

DATA SHEET

PMBTH10

**NPN 1 GHz general purpose
switching transistor**

Product specification
File under Discrete Semiconductors, SC14

September 1995

NPN 1 GHz general purpose switching transistor

PMBTH10

FEATURES

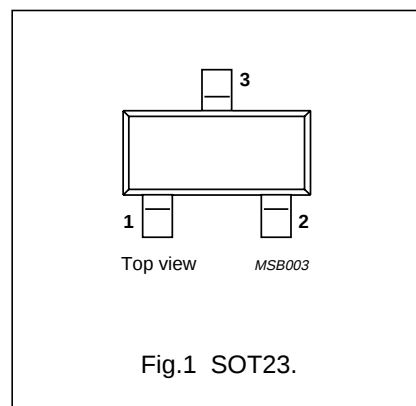
- Low cost
- High power gain.

DESCRIPTION

The PMBTH10 is a general purpose silicon npn transistor, encapsulated in a SOT23 plastic envelope. Its pnp complement is the PMBTH81.

PINNING

PIN	DESCRIPTION
Code: V30	
1	base
2	emitter
3	collector



QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	30	V
V_{CEO}	collector-emitter voltage	open base	–	25	V
V_{EBO}	emitter-base voltage	open collector	–	3	V
P_{tot}	total power dissipation	$T_s = 45\text{ °C}$ (note 1)	–	400	mW
h_{FE}	DC current gain	$V_{CE} = 10\text{ V}$; $I_C = 4\text{ mA}$	60	–	
C_{re}	collector-emitter feedback capacitance	$V_{CB} = 10\text{ V}$; $I_E = 0$; $f = 1\text{ MHz}$	–	0.7	pF
C_{rb}	collector-base feedback capacitance	$V_{CB} = 10\text{ V}$; $I_E = 0$; $f = 1\text{ MHz}$	0.35	0.65	pF
f_T	transition frequency	$V_{CE} = 10\text{ V}$; $I_C = 4\text{ mA}$; $f = 100\text{ MHz}$; $T_{amb} = 25\text{ °C}$	650	–	MHz
$r_b C_c$	collector-base time constant	$V_{CE} = 10\text{ V}$; $I_C = 4\text{ mA}$; $f = 100\text{ MHz}$; $T_{amb} = 25\text{ °C}$	–	9	ps

LIMITING VALUES

In accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	30	V
V_{CEO}	collector-emitter voltage	open base	–	25	V
V_{EBO}	emitter-base voltage	open collector	–	3	V
I_C	DC collector current		–	40	mA
P_{tot}	total power dissipation	$T_s = 45\text{ °C}$ (note 1)	–	400	mW
T_{stg}	storage temperature		–65	150	°C
T_j	junction temperature		–	150	°C

Note

1. T_s is the temperature at the soldering point of the collector tab.

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THERMAL RESISTANCE

SYMBOL	PARAMETER	THERMAL RESISTANCE
$R_{th\ j-s}$	from junction to soldering point (note 1)	260 K/W

Note

1. T_s is the temperature at the soldering point of the collector tab.

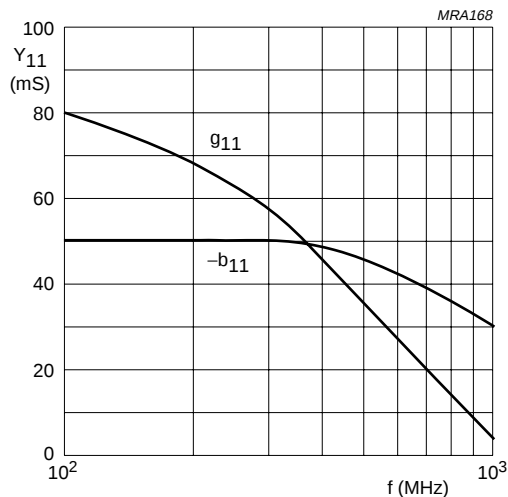
CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{(BR)CBO}$	collector-base breakdown voltage	open emitter; $I_C = 100\text{ }\mu\text{A}$; $I_E = 0$	30	—	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	open base; $I_C = 1\text{ mA}$; $I_B = 0$	25	—	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	open collector; $I_E = 10\text{ }\mu\text{A}$; $I_C = 0$	3	—	V
$V_{CE\ sat}$	collector-emitter saturation voltage	$I_C = 4\text{ mA}$; $I_B = 0.4\text{ mA}$	—	0.5	V
$V_{BE\ on}$	base-emitter ON voltage	$V_{CE} = 10\text{ V}$; $I_C = 4\text{ mA}$	—	0.95	V
I_{CBO}	collector-base cut-off current	$V_{CB} = 25\text{ V}$; $I_E = 0$	—	100	nA
I_{EBO}	emitter-base cut-off current	$V_{CB} = 25\text{ V}$; $I_C = 0$	—	100	nA
h_{FE}	DC current gain	$V_{CE} = 10\text{ V}$; $I_C = 4\text{ mA}$	60	—	
C_{re}	collector-emitter feedback capacitance	$V_{CB} = 10\text{ V}$; $I_E = i_e = 0$; $f = 1\text{ MHz}$	—	0.7	pF
C_{rb}	collector-base feedback capacitance	$V_{CB} = 10\text{ V}$; $I_C = i_c = 0$; $f = 1\text{ MHz}$	0.35	0.65	pF
f_T	transition frequency	$V_{CE} = 10\text{ V}$; $I_C = 4\text{ mA}$; $f = 100\text{ MHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	650	—	MHz
$r_b C_c$	collector-base time constant	$V_{CB} = 10\text{ V}$; $I_C = 4\text{ mA}$; $f = 100\text{ MHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	—	9	ps

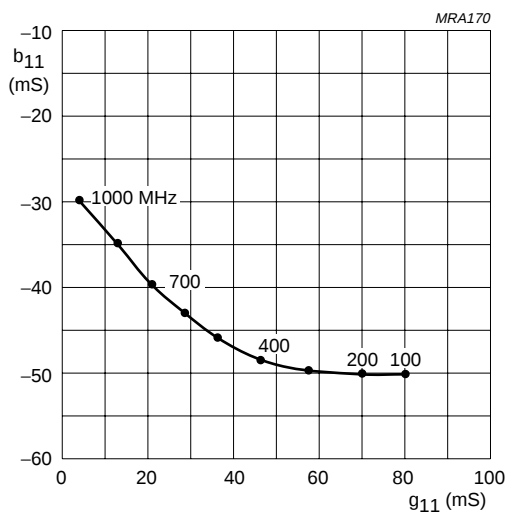
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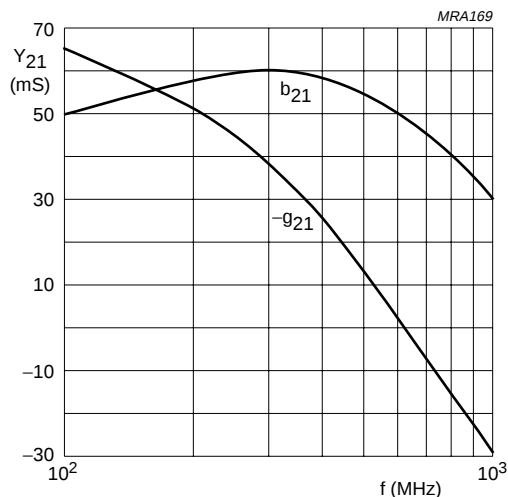
$V_{CB} = 10\text{ V}$; $I_C = 4\text{ mA}$.

Fig.2 Common base input admittance (Y_{11}) as a function of frequency.



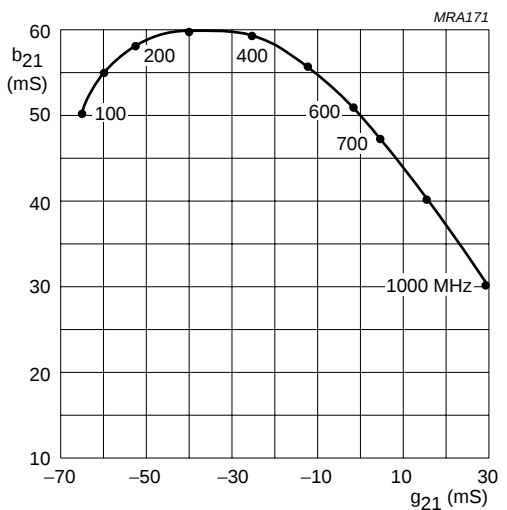
$V_{CB} = 10\text{ V}$; $I_C = 4\text{ mA}$.

Fig.3 Common base input admittance (Y_{11}).



$V_{CB} = 10\text{ V}$; $I_C = 4\text{ mA}$.

Fig.4 Common base forward transfer admittance (Y_{21}) as a function of frequency.

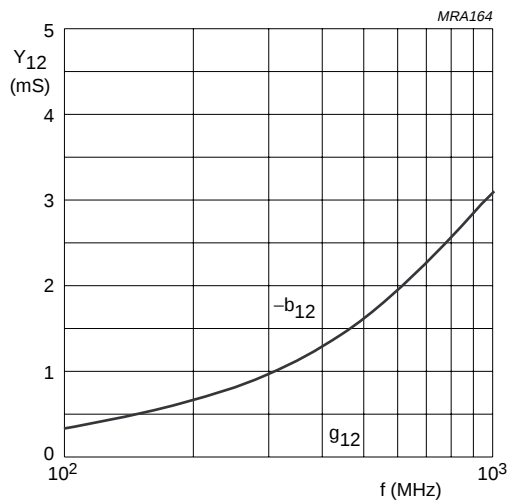


$V_{CB} = 10\text{ V}$; $I_C = 4\text{ mA}$.

Fig.5 Common base forward transfer admittance (Y_{21}).

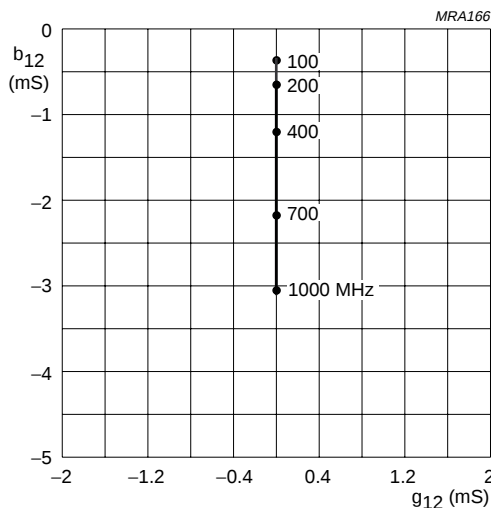
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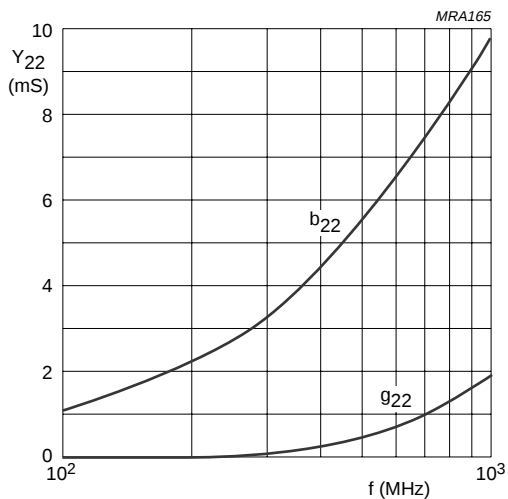
$V_{CB} = 10\text{ V}; I_C = 4\text{ mA}.$

Fig.6 Common base reverse transfer admittance (Y_{12}) as a function of frequency.



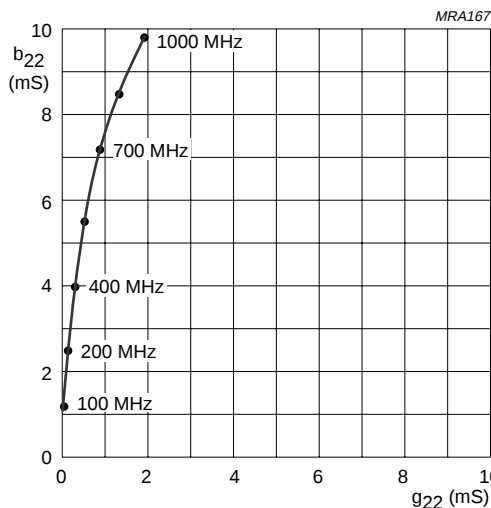
$V_{CB} = 10\text{ V}; I_C = 4\text{ mA}.$

Fig.7 Common base reverse transfer admittance (Y_{12}).



$V_{CB} = 10\text{ V}; I_C = 4\text{ mA}.$

Fig.8 Common base reverse admittance (Y_{22}) as a function of frequency.



$V_{CB} = 10\text{ V}; I_C = 4\text{ mA}.$

Fig.9 Common base reverse admittance (Y_{22}).

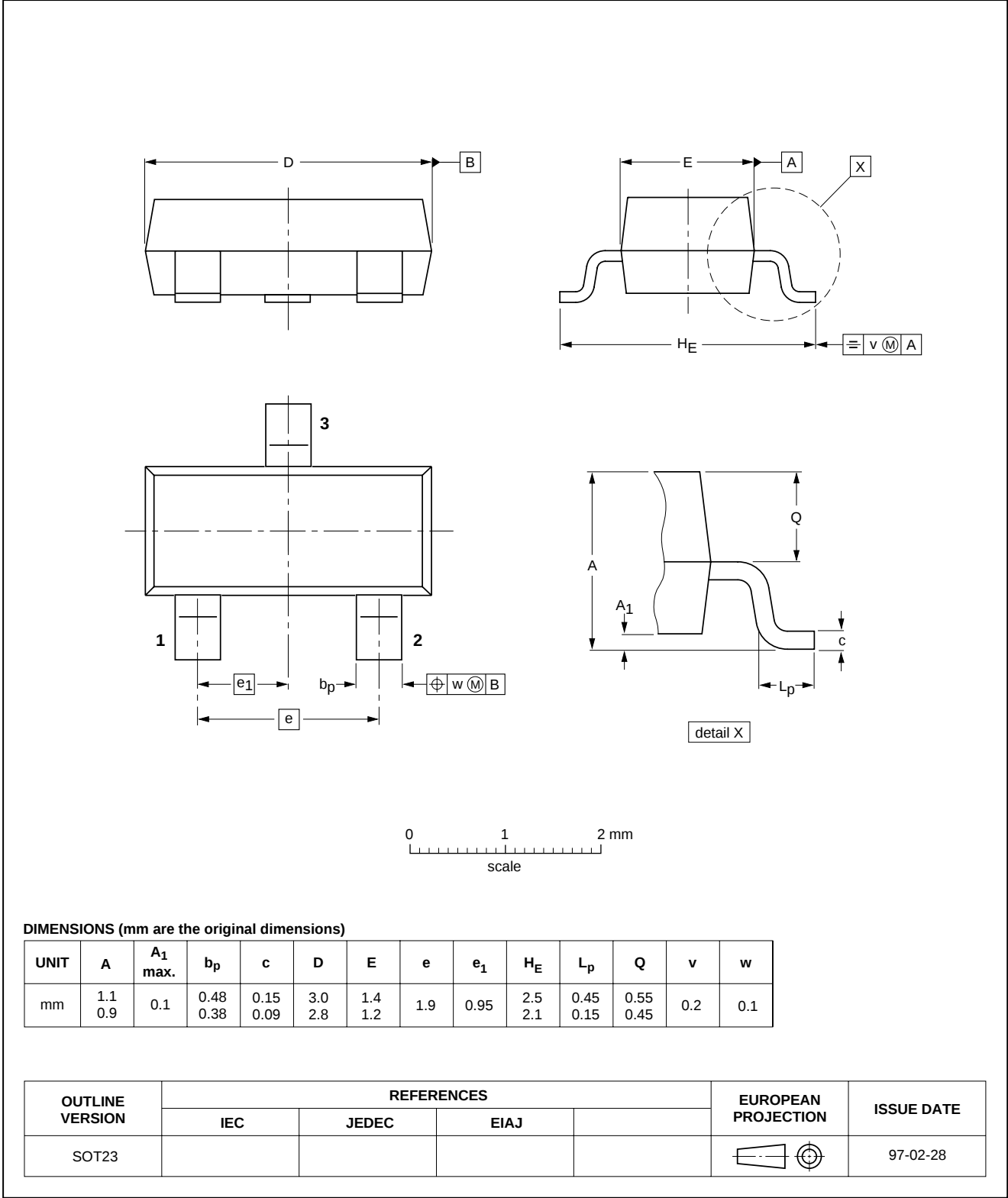
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PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



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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

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