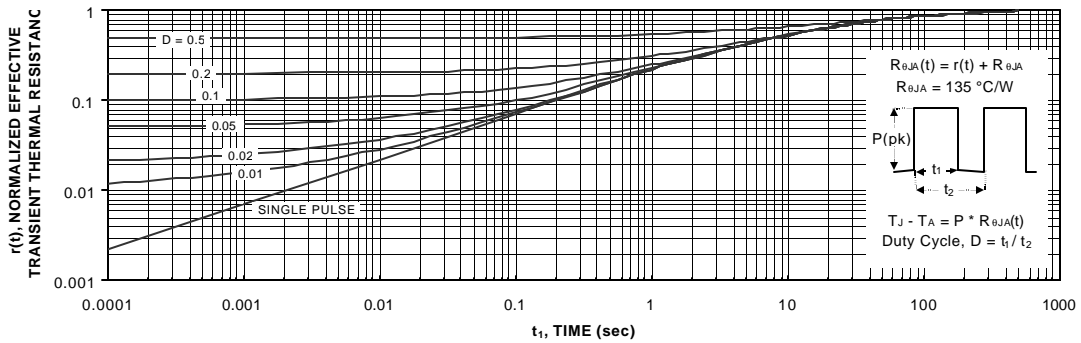

Figure 10. Single Pulse Maximum Power Dissipation.

Figure 11. Transient Thermal Response Curve.

Thermal characterization performed using the conditions described in Note 1c.
Transient thermal response will change depending on the circuit board design.

FDS9945 Rev B(W)

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™	
E²CMOS™	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.

Rev. G

FAIRCHILD
SEMICONDUCTOR

日本語 한국어 简体中文 | Search: | Go |

| DATASHEETS, SAMPLES, BUY | TECHNICAL INFORMATION | APPLICATIONS | DESIGN CENTER | SUPPORT | COMPANY | INVESTORS | MY FA |

FDS9945

60V N-Channel PowerTrench MOSFET

Related Links

Request samples

How to order products

Product Change Notices (PCNs)

Support

Sales support

Quality and reliability

Design center

Contents
- General description
- Features
- Product status/pricing/packaging
- Order Samples
- Models
- Qualification Support

BUY

Datasheet
Download this datasheet

PDF

General description

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

The MOSFET feature faster switching and lower gate charge than other MOSFET with comparable $R_{DS(on)}$ specifications.

The result is a MOSFET that is easy and safer to drive (even at very high frequencies), and DC/DC power supply designs with higher overall efficiency.

back to top

e-mail this datasheet

This page
Print version

This product
Use in FETBench Analysis

FET Bench .com

Features

- 3.5 A, 60 V
  - $R_{DS(ON)}$ = 0.100Ω @ V_{GS} = 10 V
  - $R_{DS(ON)}$ = 0.200Ω @ V_{GS} = 4.5 V
- Optimized for use in switching DC/DC converters with PWM controllers
- Very fast switching
- Low gate charge

back to top

Product status/pricing/packaging **BUY**

Product	Product status	Pb-free Status	Pricing*	Package type	Leads	Packing method	Package Marking Convention**
FDS9945	Full Production	Full Production	$0.74	SO-8	8	TAPE REEL	Line 1: **$Y** (Fairchild logo) **&Z** (Asm. Plant Code) **&2** (2-Digit Date Code) **&T** (Die Trace Code) Line 2: FDS Line 3: 9945

* Fairchild 1,000 piece Budgetary Pricing
** A sample button will appear if the part is available through Fairchild's on-line samples program. If there is no sample button, please contact a Fairchild distributor to obtain samples

Indicates product with Pb-free second-level interconnect. For more information click here.

Package marking information for product FDS9945 is available. Click here for more information .

back to top

Models

Package & leads	Condition	Temperature range	Software version	Revision date
PSPICE				
SO-8-8	Electrical	25°C to 125°C	Orcad 9.1	Aug 2, 2004

back to top

Qualification Support

Click on a product for detailed qualification data

Product
FDS9945

back to top

the pow
franc

单击下面可查看定价，库存，交付和生命周期等信息

>>ON Semiconductor(安森美)