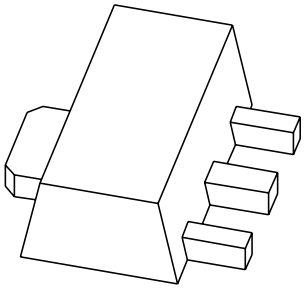
DATA SHEET



BSR30; BSR31; BSR33
PNP medium power transistors

Product data sheet
Supersedes data of 1999 Apr 26

2004 Dec 13

NXP founded by Philips

PNP medium power transistors BSR30; BSR31; BSR33

FEATURES

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

APPLICATIONS

- Telephony and general industrial applications
- Thick and thin-film circuits.

DESCRIPTION

PNP medium power transistor in a SOT89 plastic package.
NPN complements: BSR40; BSR41 and BSR43.

MARKING

TYPE NUMBER	MARKING CODE
BSR30	BR1
BSR31	BR2
BSR33	BR4

PINNING

PIN	DESCRIPTION
1	emitter
2	collector
3	base

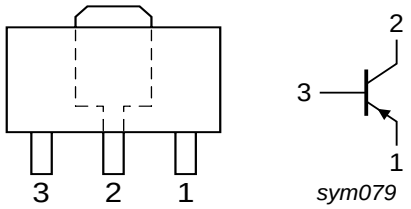


Fig.1 Simplified outline (SOT89) and symbol.

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
BSR30	SC-62	plastic surface mounted package; collector pad for good heat transfer; 3 leads	SOT89
BSR31			
BSR33			

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter			
	BSR30; BSR31		–	−70	V
	BSR33		–	−90	V
V_{CEO}	collector-emitter voltage	open base			
	BSR30; BSR31		–	−60	V
	BSR33		–	−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	$T_{amb} \leq 25$ °C; note 1	–	1.35	W
T_{stg}	storage temperature		−65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	ambient temperature		−65	+150	°C

Note

1. Device mounted on a printed-circuit board, single-sided copper, tin-plated, mounting pad for collector 6 cm^2. For other mounting conditions, see *"Thermal considerations for SOT89 in the General Part of associated Handbook".*

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		13	K/W

Note

1. Device mounted on a printed-circuit board, single-sided copper, tin-plated, mounting pad for collector 6 cm^2. For other mounting conditions, see *"Thermal considerations for SOT89 in the General Part of associated Handbook".*

CHARACTERISTICS

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

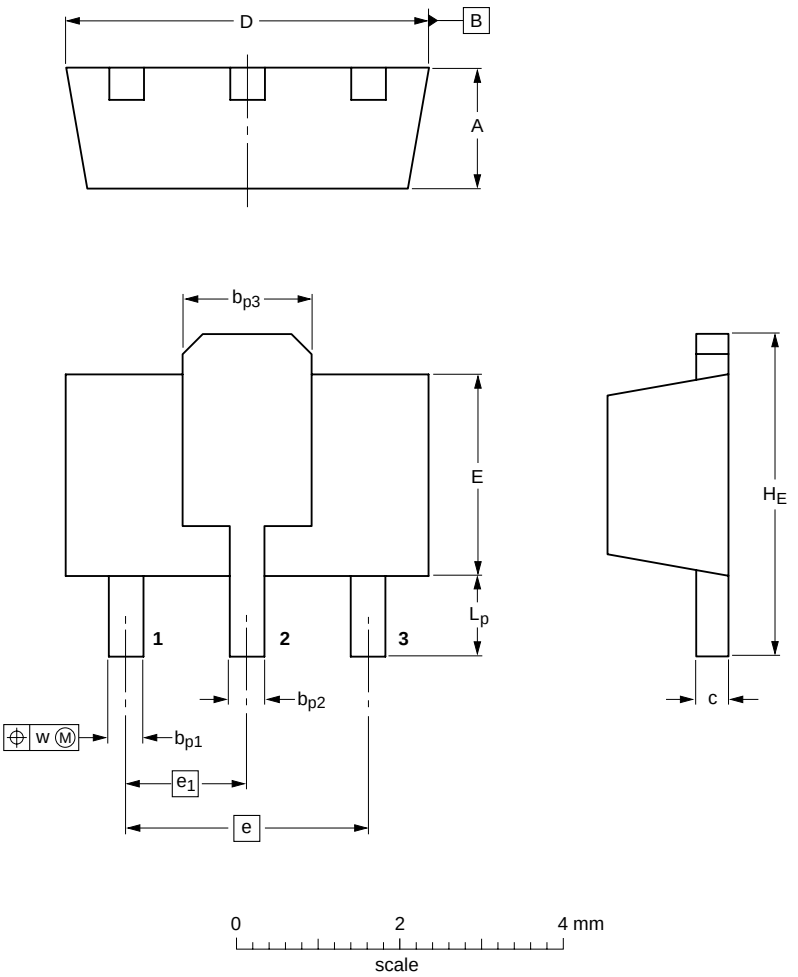
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{CBO}	collector-base cut-off current	I_E = 0 A; V_{CB} = −60 V	−	−100	nA
		I_E = 0 A; V_{CB} = −60 V; T_j = 150 °C	−	−50	μA
I_{EBO}	emitter-base cut-off current	I_C = 0 A; V_{EB} = −5 V	−	−100	nA
h_{FE}	DC current gain	I_C = −100 μA; V_{CE} = −5 V; note 1			
	BSR30		10	−	
	BSR31; BSR33		30	−	
	DC current gain	I_C = −100 mA; V_{CE} = −5 V; note 1			
	BSR30		40	120	
	BSR31; BSR33		100	300	
	DC current gain	I_C = −500 mA; V_{CE} = −5 V; note 1			
	BSR30		30	−	
	BSR31; BSR33		50	−	
V_{CEsat}	collector-emitter saturation voltage	I_C = −150 mA; I_B = −15 mA; note 1	−	−0.25	V
		I_C = −500 mA; I_B = −50 mA; note 1	−	−0.5	V
V_{BEsat}	base-emitter saturation voltage	I_C = −150 mA; I_B = −15 mA; note 1	−	−1	V
		I_C = −500 mA; I_B = −50 mA; note 1	−	−1.2	V
f_T	transition frequency	I_C = −50 mA; V_{CE} = −10 V; f = 100 MHz	100	−	MHz

Note

1. Pulse test: t_p = 300 μs; δ < 0.01.

PACKAGE OUTLINE

Plastic surface-mounted package; collector pad for good heat transfer; 3 leads **SOT89**



DIMENSIONS (mm are the original dimensions)

UNIT	A	b_{p1}	b_{p2}	b_{p3}	c	D	E	e	e_1	H_E	L_p	w
mm	1.6 1.4	0.48 0.35	0.53 0.40	1.8 1.4	0.44 0.23	4.6 4.4	2.6 2.4	3.0	1.5	4.25 3.75	1.2 0.8	0.13

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT89		TO-243	SC-62			~~04-08-03~~ 06-03-16

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.

Notes

1. Please consult the most recently issued document before initiating or completing a design.
2. The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

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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

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Printed in The Netherlands R75/04/pp7 Date of release: 2004 Dec 13 Document order number: 9397 750 13873

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