STL7N6F7

N-channel 60 V, 0.021 Ω typ., 7 A STripFET™ F7 Power MOSFET in a PowerFLAT™ 2x2 package

Datasheet - preliminary data

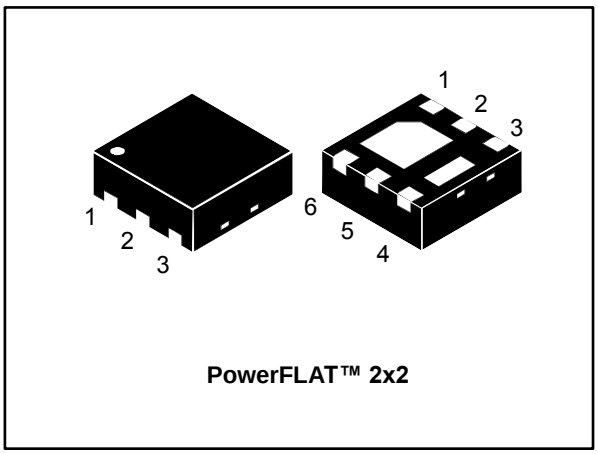
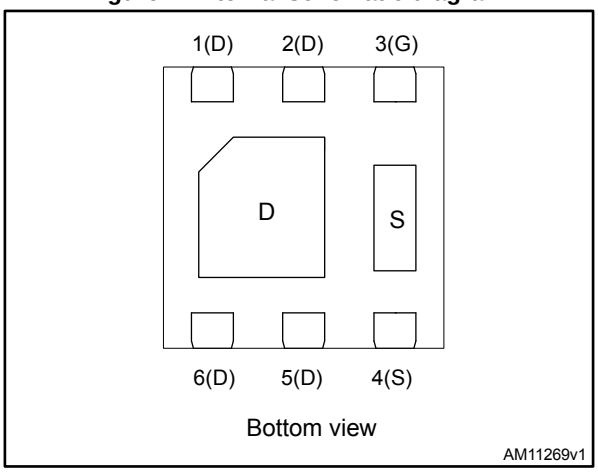


Figure 1: Internal schematic diagram



Features

Order code	V_{DS}	$R_{DS(on)}$ max	I_D
STL7N6F7	60 V	0.025 Ω	7 A

- Among the lowest $R_{DS(on)}$ on the market
- Excellent figure of merit (FoM)
- Low C_{rss}/C_{iss} ratio for EMI immunity
- High avalanche ruggedness

Applications

- Switching applications

Description

This N-channel Power MOSFET utilizes STripFET™ F7 technology with an enhanced trench gate structure that results in very low on-state resistance, while also reducing internal capacitance and gate charge for faster and more efficient switching.

Table 1: Device summary

Order code	Marking	Package	Packing
STL7N6F7	ST7N	PowerFLAT™ 2x2	Tape and reel

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1 Electrical ratings

Table 2: Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage	60	V
V_{GS}	Gate-source voltage	± 20	V
I_D	Drain current (continuous) at T_{pcb} = 25 °C	7	A
I_D	Drain current (continuous) at T_{pcb} = 100 °C	4.5	A
I_{DM} (1)	Drain current (pulsed)	28	A
P_{TOT}	Total dissipation at T_{pcb} = 25 °C	2.4	W
T_J	Operating junction temperature	-55 to 150	°C
T_{stg}	Storage temperature		

Notes:

(1)Pulse width limited by safe operating area.

Table 3: Thermal data

Symbol	Parameter	Value	Unit
$R_{thj\text{-}pcb}$ (1)	Thermal resistance junction-pcb max.	52	°C/W

Notes:

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

2 Electrical characteristics

(T_C = 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	I_D = 1 mA, V_{GS}= 0 V	60			V
I_{DSS}	Zero gate voltage drain current	V_{GS} = 0 V , V_{DS} = 60 V			1	µA
I_{GSS}	Gate-body leakage current	V_{GS} = 20 V, V_{DS} = 0 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 = 3.5A		0.021	0.025	Ω

Table 5: Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input capacitance	V_{DS} = 25 V, f = 1 MHz, V_{GS} = 0 V	-	450	-	pF
C_{oss}	Output capacitance		-	210	-	pF
C_{rss}	Reverse transfer capacitance		-	22	-	pF
Q_g	Total gate charge	V_{DD} = 48 V, I_D= 7 A V_{GS} = 10 V (see *Figure 3: "Test circuit for gate charge behavior"*)	-	8	-	nC
Q_{gs}	Gate-source charge		-	TBD	-	nC
Q_{gd}	Gate-drain charge		-	TBD	-	nC

Table 6: Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on delay time	V_{DD} = 30 V, I_D = 3.5A, R_G = 4.7 Ω, V_{GS} = 10 V (see *Figure 2: "Test circuit for resistive load switching times"*)	-	TBD	-	ns
t_r	Rise time		-	TBD	-	ns
$t_{d(off)}$	Turn-off delay time		-	TBD	-	ns
t_f	Fall time		-	TBD	-	ns

Table 7: Source-drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_{SD} (1)	Forward on voltage	I_{SD} = 7 A, V_{GS} = 0 V	-		1.2	V
t_{rr}	Reverse recovery time	I_D = 7 A, di/dt = 100 A/µs V_{DD} = 48 V (see *Figure 4: "Test circuit for inductive load switching and diode recovery times"*)	-	TBD		ns
Q_{rr}	Reverse recovery charge		-	TBD		nC
I_{RRM}	Reverse recovery current		-	TBD		A

Notes:

(1)Pulsed: pulse duration = 300 µs, duty cycle 1.5%

3 Test circuits

Figure 2: Test circuit for resistive load switching times

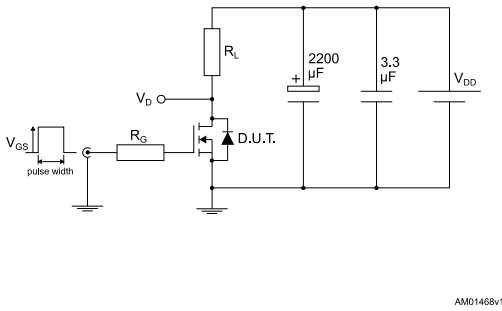


Figure 3: Test circuit for gate charge behavior

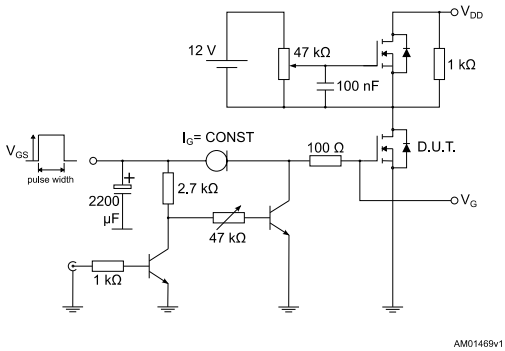


Figure 4: Test circuit for inductive load switching and diode recovery times

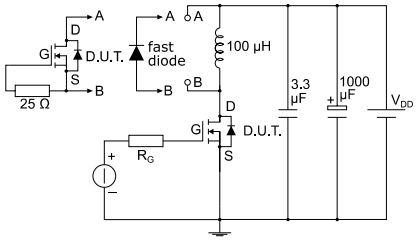


Figure 5: Unclamped inductive load test circuit

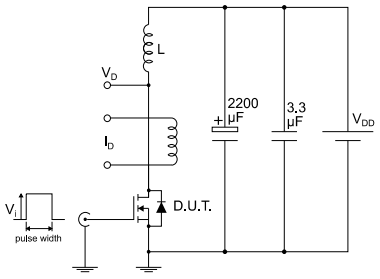


Figure 6: Unclamped inductive waveform

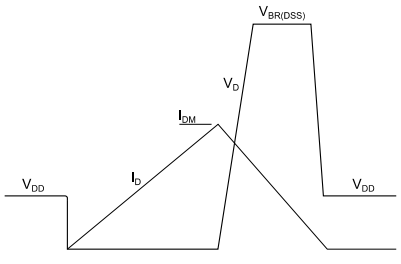
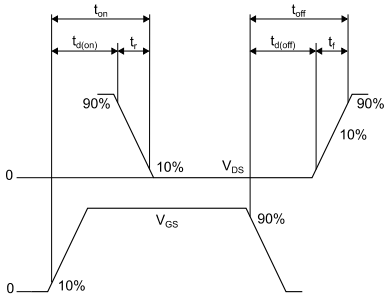


Figure 7: Switching time waveform



4 Package information

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.

4.1 PowerFLAT 2x2 package information

Figure 8: PowerFLAT™ 2x2 package outline

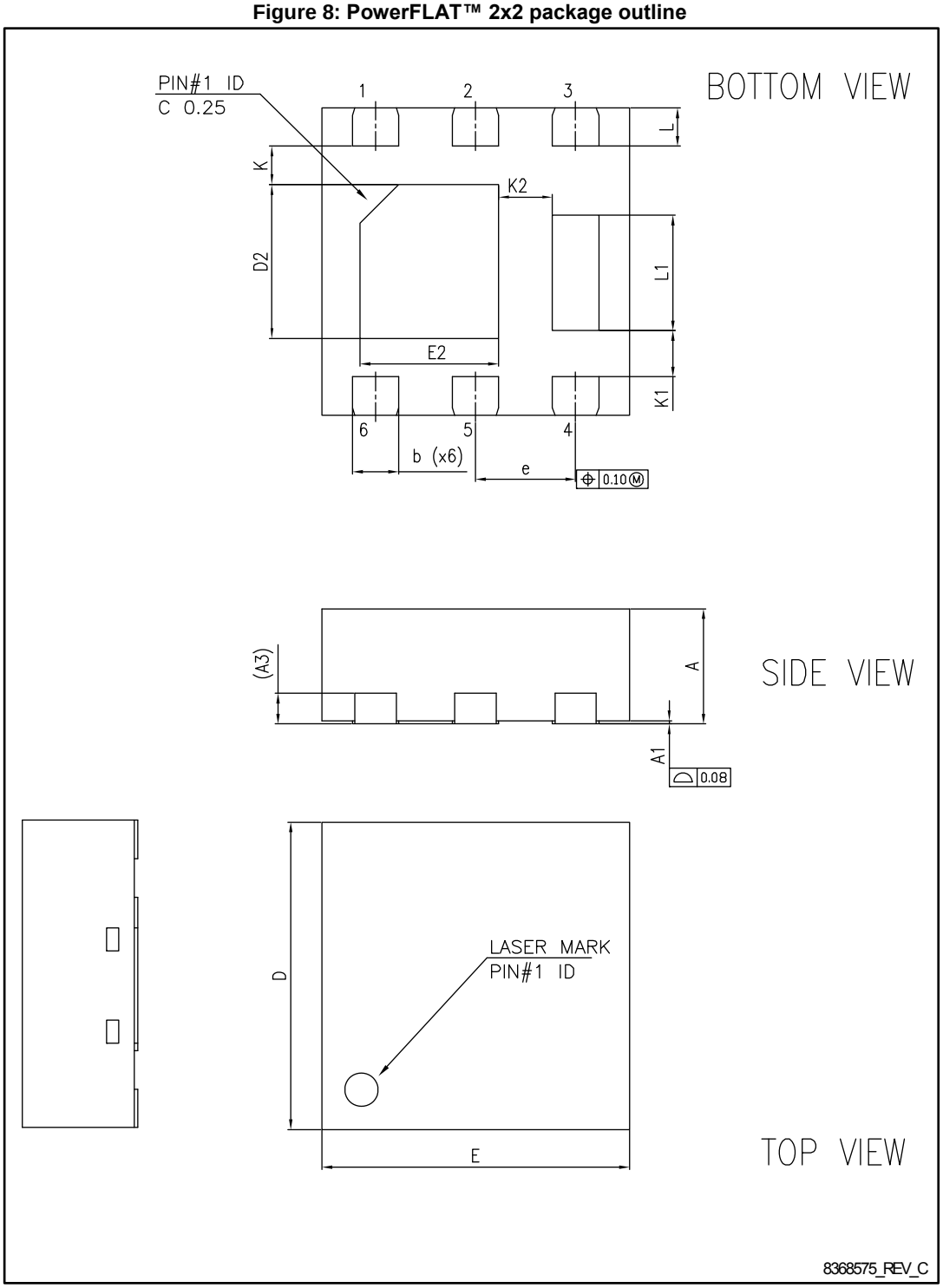
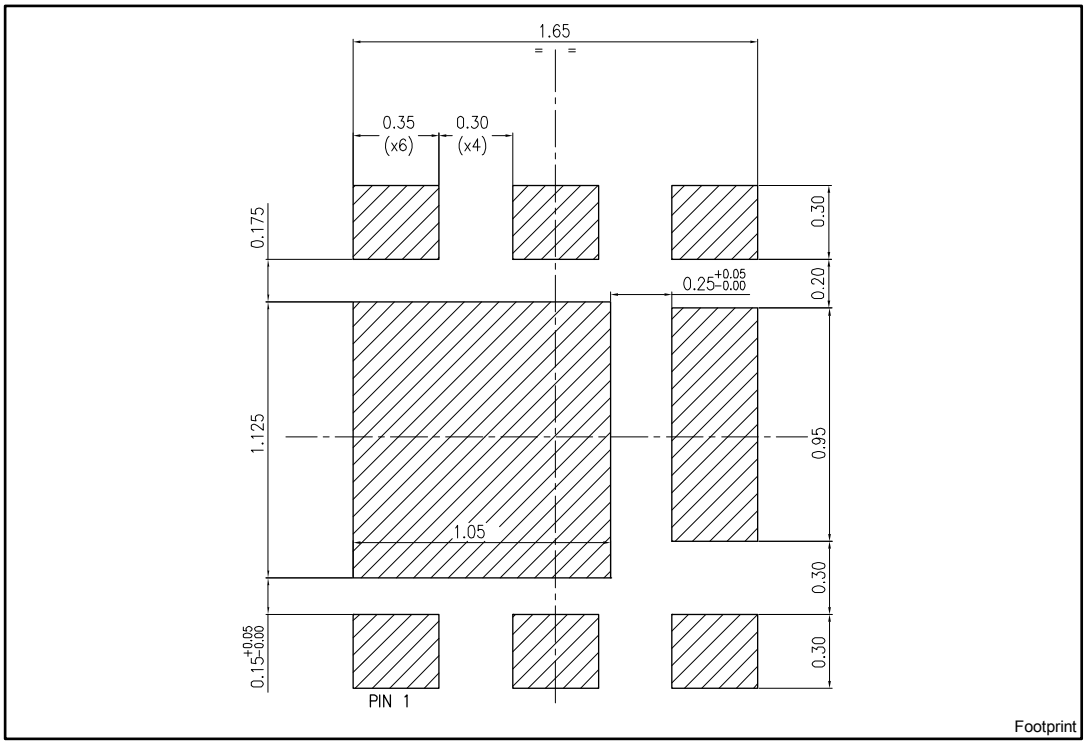


Table 8: PowerFLAT™ 2x2 mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A3		0.20	
b	0.25	0.30	0.35
D	1.90	2.00	2.10
E	1.90	2.00	2.10
D2	0.90	1.00	1.10
E2	0.80	0.90	1.00
e	0.55	0.65	0.75
K	0.15	0.25	0.35
K1	0.20	0.30	0.40
K2	0.25	0.35	0.45
L	0.20	0.25	0.30
L1	0.65	0.75	0.85

Figure 9: PowerFLAT™ 2x2 recommended footprint (dimensions are in mm)



5 Revision history

Table 9: Document revision history

Date	Revision	Changes
27-Aug-2015	1	First release.

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