



# STL75N3LLZH5

N-channel 30 V, 0.0055  $\Omega$ , 19 A PowerFLAT™ (5x6)  
STripFET™ V Power MOSFET

Preliminary data

## Features

Type	V <sub>DSS</sub>	R <sub>DS(on) max</sub>	I <sub>D</sub>
STL75N3LLZH5	30 V	<0.0061 $\Omega$	19 A <sup>(1)</sup>

1. The value is rated according R<sub>thj-pcb</sub>

- R<sub>DS(on)</sub> \* Q<sub>g</sub> industry benchmark
- Extremely low on-resistance R<sub>DS(on)</sub>
- Very low switching gate charge
- High avalanche ruggedness
- Low gate drive power losses
- Built in G-S Zener diodes

## Application

- Switching applications

## Description

The STL75N3LLZH5 is an N-channel STripFET™V Power MOSFET which has been designed to achieve very low on-state resistance providing also one of the best-in-class figure of merit (FOM).

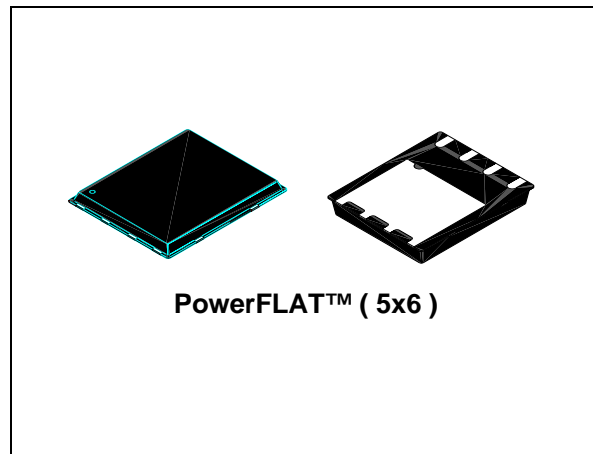


Figure 1. Internal schematic diagram

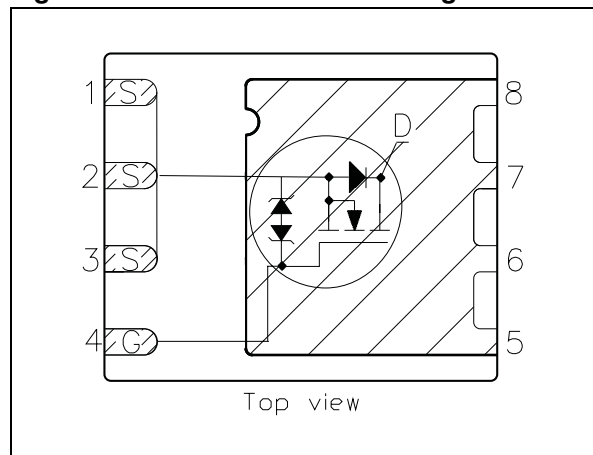


Table 1. Device summary

Order code	Marking	Package	Packaging
STL75N3LLZH5	75N3LLZH5	PowerFLAT™ (5x6)	Tape and reel

# 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	$\pm 18$	V
$I_D^{(1)}$	Drain current (continuous) at $T_C = 25^\circ\text{C}$	75	A
$I_D^{(1)}$	Drain current (continuous) at $T_C = 100^\circ\text{C}$	47	A
$I_D^{(2)}$	Drain current (continuous) at $T_C = 25^\circ\text{C}$	19	A
$I_D^{(2)}$	Drain current (continuous) at $T_C = 100^\circ\text{C}$	11.8	A
$I_{DM}^{(3)}$	Drain current (pulsed)	76	A
$P_{TOT}^{(1)}$	Total dissipation at $T_C = 25^\circ\text{C}$	60	W
$P_{TOT}^{(2)}$	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. The value is rated according  $R_{thj-pcb}$ .
3. Pulse width limited by safe operating area.

**Table 3. Thermal resistance**

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case (Drain) (steady state)	2.08	$^\circ\text{C}/\text{W}$
$R_{thj-pcb}^{(1)}$	Thermal resistance junction-ambient	31.3	$^\circ\text{C}/\text{W}$

1. When mounted on FR-4 board of 1inch<sup>2</sup>, 2oz Cu,  $t < 10$  sec

## 2 Electrical characteristics

( $T_{CASE} = 25\text{ °C}$  unless otherwise specified).

**Table 4. 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 ( $V_{GS} = 0$ )	$V_{DS} = \text{max rating}$ , $V_{DS} = \text{max rating @ } 125\text{ °C}$			1 10	$\mu\text{A}$ $\mu\text{A}$
$I_{GSS}$	Gate body leakage current ( $V_{DS} = 0$ )	$V_{GS} = \pm 18\text{ V}$			$\pm 10$	$\mu\text{A}$
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}$ , $I_D = 250\ \mu\text{A}$	1			V
$R_{DS(on)}$	Static drain-source on resistance	$V_{GS} = 10\text{ V}$ , $I_D = 9.5\text{ A}$ $V_{GS} = 4.5\text{ V}$ , $I_D = 9.5\text{ A}$		0.0055 0.0066	0.0061 0.0078	$\Omega$ $\Omega$

**Table 5. Dynamic**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$C_{iss}$	Input capacitance	$V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$ , $V_{GS} = 0$	-	1510	-	$\mu\text{F}$
$C_{oss}$	Output capacitance			287		
$C_{rss}$	Reverse transfer capacitance			40		
$Q_g$	Total gate charge	$V_{DD} = 15\text{ V}$ , $I_D = 19\text{ A}$	-	11.8	-	nC
$Q_{gs}$	Gate-source charge	$V_{GS} = 4.5\text{ V}$		4		
$Q_{gd}$	Gate-drain charge	<a href="#">Figure 3</a>		6		

**Table 6. Switching times**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on delay time	$V_{DD} = 15\text{ V}$ , $I_D = 9.5\text{ A}$ , $R_G = 4.7\ \Omega$ , $V_{GS} = 10\text{ V}$ <a href="#">Figure 2</a>	-	9.2	-	ns
$t_r$	Rise time			11		
$t_{d(off)}$	Turn-off delay time			55		
$t_f$	Fall time			20		

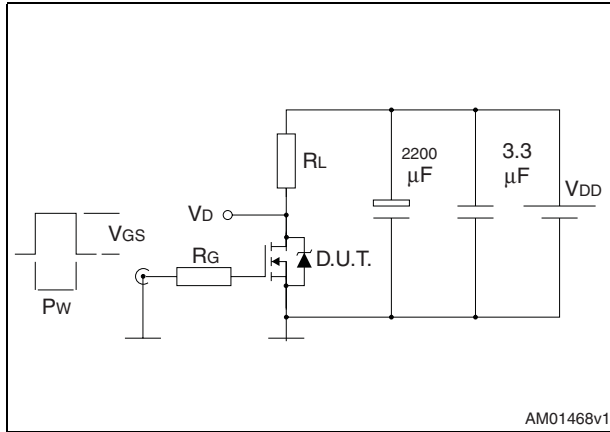
**Table 7. Source drain diode**

Symbol	Parameter	Test conditions	Min	Typ.	Max	Unit
$I_{SD}$	Source-drain current		-		19	A
$I_{SDM}^{(1)}$	Source-drain current (pulsed)		-		76	A
$V_{SD}^{(2)}$	Forward on voltage	$I_{SD} = 19 \text{ A}, V_{GS} = 0$	-		1.1	V
$t_{rr}$	Reverse recovery time	$I_{SD} = 19 \text{ A},$ $di/dt = 100 \text{ A}/\mu\text{s},$ $V_{DD} = 25 \text{ V}, T_j = 150 \text{ }^\circ\text{C}$	-	24		ns
$Q_{rr}$	Reverse recovery charge			17		nC
$I_{RRM}$	Reverse recovery current			1.4		A

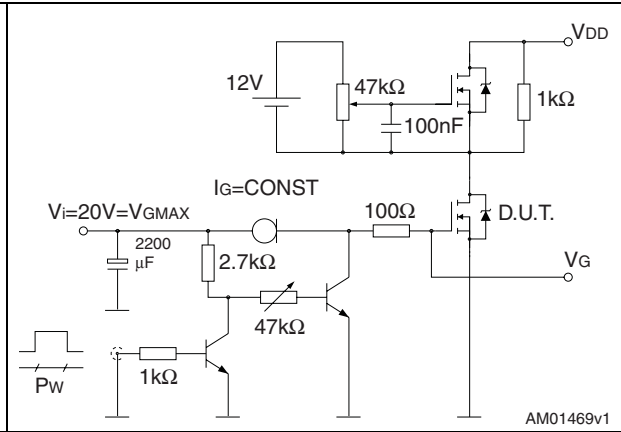
1. Pulse width limited by safe operating area.
2. Pulsed: pulse duration= 300  $\mu\text{s}$ , duty cycle 1.5%.

### 3 Test circuits

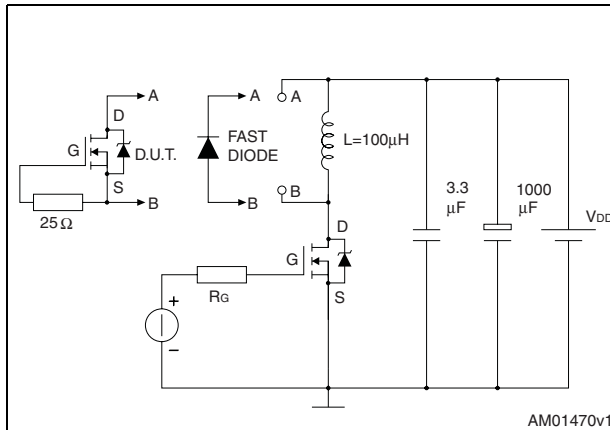
**Figure 2. Switching times test circuit for resistive load**



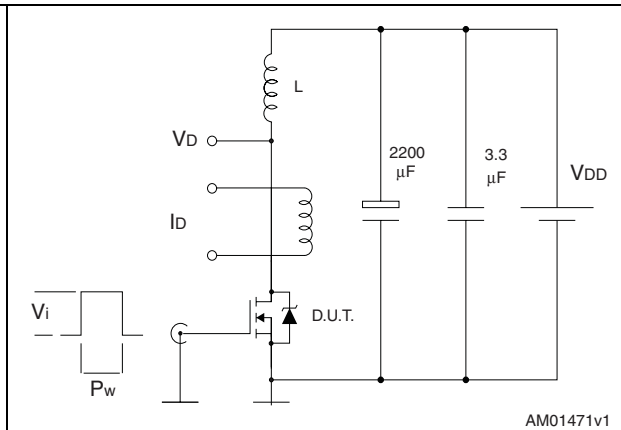
**Figure 3. Gate charge test circuit**



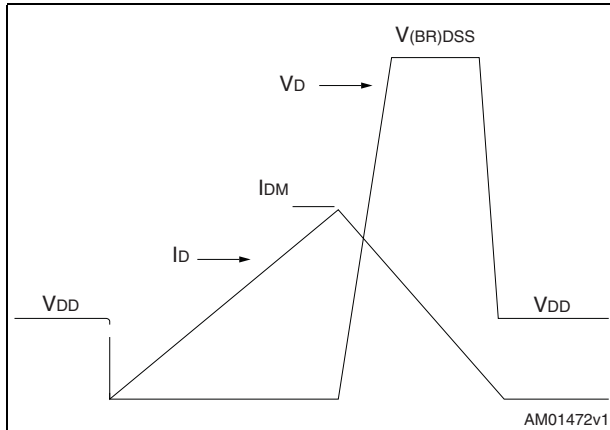
**Figure 4. Test circuit for inductive load switching and diode recovery times**



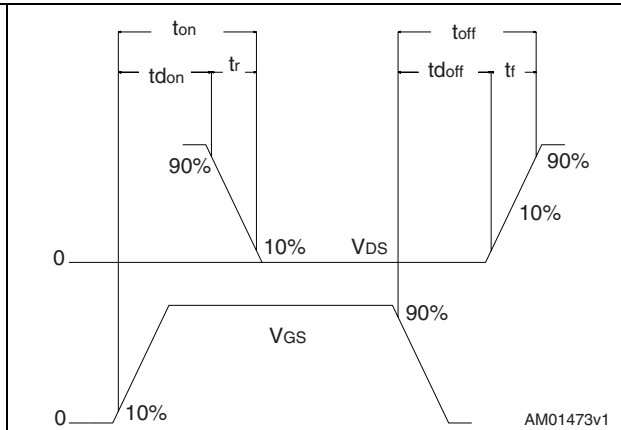
**Figure 5. Unclamped inductive load test circuit**



**Figure 6. Unclamped inductive waveform**



**Figure 7. Switching time waveform**



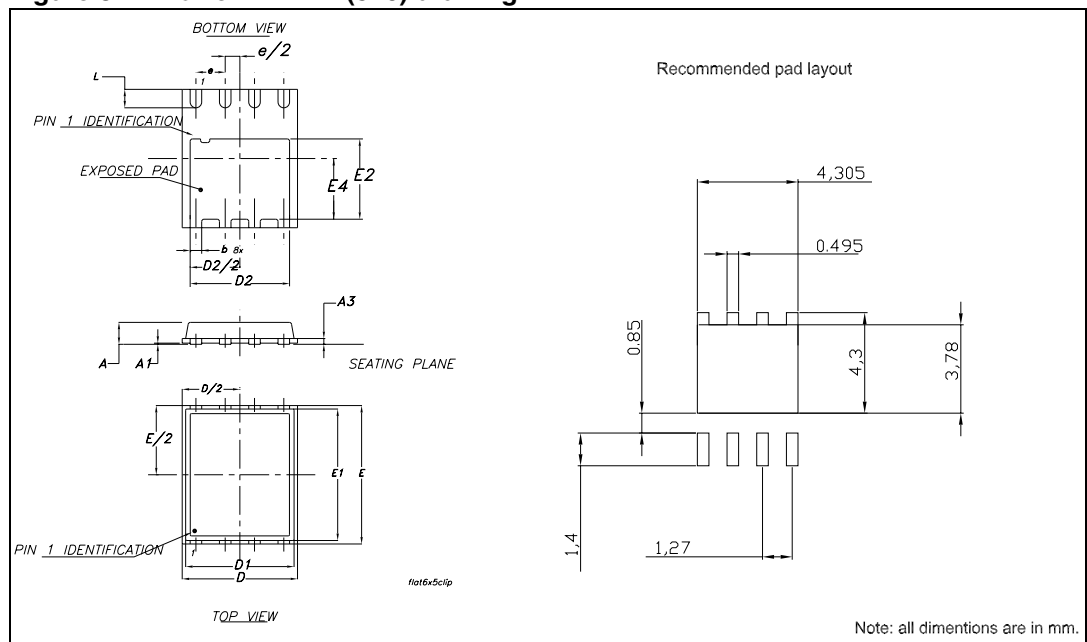
## 4 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK is an ST trademark.

Table 8. Power FLAT™ (5x6) 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

Figure 8. Power FLAT™ (5x6) drawing



## 5 Revision history

**Table 9. Document revision history**

Date	Revision	Changes
22-Jun-2010	1	First release.
08-Jul-2010	2	Modified $V_{GS}$ in <a href="#">Table 2: Absolute maximum ratings</a> and <a href="#">Table 4: On/off states</a> .



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