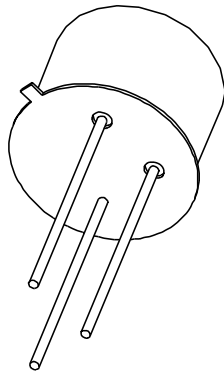


DATA SHEET



BSS50; BSS51; BSS52 NPN Darlington transistors

Product specification
Supersedes data of 1997 May 13
File under Discrete Semiconductors, SC04

1997 Sep 03

NPN Darlington transistors

BSS50; BSS51; BSS52

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-39 metal package.
 PNP complements: BSS61 and BSS62.

PINNING

PIN	DESCRIPTION
1	emitter
2	base
3	collector, connected to case

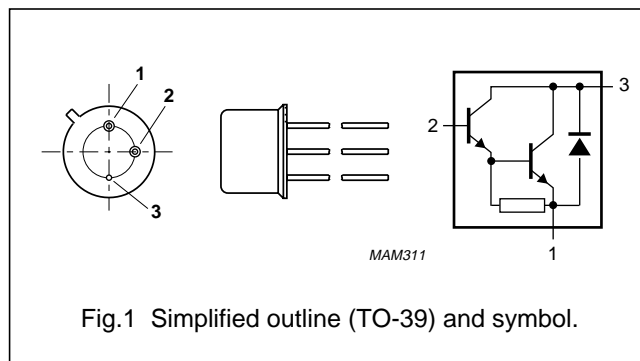


Fig.1 Simplified outline (TO-39) and symbol.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V _{CBO}	collector-base voltage	open emitter				
	BSS50		–	–	60	V
	BSS51		–	–	80	V
	BSS52		–	–	90	V
V _{CES}	collector-emitter voltage	V _{BE} = 0				
	BSS50		–	–	45	V
	BSS51		–	–	60	V
	BSS52		–	–	80	V
I _C	collector current		–	–	1	A
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	–	–	0.8	W
		T _{case} ≤ 25 °C	–	–	5	W
h _{FE}	DC current gain	I _C = 500 mA; V _{CE} = 10 V	2000	–	–	
f _T	transition frequency	I _C = 500 mA; V _{CE} = 5 V; f = 100 MHz	–	200	–	MHz

NPN Darlington transistors

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LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V _{CBO}	collector-base voltage	open emitter			
	BSS50		–	60	V
	BSS51		–	80	V
	BSS52		–	90	V
V _{CES}	collector-emitter voltage	V _{BE} = 0			
	BSS50		–	45	V
	BSS51		–	60	V
	BSS52		–	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} ≤ 25 °C	–	0.8	W
		T _{case} ≤ 25 °C	–	5	W
T _{stg}	storage temperature		–65	+150	°C
T _j	junction temperature		–	200	°C
T _{amb}	operating ambient temperature		–65	+150	°C

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R _{th j-a}	thermal resistance from junction to ambient	in free air	220	K/W
R _{th j-c}	thermal resistance from junction to case		35	K/W

NPN Darlington transistors

BSS50; BSS51; BSS52

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CES}	collector cut-off current BSS50 BSS51 BSS52	$V_{BE} = 0; V_{CE} = 45\text{ V}$	–	–	50	nA
		$V_{BE} = 0; V_{CE} = 60\text{ V}$	–	–	50	nA
		$V_{BE} = 0; V_{CE} = 80\text{ V}$	–	–	50	nA
I_{EBO}	emitter cut-off current	$I_C = 0; V_{EB} = 4\text{ V}$	–	–	50	nA
h_{FE}	DC current gain	$V_{CE} = 10\text{ V}$				
		$I_C = 150\text{ mA}$	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
		$I_C = 500\text{ mA}; I_B = 0.5\text{ mA}; T_j = 200\text{ }^\circ\text{C}$	–	–	1.3	V
V_{CEsat}	collector-emitter saturation voltage BSS51	$I_C = 1\text{ A}; I_B = 1\text{ mA}$	–	–	1.6	V
		$I_C = 1\text{ A}; I_B = 1\text{ mA}; T_j = 200\text{ }^\circ\text{C}$	–	–	2.3	V
V_{CEsat}	collector-emitter saturation voltage BSS50; BSS52	$I_C = 1\text{ A}; I_B = 4\text{ mA}$	–	–	1.6	V
		$I_C = 1\text{ A}; I_B = 4\text{ mA}; T_j = 200\text{ }^\circ\text{C}$	–	–	1.6	V
V_{BEsat}	base-emitter saturation voltage	$I_C = 500\text{ mA}; I_B = 0.5\text{ mA}$	–	–	1.9	V
V_{BEsat}	base-emitter saturation voltage BSS51 BSS50; BSS52	$I_C = 1\text{ A}; I_B = 1\text{ mA}$	–	–	2.2	V
		$I_C = 1\text{ A}; I_B = 4\text{ mA}$	–	–	2.2	V
V_{BEon}	base-emitter on-state voltage	$I_C = 150\text{ mA}; V_{CE} = 10\text{ V}$	1.3	–	1.65	V
		$I_C = 500\text{ mA}; V_{CE} = 10\text{ V}$	1.4	–	1.75	V
f_T	transition frequency	$I_C = 500\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$	–	200	–	MHz
Switching times (between 10% and 90% levels)						
t_{on}	turn-on time	$I_{Con} = 500\text{ mA}; I_{Bon} = 0.5\text{ mA}; I_{Boff} = -0.5\text{ mA}$	–	0.5	–	μs
		$I_{Con} = 1\text{ A}; I_{Bon} = 1\text{ mA}; I_{Boff} = -1\text{ mA}$	–	0.4	–	μs
t_{off}	turn-off time	$I_{Con} = 500\text{ mA}; I_{Bon} = 0.5\text{ mA}; I_{Boff} = -0.5\text{ mA}$	–	1.3	–	μs
		$I_{Con} = 1\text{ A}; I_{Bon} = 1\text{ mA}; I_{Boff} = -1\text{ mA}$	–	1.5	–	μs

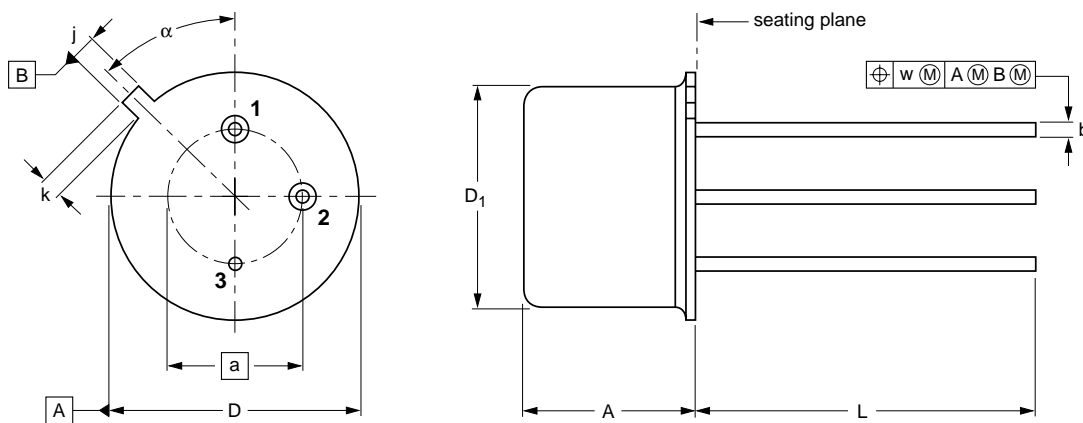
NPN Darlington transistors

BSS50; BSS51; BSS52

PACKAGE OUTLINE

Metal-can cylindrical single-ended package; 3 leads

SOT5/11



DIMENSIONS (mm are the original dimensions)

UNIT	A	a	b	D	D ₁	j	k	L	w	α
mm	6.60 6.35	5.08	0.48 0.41	9.39 9.08	8.33 8.18	0.85 0.75	0.95 0.75	14.2 12.7	0.2	45°

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT5/11		TO-39				97-04-11

NPN Darlington transistors

BSS50; BSS51; BSS52

DEFINITIONS

Data Sheet Status	
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.
Limiting values	
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.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.

NPN Darlington transistors

BSS50; BSS51; BSS52

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