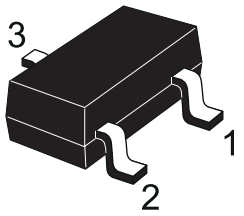
2STR1230

Low voltage fast-switching NPN power transistor

General features

- Very low collector-emitter saturation voltage
- High current gain characteristic
- Fast switching speed
- Miniature SOT-23 plastic package for surface mounting circuits
- In compliance with the 2002/93/EC European Directive



SOT-23

Description

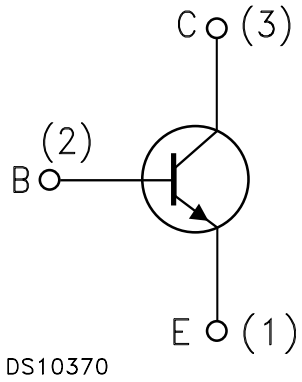
The device is a NPN transistor manufactured using new “PB-HCD” (Power Bipolar High Current Density) technology. The resulting transistor shows exceptional high gain performances coupled with very low saturation voltage.

The complementary PNP is the 2STR2230.

Applications

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

Internal schematic diagram



Order codes

Part Number	Marking	Package	Packing
2STR1230	130	SOT-23	Tape & reel

Contents

1 Electrical ratings

Table 1. 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	-65 to 150	°C
T_J	Max. operating junction temperature	150	°C

Table 2. Thermal data

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

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

2 Electrical characteristics

(T_{case} = 25°C unless otherwise specified)

Table 3. Electrical characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cut-off current (I_E =0)	V_{CB} = 30V			0.1	µA
I_{EBO}	Emitter cut-off current (I_C =0)	V_{EB} = 4V			0.1	µA
$V_{(BR)CBO}$	Collector-emitter breakdown voltage (I_E = 0)	I_C = 100µA	30			V
$V_{(BR)CEO}$ (2)	Collector-emitter breakdown voltage (I_B = 0)	I_C = 10mA	30			V
$V_{(BR)EBO}$	Emitter-base breakdown voltage (I_C = 0)	I_E = 100µA	5			V
$V_{CE(sat)}$ (2)	Collector-emitter saturation voltage	I_C = 0.1A I_B = 1mA I_C = 1A I_B = 100mA I_C = 2A I_B = 200mA		 0.25 0.4	0.15 0.5 0.85	V V V
$V_{BE(sat)}$ (2)	Base-emitter saturation voltage	I_C = 1A I_B = 100mA		0.9	1.25	V
h_{FE} (2)	DC current gain	I_C = 50mA V_{CE} = 2V I_C = 0.5A V_{CE} = 2V I_C = 1A V_{CE} = 2V I_C = 2A V_{CE} = 2V	210 180 130 80	280	560	
C_{CBO}	Collector-base capacitance	I_E = 0 V_{CB} = 10V f = 1MHz		3		pF
t_{on} t_{off}	Resistive load Turn-on time Turn-off time	I_C = 1.5A V_{CC} = 10V I_{B1} = -I_{B2} = 150mA		70 380		ns ns

Note (2) Pulsed duration = 300 µs, duty cycle ≤1.5%

2.1 Electrical characteristics (curves)

Figure 1. DC current gain

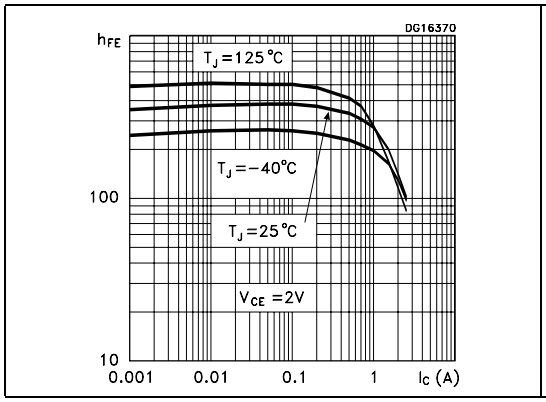


Figure 2. Collector-emitter saturation voltage

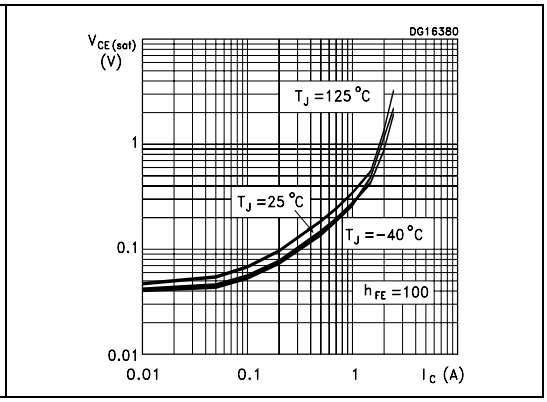


Figure 3. Base-emitter saturation voltage

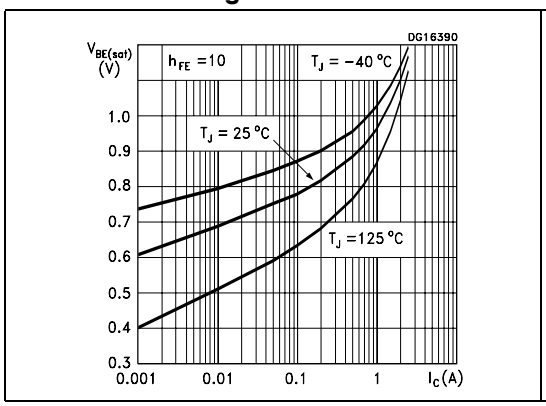


Figure 4. Resistive load switching time

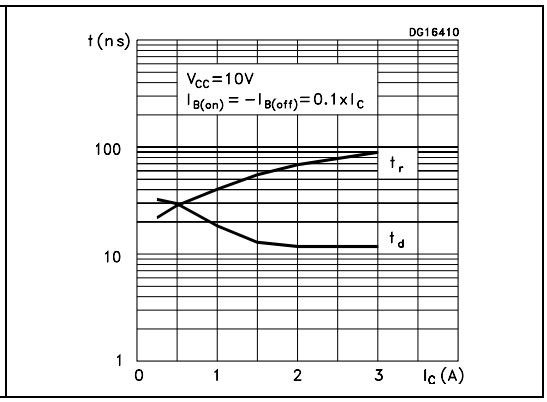


Figure 5. Resistive load switching time

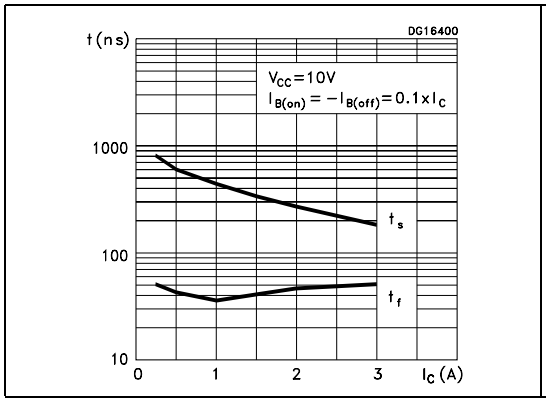
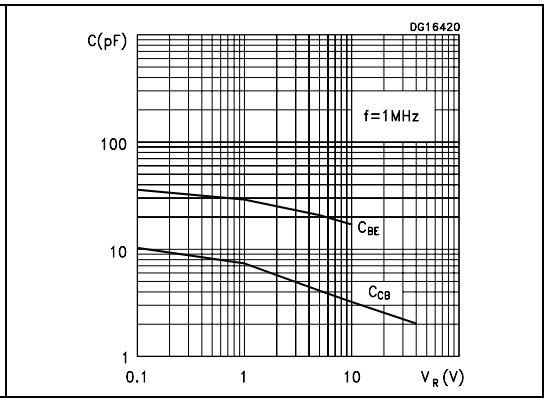
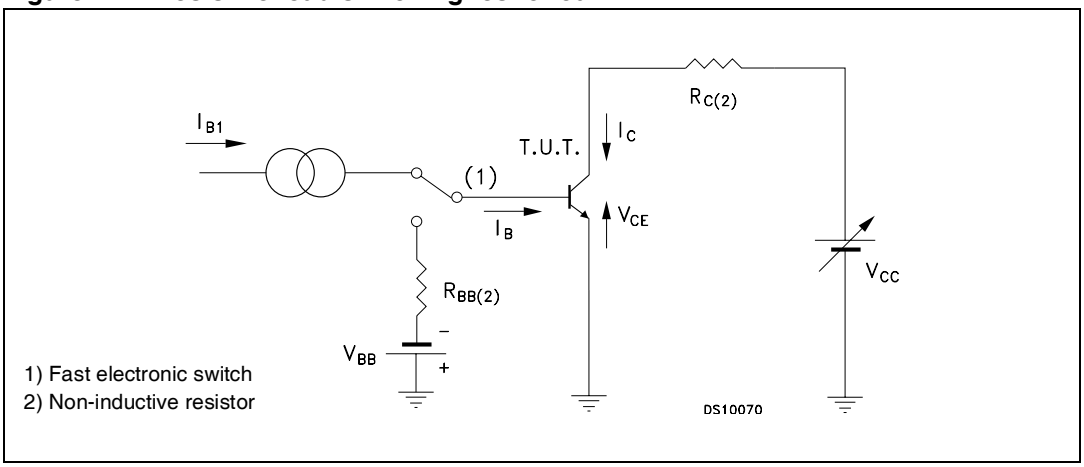


Figure 6. Capacitance



2.2 Test circuits

Figure 7. Resistive load switching test circuit



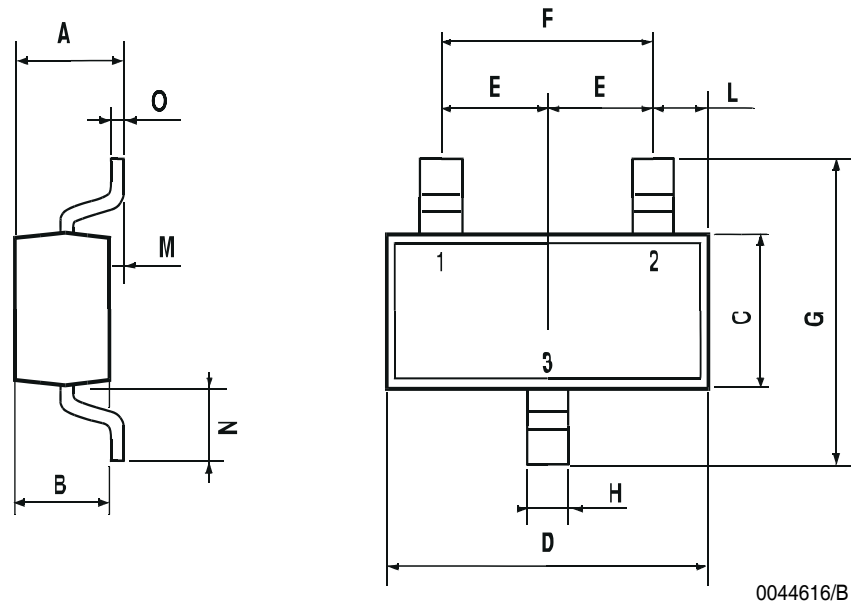
1) Fast electronic switch
2) Non-inductive resistor

3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com

SOT-23 MECHANICAL DATA

DIM.	mm			mils		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	0.85		1.1	33.4		43.3
B	0.65		0.95	25.6		37.4
C	1.20		1.4	47.2		55.1
D	2.80		3	110.2		118
E	0.95		1.05	37.4		41.3
F	1.9		2.05	74.8		80.7
G	2.1		2.5	82.6		98.4
H	0.38		0.48	14.9		18.8
L	0.3		0.6	11.8		23.6
M	0		0.1	0		3.9
N	0.3		0.65	11.8		25.6
O	0.09		0.17	3.5		6.7



4 Revision history

Table 4. Revision history

Date	Revision	Changes
18-Jul-2006	1	Initial release
24-Oct-2006	2	New graphics

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