2STR2230

Low voltage fast-switching PNP power transistor

Datasheet - production data

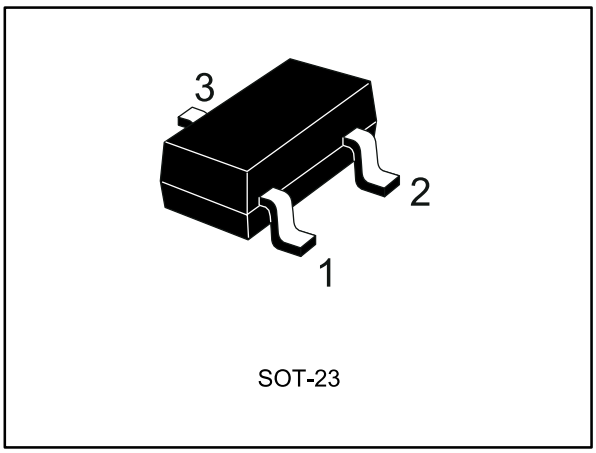
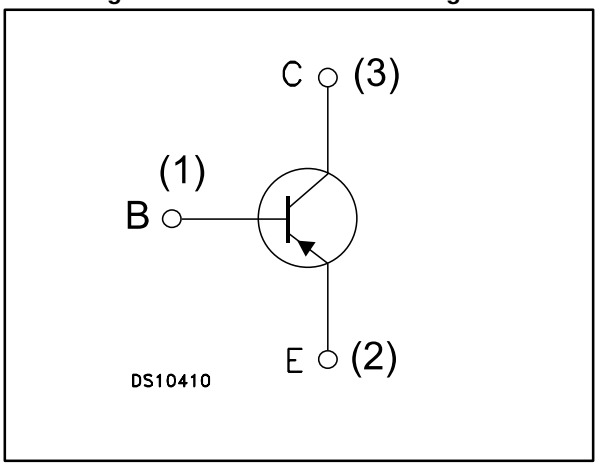


Figure 1: Internal schematic diagram



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

Contents

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 < 5ms)	-3	A
P_{tot}	Total dissipation at T_{amb} = 25°C	0.5	W
T_{stg}	Storage temperature range	-65 to 150	°C
T_J	Operating junction temperature range		

Table 3: Thermal data

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

Notes:

(1)Device mounted on PCB area of 1 cm^2

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} = -30 V			-0.1	µA
I_{EBO}	Emitter cut-off current (I_C =0)	V_{EB} = -4 V			-0.1	µA
$V_{(BR)CBO}$	Collector-base breakdown voltage (I_E = 0)	I_C = -100 µA	-30			V
$V_{(BR)CEO}$(1)	Collector-emitter breakdown voltage (I_B = 0)	I_C = -10 mA	-30			V
$V_{(BR)EBO}$	Emitter-base breakdown voltage (I_C = 0)	I_E = -100 µA	-5			V
$V_{CE(sat)}$(1)	Collector-emitter saturation voltage	I_C = -0.1 A, I_B = -1 mA			-0.17	V
		I_C = -1 A, I_B = -100 mA		-0.25	-0.45	V
		I_C = -2 A, I_B = -200 mA		-0.42	-0.8	V
$V_{BE(sat)}$(1)	Base-emitter saturation voltage	I_C = -1 A, I_B = -100 mA		-0.9	-1.25	V
h_{FE}(1)	DC current gain	I_C = -50 mA, V_{CE} = -2 V	210			
		I_C = -0.5 A, V_{CE}= -2 V	170	280	560	
		I_C = -1 A, V_{CE} = -2 V	100			
		I_C = -1.5 A , V_{CE} = -2 V	70			
f_t	Transition frequency	I_C= -0.1 A, V_{CE}= -5 V f = 100 MHz	100			MHz
C_{CBO}	Collector-base capacitance	I_E = 0, V_{CB}= -10 V f = 1 MHz		10		pF
t_{on}	Turn-on time	Resistive load I_C = -1.5 A, V_{CC} = -10 V I_{B1} = -I_{B2} = -150 mA		74		ns
t_{off}	Turn-off time			200		ns

Notes:

(1)Pulse test: pulse duration = 300 µs, duty cycle ≤ 1.5 %

2.1 Electrical characteristics (curves)

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

Figure 2: DC current gain

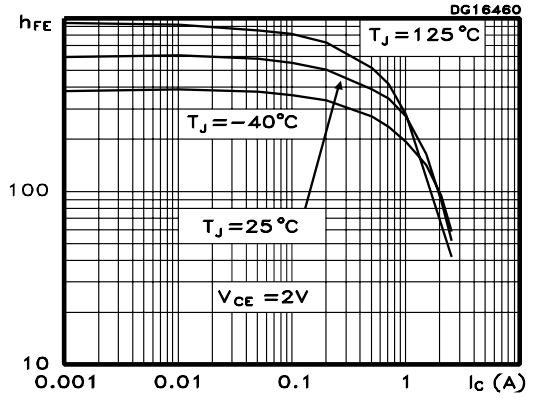


Figure 3: Collector-emitter saturation voltage

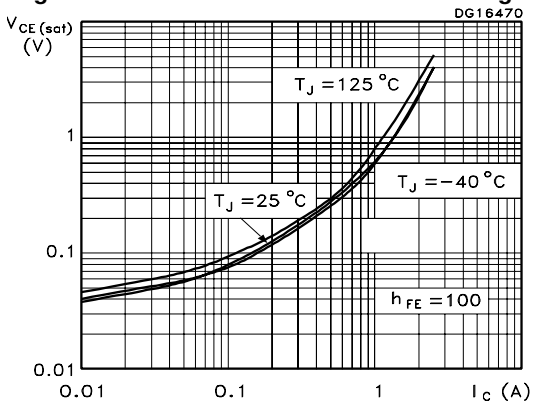


Figure 4: Base-emitter saturation voltage

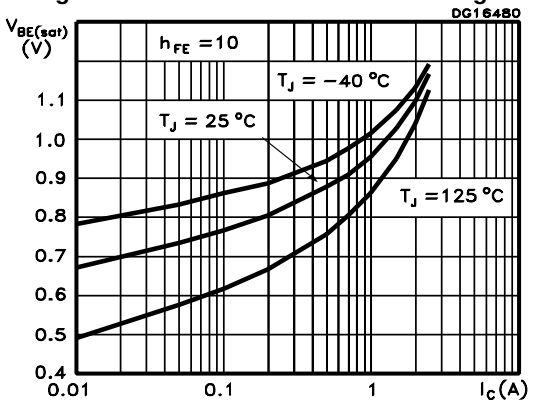


Figure 5: Resistive load switching on time

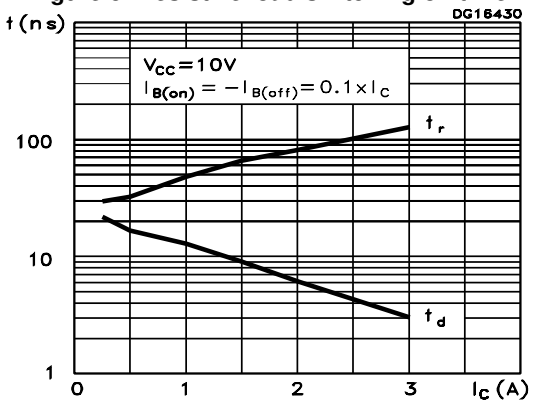


Figure 6: Resistive load switching off time

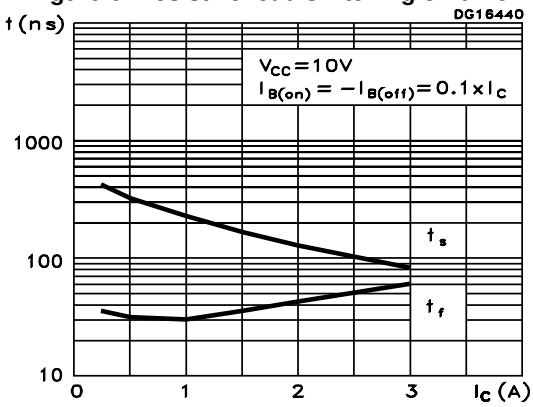
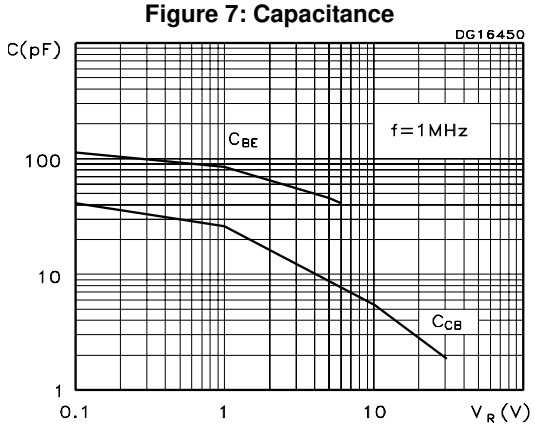


Figure 7: Capacitance



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***. ECOPACK® is an ST trademark.

3.1 SOT-23 package information

Figure 8: SOT-23 package outline

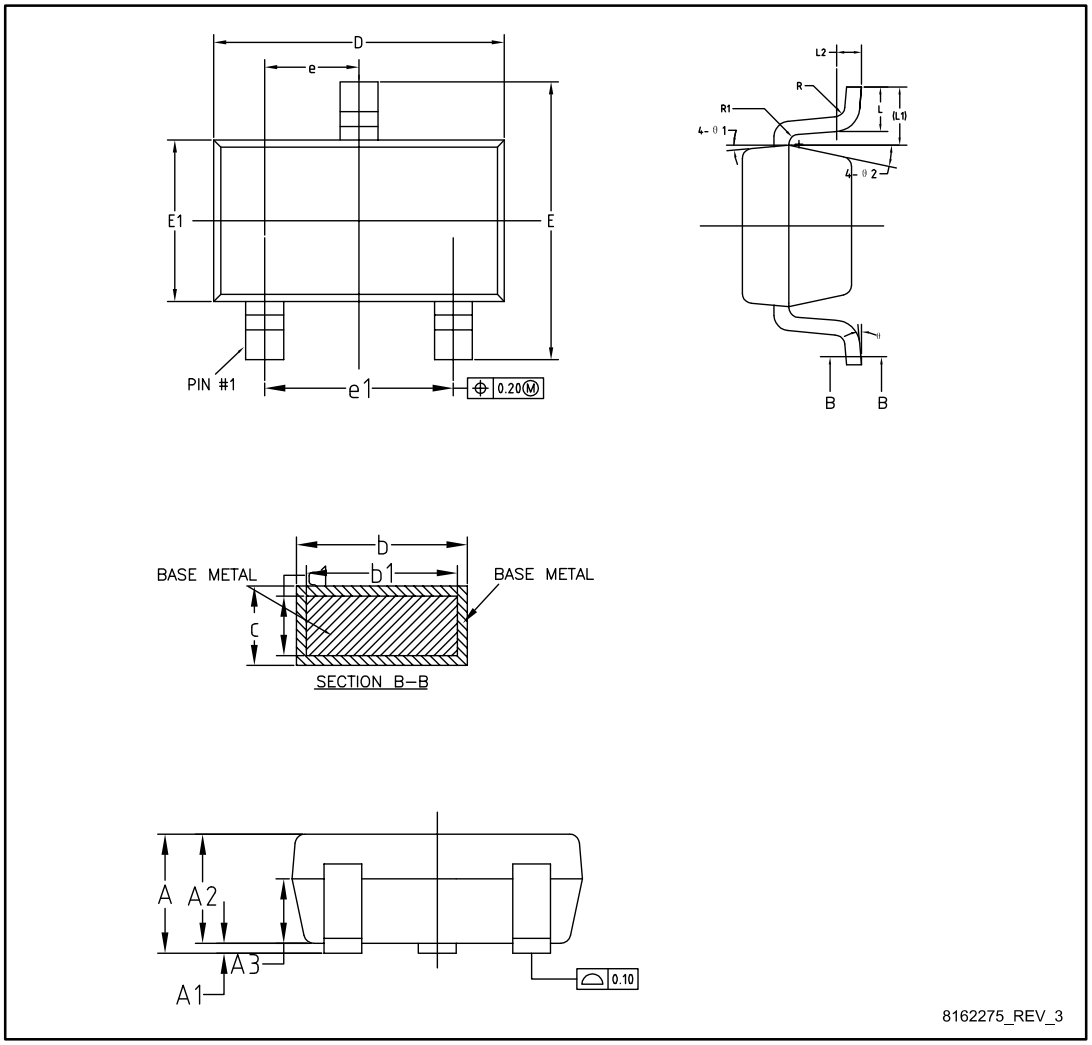
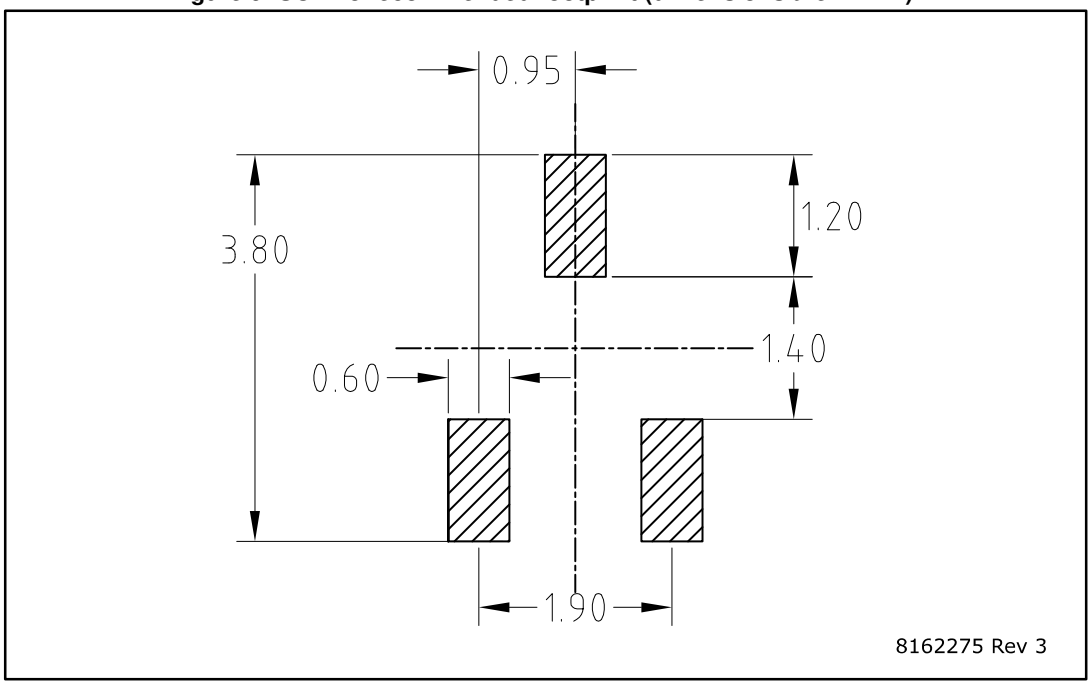


Table 5: SOT-23 package mechanical data

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		
θ	0°		8°
θ1	3°	5°	7°
θ2	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 *Table 1: "Device summary*". Updated *Section 3.1: "SOT-23 package information*" Minor text changes.
04-Jul-2016	5	Updated silhouette in cover page. Minor text changes.

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