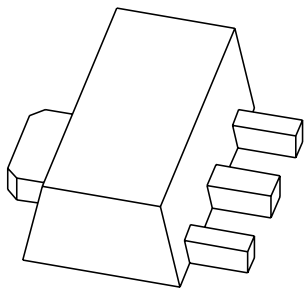


# DATA SHEET



## **BST39; BST40** NPN high-voltage transistors

Product specification  
Supersedes data of 1999 Apr 26

2000 Jul 03

# NPN high-voltage transistors

# BST39; BST40

### FEATURES

- Low current (max. 100 mA)
- High voltage (max. 350 V).

### APPLICATIONS

- General purpose switching and amplification.

### DESCRIPTION

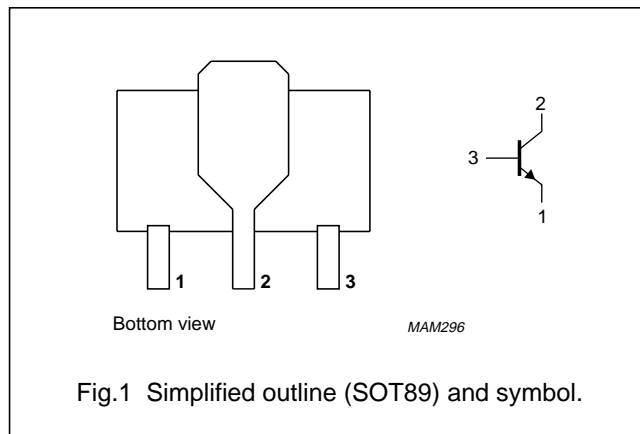
NPN high-voltage transistor in a SOT89 plastic package.  
PNP complements: BST15 and BST16.

### MARKING

TYPE NUMBER	MARKING CODE
BST39	AT1
BST40	AT2

### PINNING

PIN	DESCRIPTION
1	emitter
2	collector
3	base



### LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>CB0</sub>	collector-base voltage	open emitter			
	BST39		–	400	V
	BST40		–	300	V
V <sub>CEO</sub>	collector-emitter voltage	open base			
	BST39		–	350	V
	BST40		–	250	V
V <sub>EBO</sub>	emitter-base voltage	open collector	–	5	V
I <sub>C</sub>	collector current (DC)		–	100	mA
I <sub>CM</sub>	peak collector current		–	200	mA
I <sub>BM</sub>	peak base current		–	100	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C; note 1	–	1.3	W
T <sub>stg</sub>	storage temperature		–65	+150	°C
T <sub>j</sub>	junction temperature		–	150	°C
T <sub>amb</sub>	operating ambient temperature		–65	+150	°C

### Note

1. Device mounted on a printed-circuit board, single-sided copper, tinplated, 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”.

## NPN high-voltage transistors

## BST39; BST40

## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	note 1	96	K/W
$R_{th\ j-s}$	thermal resistance from junction to soldering point		16	K/W

## Note

1. Device mounted on a printed-circuit board, single-sided copper, tinplated, 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"*.

## CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{CBO}$	collector cut-off current	$I_E = 0; V_{CB} = 300\text{ V}$	–	20	nA
$I_{EBO}$	emitter cut-off current	$I_C = 0; V_{EB} = 5\text{ V}$	–	100	nA
$h_{FE}$	DC current gain	$I_C = 20\text{ mA}; V_{CE} = 10\text{ V}$	40	–	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 50\text{ mA}; I_B = 4\text{ mA}$	–	500	mV
$C_C$	collector capacitance	$I_E = i_e = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	–	2	pF
$f_T$	transition frequency	$I_C = 10\text{ mA}; V_{CE} = 10\text{ V}; f = 100\text{ MHz}$	70	–	MHz

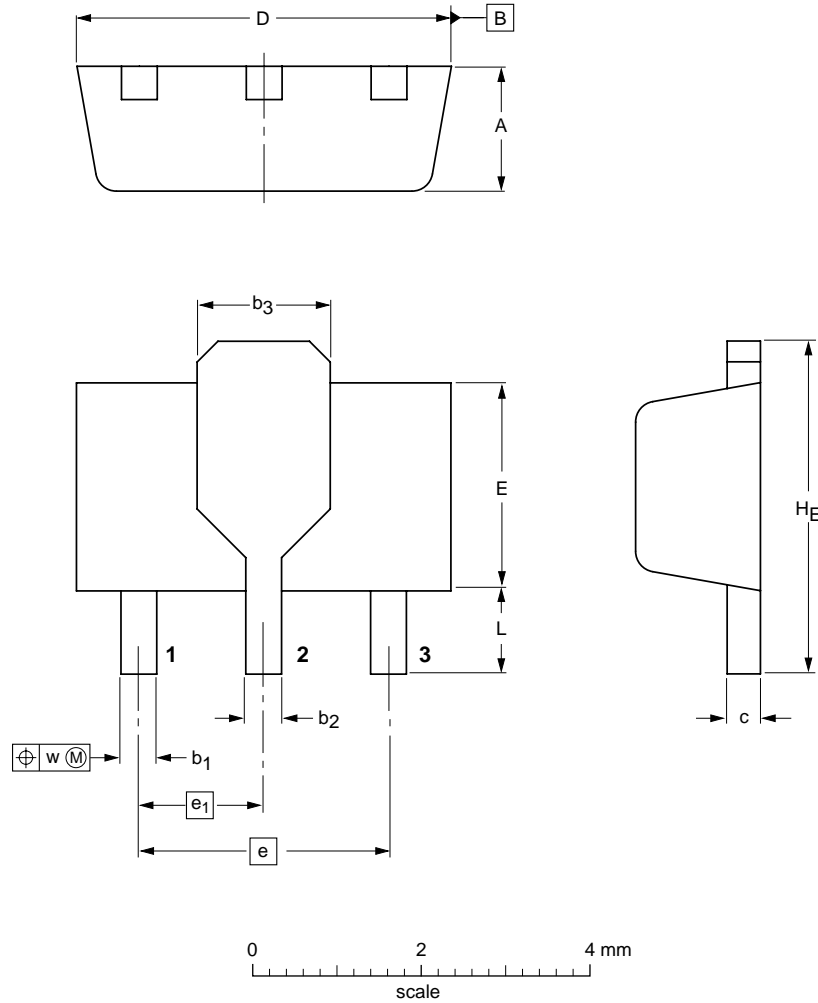
NPN high-voltage transistors

BST39; BST40

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>1</sub>	b <sub>2</sub>	b <sub>3</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L min.	w
mm	1.6 1.4	0.48 0.35	0.53 0.40	1.8 1.4	0.44 0.37	4.6 4.4	2.6 2.4	3.0	1.5	4.25 3.75	0.8	0.13

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT89		TO-243	SC-62		97-02-28 99-09-13

## NPN high-voltage transistors

## BST39; BST40

## DATA SHEET STATUS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS <sup>(1)</sup>
Objective specification	Development	This data sheet contains the design target or goal specifications for product development. Specification may change in any manner without notice.
Preliminary specification	Qualification	This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

## Note

1. Please consult the most recently issued data sheet before initiating or completing a design.

## DEFINITIONS

**Short-form specification** — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

**Limiting values definition** — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). 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.

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NPN high-voltage transistors

BST39; BST40

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**NOTES**

NPN high-voltage transistors

BST39; BST40

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**NOTES**

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