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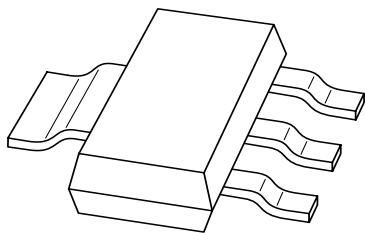
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If you have any questions related to the data sheet, please contact our nearest sales office via e-mail or telephone (details via salesaddresses@nexperia.com). Thank you for your cooperation and understanding,

Kind regards,

Team Nexperia

DATA SHEET



BSP31; BSP32; BSP33 PNP medium power transistors

Product data sheet
Supersedes data of 1997 Apr 08

1999 Apr 26

PNP medium power transistors

BSP31; BSP32; BSP33

FEATURES

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

APPLICATIONS

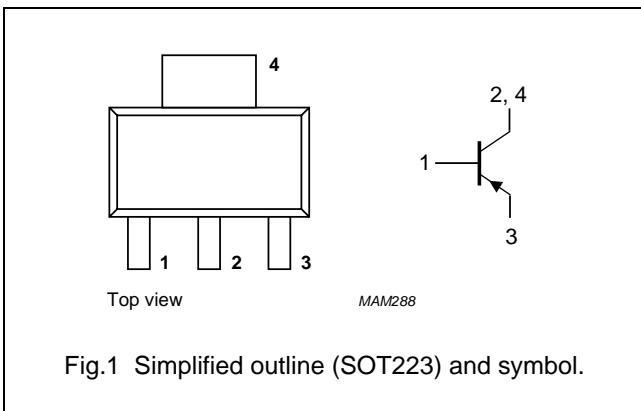
- Telephony and general industrial applications.

DESCRIPTION

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

PINNING

PIN	DESCRIPTION
1	base
2, 4	collector
3	emitter



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage BSP31 BSP32; BSP33	open emitter	— —	-70 -90	V
V_{CEO}	collector-emitter voltage BSP31 BSP32; BSP33	open base	— —	-60 -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	$T_{amb} = 25^\circ\text{C}$; 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

1. Device mounted on a printed-circuit board, single sided copper, tinplated, mounting pad for collector 1 cm². For other mounting conditions, see "Thermal considerations for SOT223 in the General Part of associated Handbook".

PNP medium power transistors

BSP31; BSP32; BSP33

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

1. Device mounted on a printed-circuit board, single sided copper, tinplated, mounting pad for collector 1 cm². For other mounting conditions, see "Thermal considerations for SOT223 in the General Part of associated Handbook".

CHARACTERISTICS

 $T_{amb} = 25^\circ\text{C}$ 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
		$I_E = 0; V_{CB} = -60\text{ V}; T_j = 150^\circ\text{C}$	–	-50	μA
I_{EBO}	emitter cut-off current	$I_C = 0; V_{EB} = -5\text{ V}$	–	-100	nA
h_{FE}	DC current gain BSP32	$I_C = -100\text{ }\mu\text{A}; V_{CE} = -5\text{ V};$ note 1	10	–	
		$I_C = -100\text{ mA}; V_{CE} = -5\text{ V};$ note 1	40	120	
		$I_C = -500\text{ mA}; V_{CE} = -5\text{ V};$ note 1	30	–	
	DC current gain BSP31; BSP33	$I_C = -100\text{ }\mu\text{A}; V_{CE} = -5\text{ V};$ note 1	30	–	
		$I_C = -100\text{ mA}; V_{CE} = -5\text{ V};$ note 1	100	300	
		$I_C = -500\text{ mA}; V_{CE} = -5\text{ V};$ note 1	50	–	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -150\text{ mA}; I_B = -15\text{ mA};$ note 1	–	-250	mV
		$I_C = -500\text{ mA}; I_B = -50\text{ mA};$ note 1	–	-500	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = -150\text{ mA}; I_B = -15\text{ mA};$ note 1	–	-1	V
		$I_C = -500\text{ mA}; I_B = -50\text{ mA};$ 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	$I_C = i_e = 0; V_{EB} = -0.5\text{ V}; f = 1\text{ MHz}$	–	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: $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.01$.

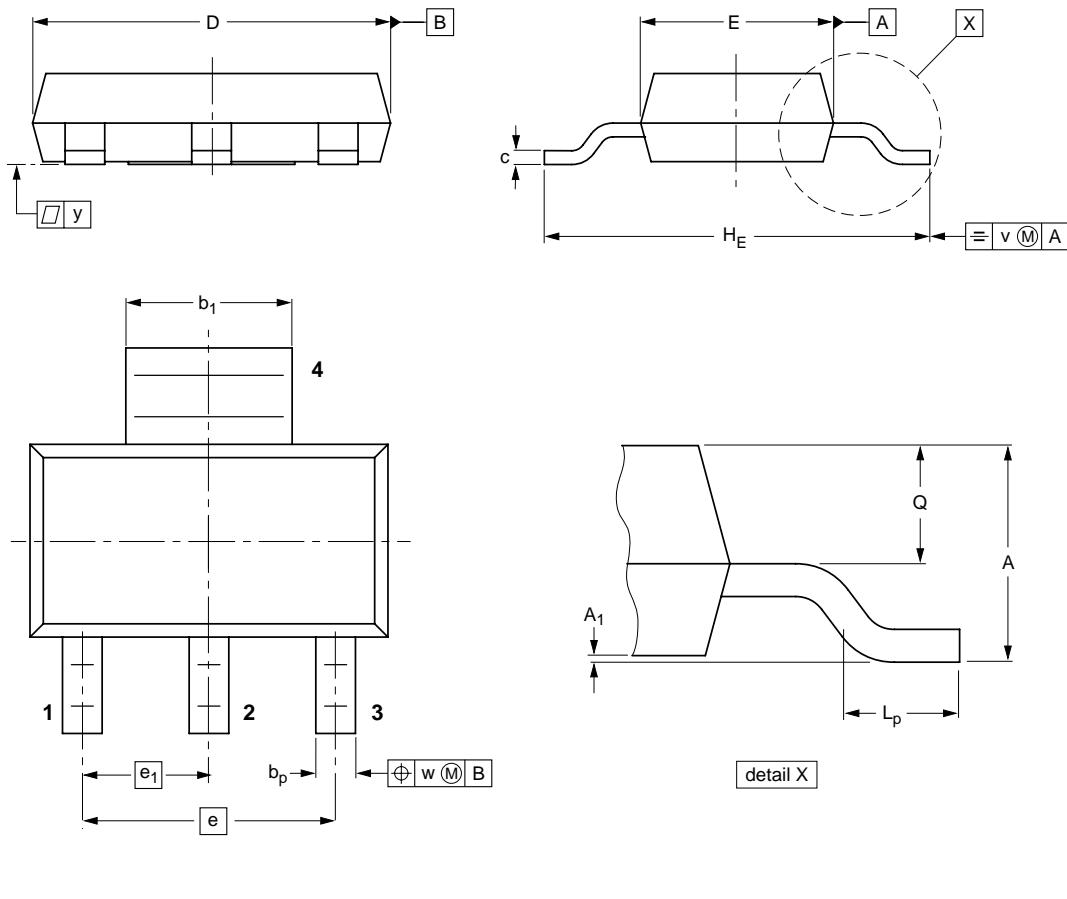
PNP medium power transistors

BSP31; BSP32; BSP33

PACKAGE OUTLINE

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

SOT223



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁	b _p	b ₁	c	D	E	e	e ₁	H _E	L _p	Q	v	w	y
mm	1.8 1.5	0.10 0.01	0.80 0.60	3.1 2.9	0.32 0.22	6.7 6.3	3.7 3.3	4.6	2.3	7.3 6.7	1.1 0.7	0.95 0.85	0.2	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ	SC-73		
SOT223						97-02-28 99-09-13

PNP medium power transistors**BSP31; BSP32; BSP33****DATA SHEET STATUS**

DOCUMENT STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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NXP Semiconductors

Customer notification

This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content, except for package outline drawings which were updated to the latest version.

Contact information

For additional information please visit: <http://www.nxp.com>

For sales offices addresses send e-mail to: salesaddresses@nxp.com

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Printed in The Netherlands

115002/00/03/PP6

Date of release: 1999 Apr 26

Document order number: 9397 750 05772

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