

## Low voltage fast-switching PNP power transistor

### Features

- Very low collector-emitter saturation voltage
- High current gain characteristic
- Fast switching speed
- Surface mounting device in medium power SOT-223 package

### Applications

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

### 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.

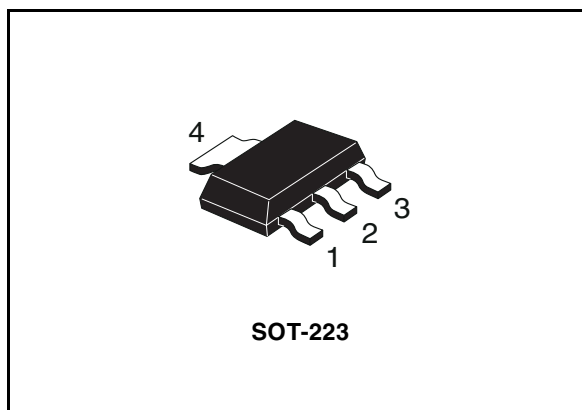


Figure 1. Internal schematic diagram

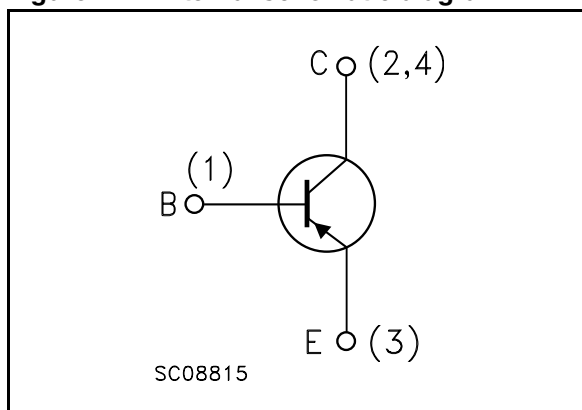


Table 1. Device summary

Order codes	Marking	Package	Packaging
STN951	N951	SOT-223	Tape and reel

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# 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 ( $I_C = 0$ )	-6	V
$I_C$	Collector current	-5	A
$I_{CM}$	Collector peak current ( $t_P < 5$ ms)	-10	A
$I_B$	Base current	-1	A
$I_{BM}$	Base peak current ( $t_P < 5$ ms)	-2	A
$P_{tot}$	Total dissipation at $T_{amb} = 25$ °C	1.6	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
$R_{thj-amb}^{(1)}$	Thermal resistance junction-amb max	78	°C/W

1. Device mounted on PCB area of 1cm<sup>2</sup>

## 2 Electrical characteristics

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

**Table 4. Electrical characteristics**

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

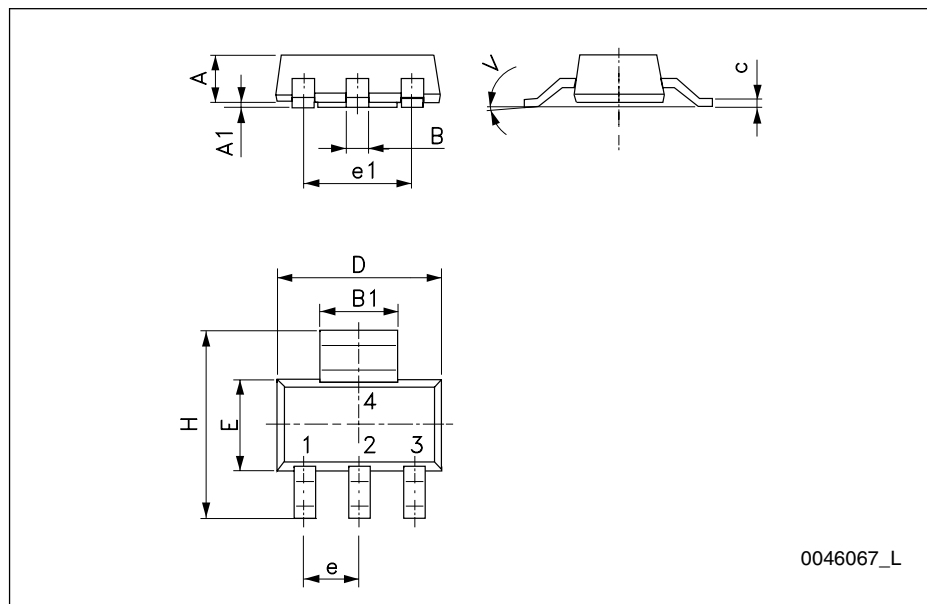
1. Pulse duration = 300  $\mu\text{s}$ , duty cycle  $\leq 2\%$

### 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](http://www.st.com)

**SOT-223 mechanical data**

DIM.	mm.		
	min.	typ	max.
A			1.80
A1	0.02		0.1
B	0.60	0.70	0.85
B1	2.90	3.00	3.15
c	0.24	0.26	0.35
D	6.30	6.50	6.70
e		2.30	
e1		4.60	
E	3.30	3.50	3.70
H	6.70	7.00	7.30
V			10 °



## 4 Revision history

**Table 5. Document revision history**

<b>Date</b>	<b>Revision</b>	<b>Changes</b>
03-Oct-2006	1	Initial release.
30-Nov-2006	2	The emitter base voltage value has been modified
13-Oct-2008	3	Document status promoted from preliminary data to datasheet

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