

# DATA SHEET



## **BSR52** NPN Darlington transistor

Product data sheet  
Supersedes data of 1999 Apr 26

2004 Nov 11

# NPN Darlington transistor

# BSR52

### FEATURES

- High current (max. 1 A)
- Low voltage (max. 80 V)
- Integrated diode and resistor.

### APPLICATIONS

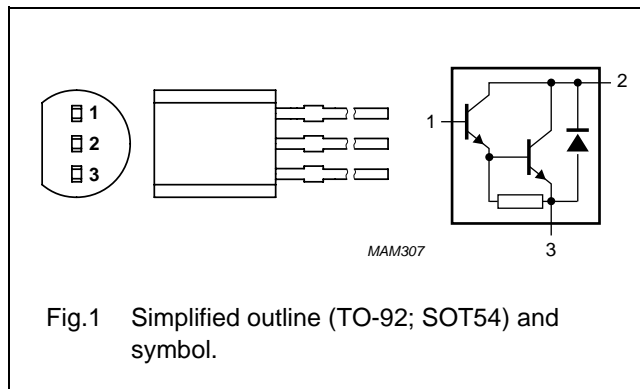
- Industrial high gain amplification.

### DESCRIPTION

NPN Darlington transistor in a TO-92; SOT54 plastic package. PNP complement: BSR62.

### PINNING

PIN	DESCRIPTION
1	base
2	collector
3	emitter



### ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
BSR52	SC-43A	plastic single-ended leaded (through hole) package; 3 leads	SOT54

### LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	–	90	V
$V_{CES}$	collector-emitter voltage	$V_{BE} = 0\text{ V}$	–	80	V
$V_{EBO}$	emitter-base voltage	open collector	–	5	V
$I_C$	collector current (DC)		–	1	A
$I_{CM}$	peak collector current		–	2	A
$I_B$	base current (DC)		–	100	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$ ; note 1	–	830	mW
$T_{stg}$	storage temperature		–65	+150	°C
$T_j$	junction temperature		–	150	°C
$T_{amb}$	ambient temperature		–65	+150	°C

### Note

1. Transistor mounted on an FR4 printed-circuit board.

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## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th(j-a)}$	thermal resistance from junction to ambient	note 1	150	K/W

## Note

1. Transistor mounted on an FR4 printed-circuit board.

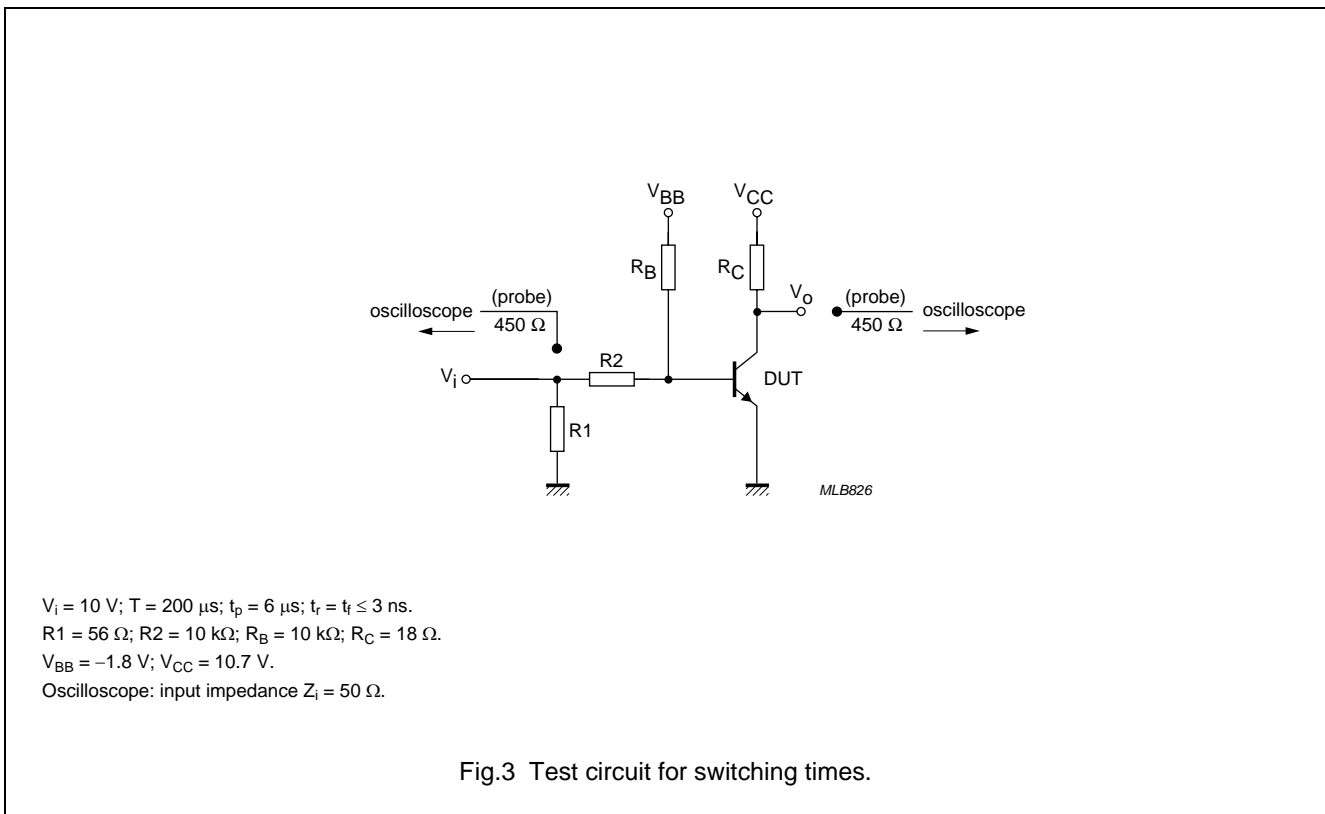
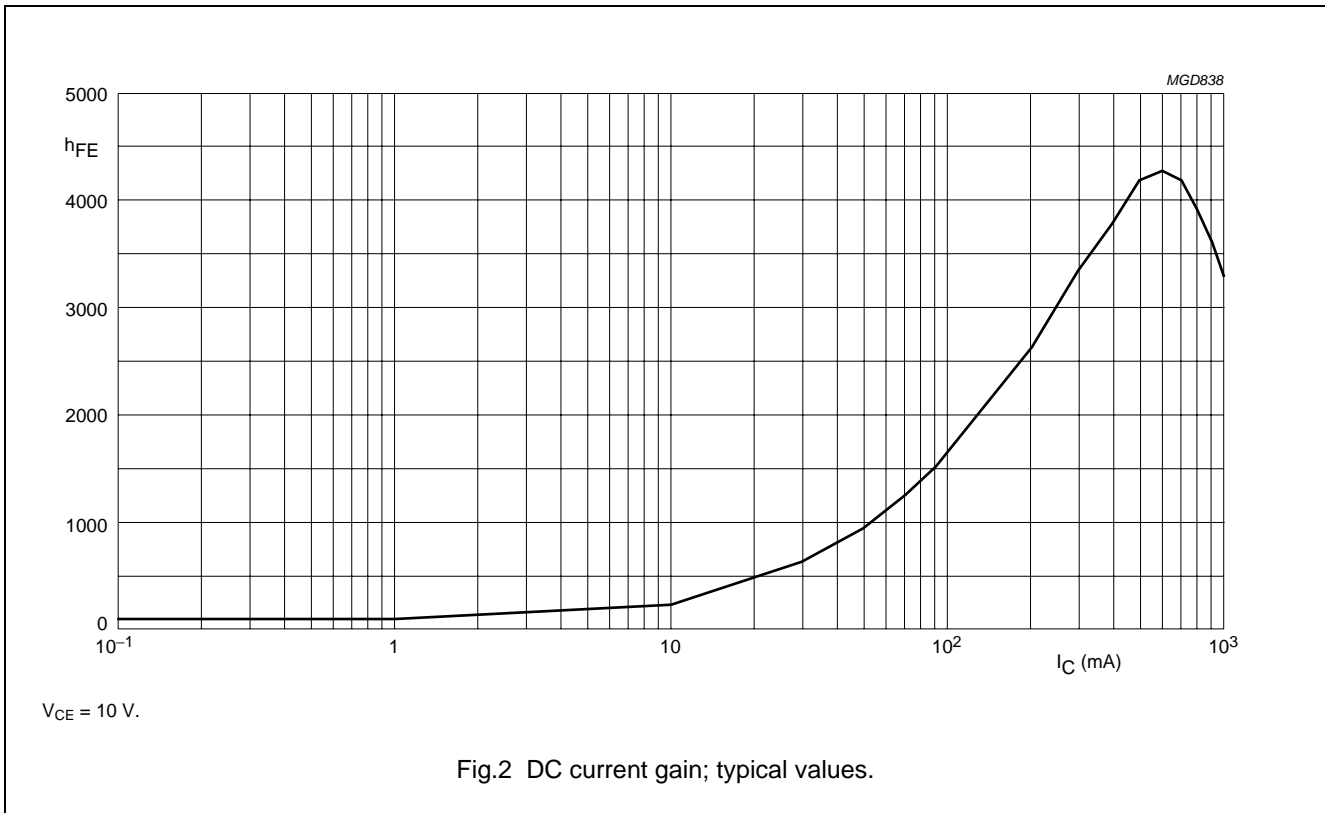
## CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CES}$	collector-base cut-off current	$V_{BE} = 0\text{ V}; V_{CE} = 80\text{ V}$	–	–	50	nA
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 4\text{ V}; I_C = 0\text{ A}$	–	–	50	nA
$h_{FE}$	DC current gain	$V_{CE} = 10\text{ V}$ ; see Fig.2 $I_C = 150\text{ mA}$ $I_C = 500\text{ mA}$	1000 2000	– –	– –	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 0.5\text{ A}; I_B = 0.5\text{ mA}$	–	–	1.3	V
		$I_C = 1\text{ A}; I_B = 4\text{ mA}$	–	–	1.6	V
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 0.5\text{ A}; I_B = 0.5\text{ mA}$	–	–	1.9	V
		$I_C = 1\text{ A}; I_B = 4\text{ mA}$	–	–	2.2	V
$f_T$	transition frequency	$V_{CE} = 5\text{ V}; I_C = 500\text{ mA};$ $f = 100\text{ MHz}$	–	200	–	MHz
<b>Switching times (between 10% and 90% levels); see Fig.3</b>						
$t_{on}$	turn-on time	$I_{Con} = 500\text{ mA}; I_{Bon} = 0.5\text{ mA};$	–	–	500	ns
$t_{off}$	turn-off time	$I_{Boff} = -0.5\text{ mA}$	–	–	1300	ns

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## PACKAGE OUTLINE

Plastic single-ended leaded (through hole) package; 3 leads

SOT54

0      2.5      5 mm  
scale

**DIMENSIONS (mm are the original dimensions)**

UNIT	A	b	b <sub>1</sub>	c	D	d	E	e	e <sub>1</sub>	L	L <sub>1</sub> <sup>(1)</sup> max.
mm	5.2 5.0	0.48 0.40	0.66 0.55	0.45 0.38	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5

**Note**  
1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT54		TO-92	SC-43A		04-06-28 04-11-16

## NPN Darlington transistor

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## 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

1. Please consult the most recently issued document before initiating or completing a design.
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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>

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