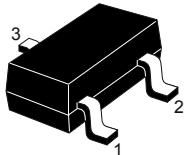


## High voltage fast-switching NPN power transistor

### Features



SOT-23

- 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

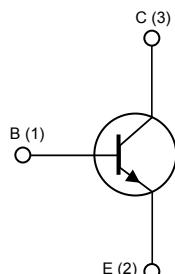
### Applications

- 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.



NPNB1C3E2



#### Product status link

STR1550

#### Product summary

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

## 1 Electrical ratings

Table 1. Absolute maximum rating

Symbol	Parameter	Value	Unit
$V_{EBO}$	Emitter-base voltage ( $I_C = 0 \text{ A}$ )	9	V
$V_{CBO}$	Collector-base voltage ( $I_E = 0 \text{ A}$ )	500	V
$V_{CEO}$	Collector-emitter voltage ( $I_B = 0 \text{ A}$ )	500	V
$I_C$	Collector current	0.5	A
$I_{CM}$	Collector peak current ( $t_p < 5 \text{ ms}$ )	1	A
$P_{TOT}$	Total power dissipation at $T_A = 25 \text{ }^\circ\text{C}$	500	mW
$T_{stg}$	Storage temperature range	-65 to 150	$^\circ\text{C}$
$T_J$	Maximum operating junction temperature	150	$^\circ\text{C}$

Table 2. Thermal data

Symbol	Parameter	Value	Unit
$R_{thJA}^{(1)}$	Thermal resistance, junction-to-ambient	250	$^\circ\text{C}/\text{W}$

1. Device mounted on a PCB area of 1 cm<sup>2</sup>.

## 2 Electrical characteristics

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

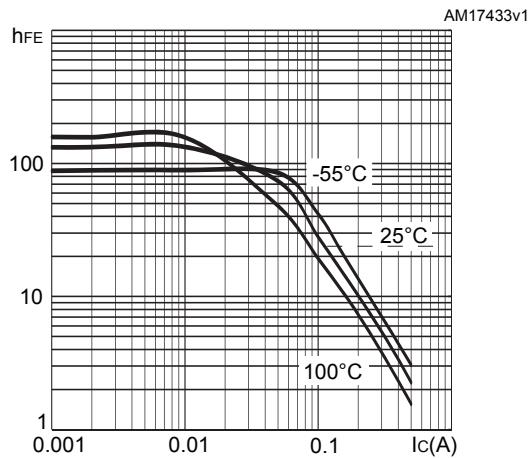
**Table 3. Electrical characteristics**

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

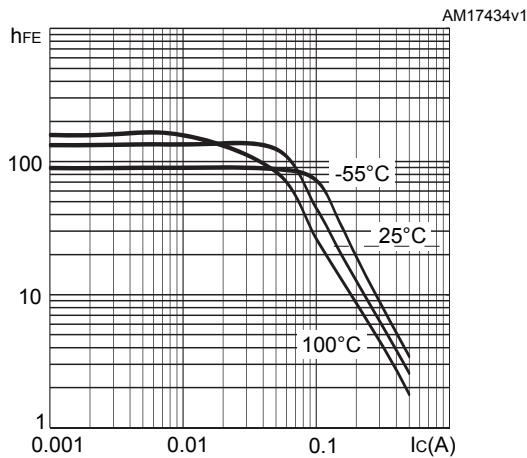
1. Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle  $\leq 2\%$ .

## 2.1 Electrical characteristics (curves)

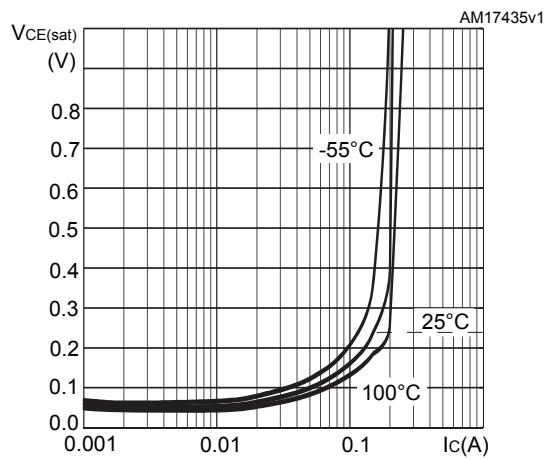
**Figure 1. DC current gain at  $V_{CE} = 5$  V**



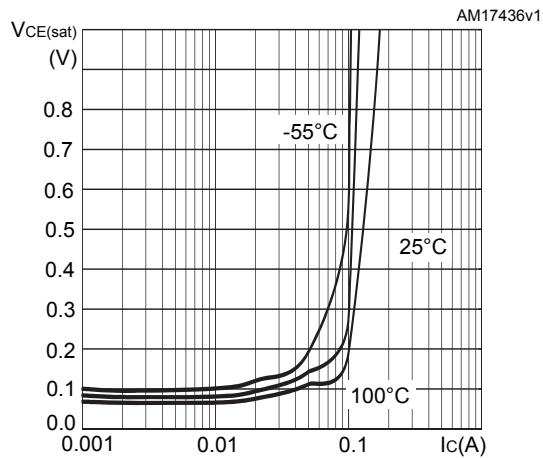
**Figure 2. DC current gain at  $V_{CE} = 10$  V**



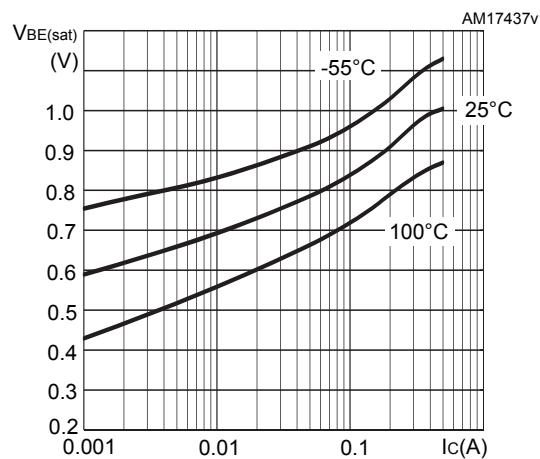
**Figure 3. Collector emitter saturation voltage at  $h_{FE} = 5$**



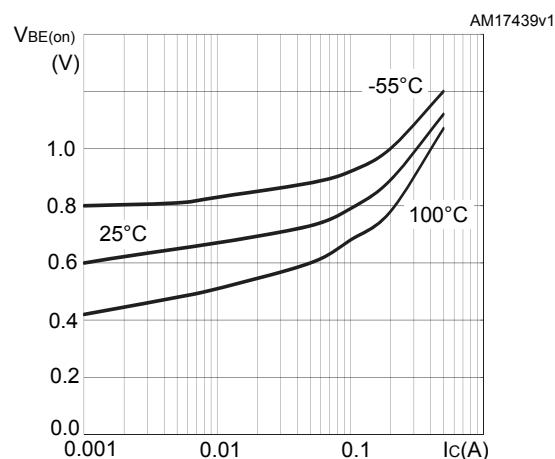
**Figure 4. Collector emitter saturation voltage at  $h_{FE} = 10$**



**Figure 5. Base-emitter saturation voltage at  $h_{FE} = 5$**



**Figure 6. Base-emitter on voltage at  $V_{CE} = 10$  V**

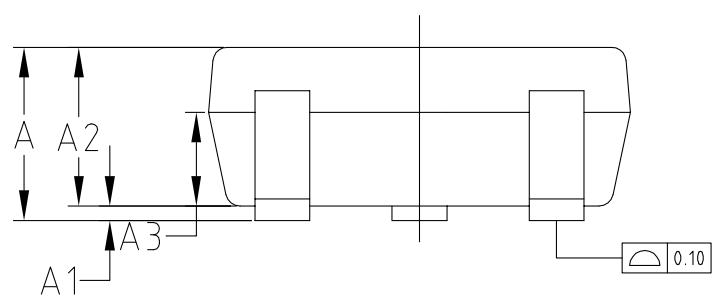
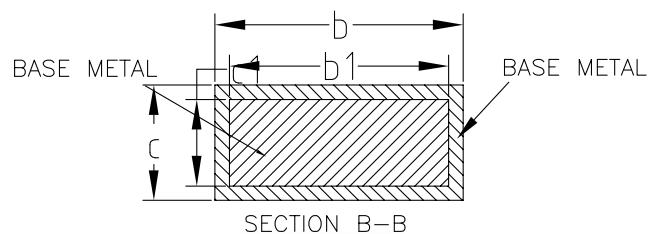
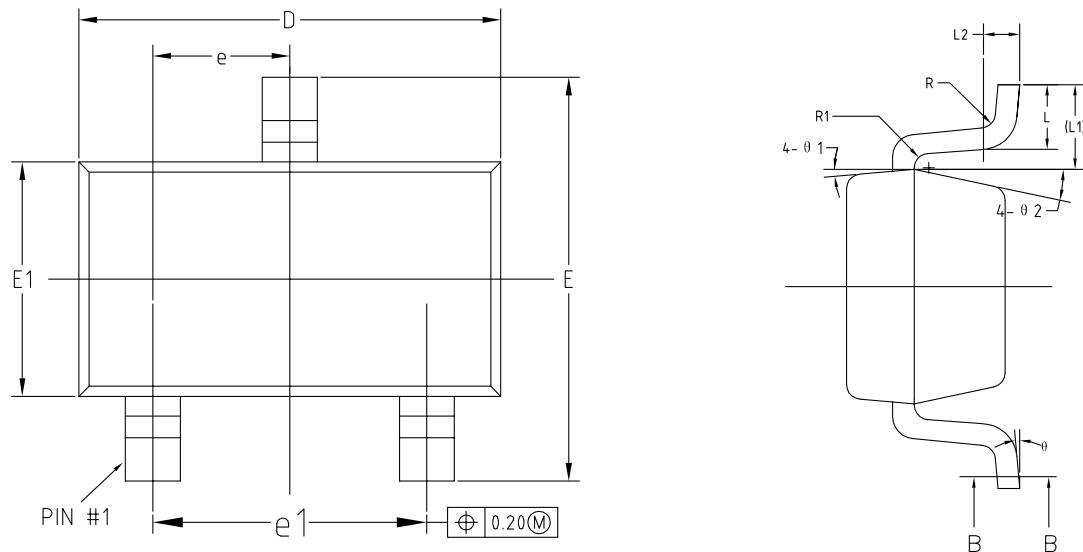


### 3 Package information

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.

#### 3.1 SOT-23 package information

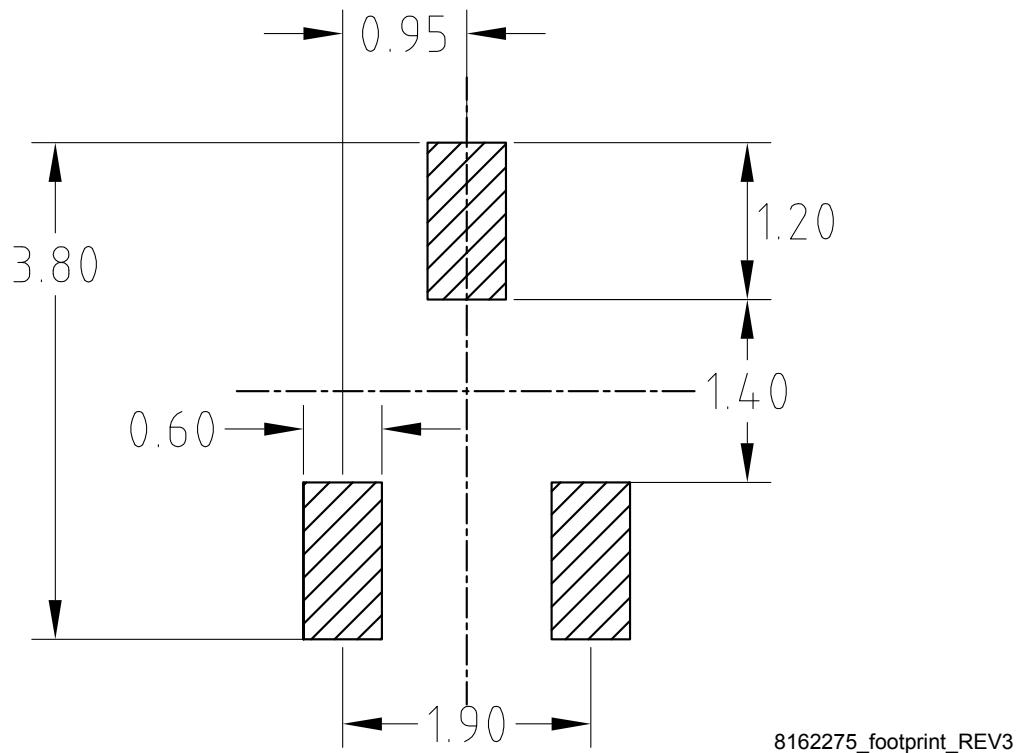
Figure 7. SOT-23 package outline (dimensions are in mm)



8162275\_REV3

**Table 4. SOT-23 package mechanical data**

Ref.	mm		
	Min.	Typ.	Max.
A			1.25
A1	0		0.15
A2	1	1.10	1.20
A3	0.60	0.65	0.70
b	0.36		0.50
b1	0.36	0.38	0.45
c	0.14		0.20
c1	0.14	0.15	0.16
D	2.826	2.926	3.026
E	2.60	2.80	3.00
E1	1.526	1.626	1.726
e	0.90	0.95	1.00
e1	1.80	1.90	2.00
L	0.35	0.45	0.60
L1		0.59 REF	
L2		0.25 BSC	
R	0.05		
R1	0.05		
θ	0°		8°
θ1	3°	5°	7°
θ2	6°		14°

**Figure 8. SOT-23 recommended footprint (dimensions in mm)**

## Revision history

**Table 5. Document revision history**

Date	Revision	Changes
17-Oct-2011	1	Initial release.
05-Jun-2012	2	Modified: features, <i>Table 4</i> ( $V_{CE(sat)}$ values, $h_{FE}$ test conditions and values)
21-May-2013	3	<ul style="list-style-type: none"><li>– Modified: <i>Table 4</i> (<math>V_{BE(sat)}</math> values, <math>h_{FE}</math> max. value and <math>V_{(BR)EBO}</math> min. value)</li><li>– Inserted: <math>V_{BE(on)}</math></li><li>– Modified: <i>Table 4</i> (<math>h_{FE}</math> max. value)</li><li>– Added new section: <i>Electrical characteristics (curves)</i></li></ul>
27-May-2013	4	<ul style="list-style-type: none"><li>– Document status promoted from preliminary to production data</li></ul>
09-May-2014	5	<ul style="list-style-type: none"><li>– Updated <i>Table 1: Device summary</i> and <i>Section 3: Package mechanical data</i></li></ul>
10-Feb-2025	6	<ul style="list-style-type: none"><li>Updated Section 3.1: SOT-23 package information.</li><li>Minor text changes.</li></ul>

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