

## P-channel 20 V, 0.087 $\Omega$ typ., 1.4 A STripFET™ H7 Power MOSFET in a SOT-23 package

Datasheet - production data

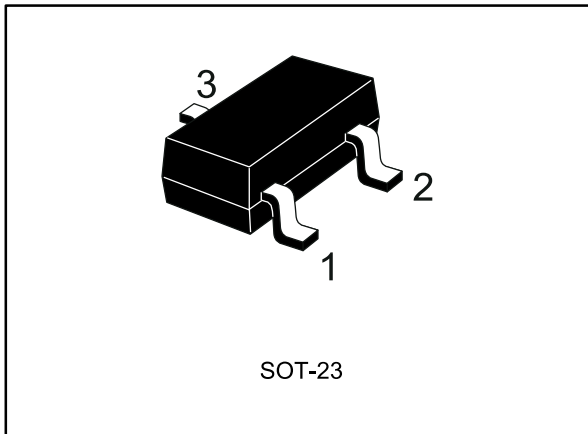
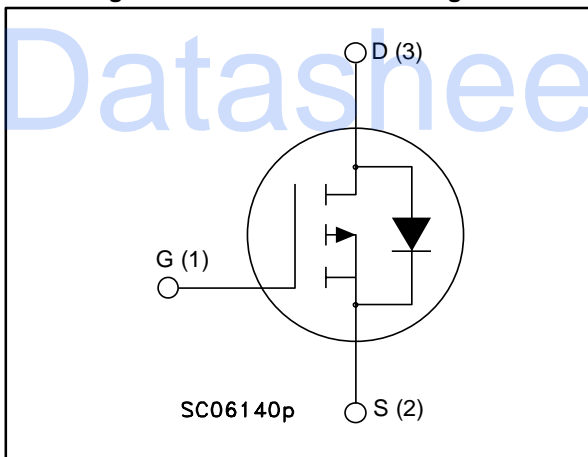


Figure 1: Internal schematic diagram



### Features

Order code	V <sub>DS</sub>	R <sub>DS(on)</sub> max	I <sub>D</sub>
STR1P2UH7	20 V	0.1 $\Omega$ @ 4.5	1.4 A

- Very low on-resistance
- Very low capacitance and gate charge
- High avalanche ruggedness

### Applications

- Switching applications

### Description

This P-channel Power MOSFET utilizes the STripFET H7 technology with a trench gate structure combined with extremely low on-resistance. The device also offers ultra-low capacitances for higher switching frequency operations.

Table 1: Device summary

Order code	Marking	Package	Packaging
STR1P2UH7	1L2U	SOT-23	Tape and reel



For the P-channel Power MOSFET the actual polarity of the voltages and the current must be reversed.

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# 1 Electrical ratings

**Table 2: Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-source voltage	20	V
$V_{GS}$	Gate-source voltage	$\pm 8$	V
$I_D$	Drain current (continuous) at $T_{pcb} = 25\text{ }^{\circ}\text{C}$	1.4	A
$I_D$	Drain current (continuous) at $T_{pcb} = 100\text{ }^{\circ}\text{C}$	0.9	A
$I_{DM}^{(1)}$	Drain current (pulsed)	5.6	A
$P_{TOT}$	Total dissipation at $T_{pcb} = 25\text{ }^{\circ}\text{C}$	0.35	W
$T_{stg}$	Storage temperature	- 55 to 150	$^{\circ}\text{C}$
$T_j$	Max. operating junction temperature	150	$^{\circ}\text{C}$

**Notes:**

<sup>(1)</sup>Pulse width limited by safe operating area

**Table 3: Thermal data**

Symbol	Parameter	Value	Unit
$R_{thj-pcb}^{(1)}$	Thermal resistance junction-pcb max, single operation	357	$^{\circ}\text{C}/\text{W}$

**Notes:**

<sup>(1)</sup>When mounted on 1inch<sup>2</sup> FR-4 board, 2 oz Cu



For the P-channel Power MOSFET the actual polarity of the voltages and the current must be reversed.

## 2 Electrical characteristics

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

**Table 4: On /off states**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	$I_D = 250\text{ }\mu\text{A}$ , $V_{GS} = 0$	20			V
$I_{DSS}$	Zero gate voltage drain current	$V_{DS} = 20\text{ V}$ , $V_{GS} = 0$			1	$\mu\text{A}$
$I_{GSS}$	Gate-body leakage current	$V_{GS} = \pm 8\text{ V}$ , $V_{DS} = 0$			10	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}$ , $I_D = 250\text{ }\mu\text{A}$	0.4		1	V
$R_{DS(on)}$	Static drain-source on-resistance	$V_{GS} = 4.5\text{ V}$ , $I_D = 0.7\text{ A}$		0.087	0.1	$\Omega$
		$V_{GS} = 2.5\text{ V}$ , $I_D = 0.7\text{ A}$		0.11	0.13	$\Omega$
		$V_{GS} = 1.8\text{ V}$ , $I_D = 0.7\text{ A}$		0.145	0.18	$\Omega$

**Table 5: Dynamic**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$C_{iss}$	Input capacitance	$V_{DS} = 10\text{ V}$ , $f = 1\text{ MHz}$ , $V_{GS} = 0$	-	510	-	pF
$C_{oss}$	Output capacitance		-	66	-	pF
$C_{riss}$	Reverse transfer capacitance		-	44	-	pF
$Q_g$	Total gate charge	$V_{DD} = 10\text{ V}$ , $I_D = 3\text{ A}$ , $V_{GS} = 4.5\text{ V}$ (see <a href="#">Figure 14: "Gate charge test circuit"</a> )	-	4.8	-	nC
$Q_{gs}$	Gate-source charge		-	0.7	-	nC
$Q_{gd}$	Gate-drain charge		-	0.8	-	nC

**Table 6: Switching times**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on delay time	$V_{DD} = 10\text{ V}$ , $I_D = 1.5\text{ A}$ , $R_G = 4.7\text{ }\Omega$ , $V_{GS} = 4.5\text{ V}$ (see <a href="#">Figure 15: "Test circuit for inductive load switching and diode recovery times"</a> )	-	9	-	ns
$t_r$	Rise time		-	21	-	ns
$t_{d(off)}$	Turn-off delay time		-	40	-	ns
$t_f$	Fall time		-	19	-	ns



For the P-channel Power MOSFET the actual polarity of the voltages and the current must be reversed.

Table 7: Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{SD}^{(1)}$	Forward on voltage	$I_{SD} = 1 \text{ A}$ , $V_{GS} = 0$	-	-	1	V
$t_{rr}$	Reverse recovery time	$V_{DD} = 10 \text{ V}$ $di/dt = 100 \text{ A}/\mu\text{s}$ , $I_{SD} = 1 \text{ A}$ $T_j = 150 \text{ }^\circ\text{C}$ (see <a href="#">Figure 15</a> : "Test circuit for inductive load switching and diode recovery times")	-	12.5		ns
$Q_{rr}$	Reverse recovery charge		-	5		nC
$I_{RRM}$	Reverse recovery current		-	0.8		A

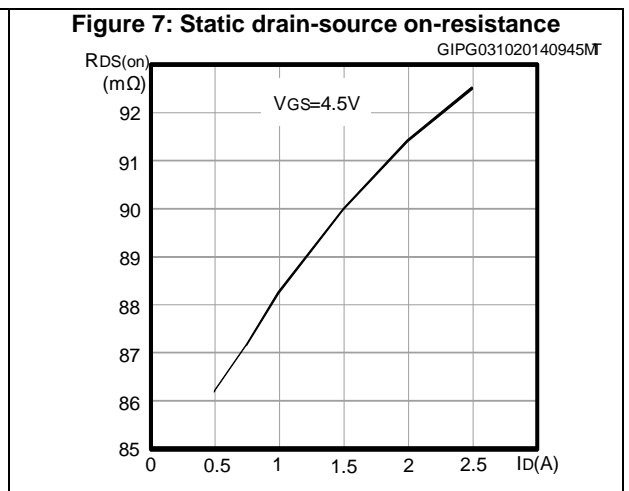
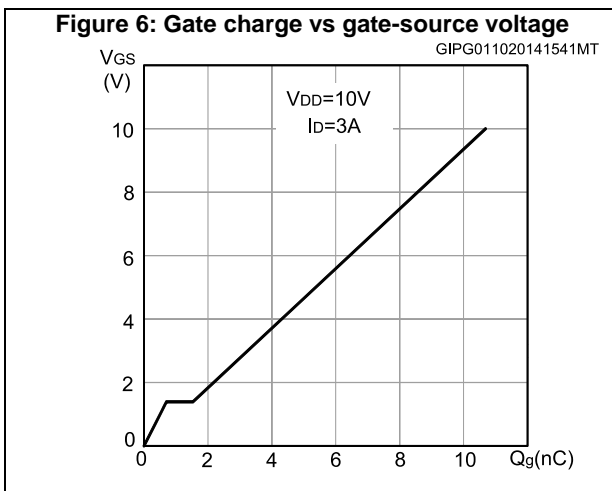
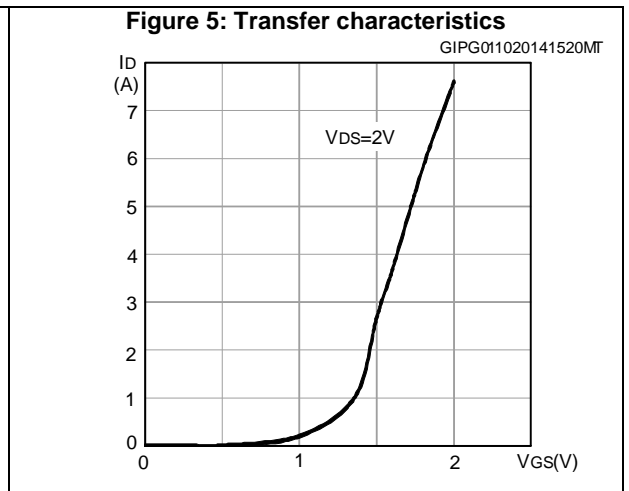
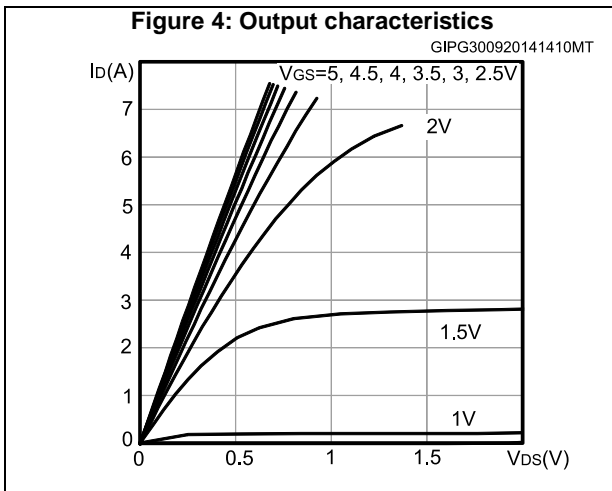
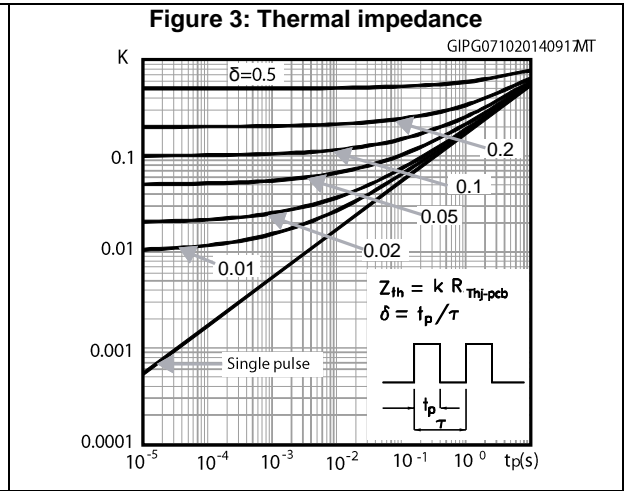
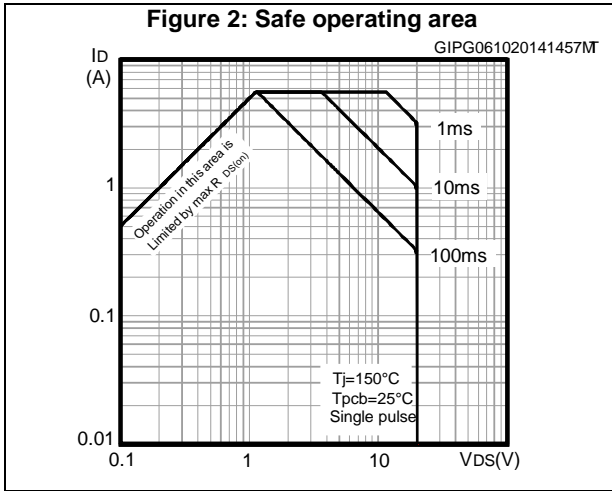
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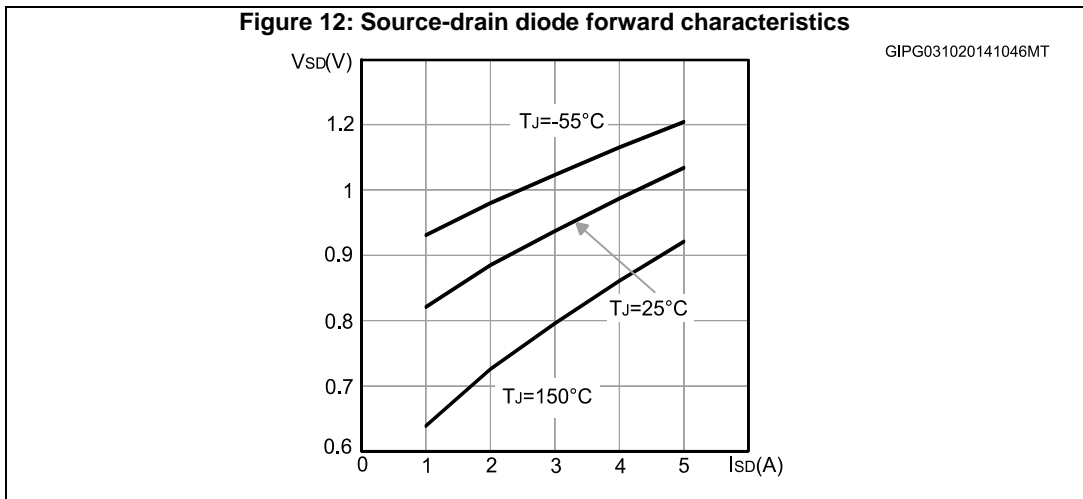
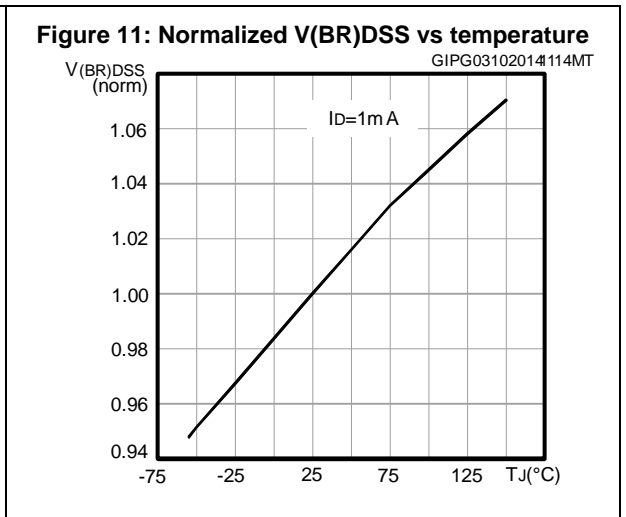
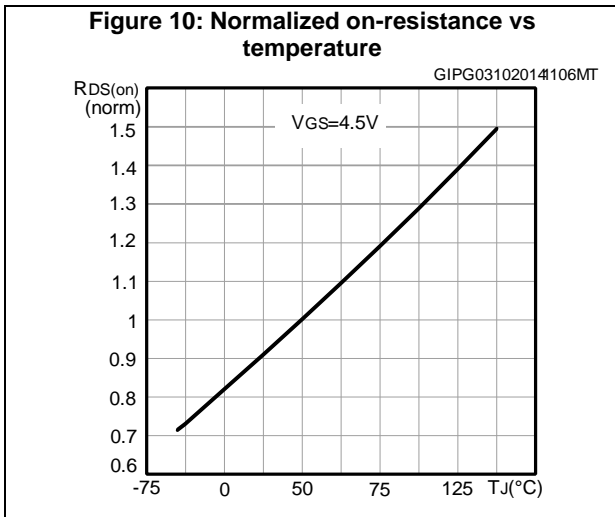
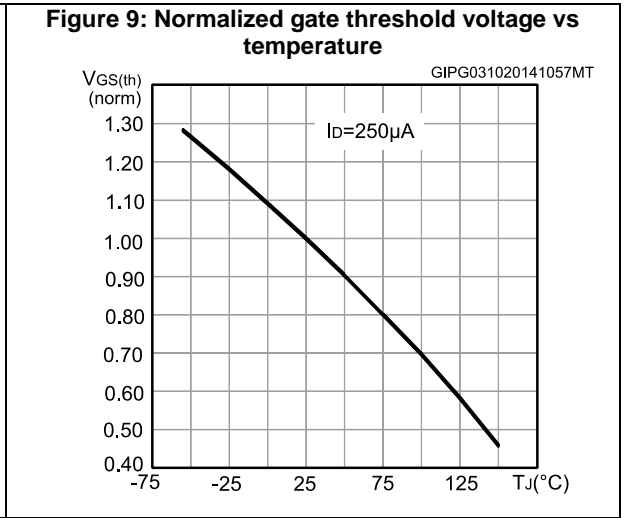
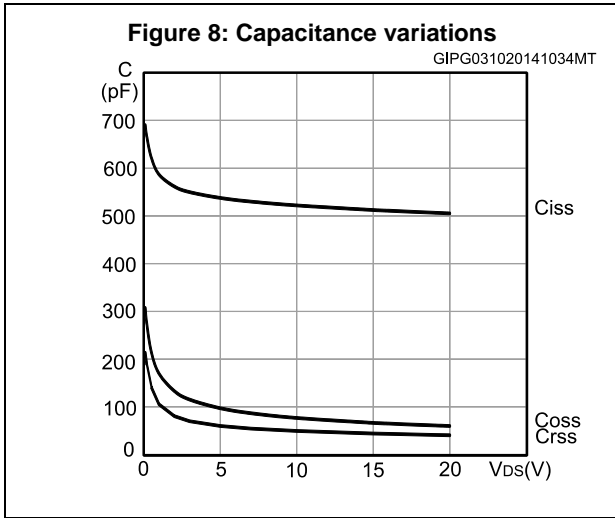
<sup>(1)</sup>Pulsed: pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5%.



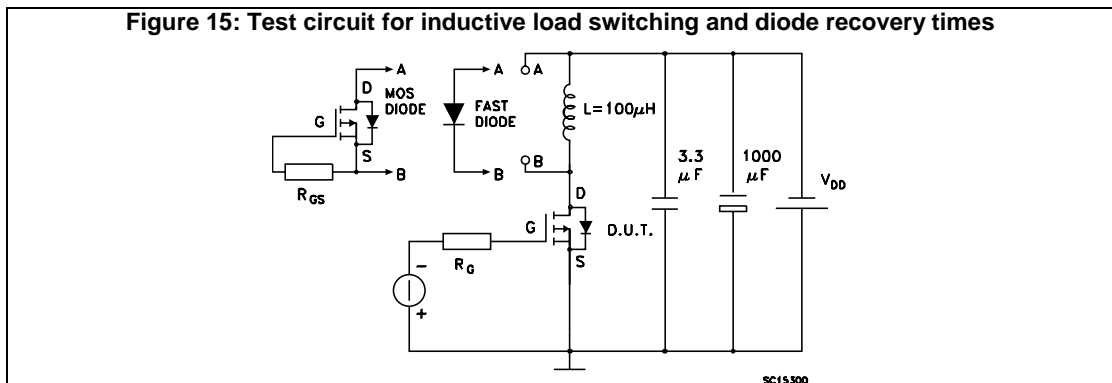
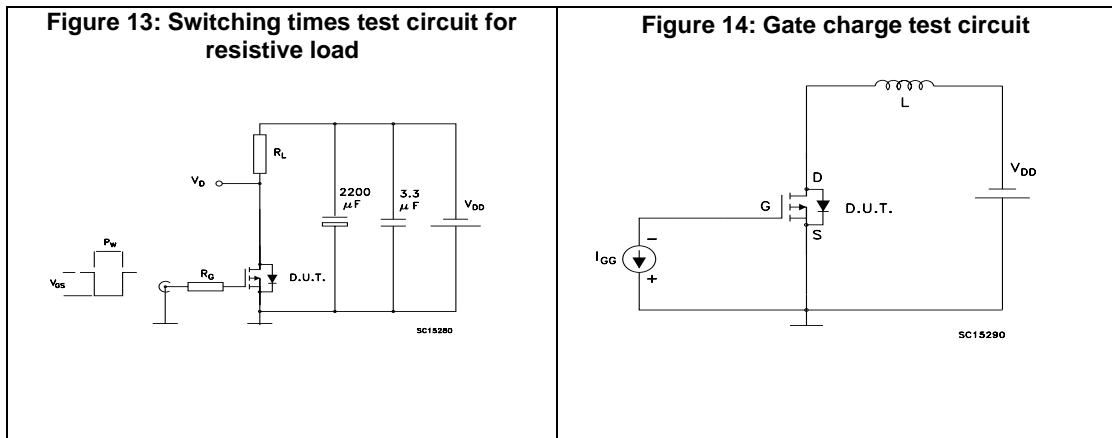
For the P-channel Power MOSFET the actual polarity of the voltages and the current must be reversed.

## 2.1 Electrical characteristics (curves)





### 3 Test circuits





## 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](http://www.st.com). ECOPACK® is an ST trademark.

### 4.1 SOT-23 package mechanical data

Figure 16: SOT-23 mechanical drawing

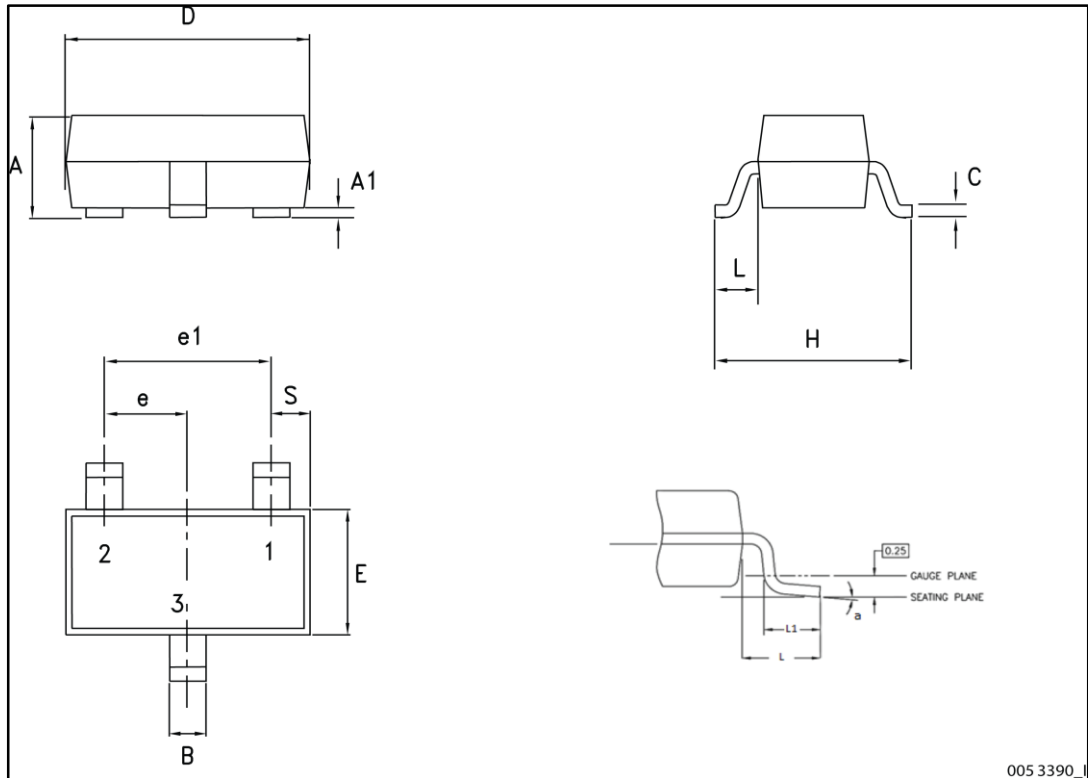
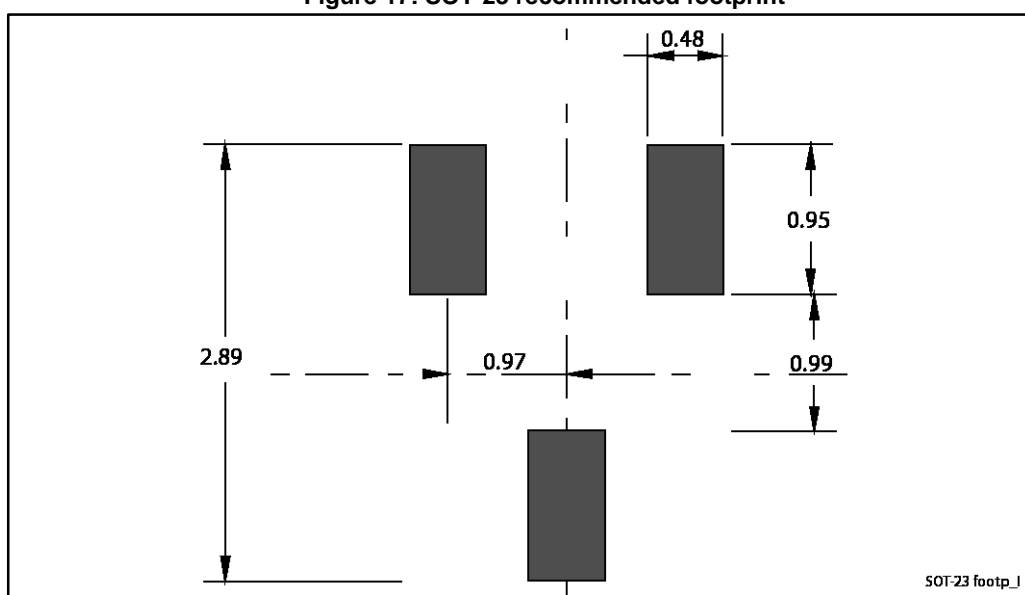


Table 8: SOT-23 mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	0.89		1.40
A1	0		0.10
B	0.30		0.51
C	0.085		0.18
D	2.75		3.04
e	0.85		1.05
e1	1.70		2.10
E	1.20		1.75
H	2.10		3.00
L		0.60	
S	0.35		0.65
L1	0.25		0.55
a	0°		8°

Figure 17: SOT-23 recommended footprint



Dimensions are in mm.

## 5 Revision history

Table 9: Document revision history

Date	Revision	Changes
18-Jul-2013	1	First release.
07-Oct-2014	2	Document status promoted from target data to preliminary data. Updated title, features and description in cover page. Updated <a href="#">Section 2: "Electrical characteristics"</a> . Minor text changes.
05-Jun-2015	3	Document status promoted from preliminary to production data.

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