

**2SC3777**

## UHF Oscillator, Mixer, Low-Noise Amplifier, Wide-Band Amplifier Applications

### Applications

- UHF frequency converters, local oscillators, low-noise amplifiers, wide-band amplifiers.

### Features

- Small noise figure : NF=3.0dB typ (f=0.9GHz).
- High power gain : MAG=12dB typ (f=0.9GHz).
- High cutoff frequency :  $f_T=3.5$ GHz typ.

### Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CB0}$		25	V
Collector-to-Emitter Voltage	$V_{CEO}$		16	V
Emitter-to-Base Voltage	$V_{EBO}$		3	V
Collector Current	$I_C$		50	mA
Base Current	$I_B$		20	mA
Collector Dissipation	$P_C$		400	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	$I_{CBO}$	$V_{CB}=16\text{V}, I_E=0$			1.0	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=2\text{V}, I_C=0$			10	$\mu\text{A}$
DC Current Gain	$h_{FE}$	$V_{CE}=10\text{V}, I_C=5\text{mA}$	40*		200*	
Gain-Bandwidth Product	$f_T$	$V_{CE}=10\text{V}, I_C=5\text{mA}$	1.8	3.5		GHz
Output Capacitance	$C_{ob}$	$V_{CB}=10\text{V}, f=1\text{MHz}$		0.7	1.0	pF
Reverse Transfer Capacitance	$C_{re}$	$V_{CB}=10\text{V}, f=1\text{MHz}$		0.45		pF

\* : The 2SC3777 is classified by 5mA  $h_{FE}$  as follows :

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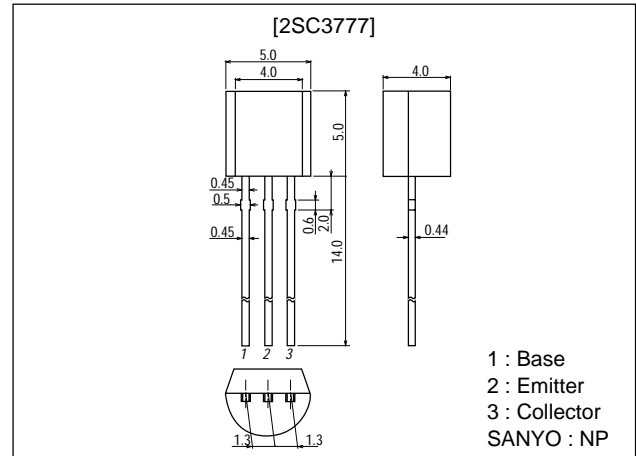
Rank	C	D	E
$h_{FE}$	40 to 80	60 to 120	100 to 200

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### Package Dimensions

unit:mm

2004B

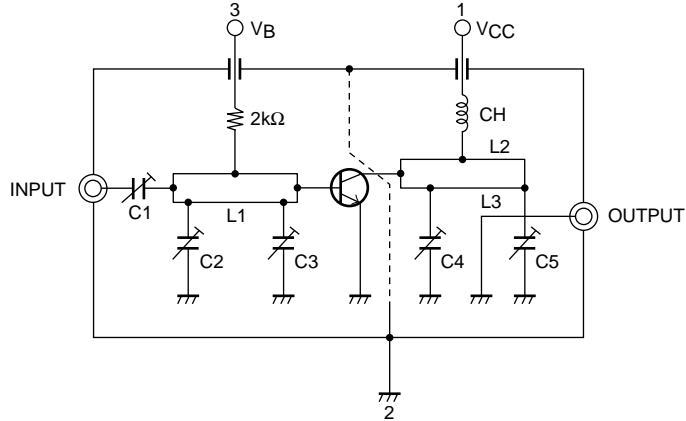


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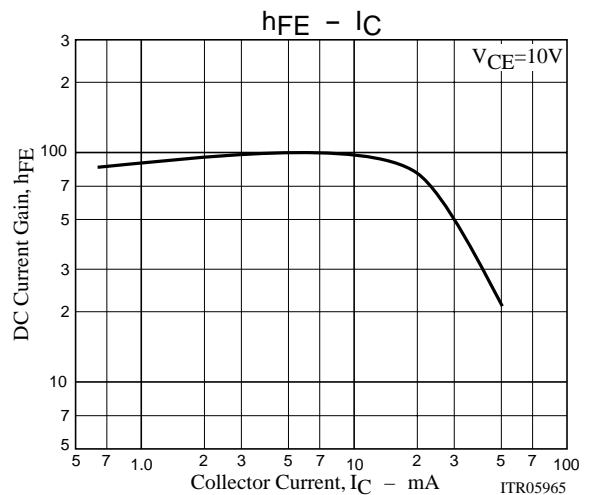
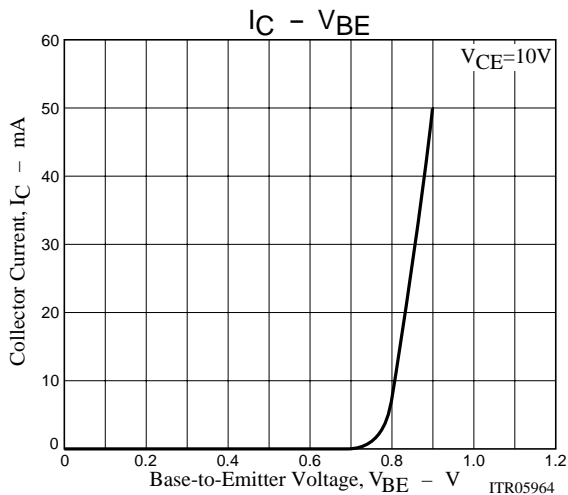
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Forward Transfer Gain	$ S_{21e} ^2$	$V_{CE}=10V, I_C=10mA, f=0.9GHz$	7.5	9		dB
Maximum Available Power Gain	MAG	$V_{CE}=10V, I_C=10mA, f=0.9GHz$		12		dB
Noise Figure	NF	$V_{CE}=10V, I_C=3mA, f=0.9GHz$ , See specified Test Circuit.		3.0	5.0	dB

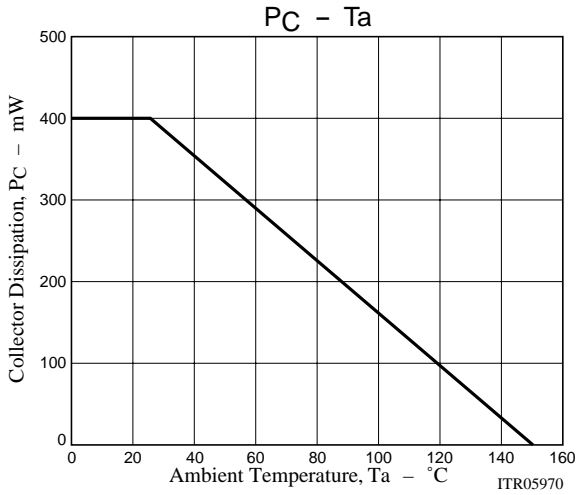
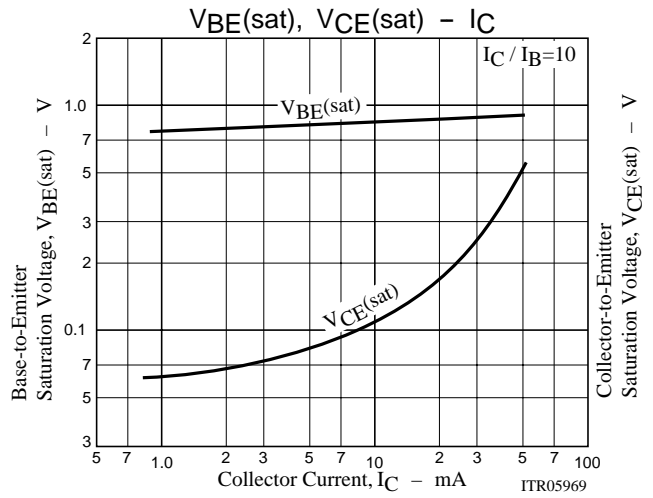
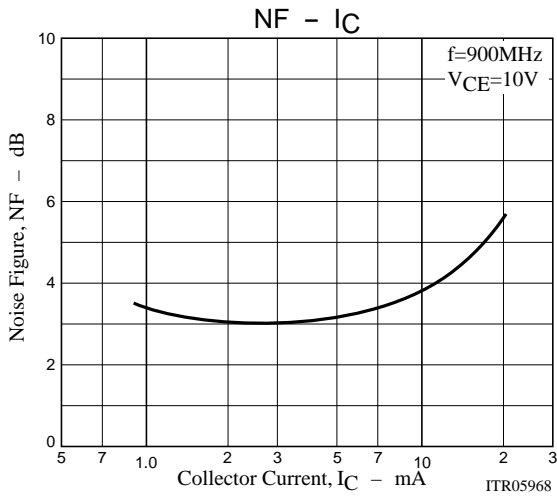
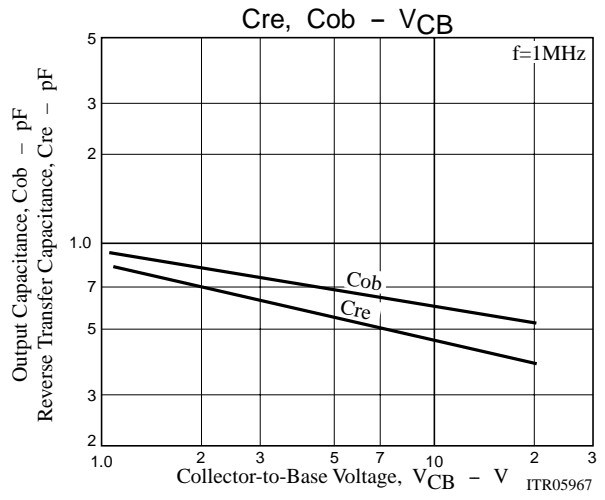
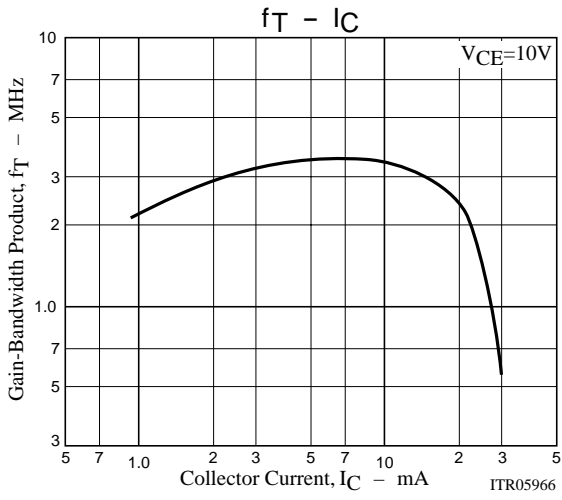
## NF Test Circuit



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



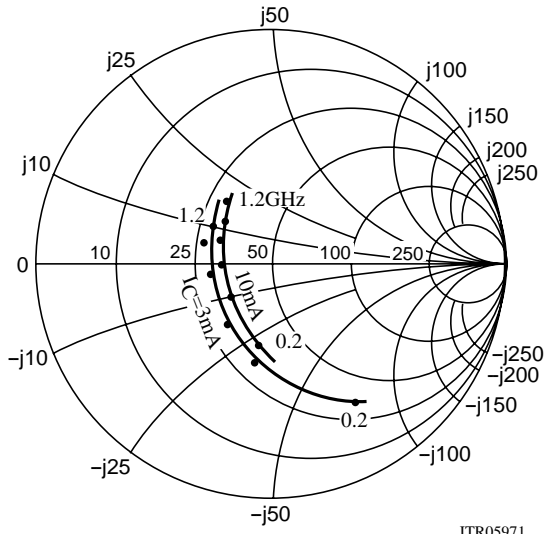
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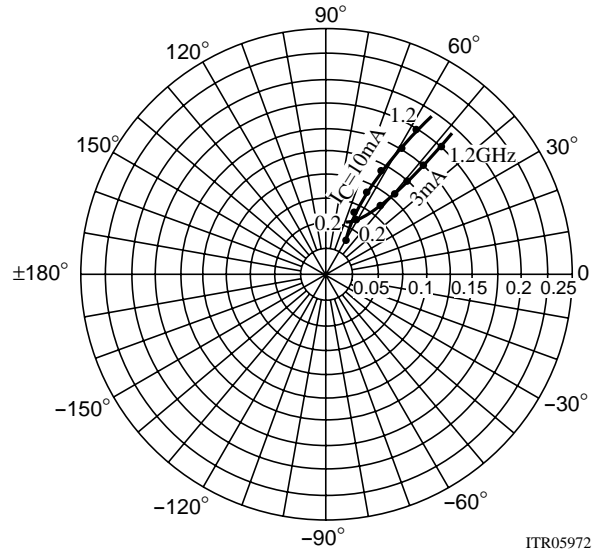
## S parameter

S11e :  $V_{CE}=10V$   
f=200MHz step



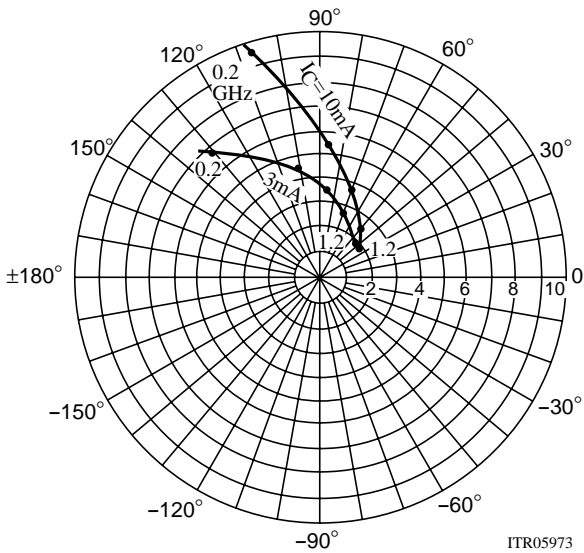
ITR05971

S12e :  $V_{CE}=10V$   
f=200MHz step



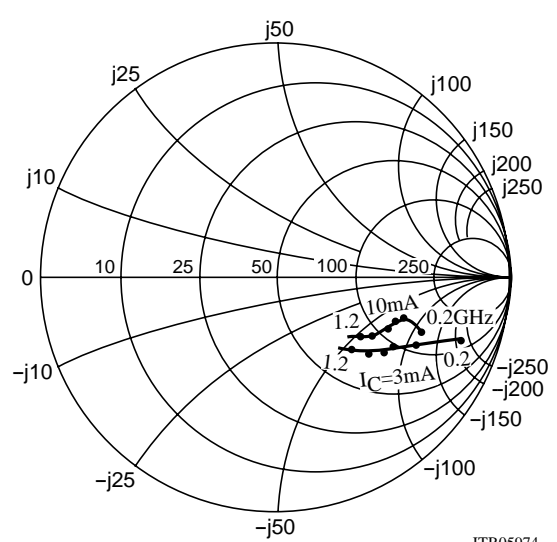
ITR05972

S21e :  $V_{CE}=10V$   
f=200MHz step



ITR05973

S22e :  $V_{CE}=10V$   
f=200MHz step



ITR05974

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