



STL100N6LF6

N-channel 60 V, 0.0038 Ω , 22 A, PowerFLAT™ 5x6
STripFET™ VI DeepGATE™ Power MOSFET

Preliminary data

Features

Type	V _{DSS}	R _{DS(on)} max	I _D
STL100N6LF6	60 V	< 0.0045 Ω	22 A

- Low gate charge
- Very low on-resistance
- High avalanche ruggedness

Applications

- Switching applications

Description

This device is an N-channel Power MOSFET developed using the 6th generation of STripFET™ DeepGATE™ technology, with a new gate structure. The resulting Power MOSFET exhibits the lowest RDS(on) in all packages.

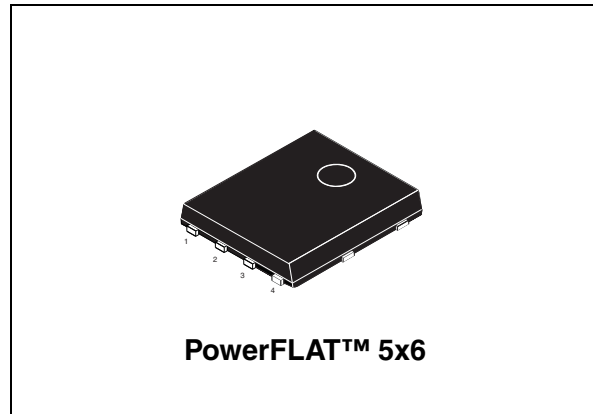


Figure 1. Internal schematic diagram

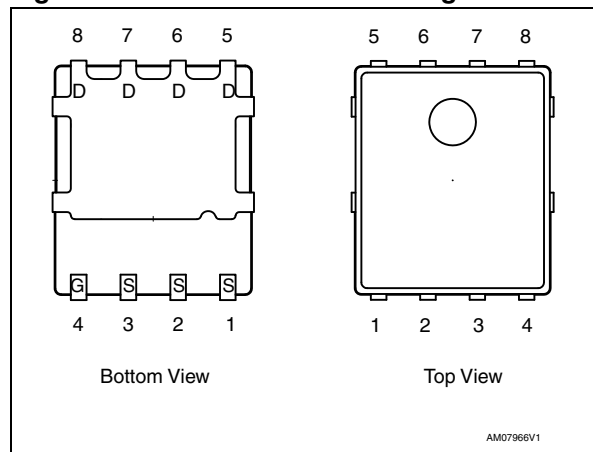


Table 1. Device summary

Order code	Marking	Package	Packaging
STL100N6LF6	100N6LF6	PowerFLAT™ 5x6	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
$I_D^{(1)}$	Drain current (continuous) at $T_C = 25\text{ }^\circ\text{C}$	100	A
$I_D^{(2)}$	Drain current (continuous) at $T_{pcb} = 25\text{ }^\circ\text{C}$	22	A
$I_D^{(2)}$	Drain current (continuous) at $T_{pcb}=100\text{ }^\circ\text{C}$	14	A
$I_{DM}^{(3)}$	Drain current (pulsed)	88	A
$P_{TOT}^{(1)}$	Total dissipation at $T_C = 25\text{ }^\circ\text{C}$	80	W
$P_{TOT}^{(2)}$	Total dissipation at $T_{pcb} = 25\text{ }^\circ\text{C}$	4	W
T_{stg}	Storage temperature	- 55 to 150	$^\circ\text{C}$
T_j	Operating junction temperature		

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

Table 3. Thermal data

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

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

Table 4. Avalanche characteristics

Symbol	Parameter	Max value	Unit
I_{AS}	Avalanche current, repetitive or not-repetitive (pulse width limited by T_j max)	TBD	A
E_{AS}	Single pulse avalanche energy (starting $T_j = 25\text{ }^\circ\text{C}$, $I_D = I_{AS}$, $V_{DD} = 50\text{ V}$)	TBD	mJ

2 Electrical characteristics

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

Table 5. On/off states

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	$I_D = 1\text{ mA}$, $V_{GS} = 0$	60			V
I_{DSS}	Zero gate voltage drain current ($V_{GS} = 0$)	$V_{DS} = 60\text{ V}$, $V_{DS} = 60\text{ V}$, $T_C = 125\text{ }^{\circ}\text{C}$			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	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	1		2.5	V
$R_{DS(on)}$	Static drain-source on resistance	$V_{GS} = 10\text{ V}$, $I_D = 11\text{ A}$		0.0038	0.0045	Ω
		$V_{GS} = 4.5\text{ V}$, $I_D = 11\text{ A}$		0.006	0.0072	Ω

Table 6. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{iss} C_{oss} C_{rss}	Input capacitance Output capacitance Reverse transfer capacitance	$V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$, $V_{GS} = 0$	-	8900 650 360	-	pF pF pF
Q_g Q_{gs} Q_{gd}	Total gate charge Gate-source charge Gate-drain charge	$V_{DD} = 30\text{ V}$, $I_D = 22\text{ A}$ $V_{GS} = 10\text{ V}$ (see Figure 3)	-	130 TBD TBD	-	nC nC nC
R_g	Gate input resistance	$f = 1\text{ MHz}$ Gate DC Bias=0 test signal level=20 mV open drain	-	TBD	-	Ω

Table 7. 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	$V_{DD} = 30\text{ V}$, $I_D = 11\text{ A}$, $R_G = 4.7\text{ }\Omega$, $V_{GS} = 10\text{ V}$ (see Figure 2)	-	TBD TBD TBD TBD	-	ns ns ns ns

Table 8. Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max	Unit
I_{SD}	Source-drain current		-		22	A
$I_{SDM}^{(1)}$	Source-drain current (pulsed)		-		84	A
$V_{SD}^{(2)}$	Forward on voltage	$I_{SD} = 22\text{ A}$, $V_{GS} = 0$	-		1.3	V
t_{rr} Q_{rr} I_{RRM}	Reverse recovery time Reverse recovery charge Reverse recovery current	$I_{SD} = 22\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$, $V_{DD} = 30\text{ V}$, $T_J = 150\text{ }^\circ\text{C}$ (see Figure 4)	-	TBD TBD TBD		ns nC A

1. Pulse width limited by safe operating area

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

Figure 2. Switching times test circuit for resistive load

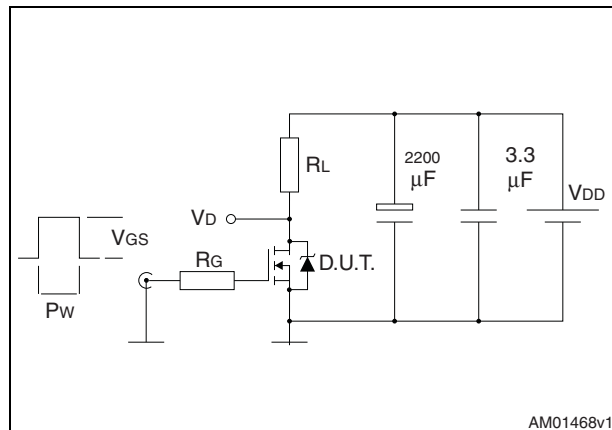


Figure 4. Test circuit for inductive load switching and diode recovery times

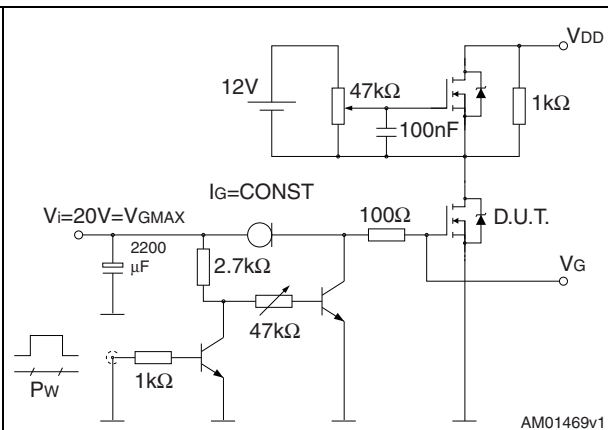
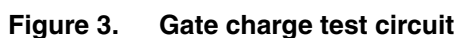


Figure 5. Unclamped inductive load test circuit

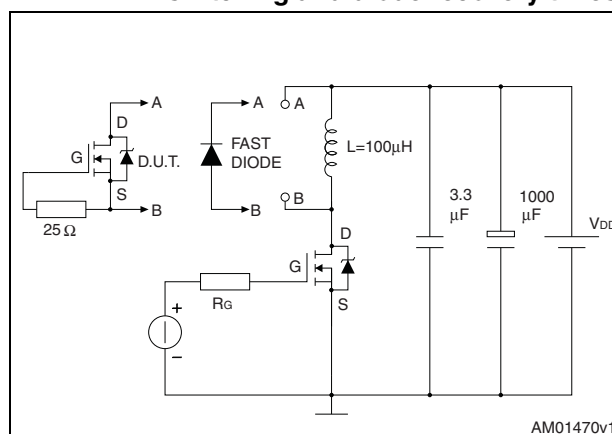


Figure 6. Unclamped inductive waveform

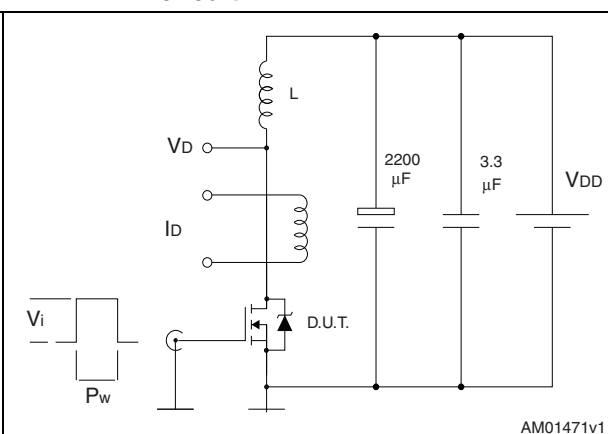
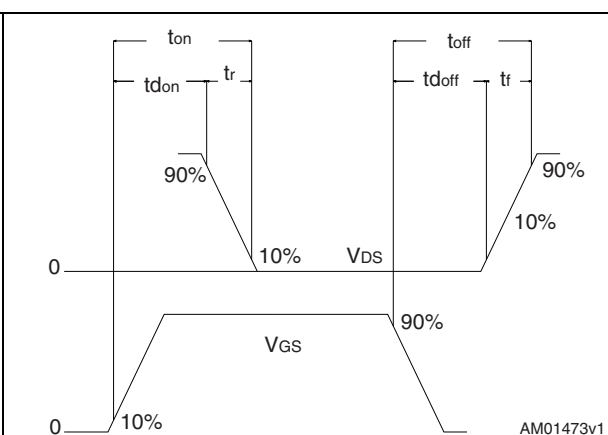
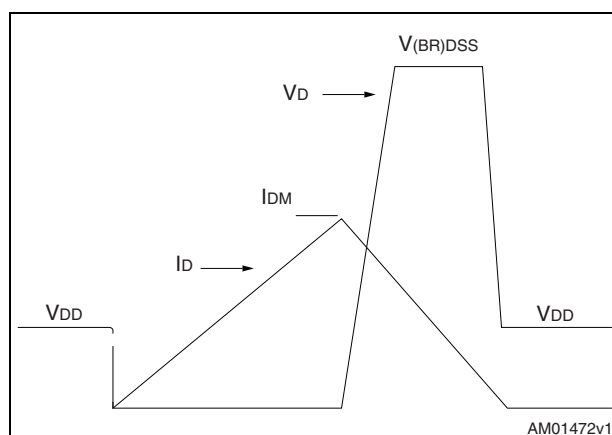


Figure 7. Switching time waveform



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 9. PowerFLAT™ 5x6 type C-B mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	0.80	0.83	0.93
A1	0	0.02	0.05
A3		0.20	
b	0.35	0.40	0.47
D		5.00	
D1		4.75	
D2	4.15	4.20	4.25
E		6.00	
E1		5.75	
E2	3.43	3.48	3.53
E4	2.58	2.63	2.68
e		1.27	
L	0.70	0.80	0.90

Figure 8. PowerFLAT™ 5x6 type C-B drawing

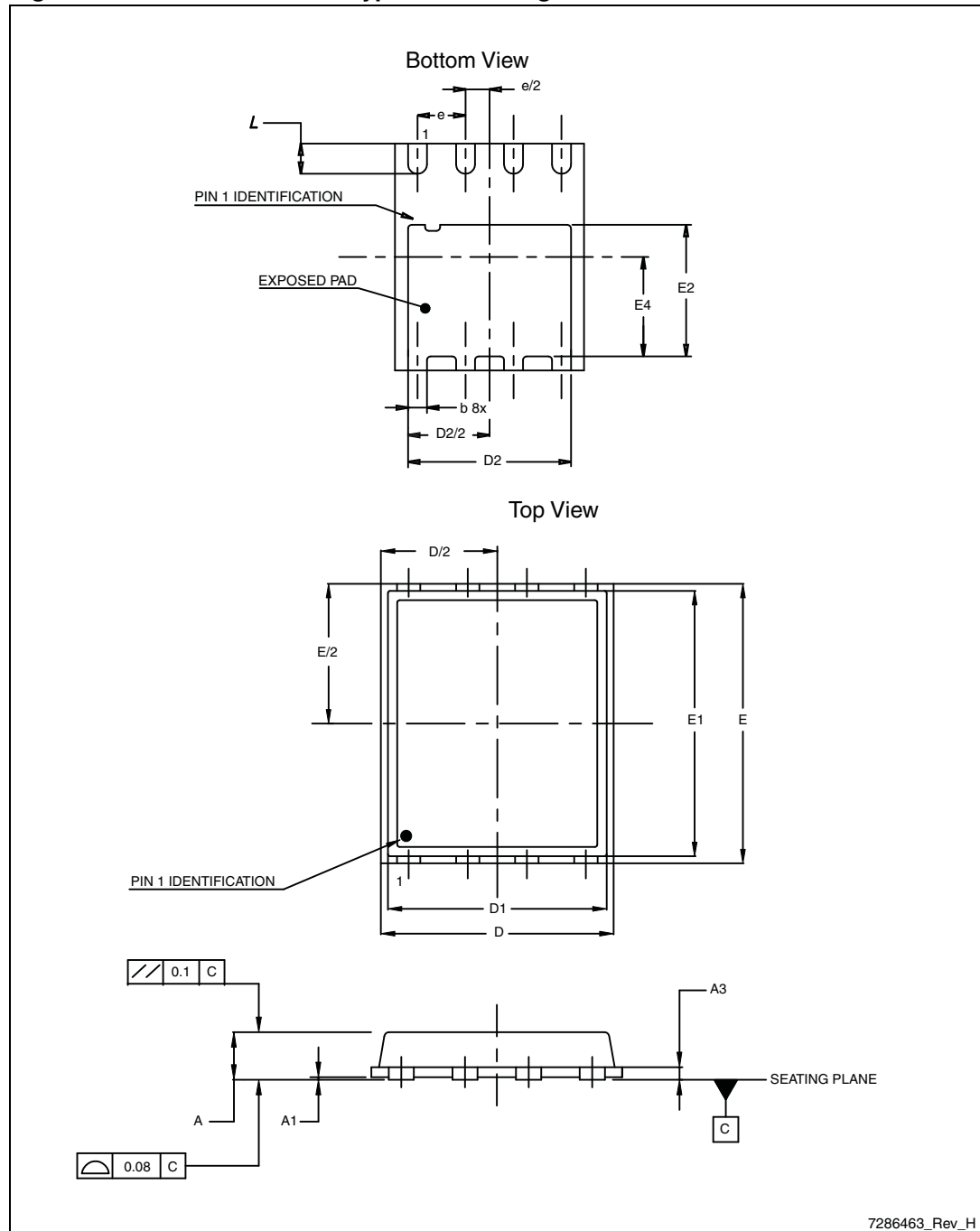


Table 10. PowerFLAT™ 5x6 type S-C mechanical data

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 9. PowerFLAT™ 5x6 type S-C mechanical data

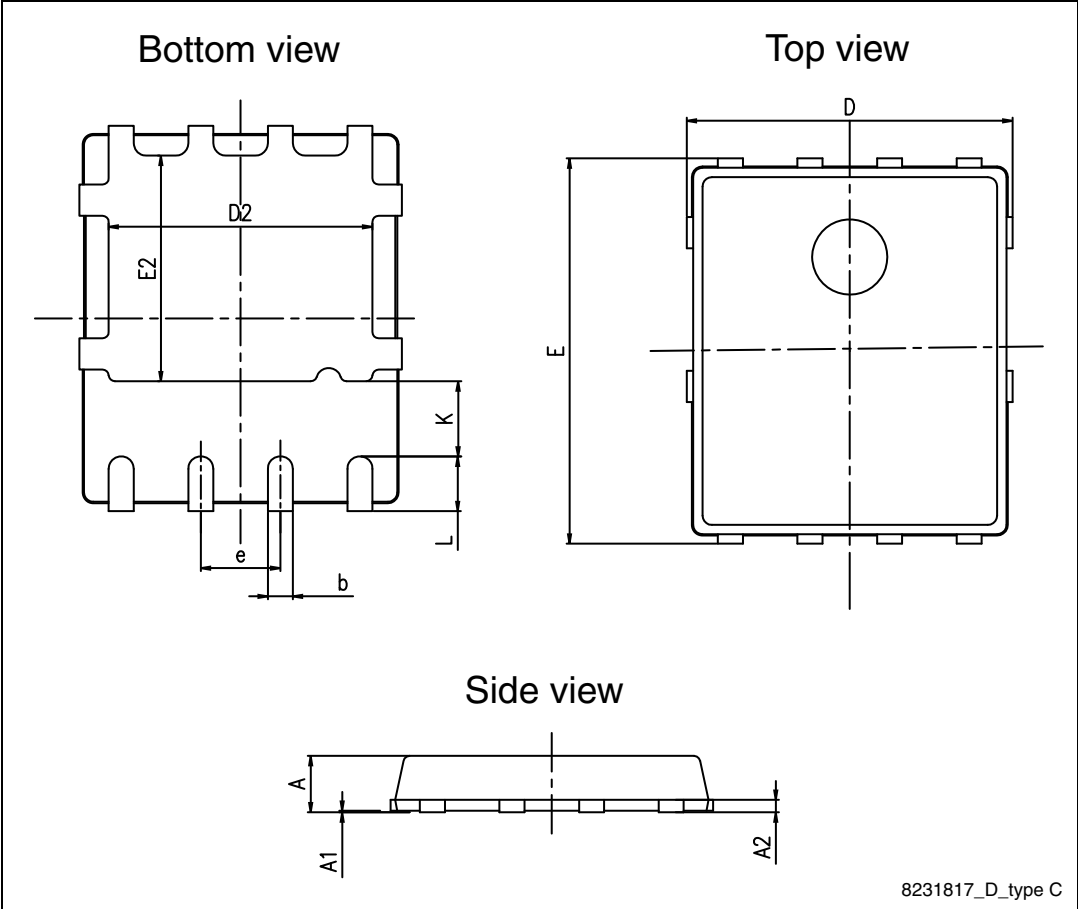
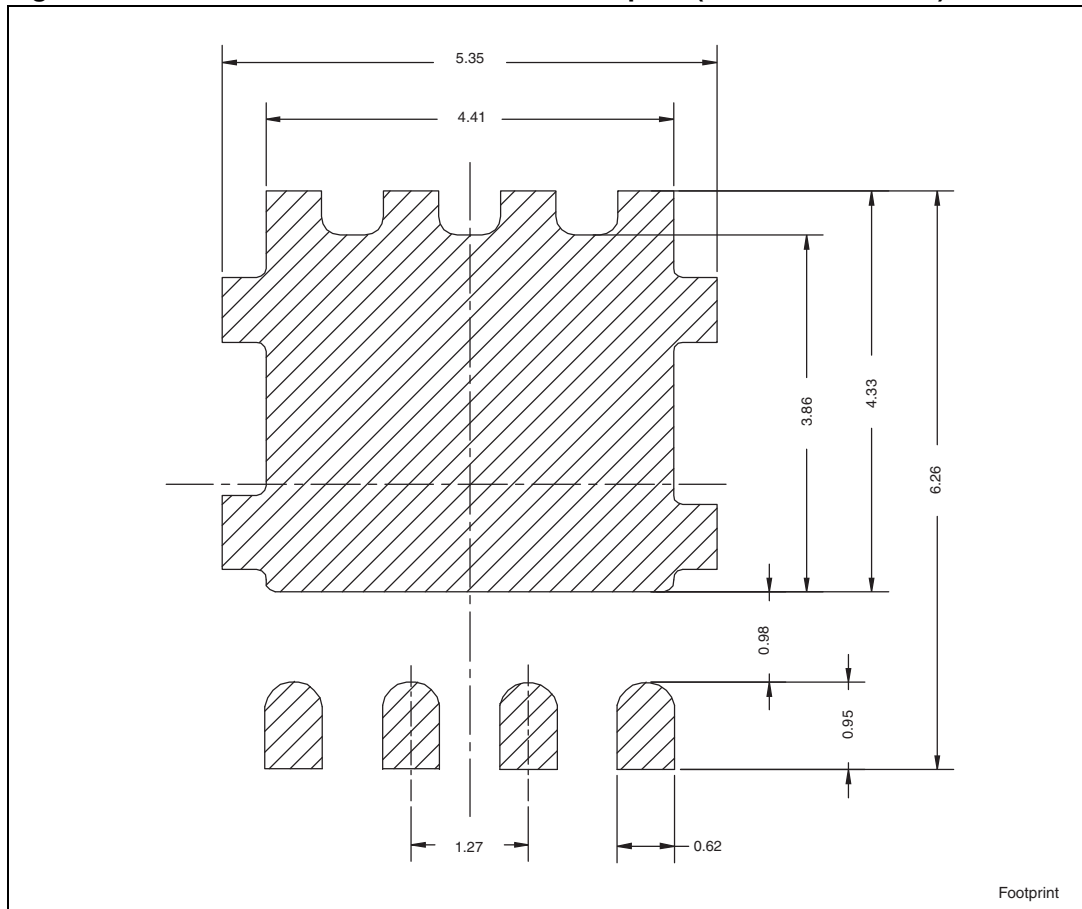


Figure 10. PowerFLAT™ 5x6 recommended footprint (dimensions in mm)



5 Revision history

Table 11. Document revision history

Date	Revision	Changes
24-Feb-2011	1	First release
10-Nov-2011	2	Section 4: Package mechanical data has been updated. Minor text changes.

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