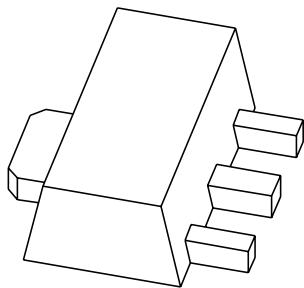


# DATA SHEET



## **BSR40; BSR41; BSR42; BSR43** NPN medium power transistors

Product data sheet  
Supersedes data of 1999 Apr 28

2004 Dec 13

**NPN medium power transistors****BSR40; BSR41;  
BSR42; BSR43****FEATURES**

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

**APPLICATIONS**

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

**DESCRIPTION**

NPN medium power transistor in a SOT89 plastic package. PNP complements: BSR30; BSR31 and BSR33.

**MARKING**

TYPE NUMBER	MARKING CODE	TYPE NUMBER	MARKING CODE
BSR40	AR1	BSR42	AR3
BSR41	AR2	BSR43	AR4

**PINNING**

PIN	DESCRIPTION
1	emitter
2	collector
3	base

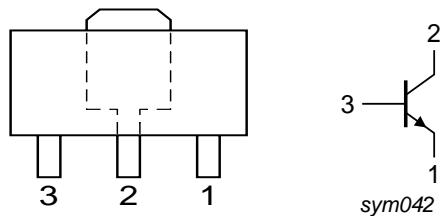


Fig.1 Simplified outline (SOT89) and symbol.

**ORDERING INFORMATION**

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
BSR40	SC-62	plastic surface mounted package; collector pad for good heat transfer; 3 leads	SOT89
BSR41			
BSR42			
BSR43			

## NPN medium power transistors

BSR40; BSR41; BSR42;  
BSR43**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage BSR40; BSR41 BSR42; BSR43	open emitter	– –	70 90	V V
$V_{CEO}$	collector-emitter voltage BSR40; BSR41 BSR42; BSR43	open base	– –	60 80	V 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		–	0.2	A
$P_{tot}$	total power dissipation	$T_{amb} \leq 25 \text{ }^{\circ}\text{C}$ ; note 1	–	1.35	W
$T_{stg}$	storage temperature		–65	+150	$^{\circ}\text{C}$
$T_j$	junction temperature		–	150	$^{\circ}\text{C}$
$T_{amb}$	ambient temperature		–65	+150	$^{\circ}\text{C}$

**Note**

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

## NPN medium power transistors

BSR40; BSR41; BSR42;  
BSR43

## CHARACTERISTICS

 $T_{amb} = 25^\circ\text{C}$  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
		$I_E = 0 \text{ A}; V_{CB} = 60 \text{ V}; T_j = 150^\circ\text{C}$	–	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 BSR40; BSR42 BSR41; BSR43	$I_C = 100 \mu\text{A}; V_{CE} = 5 \text{ V}; \text{note 1}$	10	–	
	DC current gain BSR40; BSR42 BSR41; BSR43	$I_C = 100 \text{ mA}; V_{CE} = 5 \text{ V}; \text{note 1}$	30	–	
	DC current gain BSR40; BSR42 BSR41; BSR43	$I_C = 500 \text{ mA}; V_{CE} = 5 \text{ V}; \text{note 1}$	40	120	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 150 \text{ mA}; I_B = 15 \text{ mA}; \text{note 1}$	100	300	
		$I_C = 500 \text{ mA}; I_B = 50 \text{ mA}; \text{note 1}$	–	–	
$V_{BEsat}$	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	$I_E = i_e = 0 \text{ A}; V_{CB} = 10 \text{ V}; f = 1 \text{ MHz}$	–	12	pF
$C_e$	emitter capacitance	$I_C = i_c = 0 \text{ A}; V_{EB} = 0.5 \text{ V}; f = 1 \text{ MHz}$	–	90	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	$I_{Con} = 100 \text{ mA}; I_{Bon} = 5 \text{ mA};$	–	250	ns
$t_{off}$	turn-off time	$I_{Boff} = -5 \text{ mA}$	–	1	$\mu\text{s}$

## Note

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

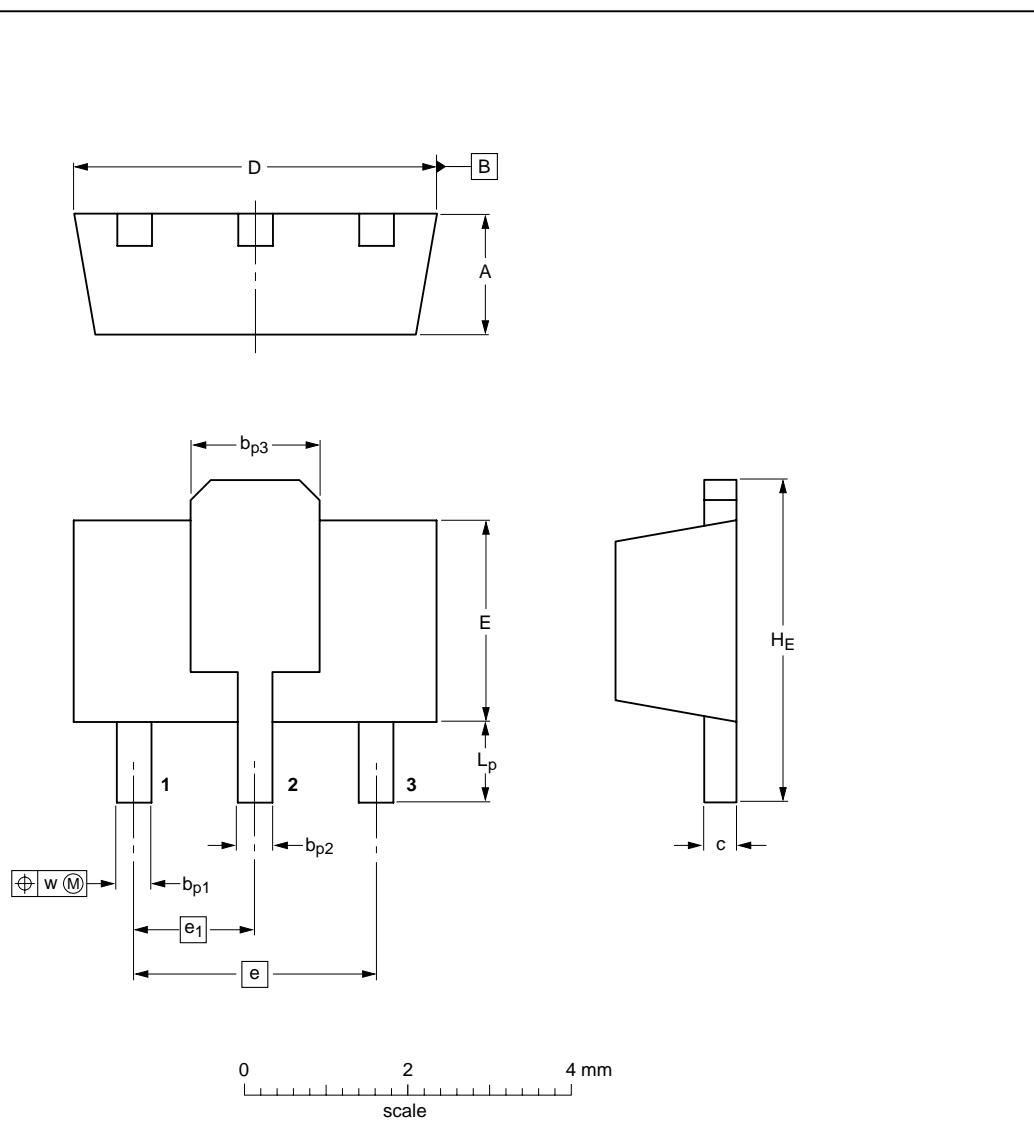
## NPN medium power transistors

BSR40; BSR41; BSR42;  
BSR43

## 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

## NPN medium power transistors

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BSR43

## 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**

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