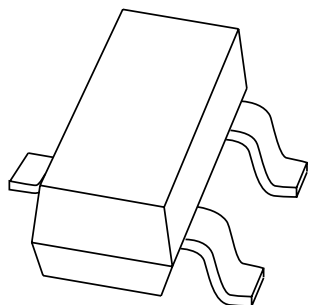


DATA SHEET



PMBS3904 NPN general purpose transistor

Product specification
Supersedes data of 1997 Mar 17
File under Discrete Semiconductors, SC04

1997 May 20

NPN general purpose transistor

PMBS3904

FEATURES

- Low current (max. 100 mA)
- Low voltage (max. 40 V).

APPLICATIONS

- General purpose switching and amplification, e.g. telephony and professional communication equipment.

DESCRIPTION

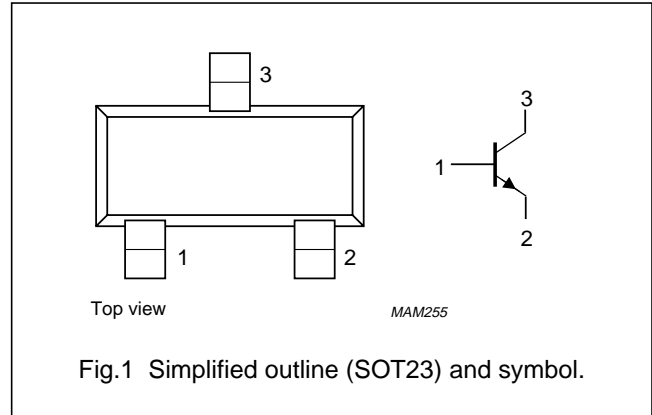
NPN transistor in a plastic SOT23 package.
PNP complement: PMBS3906.

MARKING

TYPE NUMBER	MARKING CODE
PMBS3904	pO4

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector



QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	60	V
V_{CEO}	collector-emitter voltage	open base	–	40	V
I_{CM}	peak collector current		–	200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$	–	250	mW
h_{FE}	DC current gain	$I_C = 10\text{ mA}; V_{CE} = 1\text{ V}$	100	300	
f_T	transition frequency	$I_C = 10\text{ mA}; V_{CE} = 20\text{ V}; f = 100\text{ MHz}$	180	–	MHz

NPN general purpose transistor

PMBS3904

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)		–	100	mA
I_{CM}	peak collector current		–	200	mA
I_{BM}	peak base current		–	200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	–	250	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°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	note 1	500	K/W

Note

1. Transistor mounted on an FR4 printed-circuit board.

NPN general purpose transistor

PMBS3904

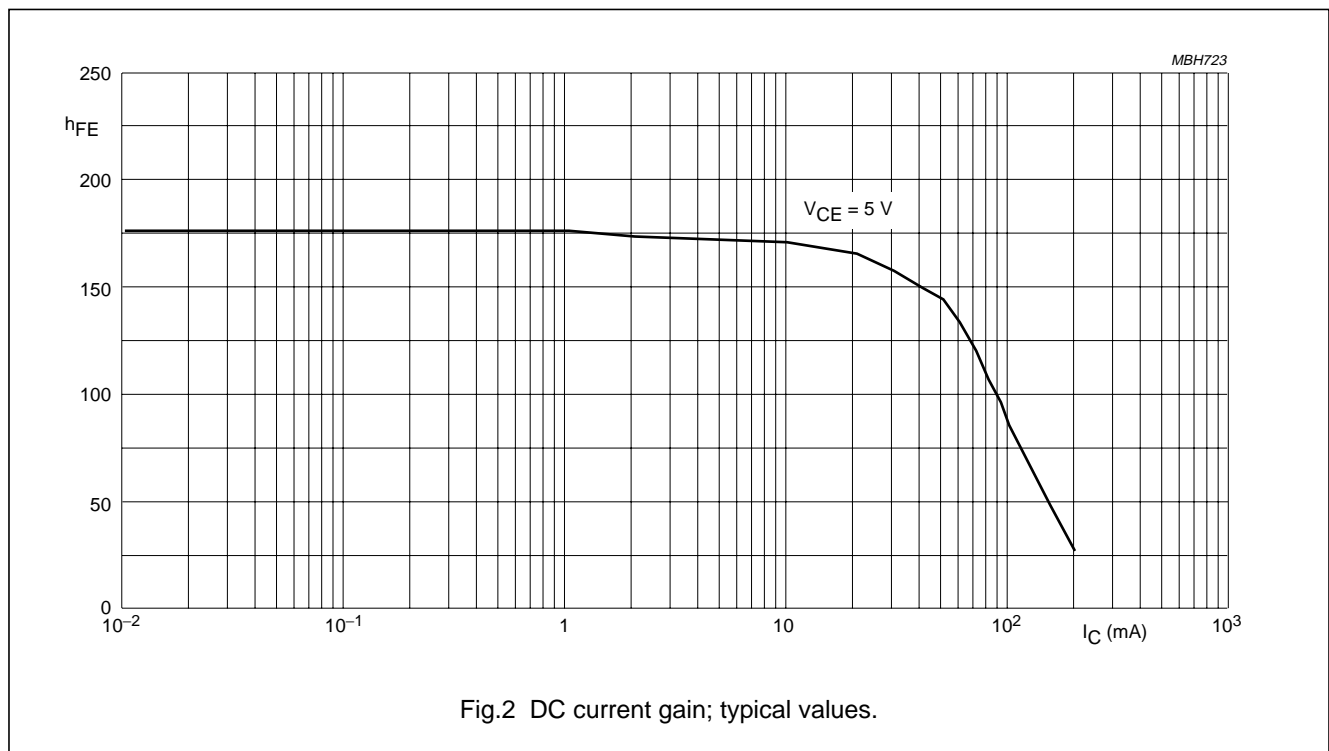
CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I _{CBO}	collector cut-off current	I _E = 0; V _{CB} = 30 V	–	50	nA
I _{EBO}	emitter cut-off current	I _C = 0; V _{EB} = 5 V	–	50	nA
h _{FE}	DC current gain	V _{CE} = 1 V; note 1; see Fig.2 I _C = 0.1 mA I _C = 1 mA I _C = 10 mA I _C = 50 mA I _C = 100 mA	40 70 100 60 30	– – 300 – –	
V _{CEsat}	collector-emitter saturation voltage	I _C = 10 mA; I _B = 1 mA	–	200	mV
		I _C = 50 mA; I _B = 5 mA	–	300	mV
V _{BEsat}	base-emitter saturation voltage	I _C = 10 mA; I _B = 1 mA	650	850	mV
		I _C = 50 mA; I _B = 5 mA	–	950	mV
C _c	collector capacitance	I _E = i _e = 0; V _{CB} = 5 V; f = 1 MHz	–	4	pF
C _e	emitter capacitance	I _C = i _c = 0; V _{EB} = 0.5 V; f = 1 MHz	–	12	pF
f _T	transition frequency	I _C = 10 mA; V _{CE} = 20 V; f = 100 MHz	180	–	MHz
F	noise figure	I _C = 100 μA; V _{CE} = 5 V; R _S = 1 kΩ; f = 10 Hz to 15.7 kHz	–	5	dB

Note

1. Pulse test: t_p ≤ 300 μs; δ ≤ 0.02.



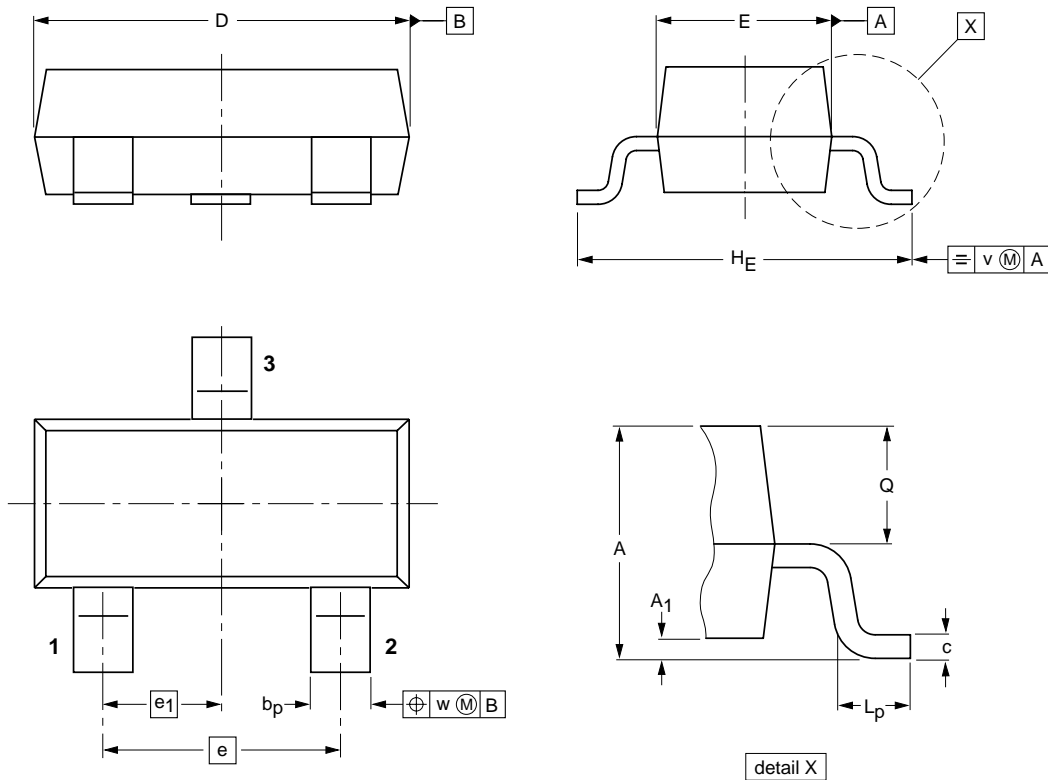
NPN general purpose transistor

PMBS3904

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁ max.	b _p	c	D	E	e	e ₁	H _E	L _p	Q	v	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT23						97-02-28

NPN general purpose transistor

PMBS3904

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

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.

NPN general purpose transistor

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