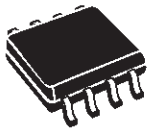
STS25NH3LL

N-CHANNEL 30V - 0.0027Ω - 25A SO-8
STripFET™ III MOSFET FOR DC-DC CONVERSION

PRELIMINARY DATA

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STS25NH3LL	30 V	< 0.0035Ω	25 A

- TYPICAL $R_{DS}(on)$ = 0.0027Ω
- OPTIMAL $R_{DS(ON)}$ x Q_g TRADE-OFF @4.5V
- CONDUCTION LOSSES REDUCED
- SWITCHING LOSSES REDUCED
- WORLD INDUSTRY'S LOWEST ON-RESISTANCE

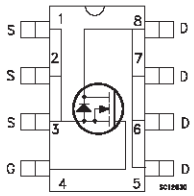


SO-8

DESCRIPTION

The **STS25NH3LL** utilizes the latest advanced design rules of ST's proprietary STripFET™ technology. This novel 0.6µ process coupled to unique metallization techniques realizes the most advanced low voltage MOSFET in SO-8 ever produced. It is therefore suitable for the most demanding DC-DC converter applications where high efficiency is to be achieved at high output current.

INTERNAL SCHEMATIC DIAGRAM



APPLICATIONS

- DC-DC CONVERTERS FOR TELECOM AND NOTEBOOK CPU CORE
- SYNCHRONOUS RECTIFIER

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	± 18	V
I_D	Drain Current (continuous) at T_A = 25°C Drain Current (continuous) at T_A = 100°C	25 18	A A
I_{DM} (●)	Drain Current (pulsed)	100	A
P_{TOT}	Total Dissipation at T_A = 25°C	3.2	W

(●) Pulse width limited by safe operating area

THERMAL DATA

Rthj-amb	(*) Thermal Resistance Junction-ambient Max	47	°C/W
Rthj-lead	Thermal Resistance Junction-leads Max	16	°C/W
T_j	Max. Operating Junction Temperature	–55 to 175	°C
T_{stg}	Storage Temperature		

(*) When mounted on 1inch FR4 Board, 2 oz of Cu, t ≤ 10 sec.

ELECTRICAL CHARACTERISTICS (T_J = 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			1	µA
		V_{DS} = Max Rating, T_C = 125 °C			10	µA
I_{GSS}	Gate-body Leakage Current (V_{DS} = 0)	V_{GS} = ± 18V			±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} = 10 V, I_D = 12 A		0.0027	0.0035	Ω
		V_{GS} = 4.5 V, I_D = 12 A		0.0035		Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (1)	Forward Transconductance	V_{DS} = 15V, I_D = 12 A		TBD		S
C_{iss}	Input Capacitance	V_{DS} = 25 V, f = 1 MHz, V_{GS} = 0		3650		pF
C_{oss}	Output Capacitance			592		pF
C_{rss}	Reverse Transfer Capacitance			80		pF

ELECTRICAL CHARACTERISTICS (CONTINUED)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	V_{DD} = 15 V, I_D = 12.5 A		24		ns
t_r	Rise Time	R_G = 4.7Ω V_{GS} = 4.5V (see test circuit, Figure 1)		60		ns
Q_g	Total Gate Charge	V_{DD} = 15 V, I_D = 25 A,		32	43	nC
Q_{gs}	Gate-Source Charge	V_{GS} = 5 V		10.5		nC
Q_{gd}	Gate-Drain Charge	(see test circuit, Figure 2)		6.5		nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off-Delay Time	V_{DD} = 15 V, I_D = 12.5 A,		55		ns
t_f	Fall Time	R_G = 4.7Ω, V_{GS} = 4.5 V (see test circuit, Figure 1)		25		ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				25	A
I_{SDM} (2)	Source-drain Current (pulsed)				100	A
V_{SD} (1)	Forward On Voltage	I_{SD} = 25 A, V_{GS} = 0			1.2	V
t_{rr}	Reverse Recovery Time	I_{SD} = 25 A, di/dt = 100A/µs,		33		ns
Q_{rr}	Reverse Recovery	V_{DD} = 25 V, T_j = 150°C		30		nC
I_{RRM}	ChargeReverse Recovery Current	(see test circuit, Figure 3)		1.8		A

Note: 1. Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %.
2. Pulse width limited by safe operating area.

Fig. 1: Switching Times Test Circuit For Resistive Load

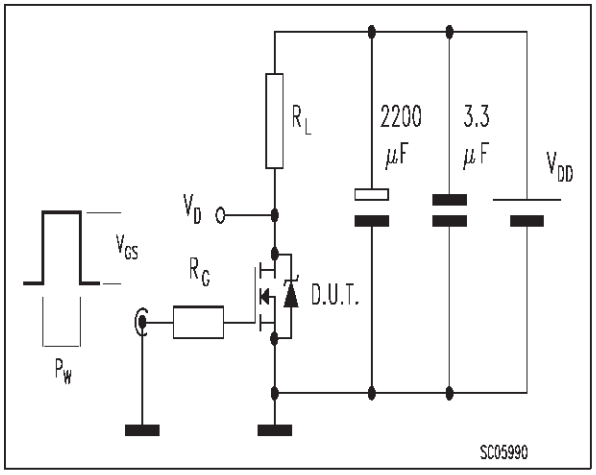


Fig. 2: Gate Charge test Circuit

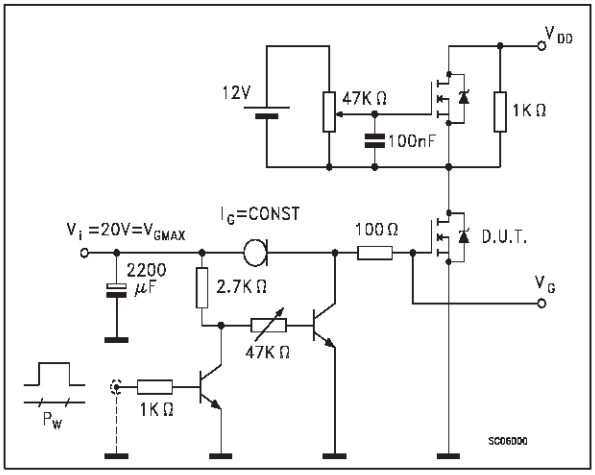
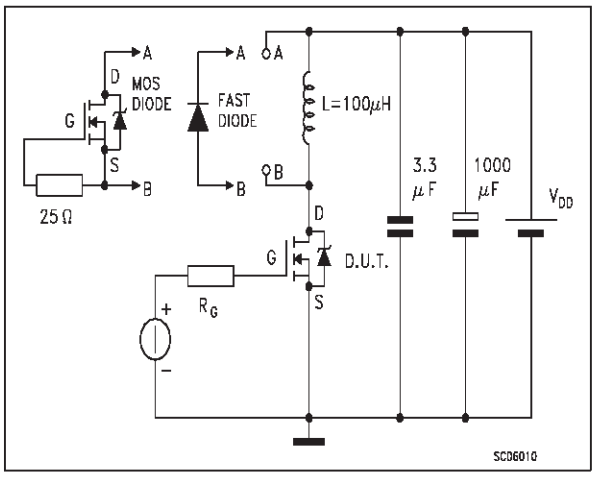
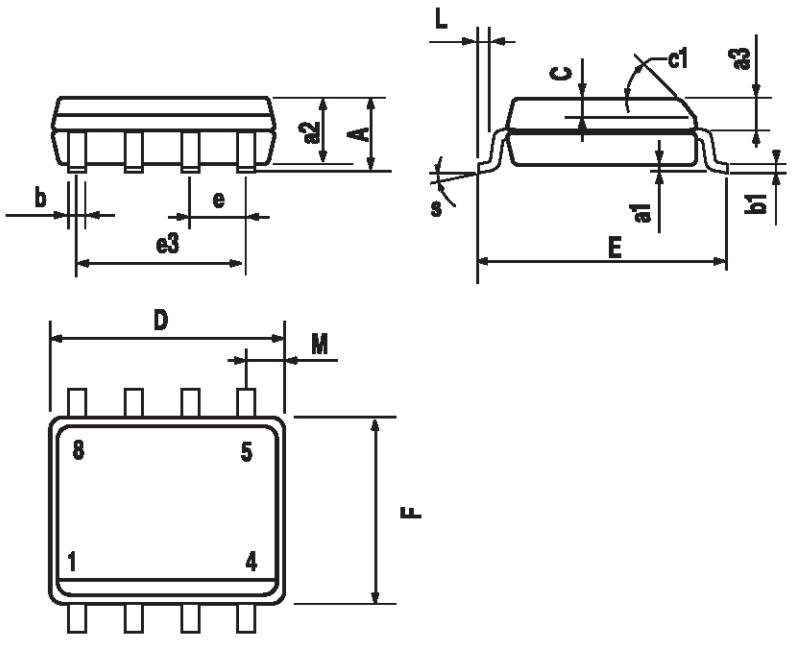


Fig. 3: Test Circuit For Diode Recovery Behaviour



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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