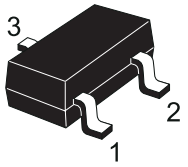
2STR1160

Low voltage fast-switching NPN power transistor

Features

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



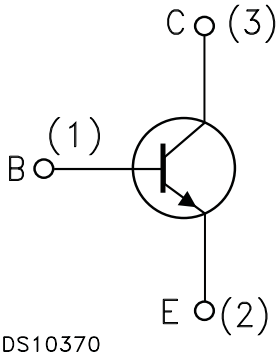
SOT-23

Description

The device in 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 2STR2160.

Figure 1. Internal schematic diagram



Applications

- LED
- Battery charger
- Motor and relay driver
- Voltage regulation

Table 1. Device summary

Order code	Marking	Package	Packing
2STR1160	160	SOT-23	Tape and reel

Content

1 Electrical ratings

Table 2. Absolute maximum rating

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base voltage (I_E = 0)	60	V
V_{CEO}	Collector-emitter voltage (I_B = 0)	60	V
V_{EBO}	Emitter-base voltage (I_C = 0)	5	V
I_C	Collector current	1	A
I_{CM}	Collector peak current (t_P < 5ms)	2	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 3. 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 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} = 60 V			0.1	µA
I_{EBO}	Emitter cut-off current (I_C =0)	V_{EB} = 5 V			0.1	µA
$V_{(BR)CBO}$	Collector-base breakdown voltage (I_E = 0)	I_C = 100 µA	60			V
$V_{(BR)CEO}$(1)	Collector-emitter breakdown voltage (I_B = 0)	I_C = 10 mA	60			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 = 0.5 A I_B = 50 mA I_C = 1 A I_B = 100 mA		130 210	210 430	mV mV
$V_{BE(sat)}$(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 = 0.5 A V_{CE} = 2V I_C = 1 A V_{CE} = 2V I_C = 2 A V_{CE} = 2V	180 85	250 130 30	560	
t_{on} t_{off}	Resistive load Turn-on time Turn-off time	I_C = 1.5 A V_{CC} = 10 V I_{B1} = -I_{B2} = 150 mA $V_{BB(off)}$= -5 V		 220 500		 ns ns

1. Pulsed duration = 300 µs, duty cycle ≤1.5%

2.1 Typical characteristic (curves)

Figure 2. DC current gain (@ V_{CE}=1 V)

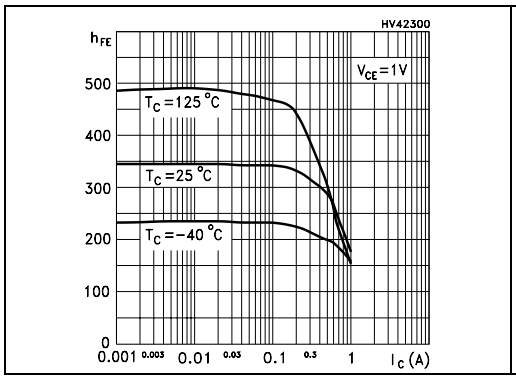


Figure 3. DC current gain (@ V_{CE}=2 V)

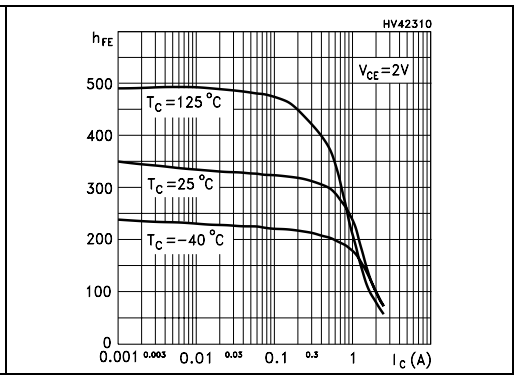


Figure 4. Base-emitter on voltage

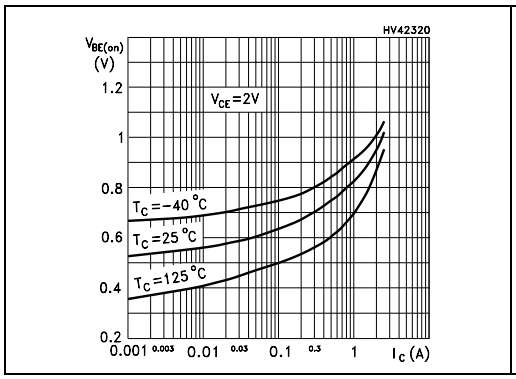


Figure 5. Base-emitter saturation voltage

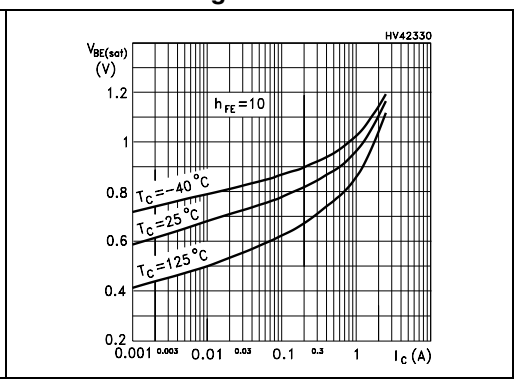


Figure 6. Collector-emitter saturation voltage

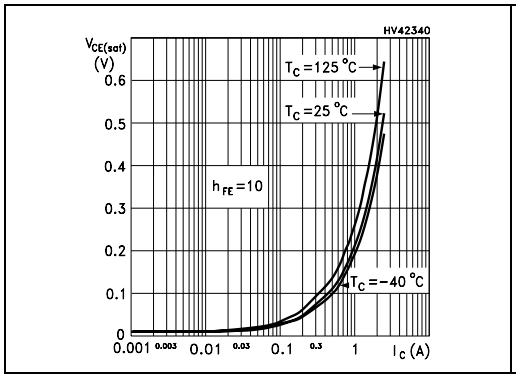


Figure 7. Capacitance curves

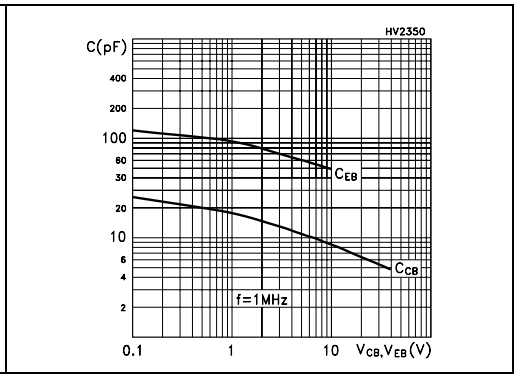


Figure 8. Resistive load switching time

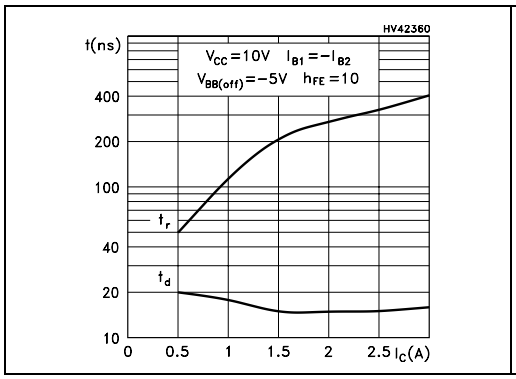
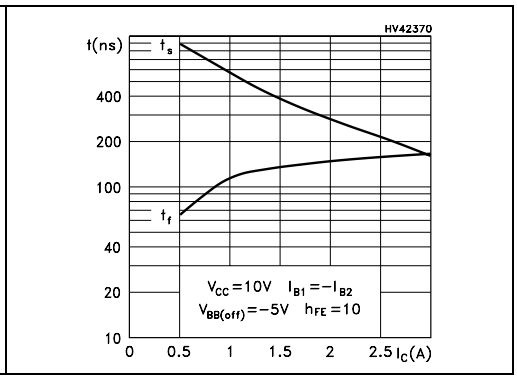


Figure 9. Resistive load switching time



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.		
	min.	typ	max.
A	0.89		1.4
A1	0		0.1
B	0.3		0.51
C	0.085		0.18
D	2.75		3.04
e	0.85		1.05
e1	1.7		2.1
E	1.2		1.6
H	2.1		2.75
L		0.6	
S	0.35		0.65

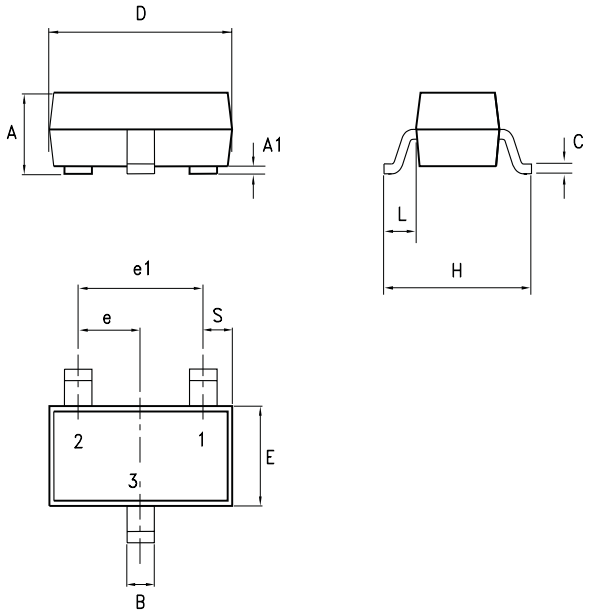
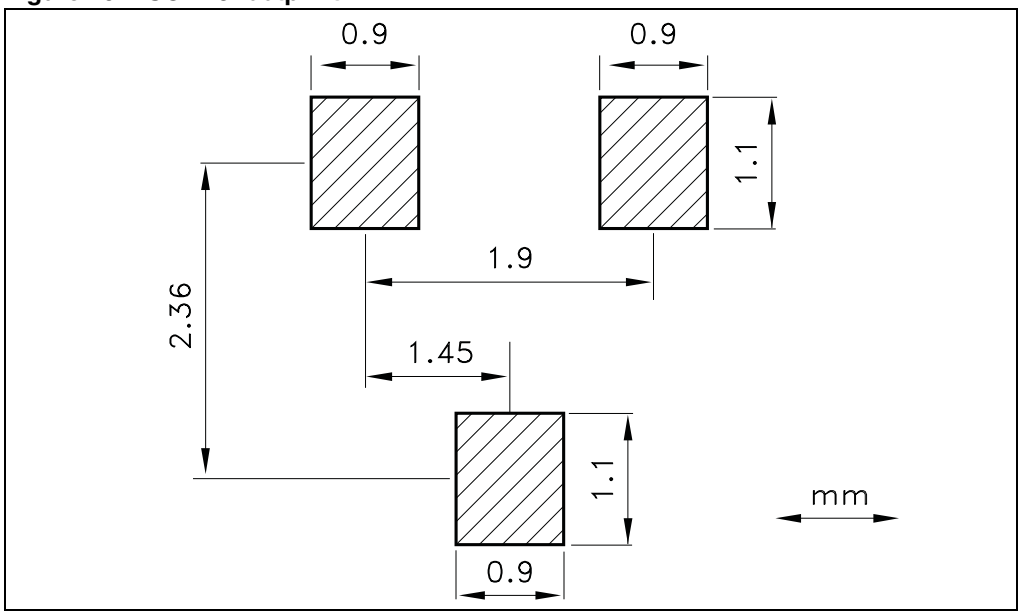


Figure 10. SOT-23 footprint



4 Revision history

Table 5. Document revision history

Date	Revision	Changes
12-Feb-2008	1	Initial release

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