



## STL30NF3LL

### N-CHANNEL 30V - 0.008Ω - 30A PowerFLAT™ LOW GATE CHARGE STripFET™ MOSFET

PRELIMINARY DATA

TYPE	V <sub>DSS</sub>	R <sub>DS(on)</sub>	I <sub>D</sub>
STL30NF3LL	30 V	< 0.010 Ω	30 A

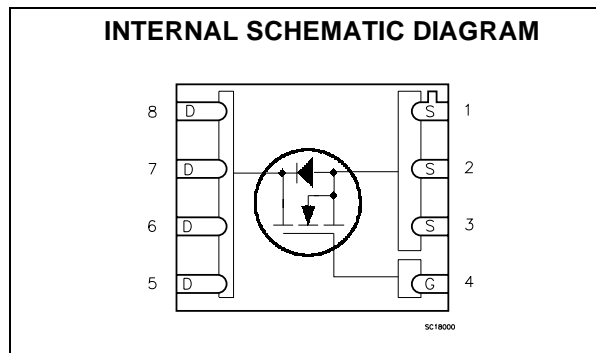
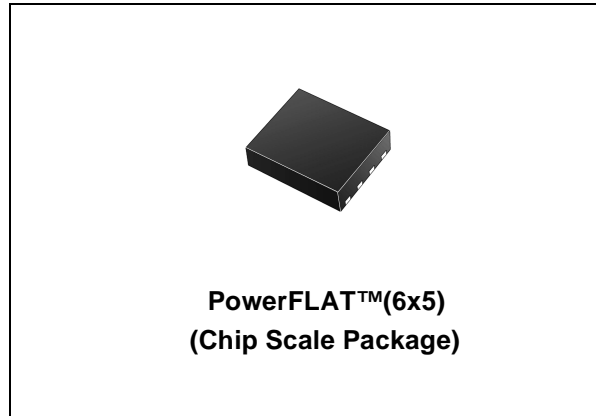
- TYPICAL R<sub>DS(on)</sub> = 0.008Ω
- IMPROVED DIE-TO-FOOTPRINT RATIO
- VERY LOW PROFILE PACKAGE

#### DESCRIPTION

This Power MOSFET is the second generation of STMicroelectronics unique "STripFET™" technology. The resulting transistor shows extremely low on-resistance and minimal gate charge. The new PowerFLAT™ package allows a significant reduction in board space without compromising performance.

#### APPLICATIONS

- DC-DC CONVERTERS
- BATTERY MANAGEMENT IN NOMADIC EQUIPMENT



#### 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 kΩ)	30	V
V <sub>GS</sub>	Gate- source Voltage	± 16	V
I <sub>D</sub> (#)	Drain Current (continuous) at T <sub>C</sub> = 25°C Drain Current (continuous) at T <sub>C</sub> = 100°C	30 19	A A
I <sub>DM</sub> (•)	Drain Current (pulsed)	120	A
P <sub>TOT</sub>	Total Dissipation at T <sub>C</sub> = 25°C	80	W
	Derating Factor	0.64	W/°C
T <sub>stg</sub>	Storage Temperature	- 55 to 150	°C
T <sub>j</sub>	Max. Operating Junction Temperature		

(•) Pulse width limited by safe operating area

(#) Limited by Wire Bonding

**STL30NF3LL****THERMAL DATA**

Rthj-case	Thermal Resistance Junction-case Max	1.56	°C/W
Rthj-amb	Thermal Resistance Junction-ambient Max	50	°C/W

**ELECTRICAL CHARACTERISTICS (TCASE = 25 °C UNLESS OTHERWISE SPECIFIED)****OFF**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	$I_D = 250 \mu A, V_{GS} = 0$	30			V
$I_{DSS}$	Zero Gate Voltage Drain Current ( $V_{GS} = 0$ )	$V_{DS} = \text{Max Rating}$ $V_{DS} = \text{Max Rating}, T_C = 125 \text{ }^\circ\text{C}$			1 10	$\mu A$ $\mu A$
$I_{GSS}$	Gate-body Leakage Current ( $V_{DS} = 0$ )	$V_{GS} = \pm 16V$			$\pm 100$	nA

**ON (1)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250 \mu A$	1			V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10 V, I_D = 15 A$ $V_{GS} = 4.5 V, I_D = 15 A$		0.008 0.0095	0.010 0.013	$\Omega$ $\Omega$

**DYNAMIC**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$g_{fs} (1)$	Forward Transconductance	$V_{DS} = 15V, I_D = 15 A$		30		S
$C_{iss}$	Input Capacitance	$V_{DS} = 25 V, f = 1 \text{ MHz}, V_{GS} = 0$		2210		pF
$C_{oss}$	Output Capacitance			635		pF
$C_{rss}$	Reverse Transfer Capacitance			138		pF

**ELECTRICAL CHARACTERISTICS (CONTINUED)****SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 15\text{ V}$ , $I_D = 30\text{ A}$		22		ns
$t_r$	Rise Time	$R_G = 4.7\Omega$ , $V_{GS} = 4.5\text{ V}$ (see test circuit, Figure 1)		130		ns
$Q_g$	Total Gate Charge	$V_{DD} = 24\text{ V}$ , $I_D = 30\text{ A}$ ,		30	40	nC
$Q_{gs}$	Gate-Source Charge	$V_{GS} = 5\text{ V}$		9		nC
$Q_{gd}$	Gate-Drain Charge	(see test circuit, Figure 1)		12.5		nC

**SWITCHING OFF**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off-Delay Time	$V_{DD} = 15\text{ V}$ , $I_D = 30\text{ A}$ ,		36.5		ns
$t_f$	Fall Time	$R_G = 4.7\Omega$ , $V_{GS} = 4.5\text{ V}$ (see test circuit, Figure 1)		36.5		ns

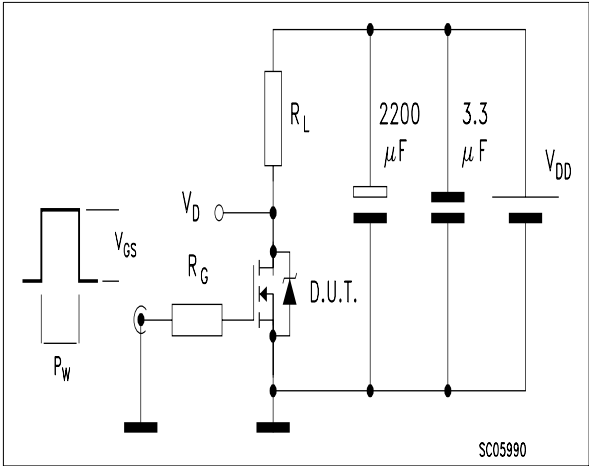
**SOURCE DRAIN DIODE**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{SD}$	Source-drain Current				30	A
$I_{SDM(2)}$	Source-drain Current (pulsed)				120	A
$V_{SD(1)}$	Forward On Voltage	$I_{SD} = 15\text{ A}$ , $V_{GS} = 0$			1.2	V
$t_{rr}$	Reverse Recovery Time	$I_{SD} = 30\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$ ,		65		ns
$Q_{rr}$	Reverse Recovery Charge	$V_{DD} = 15\text{ V}$ , $T_j = 150^\circ\text{C}$		105		nC
$I_{RRM}$	Reverse Recovery Current	(see test circuit, Figure 3)		3.4		A

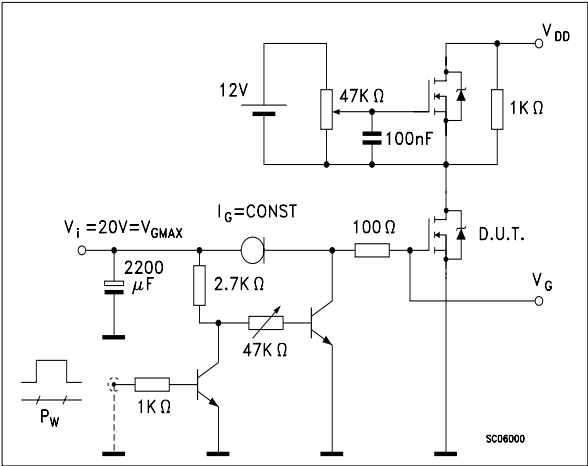
Note: 1. Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %.  
2. Pulse width limited by safe operating area.

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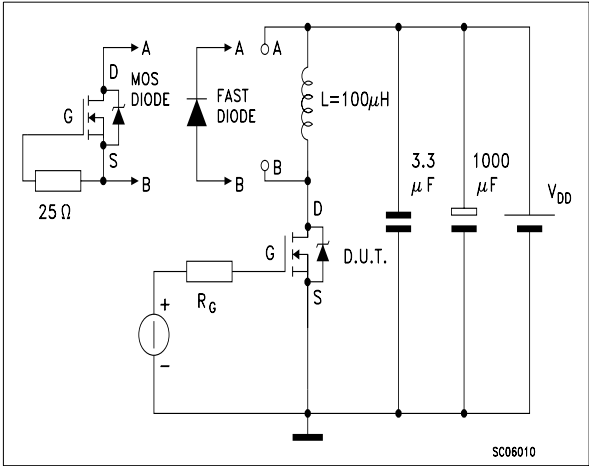
**Fig. 1: Switching Times Test Circuit For Resistive Load**



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

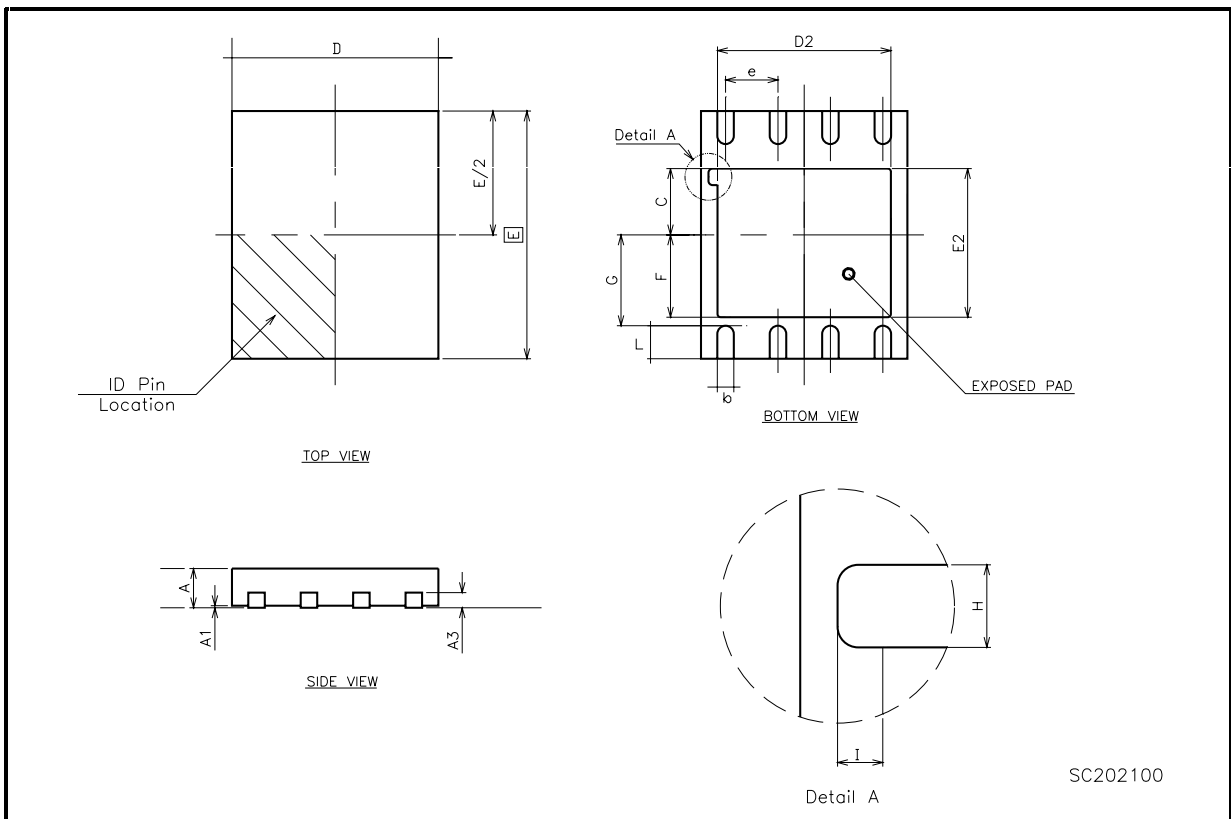


**Fig. 3: Test Circuit For Diode Recovery Behaviour**



**PowerFLAT™(6x5) MECHANICAL DATA**

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	0.80		1.00	0.031		0.039
A1		0.02			0.001	
b	0.35		0.47	0.014		0.018
C		1.61			0.063	
D		5.00			0.197	
D2	4.15		4.25	0.163		0.167
E		6.00			0.236	
E2	3.55		3.65	0.140		0.144
e		1.27			0.049	
F		1.99			0.078	
G		2.20			0.086	
H		0.40			0.015	
I		0.219			0.0086	
L	0.70		0.90	0.028		0.035



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