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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.

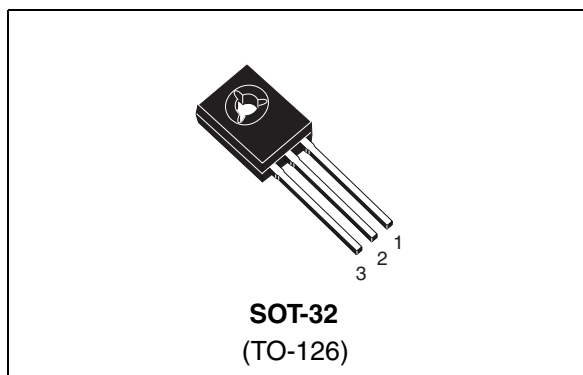


Figure 1. Internal schematic diagram

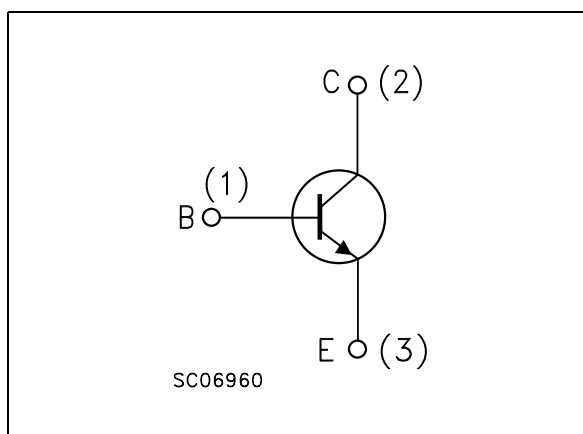


Table 1. Device summary

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
		BD235	BD237	
V_{CBO}	Collector-base voltage ($I_E = 0$)	60	100	V
V_{CER}	Collector-emitter voltage ($R_{BE} = 1\text{ k}\Omega$)	60	100	V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	60	80	V
V_{EBO}	Emitter-base voltage ($I_C = 0$)	5		V
I_C	Collector current	2		A
I_{CM}	Collector peak current ($t_p < \text{ms}$)	6		A
P_{TOT}	Total dissipation at $T_{case} = 25^\circ\text{C}$	25		W
T_{stg}	Storage temperature	-65 to 150		$^\circ\text{C}$
T_J	Max. operating junction temperature	150		$^\circ\text{C}$

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 ($I_{\text{E}} = 0$)	$V_{\text{CB}} = \text{rated } V_{\text{CBO}}$ $V_{\text{CB}} = \text{rated } V_{\text{CBO}} \quad T_{\text{C}} = 150^{\circ}\text{C}$		-	0.1 2	mA mA
I_{EBO}	Emitter cut-off current ($I_{\text{C}} = 0$)	$V_{\text{EB}} = 5\text{V}$		-	1	mA
$V_{\text{CEO(sus)}}^{(1)}$	Collector-emitter sustaining voltage ($I_{\text{B}} = 0$)	$I_{\text{C}} = 100\text{mA}$ for BD235 for BD237	60 80	-		V V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 1\text{A} \quad I_{\text{B}} = 0.1\text{A}$		-	0.6	V
$V_{\text{BE(on)}}^{(1)}$	Base-emitter on voltage	$I_{\text{C}} = 1\text{A} \quad V_{\text{CE}} = 2\text{V}$		-	1.3	V
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = 150\text{mA} \quad V_{\text{CE}} = 2\text{V}$ $I_{\text{C}} = 1\text{A} \quad V_{\text{CE}} = 2\text{V}$	40 25	-		

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

2.1 Electrical characteristic (curves)

Figure 2. Safe operating area

Figure 3. Derating curves

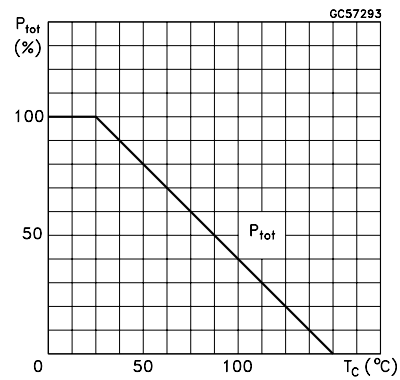
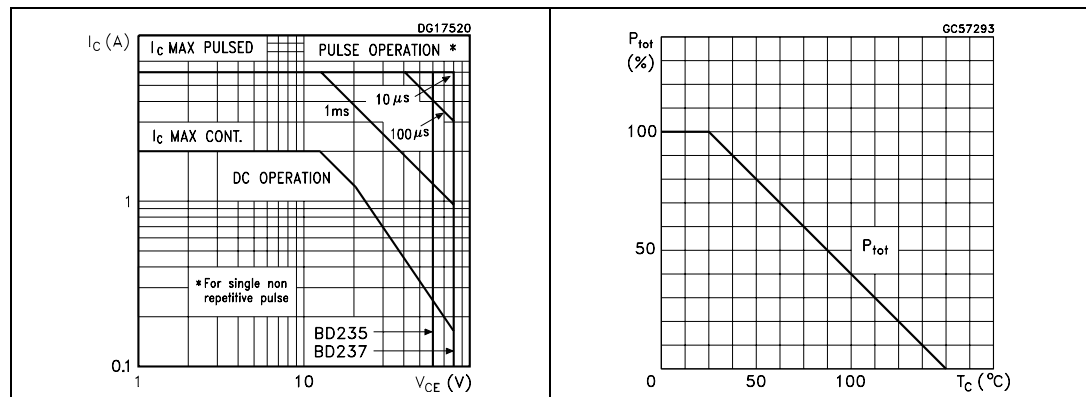


Figure 4. DC current gain ($V_{CE} = 2\text{ V}$)

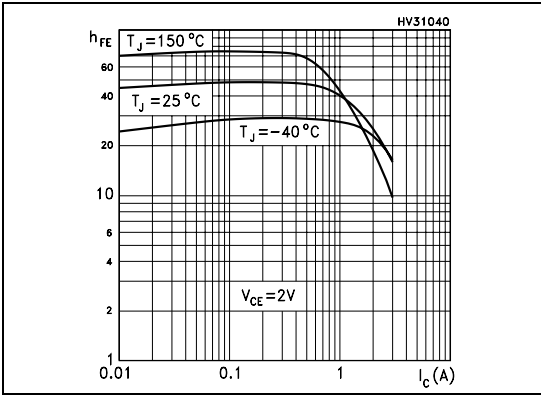


Figure 5. DC current gain ($V_{CE} = 4\text{ V}$)

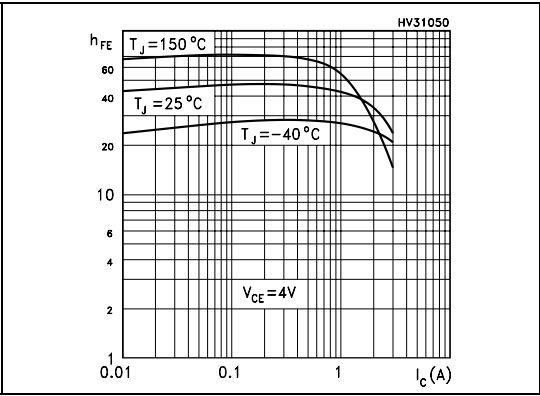


Figure 6. Collector-emitter saturation voltage

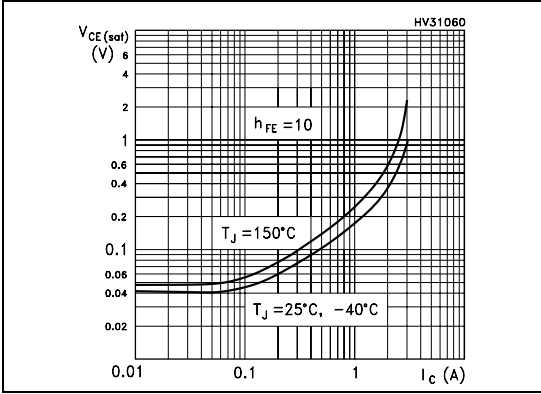


Figure 7. Base-emitter saturation voltage

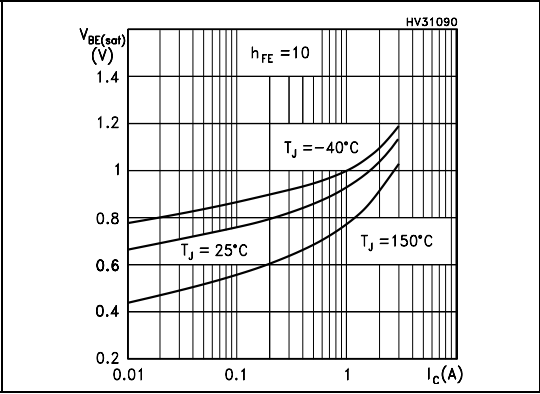


Figure 8. Base-emitter on voltage

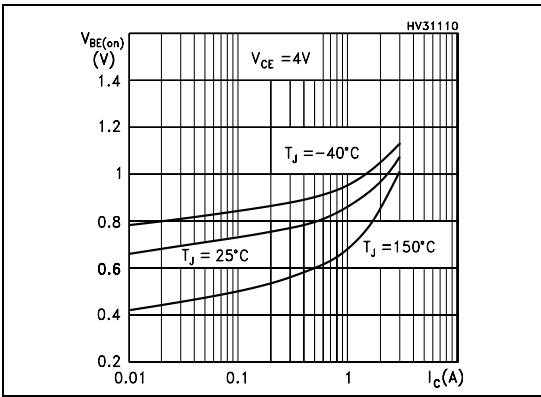


Figure 9. Resistive load switching time (on)

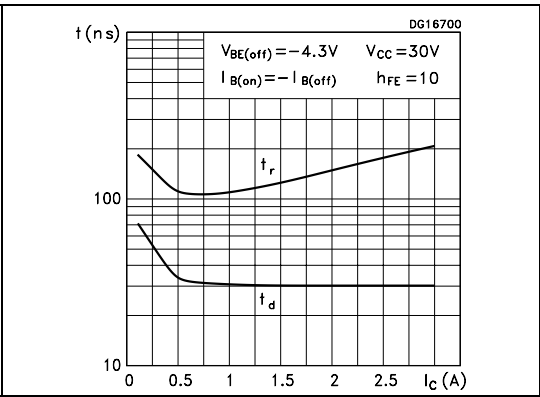
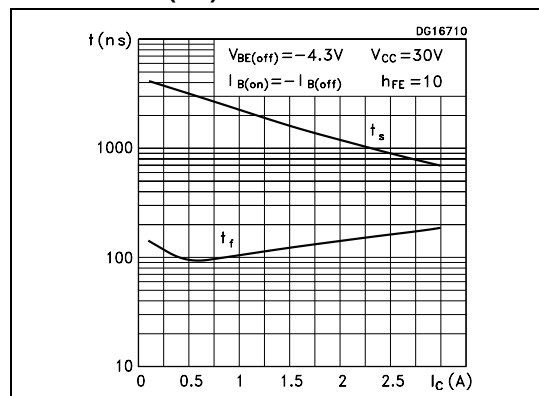
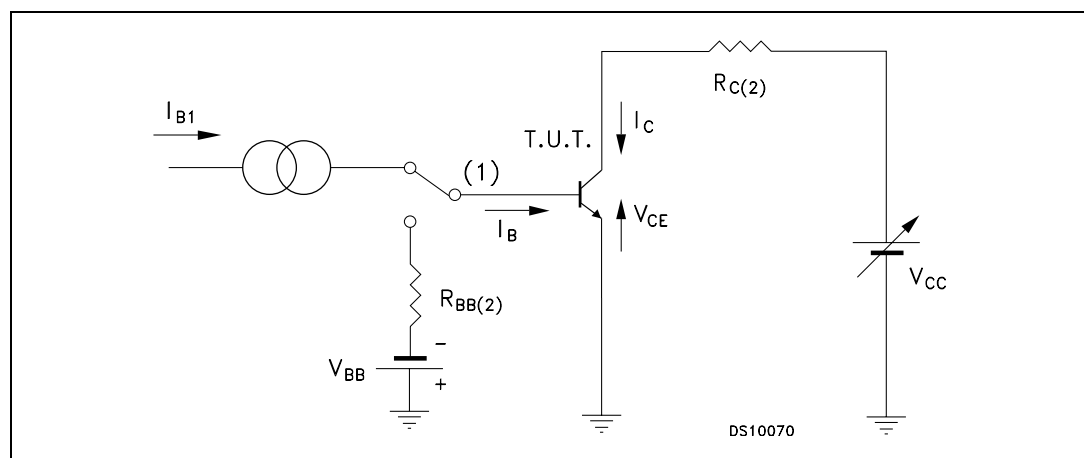


Figure 10. Resistive load switching time (off)



2.2 Test circuit

Figure 11. Resistive load switching test circuit



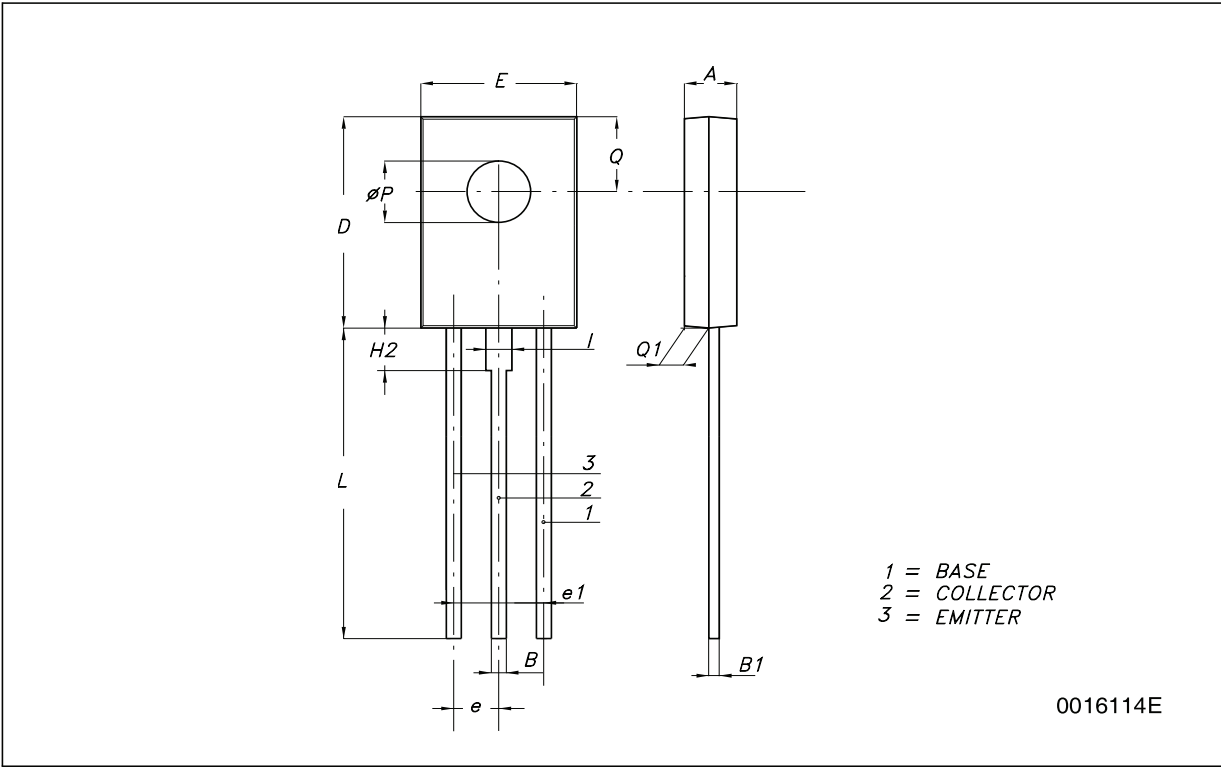
1. Fast electronic switch
2. Non-inductive resistor

3 **Package mechanical data**

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SOT-32 (TO-126) MECHANICAL DATA

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



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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