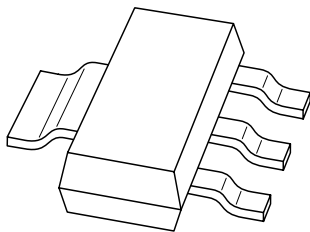


# DATA SHEET



## **BSP60; BSP61; BSP62** PNP Darlington transistors

Product specification  
Supersedes data of 1997 Apr 22

1999 Apr 29

# PNP Darlington transistors

# BSP60; BSP61; BSP62

## FEATURES

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

## APPLICATIONS

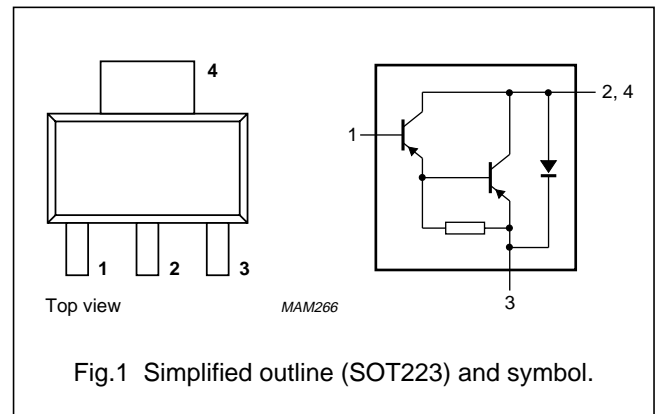
- Industrial switching applications such as:
  - Print hammer
  - Solenoid
  - Relay and lamp drivers.

## DESCRIPTION

PNP Darlington transistor in a SOT223 plastic package.  
NPN complements: BSP50, BSP51 and BSP52.

## PINNING

PIN	DESCRIPTION
1	base
2,4	collector
3	emitter



## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>CB0</sub>	collector-base voltage	open emitter			
	BSP60		–	–60	V
	BSP61		–	–80	V
V <sub>CES</sub>	collector-emitter voltage	V <sub>BE</sub> = 0			
	BSP60		–	–45	V
	BSP61		–	–60	V
V <sub>EBO</sub>	emitter-base voltage	open collector	–	–5	V
	BSP62		–	–90	V
I <sub>C</sub>	collector current (DC)		–	–0.5	A
I <sub>CM</sub>	peak collector current		–	–1.5	A
I <sub>B</sub>	base current (DC)		–	–100	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C; note 1	–	1.25	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 1 cm<sup>2</sup>. For other mounting conditions, see “Thermal considerations for the SOT223 in the General Part of associated Handbook”.

## PNP Darlington transistors

## BSP60; BSP61; BSP62

## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	note 1	98	K/W
$R_{th\ j-s}$	thermal resistance from junction to solder point		17	K/W

## Note

- Device mounted on a printed-circuit board, single sided copper, tinplated, mounting pad for collector 1 cm<sup>2</sup>.  
For other mounting conditions, see "Thermal considerations for the SOT223 in the General Part of associated Handbook".

## CHARACTERISTICS

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

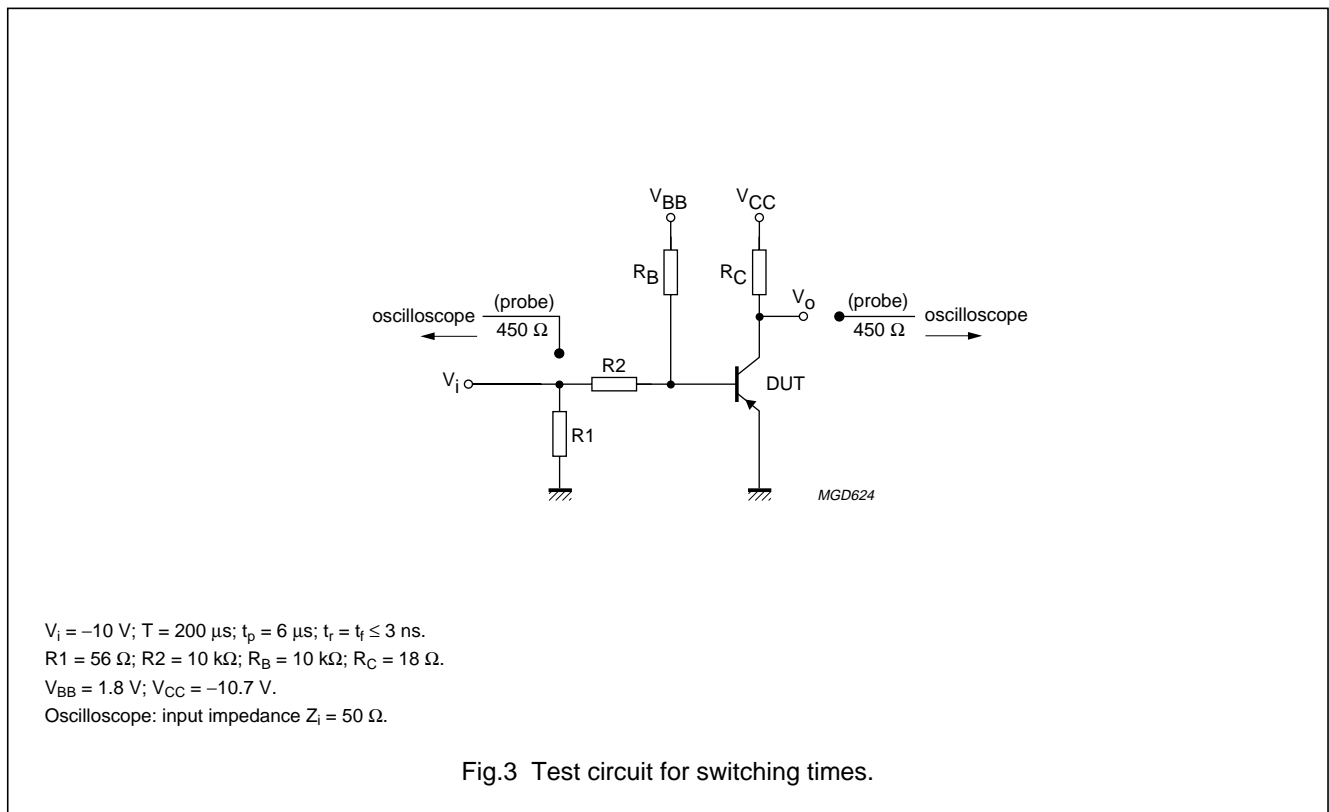
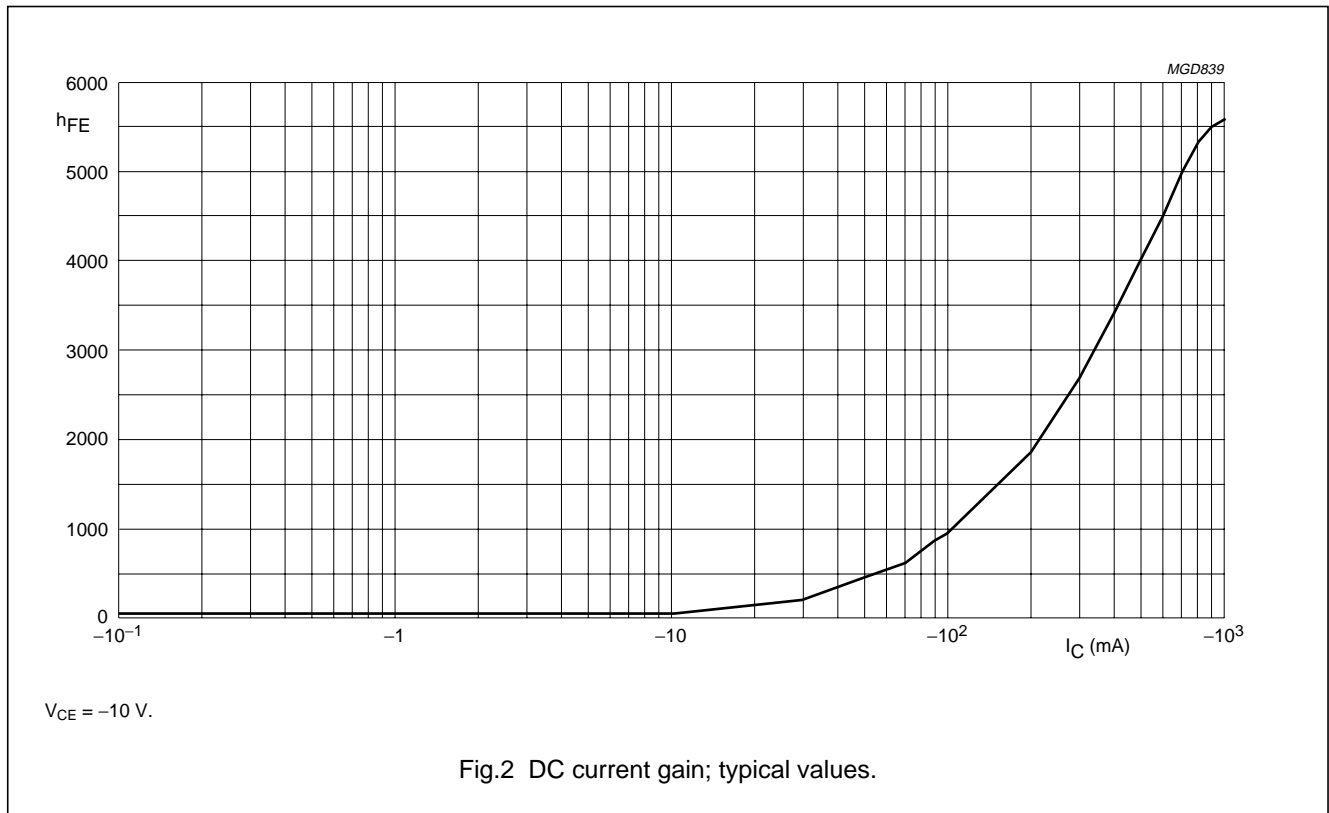
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CES}$	collector cut-off current					
	BSP60	$V_{BE} = 0; V_{CE} = -45\text{ V}$	–	–	–50	nA
	BSP61	$V_{BE} = 0; V_{CE} = -60\text{ V}$	–	–	–50	nA
	BSP62	$V_{BE} = 0; V_{CE} = -80\text{ V}$	–	–	–50	nA
$I_{EBO}$	emitter cut-off current	$I_C = 0; V_{EB} = -4\text{ V}$	–	–	–50	nA
$h_{FE}$	DC current gain	$V_{CE} = -10\text{ V}$ ; note 1; see Fig.2				
		$I_C = -150\text{ mA}$	1000	–	–	
		$I_C = -500\text{ mA}$	2000	–	–	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = -500\text{ mA}; I_B = -0.5\text{ mA}$	–	–	–1.3	V
		$I_C = -500\text{ mA}; I_B = -0.5\text{ mA}; T_j = 150\text{ °C}$	–	–	–1.3	V
$V_{BEsat}$	base-emitter saturation voltage	$I_C = -500\text{ mA}; I_B = -0.5\text{ mA}$	–	–	–1.9	V
$f_T$	transition frequency	$I_C = -500\text{ mA}; V_{CE} = -5\text{ V}; f = 100\text{ MHz}$	–	200	–	MHz
<b>Switching times (between 10% and 90% levels); see Fig.3</b>						
$t_{on}$	turn-on time	$I_{Con} = -500\text{ mA}; I_{Bon} = -0.5\text{ mA}; I_{Boff} = 0.5\text{ mA}$	–	400	–	ns
$t_{off}$	turn-off time		–	1500	–	ns

## Note

- Pulse test:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$ .

PNP Darlington transistors

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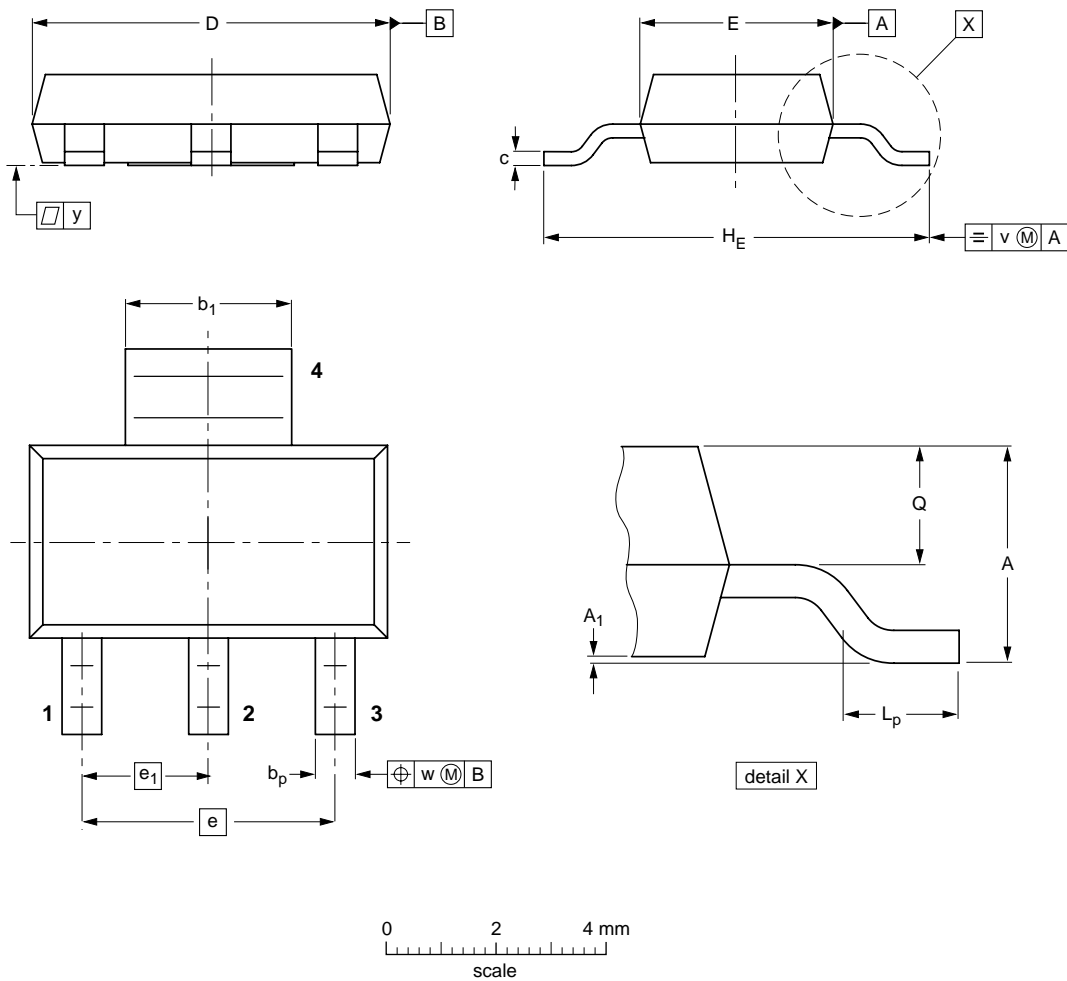
PNP Darlington transistors

BSP60; BSP61; BSP62

PACKAGE OUTLINE

Plastic surface mounted package; collector pad for good heat transfer; 4 leads

SOT223



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub>	b <sub>p</sub>	b <sub>1</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	Q	v	w	y
mm	1.8 1.5	0.10 0.01	0.80 0.60	3.1 2.9	0.32 0.22	6.7 6.3	3.7 3.3	4.6	2.3	7.3 6.7	1.1 0.7	0.95 0.85	0.2	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT223						96-11-11 97-02-28

## PNP Darlington transistors

## BSP60; BSP61; BSP62

**DEFINITIONS**

<b>Data Sheet Status</b>	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
<b>Limiting values</b>	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). 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.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	

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PNP Darlington transistors

BSP60; BSP61; BSP62

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