TR BFR96;PH;SOT37;tranzystor; NPN;UHF;75mA;20V;5GHz

Dane techniczne:
Nazwa: BFR96
Typ tranzystora: bipolarny
Kierunek przewodnictwa: NPN
Prąd kolektora: 75mA
Napięcie kolektor-emiter: 20V
Częstotliwość: 5GHz
Montaż: przewlekany(THT)
Obudowa: SOT37
Producent: PH

NPN 5 GHz wideband transistor

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DESCRIPTION

NPN transistor in a plastic SOT37 envelope primarily intended for use in RF wideband amplifiers such as in aerial amplifiers, radar systems, oscilloscopes, spectrum analyzers, etc.

The transistor features very low intermodulation distortion and high power gain; due to its very high transition frequency, it also has excellent wideband properties and low noise up to high frequencies.

A SOT54 (TO-92) version (ref: ON4487) is available on request.

PNP complement is BFQ32.

PINNING

PIN	DESCRIPTION
Code: BFR96/02	
1	base
2	emitter
3	collector

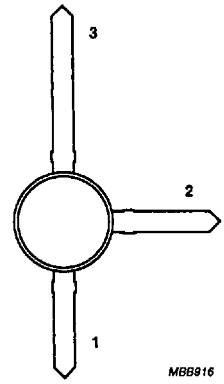

Fig.1 SOT37.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	20	V
V_{CEO}	collector-emitter voltage	open base	–	15	V
I_C	DC collector current		–	75	mA
P_{tot}	total power dissipation	up to T_s = 143 °C (note 1)	–	700	mW
f_T	transition frequency	I_C = 50 mA; V_{CE} = 10 V; f = 500 MHz; T_j = 25 °C	5	–	GHz
C_{re}	feedback capacitance	I_C = 10 mA; V_{CE} = 10 V; f = 1 MHz; T_{amb} = 25 °C	–	1.4	pF
G_{UM}	maximum unilateral power gain	I_C = 50 mA; V_{CE} = 10 V; f = 500 MHz; T_{amb} = 25 °C	15.2	–	dB
F	noise figure	I_C = 50 mA; V_{CE} = 10 V; f = 500 MHz; T_{amb} = 25 °C	3.3	–	dB
V_O	output voltage	d_{im} = –60 dB; I_C = 50 mA; V_{CE} = 10 V; R_L = 75 Ω; T_{amb} = 25 °C; $f_{(p+q-r)}$ = 493.25 MHz	500	–	mV

Note

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

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LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	20	V
V_{CEO}	collector-emitter voltage	open base	–	15	V
V_{EBO}	emitter-base voltage	open collector	–	3	V
I_C	DC collector current		–	75	mA
I_{CM}	peak collector current	f > 1 MHz	–	150	mA
P_{tot}	total power dissipation	up to T_s = 143 °C (note 1)	–	700	mW
T_{stg}	storage temperature		–65	150	°C
T_j	junction temperature		–	175	°C

THERMAL RESISTANCE

SYMBOL	PARAMETER	CONDITIONS	THERMAL RESISTANCE
$R_{th\ j\text{-}s}$	thermal resistance from junction to soldering point	up to T_s = 143 °C (note 1)	45 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	$I_E = 0$; $V_{CB} = 10$ V	–	–	100	nA
h_{FE}	DC current gain	$I_C = 50$ mA; $V_{CE} = 10$ V	25	80	–	
f_T	transition frequency	$I_C = 50$ mA; $V_{CE} = 10$ V; f = 500 MHz	4	5	–	GHz
C_c	collector capacitance	$I_E = i_e = 0$; $V_{CB} = 10$ V; f = 1 MHz	–	1.3	–	pF
C_e	emitter capacitance	$I_C = i_c = 0$; $V_{EB} = 0.5$ V; f = 1 MHz	–	6.5	–	pF
C_{re}	feedback capacitance	$I_C = 10$ mA; $V_{CE} = 10$ V; f = 1 MHz; $T_{amb} = 25$ °C	–	1	1.4	pF
G_{UM}	maximum unilateral power gain (note 1)	$I_C = 50$ mA; $V_{CE} = 10$ V; f = 500 MHz; $T_{amb} = 25$ °C	–	15.2	–	dB
F	noise figure	$I_C = 50$ mA; $V_{CE} = 10$ V; f = 500 MHz; $T_{amb} = 25$ °C	–	3.3	–	dB
V_O	output voltage	see Fig.2 and note 2	–	500	–	mV

Notes

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.
2. $d_{im} = -60$ dB (DIN 45004B); $I_C = 50$ mA; $V_{CE} = 10$ V; $R_L = 75\ \Omega$; $T_{amb} = 25$ °C;
   $V_p = V_O$ at $d_{im} = -60$ dB; $f_p = 495.25$ MHz;
   $V_q = V_O -6$ dB; $f_q = 503.25$ MHz;
   $V_r = V_O -6$ dB; $f_r = 505.25$ MHz;
   measured at $f_{(p+q-r)} = 493.25$ MHz.

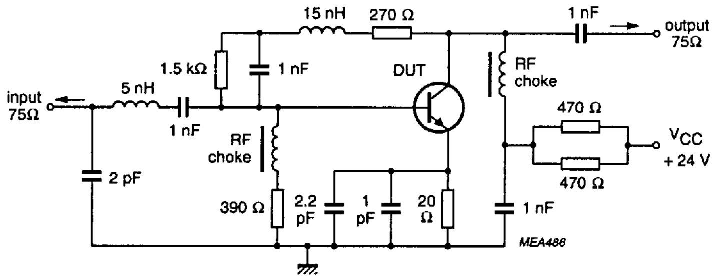


Fig.2 Intermodulation distortion test circuit.

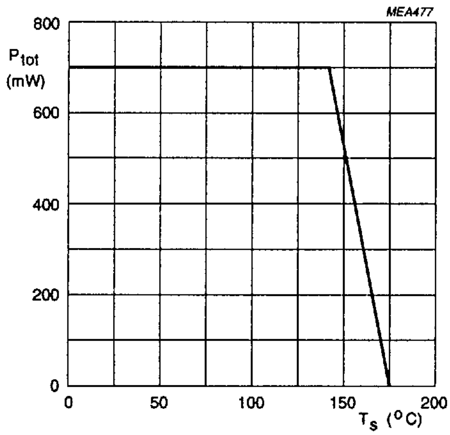
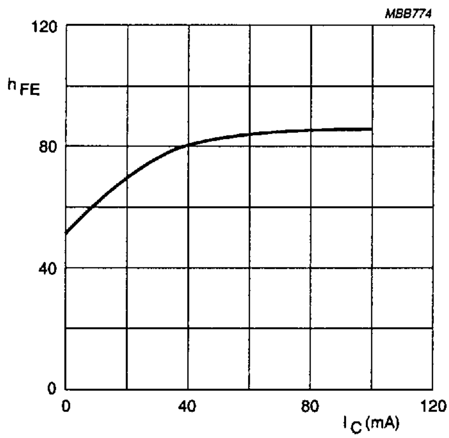


Fig.3 Power derating curve.



V_{CE} = 10 V; T_j = 25 °C.

Fig.4 DC current gain as a function of collector current.

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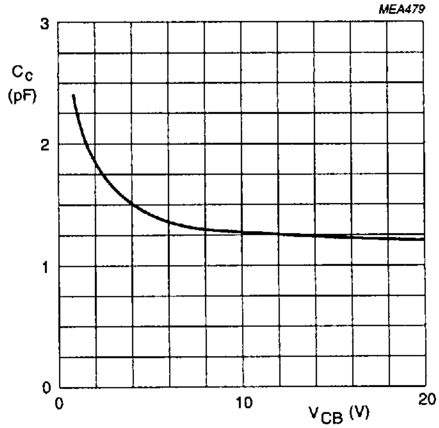
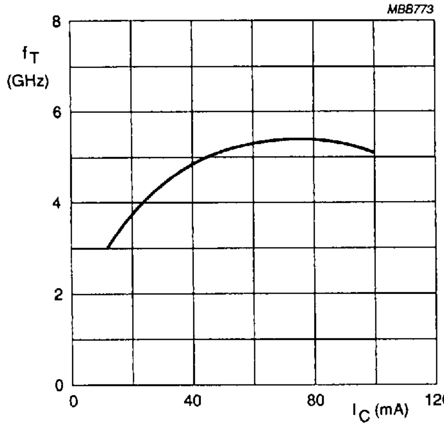


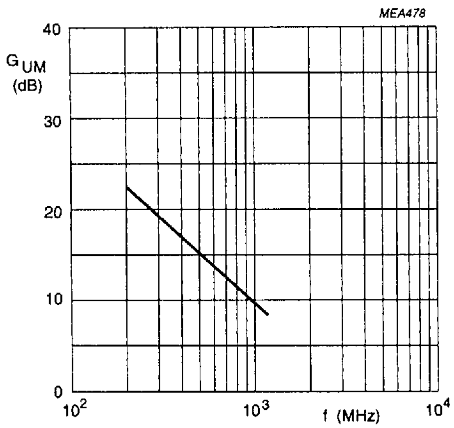
$I_E = i_e = 0$; f = 1 MHz; $T_j = 25$ °C.

Fig.5 Collector capacitance as a function of collector-base voltage.



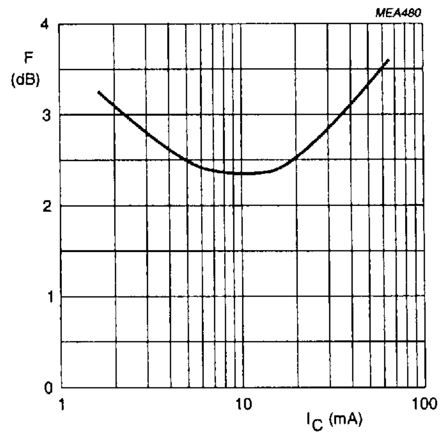
$V_{CE} = 10$ V; f = 500 MHz; $T_j = 25$ °C.

Fig.6 Transition frequency as a function of collector current.



$I_C = 50$ mA; $V_{CE} = 10$ V; $T_{amb} = 25$ °C.

Fig.7 Maximum unilateral power gain as a function of frequency.



$V_{CE} = 10$ V; f = 500 MHz; $T_{amb} = 25$ °C; Y_S = opt.

Fig.8 Minimum noise figure as a function of collector current.

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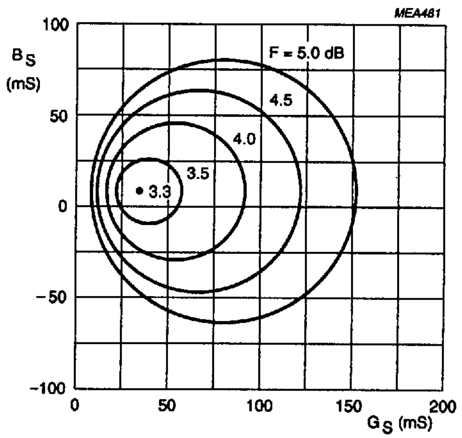

I_C = 50 mA; V_{CE} = 10 V; f = 500 MHz; T_{amb} = 25 °C.

Fig.9 Noise circle figure.

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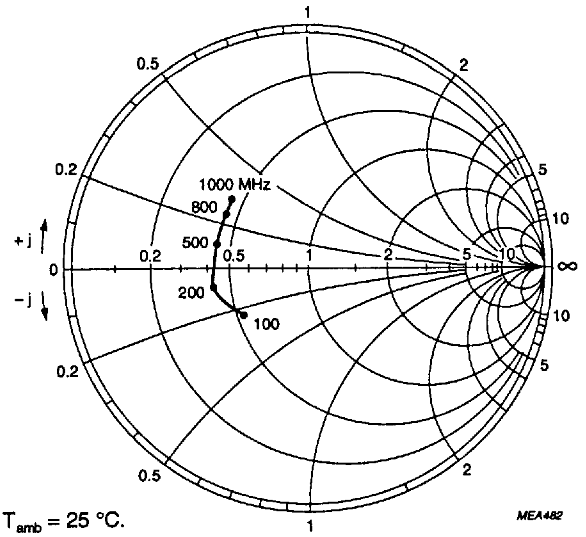
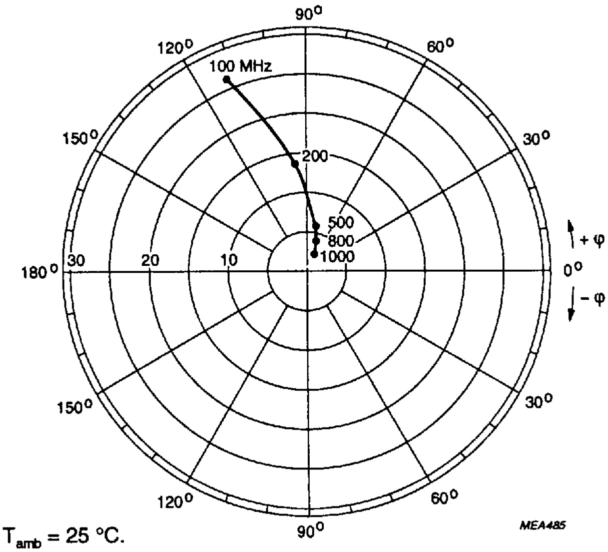


$I_C = 50$ mA; $V_{CE} = 10$ V; $T_{amb} = 25$ °C.

Fig.10 Common emitter input reflection coefficient (S_{11}).



$I_C = 50$ mA; $V_{CE} = 10$ V; $T_{amb} = 25$ °C.

Fig.11 Common emitter forward transmission coefficient (S_{21}).

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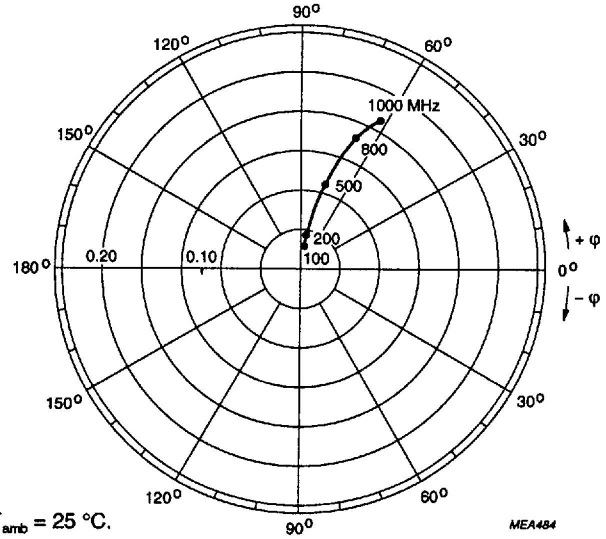
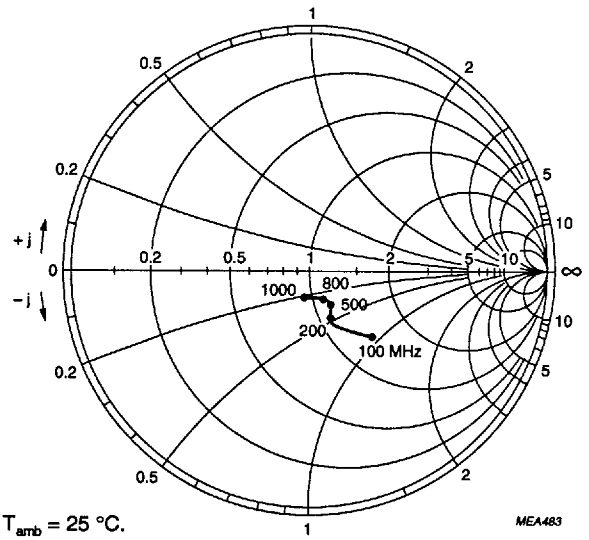


I_C = 50 mA; V_{CE} = 10 V; T_{amb} = 25 °C.

Fig.12 Common emitter reverse transmission coefficient (S_{12}).



I_C = 50 mA; V_{CE} = 10 V; T_{amb} = 25 °C.

Fig.13 Common emitter output reflection coefficient (S_{22}).