

**2SC3778**

UHF Low-Noise Amplifier, Wide-Band Amplifier Applications

Applications

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

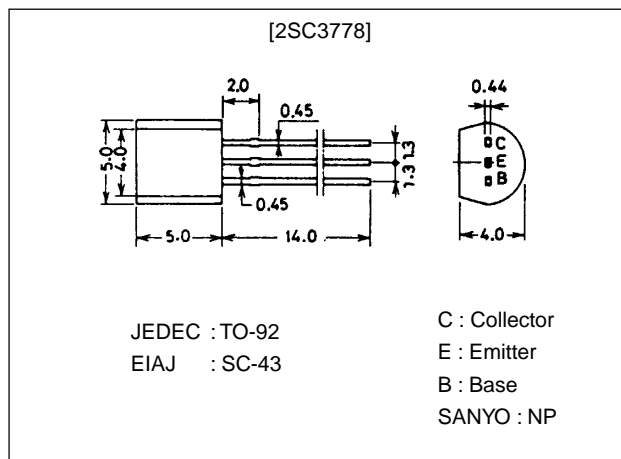
Features

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

Package Dimensions

unit:mm

2004A



Specifications

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

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	T_J		150	$^\circ\text{C}$
Storage Temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

Electrical Characteristics at $T_a = 25^\circ\text{C}$

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

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

40	C	80	60	D	120	100	E	200
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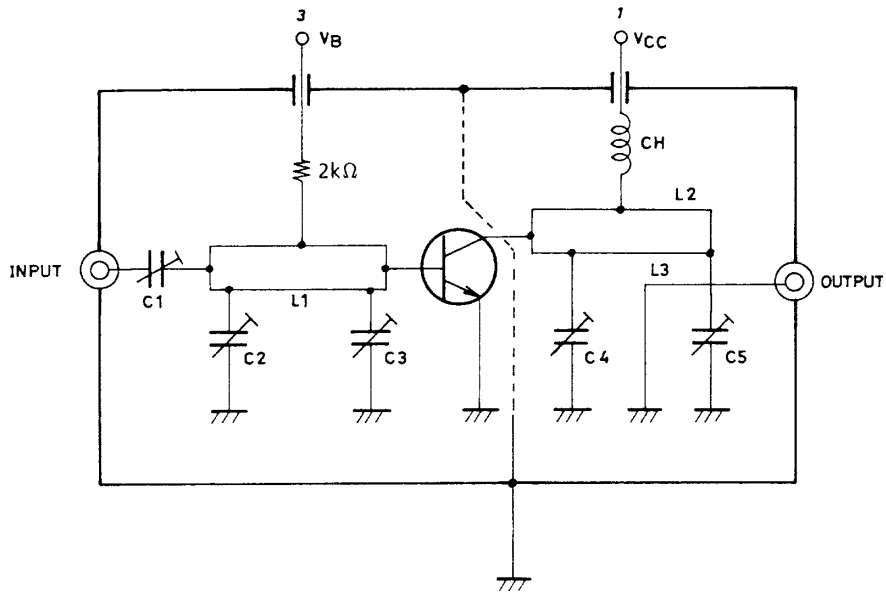
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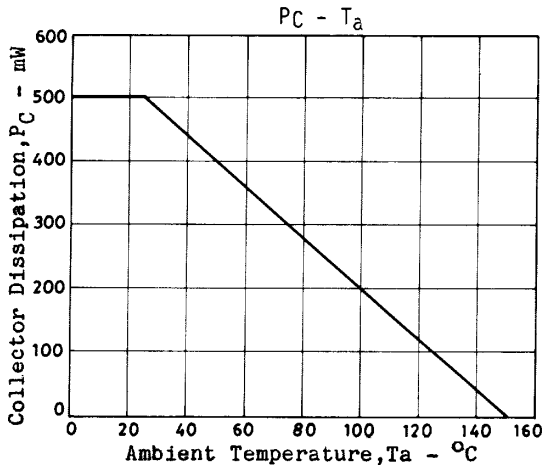
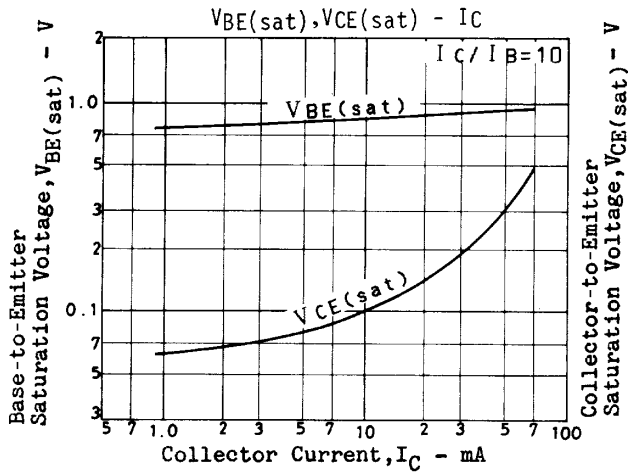
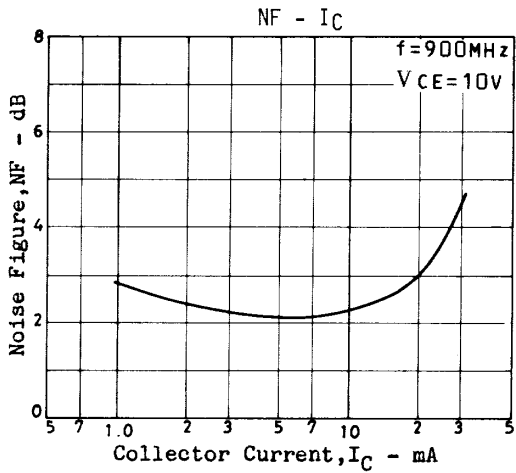
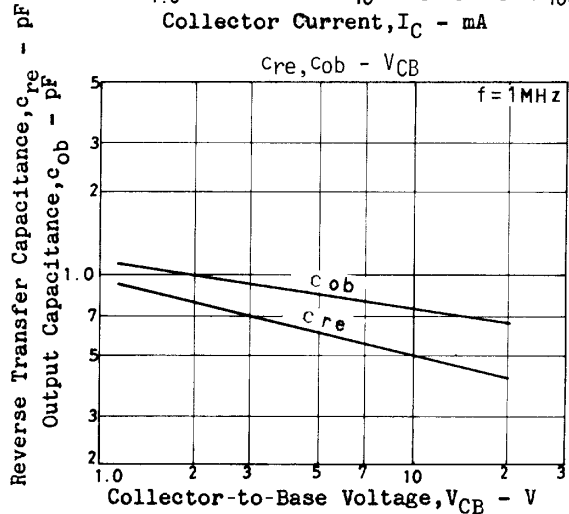
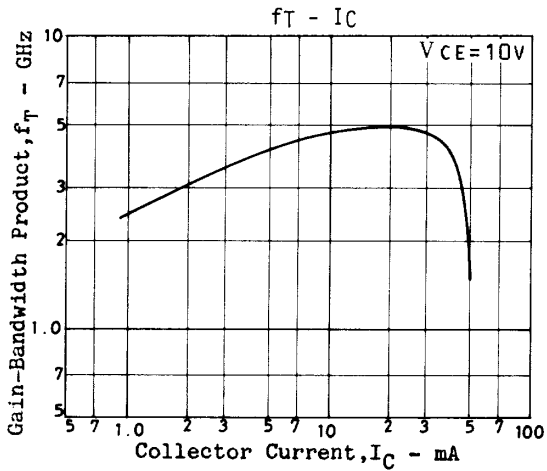
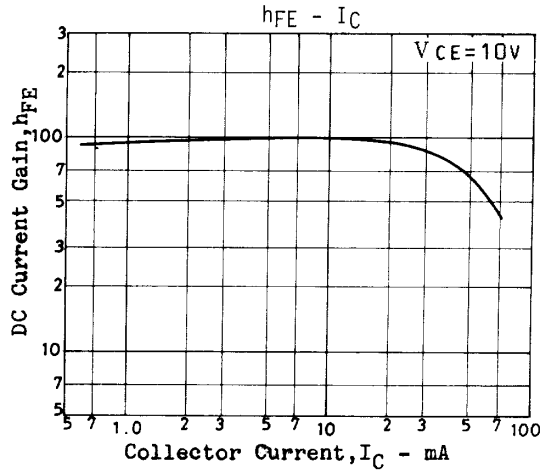
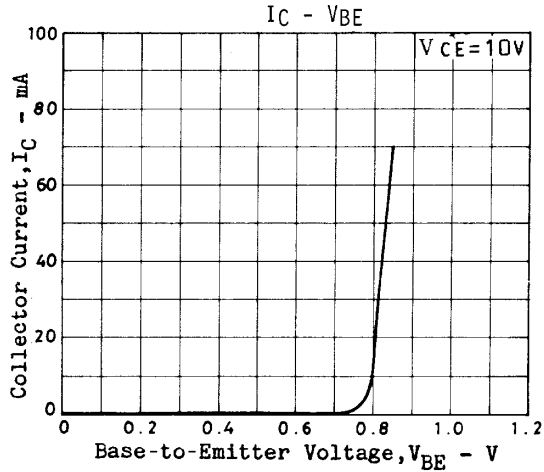
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Forward Transfer Gain	$ S_{21e} ^2$	$V_{CE}=10V, I_C=20mA, f=0.9GHz$	8	10		dB
Maximum Available Power Gain	MAG	$V_{CE}=10V, I_C=20mA, f=0.9GHz$		14		dB
Noise Figure	NF	$V_{CE}=10V, I_C=5mA, f=0.9GHz,$ See specified Test Circuit.		2.2	4.5	dB

NF Test Circuit



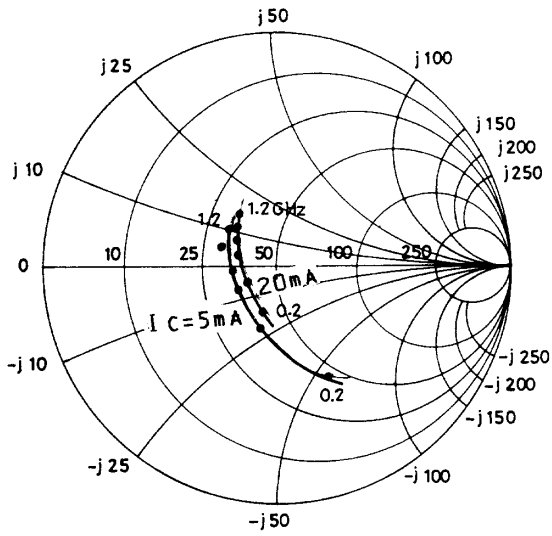
	900MHz
C1	~5pF
C2	~10pF
C3	~10pF
C4	~10pF
C5	~10pF
L1	W ≈ 1.5mm, l ≈ 25mm Strip line
L2	W ≈ 4mm, l ≈ 25mm Strip line
L3	0.5φ, l ≈ 40mm
CH	2t+bead core

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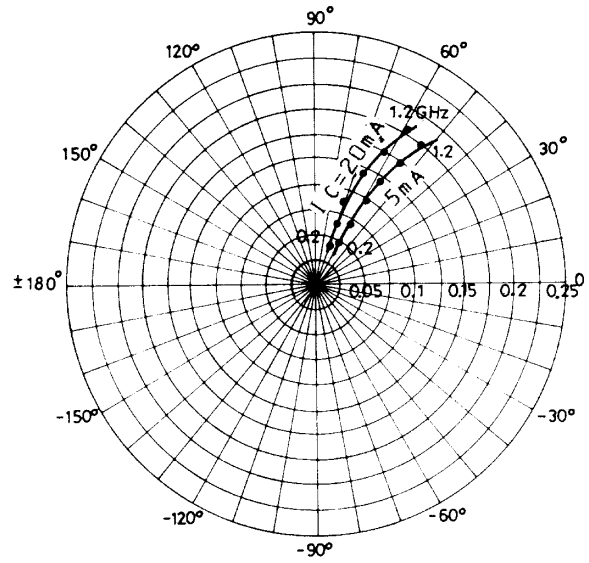


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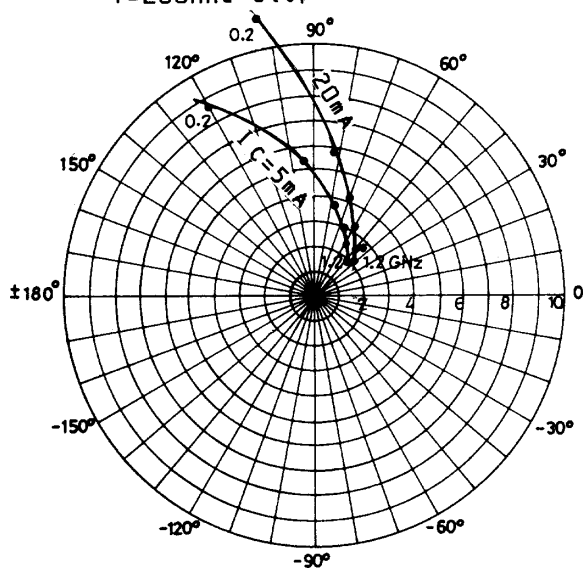
S11e : VCE=10V
f=200MHz step



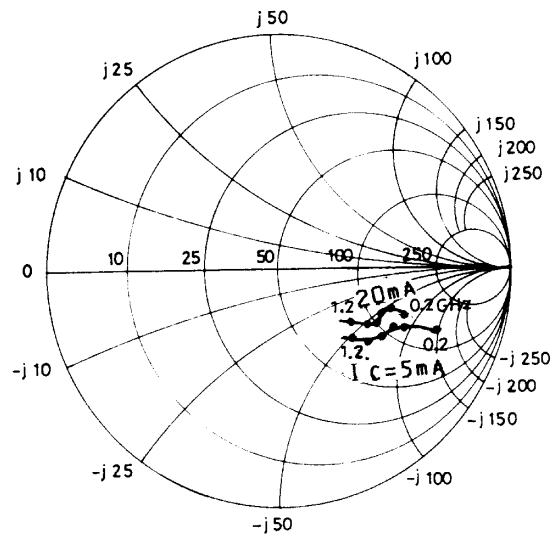
S12e : VCE=10V
f=200MHz step



S21e : VCE=10V
f=200MHz step



S22e : VCE=10V
f=200MHz step



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