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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

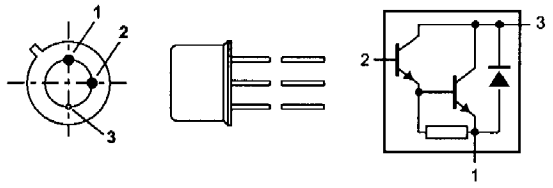


Fig.1 Simplified outline (TO-39) and symbol.

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

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	$T_{amb} \leq 25$ °C	–	0.8	W
		$T_{case} \leq 25$ °C	–	5	W
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	200	°C
T_{amb}	operating ambient temperature		–65	+150	°C

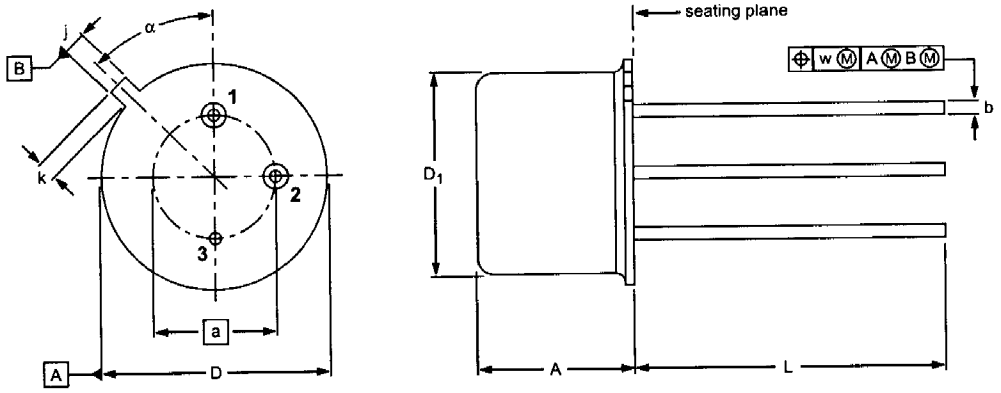
THERMAL CHARACTERISTICS

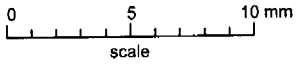
SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	in free air	220	K/W
$R_{th\ j\text{-}c}$	thermal resistance from junction to case		35	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CES}	collector cut-off current					
	BSS50	V_{BE} = 0; V_{CE} = 45 V	–	–	50	nA
	BSS51	V_{BE} = 0; V_{CE} = 60 V	–	–	50	nA
	BSS52	V_{BE} = 0; V_{CE} = 80 V	–	–	50	nA
I_{EBO}	emitter cut-off current	I_C = 0; V_{EB} = 4 V	–	–	50	nA
h_{FE}	DC current gain	V_{CE} = 10 V				
		I_C = 150 mA	1000	–	–	
		I_C = 500 mA	2000	–	–	
V_{CEsat}	collector-emitter saturation voltage	I_C = 500 mA; I_B = 0.5 mA	–	–	1.3	V
		I_C = 500 mA; I_B = 0.5 mA; T_j = 200 °C	–	–	1.3	V
V_{CEsat}	collector-emitter saturation voltage					
	BSS51	I_C = 1 A; I_B = 1 mA	–	–	1.6	V
		I_C = 1 A; I_B = 1 mA; T_j = 200 °C	–	–	2.3	V
V_{CEsat}	collector-emitter saturation voltage					
	BSS50; BSS52	I_C = 1 A; I_B = 4 mA	–	–	1.6	V
		I_C = 1 A; I_B = 4 mA; T_j = 200 °C	–	–	1.6	V
V_{BEsat}	base-emitter saturation voltage	I_C = 500 mA; I_B = 0.5 mA	–	–	1.9	V
V_{BEsat}	base-emitter saturation voltage					
	BSS51	I_C = 1 A; I_B = 1 mA	–	–	2.2	V
	BSS50; BSS52	I_C = 1 A; I_B = 4 mA	–	–	2.2	V
V_{BEon}	base-emitter on-state voltage	I_C = 150 mA; V_{CE} = 10 V	1.3	–	1.65	V
		I_C = 500 mA; V_{CE} = 10 V	1.4	–	1.75	V
f_T	transition frequency	I_C = 500 mA; V_{CE} = 5 V; f = 100 MHz	–	200	–	MHz
Switching times (between 10% and 90% levels)						
t_{on}	turn-on time	I_{Con} = 500 mA; I_{Bon} = 0.5 mA; I_{Boff} = −0.5 mA	–	0.5	–	µs
		I_{Con} = 1 A; I_{Bon} = 1 mA; I_{Boff} = −1 mA	–	0.4	–	µs
t_{off}	turn-off time	I_{Con} = 500 mA; I_{Bon} = 0.5 mA; I_{Boff} = −0.5 mA	–	1.3	–	µs
		I_{Con} = 1 A; I_{Bon} = 1 mA; I_{Boff} = −1 mA	–	1.5	–	µs





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			
	IEC	JEDEC	EIAJ	
SOT5/11		TO-39		