STS12NH3LL

N-CHANNEL 30 V - 0.008 Ω - 12 A SO-8
ULTRA LOW GATE CHARGE STripFET™ MOSFET

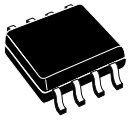
PRODUCT PREVIEW

Table 1: General Features

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STS12NH3LL	30 V	< 0.0105 Ω	12 A

- TYPICAL $R_{DS}(on)$ = 0.008 Ω @ 10V
- OPTIMAL $R_{DS}(on)$ x Qg TRADE-OFF @ 4.5 V
- SWITCHING LOSSES REDUCED
- LOW THRESHOLD DEVICE
- LOW INPUT CAPACITANCE

Figure 1: Package

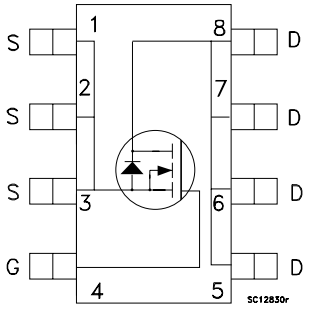


SO-8

DESCRIPTION

The STS12NH3LL is based on the latest generation of ST's proprietary "STripFET™" technology. An innovative layout enables the device to also exhibit extremely low gate charge for the most demanding requirements as high-side switch in high-frequency DC-DC converters. It's therefore ideal for high-density converters in Telecom and Computer applications.

Figure 2: Internal Schematic Diagram



APPLICATIONS

- HIGH FREQUENCY DC-DC CONVERTERS FOR COMPUTER AND TELECOM

Table 2: Order Codes

Part Number	Marking	Package	Packaging
STS12NH3LL	S12NH3LL	SO-8	TAPE & REEL

Rev. 3

Table 3: 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	± 16	V
I_D	Drain Current (continuous) at T_C= 25°C	12	A
I_D	Drain Current (continuous) at T_C= 100°C	7.5	A
I_{DM} (•)	Drain Current (pulsed)	48	A
P_{tot}	Total Dissipation at T_C= 25°C	2.5	W
T_{stg}	Storage Temperature	– 55 to 150	°C
T_j	Max. Operating Junction Temperature		

(•) Pulse width limited by safe operating area

Table 4: Thermal Data

Rthj-amb (#)	Thermal Resistance Junction-ambient	50	°C/W

(#) When Mounted on 1 inch² FR-4 board, 2 oz Cu (t ≤ 10 sec.)

ELECTRICAL CHARACTERISTICS (T_{CASE} =25°C UNLESS OTHERWISE SPECIFIED)

Table 5: On /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} = ± 16 V			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 µA	1			V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10 V, I_D = 6 A V_{GS} = 4.5 V, I_D = 6 A		0.008 0.010	0.0105 0.013	Ω Ω

Table 6: Dynamic

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (1)	Forward Transconductance	V_{DS}= 15V, I_D= 6 A		TBD		S
C_{iss}	Input Capacitance	V_{DS}= 25V, f= 1 MHz, V_{GS}= 0		965		pF
C_{oss}	Output Capacitance			285		pF
C_{rss}	Reverse Transfer Capacitance			38		pF

ELECTRICAL CHARACTERISTICS (CONTINUED)

Table 7: Switching On

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	V_{DD}= 15 V, I_D= 6 A		15		ns
t_r	Rise Time	R_G = 4.7Ω, V_{GS} = 4.5V (see Figure 3)		32		ns
Q_g	Total Gate Charge	V_{DD}= 15V, I_D= 12 A, V_{GS}= 4.5 V		9	12	nC
Q_{gs}	Gate-Source Charge	(see Figure 5)		3.7		nC
Q_{gd}	Gate-Drain Charge			3		nC

Table 8: Switching Off

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off-Delay Time	V_{DD}= 15 V, I_D= 6 A,		18		ns
t_f	Fall Time	R_G= 4.7Ω, V_{GS}= 4.5 V (see Figure 3)		8.5		ns

Table 9: Source Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				12	A
I_{SDM} (2)	Source-drain Current (pulsed)				48	A
V_{SD}	Forward On Voltage	I_{SD} = 12 A, V_{GS} = 0			1.3	V
t_{rr}	Reverse Recovery Time	I_{SD} = 12 A, di/dt = 100 A/µs		24		ns
Q_{rr}	Reverse Recovery Charge	V_{DD} = 20V, T_j = 150°C		17.4		nC
I_{RRM}	Reverse Recovery Current	(see Figure 4)		1.45		A

Figure 3: Switching Times Test Circuit For Resistive Load

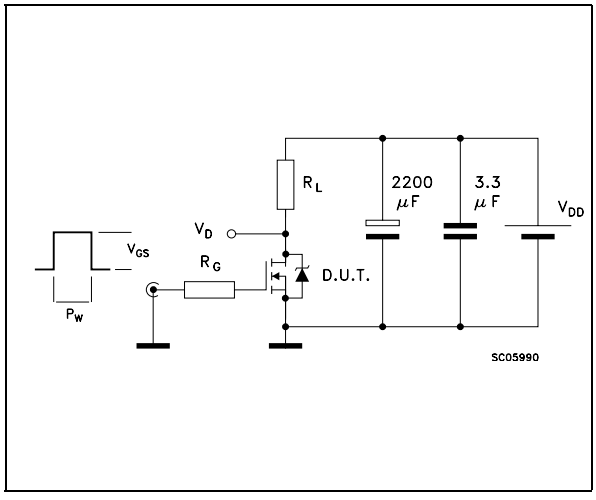


Figure 4: Test Circuit For Diode Recovery Times

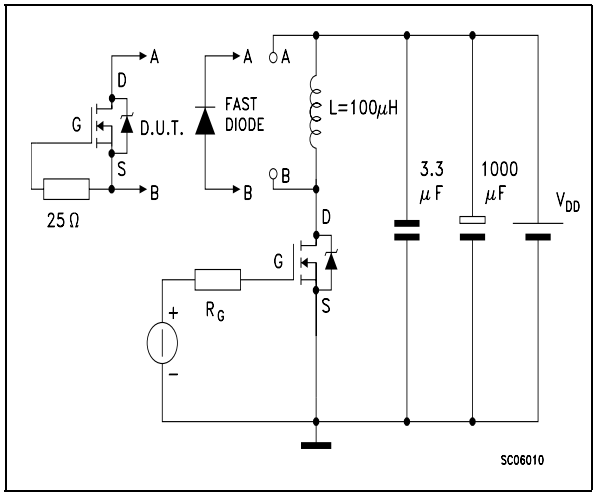
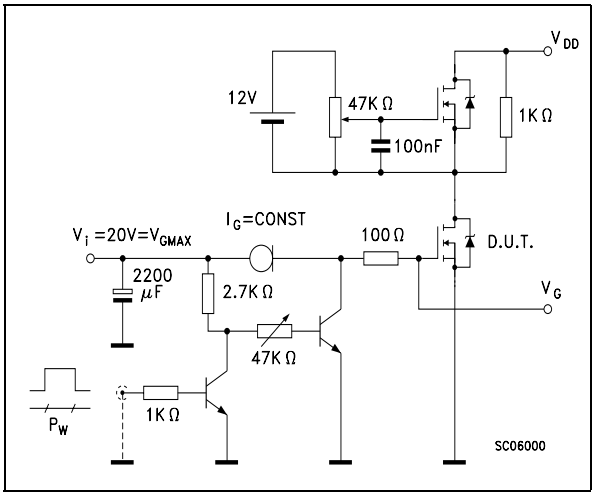


Figure 5: Gate Charge Test Circuit



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.)					

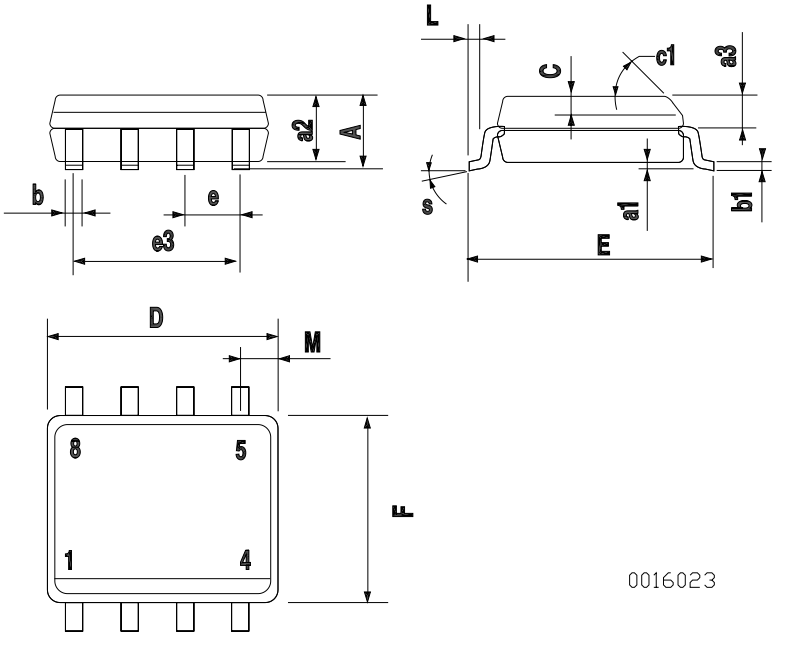


Table 10: Revision History

Date	Revision	Description of Changes
21-July-2004	3	The Rds(on) value changed (see table5). New stylesheet