Ordering number:EN1951B

NPN Epitaxial Planar Silicon Transistor

2SC3778

UHF Low-Noise Amplifier, Wide-Band Amplifier Applications

Applications

· UHF low-noise amplifiers, wide-band amplifiers.

Features

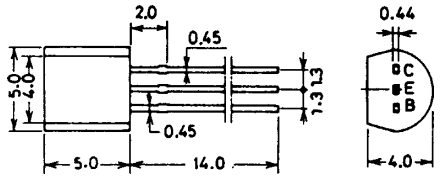
· Small noise figure : NF=2.2dB typ (f=0.9GHz).
· High power gain : MAG=14dB typ (f=0.9GHz).
· High cutoff frequency : f_T=5.0GHz typ.

Package Dimensions

unit:mm

2004A

[2SC3778]



JEDEC : TO-92
EIAJ : SC-43

C : Collector
E : Emitter
B : Base
SANYO : NP

Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		20	V
Collector-to-Emitter Voltage	V_{CEO}		12	V
Emitter-to-Base Voltage	V_{EBO}		3	V
Collector Current	I_C		70	mA
Base Current	I_B		30	mA
Collector Dissipation	P_C		500	mW
Junction Temperature	Tj		150	˚C
Storage Temperature	Tstg		–55 to +150	˚C

Electrical Characteristics at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=12V, I_E=0			1.0	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=2V, I_C=0			10	μA
DC Current Gain	h_{FE}	V_{CE}=10V, I_C=20mA	40*		200*	
Gain-Bandwidth Product	f_T	V_{CE}=10V, I_C=20mA		5.0		GHz
Output Capacitance	C_{ob}	V_{CB}=10V, f=1MHz		0.8	1.1	pF
Reverse Transfer Capacitance	C_{re}	V_{CB}=10V, f=1MHz		0.5		pF

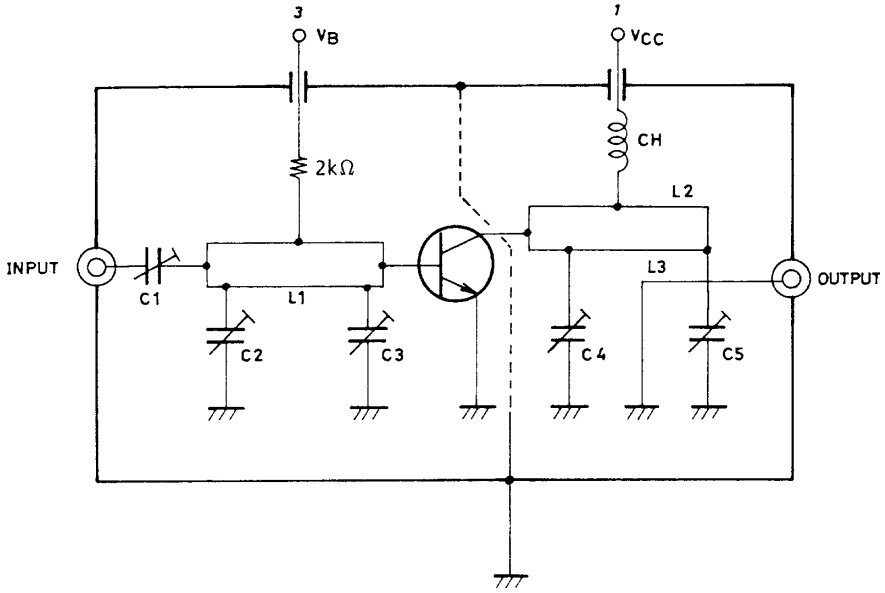
* : The 2SC3778 is classified by 20mA h_{FE} as follows :

40	C	80	60	D	120	100	E	200

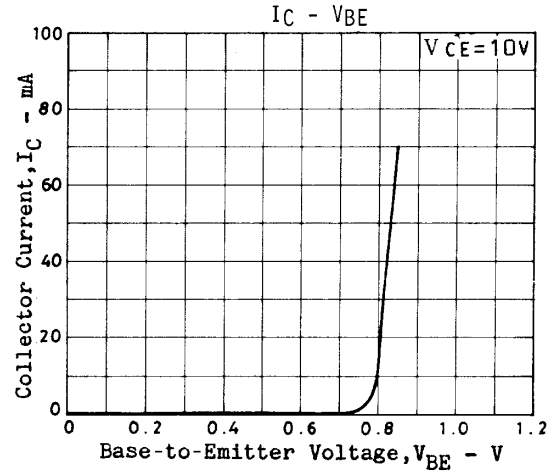
SANYO Electric Co.,Ltd. Semiconductor Bussiness Headquaters
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

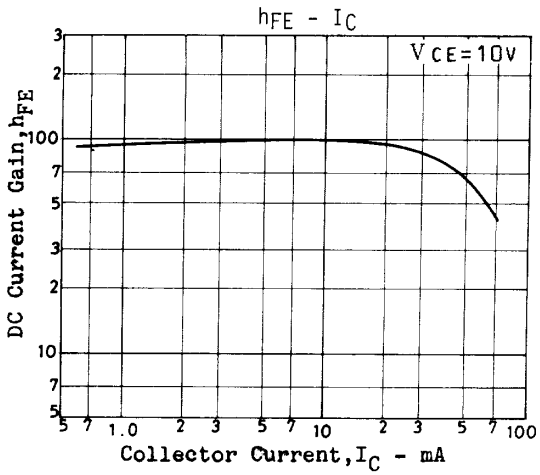
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Forward Transfer Gain	$\|S21e\|^2$	V_{CE}=10V, I_C=20mA, f=0.9GHz	8	10		dB
Maximum Available Power Gain	MAG	V_{CE}=10V, I_C=20mA, f=0.9GHz		14		dB
Noise Figure	NF	V_{CE}=10V, I_C=5mA, f=0.9GHz, See specified Test Circuit.		2.2	4.5	dB

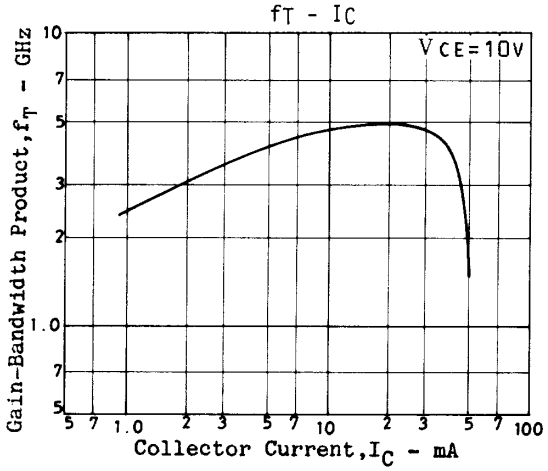
NF Test Circuit

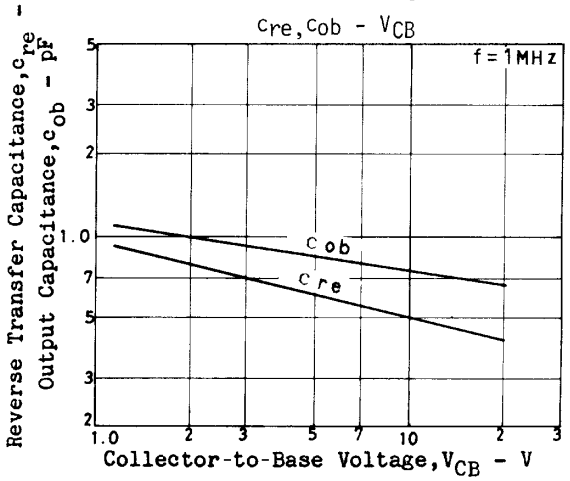


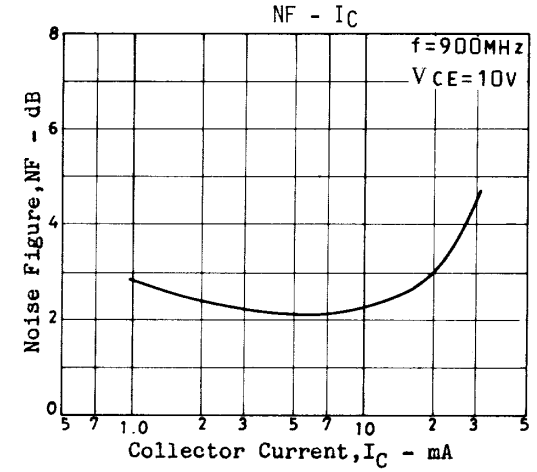
	900MHz
C1	~5pF
C2	~10pF
C3	~10pF
C4	~10pF
C5	~10pF
L1	W ≈ 1.5mm, l ≈ 25mm Strip line
L2	W ≈ 4mm, l ≈ 25mm Strip line
L3	0.5ϕ, l ≈ 40mm
CH	2t+bead core

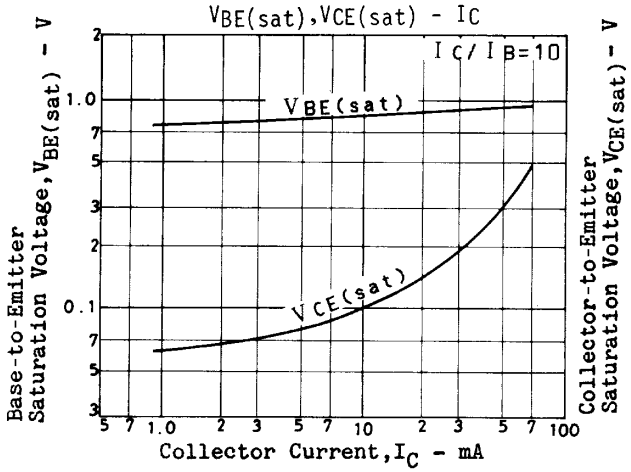

IC - VBE
VCE=10V
Collector Current, IC - mA
Base-to-Emitter Voltage, VBE - V

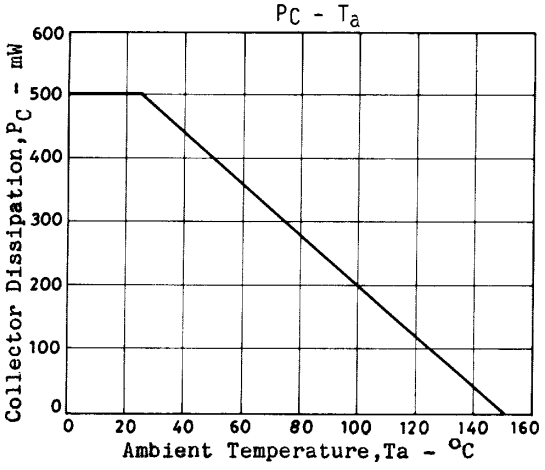

hFE - IC
VCE=10V
DC Current Gain, hFE
Collector Current, IC - mA


fT - IC
VCE=10V
Gain-Bandwidth Product, fT - GHz
Collector Current, IC - mA

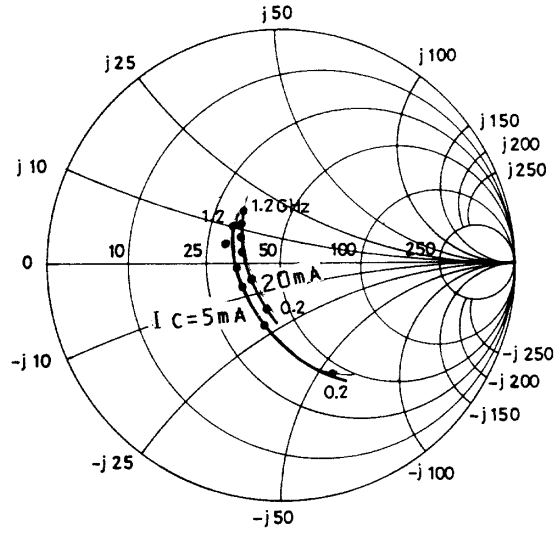

Cre, Cob - VCB
f=1MHz
Cob
Cre
Reverse Transfer Capacitance, Cre - pF
Output Capacitance, Cob - pF
Collector-to-Base Voltage, VCB - V


NF - IC
f=900MHz
VCE=10V
Noise Figure, NF - dB
Collector Current, IC - mA

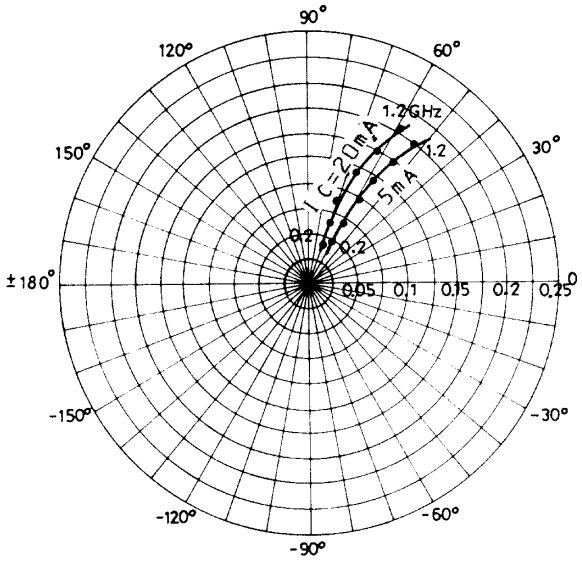

VBE(sat), VCE(sat) - IC
IC / IB=10
VBE(sat)
VCE(sat)
Base-to-Emitter Saturation Voltage, VBE(sat) - V
Collector-to-Emitter Saturation Voltage, VCE(sat) - V
Collector Current, IC - mA


PC - Ta
Collector Dissipation, PC - mW
Ambient Temperature, Ta - °C

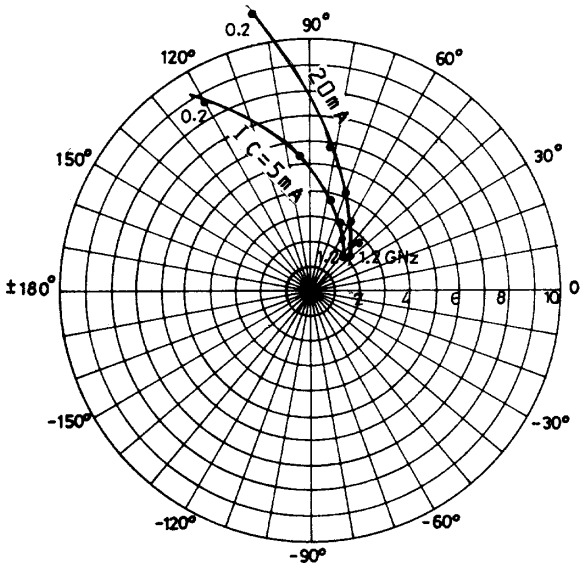
S11e : VCE=10V
f=200MHz step



S12e : VCE=10V
f=200MHz step



S21e : VCE=10V
f=200MHz step



S22e : VCE=10V
f=200MHz step