

## Low voltage NPN power transistors

#### **Features**

- Low saturation voltage
- NPN transistors

## **Applications**

■ Audio, power linear and switching applications

### **Description**

The devices are manufactured in Planar technology with "Base Island" layout. The resulting transistor shows exceptional high gain performance coupled with very low saturation voltage. The PNP type is BD238.

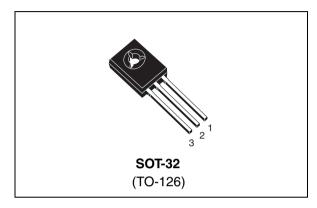


Figure 1. Internal schematic diagram

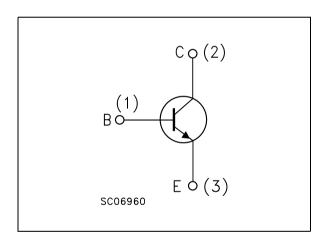


Table 1. Device summary

Order codes	Marking	Package	Packaging
BD235	BD235	SOT-32	Tube
BD237	BD237	SOT-32	Tube

# 1 Absolute maximum ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value		Unit
	Farameter	BD235	BD237	Oill
V <sub>CBO</sub>	Collector-base voltage (I <sub>E</sub> = 0)	60	100	V
V <sub>CER</sub>	Collector-emitter voltage ( $R_{BE} = 1 \text{ k}\Omega$ )	60	100	V
V <sub>CEO</sub>	Collector-emitter voltage (I <sub>B</sub> = 0)	60	80	V
V <sub>EBO</sub>	Emitter-base voltage (I <sub>C</sub> = 0)	5		V
I <sub>C</sub>	Collector current	2		Α
I <sub>CM</sub>	Collector peak current (t <sub>p</sub> < ms)	6		Α
P <sub>TOT</sub>	Total dissipation at T <sub>case</sub> = 25°C	25		W
T <sub>stg</sub>	Storage temperature	-65 to 150		°C
T <sub>J</sub>	Max. operating junction temperature	150		°C

### 2 Electrical characteristics

(T<sub>case</sub> = 25°C; unless otherwise specified)

Table 3. Electrical characteristics

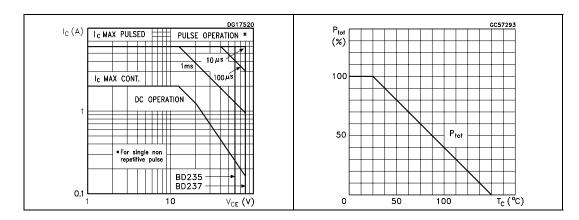
Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
I <sub>CBO</sub>	Collector cut-off current (I <sub>E</sub> = 0)	$V_{CB}$ = rated $V_{CBO}$ $V_{CB}$ = rated $V_{CBO}$ $T_{C}$ = 150°C		-	0.1 2	mA mA
I <sub>EBO</sub>	Emitter cut-off current (I <sub>C</sub> = 0)	V <sub>EB</sub> = 5V		-	1	mA
V <sub>CEO(sus)</sub> <sup>(1)</sup>	Collector-emitter sustaining voltage (I <sub>B</sub> = 0)	I <sub>C</sub> = 100mA for BD235 for BD237	60 80	-		V V
V <sub>CE(sat)</sub> <sup>(1)</sup>	Collector-emitter saturation voltage	I <sub>C</sub> = 1A		1	0.6	V
V <sub>BE(on)</sub> <sup>(1)</sup>	Base-emitter on voltage	$I_C = 1A$ $V_{CE} = 2V$		-	1.3	٧
h <sub>FE</sub> <sup>(1)</sup>	DC current gain	$I_C = 150 \text{mA}$ $V_{CE} = 2V$ $I_C = 1A$ $V_{CE} = 2V$	40 25	-		

<sup>1.</sup> Pulsed duration = 300  $\mu$ s, duty cycle = 1.5 %.

## 2.1 Electrical characteristic (curves)

Figure 2. Safe operating area

Figure 3. Derating curves



Electrical characteristics BD235, BD237

Figure 4. DC current gain  $(V_{CE} = 2 V)$  Figure 5. DC current gain  $(V_{CE} = 4 V)$ 

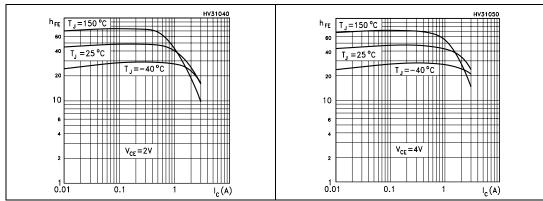
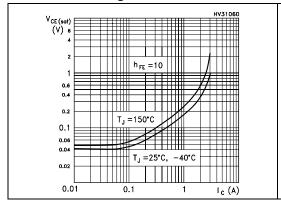


Figure 6. Collector-emitter saturation voltage

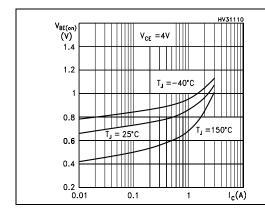
Figure 7. Base-emitter saturation voltage

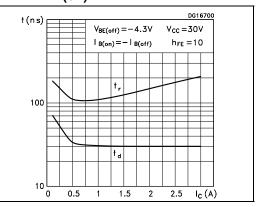


 $V_{BE(sot)}$   $V_{BE(sot)}$   $V_{SOT}$   $V_{SOT$ 

Figure 8. Base-emitter on voltage

Figure 9. Resistive load switching time (on)





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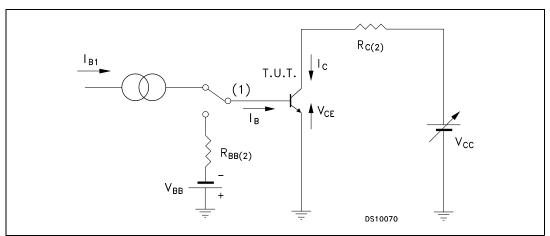
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Figure 10. Resistive load switching time (off)

## 2.2 Test circuit

Figure 11. Resistive load switching test circuit



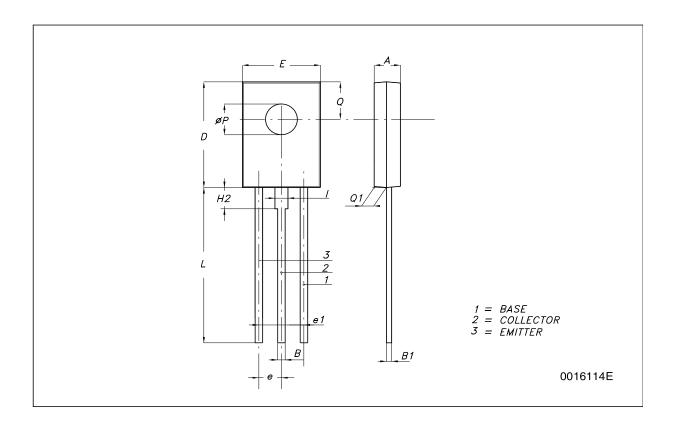
- 1. Fast electronic switch
- 2. Non-inductive resistor

## 3 Package mechanical data

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DIM.		mm.	
Diw.	MIN.	TYP	MAX.
А	2.4		2.9
В	0.64		0.88
B1	0.39		0.63
D	10.5		11.05
E	7.4		7.8
е	2.04	2.29	2.54
e1	4.07	4.58	5.08
L	15.3		16
Р	2.9		3.2
Q		3.8	
Q1	1		1.52
H2		2.15	
I		1.27	





Revision history BD235, BD237

# 4 Revision history

Table 4. Document revision history

Date	Revision	Changes
11-Feb-2003	1	Initial release.
09-Jul-2007	2	Added: figures 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12.
03-Jun-2009	3	Minor text changes.

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