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

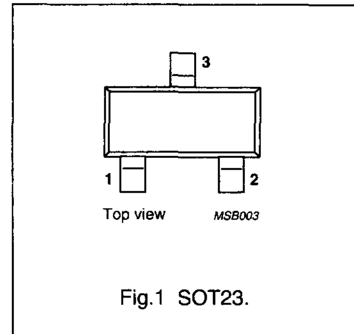


Fig.1 SOT23.

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 °C (note 1)	–	400	mW
h_{FE}	DC current gain	V_{CE} = 10 V; I_C = 4 mA	60	–	
C_{re}	collector-emitter feedback capacitance	V_{CB} = 10 V; I_E = 0; f = 1 MHz	–	0.7	pF
C_{rb}	collector-base feedback capacitance	V_{CB} = 10 V; I_E = 0; f = 1 MHz	0.35	0.65	pF
f_T	transition frequency	V_{CE} = 10 V; I_C = 4 mA; f = 100 MHz; T_{amb} = 25 °C	650	–	MHz
r_bC_c	collector-base time constant	V_{CE} = 10 V; I_C = 4 mA; f = 100 MHz; T_{amb} = 25 °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 °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.

THERMAL RESISTANCE

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

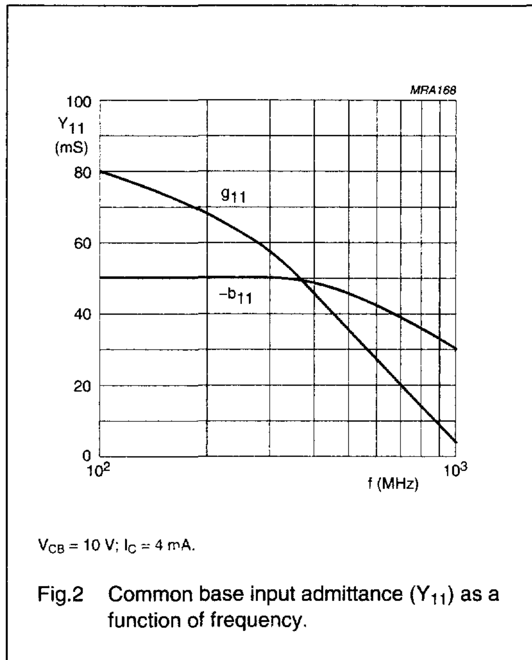
Note

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

CHARACTERISTICS

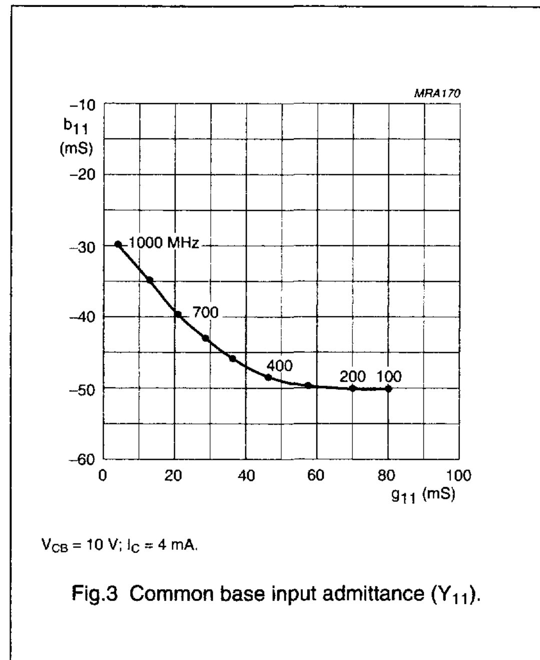
T_j = 25 °C.

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



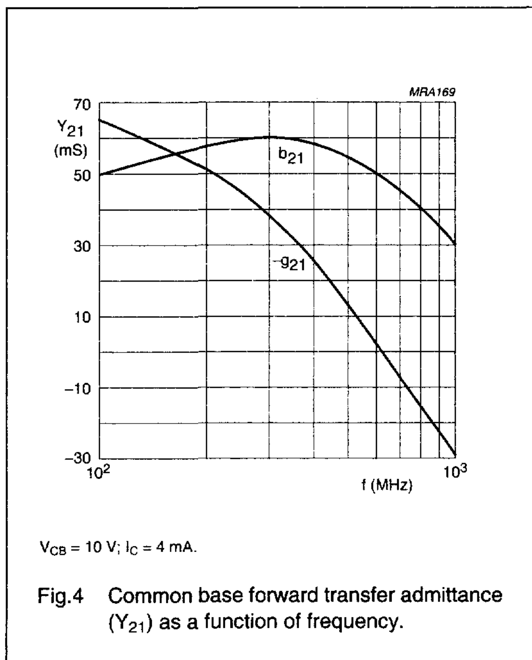
V_{CB} = 10 V; I_C = 4 mA.

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



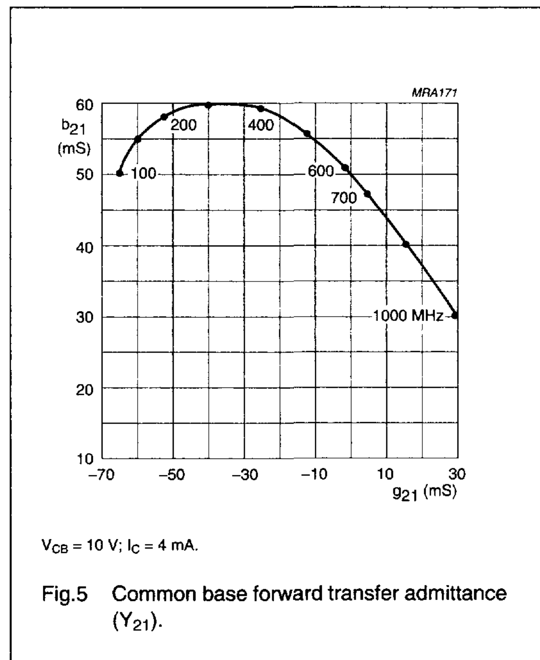
V_{CB} = 10 V; I_C = 4 mA.

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



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

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



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

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

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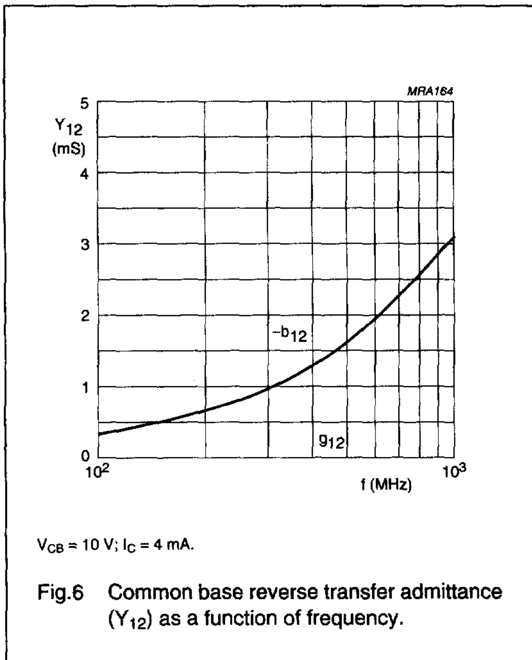
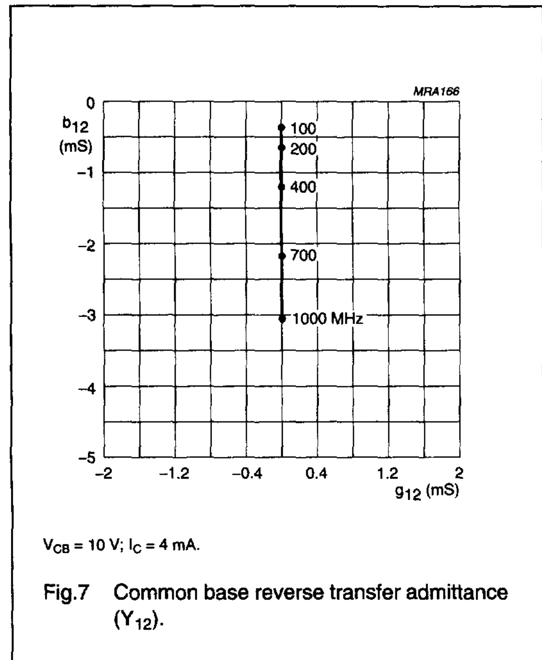


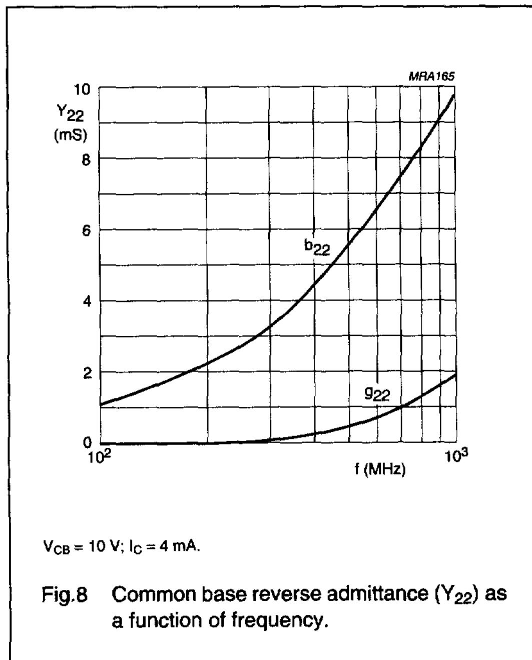
V_{CB} = 10 V; I_C = 4 mA.

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



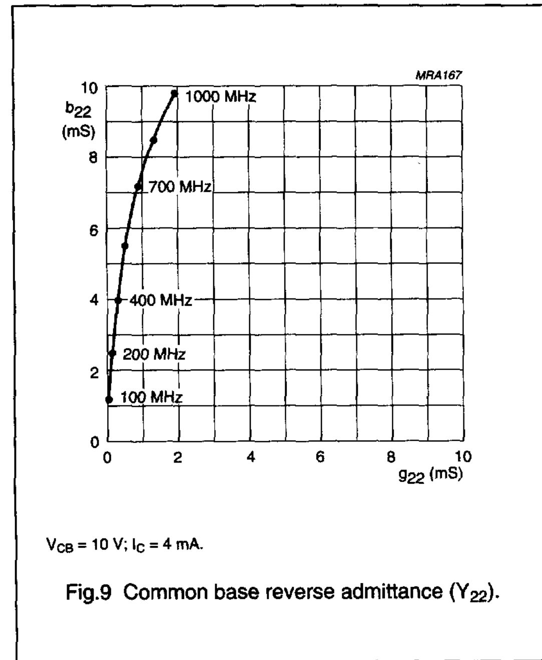
V_{CB} = 10 V; I_C = 4 mA.

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



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

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



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

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