

# SI9426DY

## Single N-Channel, 2.5V Specified MOSFET

### General Description

This N-Channel 2.5V specified MOSFET is produced using Fairchild Semiconductor's high cell density DMOS technology process that has been especially tailored to minimize on-state resistance and yet maintain low gate charge for superior switching performance.

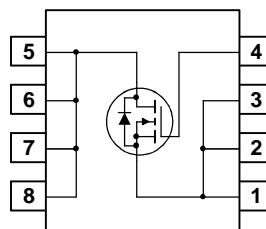
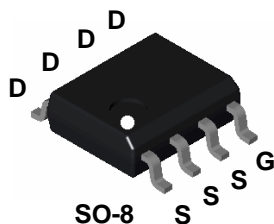
These devices have been designed to offer exceptional power dissipation in a very small footprint package.

### Applications

- DC/DC converter
- Load switch

### Features

- 10.5 A, 20 V.  $R_{DS(ON)} = 13.5 \text{ m}\Omega @ V_{GS} = 4.5 \text{ V}$   
 $R_{DS(ON)} = 16 \text{ m}\Omega @ V_{GS} = 2.7 \text{ V}$
- High cell density for extremely low  $R_{DS(ON)}$
- High power and current handling capability in a widely used surface mount package



### Absolute Maximum Ratings T<sub>A</sub>=25°C unless otherwise noted

Symbol	Parameter	Ratings	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	A
	– Pulsed	30	
P <sub>D</sub>	Power Dissipation for Single Operation (Note 1a) (Note 1b) (Note 1c)	2.5	W
		1.2	
		1	
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Junction Temperature Range	-55 to +150	°C

### Thermal Characteristics

R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient (Note 1a)	50	°C/W
R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case (Note 1)	25	°C/W

### Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape width	Quantity
9426	SI9426DY	13"	12mm	2500 units

## Electrical Characteristics

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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### Off Characteristics

$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\mu\text{A}$	20			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 16\text{ V}, V_{GS} = 0\text{ V}$ $V_{DS} = 16\text{ V}, V_{GS} = 0\text{ V}, T_J = 55^\circ\text{C}$			1 10	$\mu\text{A}$
$I_{GSSF}$	Gate-Body Leakage, Forward	$V_{GS} = 8\text{ V}, V_{DS} = 0\text{ V}$			100	nA
$I_{GSSR}$	Gate-Body Leakage, Reverse	$V_{GS} = -8\text{ V}, V_{DS} = 0\text{ V}$			-100	nA

### On Characteristics (Note 2)

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$ $V_{DS} = V_{GS}, I_D = 250\mu\text{A}, T_J = 125^\circ\text{C}$	0.4 0.3	0.6 0.5	1.5 0.8	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 4.5\text{ V}, I_D = 10.5\text{ A}$ $V_{GS} = 4.5\text{ V}, I_D = 10.5\text{ A}, T_J = 125^\circ\text{C}$ $V_{GS} = 2.7\text{ V}, I_D = 10\text{ A}$		12 17 14	13.5 24 16	m $\Omega$
$I_{D(on)}$	On-State Drain Current	$V_{GS} = 4.5\text{ V}, V_{DS} = 5\text{ V}$	30			A
$g_{FS}$	Forward Transconductance	$V_{DS} = 5\text{ V}, I_D = 10.5\text{ A}$		43		S

### Dynamic Characteristics

$C_{iss}$	Input Capacitance	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$		2150		pF
$C_{oss}$	Output Capacitance			890		pF
$C_{rss}$	Reverse Transfer Capacitance			165		pF

### Switching Characteristics (Note 2)

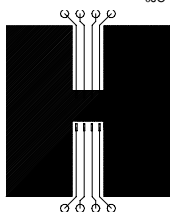
$t_{d(on)}$	Turn-On Delay Time	$V_{DS} = 5\text{ V}, I_D = 1\text{ A},$ $V_{GS} = 4.5\text{ V}, R_{GEN} = 6\Omega$		11	30	ns
$t_r$	Turn-On Rise Time			26	55	ns
$t_{d(off)}$	Turn-Off Delay Time			145	220	ns
$t_f$	Turn-Off Fall Time			40	100	ns
$Q_g$	Total Gate Charge	$V_{DS} = 10\text{ V}, I_D = 10.5\text{ A},$ $V_{GS} = 4.5\text{ V}$		43	60	nC
$Q_{gs}$	Gate-Source Charge			7		nC
$Q_{gd}$	Gate-Drain Charge			8		nC

### Drain-Source Diode Characteristics and Maximum Ratings

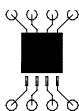
$I_S$	Maximum Continuous Drain-Source Diode Forward Current			2.1	A
$V_{SD}$	Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 2.1\text{ A}$ (Note 2)		0.6 1.2	V

#### Notes:

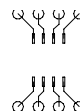
1.  $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins.  $R_{\theta JC}$  is guaranteed by design while  $R_{\theta CA}$  is determined by the user's board design.



a) 50°C/W when mounted on a 1 in<sup>2</sup> pad of 2 oz copper



b) 105°C/W when mounted on a .04 in<sup>2</sup> pad of 2 oz copper



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

Scale 1 : 1 on letter size paper

2. Pulse Test: Pulse Width < 300 $\mu\text{s}$ , Duty Cycle < 2.0%

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