

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

Datasheet - production data

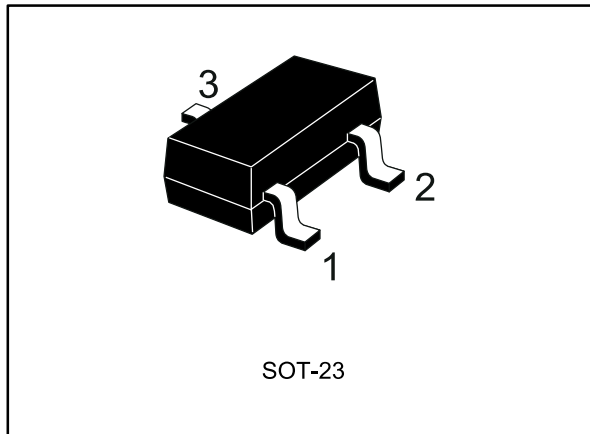
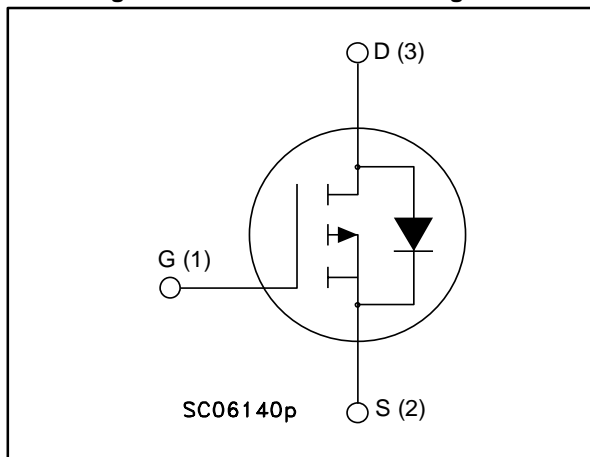


Figure 1: Internal schematic diagram



Features

| Order code | V _{DS} | R _{DS(on)} max | I _D |
|------------|-----------------|-------------------------|----------------|
| STR1P2UH7 | 20 V | 0.1 Ω @ 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 | ± 8 | V |
| I_D | Drain current (continuous) at $T_{pcb} = 25\text{ °C}$ | 1.4 | A |
| I_D | Drain current (continuous) at $T_{pcb} = 100\text{ °C}$ | 0.9 | A |
| $I_{DM}^{(1)}$ | Drain current (pulsed) | 5.6 | A |
| P_{TOT} | Total dissipation at $T_{pcb} = 25\text{ °C}$ | 0.35 | W |
| T_{stg} | Storage temperature | - 55 to 150 | °C |
| T_j | Max. operating junction temperature | 150 | °C |

Notes:

⁽¹⁾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 | °C/W |

Notes:

⁽¹⁾When mounted on 1inch² 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 | μA |
| 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 | Ω |
| | | $V_{GS} = 2.5\text{ V}$, $I_D = 0.7\text{ A}$ | | 0.11 | 0.13 | Ω |
| | | $V_{GS} = 1.8\text{ V}$, $I_D = 0.7\text{ A}$ | | 0.145 | 0.18 | Ω |

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 Figure 14: "Gate charge test circuit") | - | 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 Figure 15: "Test circuit for inductive load switching and diode recovery times") | - | 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 Figure 15 : "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 |

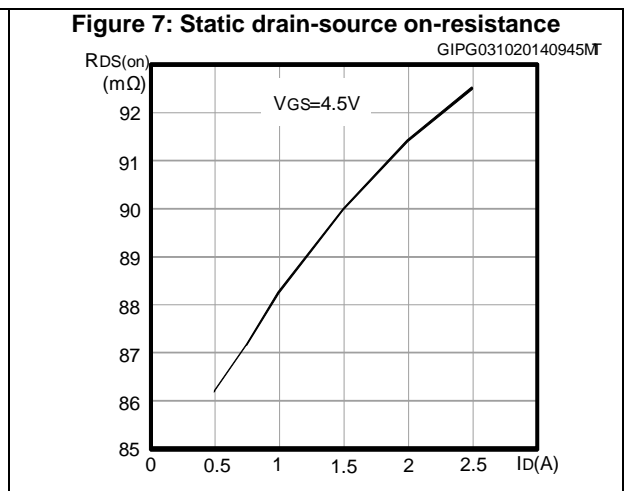
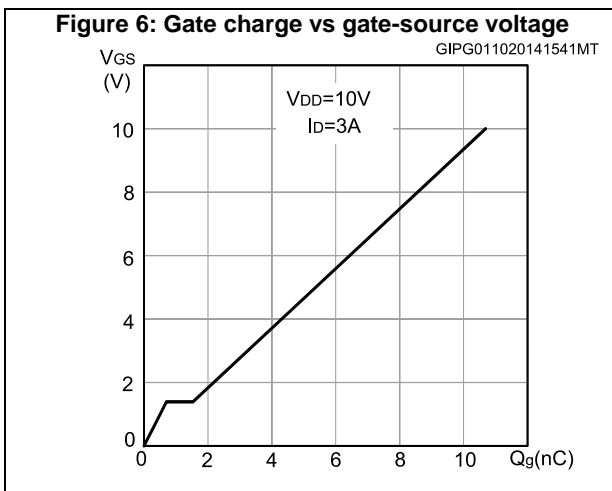
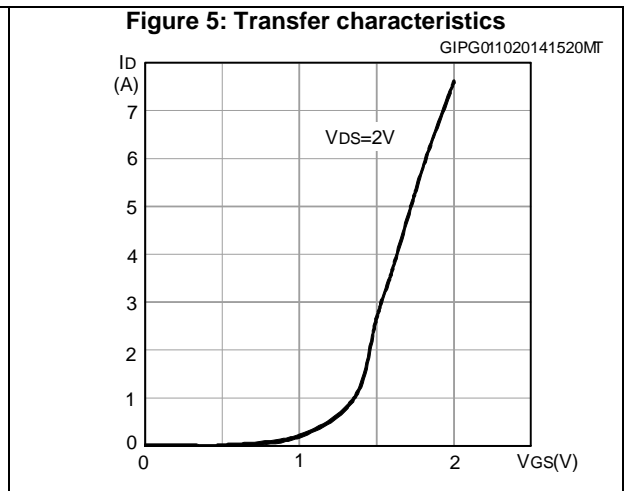
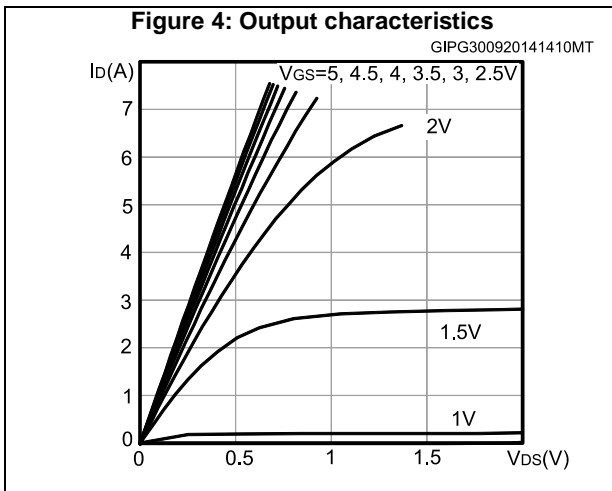
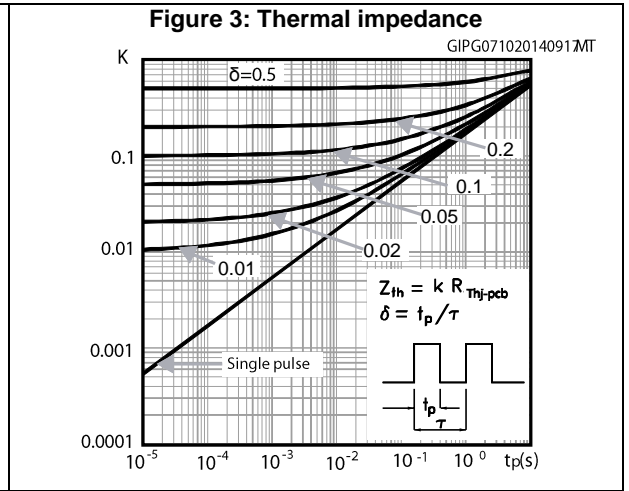
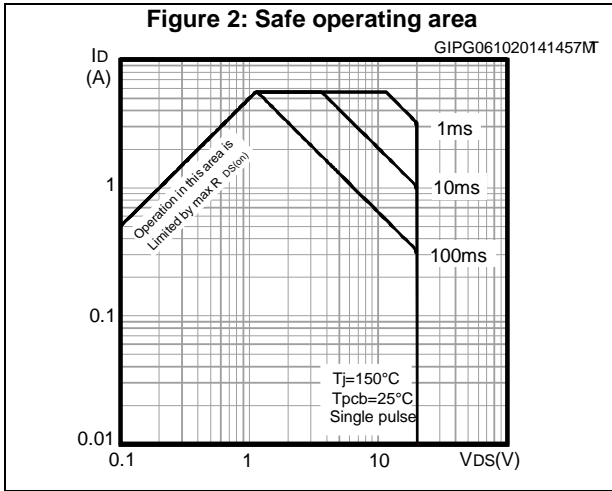
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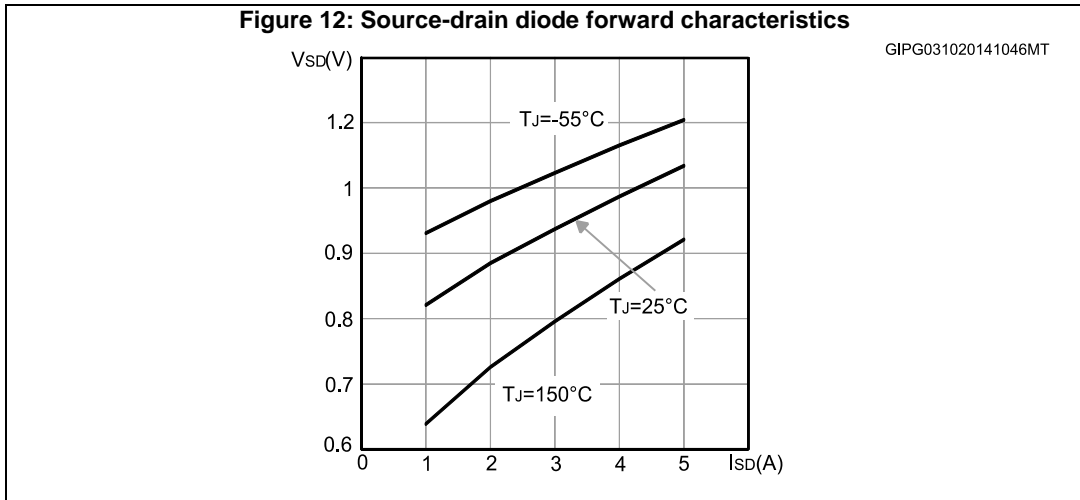
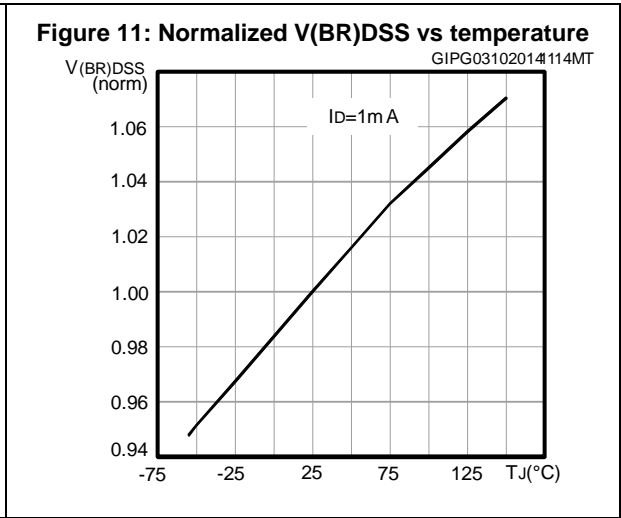
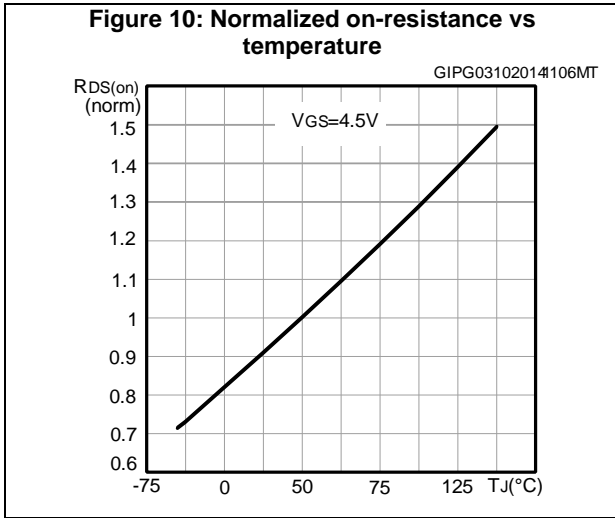
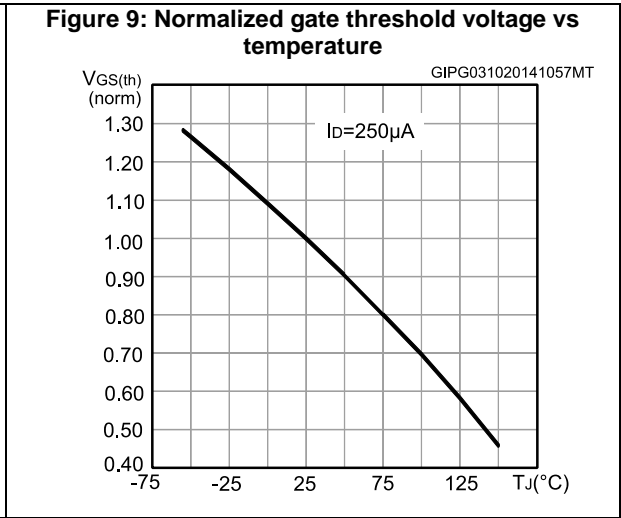
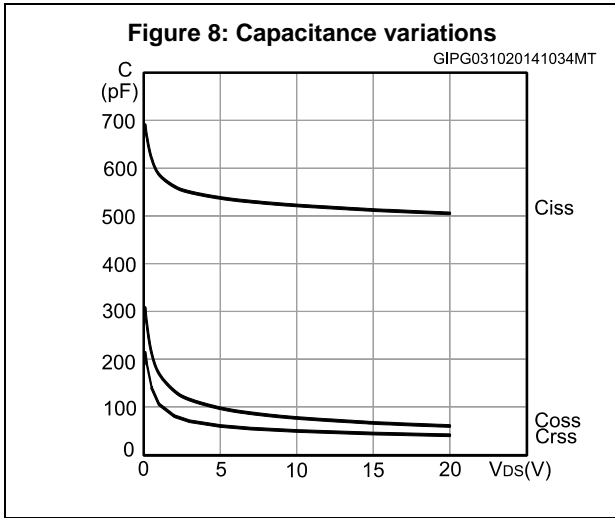
⁽¹⁾Pulsed: pulse duration = 300 μs , duty cycle 1.5%.



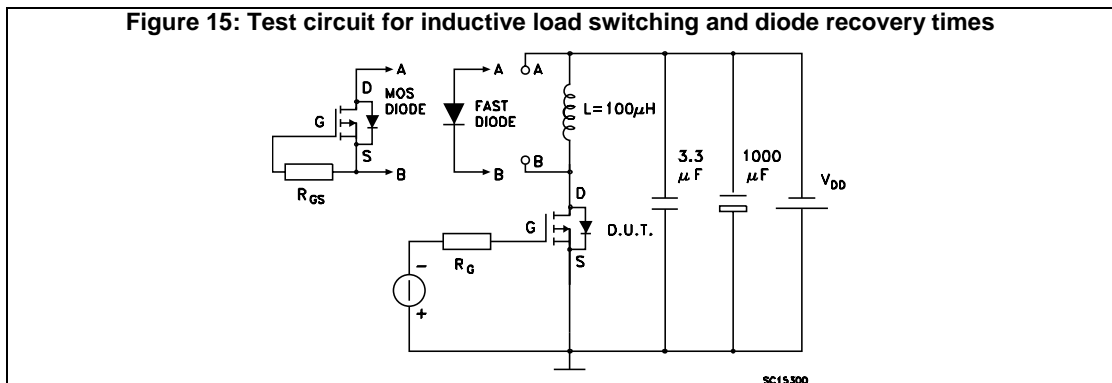
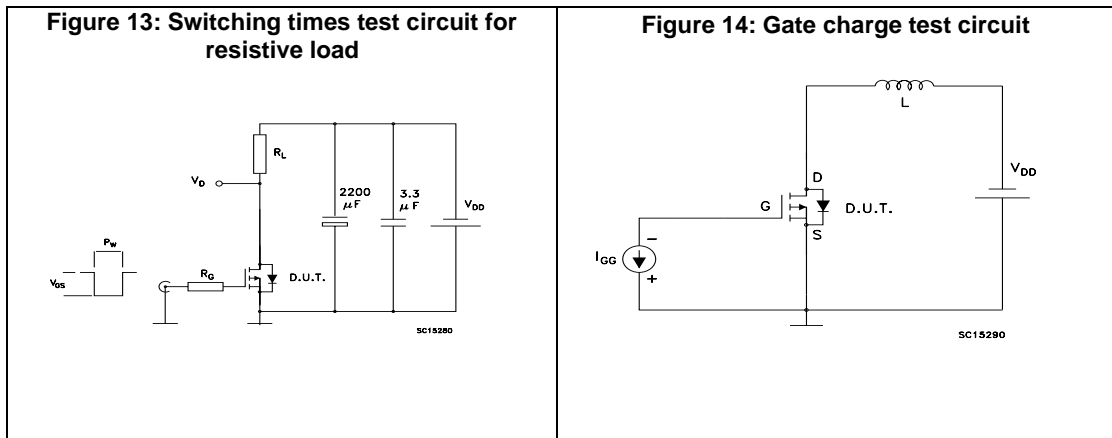
For the P-channel Power MOSFET the actual polarity of the voltages and the current must be reversed.

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. ECOPACK® is an ST trademark.

4.1 SOT-23 package mechanical data

Figure 16: SOT-23 mechanical drawing

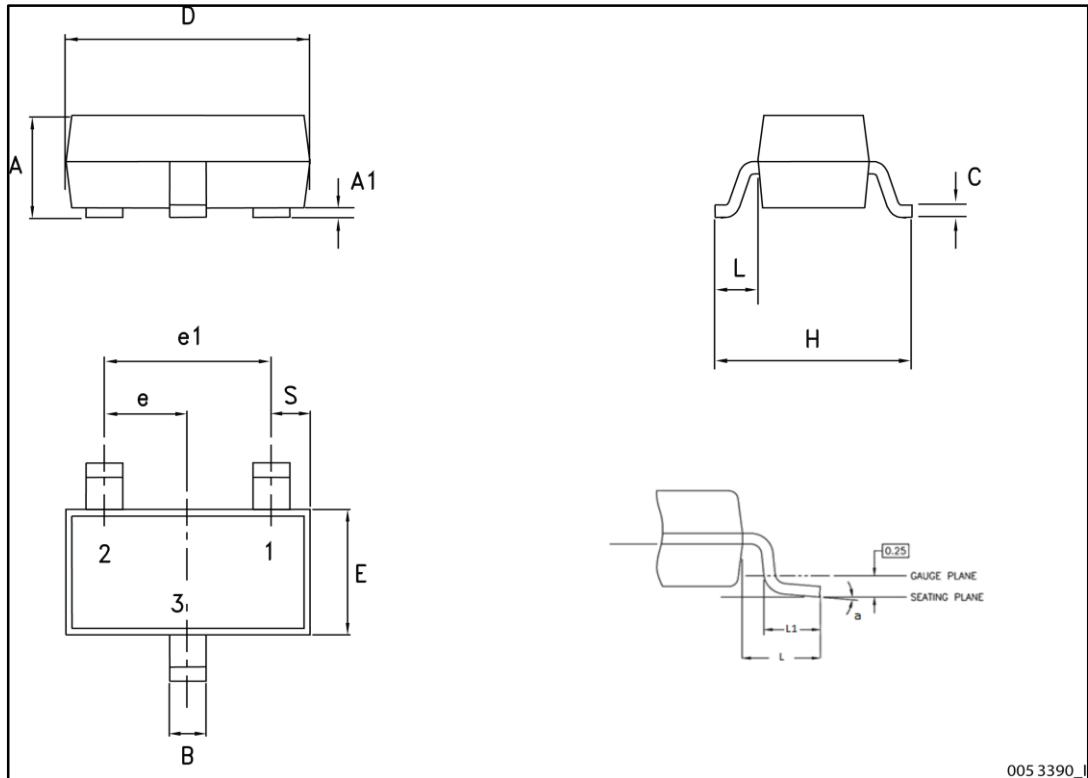
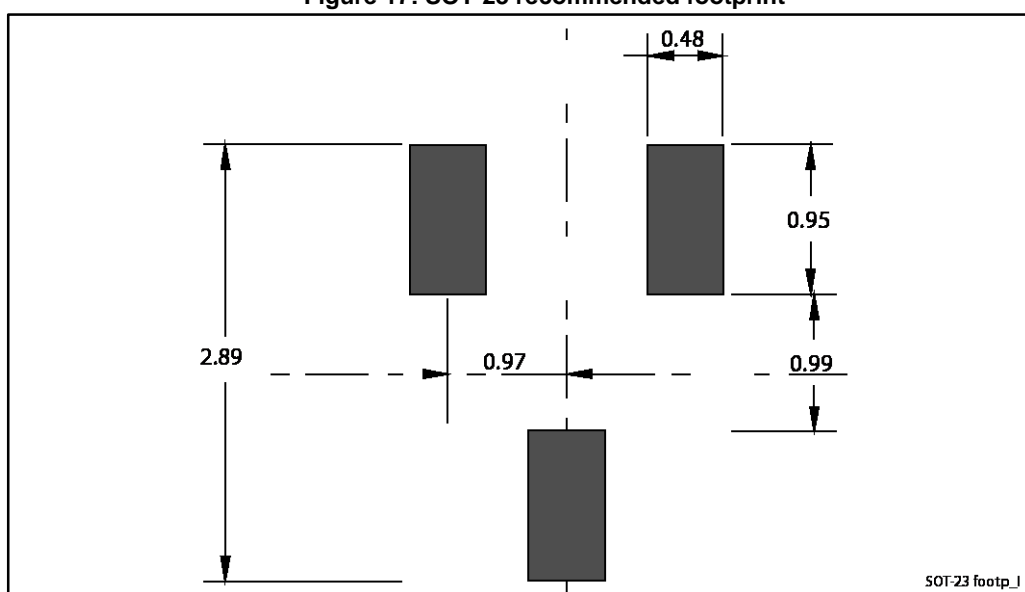


Table 8: SOT-23 mechanical data

| 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 Section 2: "Electrical characteristics" . Minor text changes. |
| 05-Jun-2015 | 3 | Document status promoted from preliminary to production data. |

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