

NPN switching transistor

PZT3904

FEATURES

- Low current (max. 200 mA)
- Low voltage (max. 40 V).

APPLICATIONS

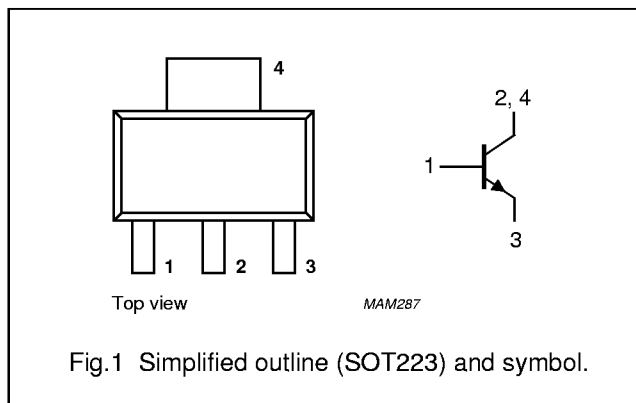
- High-speed saturated switching.

DESCRIPTION

NPN switching transistor in a SOT223 plastic package.
PNP complement: PZT3906.

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	—	60	V
V_{CEO}	collector-emitter voltage	open base	—	40	V
V_{EBO}	emitter-base voltage	open collector	—	6	V
I_C	collector current (DC)		—	200	mA
I_{CM}	peak collector current		—	300	mA
I_{BM}	peak base current		—	100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$; note 1	—	1.05	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 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	117	K/W
$R_{th\ j-s}$	thermal resistance from junction to soldering point		36	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 SOT223 in the General Part of associated Handbook".

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{CBO}	collector cut-off current	$I_E = 0$; $V_{CB} = 30\text{ V}$	–	50	nA
I_{EBO}	emitter cut-off current	$I_C = 0$; $V_{EB} = 6\text{ V}$	–	50	nA
h_{FE}	DC current gain	$V_{CE} = 1\text{ V}$; (see Fig.2) $I_C = 0.1\text{ mA}$ $I_C = 1\text{ mA}$ $I_C = 10\text{ mA}$ $I_C = 50\text{ mA}$ $I_C = 100\text{ mA}$	60 80 100 60 30	– – 300 – –	
V_{CEsat}	saturation voltage	$I_C = 10\text{ mA}$; $I_B = 1\text{ mA}$	–	200	mV
		$I_C = 50\text{ mA}$; $I_B = 5\text{ mA}$	–	200	mV
V_{BEsat}	saturation voltage	$I_C = 10\text{ mA}$; $I_B = 1\text{ mA}$	–	850	mV
		$I_C = 50\text{ mA}$; $I_B = 5\text{ mA}$	–	950	mV
C_c	collector capacitance	$I_E = I_C = 0$; $V_{CB} = 5\text{ V}$; $f = 1\text{ MHz}$	–	4	pF
C_e	emitter capacitance	$I_C = I_E = 0$; $V_{EB} = 500\text{ mV}$; $f = 1\text{ MHz}$	–	8	pF
f_T	transition frequency	$I_C = 10\text{ mA}$; $V_{CE} = 20\text{ V}$; $f = 100\text{ MHz}$	300	–	MHz
F	noise figure	$I_C = 100\text{ }\mu\text{A}$; $V_{CE} = 5\text{ V}$; $R_S = 1\text{ k}\Omega$; $f = 10\text{ Hz to }15.7\text{ kHz}$	–	5	dB

Switching times (between 10% and 90% levels); (see Fig.3)

t_{on}	turn-on time	$I_{Con} = 10\text{ mA}$; $I_{Bon} = 1\text{ mA}$; $I_{Boff} = -1\text{ mA}$	–	65	ns
t_d	delay time		–	35	ns
t_r	rise time		–	35	ns
t_{off}	turn-off time		–	240	ns
t_s	storage time		–	200	ns
t_f	fall time		–	50	ns

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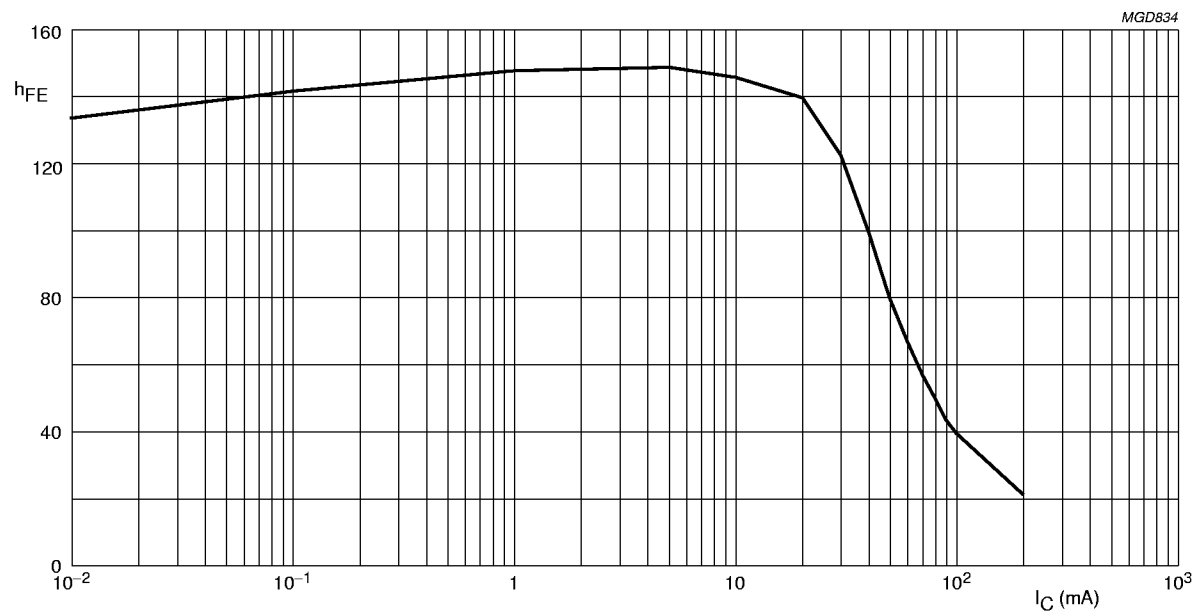
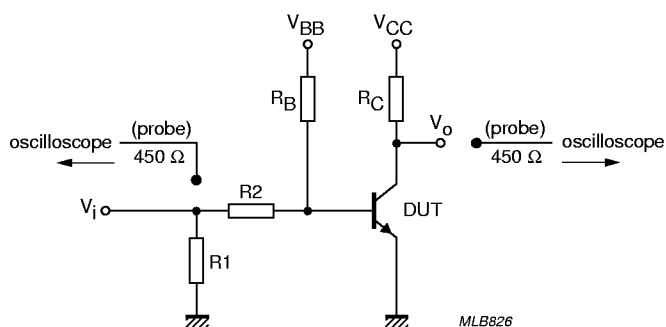
 $V_{CE} = 1 \text{ V.}$

Fig.2 DC current gain; typical values.



$V_i = 5 \text{ V; } T = 500 \text{ } \mu\text{s; } t_p = 10 \text{ } \mu\text{s; } t_r = t_f \leq 3 \text{ ns.}$
 $R_1 = 56 \text{ } \Omega; R_2 = 2.5 \text{ k}\Omega; R_B = 3.9 \text{ k}\Omega; R_C = 270 \text{ } \Omega.$
 $V_{BB} = -1.9 \text{ V; } V_{CC} = 3 \text{ V.}$
 Oscilloscope input impedance $Z_i = 50 \text{ } \Omega.$

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

