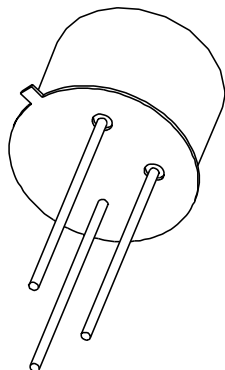


DATA SHEET



BSS50; BSS51; BSS52 NPN Darlington transistors

Product specification
Supersedes data of September 1994
File under Discrete Semiconductors, SC04

1997 May 13

NPN Darlington transistors

BSS50; BSS51; BSS52

FEATURES

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

APPLICATIONS

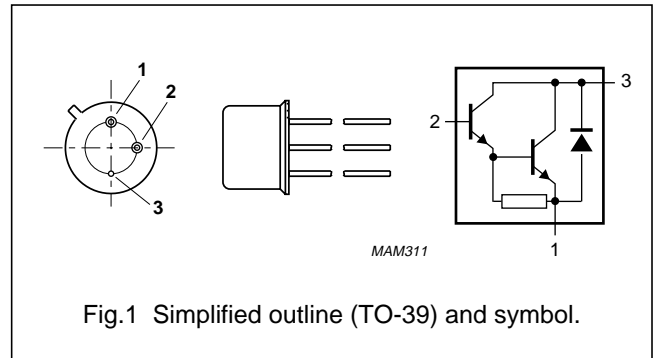
- Industrial high gain amplification.

DESCRIPTION

NPN Darlington transistor in a TO-39 metal package.
 PNP complements: BSS60, BSS61 and BSS62.

PINNING

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



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	$T_{amb} \leq 25\text{ °C}$	–	–	0.8	W
		$T_{case} \leq 25\text{ °C}$	–	–	5	W
h_{FE}	DC current gain	$I_C = 500\text{ mA}; V_{CE} = 10\text{ V}$	2000	–	–	
f_T	transition frequency	$I_C = 500\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$	–	200	–	MHz

NPN Darlington transistors

BSS50; BSS51; BSS52

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	$T_{amb} \leq 25\text{ °C}$	–	0.8	W
		$T_{case} \leq 25\text{ °C}$	–	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

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CES}	collector cut-off current					
	BSS50	$V_{BE} = 0; V_{CE} = 45\text{ V}$	–	–	50	nA
	BSS51	$V_{BE} = 0; V_{CE} = 60\text{ V}$	–	–	50	nA
	BSS52	$V_{BE} = 0; V_{CE} = 80\text{ V}$	–	–	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
		$I_C = 500\text{ mA}; I_B = 0.5\text{ mA}; T_j = 200\text{ °C}$	–	–	1.3	V
V_{CEsat}	collector-emitter saturation voltage	BSS51				
		$I_C = 1\text{ A}; I_B = 1\text{ mA}$	–	–	1.6	V
		$I_C = 1\text{ A}; I_B = 1\text{ mA}; T_j = 200\text{ °C}$	–	–	2.3	V
V_{CEsat}	collector-emitter saturation voltage	BSS50; BSS52				
		$I_C = 1\text{ A}; I_B = 4\text{ mA}$	–	–	1.6	V
		$I_C = 1\text{ A}; I_B = 4\text{ mA}; T_j = 200\text{ °C}$	–	–	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				
		$I_C = 1\text{ A}; I_B = 1\text{ mA}$	–	–	2.2	V
		BSS50; BSS52				
		$I_C = 1\text{ A}; I_B = 4\text{ mA}$	–	–	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

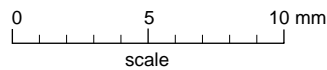
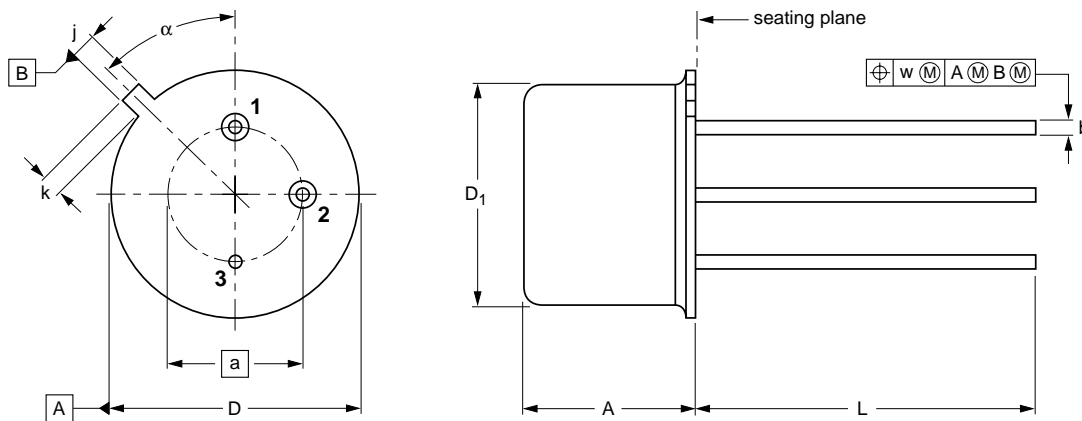
NPN Darlington transistors

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

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NPN Darlington transistors

BSS50; BSS51; BSS52

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