

2STN2540

Low voltage fast-switching PNP power bipolar 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
- LED
- CCFL drivers (back lighting)
- Voltage regulation
- Relay driver

Description

The device is a PNP transistor 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.

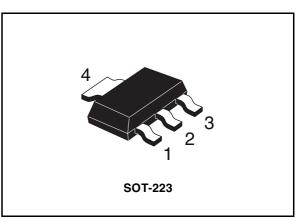


Figure 1. Internal schematic diagram

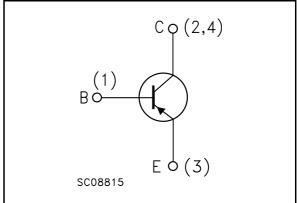


Table 1.	Device	summarv
	DEVICE	Summary

Order code	Marking	Package	Packaging
2STN2540	N2540	SOT-223	Tape and reel

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1 Electrical ratings

Table 2.	Absolute maximum rating
	Absolute maximum rating

Symbol	Parameter	Value	Unit
V _{CBO}	Collector-base voltage (I _E = 0)	-40	V
V _{CEO}	Collector-emitter voltage (I _B = 0)	-40	V
V _{EBO}	Emitter-base voltage (I _C = 0)	-6	V
۱ _C	Collector current	-5	А
I _{CM}	Collector peak current (t _P < 5ms)	-10	А
I _{BM}	Base peak current (t _P < 5ms)	-2	А
P _{tot}	Total dissipation at T _{amb} = 25 °C	1.6	W
T _{stg}	Storage temperature -65 to 150		°C
Т _Ј	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 1cm²



2 Electrical characteristics

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

Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
I _{CBO}	Collector cut-off current (I _E =0)	V _{CB} = -30 V			-0.1	μA
I _{EBO}	Emitter cut-off current (I _C =0)	V _{EB} = -5 V			-0.1	μA
V _{CE(sat)} ⁽¹⁾	Collector-emitter saturation voltage	$\begin{array}{ll} I_{\rm C} = -0.5 \mbox{ A} & I_{\rm B} = -5 \mbox{ mA} \\ I_{\rm C} = -1 \mbox{ A} & I_{\rm B} = -10 \mbox{ mA} \\ I_{\rm C} = -2 \mbox{ A} & I_{\rm B} = -200 \mbox{ mA} \\ I_{\rm C} = -5 \mbox{ A} & I_{\rm B} = -500 \mbox{ mA} \end{array}$		-80 -120 -140 -350	-120 -180 -200 -450	mV mV mV mV
V _{BE(sat)} ⁽¹⁾	Base-emitter saturation voltage	I _C = -5 A I _B = -500 mA			-1.3	V
V _{BE(on)} ⁽¹⁾	Base-emitter on voltage	$V_{CE} = -2 V I_{C} = -2 A$			-1.25	V
h _{FE} ⁽¹⁾	DC current gain	$\begin{split} I_{C} &= -0.5 \text{ A} V_{CE} &= -2 \text{ V} \\ I_{C} &= -1 \text{ A} V_{CE} &= -2 \text{ V} \\ I_{C} &= -2 \text{ A} V_{CE} &= -2 \text{ V} \\ I_{C} &= -5 \text{ A} V_{CE} &= -2 \text{ V} \end{split}$	250 200 150 50			
C _{CBO}	Collector-base capacitance	$I_E = 0$ $V_{CB} = -10 V$ f = 1 MHz		80		pF
t _{on} t _s t _f	Resistive load Turn-on time Storage time Fall time	$I_{C} = -1 A$ $V_{CC} = -10 V$ $-I_{B1} = I_{B2} = -0.1 A$ $T_{p} = 30 \ \mu s$		75 426 62		ns ns ns

 Table 4.
 Electrical characteristics

1. Pulsed duration = 300 μ s, duty cycle $\leq .5\%$

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2.1 Electrical characteristics (curves)

Figure 2. Output characteristics

Figure 3. DC current gain

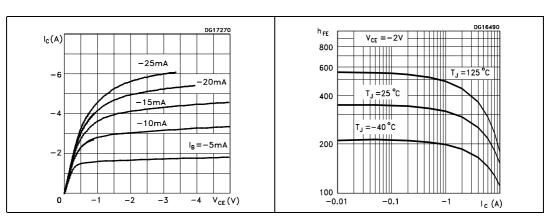
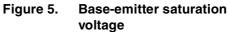


Figure 4. Collector-emitter saturation voltage



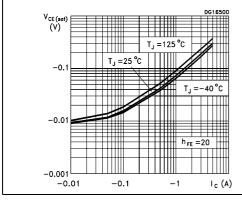


Figure 6. Base-emitter on voltage

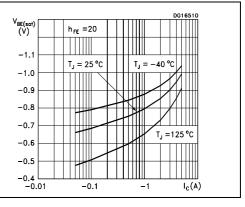
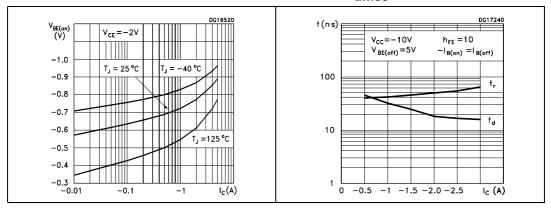


Figure 7. Resistive load switching times



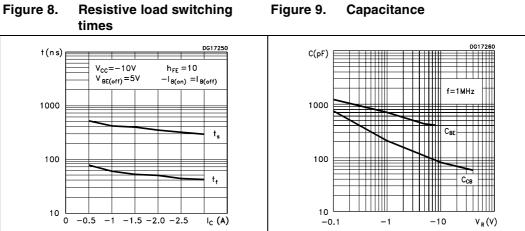
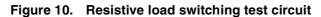
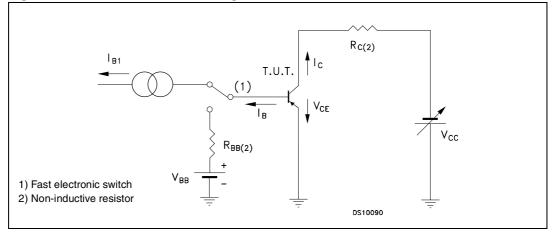


Figure 8. **Resistive load switching**

2.2 **Test circuit**



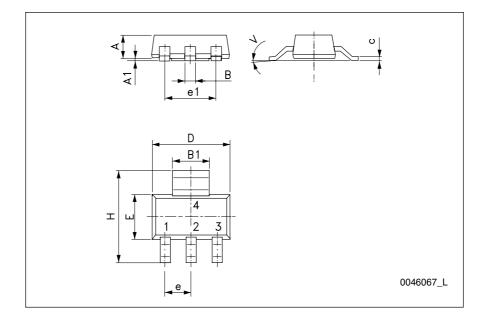


3 Package mechanical data

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-223 mechanical data		
DIM.		mm.	
	min.	typ	max.
A			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 ^o





4 Revision history

Table 5.Document revision history

Date	Revision	Changes
23-Oct-2003	1	Initial release
03-Nov-2006	2	Added new graphics: fig.2, fig. 7, fig.8, fig.9.
14-Jan-2008	3	Document status promoted from preliminary data to datasheet.



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