

Low voltage fast-switching NPN power bipolar transistors

Preliminary Data

General features

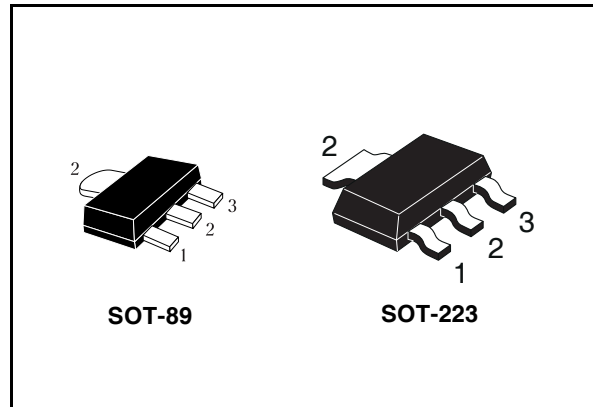
- Very low collector-emitter saturation voltage
- High current gain characteristic
- Fast switching speed
- Surface mounting devices in medium power SOT-89 and SOT-223 packages
- In compliance with the 2002/93/EC European Directive

Applications

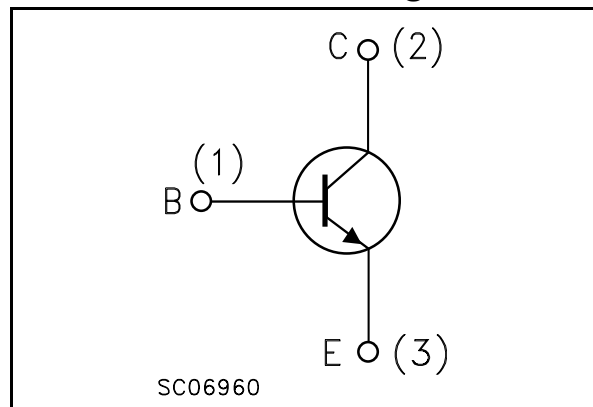
- Emergency lighting
- LED
- Motherboard & Hard Disk drive
- Mobile equipment
- Battery charger
- Voltage regulation

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.



Internal schematic diagram



Order codes

Part Number	Marking	Package	Packaging
2STF1550	1550	SOT-89	Tape & reel
2STN1550	N1550	SOT-223	Tape & reel

1 Electrical ratings

Table 1. Absolute maximum rating

Symbol	Parameter	Value		Unit
		2STF1550	2STN1550	
		SOT-89	SOT-223	
V_{CES}	Collector-emitter voltage ($V_{CE} = 0$)	50		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		A
I_{CM}	Collector peak current ($t_P < 5\text{ms}$)	10		A
I_B	Base current	1		A
P_{tot}	Total dissipation at $T_{amb} = 25^\circ\text{C}$	1.4	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	SOT-89	SOT-223	Unit
$R_{thj-amb}^{(1)}$	Thermal resistance junction-amb max	89	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 ($I_{\text{E}} = 0$)	$V_{\text{CB}} = 50\text{V}$			0.1	μA
I_{EBO}	Emitter cut-off current ($I_{\text{C}} = 0$)	$V_{\text{EB}} = 4\text{V}$			0.1	μA
$V_{(\text{BR})\text{CBO}}$	Collector-emitter breakdown voltage ($I_{\text{E}} = 0$)	$I_{\text{C}} = 100\mu\text{A}$	50			V
$V_{(\text{BR})\text{CEO}}^{(2)}$	Collector-emitter breakdown voltage ($I_{\text{B}} = 0$)	$I_{\text{C}} = 10\text{mA}$	50			V
$V_{(\text{BR})\text{EBO}}$	Emitter-base breakdown voltage ($I_{\text{C}} = 0$)	$I_{\text{E}} = 100\mu\text{A}$	5			V
$V_{\text{CE(sat)}}^{(2)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 3\text{A}$ $I_{\text{B}} = 60\text{mA}$ $I_{\text{C}} = 3\text{A}$ $I_{\text{B}} = 300\text{mA}$		0.3 0.25		V V
$V_{\text{BE(sat)}}^{(2)}$	Base-emitter saturation voltage	$I_{\text{C}} = 3\text{A}$ $I_{\text{B}} = 300\text{mA}$		1		V
$h_{\text{FE}}^{(2)}$	DC current gain	$I_{\text{C}} = 0.5\text{A}$ $V_{\text{CE}} = 2\text{V}$ $I_{\text{C}} = 2\text{A}$ $V_{\text{CE}} = 2\text{V}$ $I_{\text{C}} = 3\text{A}$ $V_{\text{CE}} = 2\text{V}$ $I_{\text{C}} = 5\text{A}$ $V_{\text{CE}} = 2\text{V}$		280 190 120 90		
C_{CBO}	Collector-base capacitance	$I_{\text{E}} = 0$ $V_{\text{CB}} = 10\text{V}$ $f = 1\text{MHz}$		tbd		pF
t_{on} t_{off}	RESISTIVE LOAD Turn-on time Turn-off time	$I_{\text{C}} = 1.5\text{A}$ $V_{\text{CC}} = 10\text{V}$ $I_{\text{B1}} = -I_{\text{B2}} = 150\text{mA}$		tbd tbd		ns ns

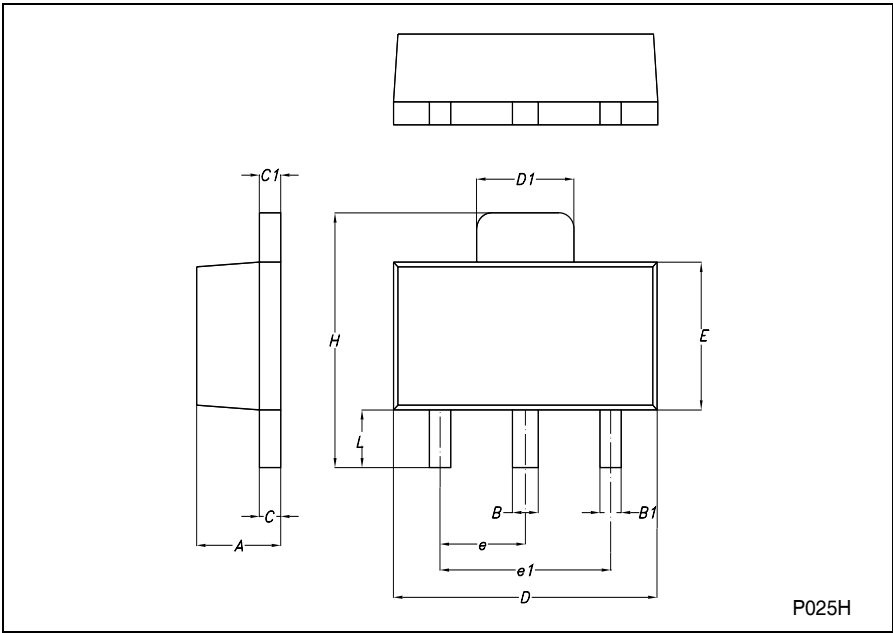
Note (2) Pulsed duration = 300 μs , duty cycle $\leq 1.5\%$

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

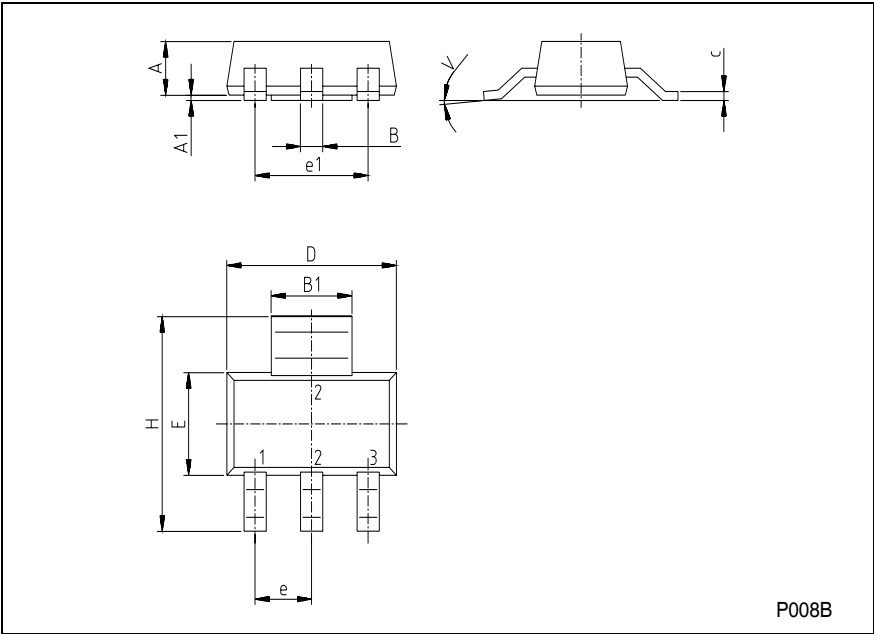
SOT-89 MECHANICAL DATA

DIM.	mm			mils		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	1.4		1.6	55.1		63.0
B	0.44		0.56	17.3		22.0
B1	0.36		0.48	14.2		18.9
C	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
E	2.29		2.6	90.2		102.4
e	1.42		1.57	55.9		61.8
e1	2.92		3.07	115.0		120.9
H	3.94		4.25	155.1		167.3
L	0.89		1.2	35.0		47.2



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				



4 Revision history

Table 4. Revision history

Date	Revision	Changes
08-May-2007	1	Initial release

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