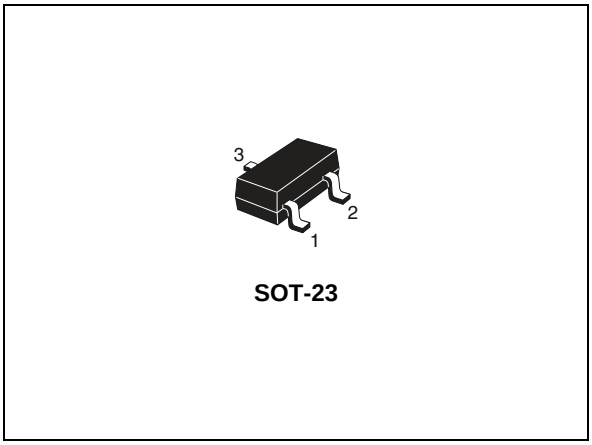
# STR1550

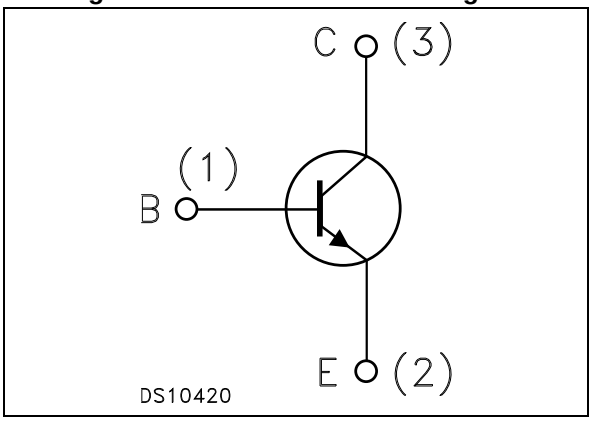
## High voltage fast-switching NPN power transistor

**Datasheet - production data**




**SOT-23**

**Figure 1. Internal schematic diagram**




## Features

- Excellent $h_{FE}$ linearity up to 50 mA
- Miniature SOT-23 plastic package for surface mounting circuits
- Tape and reel packaging
- The PNP complementary type is STR2550

## Applications

- LED driving

## Description

This device is a high voltage fast-switching NPN power transistor, manufactured using diffused collector planar technology for high switching speeds.

It employs a base island structure with planar edge termination to enhance switching speeds, while maintaining a wide RBSOA.

**Table 1. Device summary**

| Order code | Marking | Package | Packing |
|---|---|---|---|
| STR1550 | 1550 | SOT-23 | Tape and reel |

# Contents

# 1 Electrical ratings

**Table 2. Absolute maximum ratings**

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-base voltage ($I_E$ = 0) | 500 | V |
| $V_{CEO}$ | Collector-emitter voltage ($I_B$ = 0) | 500 | V |
| $V_{EBO}$ | Emitter-base voltage ($I_C$ = 0) | 9 | V |
| $I_C$ | Collector current | 0.5 | A |
| $I_{CM}$ | Collector peak current ($t_P$ < 5 ms) | 1 | A |
| $P_{TOT}$ | Total dissipation at $T_{amb}$ = 25 °C | 500 | mW |
| $T_{STG}$ | Storage temperature | -65 to 150 | °C |
| $T_J$ | Max. operating junction temperature | 150 | °C |

**Table 3. Thermal data**

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $R_{thJA}$(1) | Thermal resistance junction-ambient max | 250 | °C/W |

1. Device mounted on PCB area of 1 cm².

# 2 Electrical characteristics

$T_{case}$ = 25 °C unless otherwise specified.

**Table 4. Electrical characteristics**

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_{CBO}$ | Collector cut-off current ($I_E$ = 0) | $V_{CB}$ = 500 V | | | 10 | µA |
| $V_{(BR)CBO}$ | Collector-base breakdown voltage ($I_E$ = 0) | $I_C$ = 100 µA | 500 | | | V |
| $V_{(BR)CEO}$ (1) | Collector-emitter breakdown voltage ($I_B$ = 0) | $I_C$ = 1 mA | 500 | | | V |
| $V_{(BR)EBO}$ | Emitter-base breakdown voltage ($I_C$ = 0) | $I_E$ = 100 µA | 12 | | | V |
| $V_{CE(sat)}$ (1) | Collector-emitter saturation voltage | $I_C$ = 20 mA, $I_B$ = 2 mA | | | 0.2 | V |
| | | $I_C$ = 50 mA, $I_B$ = 6 mA | | | 0.3 | V |
| $V_{BE(sat)}$ (1) | Base-emitter saturation voltage | $I_C$ = 50 mA, $I_B$ = 5 mA | | | 0.9 | V |
| $V_{BE(on)}$ | Base-emitter on voltage | $I_C$ = 50 mA, $V_{CE}$ = 10 V | | | 0.9 | V |
| $h_{FE}$ (1) | DC current gain | $I_C$ = 1 mA, $V_{CE}$ = 10 V | 100 | | | |
| | | $I_C$ = 50 mA, $V_{CE}$ = 10 V | 100 | | 300 | |
| | | $I_C$ = 100 mA, $V_{CE}$ = 10 V | 10 | | | |

1. Pulse test: pulse duration ≤ 300 µs, duty cycle ≤ 2%

## 2.1 Electrical characteristics (curves)

**Figure 2. $h_{FE}$ vs. $I_C$ @ $V_{CE}$= 5 V**

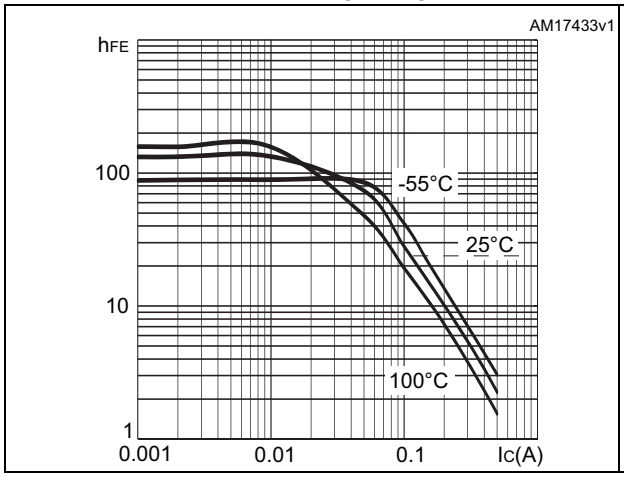



**Figure 3. $h_{FE}$ vs. $I_C$ @ $V_{CE}$= 10 V**

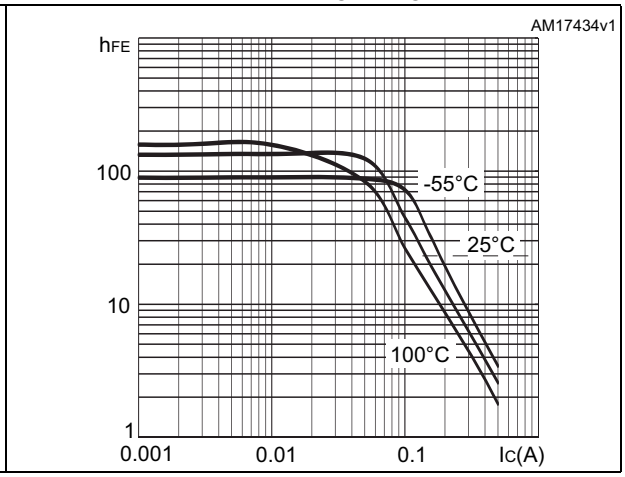


**Figure 4. $V_{CE(sat)}$ vs. $I_C$ @ $h_{FE}$= 5**

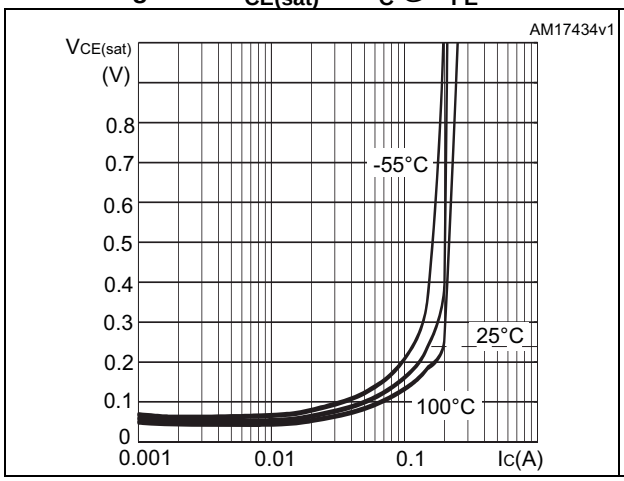



**Figure 5. $V_{CE(sat)}$ vs. $I_C$ @ $h_{FE}$= 10**

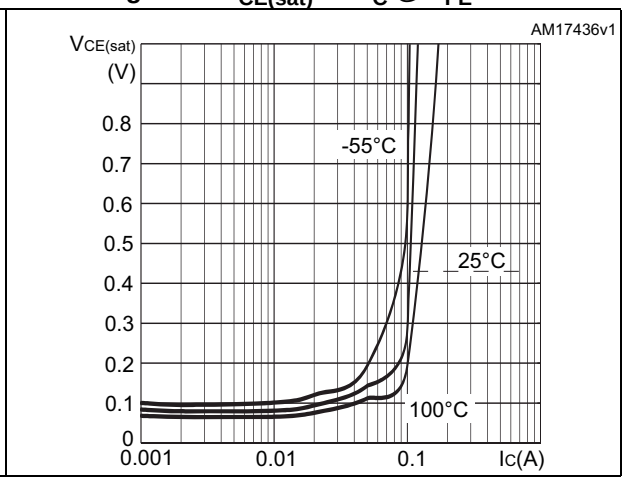



**Figure 6. $V_{BE(sat)}$ vs. $I_C$ @ $h_{FE}$= 5**

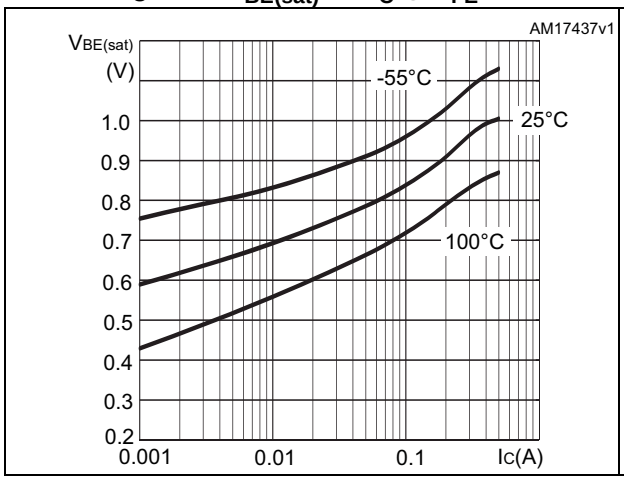



**Figure 7. $V_{BE(sat)}$ vs. $I_C$ @ $h_{FE}$= 10**

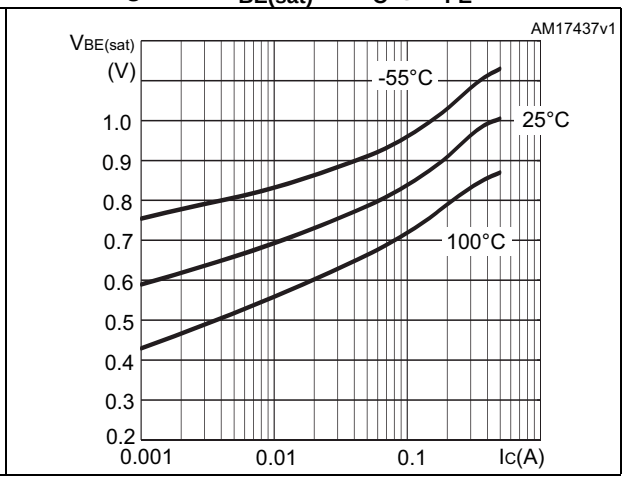
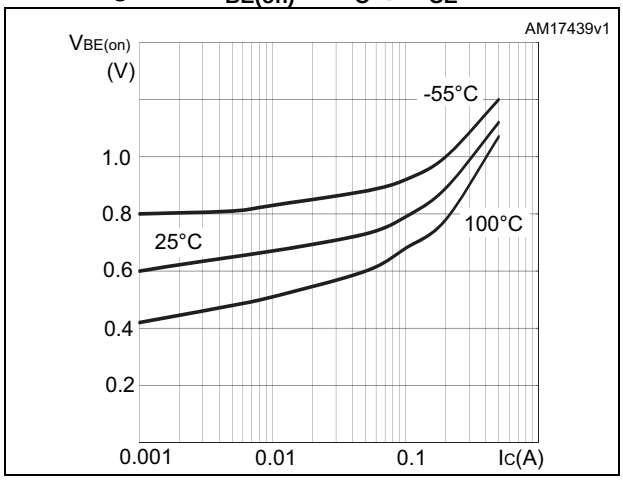



**Figure 8. $V_{BE(on)}$ vs. $I_C$ @ $V_{CE}$= 10 V**



# 3 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.

**Figure 9. SOT-23 drawings**

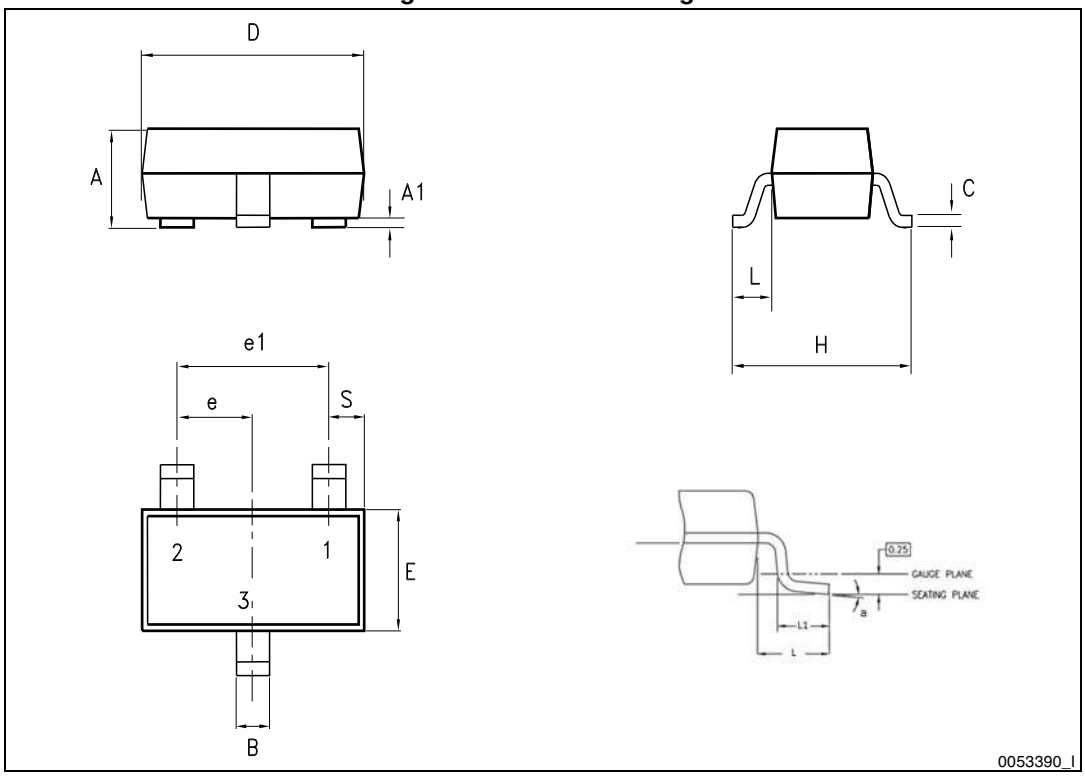
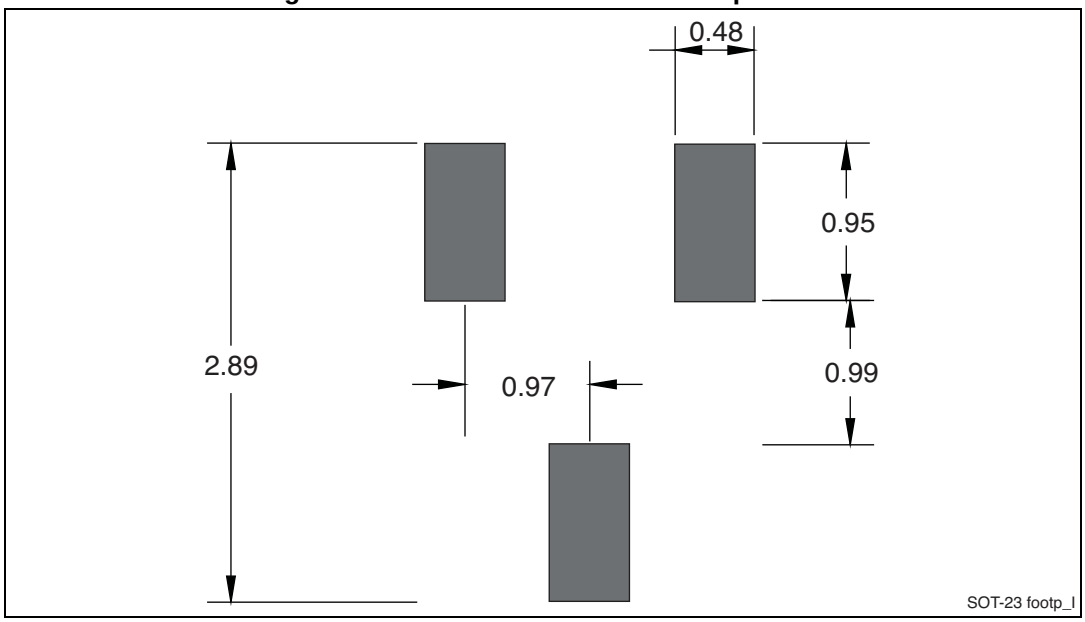


**Table 5. SOT-23 mechanical data**

| 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 10. SOT-23 recommended footprint (a)**




a. Dimensions are in mm.

# 4 Revision history

**Table 6. Document revision history**

| Date | Revision | Changes |
|---|---|---|
| 17-Oct-2011 | 1 | Initial release |
| 05-Jun-2012 | 2 | Modified: features, *Table 4* ($V_{CE(sat)}$ values, $h_{FE}$ test conditions and values) |
| 21-May-2013 | 3 | – Modified: *Table 4* ($V_{BE(sat)}$ values, $h_{FE}$ max. value and $V_{(BR)EBO}$ min. value<br>– Inserted: $V_{BE(on)}$<br>– Modified: *Table 4* ($h_{FE}$ max. value)<br>– Added new section: *Electrical characteristics (curves)* |
| 27-May-2013 | 4 | – Document status promoted from preliminary to production data |
| 09-May-2014 | 5 | – Updated *Table 1: Device summary* and *Section 3: Package mechanical data* |

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