

Excellent Integrated System Limited

Stocking Distributor

Click to view price, real time Inventory, Delivery & Lifecycle Information:

[STMicroelectronics](#)

[STS10P4LLF6](#)

For any questions, you can email us directly:

sales@integrated-circuit.com



STS10P4LLF6

P-channel 40 V, 0.0125 Ω typ., 10 A, StripFET™ F6 Power MOSFET in SO-8 package

Datasheet - production data

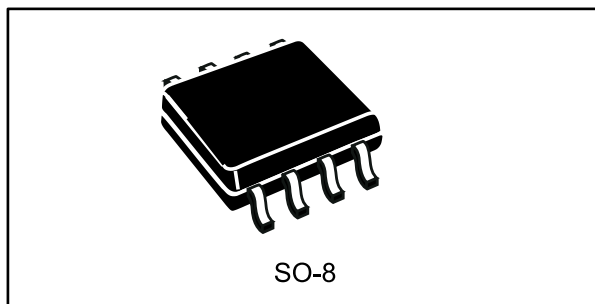
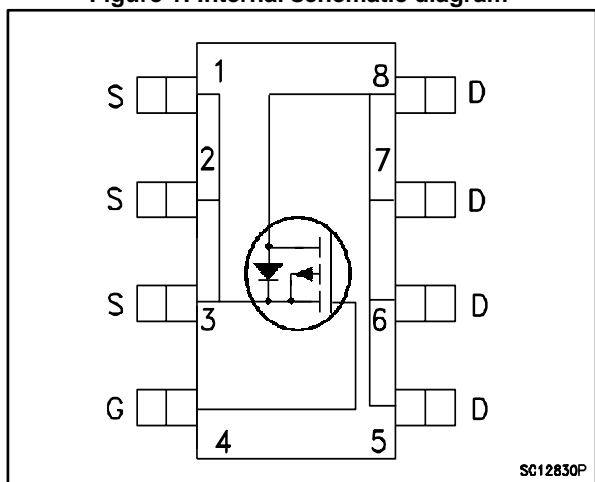


Figure 1: Internal schematic diagram



- Very low on-resistance
- Very low gate charge
- High avalanche ruggedness
- Low gate drive power loss

Applications

- Switching applications

Description

This device is a P-channel Power MOSFET developed using the STripFET™ F6 technology with a new trench gate structure. The resulting Power MOSFET exhibits very low $R_{DS(on)}$ in all packages.

Table 1: Device summary

Order code	Marking	Package	Packaging
STS10P4LLF6	10K4L	SO-8	Tape and reel

For the P-channel MOSFET actual polarity of voltages and current have to be reversed

Features

Order code	V_{DS}	$R_{DS(on)}$ max.	I_D
STS10P4LLF6	40 V	0.015	10 A

Contents

1	Electrical ratings	3
2	Electrical characteristics	4
3	Electrical characteristics (curves).....	6
4	Test circuits	8
5	Package mechanical data	9
	5.1 SO-8 package mechanical data	9
6	Packaging mechanical data.....	12
7	Revision history	13

1 Electrical ratings

Table 2: Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage	40	V
V_{GS}	Gate- source voltage	± 20	V
I_D	Drain current (continuous) at $T_{amb} = 25\text{ }^\circ\text{C}$	10	A
I_D	Drain current (continuous) at $T_{amb} = 100\text{ }^\circ\text{C}$	5.6	A
$I_{DM}^{(1)}$	Drain current (pulsed)	40	A
$P_{TOT}^{(1)}$	Total dissipation at $T_{amb} = 25\text{ }^\circ\text{C}$	2.7	W
T_{stg}	Storage temperature	-55 to 150	$^\circ\text{C}$
T_j	Operating junction temperature	150	$^\circ\text{C}$

Notes:

⁽¹⁾Pulse width limited by safe operating area

Table 3: Thermal data

Symbol	Parameter	Value	Unit
$R_{thj-amb}^{(1)}$	Thermal resistance junction-ambient	47	$^\circ\text{C/W}$

Notes:

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



For the P-channel MOSFET actual polarity of voltages and current have to be reversed

Electrical characteristics

STS10P4LLF6

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	I _D = 250 μA	40			V
I _{DSS}	Zero gate voltage drain current (V _{GS} = 0)	V _{DS} = 40 V			1	μA
		V _{DS} = 30 V, T _C = 125 °C			10	
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	1			V
R _{DS(on)}	Static drain-source on-resistance	V _{GS} = 10 V, I _D = 3 A		0.0125	0.015	Ω
		V _{GS} = 4.5 V, I _D = 3 A		0.017	0.02	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	-	3525	-	pF
C _{oss}	Output capacitance		-	344	-	pF
C _{riss}	Reverse transfer capacitance		-	238.5	-	pF
Q _g	Total gate charge	V _{DD} = 20 V I _D = 10 A V _{GS} = 4.5 V	-	34	-	nC
Q _{gs}	Gate-source charge		-	11.3	-	nC
Q _{gd}	Gate-drain charge		-	13.8	-	nC

Table 6: Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
t _{d(on)}	Turn-on delay time	V _{DD} = 20 V, I _D = 5 A R _G = 4.7 Ω V _{GS} = 10 V	-	49.4	-	ns
t _r	Rise time			60.6		
t _{d(off)}	Turn-off delay time			170		
t _f	Fall time			20		



For the P-channel MOSFET actual polarity of voltages and current have to be reversed

STS10P4LLF6

Electrical characteristics

Table 7: Source-drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{SD}^{(1)}$	Forward on voltage	$I_{SD} = 3\text{ A}, V_{GS} = 0$	-		1.1	V
t_{rr}	Reverse recovery time	$I_{SD} = 5\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 10\text{ V}, T_j = 150\text{ }^\circ\text{C}$	-	29		ns
Q_{rr}	Reverse recovery charge		-	27.6		nC
I_{RRM}	Reverse recovery current		-	1.9		A

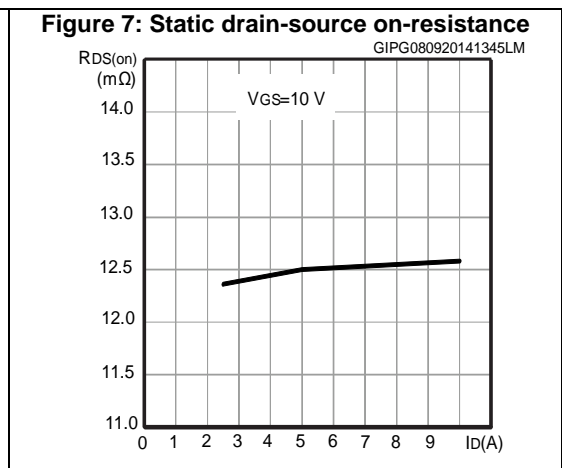
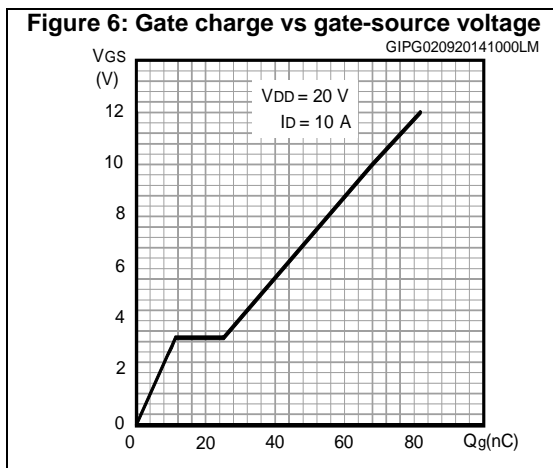
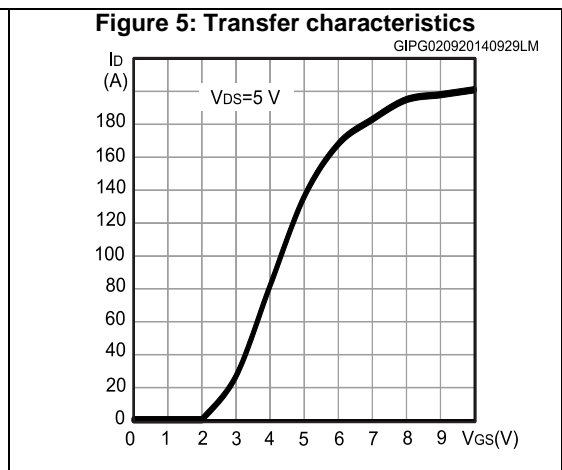
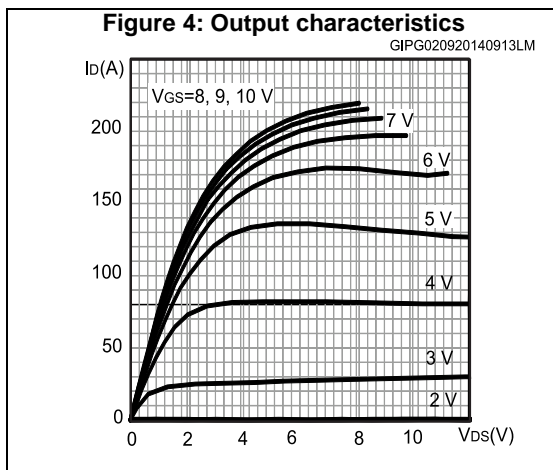
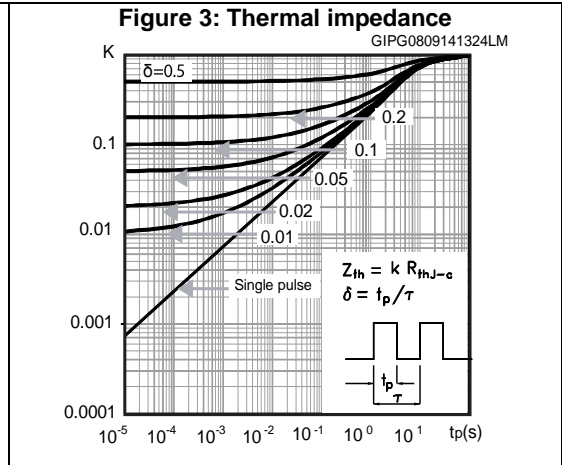
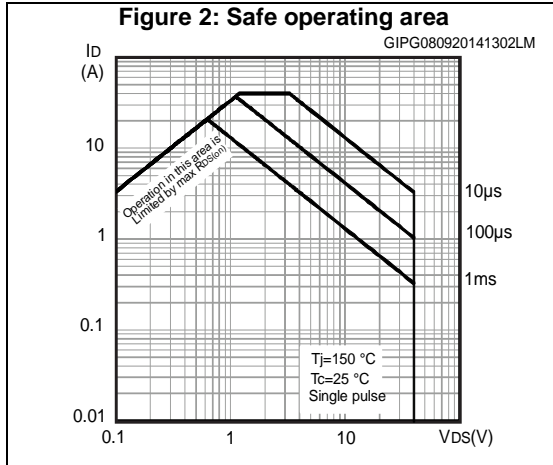
Notes:

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



For the P-channel MOSFET actual polarity of voltages and current have to be reversed

3 Electrical characteristics (curves)



STS10P4LLF6

Electrical characteristics (curves)

Figure 8: Capacitance variation

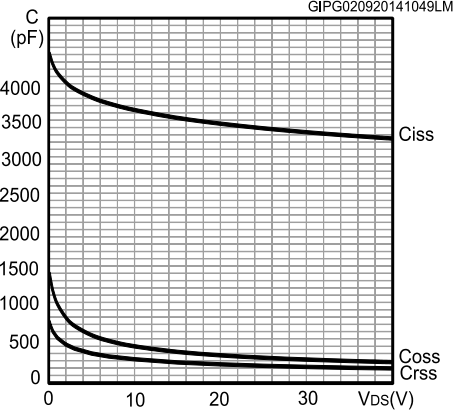


Figure 9: Normalized gate threshold voltage vs temperature

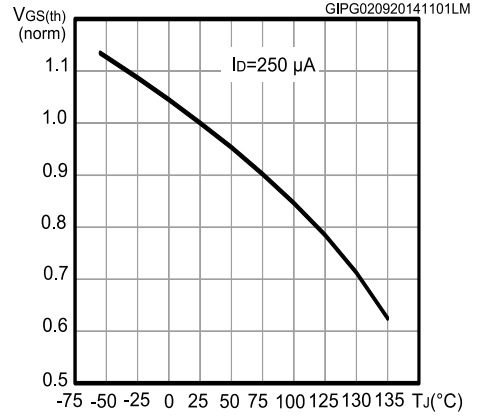


Figure 10: Normalized on-resistance vs temperature

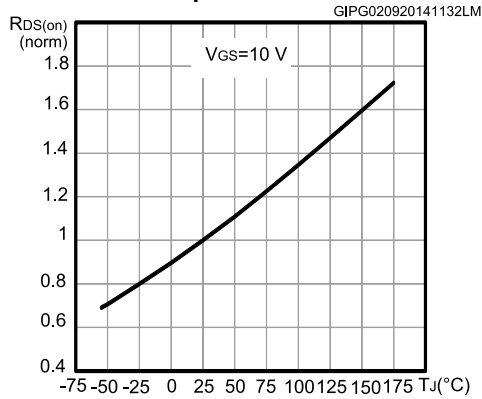


Figure 11: Normalized VBR(DSS) vs temperature

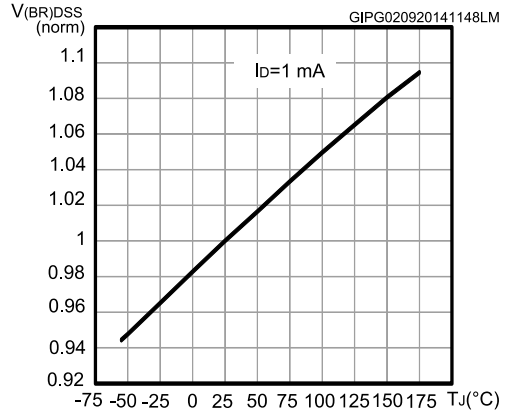
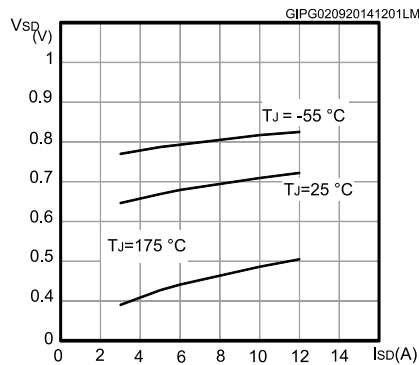


Figure 12: Source-drain diode forward characteristics

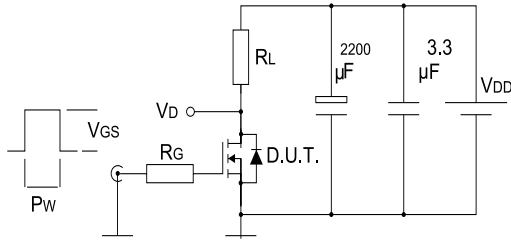


Test circuits

STS10P4LLF6

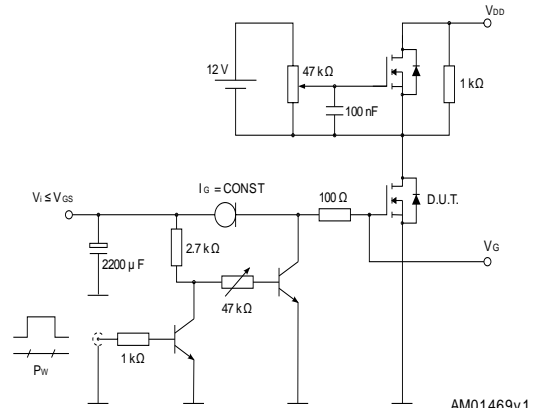
4 Test circuits

Figure 13: Switching times test circuit for resistive load



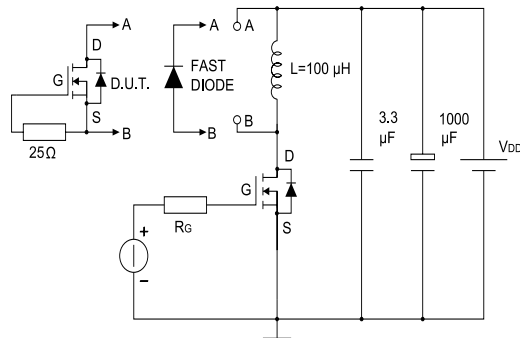
AM01468v1

Figure 14: Gate charge test circuit



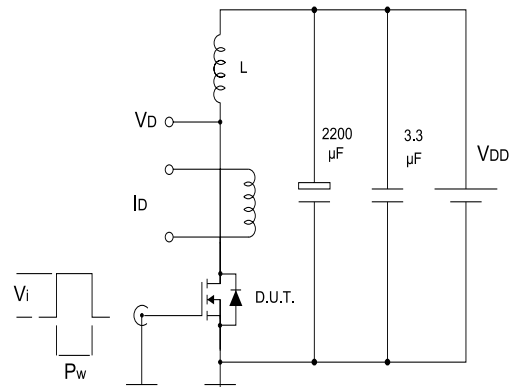
AM01469v1

Figure 15: Test circuit for inductive load switching and diode recovery times



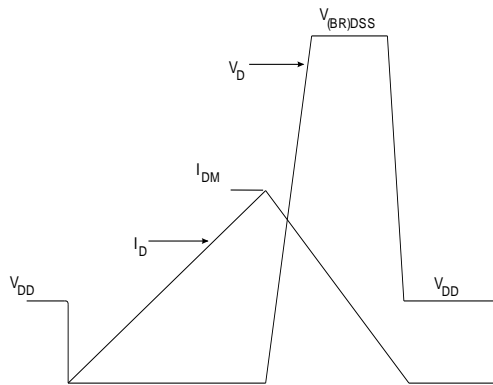
AM01470v1

Figure 16: Unclamped inductive load test circuit



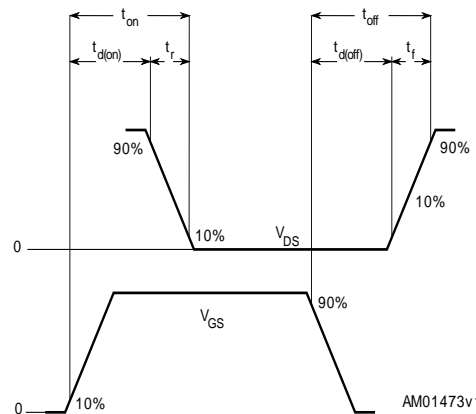
AM01471v1

Figure 17: Unclamped inductive waveform



AM01472v1

Figure 18: Switching time waveform



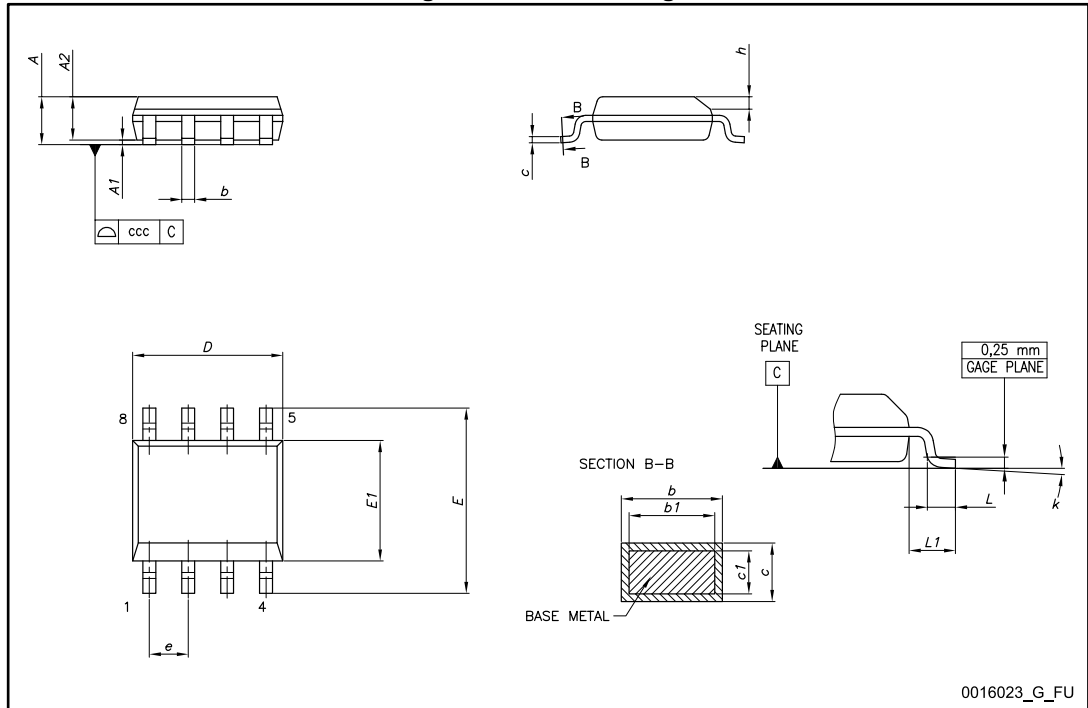
AM01473v1

5 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.

5.1 SO-8 package mechanical data

Figure 19: SO-8 drawings



Package mechanical data

STS10P4LLF6

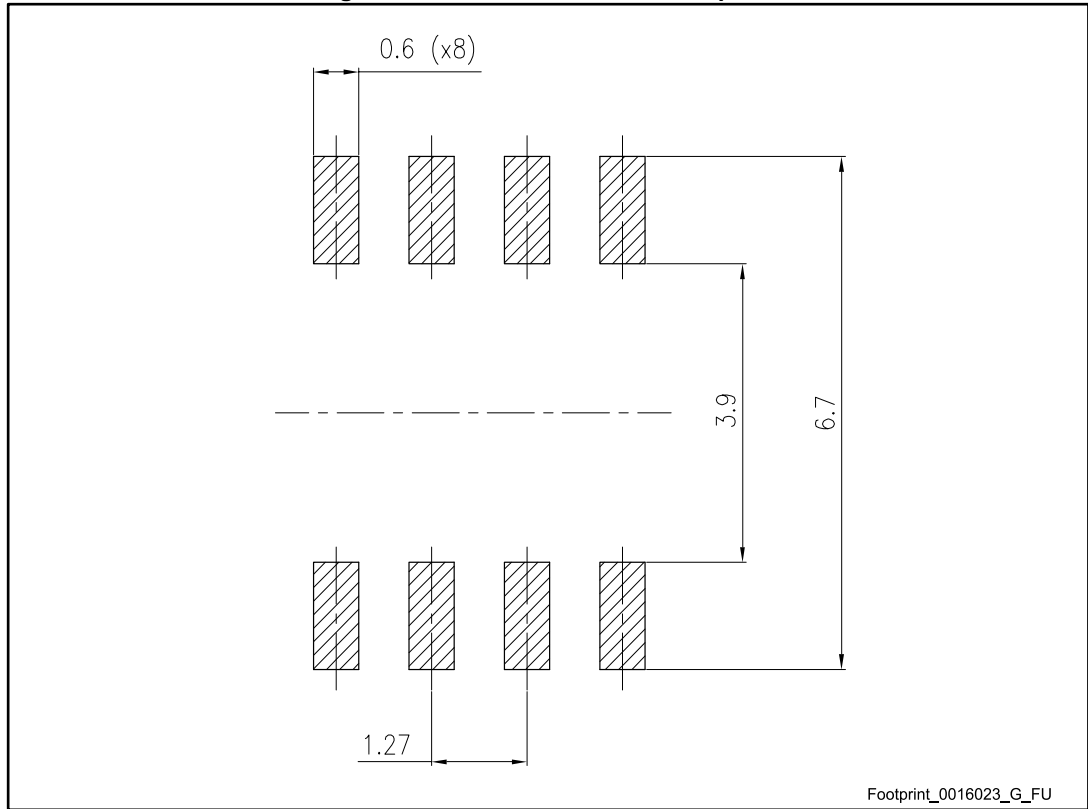
Table 8: SO-8 mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A			1.75
A1	0.10		0.25
A2	1.25		
b	0.31		0.51
b1	0.28		0.48
c	0.10		0.25
c1	0.10		0.23
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e		1.27	
h	0.25		0.50
L	0.40		1.27
L1		1.04	
L2		0.25	
k	0°		8°
ccc			0.10

STS10P4LLF6

Package mechanical data

Figure 20: SO-8 recommended footprint



All dimensions are in mm

6 Packaging mechanical data

Figure 21: SO-8 tape and reel dimensions

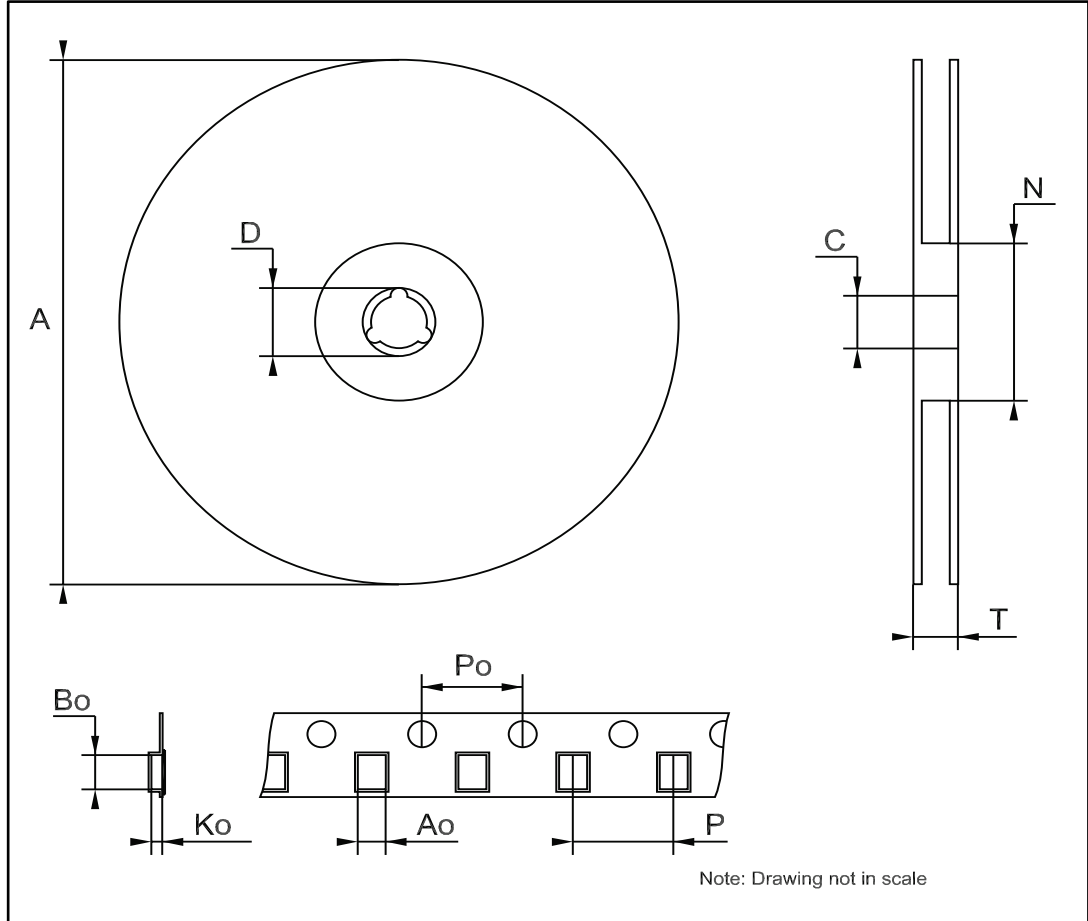


Table 9: SO-8 tape and reel mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A			330
C	12.8		13.2
D	20.2		
N	60		
T			22.4
Ao	8.1		8.5
Bo	5.5		5.9
Ko	2.1		2.3
Po	3.9		4.1
P	7.9		8.1

7 Revision history

Table 10: Revision history

Date	Revision	Changes
20-Jan-2014	1	First revision.
09-Sep-2014	2	Changed the title. Updated <i>Section "Features"</i> and <i>Section "Description"</i> . Updated <i>Table 4: "On/off states"</i> , <i>Table 5: "Dynamic"</i> , <i>Table 6: "Switching times"</i> , <i>Table 7: "Source-drain diode"</i> . Added <i>Section 3: "Electrical characteristics (curves)"</i> .
16-Dec-2014	3	Document status promoted from preliminary data to production data. Minor text changes.

IMPORTANT NOTICE – PLEASE READ CAREFULLY

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2014 STMicroelectronics – All rights reserved