STL50NH3LL

N-CHANNEL 30 V - 0.011 Ω - 27 A PowerFLAT™(6x5) ULTRA LOW GATE CHARGE STripFET™ MOSFET

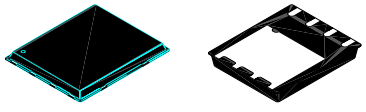
PRODUCT PREVIEW

Table 1: General Features

TYPE	V_{DSS}	$R_{DS(on)}$	I_D (1)
STL50NH3LL	30 V	< 0.013 Ω	27 A (*)

- TYPICAL R_{DS}(on) = 0.011 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™(6x5)

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

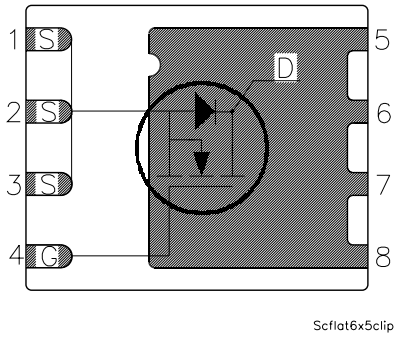


Table 2: Order Codes

Part Number	Marking	Package	Packaging
STL50NH3LL	L50NH3LL	PowerFLAT™ (6x5)	TAPE & REEL

Rev. 1

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	27	A
I_D (1)	Drain Current (continuous) at T_C= 100°C	27	A
I_{DM} (3)	Drain Current (pulsed)	108	A
I_D (2)	Drain Current (continuous) at T_C= 25°C	13	A
P_{TOT} (2)	Total Dissipation at T_C= 25°C (Steady State)	4	W
P_{TOT} (1)	Total Dissipation at T_C= 25°C	60	W
	Derating Factor	0.03	W/°C
T_{stg}	Storage Temperature	– 55 to 150	°C
T_j	Max. Operating Junction Temperature		

Table 4: Thermal Data

Rthj-C	Thermal Resistance Junction-Case (Drain)	2.08	°C/W
Rthj-pcb (2)	Thermal Operating Junction-pcb	31.2	°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 = 6.5 A V_{GS} = 4.5 V, I_D = 6.5 A		0.011 0.012	0.013 0.015	Ω Ω

Table 6: Dynamic

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (4)	Forward Transconductance	V_{DS}= 10V, I_D= 6.5A		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= 6.5 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= 13 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= 6.5 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				13	A
I_{SDM}	Source-drain Current (pulsed)				52	A
V_{SD} (4)	Forward On Voltage	I_{SD} = 13 A, V_{GS} = 0			1.3	V
t_{rr}	Reverse Recovery Time	I_{SD} = 13 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 $R_{thj\text{-}C}$ and is limited by wire bonding.
(2) When mounted on FR-4 board of 1in², 2oz Cu, t < 10sec
(3) Pulse width limited by safe operating area.
(4) Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %

Figure 3: Switching Times Test Circuit For Resistive Load

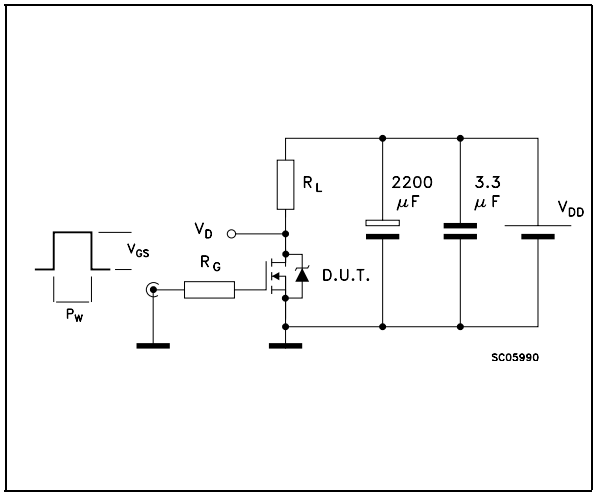


Figure 4: Test Circuit For Diode Recovery Times

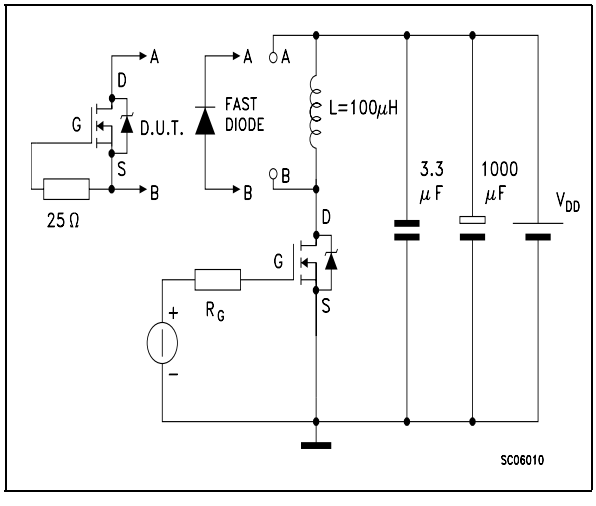
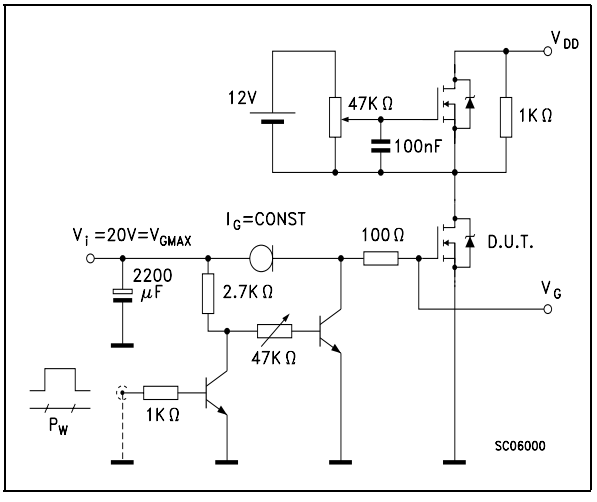


Figure 5: Gate Charge Test Circuit



PowerFLAT™ (6x5) MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	0.80		0.93	0.031		0.036
A1		0.02			0.0007	0.0019
A3		0.20			0.007	
b	0.35		0.47	0.013		0.018
D		5.00			0.196	
D1		4.75			0.187	
D2	4.15		4.25	0.163		0.167
E		6.00			0.236	
E1		5.75			0.226	
E2	3.43		3.53	0.135		0.139
E4	2.85		2.68	0.101		0.105
e		1.27			0.050	
L	0.70		0.90	0.027		0.035

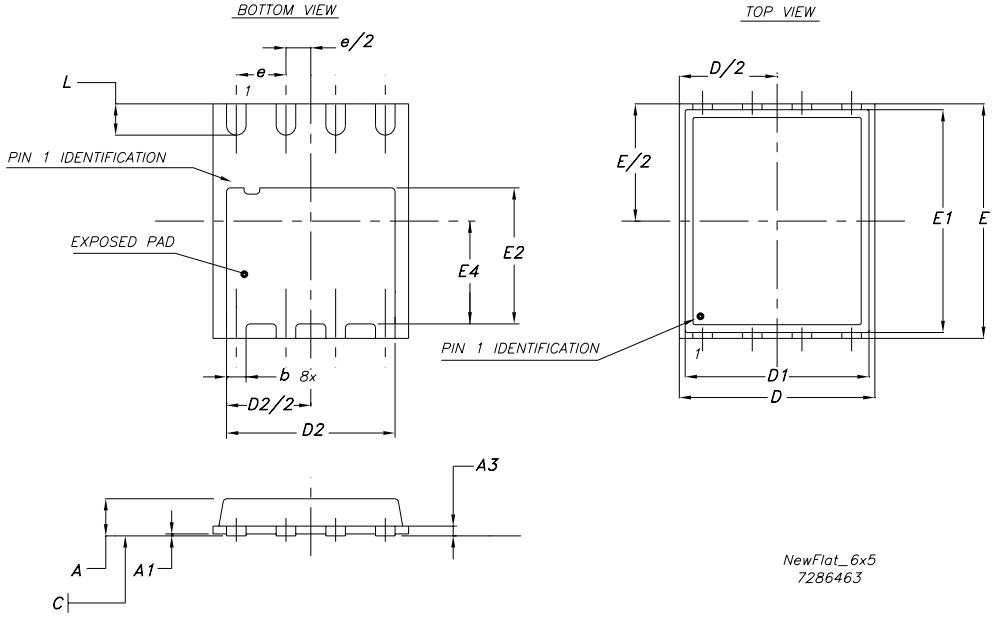


Table 10: Revision History

Date	Revision	Description of Changes
21-July-2004	1	First Release.