

PNP Darlington transistors

BSP60; BSP61; BSP62

FEATURES

- High current (max. 0.5 A)
- Low voltage (max. 80 V)
- Integrated diode and resistor.

APPLICATIONS

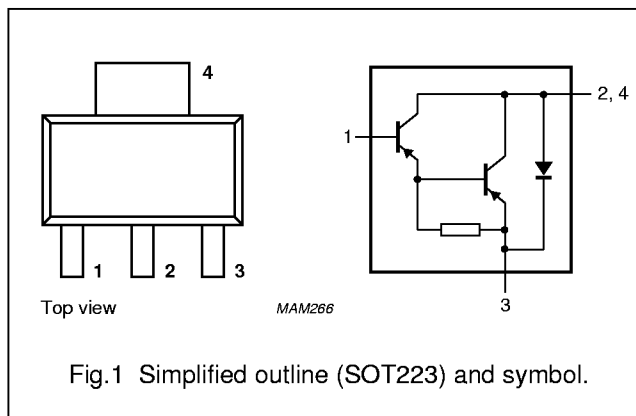
- Industrial switching applications such as:
 - Print hammer
 - Solenoid
 - Relay and lamp drivers.

DESCRIPTION

PNP Darlington transistor in a SOT223 plastic package.
NPN complements: BSP50, BSP51 and BSP52.

PINNING

PIN	DESCRIPTION
1	base
2,4	collector
3	emitter



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			
	BSP60		—	–60	V
	BSP61		—	–80	V
	BSP62		—	–90	V
V_{CES}	collector-emitter voltage	$V_{BE} = 0$			
	BSP60		—	–45	V
	BSP61		—	–60	V
	BSP62		—	–80	V
V_{EBO}	emitter-base voltage	open collector	—	–5	V
I_C	collector current (DC)		—	–0.5	A
I_{CM}	peak collector current		—	–1.5	A
I_B	base current (DC)		—	–100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$; note 1	—	1.25	W
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		—	150	°C
T_{amb}	operating ambient temperature		–65	+150	°C

Note

1. Device mounted on a printed-circuit board, single sided copper, tinplated, mounting pad for collector 1 cm².
For other mounting conditions, see “Thermal considerations for the SOT223 in the General Part of associated Handbook”.

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THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	note 1	98	K/W
$R_{th\ j-s}$	thermal resistance from junction to solder point		17	K/W

Note

1. Device mounted on a printed-circuit board, single sided copper, tinplated, mounting pad for collector 1 cm².
For other mounting conditions, see "Thermal considerations for the SOT223 in the General Part of associated Handbook".

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CES}	collector cut-off current					
	BSP60	$V_{BE} = 0; V_{CE} = -45\text{ V}$	—	—	—50	nA
	BSP61	$V_{BE} = 0; V_{CE} = -60\text{ V}$	—	—	—50	nA
	BSP62	$V_{BE} = 0; V_{CE} = -80\text{ V}$	—	—	—50	nA
I_{EBO}	emitter cut-off current	$I_C = 0; V_{EB} = -4\text{ V}$	—	—	—50	nA
h_{FE}	DC current gain	$V_{CE} = -10\text{ V}$; note 1; see Fig.2				
		$I_C = -150\text{ mA}$	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
		$I_C = -500\text{ mA}; I_B = -0.5\text{ mA}; T_j = 150\text{ }^{\circ}\text{C}$	—	—	—1.3	V
V_{BEsat}	base-emitter saturation voltage	$I_C = -500\text{ mA}; I_B = -0.5\text{ mA}$	—	—	—1.9	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); see Fig.3						
t_{on}	turn-on time	$I_{Con} = -500\text{ mA}; I_{Bon} = -0.5\text{ mA};$	—	400	—	ns
t_{off}	turn-off time	$I_{Boff} = 0.5\text{ mA}$	—	1500	—	ns

Note

1. Pulse test: $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$.

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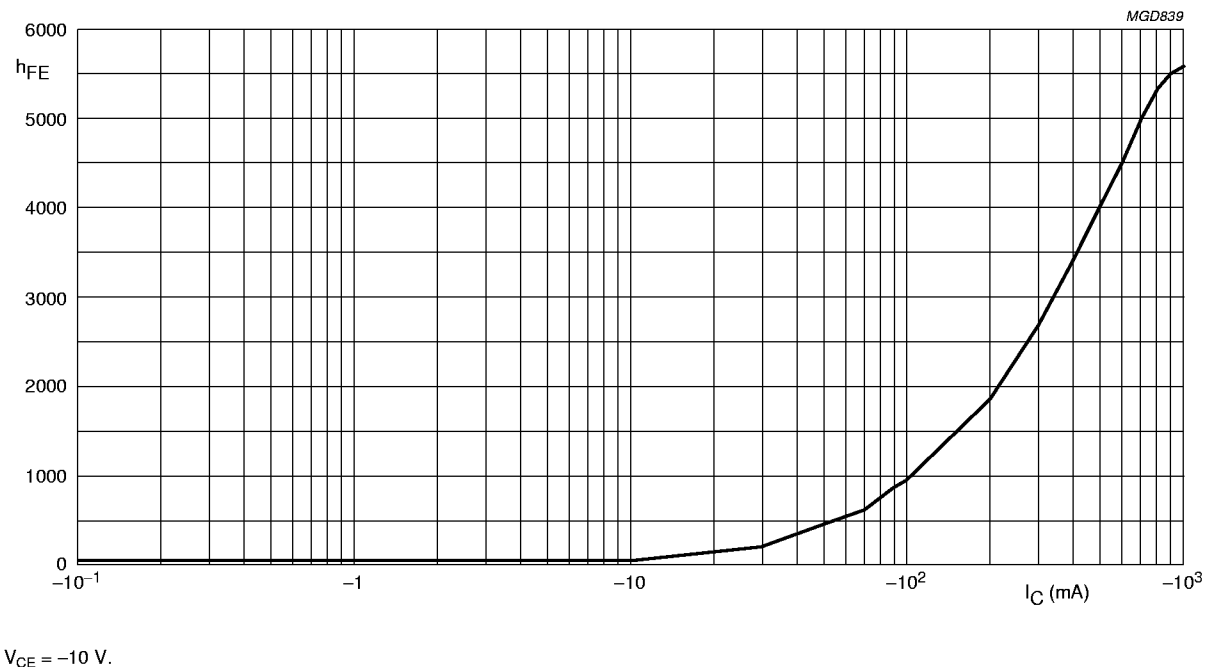
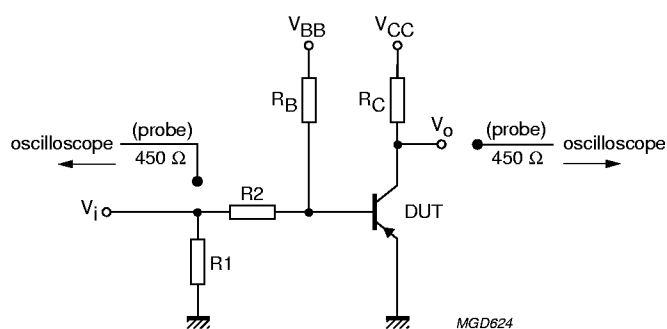


Fig.2 DC current gain; typical values.



$V_i = -10$ 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.

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PACKAGE OUTLINE

Plastic surface mounted package; collector pad for good heat transfer; 4 leads

SOT223

