

Low voltage fast-switching PNP power transistor

Preliminary Data

General features

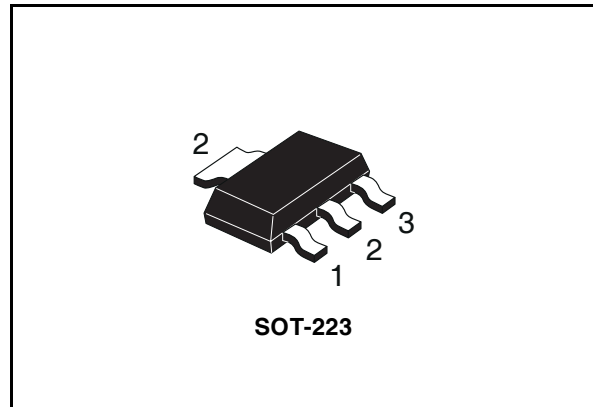
- Very low collector-emitter saturation voltage
- High current gain characteristic
- Fast switching speed
- Surface mounting device in medium power SOT-223 package
- In compliance with the 2002/93/EC European Directive

Description

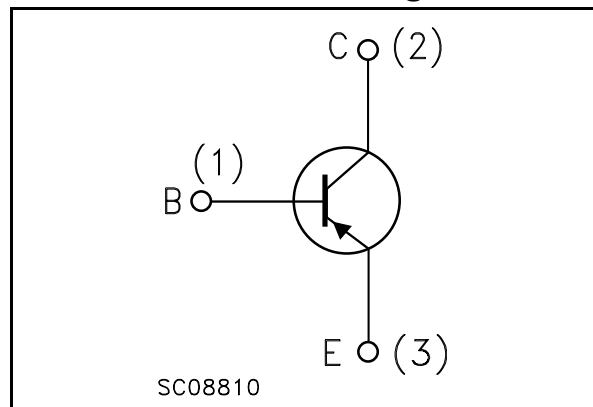
The device is manufactured in PNP planar technology by using a "Base Island" layout. The resulting transistor shows exceptional high gain performances coupled with very low saturation voltage.

Applications

- Emergency lighting
- Voltage regulators
- Relay drivers
- High efficiency low voltage switching applications



Internal schematic diagram



Order codes

Part Number	Marking	Package	Packing
STN951	N951	SOT-223	Tape & reel

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1 Electrical ratings

Table 1. 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 ($I_C = 0$)	-6	V
I_C	Collector current	-5	A
I_{CM}	Collector peak current ($t_P < 5\text{ms}$)	-10	A
I_B	Base current	-1	A
I_{BM}	Base peak current ($t_P < 5\text{ms}$)	-2	A
P_{tot}	Total dissipation at $T_{amb} = 25^\circ\text{C}$	1.6	W
T_{stg}	Storage temperature	-65 to 150	$^\circ\text{C}$
T_j	Max. operating junction temperature	150	$^\circ\text{C}$

Table 2. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj-amb}^{(1)}$	Thermal resistance junction-amb max	78	$^\circ\text{C/W}$

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

2 Electrical characteristics

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

Table 3. Electrical characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cut-off current ($I_{\text{E}} = 0$)	$V_{\text{CB}} = -60\text{V}$			-0.1	μA
I_{EBO}	Emitter cut-off current ($I_{\text{C}} = 0$)	$V_{\text{EB}} = -5\text{V}$			-0.1	μA
$V_{(\text{BR})\text{CBO}}^{(2)}$	Collector-base Breakdown voltage ($I_{\text{E}} = 0$)	$I_{\text{C}} = -100\mu\text{A}$	-60			V
$V_{(\text{BR})\text{CEO}}^{(2)}$	Collector-emitter Breakdown voltage ($I_{\text{B}} = 0$)	$I_{\text{C}} = -10\text{mA}$	-60			V
$V_{(\text{BR})\text{EBO}}^{(2)}$	Collector-base Breakdown voltage ($I_{\text{C}} = 0$)	$I_{\text{E}} = -100\mu\text{A}$	-6			V
$V_{\text{CE(sat)}}^{(2)}$	Collector-emitter saturation voltage	$I_{\text{C}} = -100\text{mA}$ $I_{\text{B}} = -5\text{mA}$		-10	-50	mV
		$I_{\text{C}} = -1\text{A}$ $I_{\text{B}} = -50\text{mA}$		-70	-120	mV
		$I_{\text{C}} = -2\text{A}$ $I_{\text{B}} = -50\text{mA}$		-140	-250	mV
		$I_{\text{C}} = -5\text{A}$ $I_{\text{B}} = -200\text{mA}$		-350	-500	mV
$V_{\text{BE(sat)}}^{(2)}$	Base-emitter saturation voltage	$I_{\text{C}} = -4\text{A}$ $I_{\text{B}} = -200\text{mA}$		-1	-1.15	V
$V_{\text{BE(on)}}^{(2)}$	Base-emitter on voltage	$I_{\text{C}} = -4\text{A}$ $V_{\text{CE}} = -1\text{V}$		-0.89	-1	V
$h_{\text{FE}}^{(2)}$	DC current gain	$I_{\text{C}} = -10\text{mA}$ $V_{\text{CE}} = -1\text{V}$	150	300	350	
		$I_{\text{C}} = -2\text{A}$ $V_{\text{CE}} = -1\text{V}$	150	270		
		$I_{\text{C}} = -5\text{A}$ $V_{\text{CE}} = -1\text{V}$	65	90		
		$I_{\text{C}} = -10\text{A}$ $V_{\text{CE}} = -1\text{V}$	10	25		
f_{T}	Transition frequency	$V_{\text{CE}} = -10\text{V}$ $I_{\text{C}} = -100\text{mA}$		130		MHz
C_{CBO}	Collector-base capacitance	$V_{\text{CB}} = -10\text{V}$ $f = 1\text{MHz}$		60		pF
t_{on}	Resistive load Turn-on time	$I_{\text{C}} = -1\text{A}$ $V_{\text{CC}} = -30\text{V}$ $I_{\text{B1}} = -I_{\text{B2}} = -0.1\text{A}$		80		ns
t_{s}	Storage time			600		ns
t_{f}	Fall time			70		ns

Note (2) Pulsed duration = 300 μs , duty cycle $\leq 1.5\%$

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-223 MECHANICAL DATA						
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.80			0.071
B	0.60	0.70	0.80	0.024	0.027	0.031
B1	2.90	3.00	3.10	0.114	0.118	0.122
c	0.24	0.26	0.32	0.009	0.010	0.013
D	6.30	6.50	6.70	0.248	0.256	0.264
e		2.30			0.090	
e1		4.60			0.181	
E	3.30	3.50	3.70	0.130	0.138	0.146
H	6.70	7.00	7.30	0.264	0.276	0.287
V			10°			10°
A1		0.02				

The mechanical drawing illustrates the SOT-223 package in three views: top, side, and bottom. The top view shows dimensions A (lead height), A1 (lead thickness), B (lead width), B1 (body width), c (lead thickness), D (body width), e (pitch), e1 (body width), E (body height), and H (total height). The side view shows the lead profile with a 10° angle V. The bottom view shows the three leads labeled 1, 2, and 3, with dimension e (pitch) and H (total height).

P008B

4 Revision history

Table 4. Revision history

Date	Revision	Changes
03-Oct-2006	1	Initial release.
30-Nov-2006	2	The emitter base voltage value has been modified

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