

Si9945DY*

Dual N-Channel Enhancement Mode MOSFET

General Description

These N-Channel Enhancement Mode MOSFETs are produced using Fairchild Semiconductor's advance process that has been especially tailored to minimize on-state resistance and yet maintain superior switching performance.

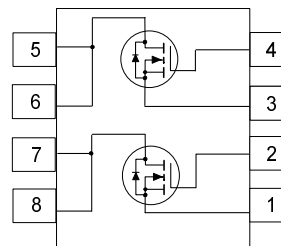
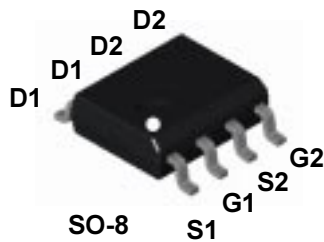
These devices are well suited for low voltage and battery powered applications where low in-line power loss and fast switching are required.

Features

- 3.3 A, 60 V. $R_{DS(ON)} = 0.100 \Omega @ V_{GS} = 10 \text{ V}$
 $R_{DS(ON)} = 0.200 \Omega @ V_{GS} = 4.5 \text{ V}$
- Low gate charge.
- Fast switching speed.
- High power and current handling capability.

Applications

- Battery switch
- Load switch
- Motor controls



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)	3.3	A
	- Pulsed	10	
P _D	Power Dissipation for Single Operation	2.0	W
	Power Dissipation for Single Operation (Note 1a)	1.6	
	(Note 1b)	1	
	(Note 1c)	0.9	
T _J , T _{STG}	Operating and Storage Junction Temperature Range	-55 to +150	°C

Thermal Characteristics

R _{θJA}	Thermal Resistance, Junction-to-Ambient	62.5	°C/W
R _{θJC}	Thermal Resistance, Junction-to-Case (Note 1)	40	°C/W

Package Outlines and Ordering Information

Device Marking	Device	Reel Size	Tape Width	Quantity
9945	SI9945DY	13"	12mm	2500 units

* Die and manufacturing source subject to change without prior notification.

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		60		mV/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 48 V, V _{GS} = 0 V V _{DS} = 48 V, V _{GS} = 0 V, T _J = 55°C			1 25	μA
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} = 20 V, V _{DS} = 0 V			100	nA
I _{GSSR}	Gate-Body Leakage Current, 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			V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	I _D = 250 μA, Referenced to 25°C		-4.5		mV/°C
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D = 3.3 A V _{GS} = 10 V, I _D = 3.3 A, T _J = 125°C V _{GS} = 4.5 V, I _D = 2.5 A		0.076 0.124 0.103	0.100 0.180 0.200	Ω
I _{D(on)}	On-State Drain Current	V _{GS} = 10 V, V _{DS} = 5 V	10			A
g _{FS}	Forward Transconductance	V _{DS} = 15 V, I _D = 3.3 A		5.3		S

Dynamic Characteristics

C _{iss}	Input Capacitance	V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0 MHz		345		pF
C _{oss}	Output Capacitance			110		pF
C _{riss}	Reverse Transfer Capacitance			25		pF

Switching Characteristics (Note 2)

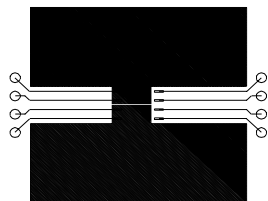
t _{d(on)}	Turn-On Delay Time	V _{DD} = 30 V, I _D = 1 A, R _L = 30 Ω V _{GS} = 10 V, R _{GEN} = 6 Ω		5	25	ns
t _r	Turn-On Rise Time			7.5	30	ns
t _{d(off)}	Turn-Off Delay Time			20	50	ns
t _f	Turn-Off Fall Time			7	40	ns
t _{rr}	Drain-Source Reverse Recovery Time	I _F = 1.7 A, di/dt = 100A/μs			100	nS
Q _g	Total Gate Charge	V _{DS} = 30 V, I _D = 3.3 A, V _{GS} = 10 V		13	30	nC
Q _{gs}	Gate-Source Charge			1.7		nC
Q _{gd}	Gate-Drain Charge			3.2		nC

Drain-Source Diode Characteristics and Maximum Ratings

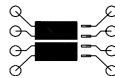
I _S	Maximum Continuous Drain-Source Diode Forward Current			1.7	A	
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 1.7 A <small>(Note 2)</small>		0.8	1.2	V

Notes:

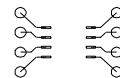
- R_{θJA} is the sum of the junction-to-case and case-to-ambient resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. R_{θJC} is guaranteed by design while R_{θJA} is determined by the user's board design.



a) 78° C/W when mounted on a 0.5 in² pad of 2 oz. copper.



b) 125° C/W when mounted on a 0.02 in² pad of 2 oz. copper.



c) 135° C/W when mounted on a 0.003 in² pad of 2 oz. copper.

Scale 1 : 1 on letter size paper

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

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