

Low voltage high performance NPN power transistors

Preliminary Data

Features

- Very low collector-emitter saturation voltage
- High current gain characteristic
- Fast switching speed
- Surface mounting devices in medium power SOT-89 and SOT-223 packages

Applications

- Emergency lighting
- LED
- Motherboard and hard disk drive
- Mobile equipment
- Battery charger
- Voltage regulation

Description

The 2STF1550 and 2STN1550 are NPN transistors 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.

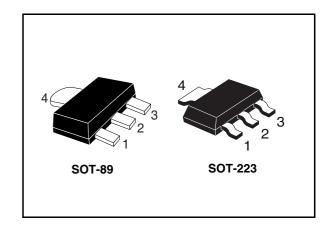


Figure 1. Internal schematic diagram

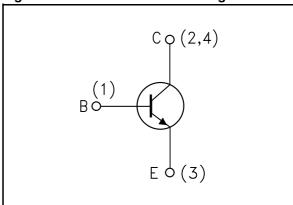


Table 1. Device summary

Order codes	Marking	Package	Packaging
2STF1550	1550	SOT-89	Tape and reel
2STN1550	N1550	SOT-223	Tape and reer

Electrical ratings 2STF1550 - 2STN1550

1 Electrical ratings

Table 2. Absolute maximum rating

		Va		
Symbol	Parameter	2STF1550 2STN1550		Unit
		SOT-89	SOT-223	
V _{CES}	Collector-emitter voltage (V _{CE} = 0)	5	0	V
V _{CEO}	Collector-emitter voltage (I _B = 0)	50		V
V _{EBO}	Emitter-base voltage ($I_C = 0$)	5		V
I _C	Collector current	5		Α
I _{CM}	Collector peak current (t _P < 5 ms)	10		Α
Ι _Β	Base current	1		Α
P _{TOT}	otal dissipation at T _{amb} = 25 °C 1.4 1.6		W	
T _{stg}	Storage temperature -65 to 150		°C	
TJ	x. operating junction temperature 150		°C	

Table 3. Thermal data

Symbol	Parameter	SOT-89	SOT-223	Unit
R _{thj-amb} ⁽¹⁾	Thermal resistance junction-amb max	89	78	°C/W

^{1.} Device mounted on PCB area of 1 cm²

2 Electrical characteristics

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

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
I _{CBO}	Collector cut-off current (I _E = 0)	V _{CB} = 50 V			0.1	μА
I _{EBO}	Emitter cut-off current (I _C = 0)	V _{EB} = 4 V			0.1	μА
V _{(BR)CBO}	Collector-base breakdown voltage (I _E = 0)	I _C = 100 μA	50			V
V _{(BR)CEO} (1)	Collector-emitter breakdown voltage (I _B = 0)	I _C = 10 mA	50			V
V _{(BR)EBO}	Emitter-base breakdown voltage ($I_C = 0$)	I _E = 100 μA	5			٧
h _{FE} ⁽¹⁾	DC current gain	$\begin{split} I_{C} &= 0.5 \text{ A} & V_{CE} &= 2 \text{ V} \\ I_{C} &= 2 \text{ A} & V_{CE} &= 2 \text{ V} \\ I_{C} &= 3 \text{ A} & V_{CE} &= 2 \text{ V} \\ I_{C} &= 5 \text{ A} & V_{CE} &= 5 \text{ V} \end{split}$	135 100	250 95	400	
V _{CE(sat)} (1)	Collector-emitter saturation voltage	$I_C = 3 \text{ A}$ $I_B = 300 \text{ mA}$		0.26	0.45	٧
V _{BE(sat)} (1)	Base-emitter saturation voltage	$I_C = 3 \text{ A}$ $I_B = 300 \text{ mA}$		1	1.2	V
C _{CBO}	Collector-base capacitance (I _E = 0)	V _{CB} = 10 V, f = 1 MHz		20		pF
t _{on} t _{off}	Resistive load Turn-on time Turn-off time	$I_C = 1.5 \text{ A}$ $V_{CC} = 10 \text{ V}$ $I_{B1} = -I_{B2} = 150 \text{ mA}$		90 700		ns ns

^{1.} Pulsed duration = 300 μ s, duty cycle \leq 1.5%

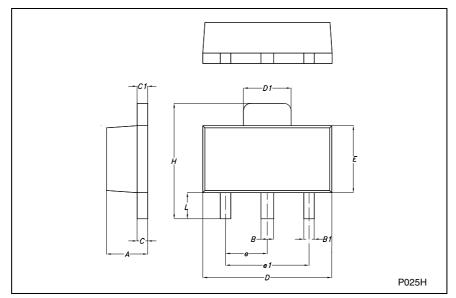
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3 Package mechanical data

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-89 MECHANICAL DATA

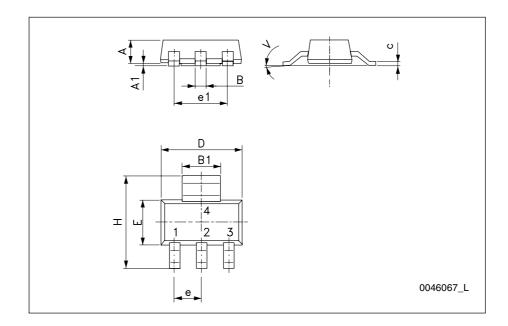
DIM.	mm		mils			
Dim.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
Α	1.4		1.6	55.1		63.0
В	0.44		0.56	17.3		22.0
B1	0.36		0.48	14.2		18.9
С	0.35		0.44	13.8		17.3
C1	0.35		0.44	13.8		17.3
D	4.4		4.6	173.2		181.1
D1	1.62		1.83	63.8		72.0
Е	2.29		2.6	90.2		102.4
е	1.42		1.57	55.9		61.8
e1	2.92		3.07	115.0		120.9
Н	3.94		4.25	155.1		167.3
L	0.89		1.2	35.0		47.2



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SOT-223	mechanical	data
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DIM.	mm.				
DIIVI.	min.	typ	max.		
Α			1.80		
A1	0.02		0.1		
В	0.60	0.70	0.85		
B1	2.90	3.00	3.15		
С	0.24	0.26	0.35		
D	6.30	6.50	6.70		
е		2.30			
e1		4.60			
E	3.30	3.50	3.70		
Н	6.70	7.00	7.30		
V			10 °		



2STF1550 - 2STN1550 Revision history

4 Revision history

Table 5. Document revision history

Date	Revision	Changes	
08-May-2007	1	Initial release	
12-Nov-2008	2	Updated SOT-223 mechanical data	

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