STL8NH3LL

N-CHANNEL 30 V - 0.012 Ω - 8 A PowerFLAT™ ULTRA LOW GATE CHARGE STripFET™ MOSFET

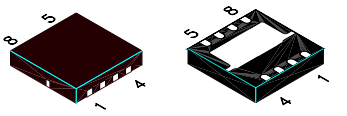
PRELIMINARY DATA

Table 1: General Features

TYPE	V_{DSS}	$R_{DS(on)}$	I_D (1)
STL8NH3LL	30 V	< 0.015 Ω	8 A

- TYPICAL R_{DS}(on) = 0.012 Ω @ 10V
- IMPROVED DIE-TO-FOOTPRINT RATIO
- VERY LOW PROFILE PACKAGE (1mm MAX)
- VERY LOW THERMAL RESISTANCE
- VERY LOW GATE CHARGE
- LOW THRESHOLD DEVICE

Figure 1: Package



PowerFLAT™(3.3x3.3)

(Chip Scale Package)

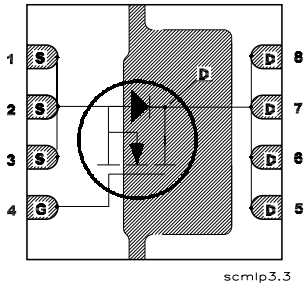
DESCRIPTION

This application specific MOSFET is the lastest generation of STMicroelectronics unique "STripFET™" technology. The resulting transistor is optimized for low on-resistance and minimal gate charge. The Chip-scaled PowerFLAT™ package allows a significant board space saving, still boosting the performance.

APPLICATIONS

- CONTROL FET IN BUCK CONVERTER

Figure 2: Internal Schematic Diagram



TOP VIEW

Table 2: Order Codes

Part Number	Marking	Package	Packaging
STL8NH3LL	L8NH3LL	PowerFLAT™ (3.3x3.3)	TAPE & REEL

Rev 2

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 (1)	Drain Current (continuous) at T_C= 25°C (Steady State)	8	A
I_D (2)	Drain Current (continuous) at T_C= 100°C (Steady State)	5	A
I_{DM} (3)	Drain Current (pulsed)	32	A
P_{TOT} (1)	Total Dissipation at T_C= 25°C	50	W
P_{TOT} (2)	Total Dissipation at T_C= 25°C (Steady State)	1.56	W
	Derating Factor (2)	0.4	W/°C
T_{stg}	Storage Temperature	– 55 to 150	°C
T_j	Max. Operating Junction Temperature		

Table 4: Thermal Data

Rthj-Case	Thermal Resistance Junction-Case Max	2.5	°C/W
Rthj-a (4)	Thermal Operating Junction-ambient	80	°C/W

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 = 4 A V_{GS} = 4.5 V, I_D = 4 A		0.012 0.0135	0.015 0.017	Ω Ω

Table 6: Dynamic

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (5)	Forward Transconductance	V_{DS} = 15V, I_D= 4A		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= 4 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= 8 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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off-Delay Time	V_{DD}= 15 V, I_D= 4 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				8	A
I_{SDM}(3)	Source-drain Current (pulsed)				32	A
V_{SD} (5)	Forward On Voltage	I_{SD} = 8 A, V_{GS} = 0			1.3	V
t_{rr}	Reverse Recovery Time	I_{SD} = 8 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

(1) The value is rated according $R_{thj\text{-}c}$
(2) The value is rated according $R_{thj\text{-}a}$
(3) Pulse width limited by safe operating area.
(4) When mounted on minimum footprint
(5) Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %

Figure 3: Switching Times Test Circuit For Resistive Load

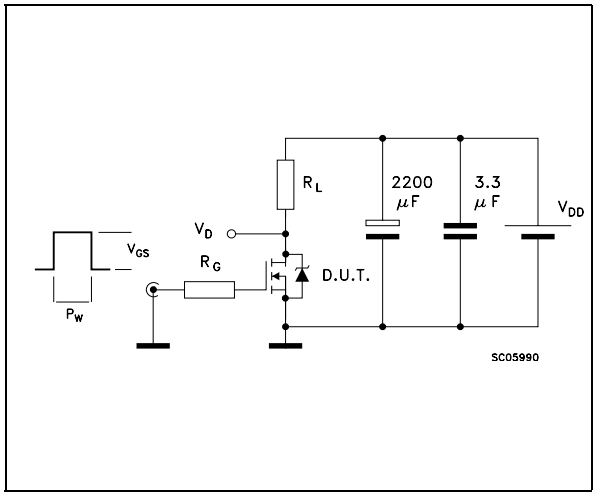


Figure 4: Test Circuit For Diode Recovery Times

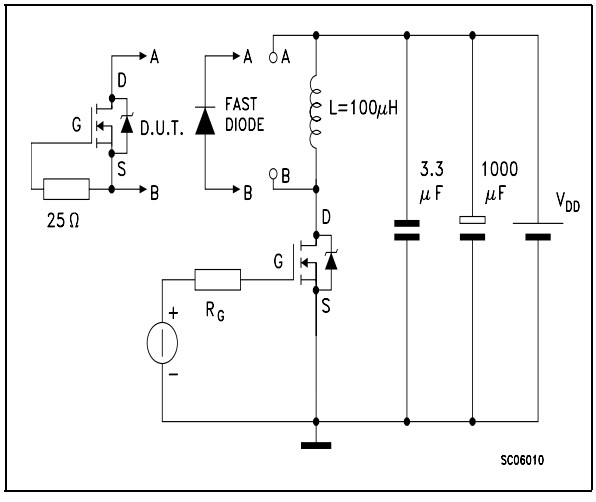
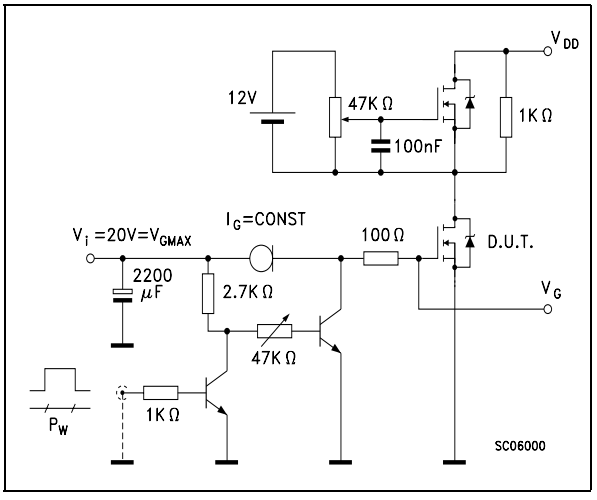


Figure 5: Gate Charge Test Circuit



PowerFLAT™ (3.3x3.3) MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	0.80	0.90	1.00	0.031	0.035	0.039
A1		0.02	0.05		0.0007	0.0019
A3		0.20			0.007	
b	0.23	0.30	0.38	0.009	0.011	0.015
C		0.328			0.012	
C1		0.12			0.004	
D		3.30			0.13	
D2	2.50	2.65	2.75	0.098	0.104	0.108
E		3.30			0.13	
E2	1.25	1.40	1.50	0.049	0.055	0.059
F		1.325			0.052	
F1		0.975			0.038	
e		0.65			0.025	
L	0.30		0.50	0.011		0.019

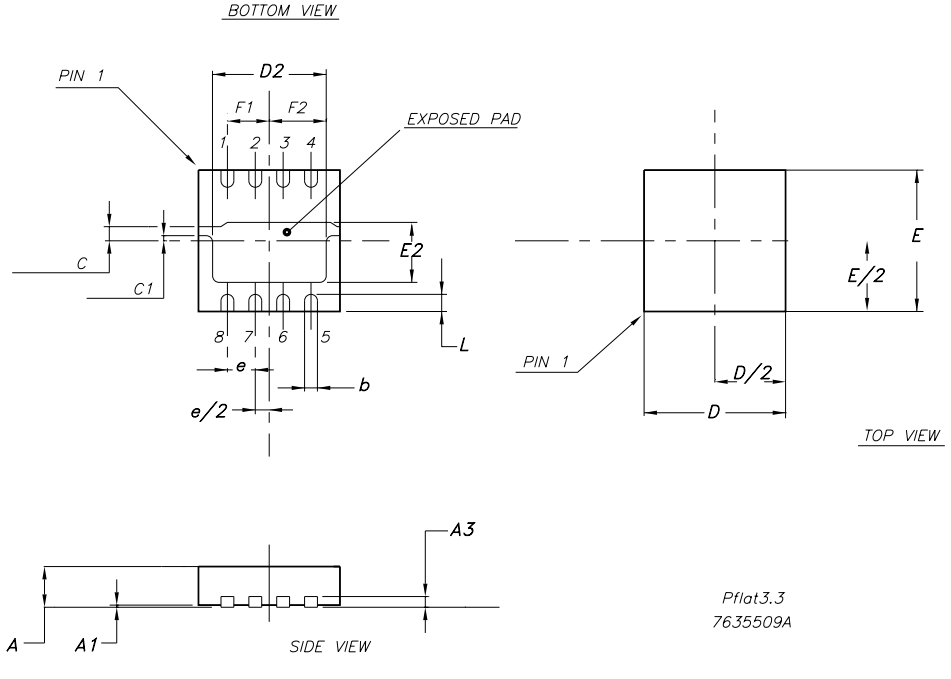


Table 10: Revision History

Date	Revision	Description of Changes
21-July-2004	1	First Release.
05-Oct-2004	2	Values changed