

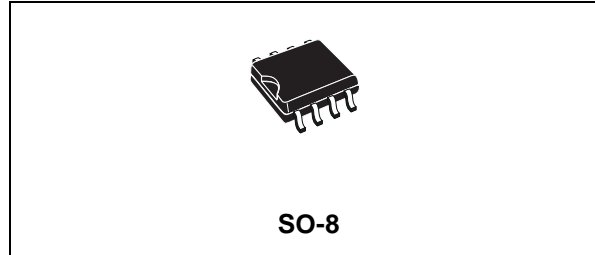


STS2DNFS30L

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

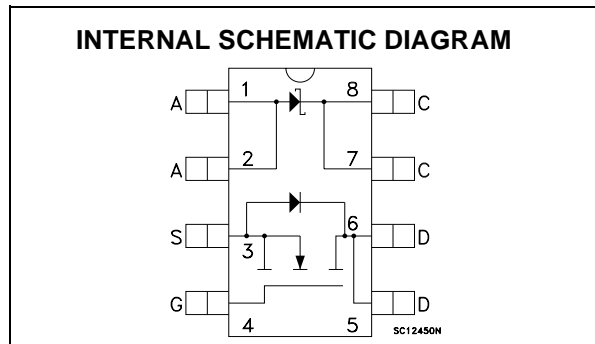
PRELIMINARY DATA

MAIN PRODUCT CHARACTERISTICS			
MOSFET	V_{DSS}	R_{DS(on)}	I_D
	30 V	< 0.11 Ω	3 A
SCHOTTKY	I_{F(AV)}	V_{RRM}	V_{F(MAX)}
	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 _{DS}	Drain-source Voltage (V _{GS} = 0)	30	V
V _{DGR}	Drain-gate Voltage (R _{GS} = 20 kΩ)	30	V
V _{GS}	Gate- source Voltage	± 15	V
I _D	Drain Current (continuous) at T _C = 25°C	3	A
I _D	Drain Current (continuous) at T _C = 100°C	1.9	A
I _{DM} (●)	Drain Current (pulsed)	12	A
P _{TOT}	Total Dissipation at T _C = 25°C	2	W

SCHOTTKY ABSOLUTE MAXIMUM RATINGS

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

(●)Pulse width limited by safe operating area

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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 _{stg}	Storage Temperature Range	-55 to 150	°C
T _J	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 _{(BR)DSS}	Drain-source Breakdown Voltage	I _D = 250 µA, V _{GS} = 0	30			V
I _{DSS}	Zero Gate Voltage Drain Current (V _{GS} = 0)	V _{DS} = Max Rating V _{DS} = Max Rating, T _C = 125 °C			1 10	µA µA
I _{GSS}	Gate-body Leakage Current (V _{DS} = 0)	V _{GS} = ± 15 V			±100	nA

ON (1)

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

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (1)	Forward Transconductance	V _{DS} = 15 V, I _D = 1.5 A		2.5		S
C _{iss}	Input Capacitance	V _{DS} = 25V, f = 1 MHz, V _{GS} = 0		121		pF
C _{oss}	Output Capacitance		45		pF	
C _{rss}	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 μs , 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	μA 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

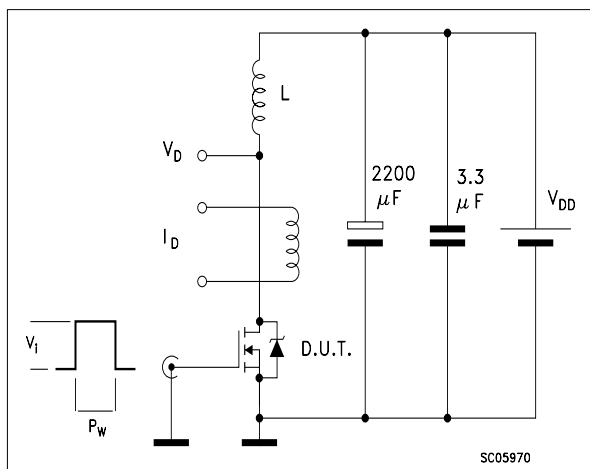


Fig. 2: Unclamped Inductive Waveform

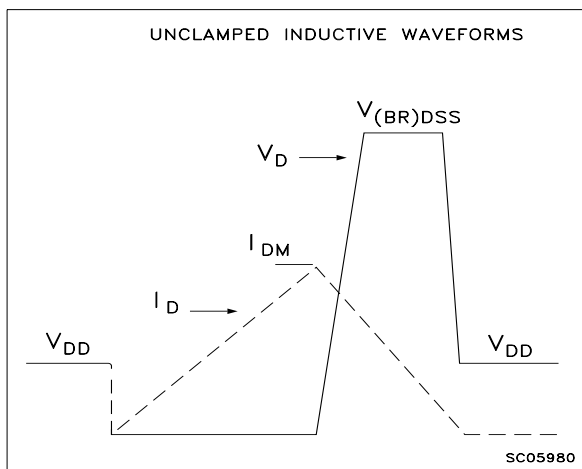


Fig. 3: Switching Times Test Circuit For Resistive Load

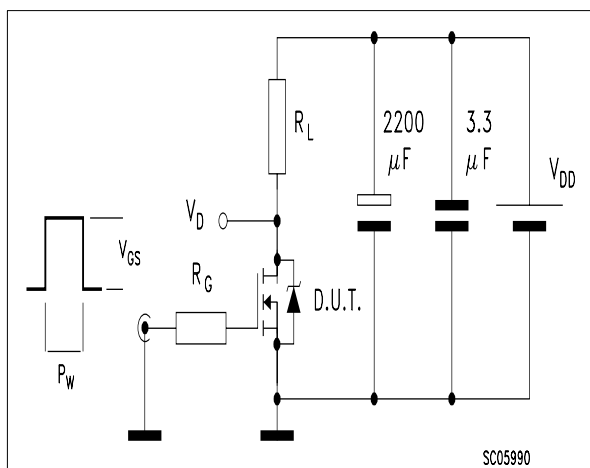


Fig. 4: Gate Charge test Circuit

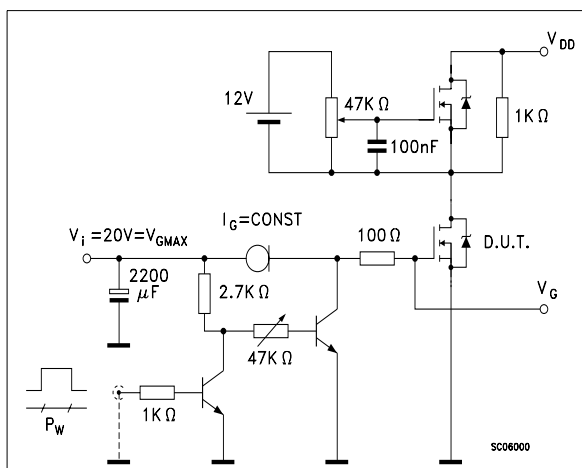
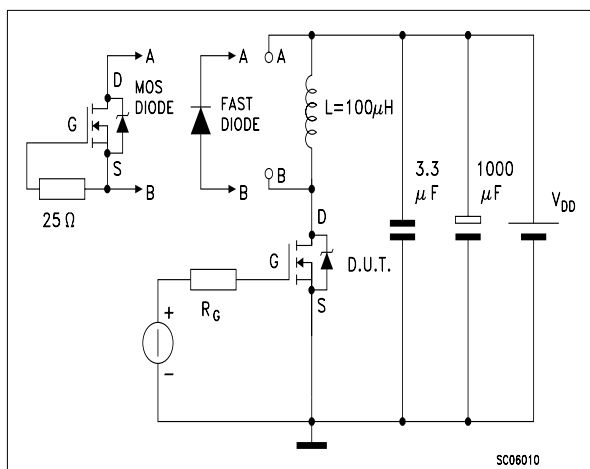
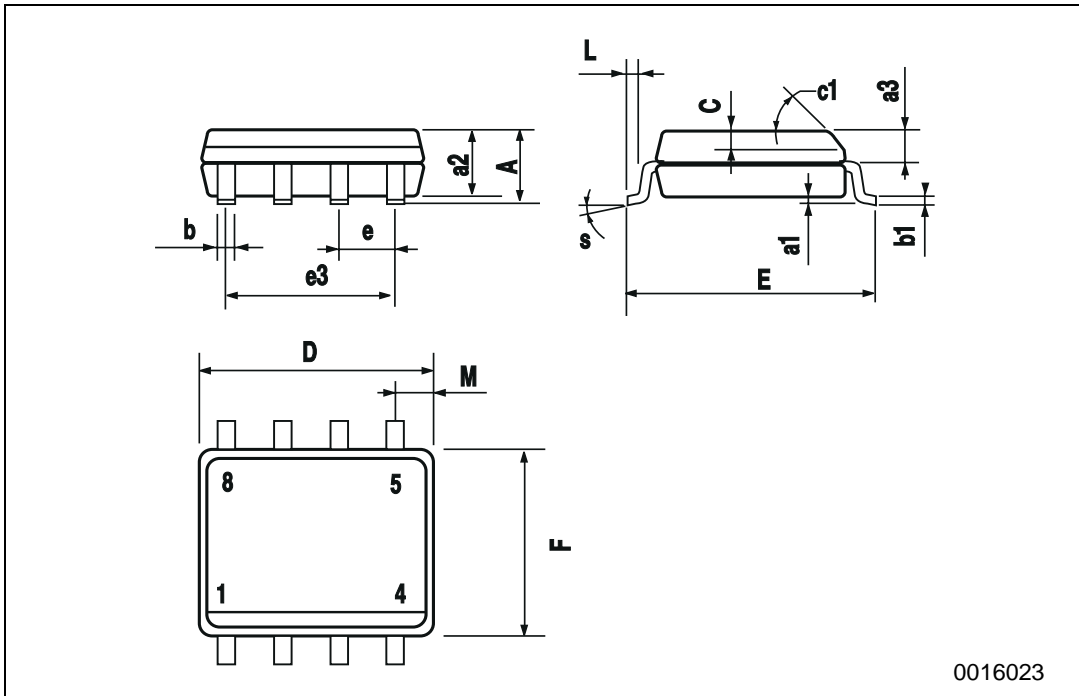


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



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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