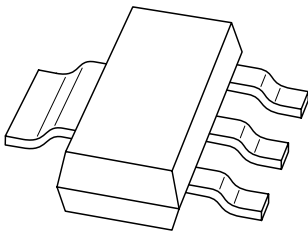


# DATA SHEET



## **PZT3904** NPN switching transistor

Product specification  
Supersedes data of 1997 Jul 04

1999 Apr 14

# NPN switching transistor

# PZT3904

### FEATURES

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

### APPLICATIONS

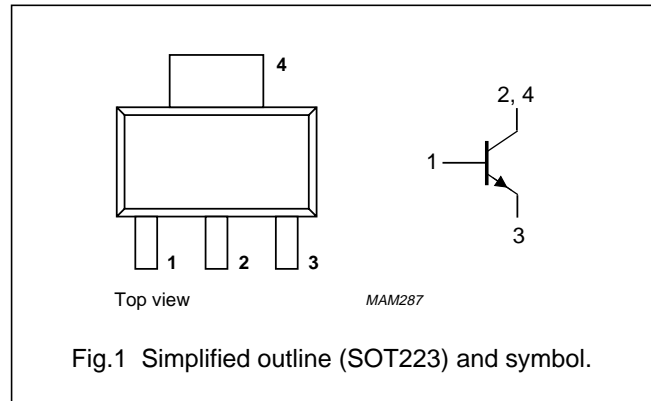
- High-speed saturated switching.

### 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	$T_{amb} \leq 25\text{ }^\circ\text{C}$ ; note 1	–	1.05	W
$T_{stg}$	storage temperature		–65	+150	$^\circ\text{C}$
$T_j$	junction temperature		–	150	$^\circ\text{C}$
$T_{amb}$	operating ambient temperature		–65	+150	$^\circ\text{C}$

### Note

1. Device mounted on a printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1 cm<sup>2</sup>. For other mounting conditions, see “*Thermal considerations for SOT223 in the General Part of associated Handbook*”.

## NPN switching transistor

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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 cm<sup>2</sup>. 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.

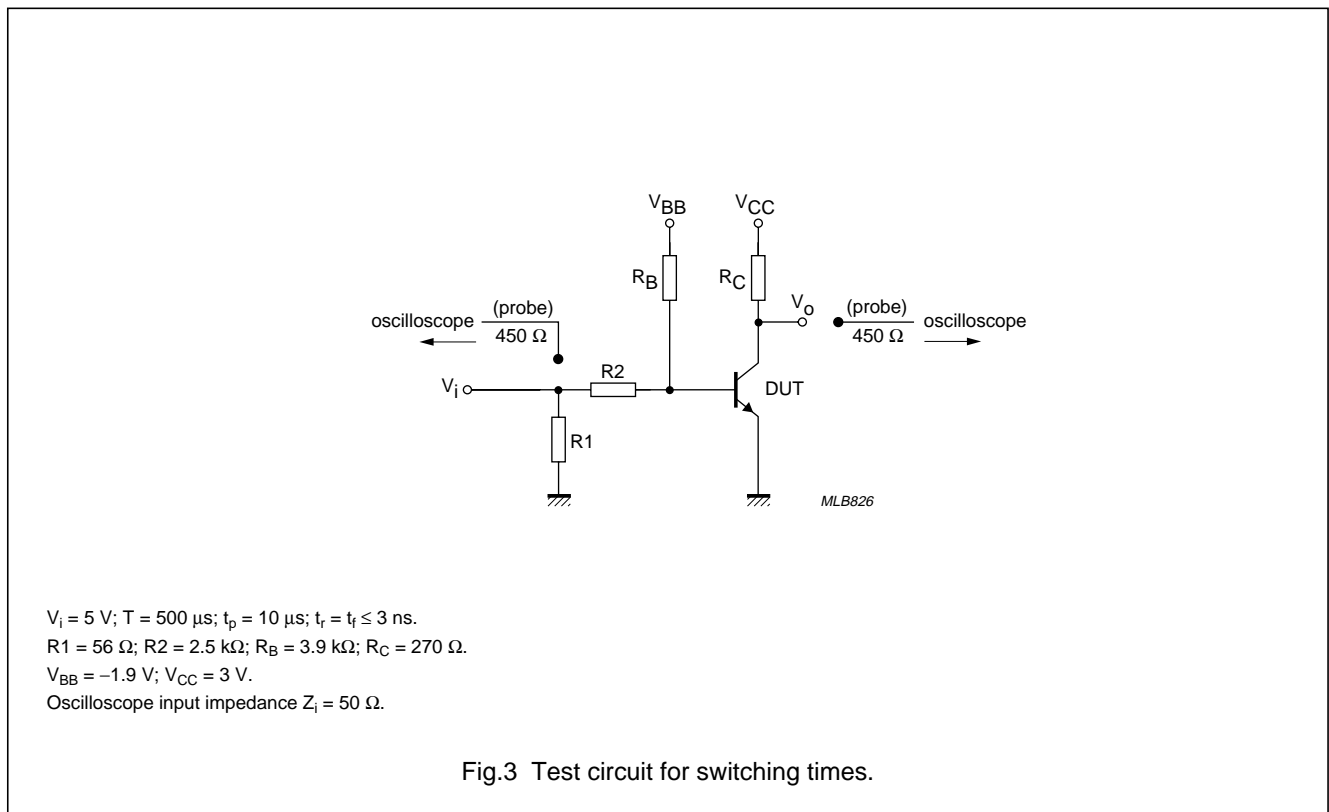
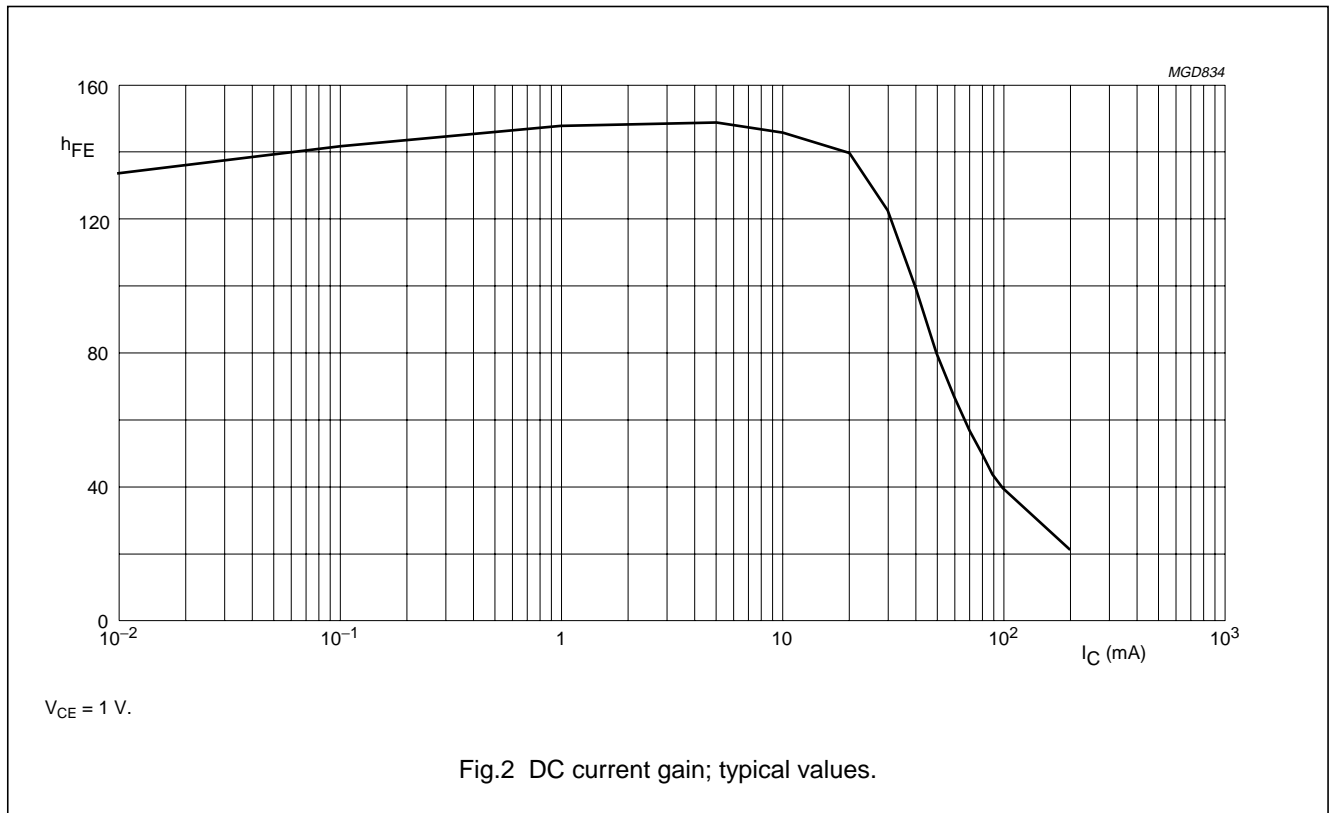
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{CBO}$	collector cut-off current	$I_E = 0; V_{CB} = 30\text{ V}$	–	50	nA
$I_{EBO}$	emitter cut-off current	$I_C = 0; V_{EB} = 6\text{ V}$	–	50	nA
$h_{FE}$	DC current gain	$V_{CE} = 1\text{ V}$ ; (see Fig.2) $I_C = 0.1\text{ mA}$ $I_C = 1\text{ mA}$ $I_C = 10\text{ mA}$ $I_C = 50\text{ mA}$ $I_C = 100\text{ mA}$	60 80 100 60 30	– – 300 – –	
$V_{CEsat}$	saturation voltage	$I_C = 10\text{ mA}; I_B = 1\text{ mA}$ $I_C = 50\text{ mA}; I_B = 5\text{ mA}$	– –	200 200	mV mV
$V_{BEsat}$	saturation voltage	$I_C = 10\text{ mA}; I_B = 1\text{ mA}$ $I_C = 50\text{ mA}; I_B = 5\text{ mA}$	– –	850 950	mV mV
$C_c$	collector capacitance	$I_E = i_e = 0; V_{CB} = 5\text{ V}; f = 1\text{ MHz}$	–	4	pF
$C_e$	emitter capacitance	$I_C = i_c = 0; V_{EB} = 500\text{ mV}; f = 1\text{ MHz}$	–	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

NPN switching transistor

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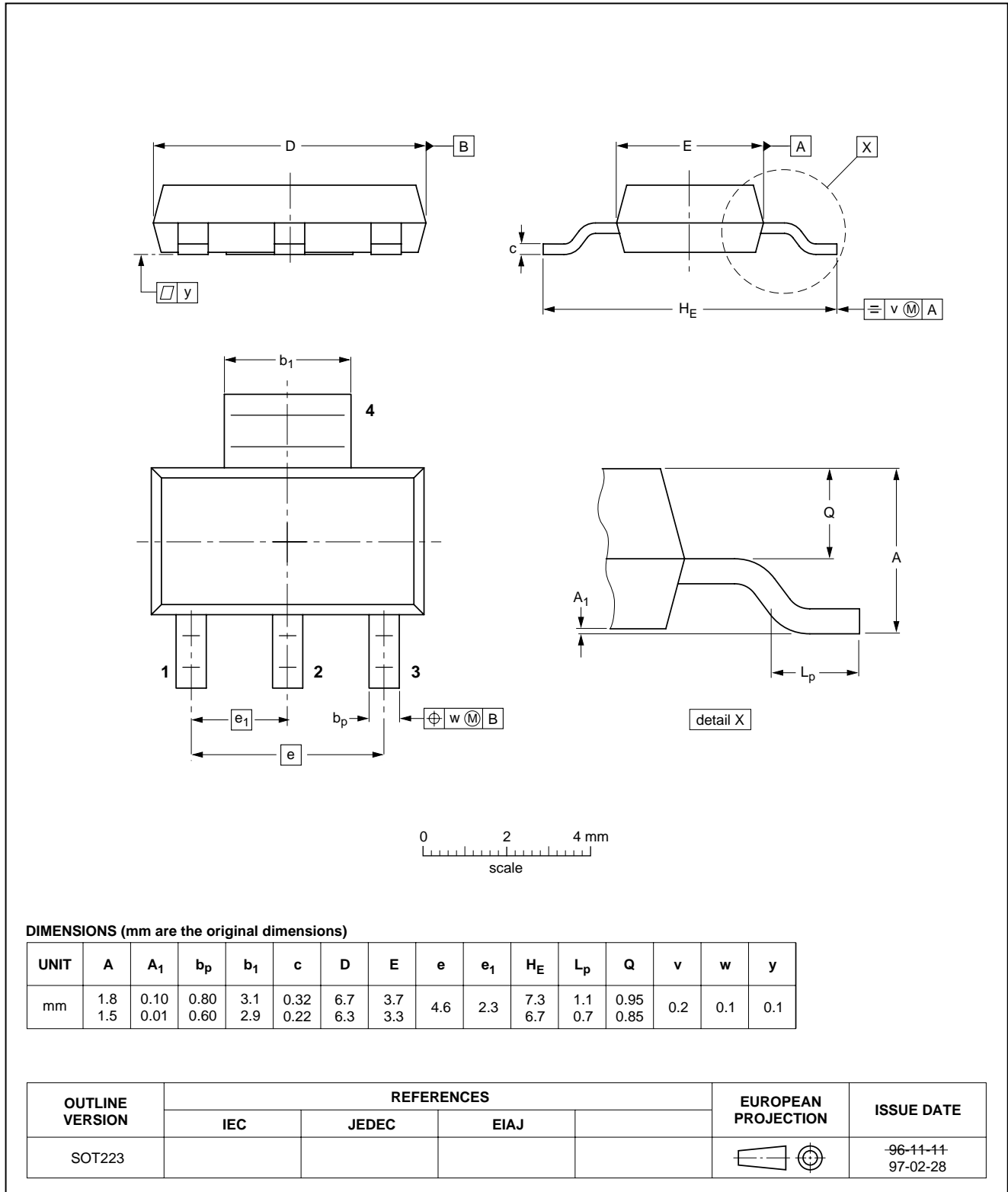
NPN switching transistor

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PACKAGE OUTLINE

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

SOT223



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**NPN switching transistor****PZT3904**

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**DEFINITIONS**

<b>Data sheet status</b>	
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.
<b>Limiting values</b>	
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.	
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NPN switching transistor

PZT3904

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