



# STN851

## LOW VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

PRELIMINARY DATA

Ordering Code	Marking	Shipment
STN851	N851	Tape & Reel

- VERY LOW COLLECTOR TO EMITTER SATURATION VOLTAGE
- HIGH CURRENT GAIN CHARACTERISTIC
- FAST SWITCHING SPEED
- SURFACE-MOUNTING SOT-223 POWER PACKAGE IN TAPE & REEL

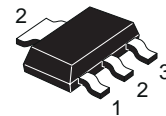
### APPLICATIONS:

- EMERGENCY LIGHTING
- VOLTAGE REGULATORS
- RELAY DRIVERS
- HIGH EFFICIENCY LOW VOLTAGE SWITCHING CIRCUITS

### DESCRIPTION

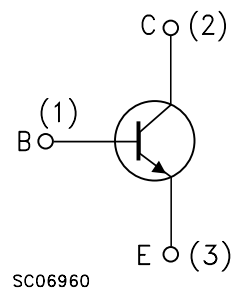
The device is manufactured in NPN Planar technology by using a "Base Island" layout.

The resulting transistor shows exceptional high gain performance coupled with very low saturation voltage.



SOT-223

### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-Base Voltage ( $I_E = 0$ )	150	V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	60	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	7	V
$I_C$	Collector Current	5	A
$I_{CM}$	Collector Peak Current ( $t_p < 5$ ms)	20	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

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### THERMAL DATA

$R_{thj-amb}$ ■	Thermal Resistance Junction-ambient	Max	78	°C/W
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■ Device mounted on P.C.B. with area of 1 cm<sup>2</sup>

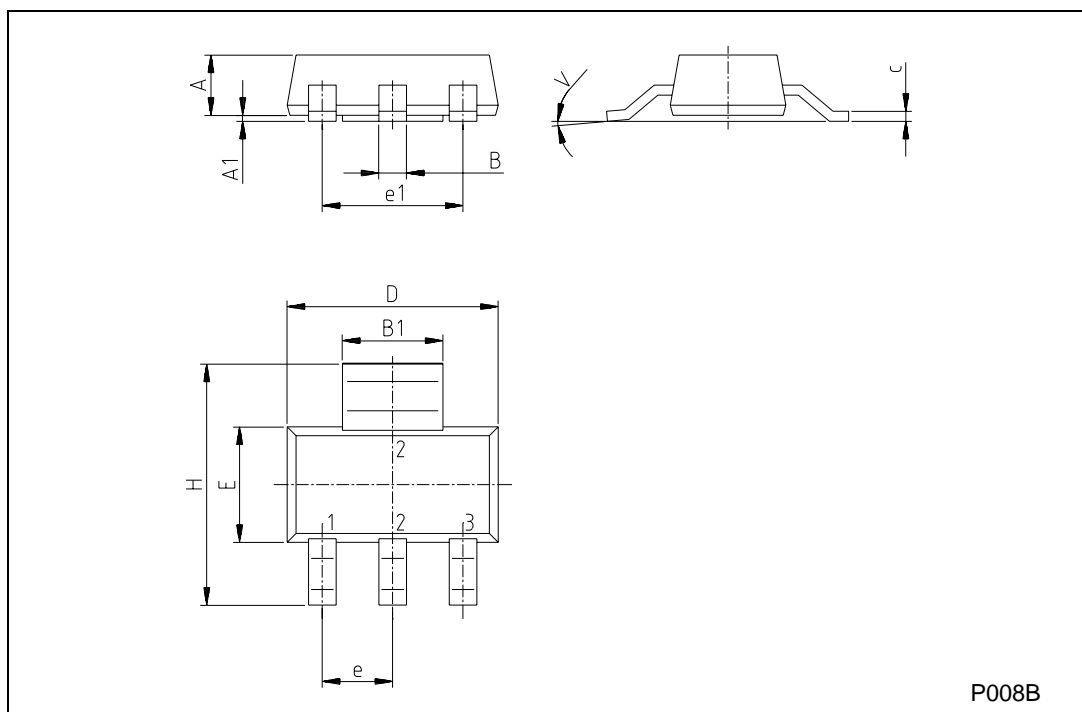
### ELECTRICAL CHARACTERISTICS (T<sub>j</sub> = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I <sub>CBO</sub>	Collector Cut-off Current (I <sub>E</sub> = 0)	V <sub>CB</sub> = 120 V V <sub>CB</sub> = 120 V	T <sub>j</sub> = 100 °C			50 1	nA μA
I <sub>EBO</sub>	Emitter Cut-off Current (I <sub>C</sub> = 0)	V <sub>EB</sub> = 7 V				10	nA
V <sub>(BR)CBO</sub> *	Collector-Base Breakdown Voltage (I <sub>E</sub> = 0)	I <sub>C</sub> = 100 μA		150			V
V <sub>(BR)CEO</sub> *	Collector-Emitter Breakdown Voltage (I <sub>B</sub> = 0)	I <sub>E</sub> = 10 mA		60			V
V <sub>(BR)EBO</sub> *	Emitter-Base Breakdown Voltage (I <sub>C</sub> = 0)	I <sub>C</sub> = 100 μA		7			V
V <sub>CE(sat)</sub> *	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 100 mA I <sub>C</sub> = 1 A I <sub>C</sub> = 2 A I <sub>C</sub> = 5 A	I <sub>B</sub> = 5 mA I <sub>B</sub> = 50 mA I <sub>B</sub> = 50 mA I <sub>B</sub> = 200 mA		10 70 140 320	50 120 200 450	mV mV mV mV
V <sub>BE(sat)</sub> *	Base-Emitter Saturation Voltage	I <sub>C</sub> = 4 A	I <sub>B</sub> = 200 mA		1	1.15	V
V <sub>BE(on)</sub> *	Base-Emitter On Voltage	I <sub>C</sub> = 4 A	V <sub>CE</sub> = 1 V		0.89	1	V
h <sub>FE</sub> *	DC Current Gain	I <sub>C</sub> = 10 mA I <sub>C</sub> = 2 A I <sub>C</sub> = 5 A I <sub>C</sub> = 10 A	V <sub>CE</sub> = 1 V V <sub>CE</sub> = 1 V V <sub>CE</sub> = 1 V V <sub>CE</sub> = 1 V	150 150 90 30	300 270 140 50	350	
C <sub>CB0</sub>	Collector-Base Capacitance	V <sub>CB</sub> = 10 V	f = 1 MHz		50		pF
t <sub>on</sub> t <sub>s</sub> t <sub>f</sub>	RESISTIVE LOAD Turn-On Time Storage Time Fall Time	I <sub>C</sub> = 1 A I <sub>B1</sub> = -I <sub>B2</sub> = 100 mA	V <sub>CC</sub> = 10 V		50 1.35 120		ns μs ns

\* Pulsed: Pulse duration = 300 μs, duty cycle = 1.5 %.

## 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				



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