



# STL35N6F3

N-channel 60 V, 0.018  $\Omega$ , 10 A, PowerFLAT™ 5x6  
STripFET™ III Power MOSFET

## Features

Type	V <sub>DSS</sub>	R <sub>DS(on) max</sub>	I <sub>D</sub>
STL35N6F3	60 V	< 0.022 $\Omega$	10 A

- N-channel enhancement mode
- 100% avalanche rated
- Low gate charge
- Very low on-resistance

## Applications

- Switching applications

## Description

This device is an N-channel enhancement mode Power MOSFET produced using STMicroelectronics' STripFET™ III technology, which is specifically designed to minimize on-resistance and gate charge to provide superior switching performance.

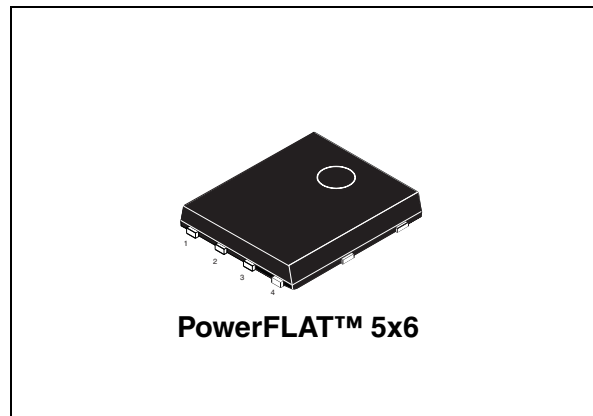


Figure 1. Internal schematic diagram



Table 1. Device summary

Order code	Marking	Package	Packaging
STL35N6F3	35N6F3	PowerFLAT™ 5x6	Tape and reel

# Contents

1	<b>Electrical ratings</b> .....	3
2	<b>Electrical characteristics</b> .....	4
3	<b>Test circuits</b> .....	6
4	<b>Package mechanical data</b> .....	7
5	<b>Revision history</b> .....	12

# 1 Electrical ratings

**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-source voltage	60	V
$V_{GS}$	Gate-source voltage	$\pm 20$	V
$I_D^{(1)}$	Drain current (continuous) at $T_C = 25\text{ }^\circ\text{C}$	44	A
$I_D^{(2)}$	Drain current (continuous) at $T_{pcb} = 25\text{ }^\circ\text{C}$	10	A
$I_D^{(2)}$	Drain current (continuous) at $T_{pcb}=100\text{ }^\circ\text{C}$	6.2	A
$I_{DM}^{(3)}$	Drain current (pulsed)	40 <sup>(2)</sup>	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	$^\circ\text{C}/\text{W}$
$R_{thj-case}$	Thermal resistance junction-case max.	1.56	$^\circ\text{C}/\text{W}$

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

( $T_J = 25\text{ °C}$  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 ( $V_{GS} = 0$ )	$V_{DS} = 60\text{ V}$ , $V_{DS} = 60\text{ V}$ , $T_C = 125\text{ °C}$			1 10	$\mu\text{A}$ $\mu\text{A}$
$I_{GSS}$	Gate body leakage current ( $V_{DS} = 0$ )	$V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}$ , $I_D = 250\text{ }\mu\text{A}$	2		4	V
$R_{DS(on)}$	Static drain-source on resistance	$V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$		0.018	0.022	$\Omega$

**Table 6. Dynamic**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$C_{iss}$	Input capacitance	$V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$ , $V_{GS} = 0$	-	TBD	-	pF
$C_{oss}$	Output capacitance			TBD		pF
$C_{rss}$	Reverse transfer capacitance			TBD		pF
$Q_g$	Total gate charge	$V_{DD} = 75\text{ V}$ , $I_D = 6\text{ A}$ $V_{GS} = 10\text{ V}$ (see <a href="#">Figure 3</a> )	-	TBD	-	nC
$Q_{gs}$	Gate-source charge			TBD		nC
$Q_{gd}$	Gate-drain charge			TBD		nC
$R_g$	Gate input resistance	$f = 1\text{ MHz}$ Gate DC Bias=0 test signal level=20 mV open drain	-	TBD	-	$\Omega$

**Table 7. Switching times**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on delay time	$V_{DD} = 75\text{ V}$ , $I_D = 3\text{ A}$ , $R_G = 4.7\text{ }\Omega$ , $V_{GS} = 10\text{ V}$ (see <a href="#">Figure 2</a> )	-	TBD	-	ns
$t_r$	Rise time			TBD		ns
$t_{d(off)}$	Turn-off delay time			TBD		ns
$t_f$	Fall time			TBD		ns

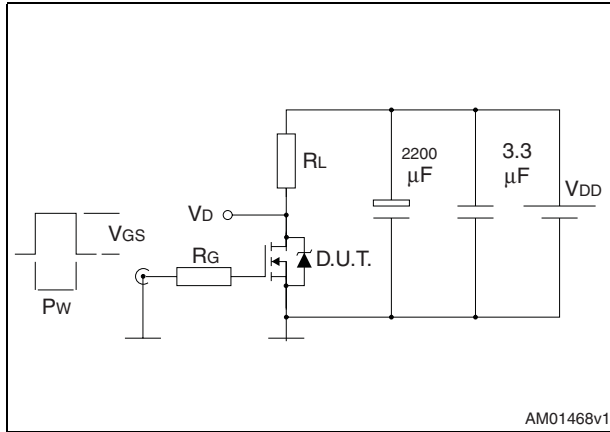
**Table 8. Source drain diode**

Symbol	Parameter	Test conditions	Min.	Typ.	Max	Unit
$I_{SD}$	Source-drain current		-		10	A
$I_{SDM}^{(1)}$	Source-drain current (pulsed)		-		40	A
$V_{SD}^{(2)}$	Forward on voltage	$I_{SD} = 6\text{ A}, V_{GS} = 0$	-		TBD	V
$t_{rr}$ $Q_{rr}$ $I_{RRM}$	Reverse recovery time Reverse recovery charge Reverse recovery current	$I_{SD} = 6\text{ A},$ $di/dt = 100\text{ A}/\mu\text{s},$ $V_{DD} = 120\text{ V}, T_J = 150\text{ }^\circ\text{C}$ (see <a href="#">Figure 4</a> )	-	TBD TBD TBD		ns nC A

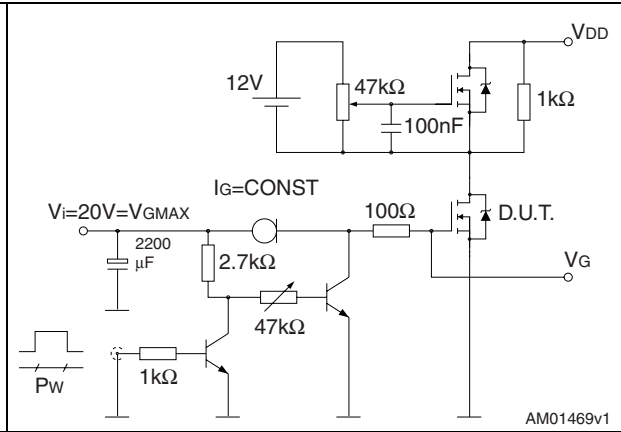
1. Pulse width limited by safe operating area
2. Pulsed: pulse duration= 300 $\mu\text{s}$ , duty cycle 1.5%

### 3 Test circuits

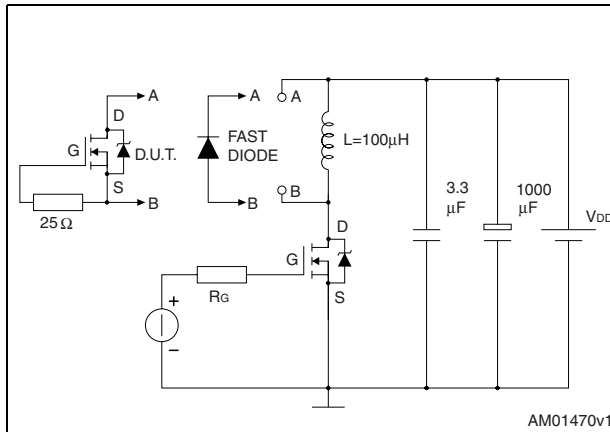
**Figure 2. Switching times test circuit for resistive load**



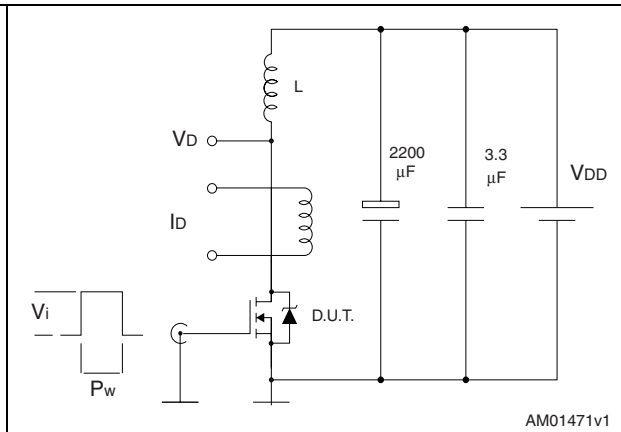
**Figure 3. Gate charge test circuit**



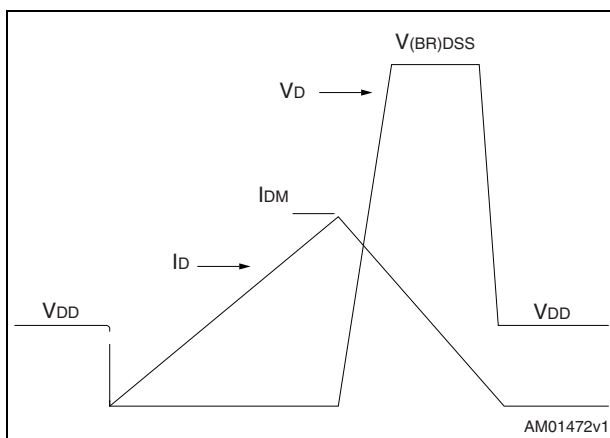
**Figure 4. Test circuit for inductive load switching and diode recovery times**



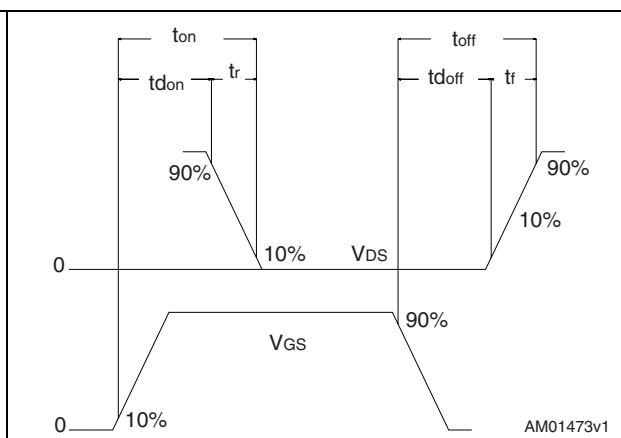
**Figure 5. Unclamped inductive load test circuit**



**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<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://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

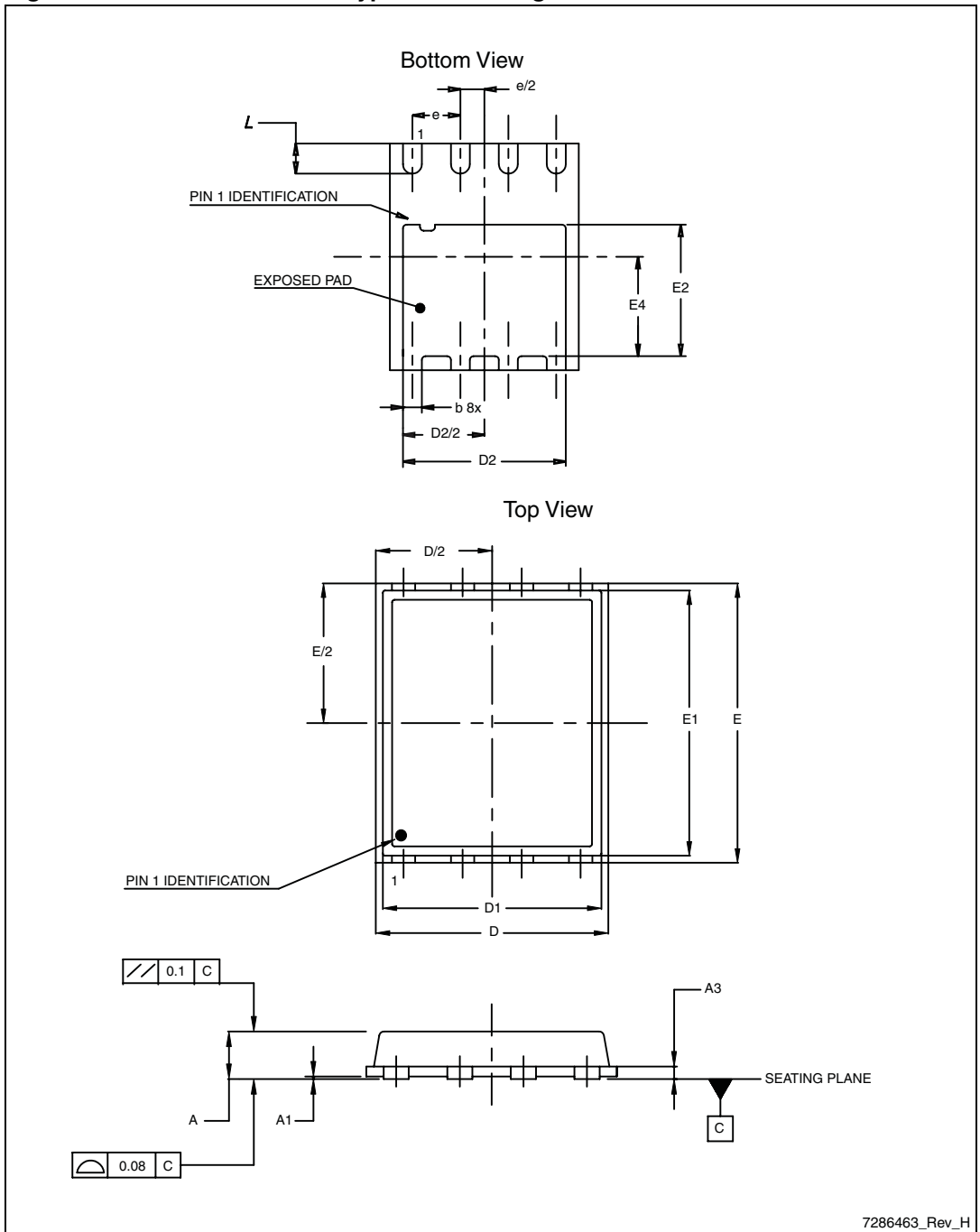


Table 10. PowerFLAT™ 5x6 type S-C mechanical data

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

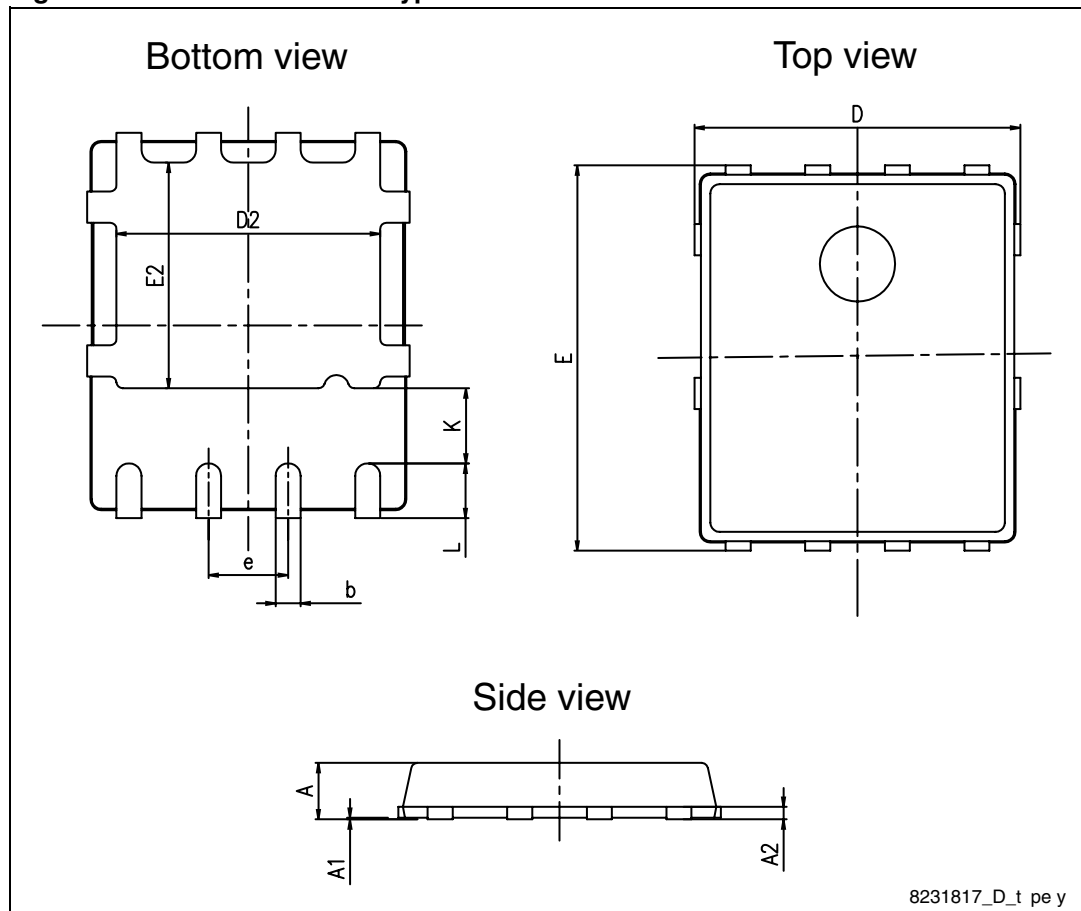
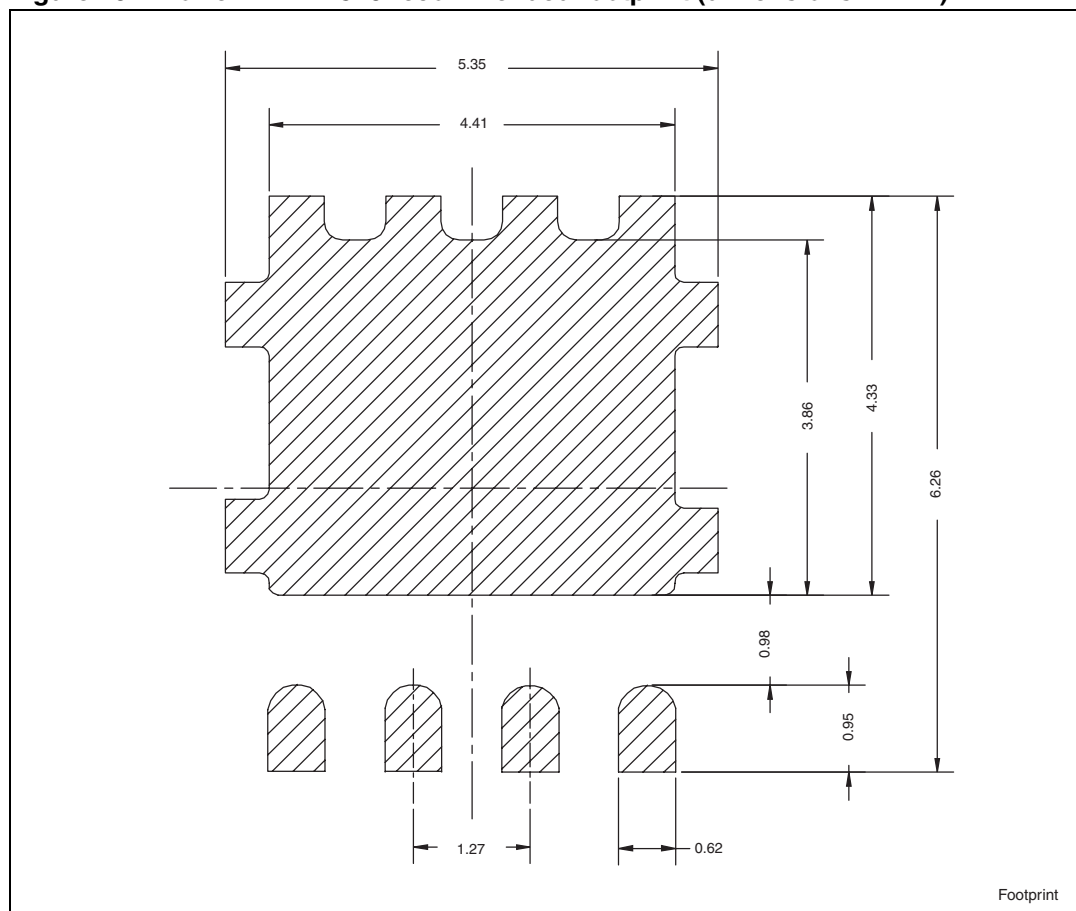


Figure 10. PowerFLAT™ 5x6 recommended footprint (dimensions in mm)



## 5 Revision history

Table 11. Document revision history

Date	Revision	Changes
29-Oct-2009	1	First release.
15-Nov-2011	2	<i>Section 4: Package mechanical data</i> has been updated. Minor text changes. Document status promoted from preliminary data to datasheet.

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