



# STSJ100NH3LL

## N-CHANNEL 30V - 0.0027 $\Omega$ - 100A PowerSO-8™ STripFET™ III POWER MOSFET FOR DC-DC CONVERSION

PRELIMINARY DATA

TYPE	V <sub>DSS</sub>	R <sub>DS(on)</sub>	I <sub>D</sub>
STSJ100NH3LL	30 V	<0.0035 $\Omega$	100 A

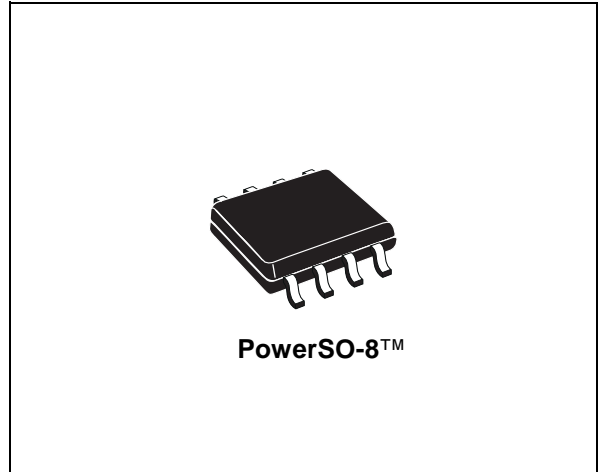
- TYPICAL R<sub>DS(on)</sub> = 0.0027  $\Omega$  @ 10V
- OPTIMAL R<sub>DS(on)</sub> x Qg TRADE-OFF @ 4.5V
- CONDUCTION LOSSES REDUCED
- SWITCHING LOSSES REDUCED
- IMPROVED JUNCTION-CASE THERMAL RESISTANCE

### DESCRIPTION

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

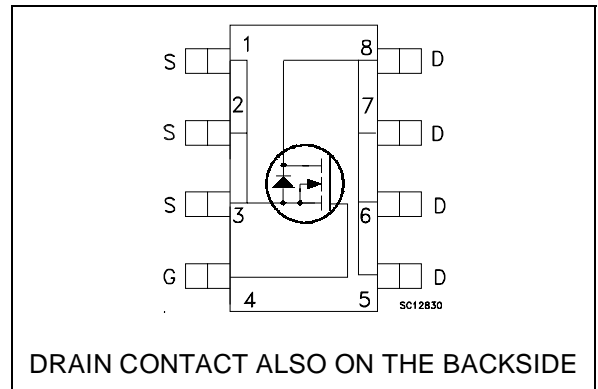
### APPLICATIONS

- SPECIFICALLY DESIGNED AND OPTIMISED FOR HIGH EFFICIENCY CPU CORE DC/DC CONVERTERS FOR MOBILE PC<sub>S</sub>



PowerSO-8™

### INTERNAL SCHEMATIC DIAGRAM



### 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 k $\Omega$ )	30	V
V <sub>GS</sub>	Gate- source Voltage	$\pm$ 18	V
I <sub>D</sub>	Drain Current (continuous) at T <sub>C</sub> = 25°C	100	A
I <sub>D</sub>	Drain Current (continuous) at T <sub>C</sub> = 25°C (#)	22	A
I <sub>D</sub>	Drain Current (continuous) at T <sub>C</sub> = 100°C	62.5	A
I <sub>DM</sub> (●)	Drain Current (pulsed)	400	A
P <sub>tot</sub>	Total Dissipation at T <sub>C</sub> = 25°C	70	W
	Total Dissipation at T <sub>C</sub> = 25°C (#)	3	W

(●) Pulse width limited by safe operating area.

# STSJ100NH3LL

## THERMAL DATA

Rthj-c	Thermal Resistance Junction-case	Max	1.8	°C/W
Rthj-amb	(#)Thermal Resistance Junction-ambient	Max	42	°C/W
T <sub>j</sub>	Maximum Operating Junction Temperature		150	°C
T <sub>stg</sub>	Storage Temperature		-55 to 150	°C

(#) When Mounted on FR-4 board with 1 inch<sup>2</sup> pad, 2 oz of Cu and t ≤ 10 sec.

## ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 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> = ± 18 V			±100	nA

### ON (\*)

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> = 250 μA	1			V
R <sub>DS(on)</sub>	Static Drain-source On Resistance	V <sub>GS</sub> = 10 V I <sub>D</sub> = 50 A V <sub>GS</sub> = 4.5 V I <sub>D</sub> = 50 A		0.0027 0.0035	0.0035 0.005	Ω Ω

### DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g <sub>fs</sub> (*)	Forward Transconductance	V <sub>DS</sub> =10 V I <sub>D</sub> = 12 A		30		S
C <sub>iSS</sub>	Input Capacitance	V <sub>DS</sub> = 25V, f = 1 MHz, V <sub>GS</sub> = 0		4450		pF
C <sub>oSS</sub>	Output Capacitance			655		pF
C <sub>rSS</sub>	Reverse Transfer Capacitance			50		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	$V_{DD} = 15\text{ V}$ $I_D = 50\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ (Resistive Load, Figure 1)		18 50		ns ns
$Q_g$ $Q_{gs}$ $Q_{gd}$	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD}=15\text{V}$ $I_D=100\text{A}$ $V_{GS}=4.5\text{V}$ (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	$V_{DD} = 15\text{ V}$ $I_D = 50\text{ A}$ $R_G = 4.7\ \Omega$ , $V_{GS} = 10\text{ V}$ (Resistive Load, Figure 3)		75 8		ns ns

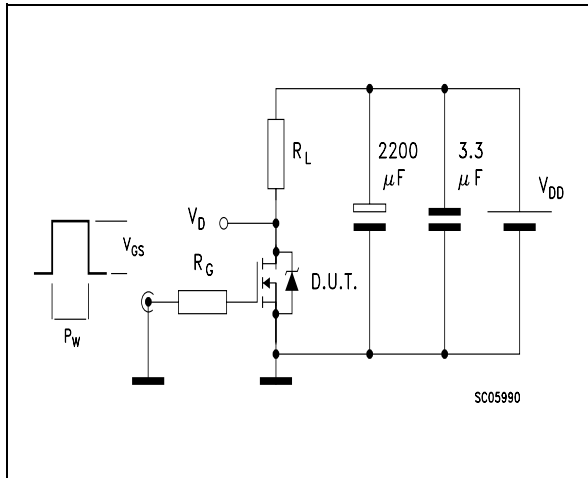
## SOURCE DRAIN DIODE

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	$I_{SD} = 100\text{ A}$ $V_{GS} = 0$			1.2	V
$t_{rr}$ $Q_{rr}$ $I_{RRM}$	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 100\text{ A}$ $di/dt = 100\text{A}/\mu\text{s}$ $V_{DD} = 25\text{ V}$ $T_j = 150^\circ\text{C}$ (see test circuit, Figure 3)		32 34 2.1		ns nC A

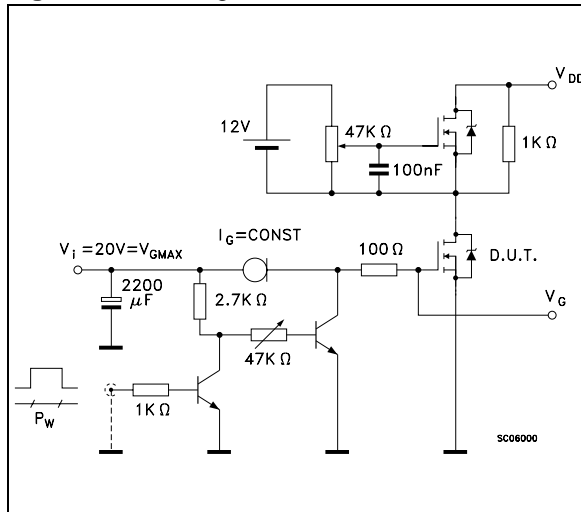
(\*) Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %.

(●) Pulse width limited by safe operating area.

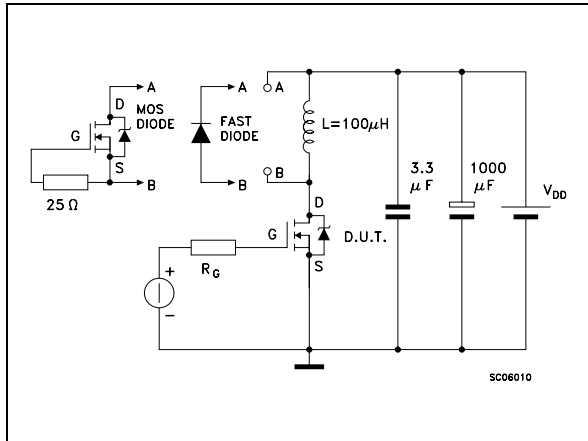
**Fig. 1: Switching Times Test Circuits For Resistive Load**



**Fig. 2: Gate Charge test Circuit**

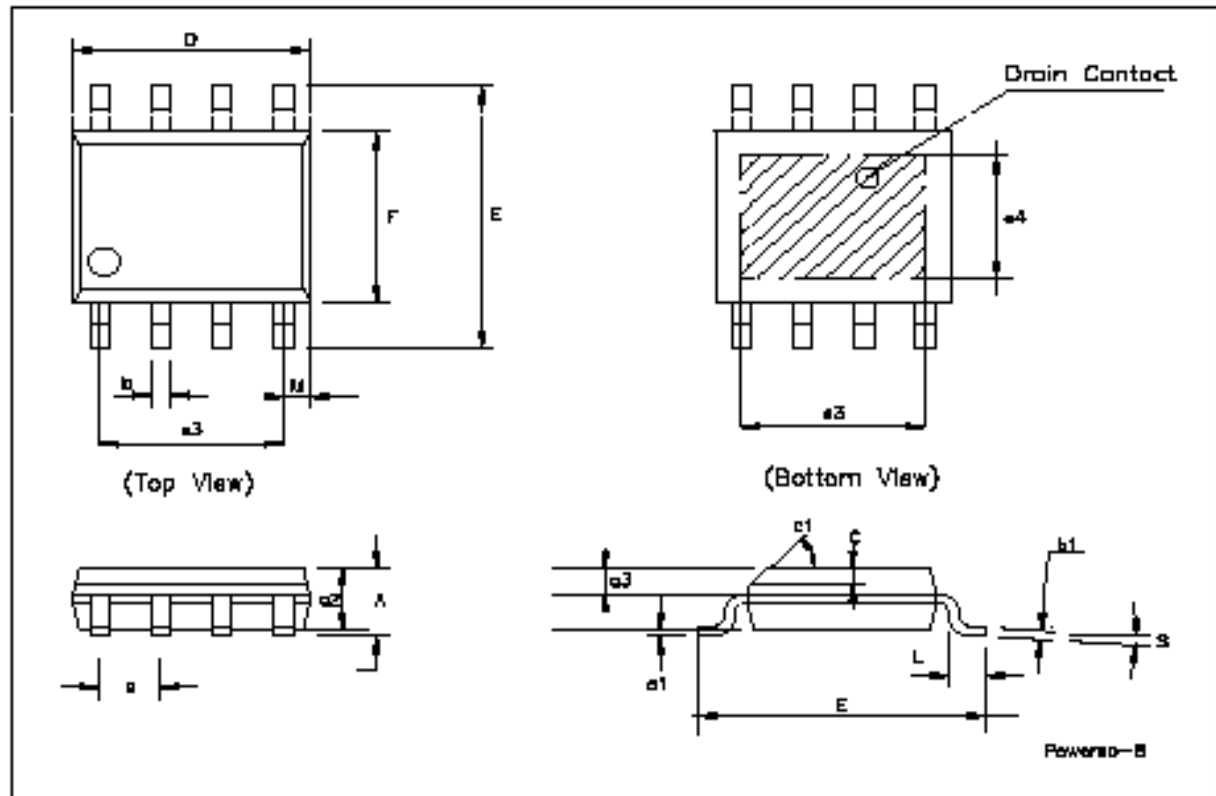


**Fig. 3: Test Circuit For Diode Recovery Behaviour**



**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.)					



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