## January 1998



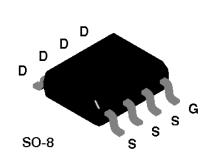
# NDS8426A Single N-Channel Enhancement Mode Field Effect Transistor

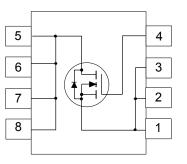
## **General Description**

SO-8 N-Channel enhancement mode power field effect transistors are produced using Fairchild's proprietary, high cell density, DMOS technology. This very high density process is especially tailored to minimize on-state resistance and provide superior switching performance. These devices are particularly suited for low voltage applications such as notebook computer power management and other battery powered circuits where fast switching, low in-line power loss, and resistance to transients are needed.

# Features

- 10.5 A, 20 V.  $R_{DS(ON)} = 0.0135 \Omega @ V_{GS} = 4.5 V.$  $R_{DS(ON)} = 0.016 \Omega @ V_{GS} = 2.7 V.$
- High density cell design for extremely low R<sub>DS(ON)</sub>.
- High power and current handling capability in a widely used surface mount package.



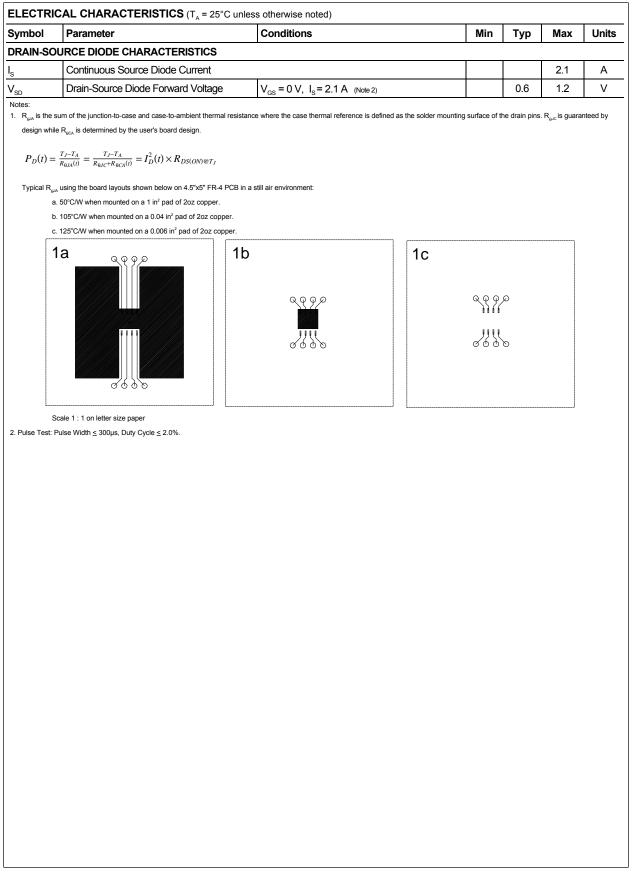


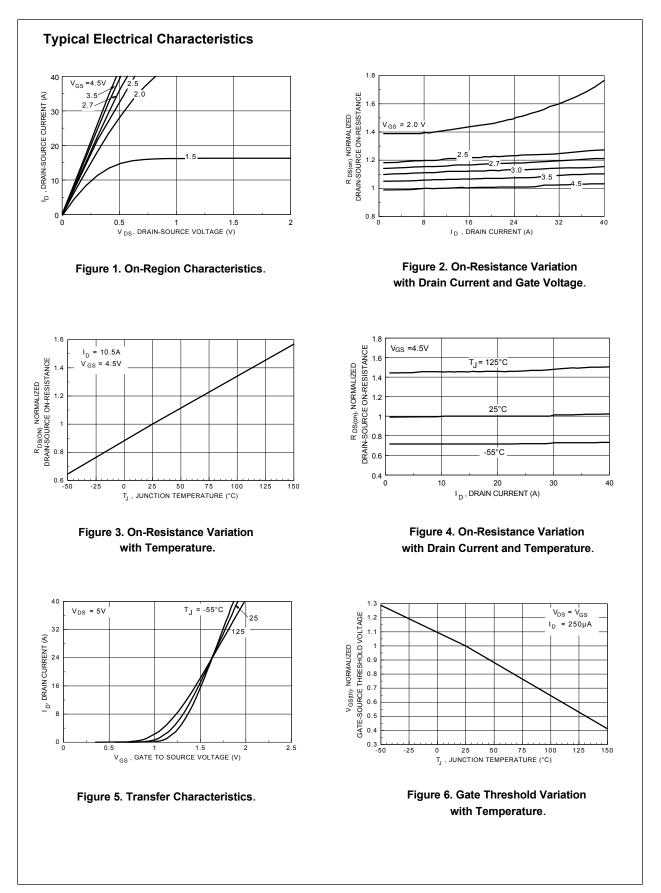
#### **ABSOLUTE MAXIMUM RATINGS** $T_A = 25^{\circ}C$ unless otherwise noted

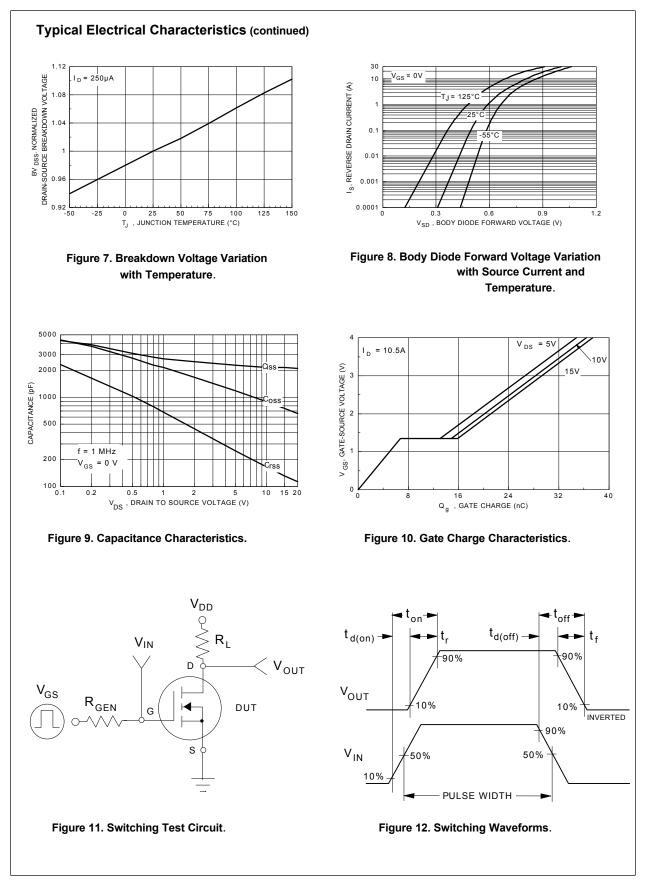
Symbol	Parameter		NDS8426A	Units
V <sub>DSS</sub>	Drain-Source Voltage		20	V
V <sub>GSS</sub>	Gate-Source Voltage		±8	V
I <sub>D</sub>	Drain Current - Continuous	(Note 1a)	10.5	А
	- Pulsed		30	
P <sub>D</sub>	Maximum Power Dissipation	(Note 1a)	2.5	W
		(Note 1b)	1.2	
		(Note 1c)	1	
T <sub>J</sub> ,T <sub>STG</sub>	Operating and Storage Temperature Range		-55 to 150	C°
THERMA	L CHARACTERISTICS			
R <sub>eja</sub>	Thermal Resistance, Junction-to-Ambient	(Note 1a)	50	°C/W
R <sub>eJC</sub>	Thermal Resistance, Junction-to-Case	(Note 1)	25	°C/W

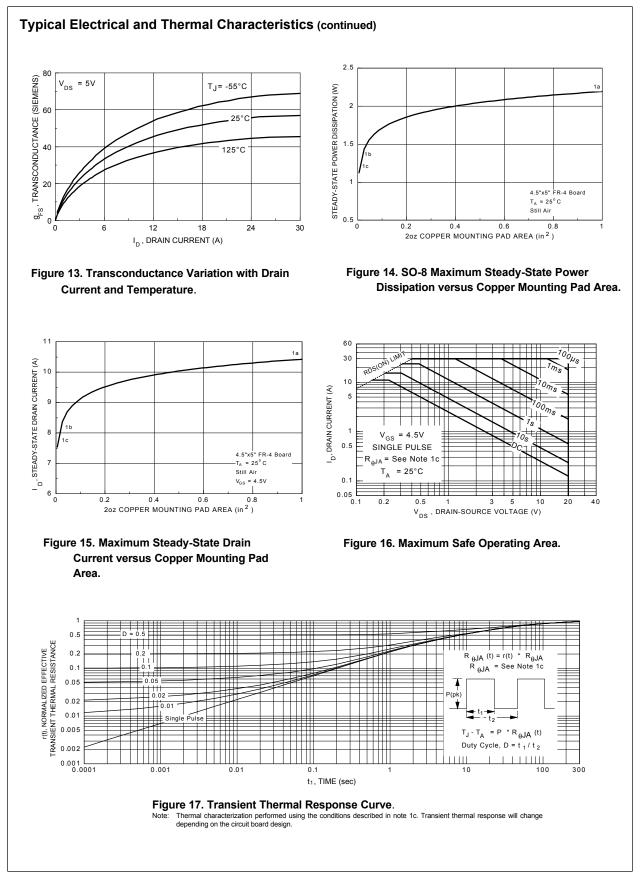
© 1998 Fairchild Semiconductor Corporation

Symbol	Parameter	Conditions		Min	Тур	Max	Units
OFF CHA	RACTERISTICS					•	•
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA		20			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 16 V, V <sub>GS</sub> = 0 V				1	μA
			T_= 55°C			10	μA
GSSF	Gate - Body Leakage, Forward	V <sub>GS</sub> = 8 V, V <sub>DS</sub> = 0 V				100	nA
I <sub>GSSR</sub>	Gate - Body Leakage, Reverse	V <sub>GS</sub> = -8 V, V <sub>DS</sub> = 0 V				-100	nA
ON CHAR	ACTERISTICS (Note 2)	· ·					
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{D} = 250 \mu\text{A}$		0.4	0.6	1	V
			T_= 125°C	0.3	0.5	0.8	
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	$V_{GS} = 4.5 \text{ V}, I_{D} = 10.5 \text{ A}$			0.012	0.0135	Ω
			T_= 125°C		0.017	0.024	
		$V_{GS} = 2.7 \text{ V}, I_{D} = 10 \text{ A}$			0.014	0.016	
I <sub>D(on)</sub>	On-State Drain Current	V <sub>GS</sub> = 4.5 V, V <sub>DS</sub> = 5 V		30			Α
9 <sub>FS</sub>	Forward Transconductance	$V_{\rm DS} = 5 V, I_{\rm D} = 10.5 A$			43		S
DYNAMIC	CHARACTERISTICS						
C <sub>iss</sub>	Input Capacitance	$V_{DS} = 10 \text{ V},  V_{GS} = 0 \text{ V},$ f = 1.0 MHz			2150		pF
C <sub>oss</sub>	Output Capacitance				890		pF
C <sub>rss</sub>	Reverse Transfer Capacitance				165		pF
SWITCHIN	IG CHARACTERISTICS (Note 2)						
t <sub>D(on)</sub>	Turn - On Delay Time	$V_{DD} = 5 V, I_{D} = 1 A,$			11	30	ns
ţ	Turn - On Rise Time	$V_{\text{GEN}}$ = 4.5 V, $R_{\text{GEN}}$ = 6 $\Omega$			26	55	ns
t <sub>D(off)</sub>	Turn - Off Delay Time				145	220	ns
ţ	Turn - Off Fall Time				40	100	ns
Q <sub>g</sub>	Total Gate Charge	$V_{DS} = 10 V,$ $I_{D} = 10.5 A, V_{GS} = 4.5 V$			43	60	nC
Q <sub>gs</sub>	Gate-Source Charge	$I_{\rm D} = 10.5 \text{A},  V_{\rm GS} = 4.5 \text{V}$			7		nC
$Q_{gd}$	Gate-Drain Charge				8		nC









NDS8426A Rev.B1

# 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<sup>TM</sup> CoolFET<sup>TM</sup> CROSSVOLT<sup>TM</sup> E<sup>2</sup>CMOS<sup>TM</sup> FACT<sup>TM</sup> FACT Quiet Series<sup>TM</sup> FAST<sup>®</sup> FAST<sup>®</sup> FASTr<sup>TM</sup> GTO<sup>TM</sup> HiSeC<sup>TM</sup> ISOPLANAR<sup>™</sup> MICROWIRE<sup>™</sup> POP<sup>™</sup> PowerTrench<sup>™</sup> QFET<sup>™</sup> QS<sup>™</sup> Quiet Series<sup>™</sup> SuperSOT<sup>™</sup>-3 SuperSOT<sup>™</sup>-6 SuperSOT<sup>™</sup>-8

TinyLogic™ UHC™ VCX™

# 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.				