NPN 6 GHz wideband transistor BFQ22S

DESCRIPTION

NPN transistor in a TO-72 metal envelope with insulated electrodes and a shield lead connected to the case. It is primarily intended for use in UHF and microwave aerial amplifiers, radar systems, oscilloscopes, spectrum analyzers, etc.

The transistor has extremely high power gain and good low noise performance.

PNP complement is BFQ24.

PINNING

PIN	DESCRIPTION
1	emitter
2	base
3	collector
4	shield lead (connected to case)

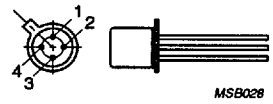


Fig.1 TO-72.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V_{CEO}	collector-emitter voltage	open base	–	12	V
I_C	DC collector current		–	35	mA
P_{tot}	total power dissipation	up to T_s = 50 °C (note 1)	–	250	mW
f_T	transition frequency	I_C = 30 mA; V_{CE} = 5 V; f = 500 MHz; T_j = 25 °C	6	–	GHz
C_{re}	feedback capacitance	I_C = 0; V_{CE} = 5 V; f = 1 MHz; T_{amb} = 25 °C	0.65	–	pF
F	noise figure	I_C = 10 mA; V_{CE} = 8 V; Z_S = opt.; f = 500 MHz; T_{amb} = 25 °C	1.5	–	dB
G_{UM}	maximum unilateral power gain	I_C = 30 mA; V_{CE} = 5 V; f = 500 MHz; T_{amb} = 25 °C	16	–	dB

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	15	V
V_{CEO}	collector-emitter voltage	open base	–	12	V
V_{EBO}	emitter-base voltage	open collector	–	2	V
I_C	DC collector current		–	35	mA
I_{CM}	peak collector current	f > 1 MHz	–	50	mA
P_{tot}	total power dissipation	up to T_s = 50 °C (note 1)	–	250	mW
T_{stg}	storage temperature		–65	200	°C
T_j	junction temperature		–	200	°C

Note

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

THERMAL RESISTANCE

SYMBOL	PARAMETER	CONDITIONS	THERMAL RESISTANCE
$R_{th\ j\text{-}s}$	thermal resistance from junction to soldering point	up to T_s = 50 °C (note 1)	600 K/W

Note

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

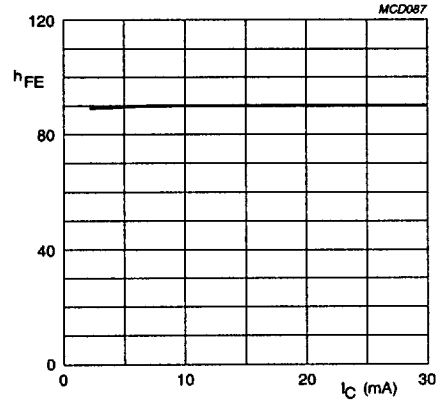
CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector cut-off current	I_E = 0; V_{CB} = 5 V	–	–	50	nA
h_{FE}	DC current gain	I_C = 10 mA; V_{CE} = 5 V	45	90	–	
C_{re}	feedback capacitance	I_C = 0; V_{CE} = 5 V; f = 1 MHz; T_{amb} = 25 °C	–	0.65	–	pF
f_T	transition frequency	I_C = 30 mA; V_{CE} = 5 V; f = 500 MHz	–	6	–	GHz
G_{UM}	maximum unilateral power gain (note 1)	I_C = 30 mA; V_{CE} = 5 V; f = 500 MHz; T_{amb} = 25 °C	–	16	–	dB
F	noise figure	I_C = 10 mA; V_{CE} = 8 V; Z_S = opt.; f = 500 MHz; T_{amb} = 25 °C	–	1.5	–	dB

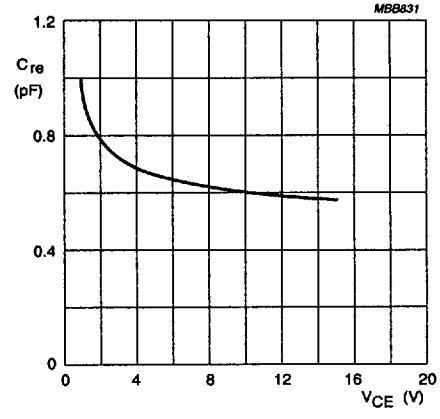
Note

1. G_{UM} is the maximum unilateral power gain, assuming S_{12} is zero and $G_{UM} = 10 \log \frac{|S_{21}|^2}{(1-|S_{11}|^2)(1-|S_{22}|^2)}$ dB.



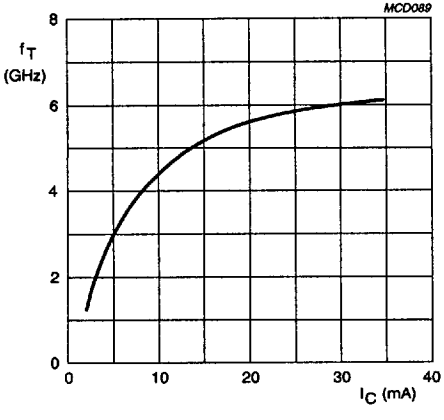
V_{CE} = 8 V; T_j = 25 °C.

Fig.2 DC current gain as a function of collector current.



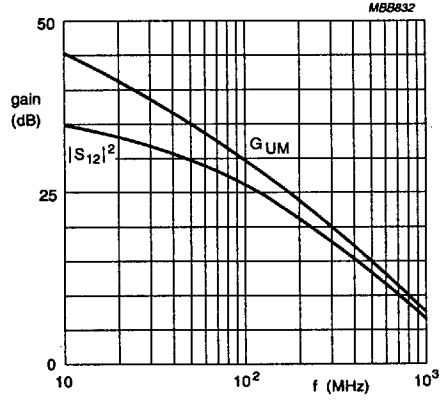
f = 1 MHz; T_{amb} = 25 °C.

Fig.3 Feedback capacitance as a function of collector-emitter voltage.



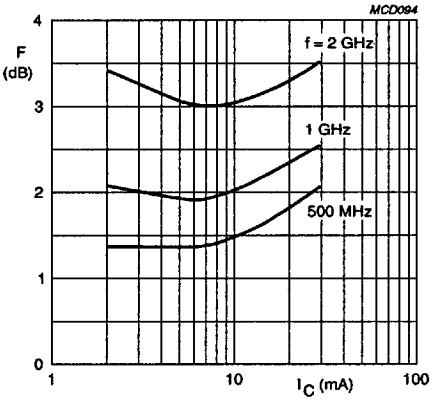
V_{CE} = 5 V; T_j = 25 °C.

Fig.4 Transition frequency as a function of collector current.



I_C = 30 mA; V_{CE} = 5 V; T_{amb} = 25 °C.

Fig.5 Maximum unilateral power gain as a function of frequency.



V_{CE} = 8 V; Z_S = opt.; T_{amb} = 25 °C.

Fig.6 Minimum noise figure as a function of collector current.