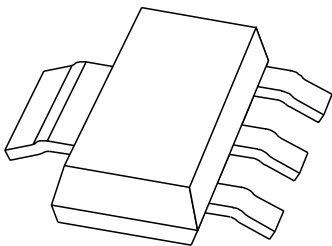


DATA SHEET



BSP30; BSP31; BSP32; BSP33 PNP medium power transistors

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

1997 Apr 09

PNP medium power transistors

BSP30; BSP31; BSP32; BSP33

FEATURES

- High current (max. 1 A)
- Low voltage (max. 80 V).

APPLICATIONS

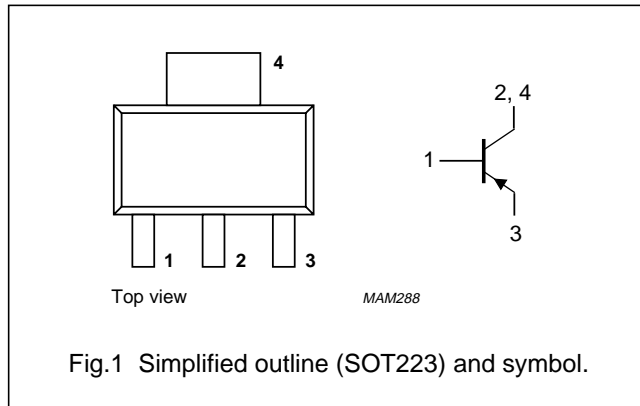
- Telephony and general industrial applications.

DESCRIPTION

PNP medium power transistor in a SOT223 plastic package. NPN complements: BSP40, BSP41, BSP42 and BSP43.

PINNING

PIN	DESCRIPTION
1	base
2, 4	collector
3	emitter



QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter			
	BSP30; BSP31		–	–70	V
	BSP32; BSP33		–	–90	V
V_{CEO}	collector-emitter voltage	open base			
	BSP30; BSP31		–	–60	V
	BSP32; BSP33		–	–80	V
I_{CM}	peak collector current		–	–2	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$	–	1.3	W
h_{FE}	DC current gain	$I_C = -100\text{ mA}; V_{CE} = -5\text{ V}$			
	BSP30; BSP32		40	120	
	BSP31; BSP33		100	300	
f_T	transition frequency	$I_C = -50\text{ mA}; V_{CE} = -10\text{ V}; f = 100\text{ MHz}$	100	–	MHz

PNP medium power transistors

BSP30; BSP31; BSP32;
BSP33**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			
	BSP30; BSP31		–	–70	V
	BSP32; BSP33		–	–90	V
V _{CEO}	collector-emitter voltage	open base			
	BSP30; BSP31		–	–60	V
	BSP32; BSP33		–	–80	V
V _{EBO}	emitter-base voltage	open collector	–	–5	V
I _C	collector current (DC)		–	–1	A
I _{CM}	peak collector current		–	–2	A
I _{BM}	peak base current		–	–200	mA
P _{tot}	total power dissipation	T _{amb} = 25 °C; note 1	–	1.3	W
T _{stg}	storage temperature		–65	+150	°C
T _j	junction temperature		–	150	°C
T _{amb}	operating ambient temperature		–65	+150	°C

Note

- Device mounted on a printed-circuit board, single sided copper, tinned, mounting pad for collector 1 cm².
For other mounting conditions, see "*Thermal considerations for SOT223 in the General part of handbook SC04*".

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R _{th j-a}	thermal resistance from junction to ambient	note 1	93	K/W
R _{th j-s}	thermal resistance from junction to soldering point		12	K/W

Note

- Device mounted on a printed-circuit board, single sided copper, tinned, mounting pad for collector 1 cm².
For other mounting conditions, see "*Thermal considerations for SOT223 in the General part of handbook SC04*".

PNP medium power transistors

BSP30; BSP31; BSP32;
BSP33**CHARACTERISTICS**

$T_{amb} = 25\text{ °C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{CBO}	collector cut-off current	$I_E = 0; V_{CB} = -60\text{ V}$	–	–100	nA
		$I_E = 0; V_{CB} = -60\text{ V}; T_j = 150\text{ °C}$	–	–50	μA
I_{EBO}	emitter cut-off current	$I_C = 0; V_{EB} = -5\text{ V}$	–	–100	nA
h_{FE}	DC current gain BSP30; BSP32 BSP31; BSP33	$I_C = -100\text{ }\mu\text{A}; V_{CE} = -5\text{ V}; \text{note 1}$	10	–	
			30	–	
h_{FE}	DC current gain BSP30; BSP32 BSP31; BSP33	$I_C = -100\text{ mA}; V_{CE} = -5\text{ V}; \text{note 1}$	40	120	
			100	300	
h_{FE}	DC current gain BSP30; BSP32 BSP31; BSP33	$I_C = -500\text{ mA}; V_{CE} = -5\text{ V}; \text{note 1}$	30	–	
			50	–	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -150\text{ mA}; I_B = -15\text{ mA}; \text{note 1}$	–	–250	mV
		$I_C = -500\text{ mA}; I_B = -50\text{ mA}; \text{note 1}$	–	–500	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = -150\text{ mA}; I_B = -15\text{ mA}; \text{note 1}$	–	–1	V
		$I_C = -500\text{ mA}; I_B = -50\text{ mA}; \text{note 1}$	–	–1.2	V
C_c	collector capacitance	$I_E = i_e = 0; V_{CB} = -10\text{ V}; f = 1\text{ MHz}$	–	20	pF
C_e	emitter capacitance	$I_C = i_c = 0; V_{EB} = -0.5\text{ V}; f = 1\text{ MHz}$	–	120	pF
f_T	transition frequency	$I_C = -50\text{ mA}; V_{CE} = -10\text{ V}; f = 100\text{ MHz}$	100	–	MHz
Switching times (between 10% and 90% levels)					
t_{on}	turn-on time	$I_{Con} = -100\text{ mA}; I_{Bon} = -5\text{ mA}; I_{Boff} = 5\text{ mA}$	–	500	ns
t_{off}	turn-off time		–	650	ns

Note

1. Pulse test: $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.01$.

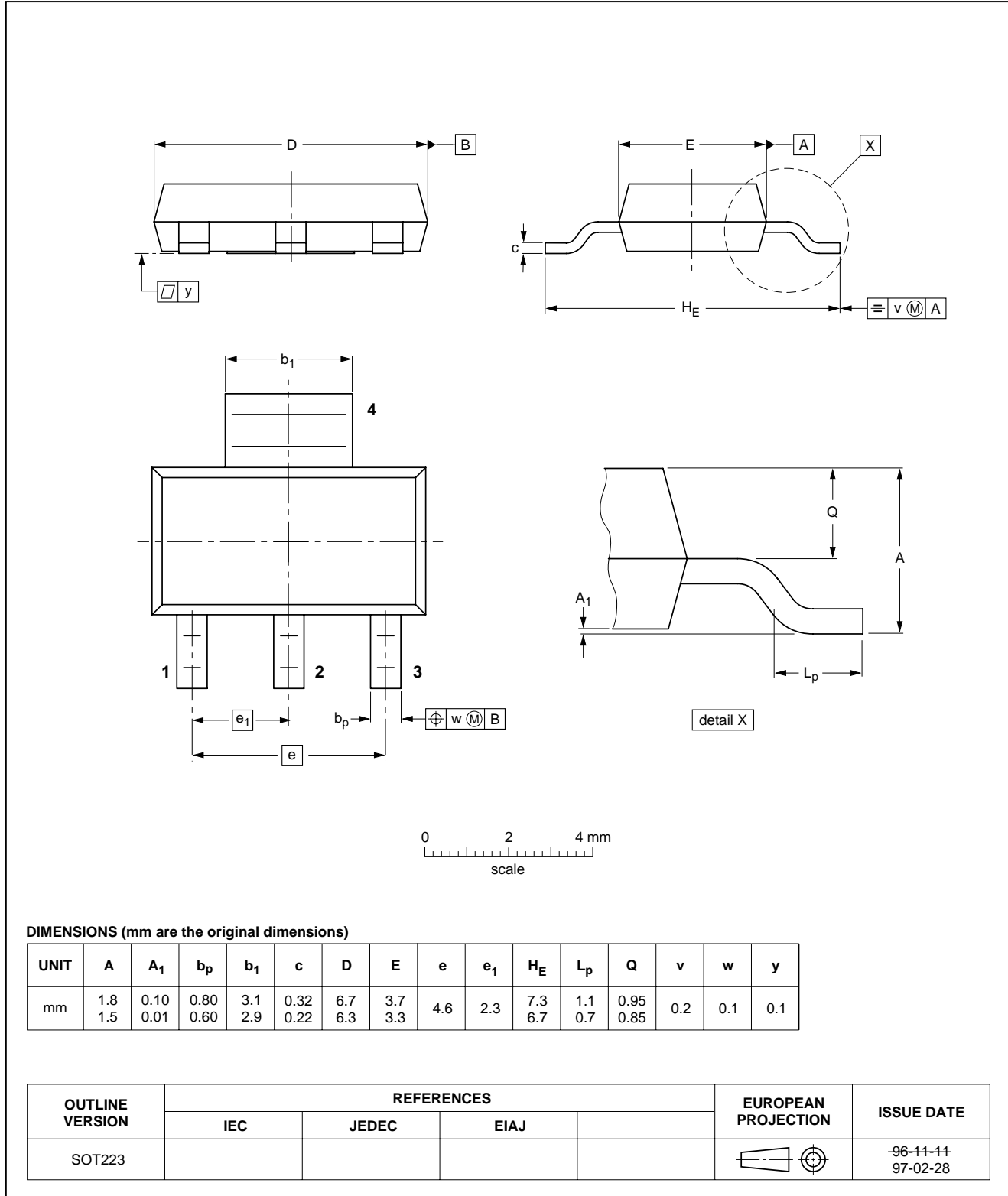
PNP medium power transistors

BSP30; BSP31; BSP32;
BSP33

PACKAGE OUTLINE

Plastic surface mounted package; collector pad for good heat transfer; 4 leads

SOT223



PNP medium power transistors

BSP30; BSP31; BSP32;
BSP33**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.