STL110N10F7

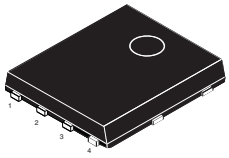
N-channel 100 V, 0.005 Ω typ., 21 A, STripFET™ VII DeepGATE™ Power MOSFET in a PowerFLAT™ 5x6 package

Datasheet — preliminary data

Features

Type	V_{DSS}	$R_{DS(on)}$ max	I_D	P_{TOT}
STL110N10F7	100 V	0.006 Ω (V_{GS}= 10 V)	21 A	5 W

- Ultra low on-resistance
- 100% avalanche tested



PowerFLAT™ 5x6

Applications

- Switching applications

Description

This device is an N-channel Power MOSFET developed using the 7th generation of STripFET™ DeepGATE™ technology, with a new gate structure. The resulting Power MOSFET exhibits the lowest $R_{DS(on)}$ in all packages.

Figure 1. Internal schematic diagram

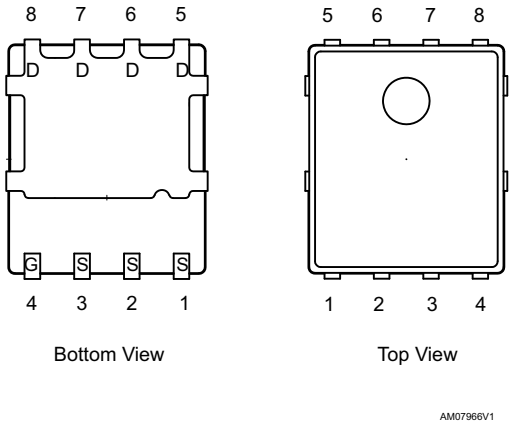


Table 1. Device summary

Order code	Marking	Package	Packaging
STL110N10F7	110N10F7	PowerFLAT™ 5x6	Tape and reel

Contents

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage	100	V
V_{GS}	Gate-source voltage	± 20	V
I_D (1)	Drain current (continuous) at T_C = 25 °C	110	A
I_D (1)	Drain current (continuous) at T_C = 100 °C	77	A
I_D (2)	Drain current (continuous) at T_C = 25 °C	21	A
I_D (2)	Drain current (continuous) at T_C=100 °C	15	A
I_{DM} (2)(3)	Drain current (pulsed)	75	A
P_{TOT} (1)	Total dissipation at T_{pcb} = 25 °C	5	W
T_J T_{stg}	Operating junction temperature Storage temperature	-55 to 175	°C

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

Table 3. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{thj\text{-}case}$	Thermal resistance junction-case	1.13	°C/W
$R_{thj\text{-}pcb}$ (1)	Thermal resistance junction-pcb	31	°C/W

1. When mounted on FR-4 board of 1inch², 2oz Cu, t < 10 sec

2 Electrical characteristics

(T_{CASE}=25 °C unless otherwise specified)

Table 4. On/off states

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage (V_{GS}= 0)	I_D = 250 µA	100			V
I_{DSS}	Zero gate voltage drain current (V_{GS} = 0)	V_{DS} = 100 V V_{DS} = 100 V; T_C=125 °C			1 100	µA µA
I_{GSS}	Gate body leakage current (V_{DS} = 0)	V_{GS} = ±20 V			±100	nA
$V_{GS(th)}$	Gate threshold voltage	V_{DS}= V_{GS}, I_D = 250 µA	2		4	V
$R_{DS(on)}$	Static drain-source on-resistance	V_{GS}= 10 V, I_D= 10.5 A		0.005	0.006	Ω

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{iss} C_{oss} C_{rss}	Input capacitance Output capacitance Reverse transfer capacitance	V_{DS} = 50 V, f=1 MHz, V_{GS}=0	-	5500 950 30	-	pF pF pF
Q_g Q_{gs} Q_{gd}	Total gate charge Gate-source charge Gate-drain charge	V_{DD}= 50 V, I_D = 21 A V_{GS} =10 V *Figure 3*	-	60 TBD TBD	-	nC

Table 6. Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r $t_{d(off)}$ t_f	Turn-on delay time Rise time Turn-off delay time Fall time	V_{DD}=50 V, I_D= 10.5 A, R_G=4.7 Ω, V_{GS}= 10 V *Figure 2*	-	TBD TBD TBD TBD	-	ns ns ns ns

Table 7. Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain current		-		21	A
I_{SDM}(1)	Source-drain current (pulsed)		-		84	A
V_{SD}(2)	Forward on voltage	I_{SD} = 21 A, V_{GS}=0	-		TBD	V
t_{rr} Q_{rr} I_{RRM}	Reverse recovery time Reverse recovery charge Reverse recovery current	I_{SD} = 21 A, di/dt = 80 A/µs, V_{DD}=80 V, T_j=150 °C	-	TBD TBD TBD		ns nC A

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

3 Test circuits

Figure 2. Switching times test circuit for resistive load

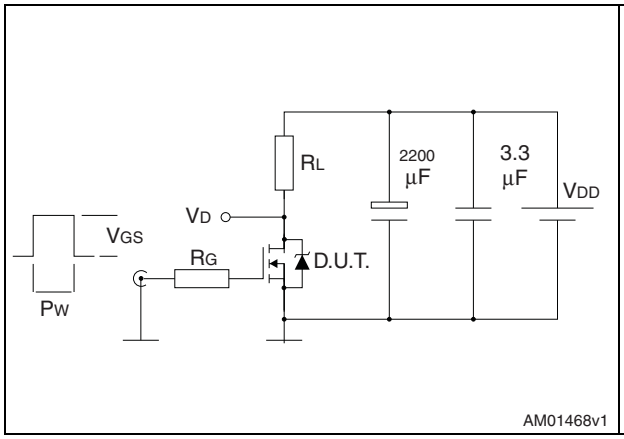


Figure 3. Gate charge test circuit

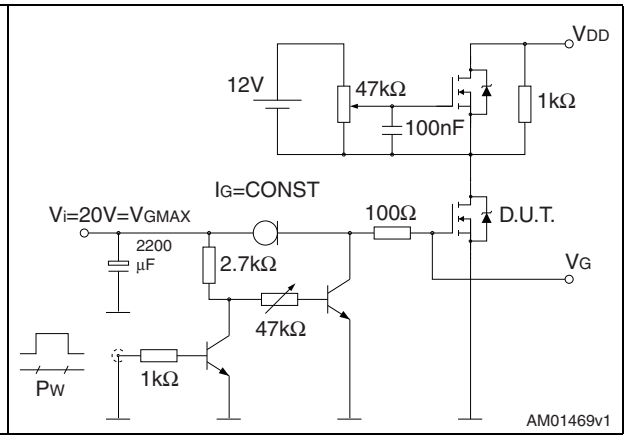


Figure 4. Test circuit for inductive load switching and diode recovery times

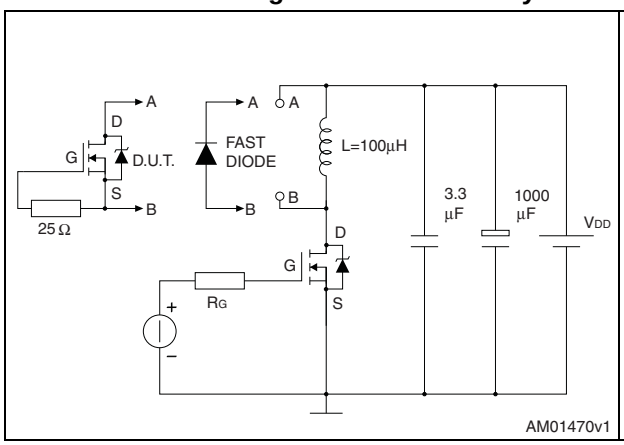


Figure 5. Unclamped inductive load test circuit

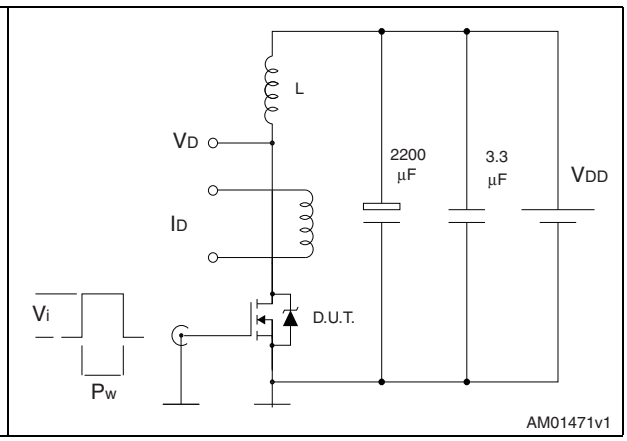


Figure 6. Unclamped inductive waveform

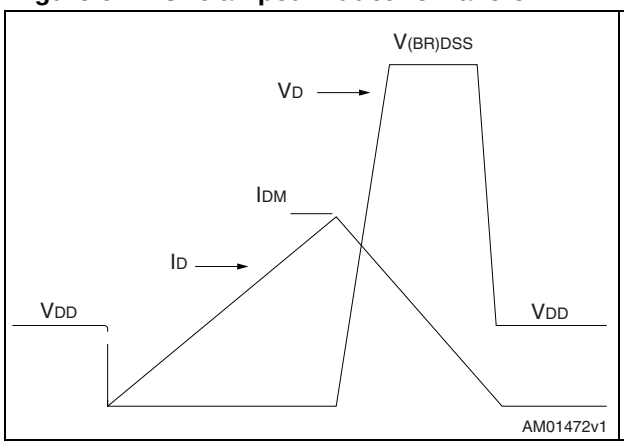
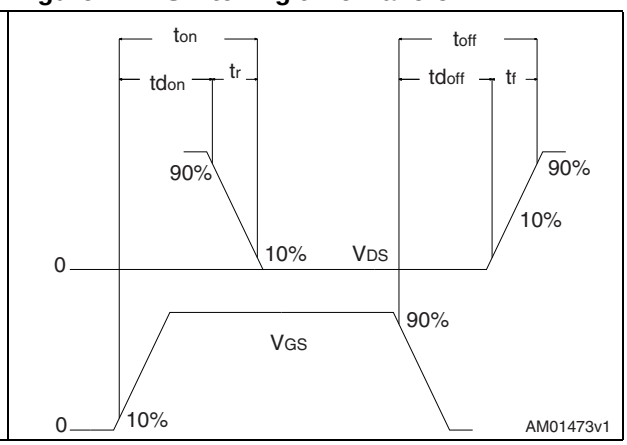


Figure 7. Switching time waveform



4 Package mechanical data

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

Table 8. PowerFLAT™ 5x6 type S-C mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	0.80		1.00
A1	0.02		0.05
A2		0.25	
b	0.30		0.50
D		5.20	
E		6.15	
D2	4.11		4.31
E2	3.50		3.70
e		1.27	
e1		0.65	
L	0.715		1.015
K	1.05		1.35

Figure 8. PowerFLAT™ 5x6 type S-C mechanical data

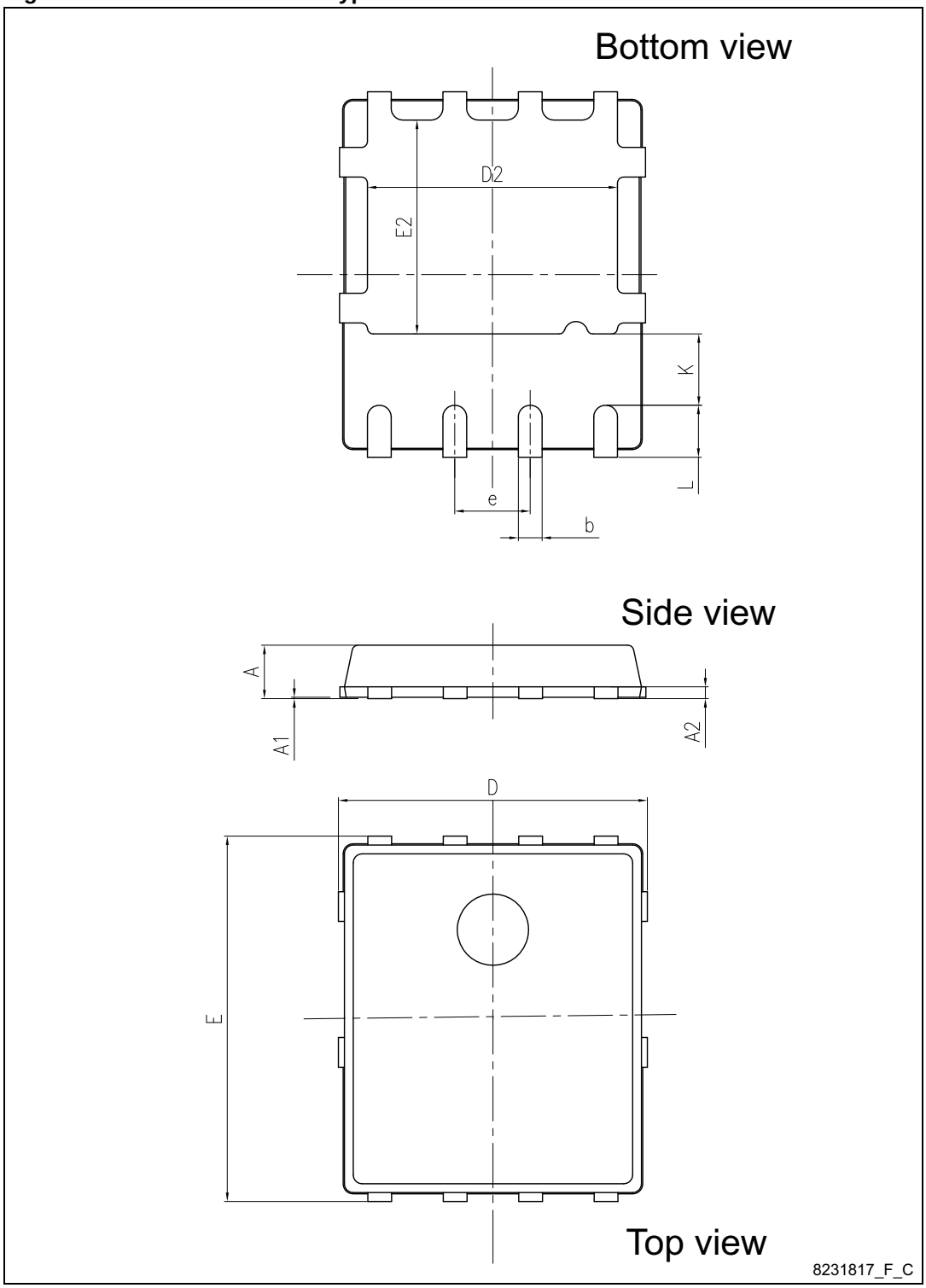
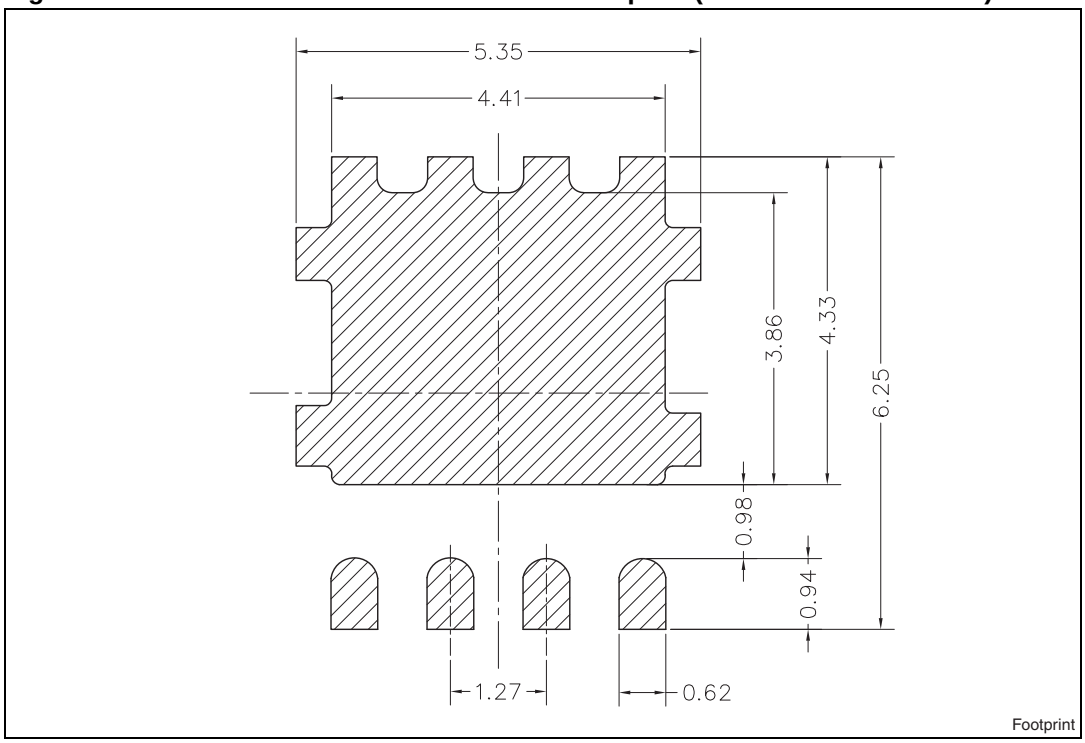


Figure 9. PowerFLAT™ 5x6 recommended footprint (dimensions are in mm)



5 Revision history

Table 9. Document revision history

Date	Revision	Changes
03-Dec-2012	1	First release.

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