HUIYEE ELECTRONIC

Approved by:
Checked by:
Issued by:

SPECIFICATION

PRODUCT: NPN 5GHz wideband transistor

MODEL: MAR92A SOT23

H.K.HUIYEE ELECTRON INDUSTRIAL LIMITED

Tel:+86-755-82973806 Fax:+86-755-82973550 E-mail: sales@hoperf.com http://www.hoperf.com

MAR92A

This item can replace **BFR92A**

FEATURES

- High power gain, Insertion power gain $|S21|^2$=14dB at 1GHz
- Low noise,Noise figure NF=2.1dB at 1GHz
- High transition frequency f_T=5GHz
- Gold metallization ensures excellent reliability
- Large dynamic range
- Good current characteristic
- SOT-23 / SC-59 package

MARKING:2D

PACKAGE DIMENSIONS
(Units: mm)

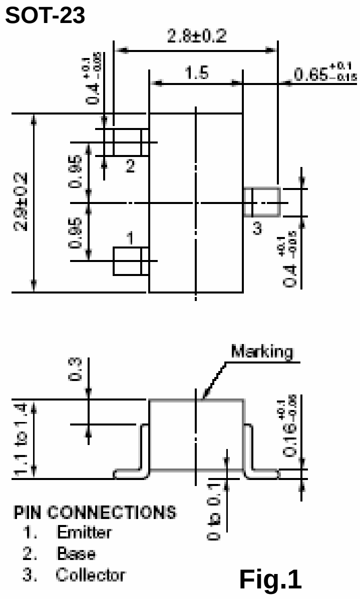


Fig.1

APPLICATION

Intended for applications in the GHz range such as MATV or CATV amplifiers and RF communications subscriber equipment.

DESCREPTION

NPN silicon plananr transistor 3 pin SOT-23 package.

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	collector current (DC)			25	mA
P_{tot}	total power dissipation	Ts≤95℃	300		mW
C_{re}	Feedback capacitace	IC=0; VCE=10V; f=1MHz	0.35	-	pF
f_T	Trasition frequency	IC=15mA; VCE=10V; f=500MHz	5	-	GHz
G_{UM}	maximum unilateral power gain	IC=15mA; VCE=10V; f=1GHz; Tamb=25℃	14		dB
		IC=30mA; VCE=10V; f=2GHz; Tamb=25℃	8		dB
F	noise figure	IC=5mA; VCE=10V; f=1GHz;s=opt;Tamb=25℃	2.1		dB
V_O	output voltage	dim=60dB; IC=14mA; VCE=10V;RL=75Ω; Tamb=25℃;fp+fqfr=793.25MHz	150		mV

LIMITING VALUES

In accordance with the Absolute Maximum Rating System

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	-	2	V

I_C	collector current (DC)		-	25	mA
P_{tot}	total power dissipation	Ts≤95℃;note 1	-	300	mW
T_{stg}	storage temperature		-65	+150	℃
T_J	junction temperature		-	+175	℃

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{Th\ j\text{-}s}$	thermal resistance from junction to soldering point	Ts≤95℃;note 1	260	mW

Note

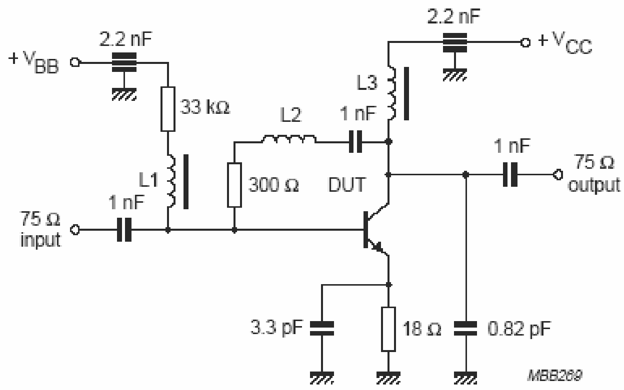
1. Ts is the temperature at the soldering point of the collector pin.

CHARACTERISTICS

Tj=25℃ un less otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	Collector cut-off current	IE=0; VCB=5V	-	-	50	nA
h_{FE}	DC current gain	Ic=5mA Vce=10V	160	-	200	-
C_c	collector capacitance	IE=ie=0; VCB=10V; f=1MHz	-	0.6	-	pF
c_e	emitter capacitance	IC=ic=0; VEB=10V; f=1MHz	-	1.2	-	pF
c_{re}	feedback capacitance	IC=ic=0; VCE=10V; f=1MHz;Tamb=25℃	-	0.35	-	pF
f_T	transition frequency	IC=15mA; VCE=5V; f=500MHz		5	-	GHz
G_{UM}	maximum unilateral power gain(note1)	IC=15mA; VCE=10V; f=1GHz;Tamb=25℃	-	14	-	dB
		IC=15mA; VCE=10V; f=2GHz;Tamb=25℃	-	8	-	dB
F	noise figure	IC=5mA; VCE=10V; f=1GHz;s=opt; Tamb=25℃	-	2.1	-	dB
		IC=5mA; VCE=10V; f=2GHz;s=opt; Tamb=25℃	-	3	-	dB
v_O	output voltage		-	150	-	mV
d_2	second order intermodulationdist ortion		-	-50	-	dB

* pulse measurement PW ≤350 μs, duty cycle ≤2%



L1 = L3 = 5 µH choke.
L2 = 3 turns 0.4 mm copper wire, internal diameter 3 mm, winding pitch 1 mm.

Fig.2 Intermodulation distortion and second harmonic distortion MATV test circuit.

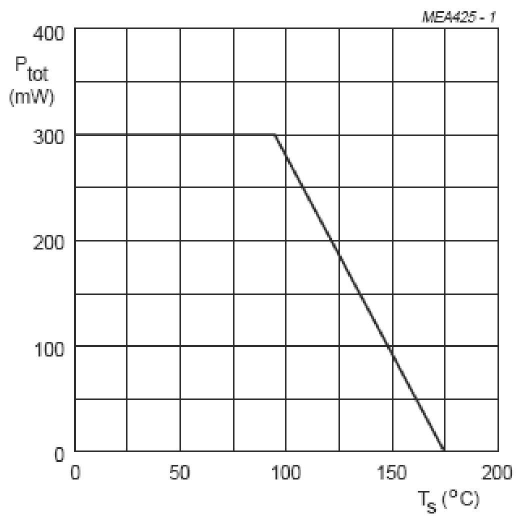
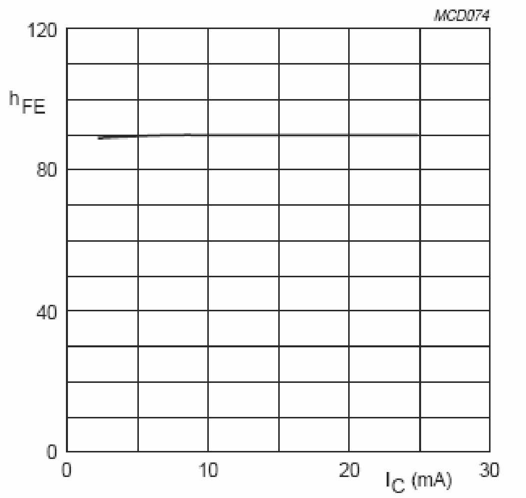
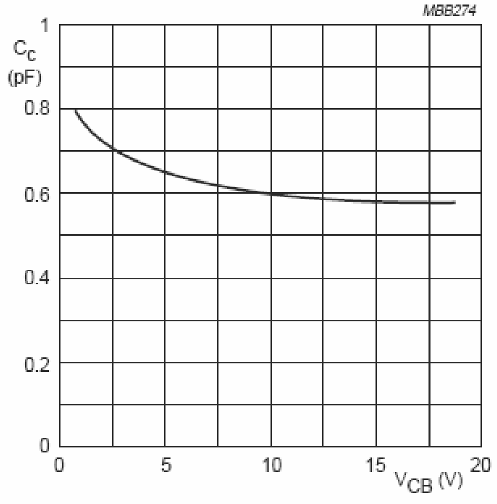


Fig.3 Power derating curve.



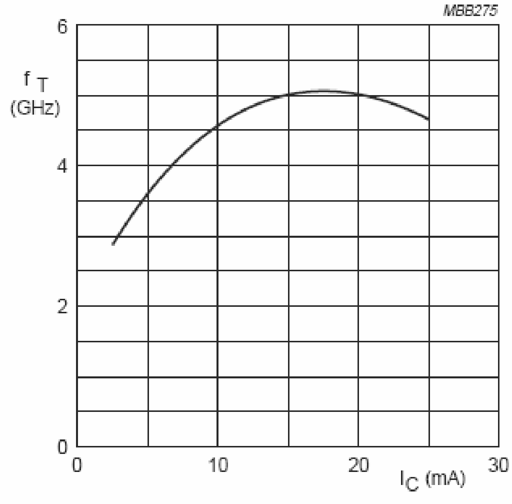
V_{CE} = 10 V; T_j = 25 °C.

Fig.4 DC current gain as a function of collector current; typical values.



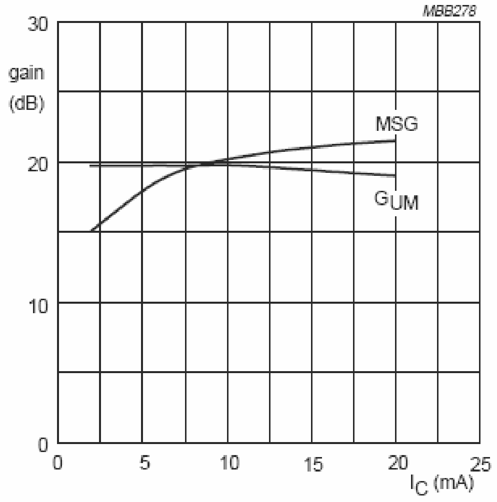
$I_C = i_c = 0$; f = 1 MHz; $T_j = 25$ °C.

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



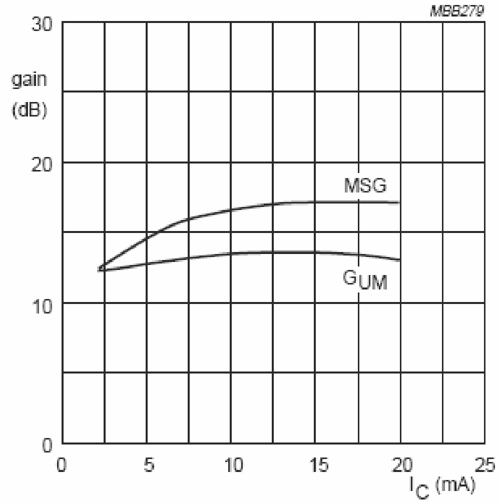
$V_{CE} = 10$ V; f = 500 MHz; $T_{amb} = 25$ °C.

Fig.6 Transition frequency as a function of collector current; typical values.



$V_{CE} = 10$ V; f = 500 MHz.
MSG = maximum stable gain;
G_{UM} = maximum unilateral power gain.

Fig.7 Gain as a function of collector current; typical values.



$V_{CE} = 10$ V; f = 1 GHz.
MSG = maximum stable gain;
G_{UM} = maximum unilateral power gain.

Fig.8 Gain as a function of collector current; typical values.

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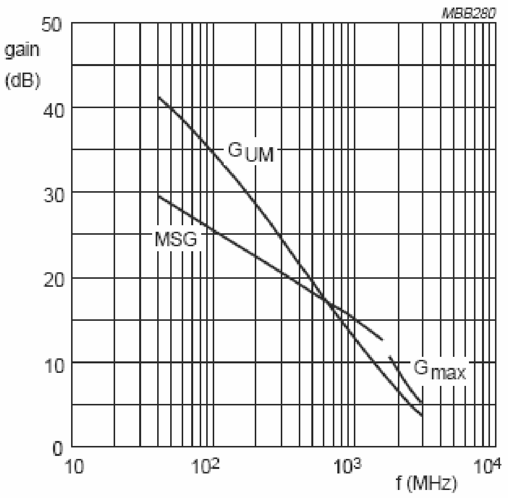
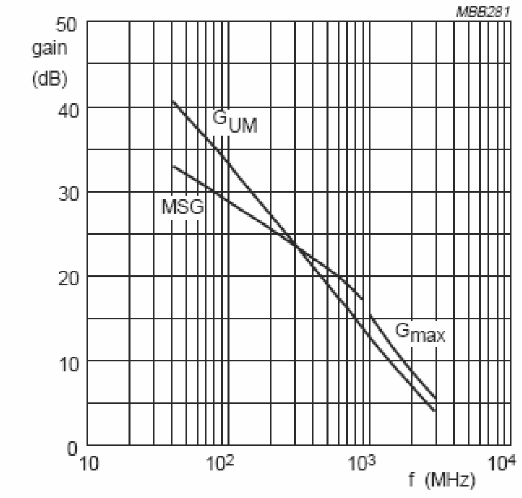


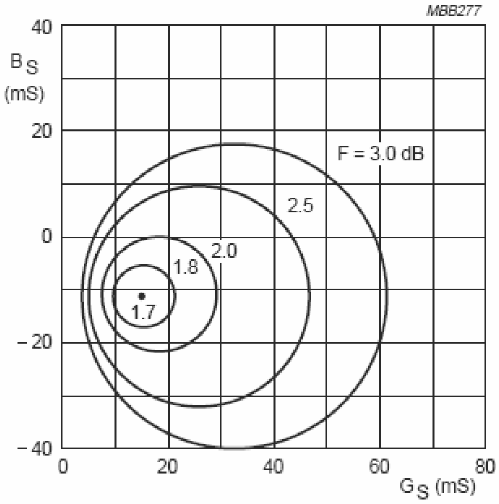
I_C = 5 mA; V_{CE} = 10 V.
G_{UM} = maximum unilateral power gain; MSG = maximum stable gain;
G_{max} = maximum available gain.

Fig.9 Gain as a function of frequency; typical values.



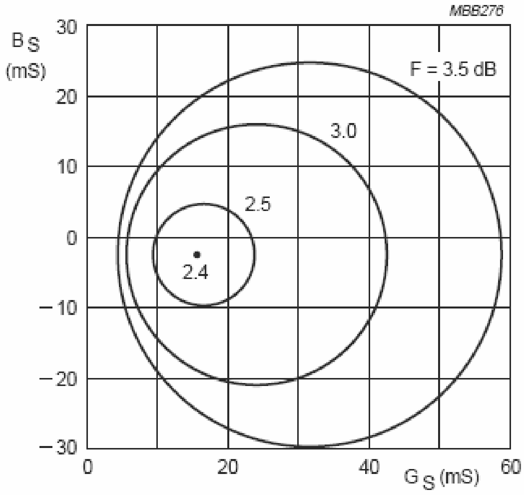
I_C = 15 mA; V_{CE} = 10 V.
G_{UM} = maximum unilateral power gain; MSG = maximum stable gain;
G_{max} = maximum available gain.

Fig.10 Gain as a function of frequency; typical values.



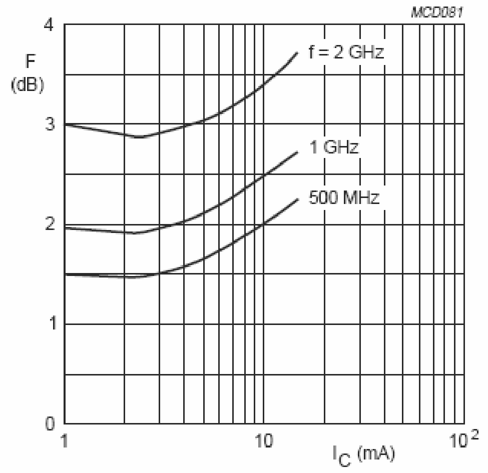
I_C = 4 mA; V_{CE} = 10 V; f = 800 MHz.

Fig.11 Circles of constant noise figure; typical values.



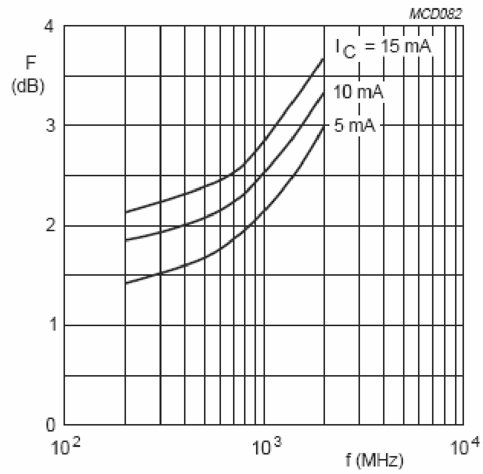
I_C = 14 mA; V_{CE} = 10 V; f = 800 MHz.

Fig.12 Circles of constant noise figure; typical values.



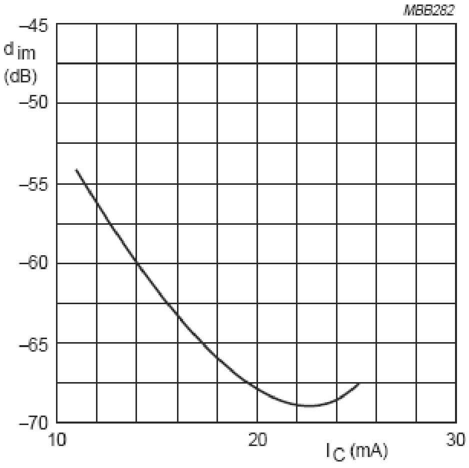
V_{CE} = 10 V.

Fig.13 Minimum noise figure as a function of collector current; typical values.



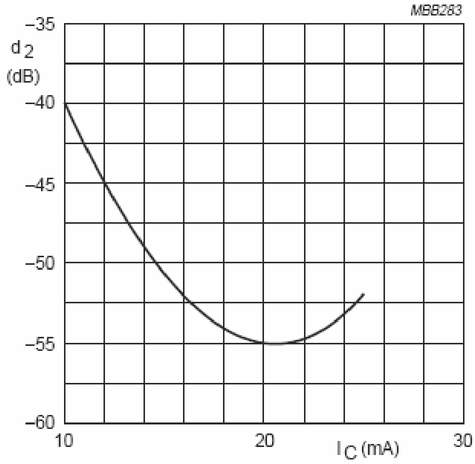
V_{CE} = 10 V.

Fig.14 Minimum noise figure as a function of frequency; typical values.



V_{CE} = 10 V; V_O = 150 mV (43.5 dBmV);
$f_p + f_q - f_r$ = 793.25 MHz; T_{amb} = 25 °C.
Measured in MATV test circuit (see Fig.2).

Fig.15 Intermodulation distortion; typical values.



V_{CE} = 10 V; V_O = 60 mV; $f_p + f_q - f_r$ = 810 MHz; T_{amb} = 25 °C.
Measured in MATV test circuit (see Fig.2).

Fig.16 Second order intermodulation distortion; typical values.

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