



STL150N3LLH5

N-channel 30V - 0.0017Ω - 34A - PowerFLAT™ (6x5)
STripFET™ V Power MOSFET

Preliminary Data

Features

Type	V _{DSS}	R _{DS(on)}	I _D
STL150N3LLH5	30 V	<0.002 Ω	34 A ⁽¹⁾

1. The value is rated according R_{thj-pcb}

- R_{DS(on)} * Q_g industry benchmark
- Extremely low on-resistance R_{DS(on)}
- Very low switching gate charge
- High avalanche ruggedness
- Low gate drive power losses

Application

- Switching applications

Description

This product utilizes the 5th generation of design rules of ST's proprietary STripFET™ technology. The lowest available R_{DS(on)} * Q_g, in this chip scale package, makes this device suitable for the most demanding DC-DC converter applications, where high power density is to be achieved.

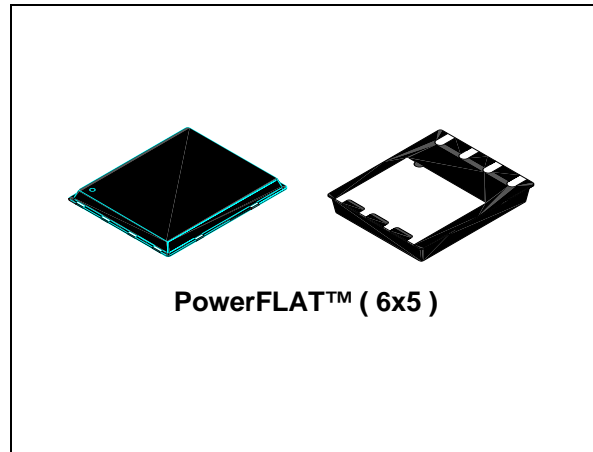


Figure 1. Internal schematic diagram

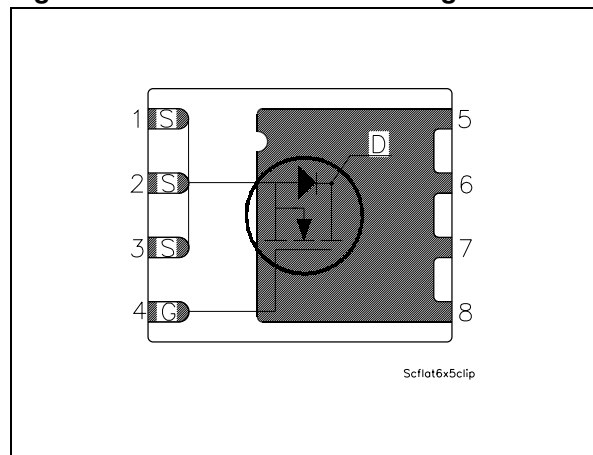


Table 1. Device summary

Order code	Marking	Package	Packaging
STL150N3LLH5	L150N3LLH5	PowerFLAT™ (6x5)	Tape & reel

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1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage ($V_{GS} = 0$)	30	V
V_{GS}	Gate-source voltage	± 20	V
$I_D^{(1)}$	Drain current (continuous) at $T_C = 25^\circ\text{C}$	150	A
$I_D^{(1)}$	Drain current (continuous) at $T_C = 100^\circ\text{C}$	94	A
$I_D^{(3)}$	Drain current (continuous) at $T_C = 100^\circ\text{C}$	21	A
$I_{DM}^{(2)}$	Drain current (pulsed)	136	A
$I_D^{(3)}$	Drain current (continuous) at $T_C = 25^\circ\text{C}$	34	A
$P_{TOT}^{(1)}$	Total dissipation at $T_C = 25^\circ\text{C}$	80	W
$P_{TOT}^{(3)}$	Total dissipation at $T_C = 25^\circ\text{C}$	4	W
	Derating factor	0.03	W/ $^\circ\text{C}$
T_J	Operating junction temperature	-55 to 150	$^\circ\text{C}$
T_{stg}	Storage temperature		

1. The value is rated according R_{thj-c}
2. Pulse width limited by safe operating area
3. The value is rated according $R_{thj-pcb}$

Table 3. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case (Drain) (steady state)	1.56	$^\circ\text{C}/\text{W}$
$R_{thj-pcb}^{(1)}$	Thermal resistance junction-ambient	31.3	$^\circ\text{C}/\text{W}$

1. When mounted on FR-4 board of 1inch², 2oz Cu, $t < 10\text{sec}$

Table 4. Avalanche data

Symbol	Parameter	Value	Unit
I_{AV}	Not-repetitive avalanche current, (pulse width limited by $T_J \text{ Max}$)	TBD	A
E_{AS}	Single pulse avalanche energy (starting $T_J = 25^\circ\text{C}$, $I_D = I_{AV}$, $V_{DD} = 24 \text{ V}$)	TBD	J

2 Electrical characteristics

($T_{CASE}=25^{\circ}\text{C}$ unless otherwise specified)

Table 5. On/off states

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	$I_D = 250\mu\text{A}$, $V_{GS} = 0$	30			V
I_{DSS}	Zero gate voltage drain current ($V_{GS} = 0$)	$V_{DS} = \text{Max rating}$, $V_{DS} = \text{Max rating @ } 125^{\circ}\text{C}$			1 10	μA μA
I_{GSS}	Gate body leakage current ($V_{DS} = 0$)	$V_{GS} = \pm 20\text{V}$			± 100	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$	1			V
$R_{DS(on)}$	Static drain-source on resistance	$V_{GS} = 10\text{V}$, $I_D = 17\text{A}$ $V_{GS} = 4.5\text{V}$, $I_D = 17\text{A}$		0.0017 0.0027	0.002 0.003	Ω Ω

Table 6. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input capacitance	$V_{DS} = 25\text{V}$, $f = 1\text{ MHz}$, $V_{GS} = 0$		5800		pF
C_{oss}	Output capacitance			1600		pF
C_{rss}	Reverse transfer capacitance			200		pF
Q_g	Total gate charge	$V_{DD} = 15\text{V}$, $I_D = 34\text{A}$		42		nC
Q_{gs}	Gate-source charge	$V_{GS} = 4.5\text{V}$		TBD		nC
Q_{gd}	Gate-drain charge	(see Figure 3)		TBD		nC
R_G	Gate input resistance	$f = 1\text{ MHz}$ Gate DC Bias = 0 Test signal level = 20mV open drain		2		Ω

Table 7. Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on delay time	$V_{DD}=15V$, $I_D=17A$, $R_G=4.7\Omega$, $V_{GS}=10V$ <i>(see Figure 2)</i>		TBD		ns
t_r	Rise time			TBD		ns
$t_{d(off)}$	Turn-off delay time			TBD		ns
t_f	Fall time			TBD		ns

Table 8. Source drain diode

Symbol	Parameter	Test conditions	Min	Typ.	Max	Unit
I_{SD}	Source-drain current				34	A
$I_{SDM}^{(1)}$	Source-drain current (pulsed)				136	A
$V_{SD}^{(2)}$	Forward on voltage	$I_{SD} = 34A$, $V_{GS}=0$			1.3	V
t_{rr}	Reverse recovery time	$I_{SD} = 34A$, $di/dt = 100A/\mu s$, $V_{DD}=25V$, $T_j=150^\circ C$		TBD		ns
Q_{rr}	Reverse recovery charge			TBD		nC
I_{RRM}	Reverse recovery current			TBD		A

1. Pulse width limited by safe operating area

2. Pulsed: pulse duration=300 μs , duty cycle 1.5%

3 Test circuit

Figure 2. Switching times test circuit for resistive load

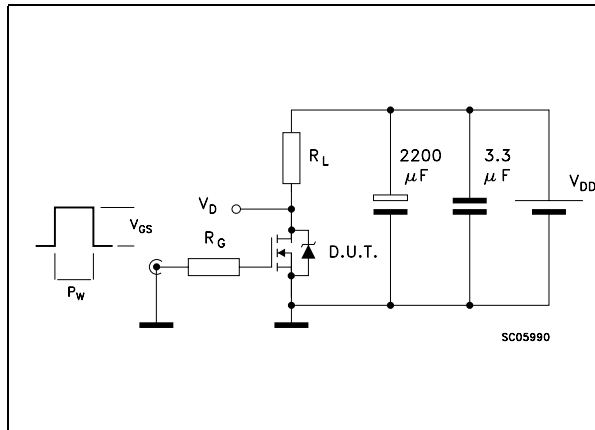


Figure 3. Gate charge test circuit

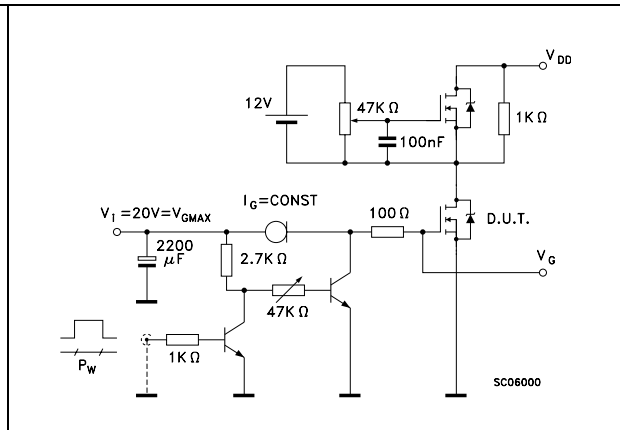


Figure 4. Test circuit for inductive load switching and diode recovery times

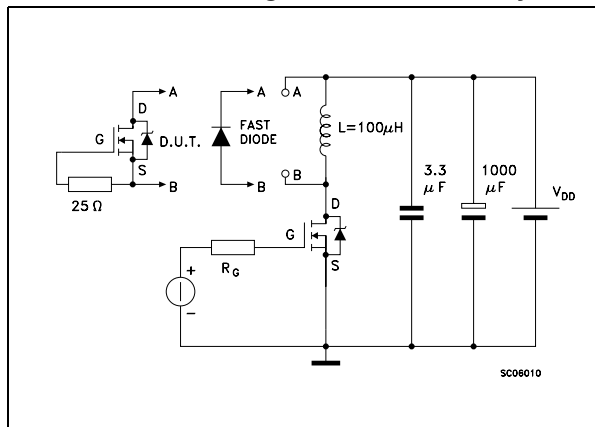


Figure 5. Unclamped inductive load test circuit

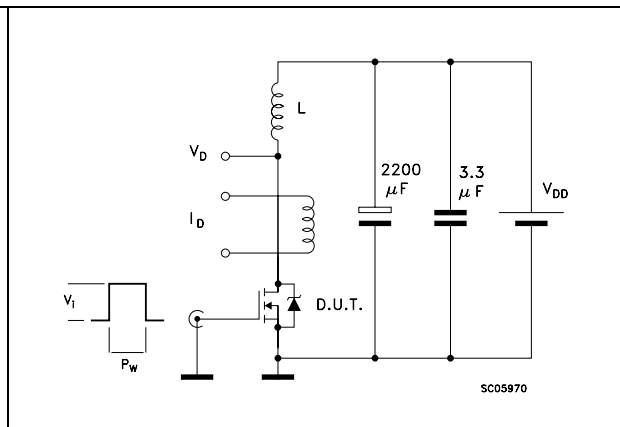


Figure 6. Unclamped inductive waveform

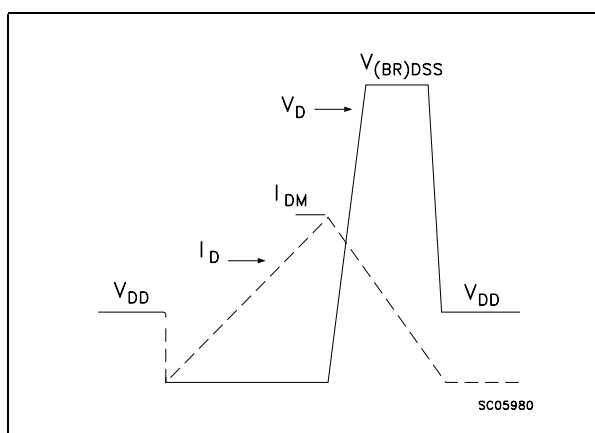
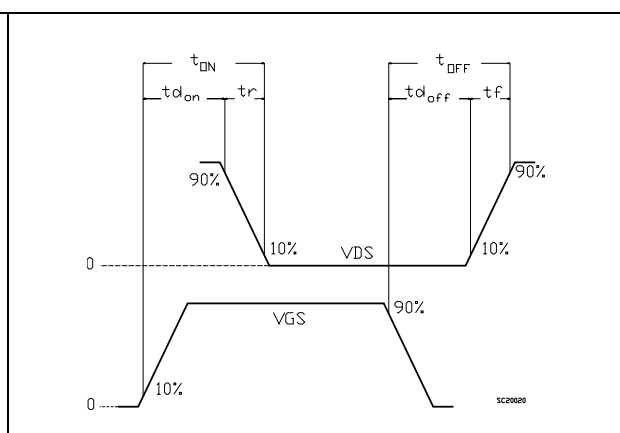


Figure 7. Switching time waveform

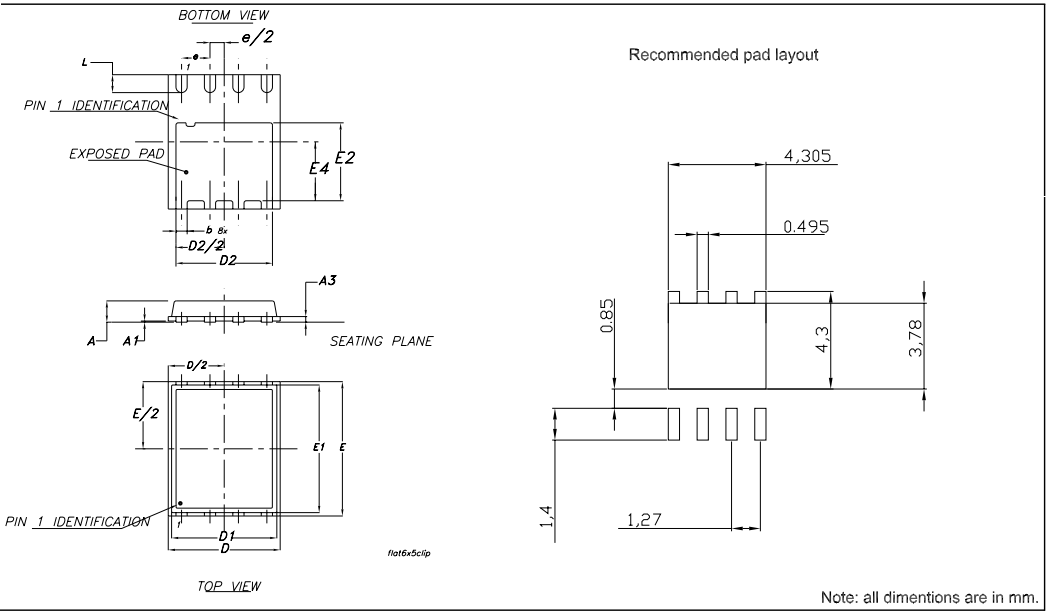


4 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com

PowerFLAT™(6x5) mechanical data

DIM.	mm.			inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.80	0.83	0.93	0.031	0.32	0.036
A1		0.02	0.05		0.0007	0.0019
A3		0.20			0.007	
b	0.35	0.40	0.47	0.013	0.015	0.018
D		5.00			0.196	
D1		4.75			0.187	
D2	4.15	4.20	4.25	0.163	0.165	0.167
E		6.00			0.236	
E1		5.75			0.226	
E2	3.43	3.48	3.53	0.135	0.137	0.139
E4	2.58	2.63	2.68		0.103	0.105
e		1.27			0.050	
L	0.70	0.80	0.90	0.027	0.031	0.035



5 Revision history

Table 9. Document revision history

Date	Revision	Changes
26-Oct-2007	1	First release

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