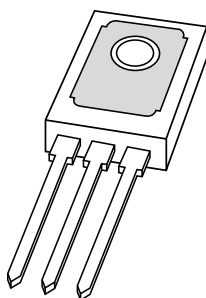


DATA SHEET



BD135; BD137; BD139 NPN power transistors

Product specification
Supersedes data of September 1994
File under Discrete Semiconductors, SC04

1997 Mar 04

NPN power transistors

BD135; BD137; BD139

FEATURES

- High current (max. 1.5 A)
- Low voltage (max. 80 V).

APPLICATIONS

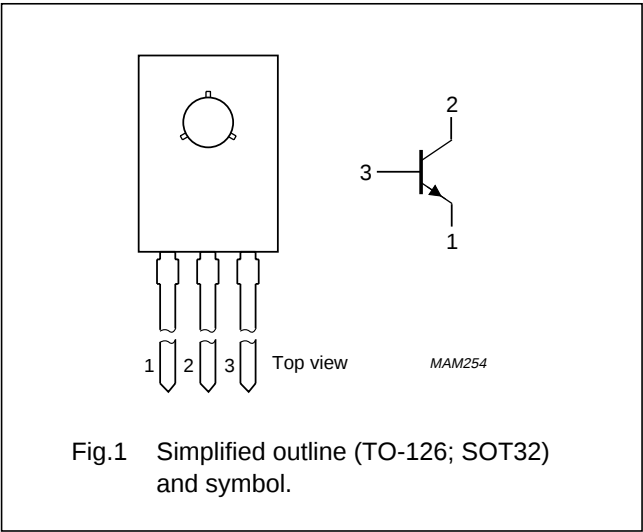
- Driver stages in hi-fi amplifiers and television circuits.

DESCRIPTION

NPN power transistor in a TO-126; SOT32 plastic package. PNP complements: BD136, BD138 and BD140.

PINNING

PIN	DESCRIPTION
1	emitter
2	collector, connected to metal part of mounting surface
3	base



QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter				
	BD135		—	—	45	V
	BD137		—	—	60	V
	BD139		—	—	100	V
V_{CEO}	collector-emitter voltage	open base				
	BD135		—	—	45	V
	BD137		—	—	60	V
	BD139		—	—	80	V
I_{CM}	peak collector current		—	—	2	A
P_{tot}	total power dissipation	$T_{mb} \leq 70\text{ }^{\circ}\text{C}$	—	—	8	W
h_{FE}	DC current gain	$I_C = 150\text{ mA}; V_{CE} = 2\text{ V}$	40	—	250	
f_T	transition frequency	$I_C = 50\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$	—	190	—	MHz

NPN power transistors

BD135; BD137; BD139

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter			
	BD135		–	45	V
	BD137		–	60	V
	BD139		–	100	V
V_{CEO}	collector-emitter voltage	open base			
	BD135		–	45	V
	BD137		–	60	V
	BD139		–	80	V
V_{EBO}	emitter-base voltage	open collector	–	5	V
I_C	collector current (DC)		–	1.5	A
I_{CM}	peak collector current		–	2	A
I_{BM}	peak base current		–	1	A
P_{tot}	total power dissipation	$T_{mb} \leq 70\text{ °C}$	–	8	W
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		–65	+150	°C

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	note 1	100	K/W
$R_{th\ j-mb}$	thermal resistance from junction to mounting base		10	K/W

Note

1. Refer to TO-126; SOT32 standard mounting conditions.

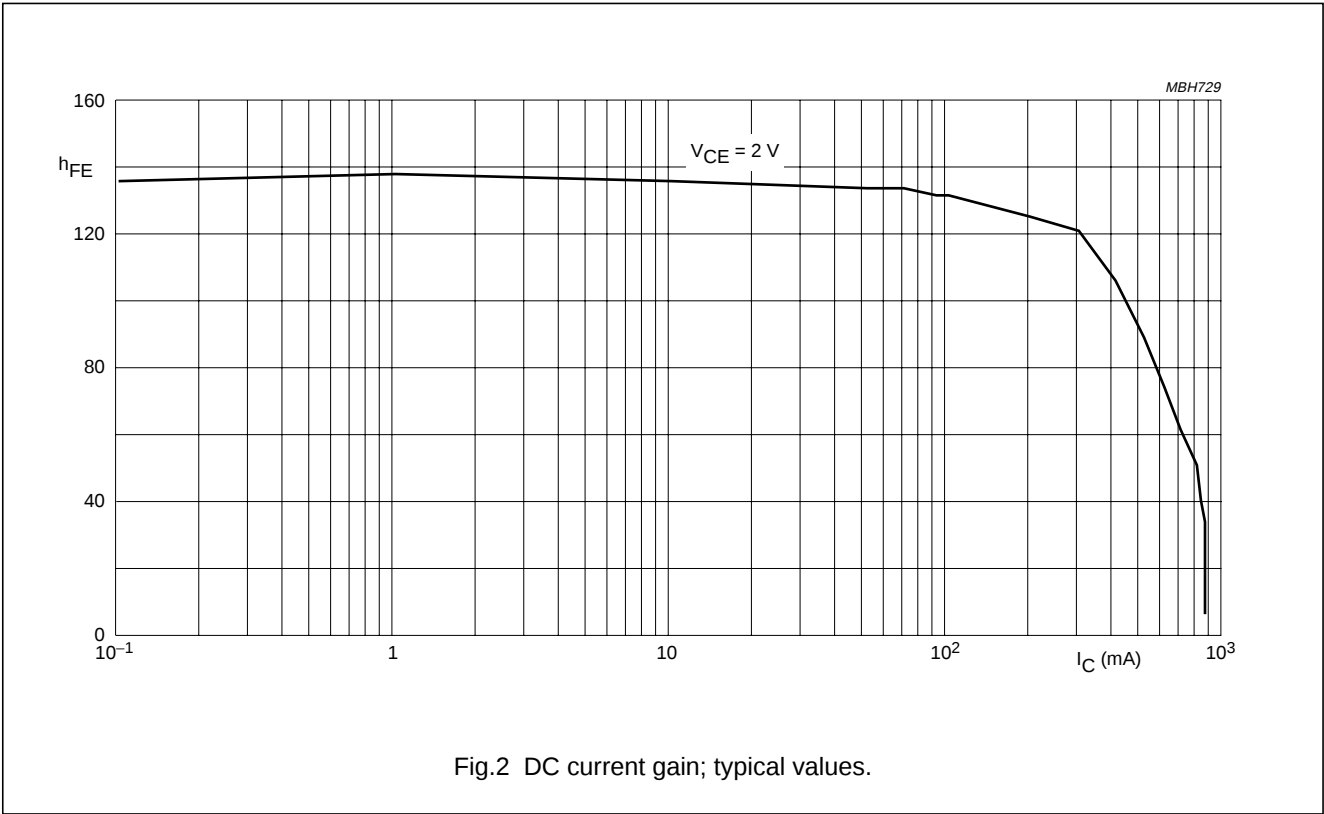
NPN power transistors

BD135; BD137; BD139

CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I _{CBO}	collector cut-off current	I _E = 0; V _{CB} = 30 V	–	–	100	nA
		I _E = 0; V _{CB} = 30 V; T _j = 125 °C	–	–	10	μA
I _{EBO}	emitter cut-off current	I _C = 0; V _{EB} = 5 V	–	–	100	nA
h _{FE}	DC current gain	V _{CE} = 2 V; see Fig.2				
		I _C = 5 mA	40	–	–	
		I _C = 150 mA	40	–	250	
		I _C = 500 mA	25	–	–	
h _{FE}	DC current gain	I _C = 150 mA; V _{CE} = 2 V; see Fig.2				
	BD135-10; BD137-10; BD139-10		63	–	160	
	BD135-16; BD137-16; BD139-16		100	–	250	
V _{CEsat}	collector-emitter saturation voltage	I _C = 500 mA; I _B = 50 mA	–	–	0.5	V
V _{BE}	base-emitter voltage	I _C = 500 mA; V _{CE} = 2 V	–	–	1	V
f _T	transition frequency	I _C = 50 mA; V _{CE} = 5 V; f = 100 MHz	–	190	–	MHz
$\frac{h_{FE1}}{h_{FE2}}$	DC current gain ratio of the complementary pairs	I _C = 150 mA; V _{CE} = 2 V	–	1.3	1.6	

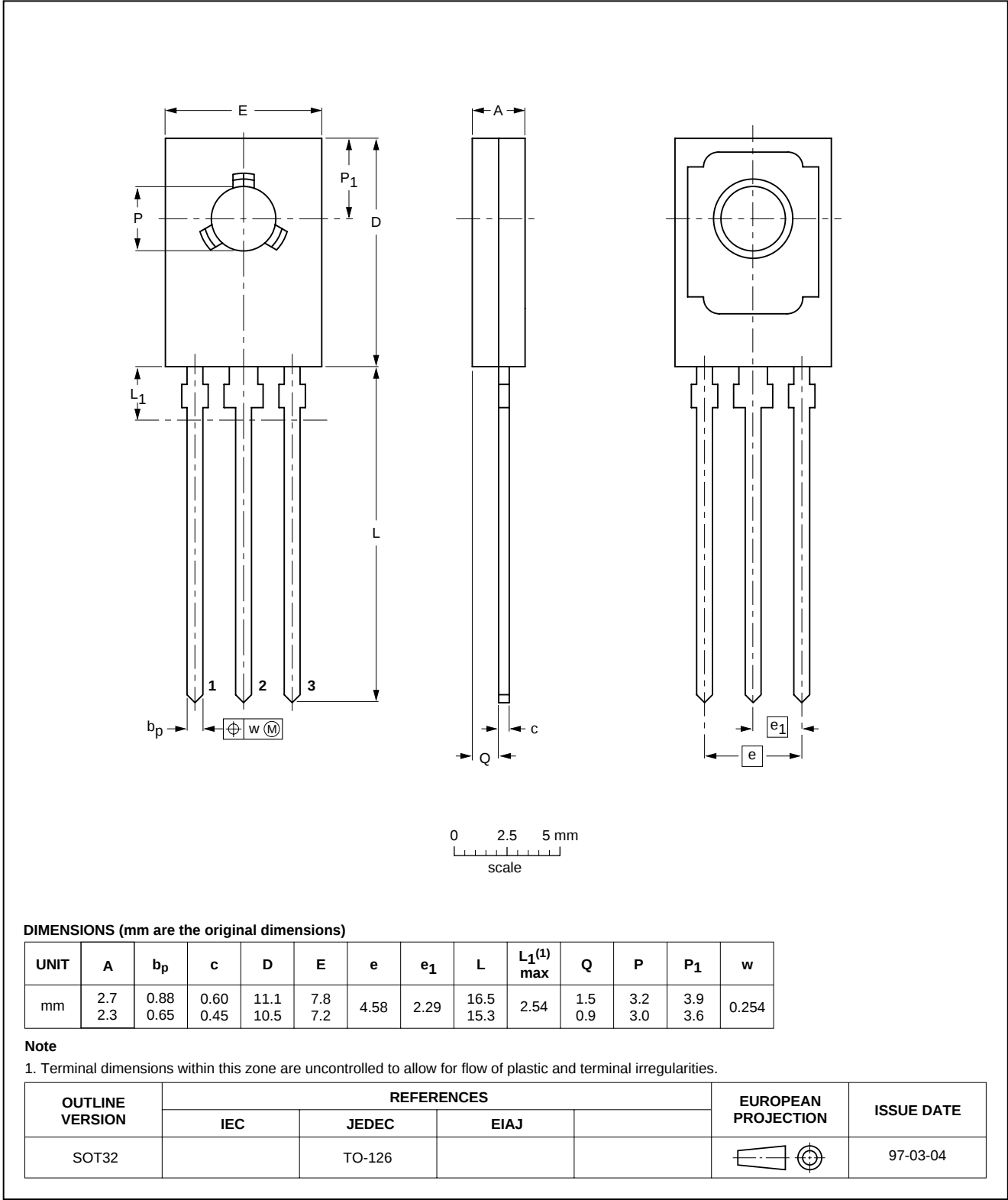


NPN power transistors

BD135; BD137; BD139

PACKAGE OUTLINE

Plastic single-ended leaded (through hole) package; mountable to heatsink, 1 mounting hole; 3 leads SOT32



NPN power transistorsBD135; BD137; BD139

DEFINITIONS

Data Sheet Status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.

NPN power transistors

BD135; BD137; BD139

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Printed in The Netherlands

117047/00/02/pp8

Date of release: 1997 Mar 04

Document order number: 9397 750 01843

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