2STR1230

Low voltage fast-switching NPN power transistor

Datasheet - production data

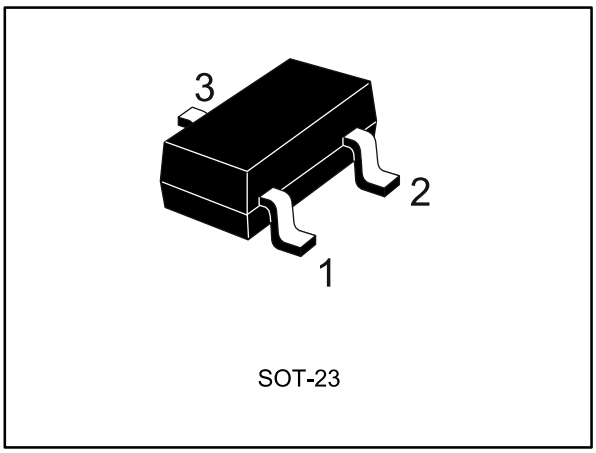
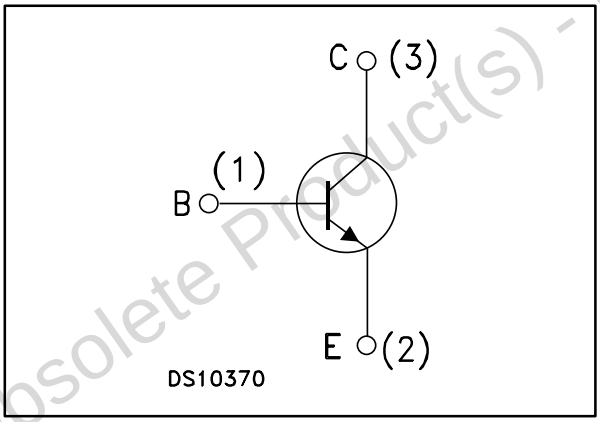


Figure 1: Internal schematic diagram



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
- DC-DC converter
- Voltage regulation

Description

The device is an NPN transistor manufactured using new “PB-HCD” (power bipolar high current density) technology. The resulting transistor shows exceptionally high gain performance coupled with very low saturation voltage.

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Table 1: Device summary

Order code	Marking	Package	Packing
2STR1230	1230	SOT-23	Tape and reel

This is information on a product in full production.

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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 < 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

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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			0.15	V
		I_C = 1 A, I_B = 100 mA		0.2	0.5	
		I_C = 2 A, I_B = 200 mA		0.4	0.85	
V_{BE}(sat)(1)	Base-emitter saturation voltage	I_C = 1 A, I_B = 100 mA			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	180	330	560	
		I_C = 1 A, V_{CE} = 2 V	130			
		I_C = 2 A, V_{CE} = 2 V	80			
C_{CBO}	Collector-base capacitance	I_E = 0 A V_{CB} = 10 V , f = 1 MHz		5		pF
t_{on}	Turn-on time	Resistive load I_C = 1.5 A, V_{CC} = 10 V I_{B1} = -I_{B2} = 150 mA		70		ns
t_{off}	Turn-off time			380		

Notes:

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

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2.1 Electrical characteristics (curves)

Figure 2: DC current gain

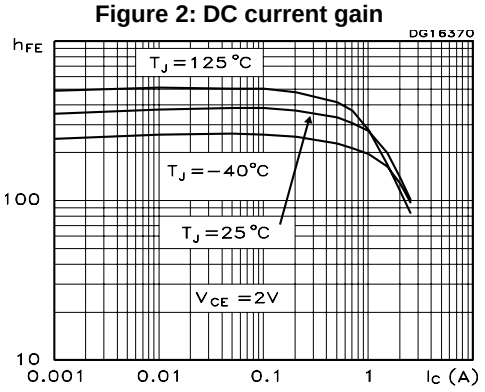


Figure 3: Collector-emitter saturation voltage

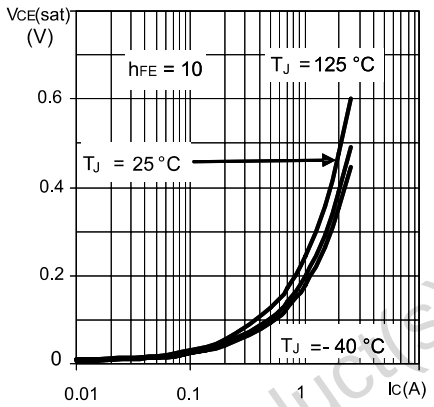


Figure 4: Base-emitter saturation voltage

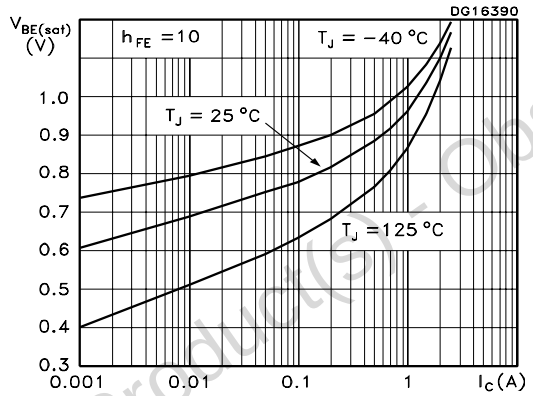


Figure 5: Resistive load switching on time

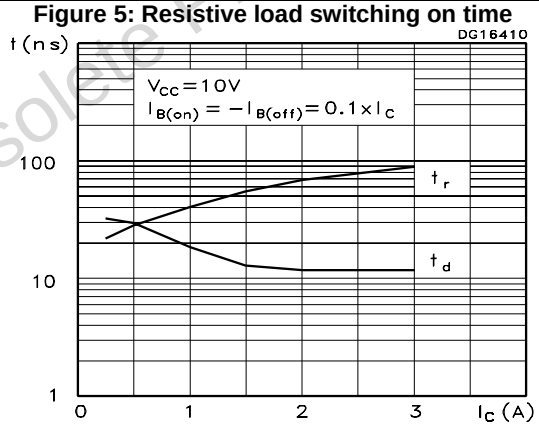


Figure 6: Resistive load switching off time

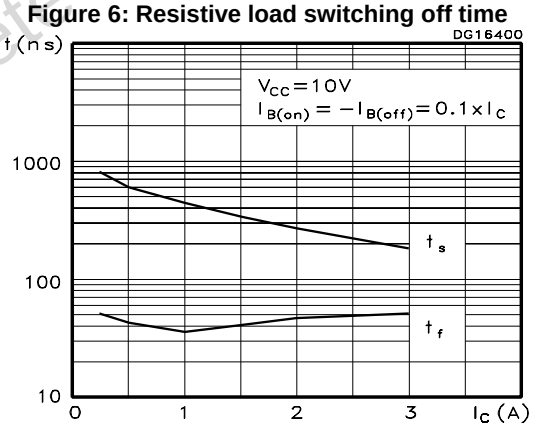
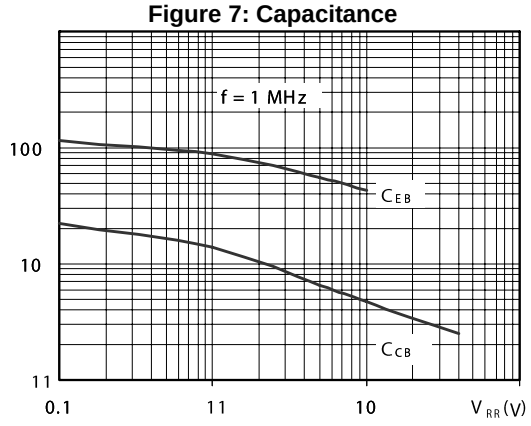


Figure 7: Capacitance



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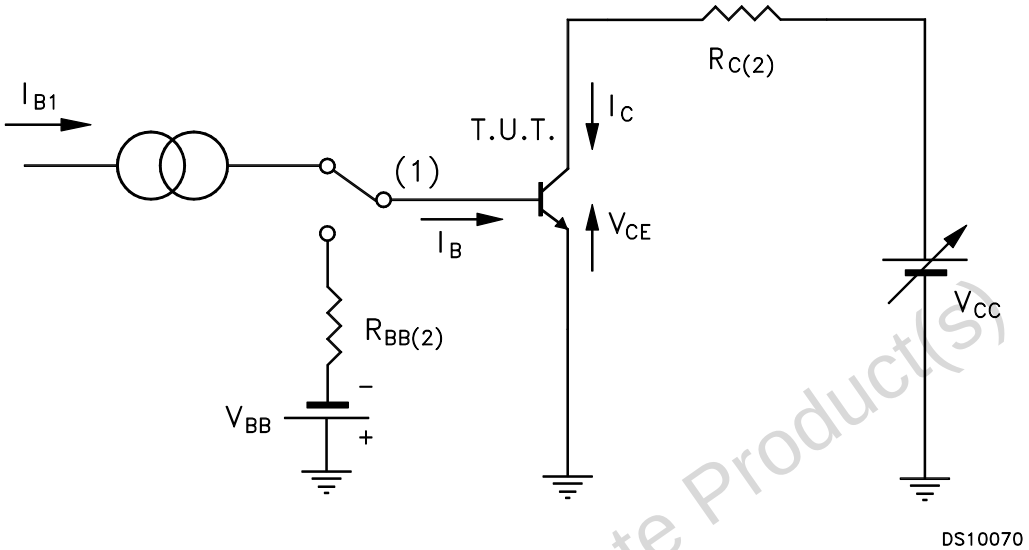
2.2 Test circuits

Figure 8: Resistive load switching test circuit



1. Fast electronic switch
2. Non-inductive resistor

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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 9: SOT-23 package outline

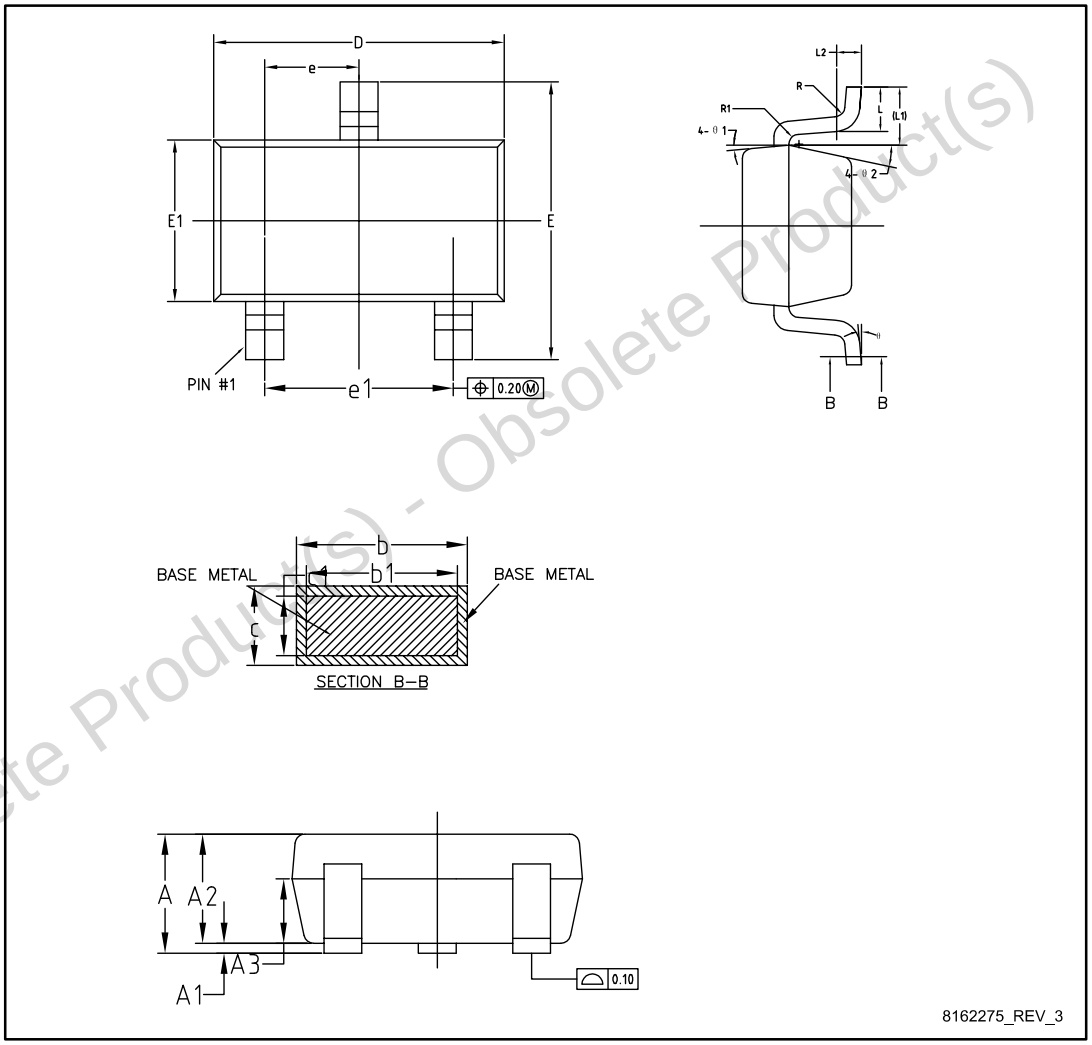

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Table 5: SOT-23 package mechanical data

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°

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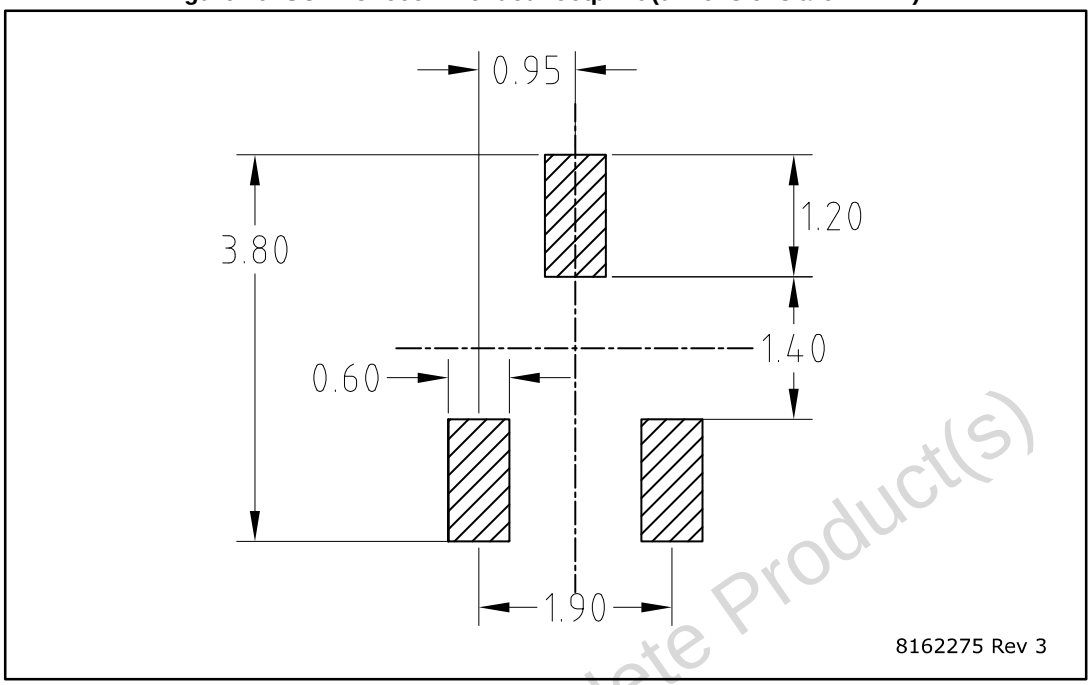
Figure 10: SOT-23 recommended footprint (dimensions are in mm)



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4 Revision history

Table 6: Document revision history

Date	Revision	Changes
18-Jul-2006	1	Initial release
24-Oct-2006	2	New graphics
09-Oct-2009	3	Updated: Figure 3, Figure 7 and package mechanical data..
08-Jul-2016	4	Updated description and *Table 1: "Device summary"* in cover page. Updated *Section 4.1: "SOT-23 package information"*. Minor text changes.

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