



**THE DATASHEET OF  
2STR2230**



## Low voltage fast-switching PNP power transistor

Datasheet - production data

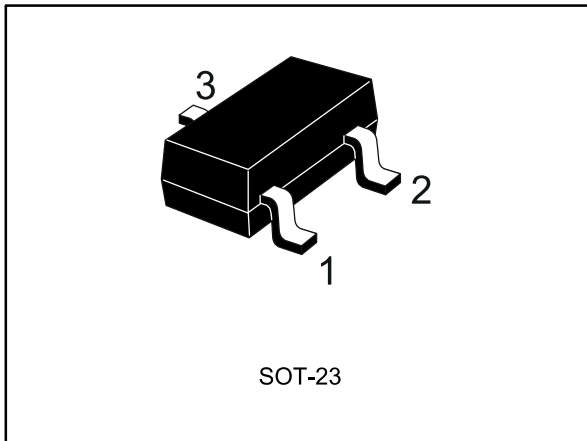
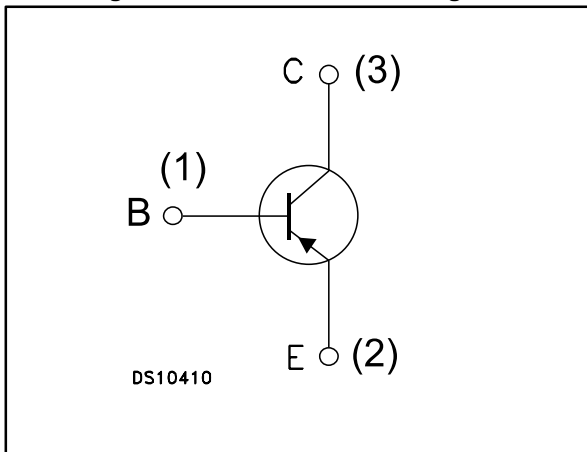


Figure 1: Internal schematic diagram



### Features

- Very low collector-emitter saturation voltage
- High current gain characteristic
- Fast switching speed
- Miniature SOT-23 plastic package for surface mounting circuits

### Applications

- LED
- Motherboard & hard disk drive
- Mobile equipment
- Battery charger
- Voltage regulation

### Description

The device is a PNP transistor manufactured using new "PB-HCD" (power bipolar high current density) technology. The resulting transistor shows exceptional high gain performances coupled with very low saturation voltage.

Table 1: Device summary

Order code	Marking	Package	Packing
2STR2230	2230	SOT-23	Tape and reel

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# 1 Electrical ratings

**Table 2: Absolute maximum rating**

Symbol	Parameter	Value	Unit
$V_{CES}$	Collector-emitter voltage ( $V_{CE} = 0$ )	-30	V
$V_{CEO}$	Collector-emitter voltage ( $I_B = 0$ )	-30	V
$V_{EBO}$	Emitter-base voltage ( $I_C = 0$ )	-5	V
$I_C$	Collector current	-1.5	A
$I_{CM}$	Collector peak current ( $t_P < 5\text{ms}$ )	-3	A
$P_{tot}$	Total dissipation at $T_{amb} = 25^\circ\text{C}$	0.5	W
$T_{stg}$	Storage temperature range	-65 to 150	$^\circ\text{C}$
$T_J$	Operating junction temperature range		

**Table 3: Thermal data**

Symbol	Parameter	Value	Unit
$R_{thj-amb}^{(1)}$	Thermal resistance junction-amb max	250	$^\circ\text{C/W}$

**Notes:**

<sup>(1)</sup>Device mounted on PCB area of 1 cm<sup>2</sup>

## 2 Electrical characteristics

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

Table 4: Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{\text{CBO}}$	Collector cut-off current ( $I_{\text{E}} = 0$ )	$V_{\text{CB}} = -30 \text{ V}$			-0.1	$\mu\text{A}$
$I_{\text{EBO}}$	Emitter cut-off current ( $I_{\text{C}} = 0$ )	$V_{\text{EB}} = -4 \text{ V}$			-0.1	$\mu\text{A}$
$V_{(\text{BR})\text{CBO}}$	Collector-base breakdown voltage ( $I_{\text{E}} = 0$ )	$I_{\text{C}} = -100 \mu\text{A}$	-30			V
$V_{(\text{BR})\text{CEO}}^{(1)}$	Collector-emitter breakdown voltage ( $I_{\text{B}} = 0$ )	$I_{\text{C}} = -10 \text{ mA}$	-30			V
$V_{(\text{BR})\text{EBO}}$	Emitter-base breakdown voltage ( $I_{\text{C}} = 0$ )	$I_{\text{E}} = -100 \mu\text{A}$	-5			V
$V_{\text{CE}(\text{sat})}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = -0.1 \text{ A}, I_{\text{B}} = -1 \text{ mA}$			-0.17	V
		$I_{\text{C}} = -1 \text{ A}, I_{\text{B}} = -100 \text{ mA}$		-0.25	-0.45	V
		$I_{\text{C}} = -2 \text{ A}, I_{\text{B}} = -200 \text{ mA}$		-0.42	-0.8	V
$V_{\text{BE}(\text{sat})}^{(1)}$	Base-emitter saturation voltage	$I_{\text{C}} = -1 \text{ A}, I_{\text{B}} = -100 \text{ mA}$		-0.9	-1.25	V
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = -50 \text{ mA}, V_{\text{CE}} = -2 \text{ V}$	210			
		$I_{\text{C}} = -0.5 \text{ A}, V_{\text{CE}} = -2 \text{ V}$	170	280	560	
		$I_{\text{C}} = -1 \text{ A}, V_{\text{CE}} = -2 \text{ V}$	100			
		$I_{\text{C}} = -1.5 \text{ A}, V_{\text{CE}} = -2 \text{ V}$	70			
$f_{\text{t}}$	Transition frequency	$I_{\text{C}} = -0.1 \text{ A}, V_{\text{CE}} = -5 \text{ V}$ $f = 100 \text{ MHz}$	100			MHz
$C_{\text{CBO}}$	Collector-base capacitance	$I_{\text{E}} = 0, V_{\text{CB}} = -10 \text{ V}$ $f = 1 \text{ MHz}$		10		pF
$t_{\text{on}}$	Turn-on time	Resistive load		74		ns
$t_{\text{off}}$	Turn-off time	$I_{\text{C}} = -1.5 \text{ A}, V_{\text{CC}} = -10 \text{ V}$ $I_{\text{B}1} = -I_{\text{B}2} = -150 \text{ mA}$		200		ns

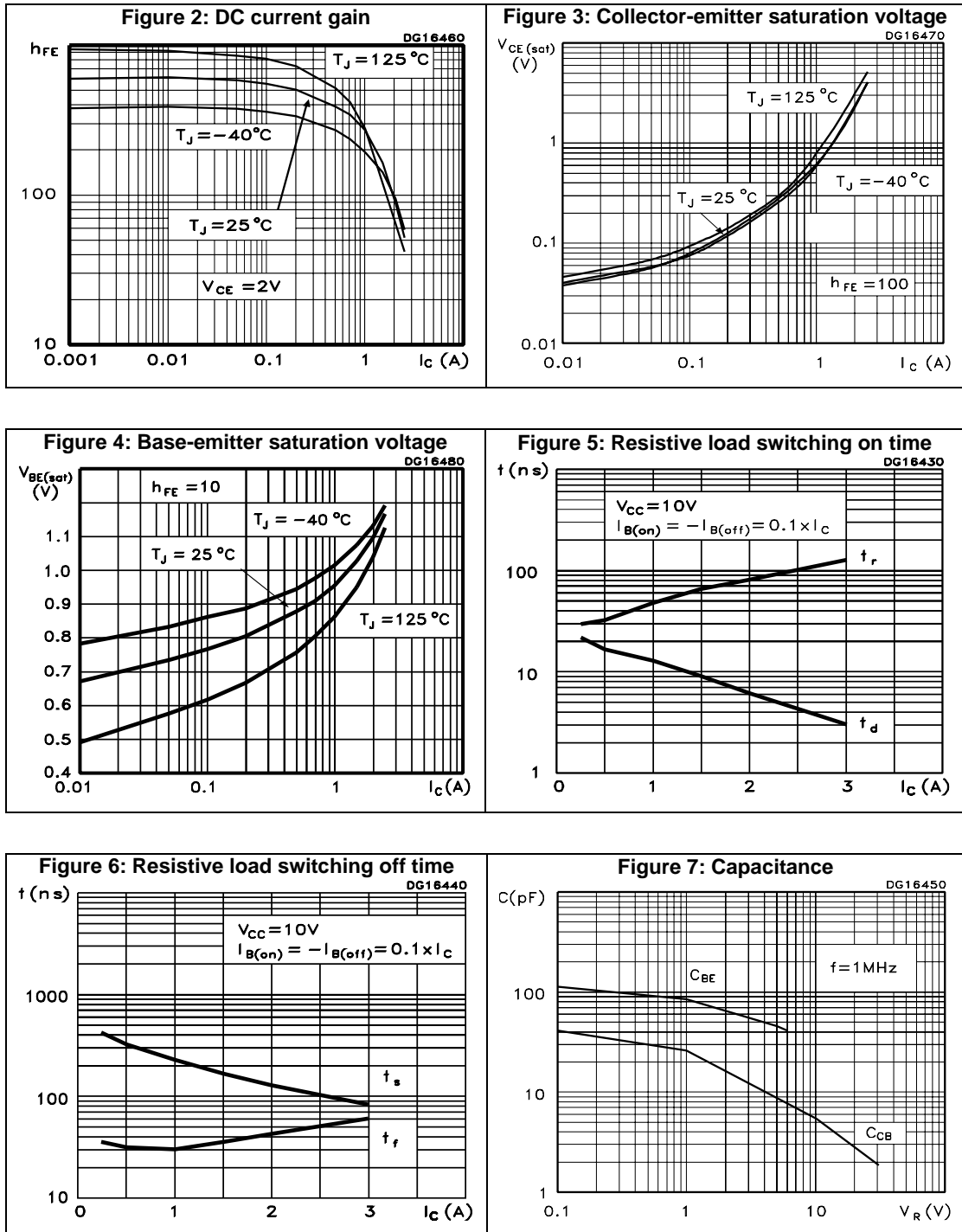
**Notes:**

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

## 2.1 Electrical characteristics (curves)



For the PNP transistors, current and voltage polarities are reversed.



### 3 Package information

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.

#### 3.1 SOT-23 package information

Figure 8: SOT-23 package outline

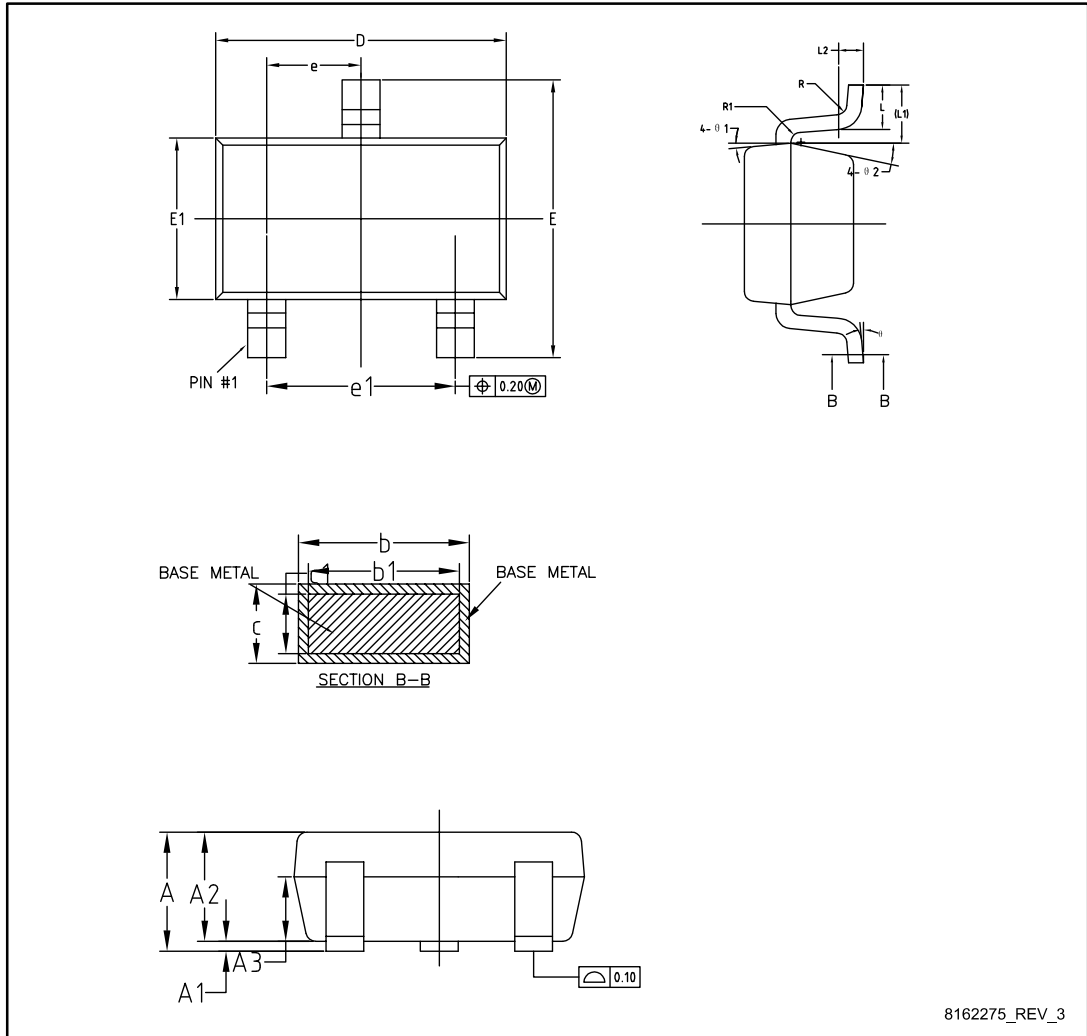
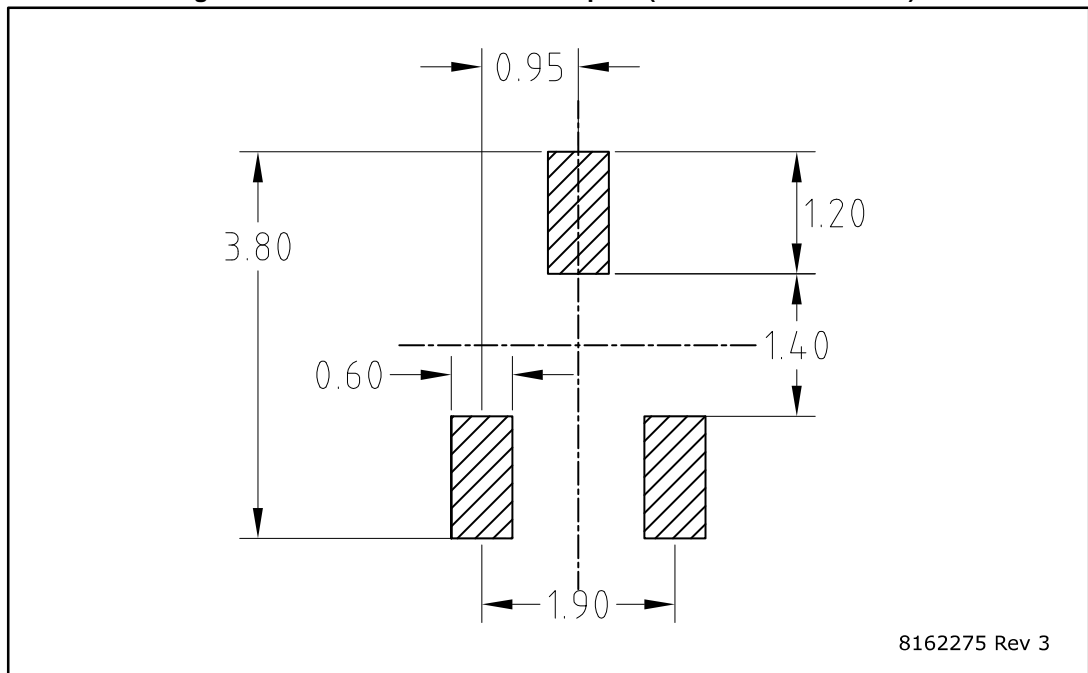


Table 5: SOT-23 package mechanical data

Dim.	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		
$\theta$	0°		8°
$\theta_1$	3°	5°	7°
$\theta_2$	6°		14°

Figure 9: SOT-23 recommended footprint (dimensions are in mm)



## 4 Revision history

**Table 6: Document revision history**

Date	Revision	Changes
18-Jul-2006	1	Initial release
31-Oct-2006	2	New graphics
07-Nov-2006	3	Maturity changed from preliminary to full.
09-Jun-2016	4	Updated features and description in cover page. Updated <i>Table 1: "Device summary"</i> . Updated <i>Section 3.1: "SOT-23 package information"</i> Minor text changes.
04-Jul-2016	5	Updated silhouette in cover page. Minor text changes.

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