



No.1951B

**2SC3778**

NPN Epitaxial Planar Silicon Transistor

**UHF Low-Noise Amp,  
Wide-Band Amp Applications**

**Applications**

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

**Features**

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

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

			unit
Collector to Base Voltage	$V_{CB0}$	20	V
Collector to Emitter Voltage	$V_{CE0}$	12	V
Emitter to Base Voltage	$V_{EB0}$	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	$^\circ\text{C}$

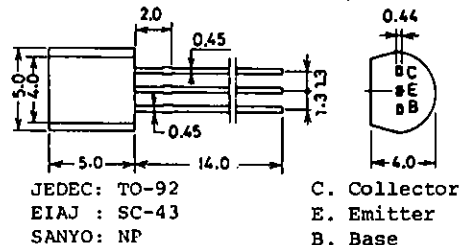
**Electrical Characteristics at  $T_a=25^\circ\text{C}$**

			min	typ	max	unit
Collector Cutoff Current	$I_{CB0}$	$V_{CB}=12\text{V}, I_E=0$			1.0	$\mu\text{A}$
Emitter Cutoff Current	$I_{EB0}$	$V_{EB}=2\text{V}, I_C=0$			10	$\mu\text{A}$
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
Forward Transfer Gain	$ S_{21e}^2 $	$V_{CE}=10\text{V}, I_C=20\text{mA}, f=0.9\text{GHz}$	8	10		dB
Maximum Available Power Gain	MAG	$V_{CE}=10\text{V}, I_C=20\text{mA}, f=0.9\text{GHz}$		14		dB
Noise Figure	NF	$V_{CE}=10\text{V}, I_C=5\text{mA}, f=0.9\text{GHz}$ , See specified Test Circuit.		2.2	4.5	dB

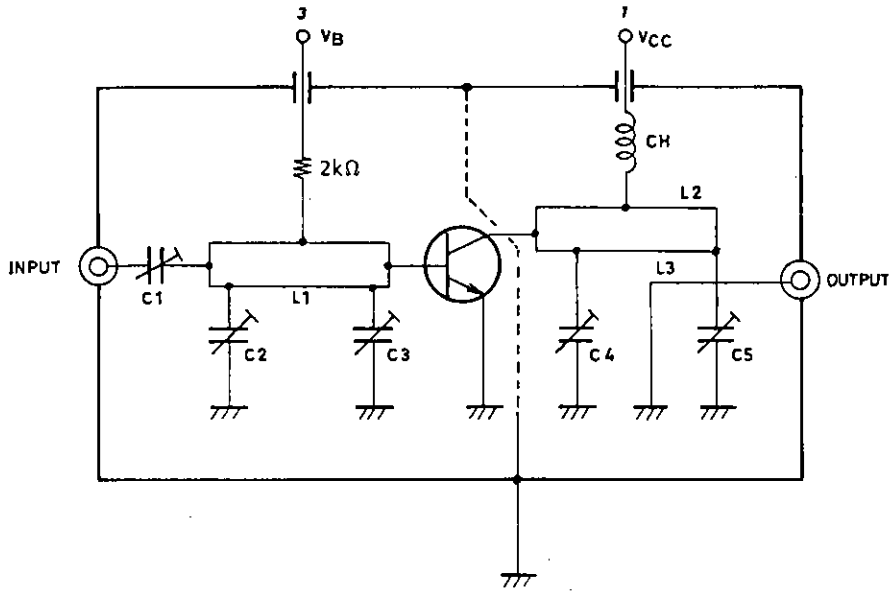
\*: The 2SC3778 is classified by 20mA  $h_{FE}$  as follows:

40	C	80	60	D	120	100	E	200
----	---	----	----	---	-----	-----	---	-----

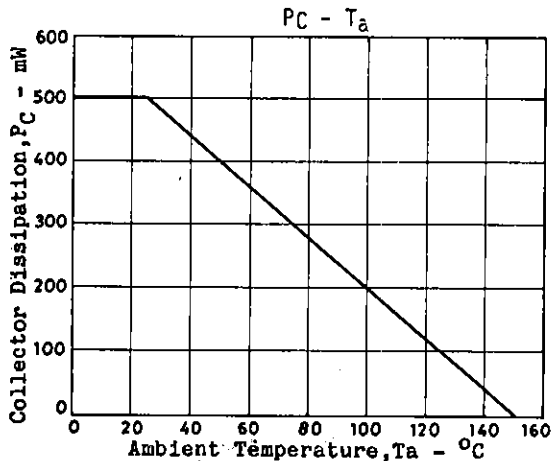
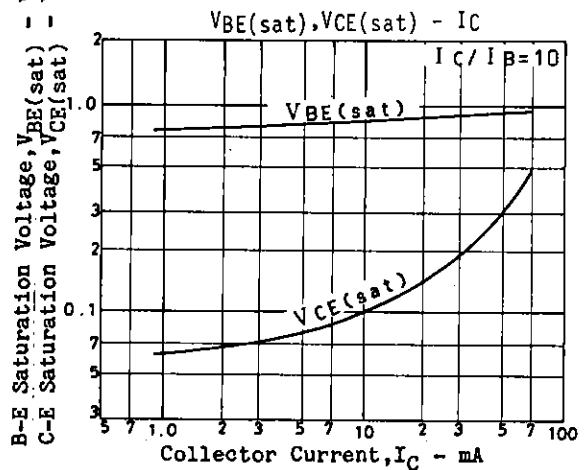
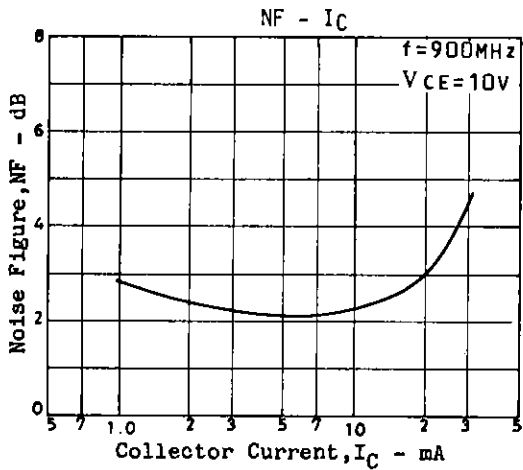
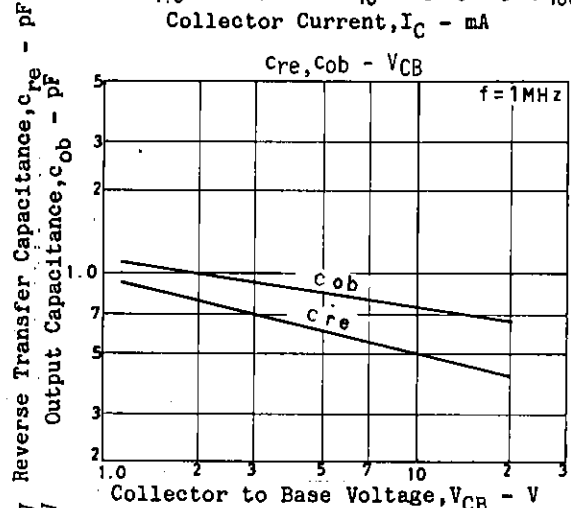
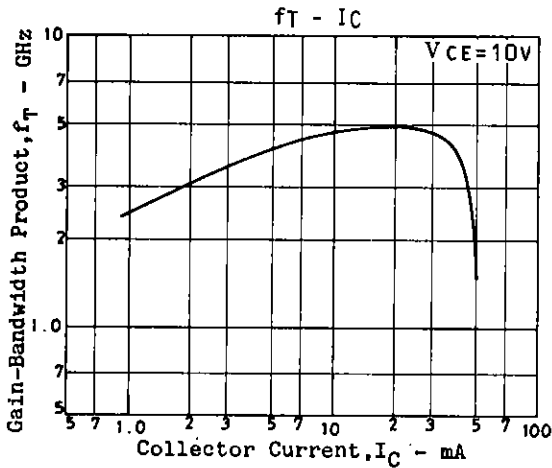
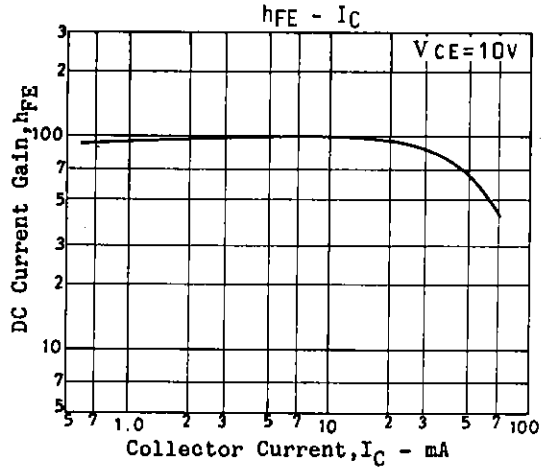
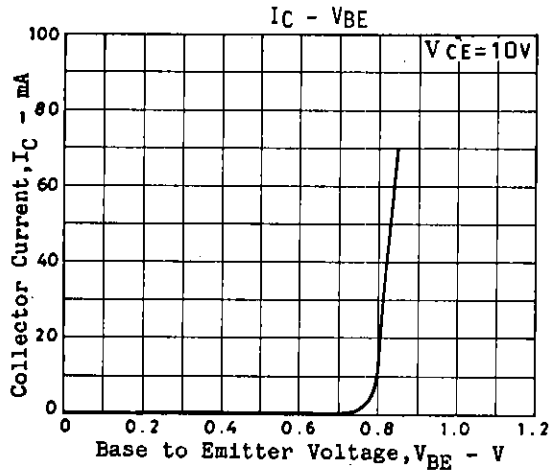
**Package Dimensions 2004A  
(unit: mm)**



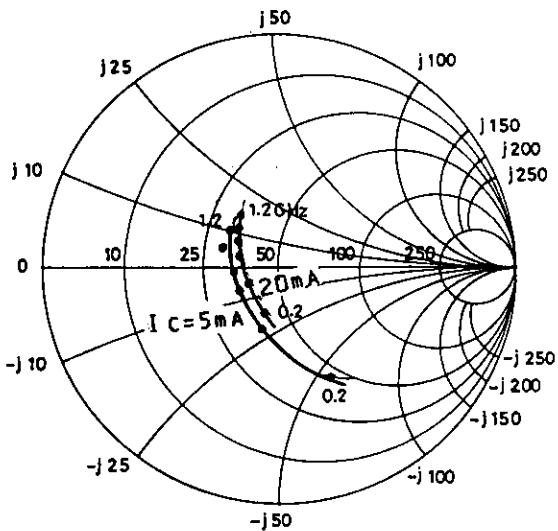
## NF Test Circuit



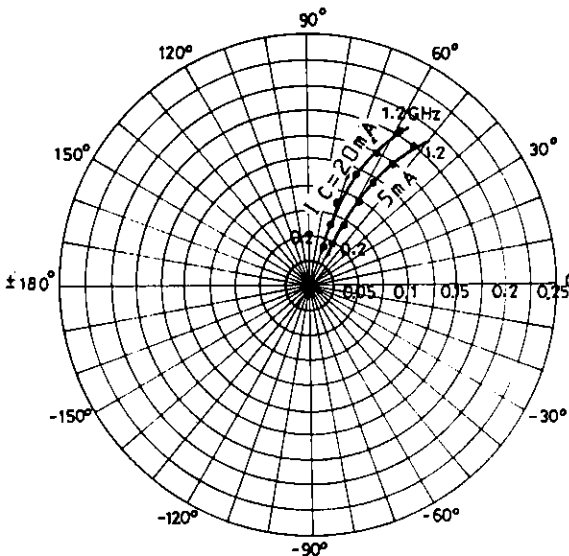
900MHz	
C1	~5 pF
C2	~10 pF
C3	~10 pF
C4	~10 pF
C5	~10 pF
L1	W≐1.5mm, l≐25mm <b>strip line</b>
L2	W≐4mm, l≐25mm <b>strip line</b>
L3	0.5φ, l≐40mm
CH	<b>2t+bead core</b>



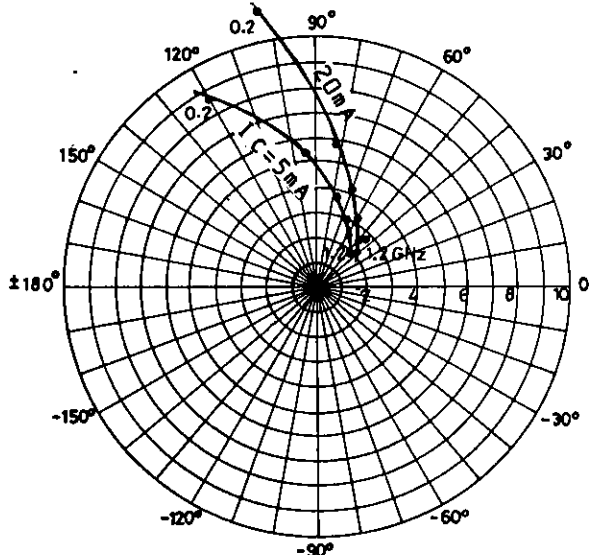
S11e : V<sub>CE</sub>=10V  
f=200MHz step



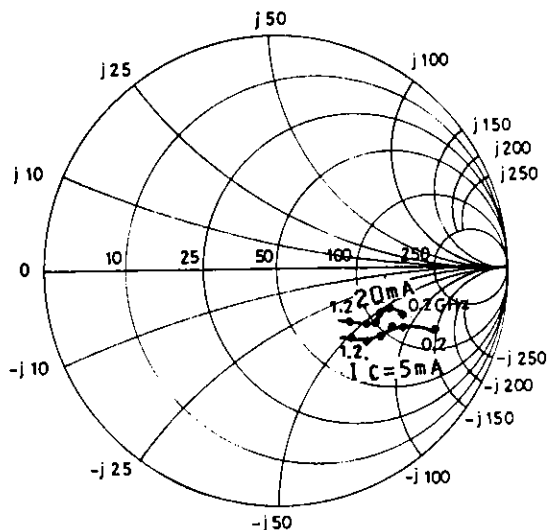
S12e : V<sub>CE</sub>=10V  
f=200MHz step



S21e : V<sub>CE</sub>=10V  
f=200MHz step



S22e : V<sub>CE</sub>=10V  
f=200MHz step



■ No products described or contained herein are intended for use in surgical implants, life-support systems, aerospace equipment, nuclear power control systems, vehicles, disaster/crime-prevention equipment and the like, the failure of which may directly or indirectly cause injury, death or property loss.

■ Anyone purchasing any products described or contained herein for an above-mentioned use shall:

- ① Accept full responsibility and indemnify and defend SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors and all their officers and employees, jointly and severally, against any and all claims and litigation and all damages, cost and expenses associated with such use;
- ② Not impose any responsibility for any fault or negligence which may be cited in any such claim or litigation on SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors or any of their officers and employees jointly or severally.

■ Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.