

Low voltage fast-switching NPN power transistor

Datasheet - production data

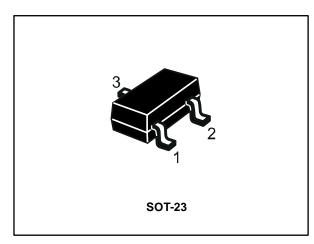
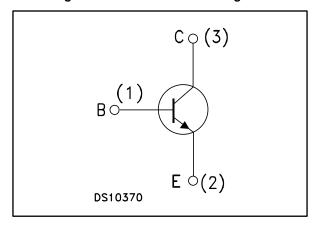


Figure 1: Internal schematic diagram



Features

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

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.

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

Contents 2STR1160

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2STR1160 Electrical ratings

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
Ic	Collector current	1	А
I _{CM}	Collector peak current (t _P < 5ms)	2	Α
P _{tot}	Total dissipation at T _{amb} = 25°C	0.5	W
Tstg	Storage temperature	-65 to 150	°C
TJ	Max. operating junction temperature	150	°C

Table 3: Thermal data

Symbol	Parameter	Value	Unit
R _{thj-amb} ⁽¹⁾	Thermal resistance junction-amb max	250	°C/W

Notes:

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

Electrical characteristics 2STR1160

2 Electrical characteristics

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

Table 4: Electrical characteristics

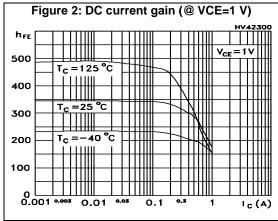
Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
Ісво	Collector cut-off current (I _E =0)	V _{CB} = 60 V			0.1	μA
I _{EBO}	Emitter cut-off current (I _C =0)	V _{EB} = 5 V			0.1	μΑ
V _{(BR)CBO}	Collector-base breakdown voltage (I _E = 0)	Ι _C = 100 μΑ	60			V
V _{(BR)CEO} ⁽¹⁾	Collector-emitter breakdown voltage (I _B = 0)	I _C = 10 mA	60			V
V _{(BR)EBO}	Emitter-base breakdown voltage (I _C = 0)	Ι _Ε = 100 μΑ	5			V
$V_{CE(sat)}$	Collector-emitter saturation	$I_C = 0.5 \text{ A } I_B = 50 \text{ mA}$		130	210	mV
	voltage	$I_C = 1 A I_B = 100 mA$		210	430	mV
V _{BE(sat)}	Base-emitter saturation voltage	$I_C = 1 A I_B = 100 mA$		0.9	1.25	V
h _{FE}	DC current gain	$I_C = 0.5 \text{ A V}_{CE} = 2V$	180	250	560	
		I _C = 1 A V _{CE} = 2V	85	130		
		I _C = 2 A V _{CE} = 2V		30		
	Resistive load					
t _{on}	Turn-on time	I _C = 1.5 A V _{CC} = 10 V		220		ns
t off	Turn-off time	$I_{B1} = -I_{B2} = 150 \text{ mA}$ $V_{BB(off)} = -5 \text{ V}$		500		ns

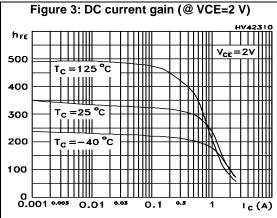
Notes:

 $^{^{(1)}\}text{Pulse}$ test: pulse duration = 300 µs, duty cycle ≤ 1.5 %%

2STR1160 Electrical characteristics

2.1 Typical characteristic (curves)





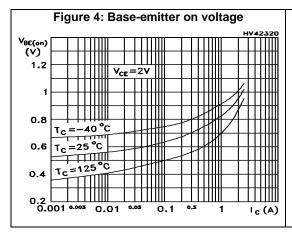
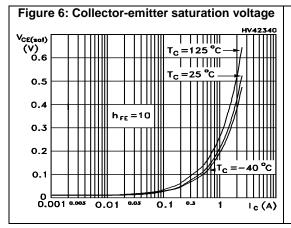
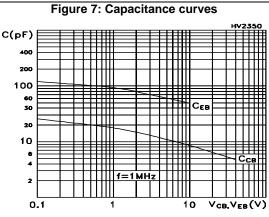


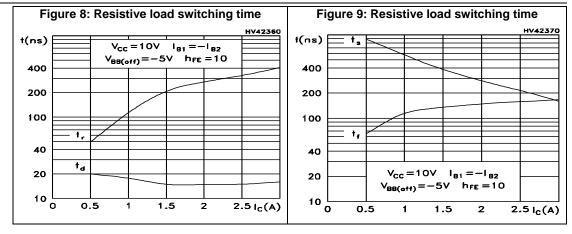
Figure 5: Base-emitter saturation voltage $V_{\text{BE}(\text{soft})}$ (V)1.2 $h_{\text{FE}} = 10$ 0.8 $T_{\text{C}} = A0^{\circ}\text{C}$ $T_{\text{C}} = 25^{\circ}\text{C}$ 0.4

0.2

0.001 9.003 0.01 9.05 0.1 9.3 1 $I_{\text{C}}(A)$







3 Package mechanical data

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3.1 SOT-23 mechanical data

Figure 10: SOT-23 mechanical drawing

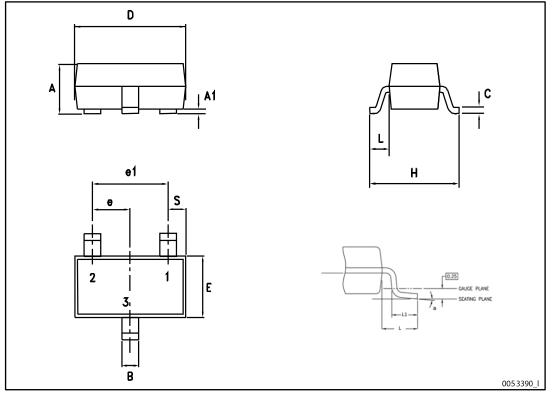
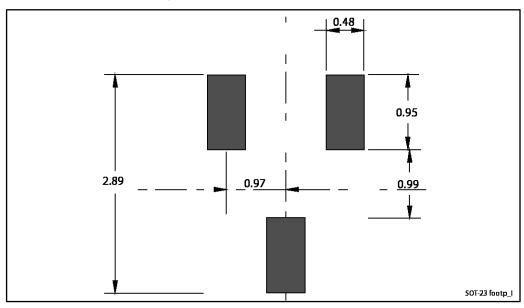


Table 5: SOT-23 mechanical data

Dim.	mm		
	Min.	Тур.	Max.
А	0.89		1.40
A1	0		0.10
В	0.30		0.51
С	0.085		0.18
D	2.75 3.0		3.04
е	0.85 1.05		1.05
e1	1.70 2.10		2.10
Е	1.20 1.75		1.75
Н	2.10 3.00		3.00
L		0.60	
S	0.35	0.35 0.65	
L1	0.25		0.55
а	0° 8°		8°

Figure 11: SOT-23 recommended footprint





Dimensions are in mm.

2STR1160 Revision history

4 Revision history

Table 6: Document revision history

Date	Revision	Changes	
12-Feb-2008	1	Initial release	
08-May-2014	2	Updated Section 3: "Package mechanical data".	

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