



STL28NF3LL

N-CHANNEL 30V - 0.0055Ω - 28A PowerFLAT™ LOW GATE CHARGE STripFET™ MOSFET

PRELIMINARY DATA

TYPE	V _{DSS}	R _{DS(on)}	I _D
STL28NF3LL	30 V	< 0.0065 Ω	28 A

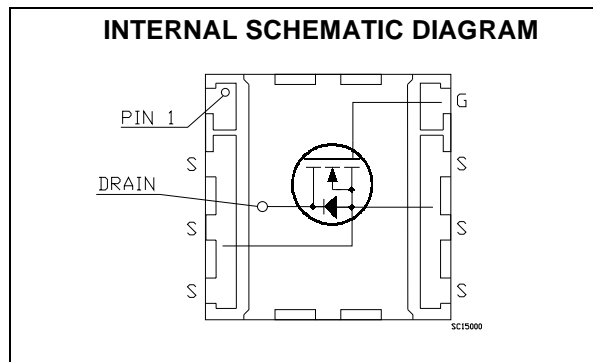
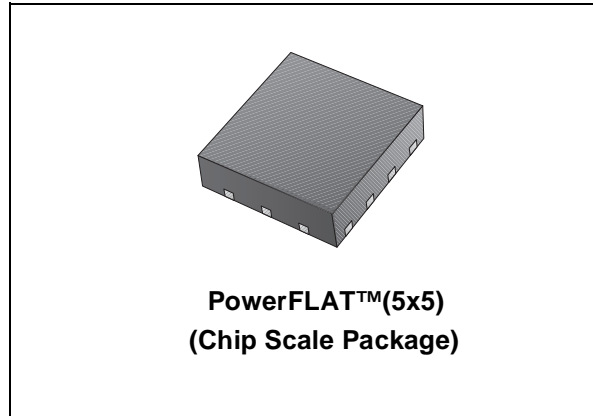
- TYPICAL R_{DS(on)} = 0.0055Ω
- IMPROVED DIE-TO-FOOTPRINT RATIO
- VERY LOW PROFILE PACKAGE

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



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 (#)	Drain Current (continuous) at T _C = 25°C Drain Current (continuous) at T _C = 100°C	28 17.5	A A
I _{DM} (•)	Drain Current (pulsed)	112	A
P _{TOT}	Total Dissipation at T _C = 25°C	80	W
	Derating Factor	0.64	W/°C
E _{AS} (1)	Single Pulse Avalanche Energy	2	J
T _{stg}	Storage Temperature	-55 to 150	°C
T _j	Max. Operating Junction Temperature		

(●) Pulse width limited by safe operating area
(#) Limited by Wire Bonding

(1) Starting T_j = 25°C, I_D = 14A, V_{DD} = 18V

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THERMAL DATA

Rthj-case	Thermal Resistance Junction-case Max	1.56	°C/W
Rthj-pcb (#)	Thermal Resistance Junction-ambient Max	31.2	°C/W

(*) When mounted on 1inch² FR4 Board, 2oz of Cu, t ≤ 10 sec.

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 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} = ± 16V			±100	nA

ON (1)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1			V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} = 10 V, I _D = 14 A V _{GS} = 4.5 V, I _D = 14 A		0.0055 0.0065	0.0065 0.0095	Ω Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (1)	Forward Transconductance	V _{DS} = 15 V, I _D = 14 A		32		S
C _{iss}	Input Capacitance	V _{DS} = 25 V, f = 1 MHz, V _{GS} = 0		2780		pF
C _{oss}	Output Capacitance			890		pF
C _{rss}	Reverse Transfer Capacitance			195		pF

ELECTRICAL CHARACTERISTICS (CONTINUED)**SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 15\text{ V}$, $I_D = 14\text{ A}$		25		ns
t_r	Rise Time	$R_G = 4.7\Omega$, $V_{GS} = 4.5\text{ V}$ (see test circuit, Figure 3)		82		ns
Q_g	Total Gate Charge	$V_{DD} = 15\text{ V}$, $I_D = 28\text{ A}$,		32	43	nC
Q_{gs}	Gate-Source Charge	$V_{GS} = 5\text{ V}$		13		nC
Q_{gd}	Gate-Drain Charge			18		nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off-Delay Time	$V_{DD} = 15\text{ V}$, $I_D = 14\text{ A}$,		42		ns
t_f	Fall Time	$R_G = 4.7\Omega$, $V_{GS} = 4.5\text{ V}$ (see test circuit, Figure 3)		35		ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				28	A
$I_{SDM(2)}$	Source-drain Current (pulsed)				112	A
$V_{SD(1)}$	Forward On Voltage	$I_{SD} = 28\text{ A}$, $V_{GS} = 0$			1.2	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 28\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$,		50		ns
Q_{rr}	Reverse Recovery Charge	$V_{DD} = 25\text{ V}$, $T_j = 150^\circ\text{C}$		82		nC
I_{RRM}	Reverse Recovery Current	(see test circuit, Figure 5)		3.3		A

Note: 1. Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %.
2. Pulse width limited by safe operating area.

Fig. 1: Unclamped Inductive Load Test Circuit

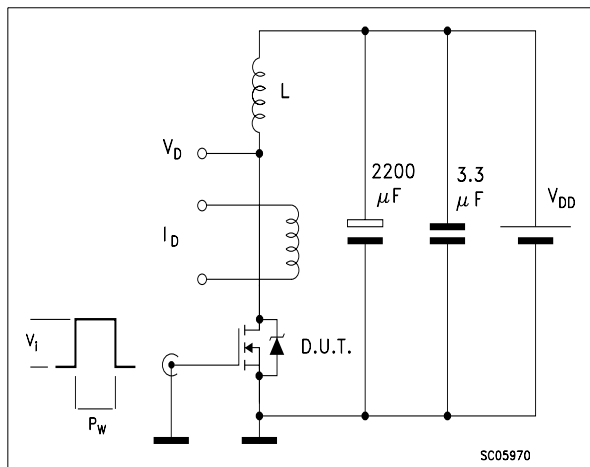


Fig. 2: Unclamped Inductive Waveform

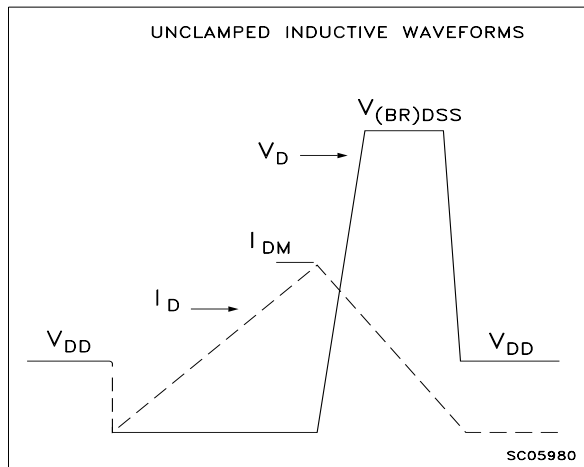


Fig. 3: Switching Times Test Circuit For Resistive Load

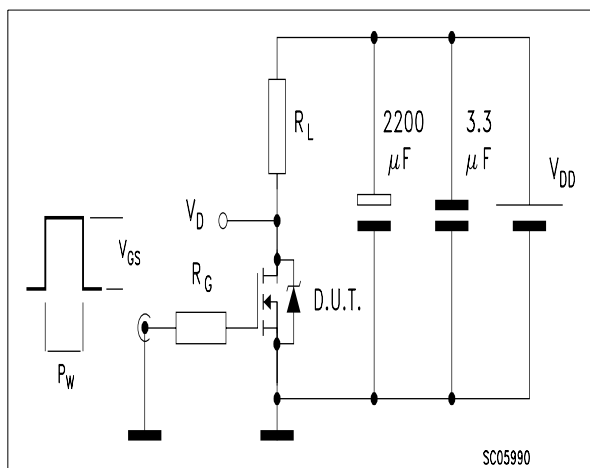


Fig. 4: Gate Charge test Circuit

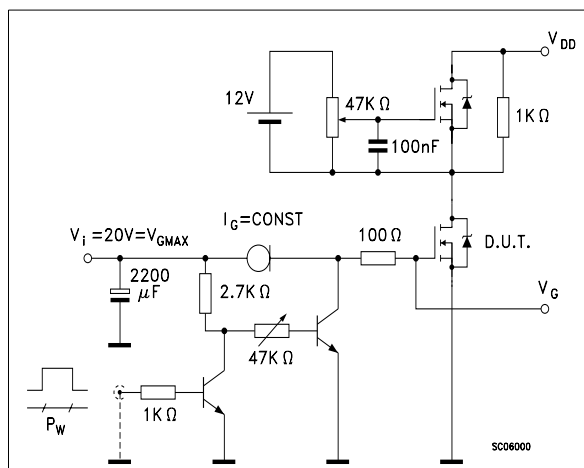
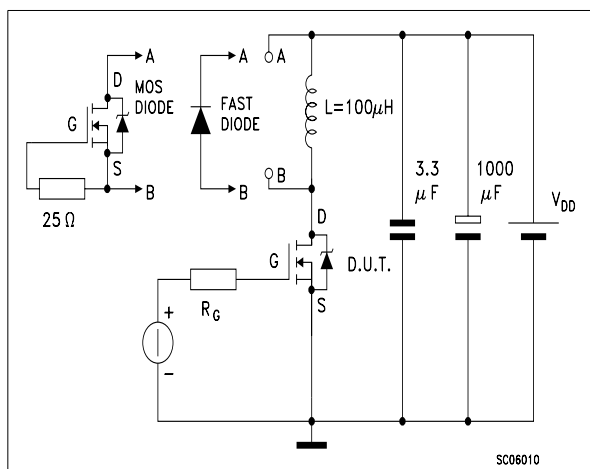
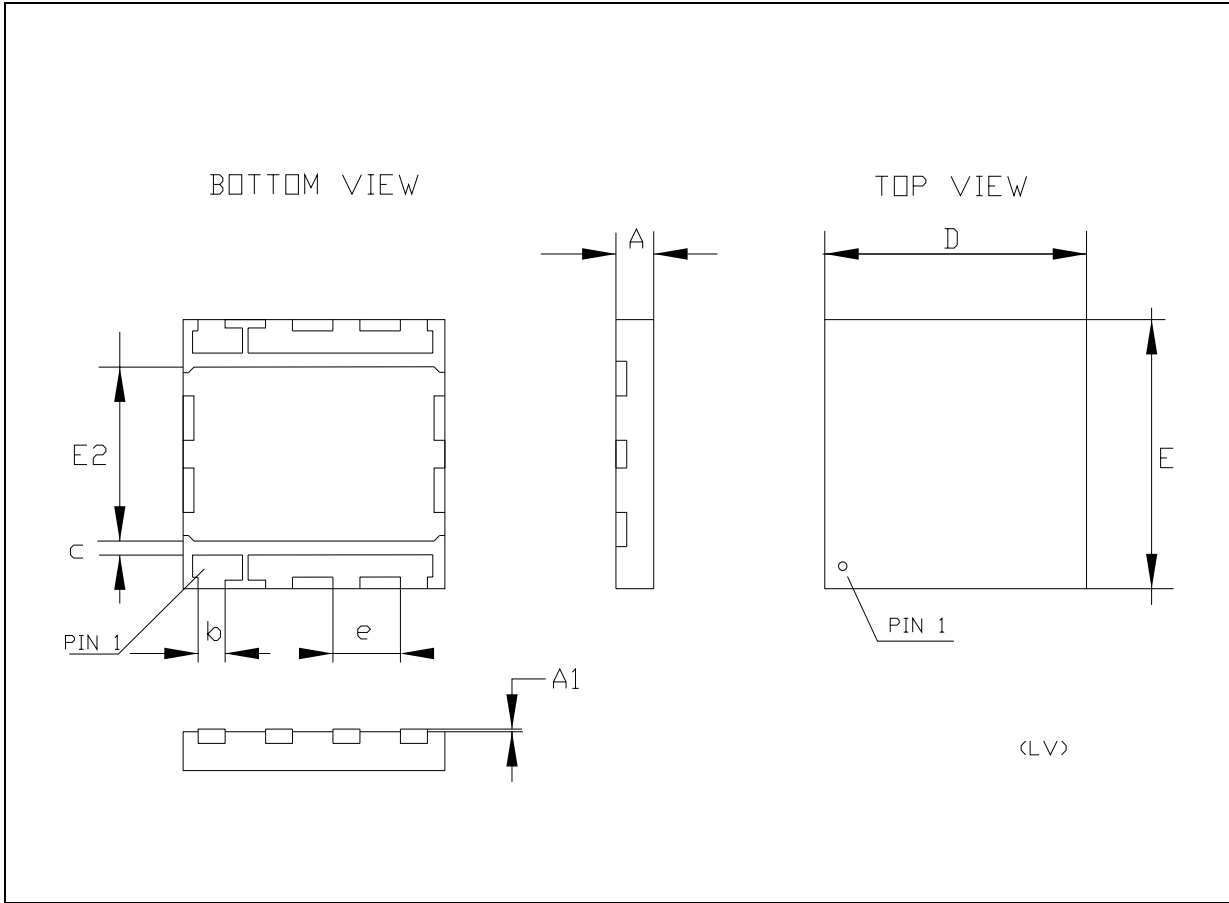


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



PowerFLAT™(5x5) MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A		0.90	1.00		0.035	0.039
A1		0.02	0.05		0.001	0.002
b	0.43	0.51	0.58	0.017	0.020	0.023
c	0.33	0.41	0.48	0.013	0.016	0.019
D		5.00			0.197	
E		5.00			0.197	
E2	3.10	3.18	3.25	0.122	0.125	0.128
e		1.27			0.050	



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