

PNP 5 GHz wideband transistor

BFQ24

N AMER PHILIPS/DISCRETE

69E D

DESCRIPTION

PNP 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 amplifiers, such as in aerial amplifiers, radar systems, oscilloscopes, spectrum analyzers etc.

The transistor features extremely high power gain coupled with good low noise performance.

NPN complement is BFQ22S.

PINNING

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

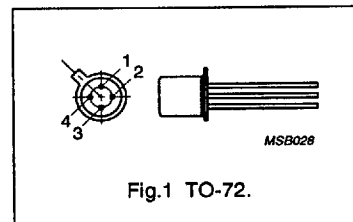


Fig.1 TO-72.

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 $T_s = 50\text{ °C}$ (note 1)	—	250	mW
f_T	transition frequency	$I_C = -30\text{ mA}$; $V_{CE} = -5\text{ V}$; $f = 500\text{ MHz}$; $T_j = 25\text{ °C}$	5	—	GHz
C_{re}	feedback capacitance	$I_C = 0$; $V_{CE} = -5\text{ V}$; $f = 1\text{ MHz}$; $T_{amb} = 25\text{ °C}$	0.8	—	pF
G_{UM}	maximum unilateral power gain	$I_C = -30\text{ mA}$; $V_{CE} = -5\text{ V}$; $f = 500\text{ MHz}$; $T_{amb} = 25\text{ °C}$	15	—	dB
F	noise figure	$I_C = -2\text{ mA}$; $V_{CE} = -5\text{ V}$; $Z_S = \text{opt.}$; $f = 500\text{ MHz}$; $T_{amb} = 25\text{ °C}$	2.4	—	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	$f > 1\text{ MHz}$	—	—50	mA
P_{tot}	total power dissipation	up to $T_s = 50\text{ °C}$ (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.

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THERMAL RESISTANCE

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

Note

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

CHARACTERISTICS

 $T_i = 25\text{ °C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector cut-off current	$I_E = 0; V_{CB} = -5\text{ V}$	—	—	—50	nA
h_{FE}	DC current gain	$I_C = -30\text{ mA}; V_{CE} = -5\text{ V}$	20	40	—	
C_c	collector capacitance (note 2)	$I_E = I_s = 0; V_{CB} = -5\text{ V}; f = 1\text{ MHz}$	—	1.2	—	pF
C_e	emitter capacitance	$I_C = I_e = 0; V_{EB} = -0.5\text{ V}; f = 1\text{ MHz}$	—	2.5	—	pF
C_{fe}	feedback capacitance (note 1)	$I_C = 0; V_{CE} = -5\text{ V}; f = 1\text{ MHz}$	—	0.8	—	pF
f_T	transition frequency (note 1)	$I_C = -30\text{ mA}; V_{CE} = -5\text{ V};$ $f = 500\text{ MHz}$	—	5	—	GHz
G_{UM}	maximum unilateral power gain (notes 1 and 3)	$I_C = -30\text{ mA}; V_{CE} = -5\text{ V};$ $f = 500\text{ MHz}; T_{amb} = 25\text{ °C}$	—	15	—	dB
F	noise figure (note 1)	$I_C = -2\text{ mA}; V_{CE} = -5\text{ V}; Z_s = \text{opt};$ $f = 500\text{ MHz}; T_{amb} = 25\text{ °C}$	—	2.4	—	dB

Notes

1. Shield lead grounded.
2. Shield lead not connected.

3. 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.

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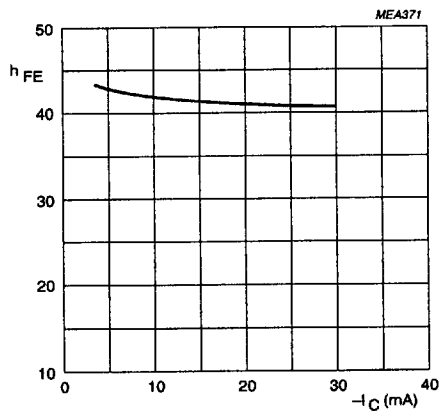
 $V_{CE} = -5$ V; $T_j = 25$ °C.

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

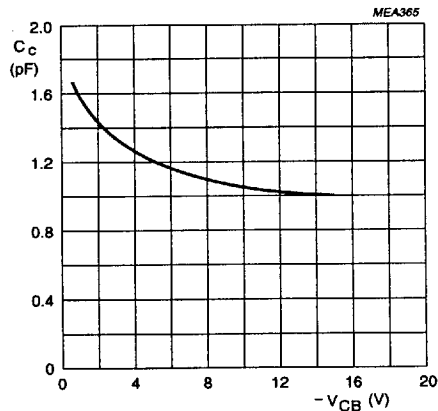
 $I_E = i_b = 0$; $f = 1$ MHz; $T_j = 25$ °C.

Fig.3 Collector capacitance as a function of collector-base voltage.

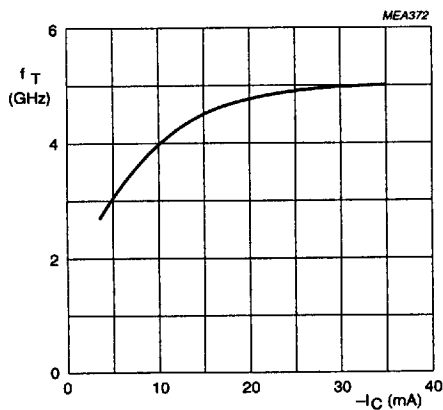
 $V_{CE} = -5$ V; $f = 500$ MHz; $T_j = 25$ °C.

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