

Low voltage fast-switching PNP power transistor

Features

- Very low collector-emitter saturation voltage
- High current gain characteristic
- Fast switching speed
- SOT-89 plastic package for surface mounting circuits

Applications

- LED
- Motherboard & hard disk drive
- Mobile equipment
- Battery charger
- Voltage regulation

Description

The device is a PNP transistor manufactured using new "PB-HDC" (Power Bipolar High Density Current) technology. The resulting transistor shows exceptional high gain performances coupled with very low saturation voltage. The complementary NPN is the 2STF1340.

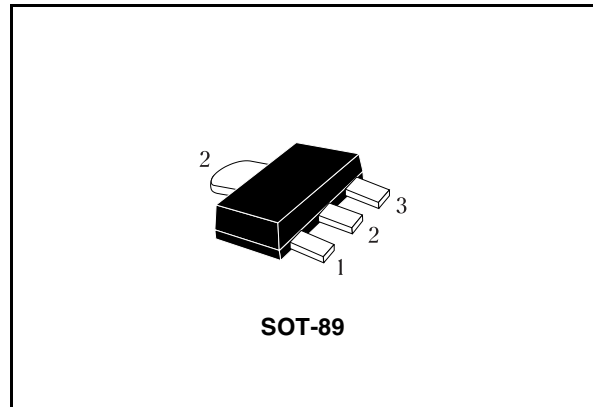


Figure 1. Internal schematic diagram

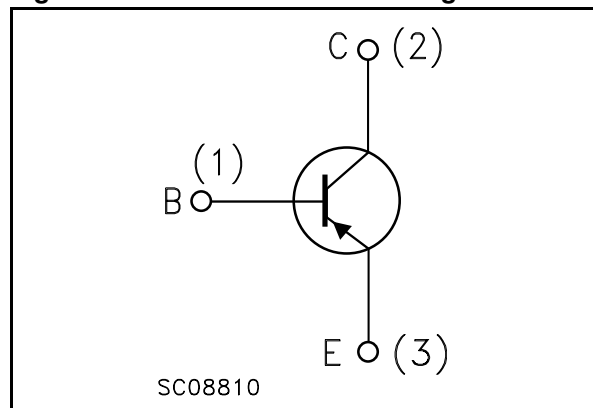


Table 1. Device summary

Order code	Marking	Package	Packaging
2STF2340	2340	SOT-89	Tape and reel

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1 Electrical ratings

Table 2. Absolute maximum rating

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage ($V_{CE} = 0$)	-40	V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	-40	V
V_{EBO}	Emitter-base voltage ($I_C = 0$)	-5	V
I_C	Collector current	-3	A
I_{CM}	Collector peak current ($t_P < 5\text{ms}$)	-6	A
P_{tot}	Total dissipation at $T_{amb} = 25^\circ\text{C}$	1.4	W
T_{stg}	Storage temperature	-65 to 150	$^\circ\text{C}$
T_J	Max. operating junction temperature	150	$^\circ\text{C}$

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj-amb}^{(1)}$	Thermal resistance junction-amb max	89.3	$^\circ\text{C/W}$

1. Device mounted on PCB area of 1cm^2

2 Electrical characteristics

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

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cut-off current ($I_{\text{E}} = 0$)	$V_{\text{CB}} = -40 \text{ V}$			-0.1	μA
I_{EBO}	Emitter cut-off current ($I_{\text{C}} = 0$)	$V_{\text{EB}} = -5 \text{ V}$			-0.1	μA
$V_{(\text{BR})\text{CBO}}^{(1)}$	Collector-base breakdown voltage ($I_{\text{E}} = 0$)	$I_{\text{C}} = -100 \mu\text{A}$	-40			V
$V_{(\text{BR})\text{CEO}}^{(1)}$	Collector-emitter breakdown voltage ($I_{\text{B}} = 0$)	$I_{\text{C}} = -10 \text{ mA}$	-40			V
$V_{(\text{BR})\text{EBO}}$	Emitter-base breakdown voltage ($I_{\text{C}} = 0$)	$I_{\text{E}} = -100 \mu\text{A}$	-5			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = -2 \text{ A}$ $I_{\text{B}} = -100 \text{ mA}$ $I_{\text{C}} = -3 \text{ A}$ $I_{\text{B}} = -150 \text{ mA}$		-0.2 -0.3		V V
$V_{\text{BE(sat)}}^{(1)}$	Base-emitter saturation voltage	$I_{\text{C}} = -2 \text{ A}$ $I_{\text{B}} = -100 \text{ mA}$		-0.9	-1.25	V
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = -0.1 \text{ A}$ $V_{\text{CE}} = -2 \text{ V}$ $I_{\text{C}} = -1 \text{ A}$ $V_{\text{CE}} = -2 \text{ V}$ $I_{\text{C}} = -3 \text{ A}$ $V_{\text{CE}} = -2 \text{ V}$		280 250 200		
f_{t}	Transition frequency	$I_{\text{C}} = -0.1 \text{ A}$ $V_{\text{CE}} = -5 \text{ V}$ $f = 100 \text{ MHz}$	100			MHz
C_{CBO}	Collector-base capacitance ($I_{\text{E}} = 0$)	$V_{\text{CB}} = -10 \text{ V}$ $f = 1 \text{ MHz}$		50		pF
t_{on} t_{off}	Resistive load Turn-on time Turn-off time	$I_{\text{C}} = -1.5 \text{ A}$ $V_{\text{CC}} = -10 \text{ V}$ $I_{\text{B1}} = -I_{\text{B2}} = -150 \text{ mA}$		80 450		ns ns

1. Pulsed duration = 300 μs , duty cycle $\leq 1.5\%$

2.1 Electrical characteristics (curves)

Figure 2. Output characteristics

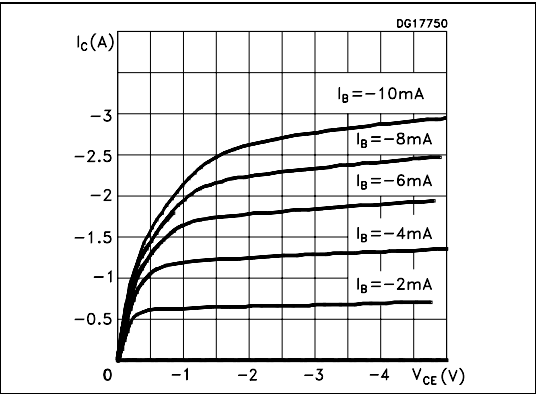


Figure 3. Derating curve

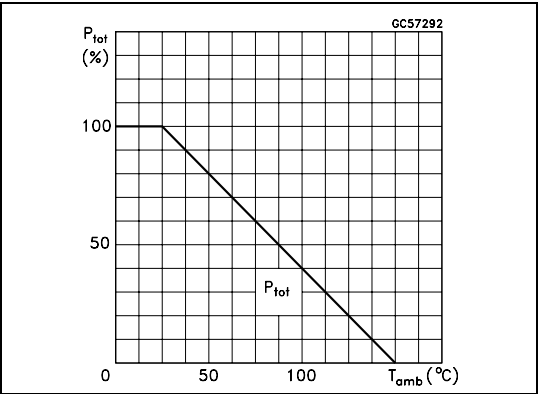


Figure 4. DC current gain

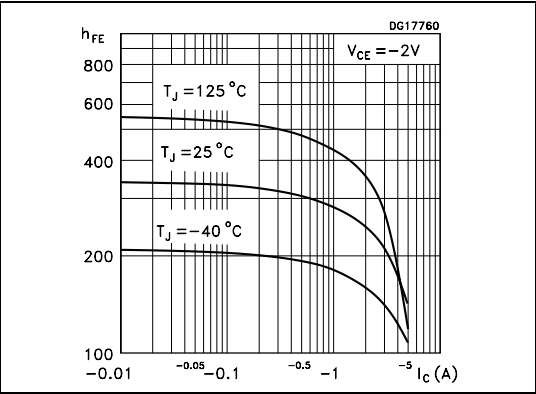


Figure 5. DC current gain

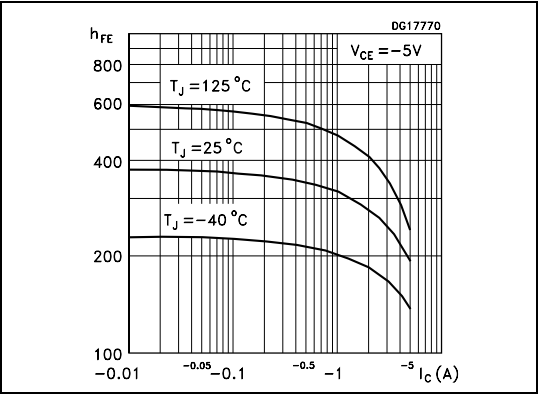


Figure 6. Collector-emitter saturation voltage

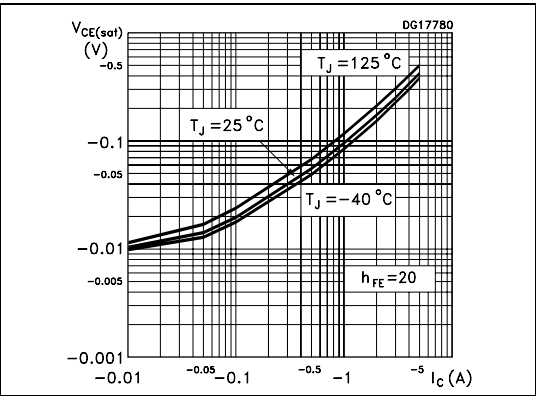


Figure 7. Base-emitter saturation voltage

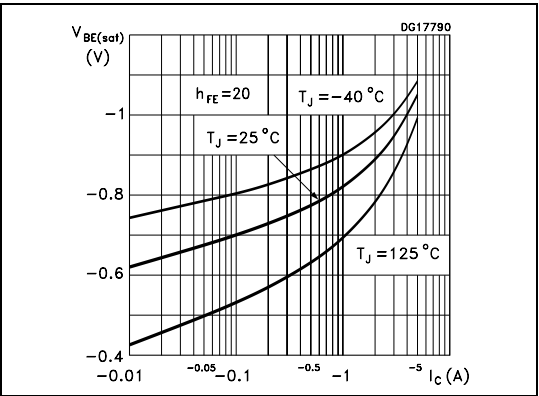


Figure 8. Resistive load switching time Figure 9. Resistive load switching time

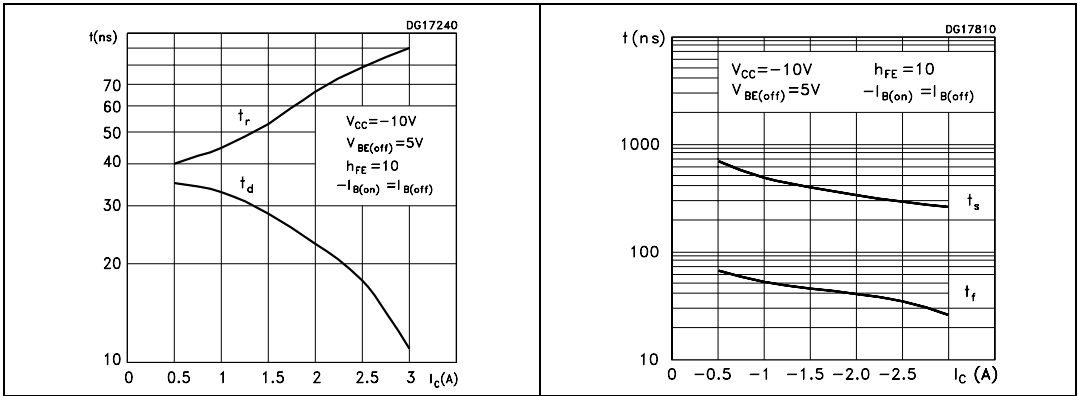
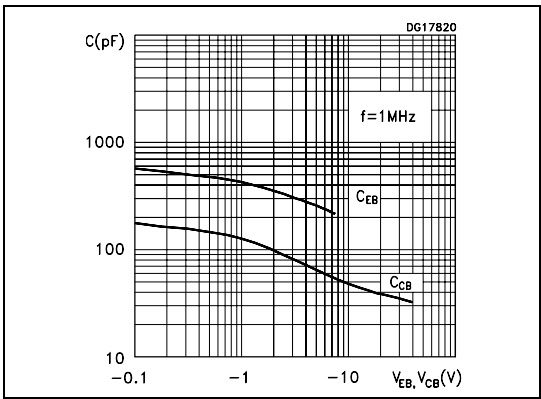
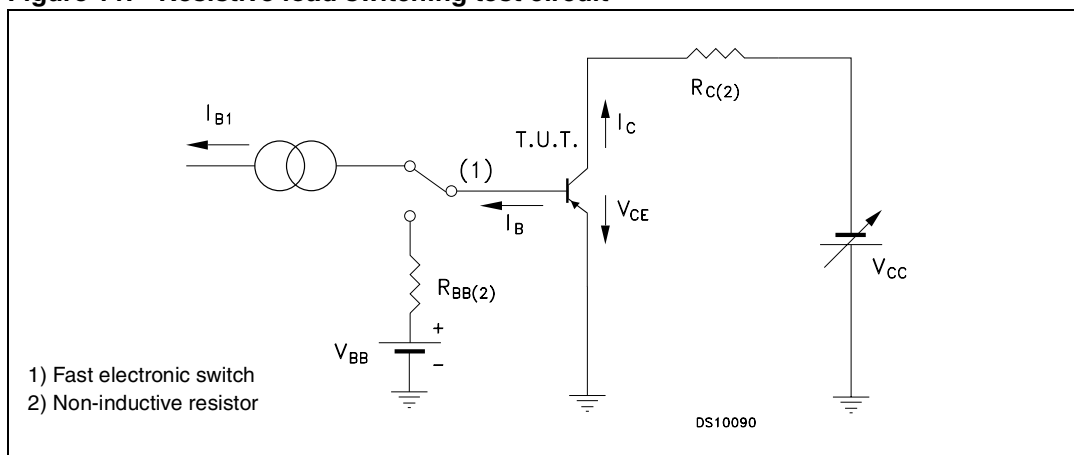


Figure 10. Capacitance curves



2.2 Test circuits

Figure 11. Resistive load switching test circuit

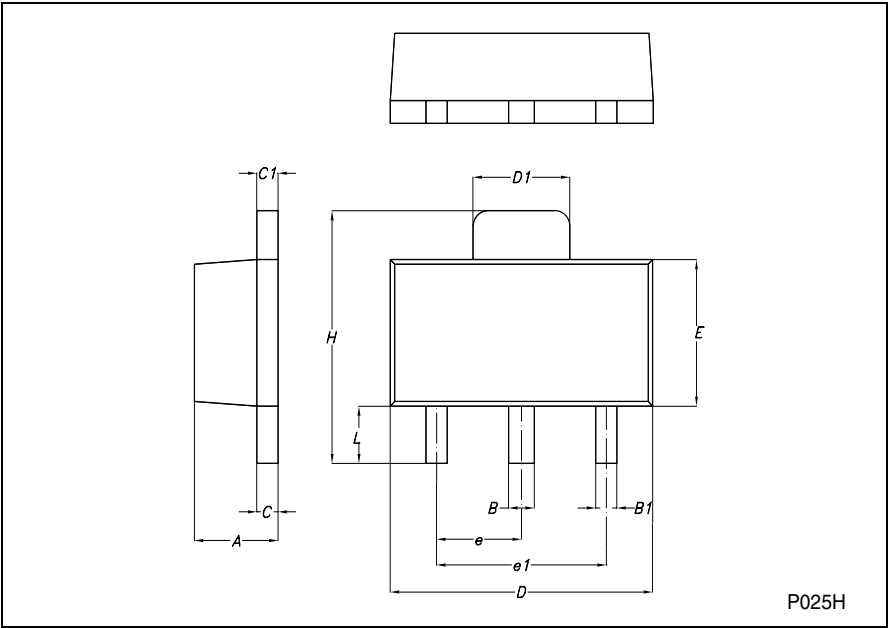


3 **Package mechanical data**

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



4 Revision history

Table 5. Document revision history

Date	Revision	Changes
04-Dec-2007	1	Initial release.

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