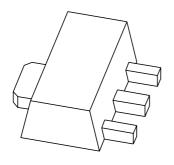
## **DISCRETE SEMICONDUCTORS**

# DATA SHEET



# BST50; BST51; BST52 NPN Darlington transistors

Product data sheet Supersedes data of 2001 Feb 20

2004 Dec 09



# **NPN Darlington transistors**

# **BST50**; **BST51**; **BST52**

#### **FEATURES**

- High current (max. 0.5 A)
- Low voltage (max. 80 V)
- Integrated diode and resistor.

#### **APPLICATIONS**

- Industrial switching applications such as:
  - Print hammer
  - Solenoid
  - Relay and lamp driving.

#### **DESCRIPTION**

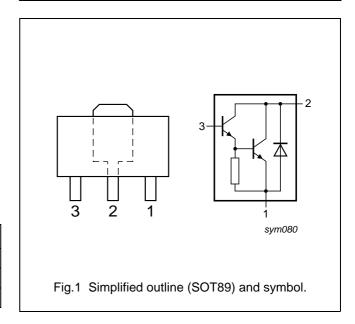
NPN Darlington transistor in a SOT89 plastic package. PNP complements: BST60, BST61 and BST62.

#### **MARKING**

TYPE NUMBER	MARKING CODE
BST50	AS1
BST51	AS2
BST52	AS3

#### **PINNING**

PIN	DESCRIPTION	
1	emitter	
2	collector	
3	base	



#### **ORDERING INFORMATION**

TYPE NUMBER	PACKAGE			
TIPE NOMBER	NAME	E DESCRIPTION V		
BST50	SC-62	plastic surface mounted package; collector pad for good heat	SOT89	
BST51		transfer; 3 leads		
BST52				

## **NPN** Darlington transistors

BST50; BST51; BST52

#### **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			
	BST50		_	60	V
	BST51		_	80	V
	BST52		_	90	V
V <sub>CES</sub>	collector-emitter voltage	V <sub>BE</sub> = 0 V			
	BST50		_	45	V
	BST51		_	60	V
	BST52		_	80	V
V <sub>EBO</sub>	emitter-base voltage	open collector	_	5	V
I <sub>C</sub>	collector current (DC)		_	1	Α
I <sub>CM</sub>	peak collector current		_	2	Α
I <sub>B</sub>	base current (DC)		_	100	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C; note 1	_	1.3	W
Tj	junction temperature		_	150	°C
T <sub>amb</sub>	ambient temperature		-65	+150	°C
T <sub>stg</sub>	storage temperature		-65	+150	°C

#### Note

#### THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R <sub>th(j-a)</sub>	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

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".

<sup>1.</sup> 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".

# NPN Darlington transistors

BST50; BST51; BST52

#### **CHARACTERISTICS**

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

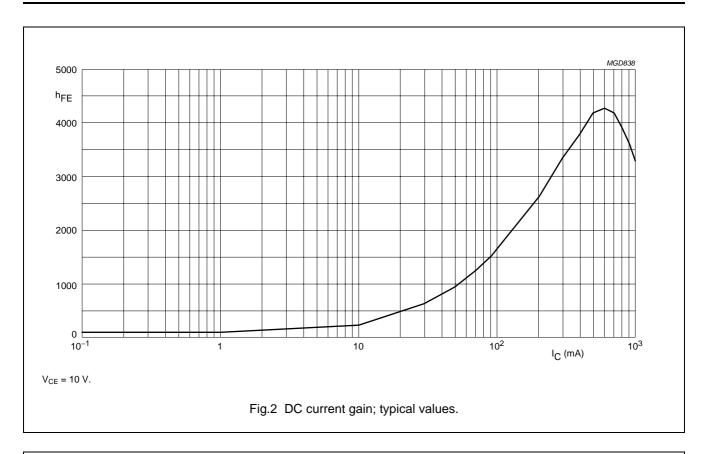
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I <sub>CES</sub>	collector-emitter cut-off current					
	BST50	V <sub>BE</sub> = 0 V; V <sub>CE</sub> = 45 V	_	_	50	nA
	BST51	V <sub>BE</sub> = 0 V; V <sub>CE</sub> = 60 V	_	_	50	nA
	BST52	V <sub>BE</sub> = 0 V; V <sub>CE</sub> = 80 V	_	_	50	nA
I <sub>EBO</sub>	emitter-base cut-off current	I <sub>C</sub> = 0 A; V <sub>EB</sub> = 4 V	_	_	50	nA
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = 10 V; note 1; (see Fig.2)				
		I <sub>C</sub> = 150 mA	1000	_	_	
		I <sub>C</sub> = 500 mA	2000	_	_	
V <sub>CEsat</sub>	collector-emitter saturation	$I_C = 500 \text{ mA}; I_B = 0.5 \text{ mA}$	_	_	1.3	V
	voltage	$I_C = 500 \text{ mA}; I_B = 0.5 \text{ mA};$ $T_j = 150 \text{ °C}$	_	_	1.3	V
V <sub>BEsat</sub>	base-emitter saturation voltage	$I_C = 500 \text{ mA}; I_B = 0.5 \text{ mA}$	_	_	1.9	V
f <sub>T</sub>	transition frequency	$I_C = 500 \text{ mA}; V_{CE} = 5 \text{ V};$ f = 100 MHz	_	200	_	MHz
Switching ti	Switching times (between 10% and 90% levels); (see Fig.3)					
t <sub>on</sub>	turn-on time	I <sub>Con</sub> = 500 mA; I <sub>Bon</sub> = 0.5 mA;	_	400	_	ns
t <sub>off</sub>	turn-off time	$I_{Boff} = -0.5 \text{ mA}$	_	1500	_	ns

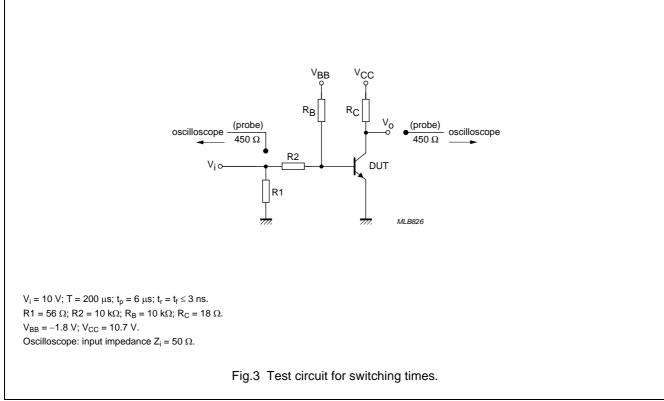
#### Note

<sup>1.</sup> Pulse test:  $t_p \le 300~\mu s;~\delta \le 0.02.$ 

# NPN Darlington transistors

BST50; BST51; BST52





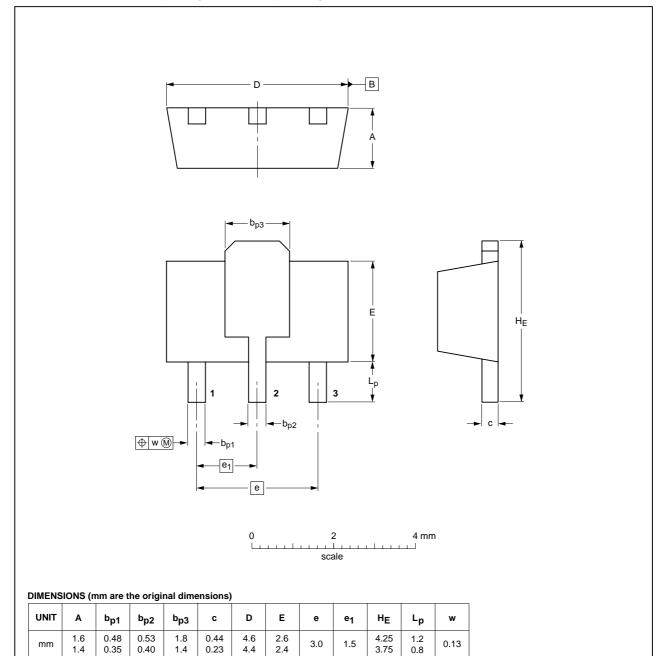
# NPN Darlington transistors

BST50; BST51; BST52

#### **PACKAGE OUTLINE**

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

SOT89



OUTLINE	REFERENCES			EUROPEAN	ICCUE DATE	
VERSION	IEC	JEDEC	JEITA		PROJECTION ISSUE DAT	
SOT89		TO-243	SC-62			<del>04-08-03</del> 06-03-16

### NPN Darlington transistors

BST50; BST51; BST52

#### **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.

#### **Notes**

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#### **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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