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Kind regards,

Team Nexperia

# DATA SHEET



## **BSR30; BSR31; BSR33** PNP medium power transistors

Product data sheet  
Supersedes data of 1999 Apr 26

2004 Dec 13

# 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

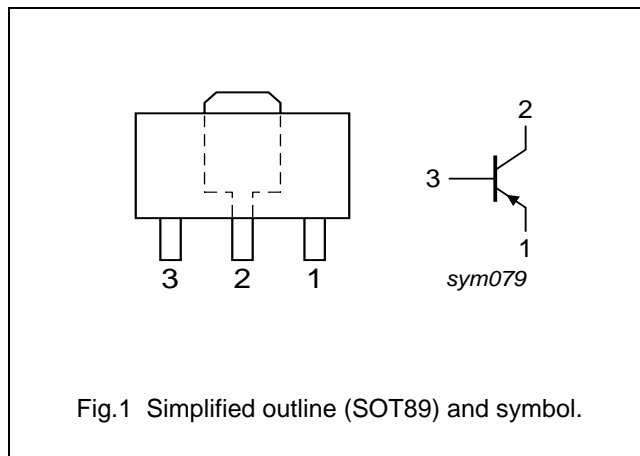
PNP medium power transistor in a SOT89 plastic package.  
NPN complements: BSR40; BSR41 and BSR43.

### MARKING

TYPE NUMBER	MARKING CODE
BSR30	BR1
BSR31	BR2
BSR33	BR4

### PINNING

PIN	DESCRIPTION
1	emitter
2	collector
3	base



### 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			

## PNP medium power transistors

## BSR30; BSR31; BSR33

**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>CBO</sub>	collector-base voltage	open emitter			
	BSR30; BSR31		–	–70	V
	BSR33		–	–90	V
V <sub>CEO</sub>	collector-emitter voltage	open base			
	BSR30; BSR31		–	–60	V
	BSR33		–	–80	V
V <sub>EBO</sub>	emitter-base voltage	open collector	–	–5	V
I <sub>C</sub>	collector current (DC)		–	–1	A
I <sub>CM</sub>	peak collector current		–	–2	A
I <sub>BM</sub>	peak base current		–	–200	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C; note 1	–	1.35	W
T <sub>stg</sub>	storage temperature		–65	+150	°C
T <sub>j</sub>	junction temperature		–	150	°C
T <sub>amb</sub>	ambient temperature		–65	+150	°C

**Note**

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

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	note 1	93	K/W
R <sub>th(j-s)</sub>	thermal resistance from junction to soldering point		13	K/W

**Note**

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

## PNP medium power transistors

## BSR30; BSR31; BSR33

**CHARACTERISTICS**

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

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

**Note**

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

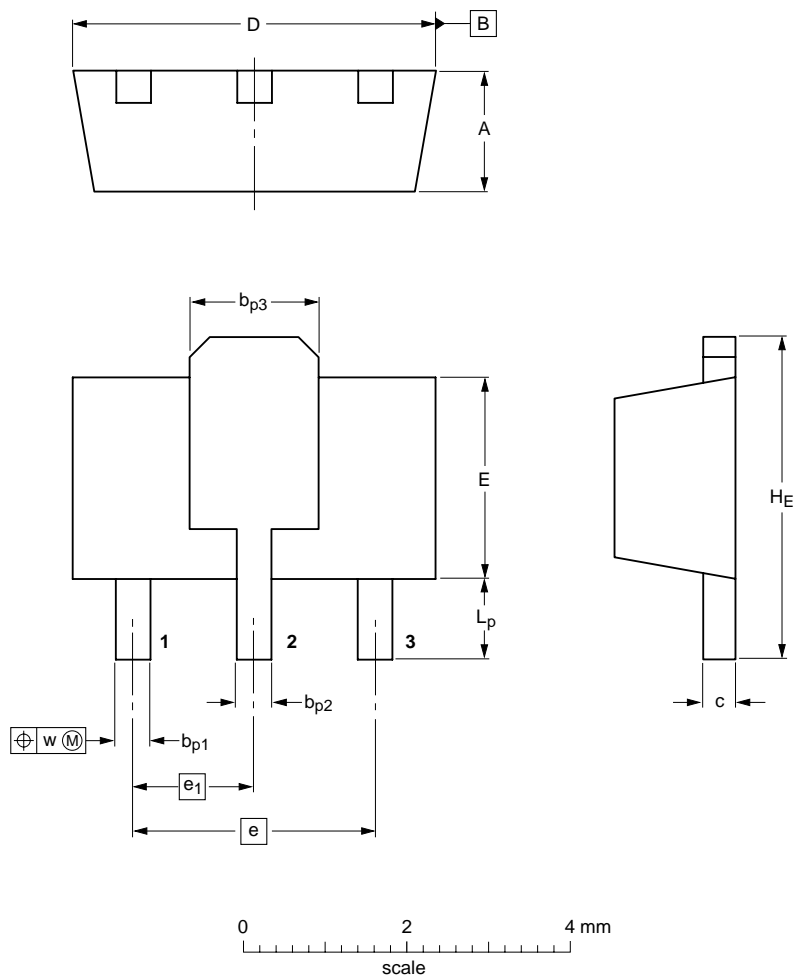
PNP medium power transistors

BSR30; BSR31; BSR33

PACKAGE OUTLINE

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

SOT89



DIMENSIONS (mm are the original dimensions)

UNIT	A	b <sub>p1</sub>	b <sub>p2</sub>	b <sub>p3</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	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

## PNP medium power transistors

## BSR30; BSR31; BSR33

## DATA SHEET STATUS

DOCUMENT STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)</sup>	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](mailto:salesaddresses@nxp.com)

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