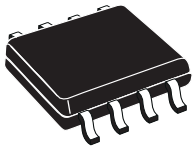
STSJ100NH3LL

N-CHANNEL 30V - 0.0027 Ω - 100A PowerSO-8™ STripFET™ III POWER MOSFET FOR DC-DC CONVERSION

PRELIMINARY DATA

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STSJ100NH3LL	30 V	<0.0035 Ω	100 A

- TYPICAL R_{DS}(on) = 0.0027 Ω @ 10V
- OPTIMAL R_{DS}(on) x Qg TRADE-OFF @ 4.5V
- CONDUCTION LOSSES REDUCED
- SWITCHING LOSSES REDUCED
- IMPROVED JUNCTION-CASE THERMAL RESISTANCE



PowerSO-8™

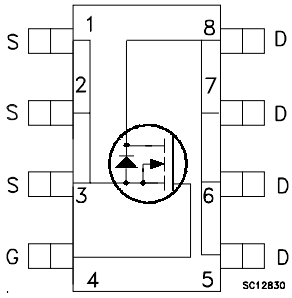
DESCRIPTION

The STSJ100NH3LL utilizes the latest advanced design rules of ST's proprietary STripFET™ technology. This process compled to unique metallization techniques realizes the most advanced low voltage MOSFET in SO-8 ever produced. The exposed slug reduces the R_{thj-c} improving the current capability.

APPLICATIONS

- SPECIFICALLY DESIGNED AND OPTIMISED FOR HIGH EFFICIENCY CPU CORE DC/DC CONVERTERS FOR MOBILE PC_S

INTERNAL SCHEMATIC DIAGRAM



DRAIN CONTACT ALSO ON THE BACKSIDE

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_C = 25°C	100	A
I_D	Drain Current (continuous) at T_C = 25°C (#)	22	A
I_D	Drain Current (continuous) at T_C = 100°C	62.5	A
I_{DM}(•)	Drain Current (pulsed)	400	A
P_{tot}	Total Dissipation at T_C = 25°C Total Dissipation at T_C = 25°C (#)	70 3	W W

(•) Pulse width limited by safe operating area.

THERMAL DATA

R_{thj-c}	Thermal Resistance Junction-case	Max	1.8	°C/W
$R_{thj-amb}$	(#)Thermal Resistance Junction-ambient	Max	42	°C/W
T_j	Maximum Operating Junction Temperature		150	°C
T_{stg}	Storage Temperature		-55 to 150	°C

(#) When Mounted on FR-4 board with 1 inch^2 pad, 2 oz of Cu and $t \leq 10$ sec.

ELECTRICAL CHARACTERISTICS (T_{case} = 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} = ± 18 V			±100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	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 = 50 A V_{GS} = 4.5 V I_D = 50 A		0.0027 0.0035	0.0035 0.005	Ω Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (*)	Forward Transconductance	V_{DS}=10 V I_D = 12 A		30		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 25V, f = 1 MHz, V_{GS} = 0		4450 655 50		pF pF pF

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Delay Time Rise Time	V_{DD} = 15 V I_D = 50 A R_G = 4.7 Ω V_{GS} = 10 V (Resistive Load, Figure 1)		18 50		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD}=15V I_D=100A V_{GS}=4.5V (see test circuit, Figure 2)		32 12.5 10	43	nC nC nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	V_{DD} = 15 V I_D = 50 A R_G = 4.7Ω, V_{GS} = 10 V (Resistive Load, Figure 3)		75 8		ns ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM}	Source-drain Current Source-drain Current (pulsed)				100 400	A A
V_{SD} (*)	Forward On Voltage	I_{SD} = 100 A V_{GS} = 0			1.2	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD} = 100 A di/dt = 100A/µs V_{DD} = 25 V T_j = 150°C (see test circuit, Figure 3)		32 34 2.1		ns nC A

(*)Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %.
(•)Pulse width limited by safe operating area.

Fig. 1: Switching Times Test Circuits For Resistive Load

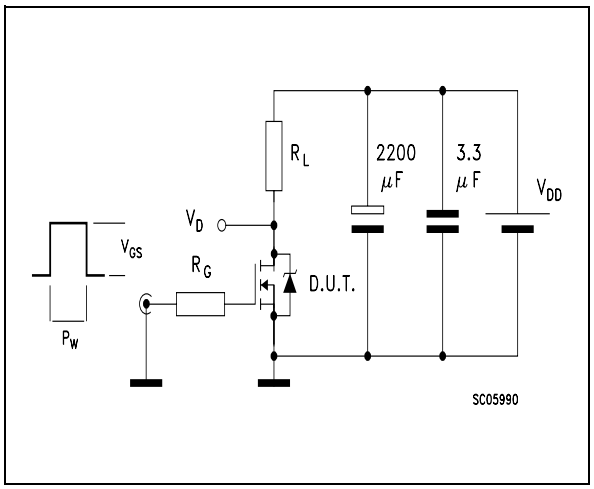


Fig. 2: Gate Charge test Circuit

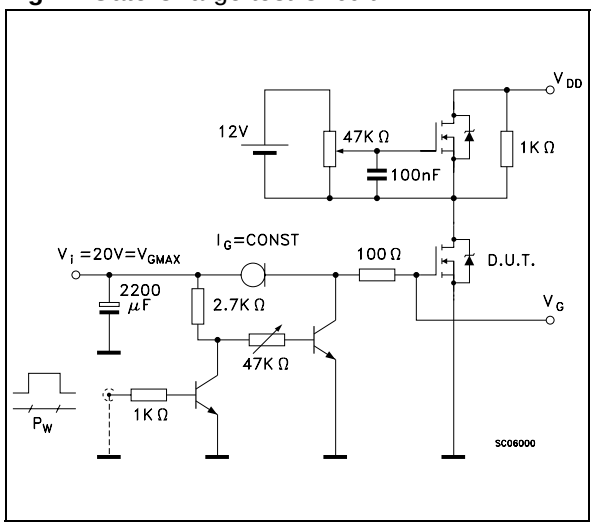
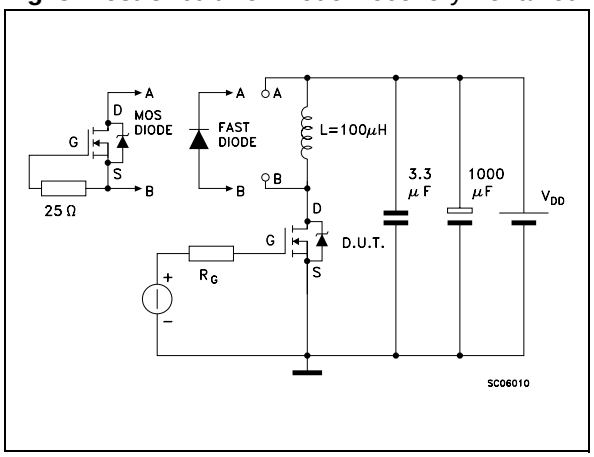


Fig. 3: Test Circuit For Diode Recovery Behaviour



PowerSO-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	
e4		2.79			0.110	
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.)