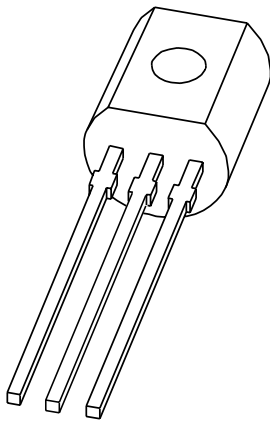


DATA SHEET



BSR52

NPN Darlington transistor

Product specification
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

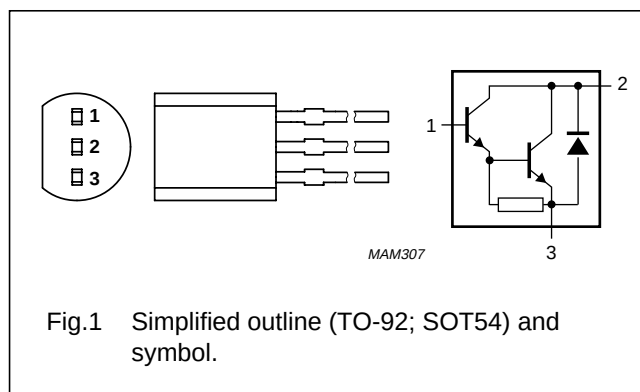
- Industrial high gain amplification.

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	$V_{BE} = 0$ 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	$T_{amb} \leq 25$ °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.

NPN Darlington transistor

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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
Switching times (between 10% and 90% levels); see Fig.3						
t_{on}	turn-on time	$I_{Con} = 500\text{ mA}$; $I_{Bon} = 0.5\text{ mA}$; $I_{Boff} = -0.5\text{ mA}$	–	–	500	ns
t_{off}	turn-off time		–	–	1300	ns

NPN Darlington transistor

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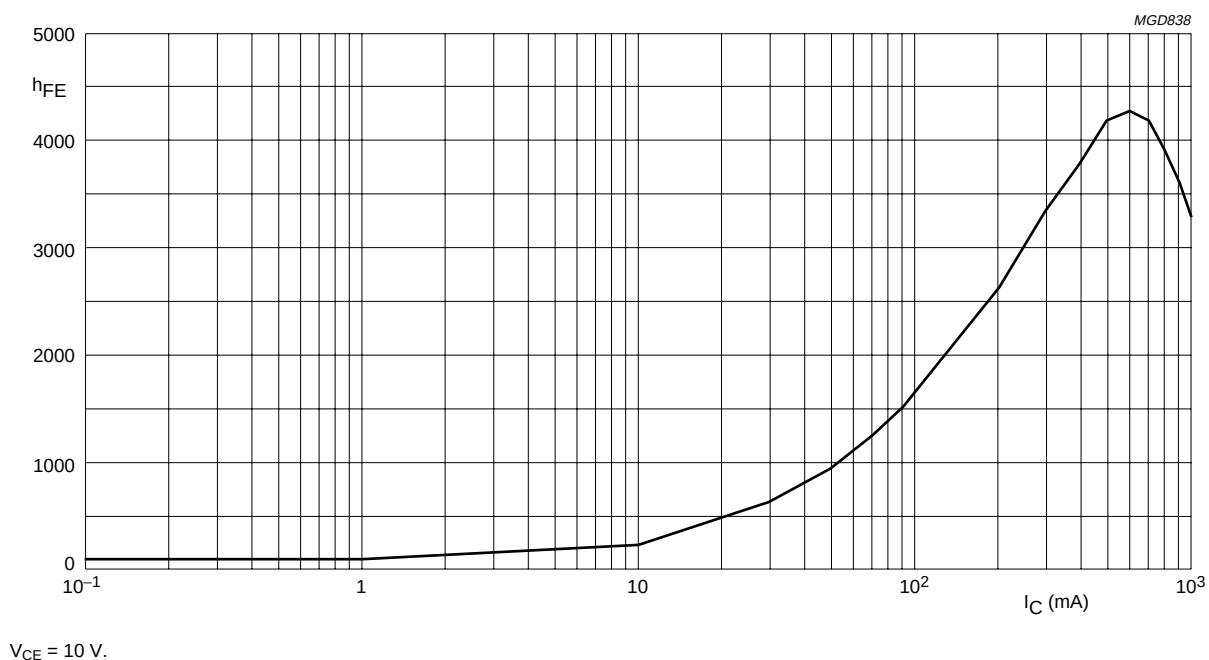
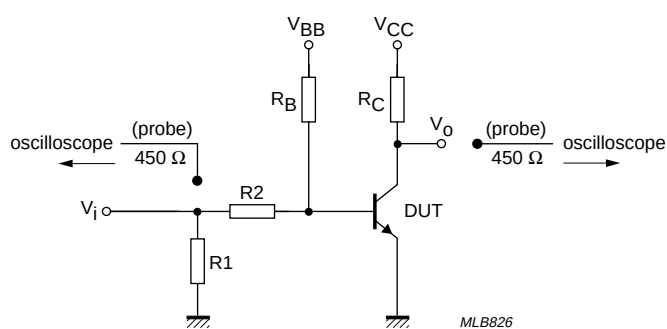


Fig.2 DC current gain; typical values.



$V_i = 10$ V; $T = 200$ μ s; $t_p = 6$ μ s; $t_r = t_f \leq 3$ ns.
 $R_1 = 56$ Ω ; $R_2 = 10$ k Ω ; $R_B = 10$ k Ω ; $R_C = 18$ Ω .
 $V_{BB} = -1.8$ V; $V_{CC} = 10.7$ V.
 Oscilloscope: input impedance $Z_i = 50$ Ω .

Fig.3 Test circuit for switching times.

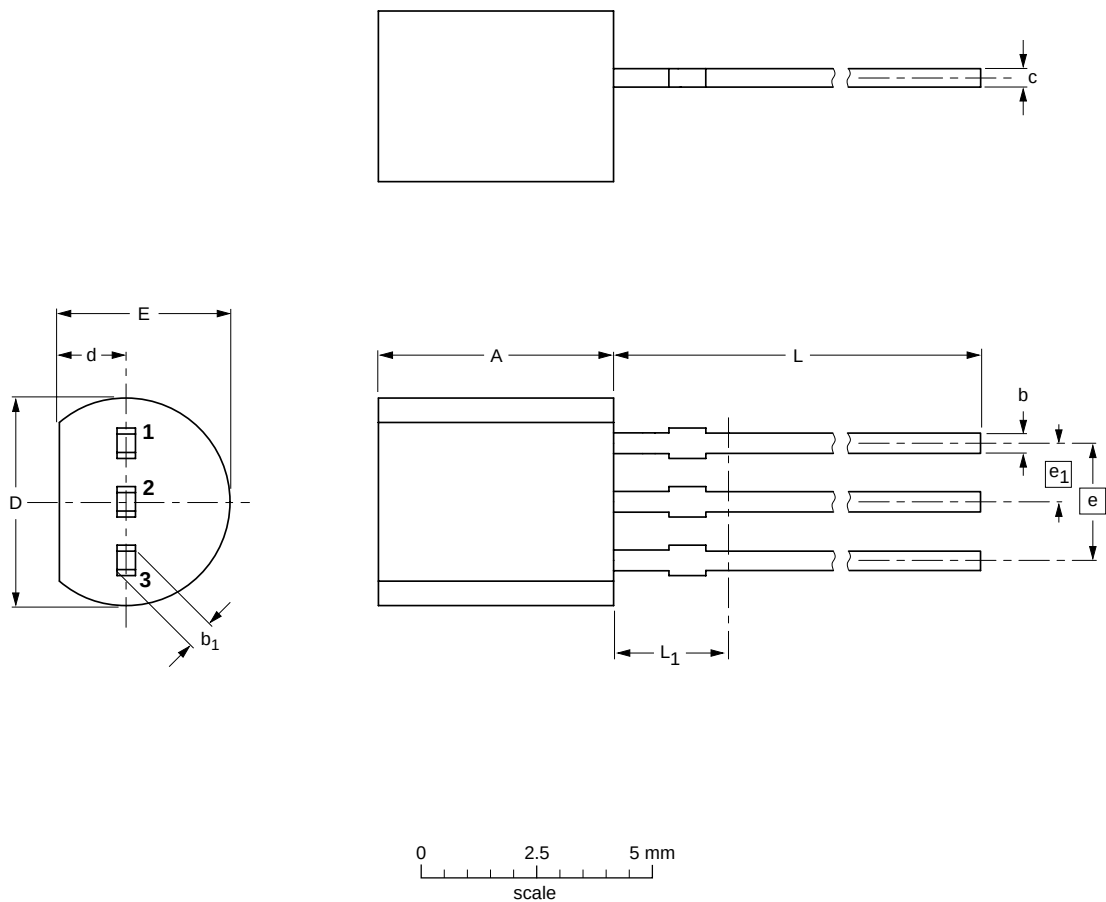
NPN Darlington transistor

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PACKAGE OUTLINE

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

SOT54



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b ₁	c	D	d	E	e	e ₁	L	L ₁ ⁽¹⁾ 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			-97-02-28 04-06-28

NPN Darlington transistor

BSR52

DATA SHEET STATUS

LEVEL	DATA SHEET STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾⁽³⁾	DEFINITION
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