

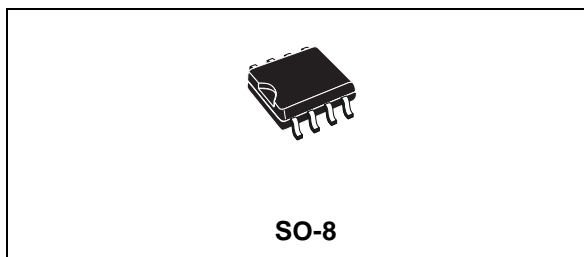


# STS2DNFS30L

## N-CHANNEL 30V - 0.09Ω - 3A SO-8 STripFET™ II MOSFET PLUS SCHOTTKY RECTIFIER

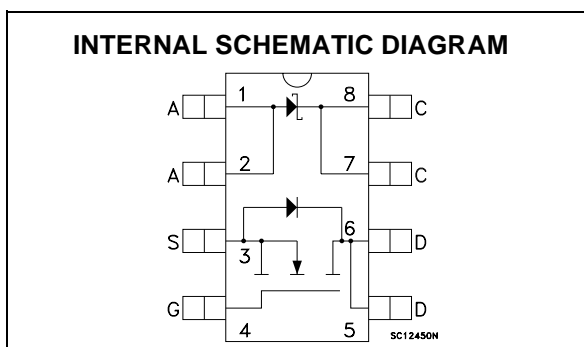
PRELIMINARY DATA

MAIN PRODUCT CHARACTERISTICS			
<b>MOSFET</b>	<b>V<sub>DSS</sub></b>	<b>R<sub>DS(on)</sub></b>	<b>I<sub>D</sub></b>
	30 V	< 0.11 Ω	3 A
<b>SCHOTTKY</b>	<b>I<sub>F(AV)</sub></b>	<b>V<sub>RRM</sub></b>	<b>V<sub>F(MAX)</sub></b>
	1 A	30 V	0.46 V



### DESCRIPTION

This product associates the latest low voltage STripFET™ in n-channel version to a low drop Schottky diode. Such configuration is extremely versatile in implementing, a large variety of DC-DC converters for printers, portable equipment, and cellular phones.



### MOSFET ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V <sub>DS</sub>	Drain-source Voltage (V <sub>GS</sub> = 0)	30	V
V <sub>DGR</sub>	Drain-gate Voltage (R <sub>GS</sub> = 20 kΩ)	30	V
V <sub>GS</sub>	Gate- source Voltage	± 15	V
I <sub>D</sub>	Drain Current (continuous) at T <sub>C</sub> = 25°C	3	A
I <sub>D</sub>	Drain Current (continuous) at T <sub>C</sub> = 100°C	1.9	A
I <sub>DM</sub> (●)	Drain Current (pulsed)	12	A
P <sub>TOT</sub>	Total Dissipation at T <sub>C</sub> = 25°C	2	W

### SCHOTTKY ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V <sub>RRM</sub>	Repetitive Peak Reverse Voltage		30	V
I <sub>F(RMS)</sub>	RMS Forward Current		7	A
I <sub>F(AV)</sub>	Average Forward Current	TL = 135°C δ = 0.5	1	A
I <sub>FSM</sub>	Surge Non Repetitive Forward Current	tp = 10 ms Sinusoidal	45	A
I <sub>RSM</sub>	Non Repetitive Peak Reverse Current	tp = 100 μs	1	A
dv/dt	Critical Rate Of Rise Of Reverse Voltage		10000	V/μs

(●)Pulse width limited by safe operating area

## STS2DNFS30L

### THERMAL DATA

Rthj-amb	(*)Thermal Resistance Junction-ambient MOSFET	62.5	°C/W
Rthj-amb	(*)Thermal Resistance Junction-ambient SCHOTTKY Maximum	100	°C/W
T <sub>stg</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Junction Temperature	150	°C
(*) Mounted on FR-4 board (Steady State)			

### MOSFET ELECTRICAL CHARACTERISTICS (TCASE = 25 °C UNLESS OTHERWISE SPECIFIED) OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V <sub>(BR)DSS</sub>	Drain-source Breakdown Voltage	I <sub>D</sub> = 250 μA, V <sub>GS</sub> = 0	30			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current (V <sub>GS</sub> = 0)	V <sub>DS</sub> = Max Rating V <sub>DS</sub> = Max Rating, T <sub>C</sub> = 125 °C			1 10	μA μA
I <sub>GSS</sub>	Gate-body Leakage Current (V <sub>DS</sub> = 0)	V <sub>GS</sub> = ± 15 V			±100	nA

### ON (1)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1			V
R <sub>DS(on)</sub>	Static Drain-source On Resistance	V <sub>GS</sub> = 10V, I <sub>D</sub> = 1.5 A V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 1.5 A		0.09 0.13	0.11 0.15	Ω Ω

### DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g <sub>fs</sub> (1)	Forward Transconductance	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 1.5 A		2.5		S
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = 25V, f = 1 MHz, V <sub>GS</sub> = 0		121		pF
C <sub>oss</sub>	Output Capacitance			45		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			11		pF

**ELECTRICAL CHARACTERISTICS (CONTINUED)**
**SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 15\text{ V}$ , $I_D = 1.5\text{ A}$ $R_G = 4.7\ \Omega$ , $V_{GS} = 4.5\text{ V}$ (see test circuit, Figure 3)		19		ns
$t_r$	Rise Time			20		ns
$Q_g$	Total Gate Charge	$V_{DD} = 24\text{ V}$ , $I_D = 3\text{ A}$ , $V_{GS} = 4.5\text{ V}$		4.5	6	nC
$Q_{gs}$	Gate-Source Charge			1.7		nC
$Q_{gd}$	Gate-Drain Charge			0.9		nC

**SWITCHING OFF**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off Delay Time	$V_{DD} = 15\text{ V}$ , $I_D = 1.5\text{ A}$ , $R_G = 4.7\ \Omega$ , $V_{GS} = 4.5\text{ V}$ (see test circuit, Figure 3)		12		ns
$t_f$	Fall Time			8		ns

**SOURCE DRAIN DIODE**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{SD}$	Source-drain Current				3	A
$I_{SDM(2)}$	Source-drain Current (pulsed)				12	A
$V_{SD(1)}$	Forward On Voltage	$I_{SD} = 3\text{ A}$ , $V_{GS} = 0$			1.2	V
$t_{rr}$	Reverse Recovery Time	$I_{SD} = 3\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$ , $V_{DD} = 30\text{ V}$ , $T_j = 150^\circ\text{C}$ (see test circuit, Figure 5)		19		ns
$Q_{rr}$	Reverse Recovery Charge			8.1		nC
$I_{RRM}$	Reverse Recovery Current			0.85		A

Note: 1. Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %.

2. Pulse width limited by safe operating area.

**SCHOTTKY STATIC ELECTRICAL CHARACTERISTICS**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_R(^*)$	Reversed Leakage Current	$T_J = 25^\circ\text{C}$ , $V_R = 30\text{ V}$ $T_J = 125^\circ\text{C}$ , $V_R = 30\text{ V}$		1.5	10	$\mu\text{A}$ mA
$V_F(^*)$	Forward Voltage Drop	$T_J = 25^\circ\text{C}$ , $I_F = 1\text{ A}$ $T_J = 125^\circ\text{C}$ , $I_F = 1\text{ A}$		0.37	0.55 0.46	V V

Fig. 1: Unclamped Inductive Load Test Circuit

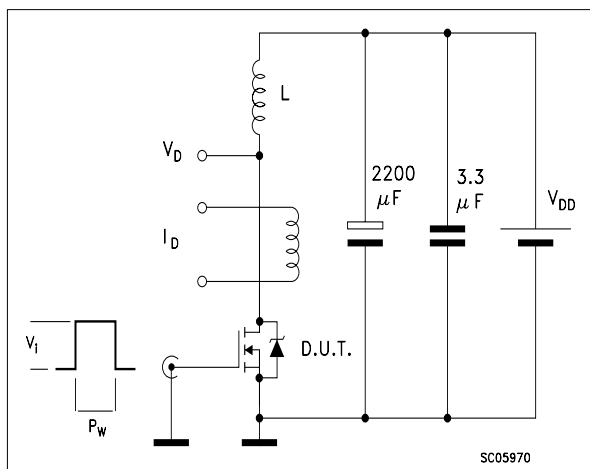


Fig. 2: Unclamped Inductive Waveform

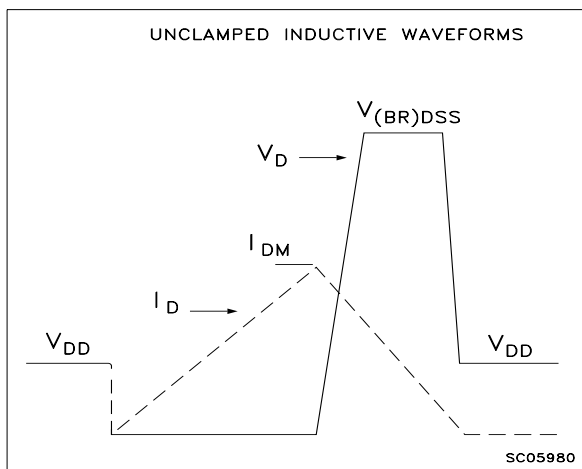


Fig. 3: Switching Times Test Circuit For Resistive Load

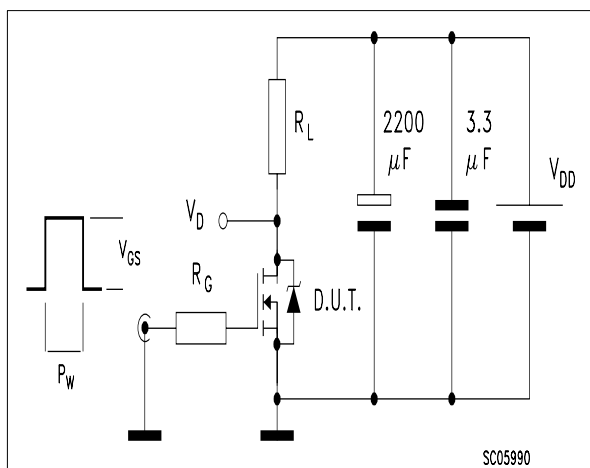


Fig. 4: Gate Charge test Circuit

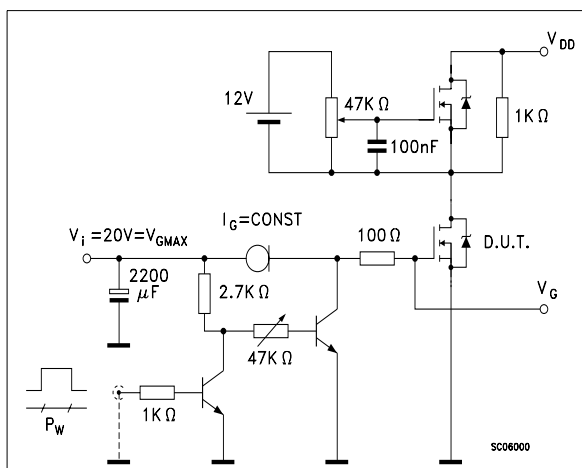
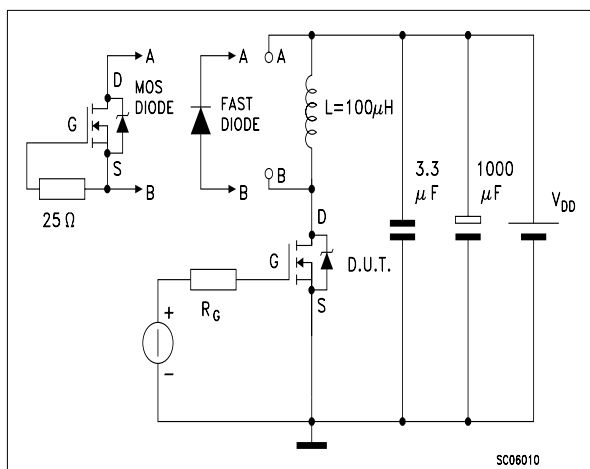
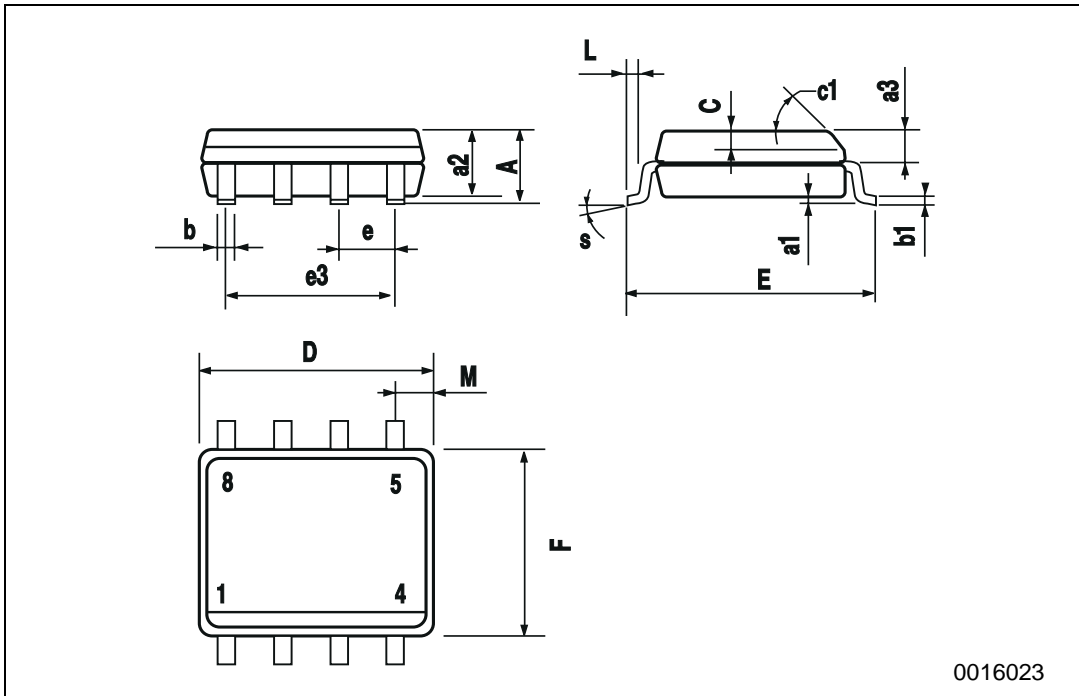


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



**SO-8 MECHANICAL DATA**

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.25	0.003		0.009
a2			1.65			0.064
a3	0.65		0.85	0.025		0.033
b	0.35		0.48	0.013		0.018
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.019
c1	45 (typ.)					
D	4.8		5.0	0.188		0.196
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.14		0.157
L	0.4		1.27	0.015		0.050
M			0.6			0.023
S	8 (max.)					



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