

**SANYO**

No.1949B

**2SC3776**

NPN Epitaxial Planar Silicon Transistor

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

**Applications**

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

**Features**

- Small noise figure:  $NF=2.5\text{dB typ}(f=0.9\text{GHz})$ .
- High power gain:  $MAG=12\text{dB typ}(f=0.9\text{GHz})$ .
- High cutoff frequency:  $f_T=3.0\text{GHz typ}$ .

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

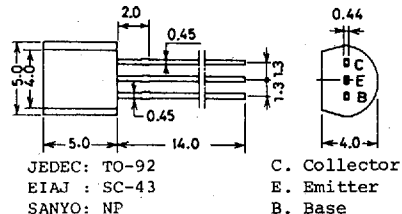
			unit
Collector to Base Voltage	$V_{CB0}$	25	V
Collector to Emitter Voltage	$V_{CE0}$	16	V
Emitter to Base Voltage	$V_{EB0}$	3	V
Collector Current	$I_C$	70	mA
Base Current	$I_B$	20	mA
Collector Dissipation	$P_C$	400	mW
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

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

			min	typ	max	unit
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	$h_{FE}$	$V_{CE}=10\text{V}, I_C=10\text{mA}$	40*		200*	
Gain-Bandwidth Product	$f_T$	$V_{CE}=10\text{V}, I_C=10\text{mA}$	1.5	3.0		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
Forward Transfer Gain	$ S_{21e}^2 $	$V_{CE}=10\text{V}, I_C=10\text{mA}, f=0.9\text{GHz}$	7	9		dB
Maximum Available Power Gain	MAG	$V_{CE}=10\text{V}, I_C=10\text{mA}, f=0.9\text{GHz}$		12		dB
Noise Figure	NF	$V_{CE}=10\text{V}, I_C=3\text{mA}, f=0.9\text{GHz}$ , See specified Test Circuit.	2.5			dB

\*: The 2SC3776 is classified by 10mA  $h_{FE}$  as follows:

40	C	80	60	D	120	100	E	200
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**Case Outline 2004A**  
(unit:mm)

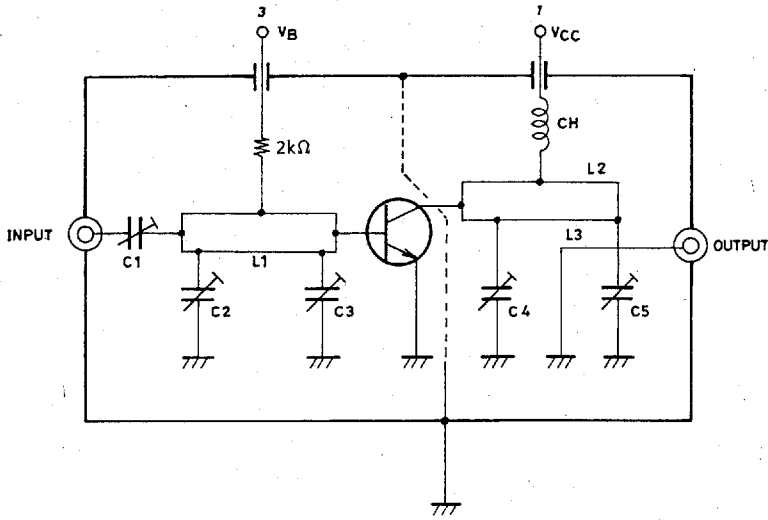
Specifications and information herein are subject to change without notice.

**SANYO Electric Co., Ltd. Semiconductor Business Headquarters**

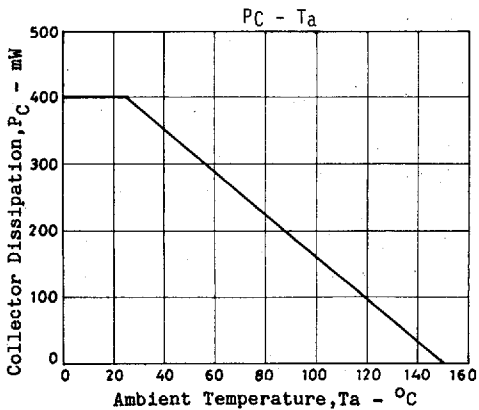
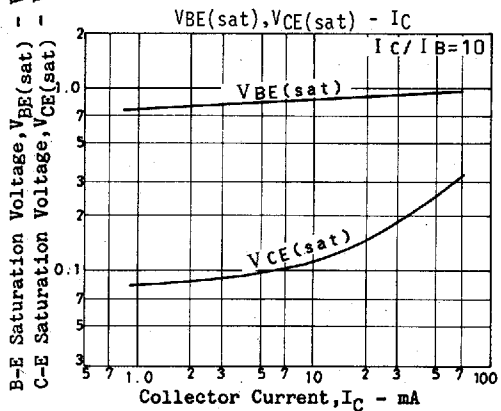
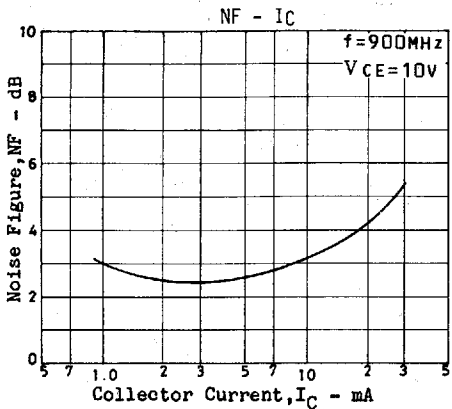
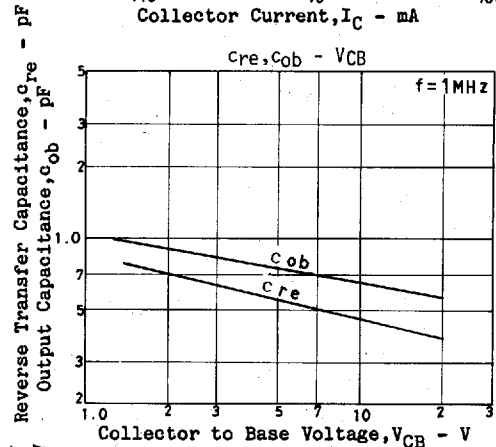
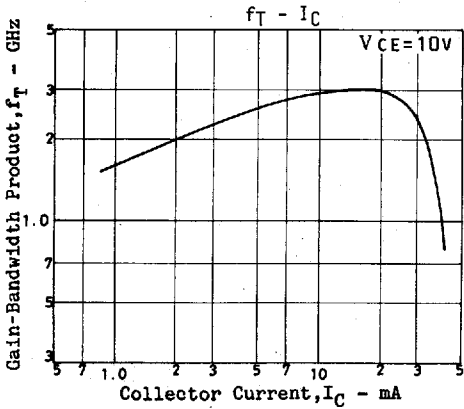
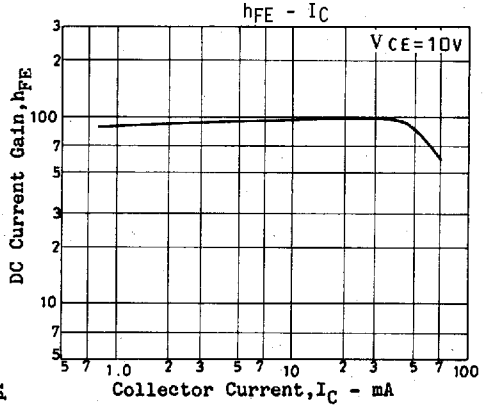
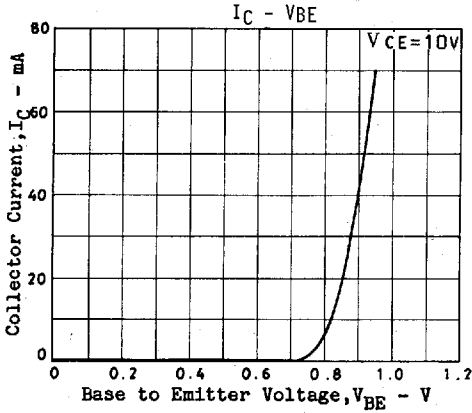
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110 JAPAN

5318M0/5137KI/0185KI, TS No. 1949-1/4 ■ 7997076 0015498 531 ■

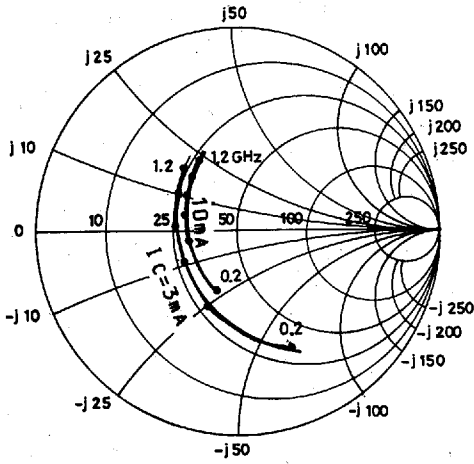
## NF Test Circuit



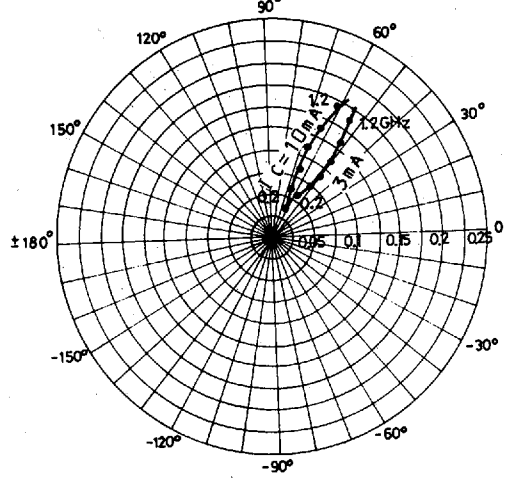
900MHz	
C1	~5 pF
C2	~10 pF
C3	~10 pF
C4	~10 pF
C5	~10 pF
L1	W≐1.5mm, l≐25mm strip line
L2	W≐4mm, l≐25mm strip line
L3	0.5φ, l≐40mm
CH	2t+bead core



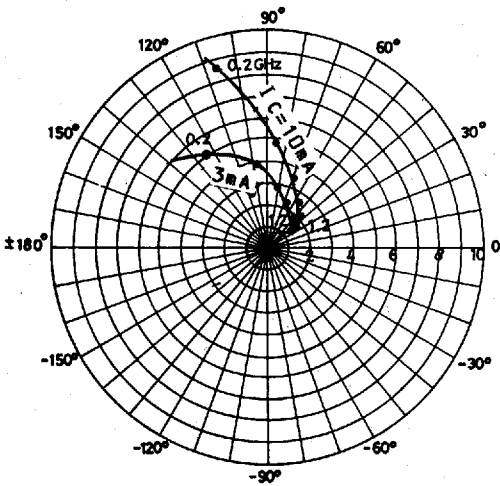
S11e : VCE=10V  
f=200MHz step



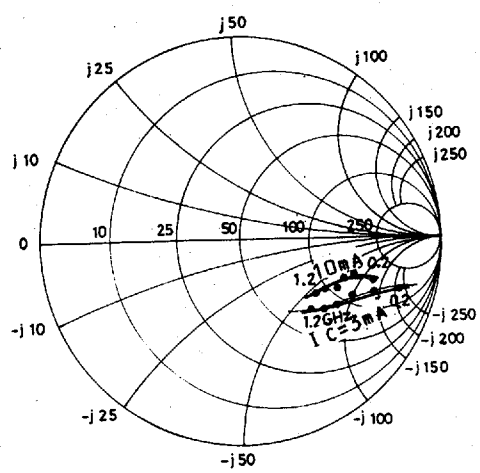
S12e : VCE=10V  
f=200MHz step



S21e : VCE=10V  
f=200MHz step



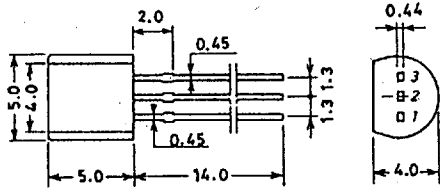
S22e : VCE=10V  
f=200MHz step



# CASE OUTLINES OF LEAD FORMED SMALL SIGNAL TRANSISTORS

- All of Sanyo lead formed small signal transistor case outlines are illustrated below.
- All dimensions are in mm, and dimensions which are not followed by min. or max. are represented by typical values.
- No marking is indicated.

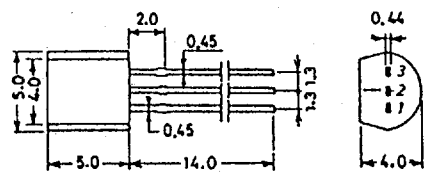
Case Outline 2003A/2003B (unit : mm)



JEDEC : TO-92  
EIAJ : SC-43  
SANYO : NP

1 : Emitter  
2 : Collector  
3 : Base

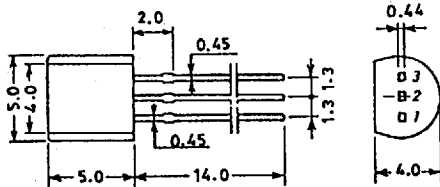
Case Outline 2019A/2019B (unit : mm)



JEDEC : TO-92  
EIAJ : SC-43  
SANYO : NP

1 : Source  
2 : Gate  
3 : Drain

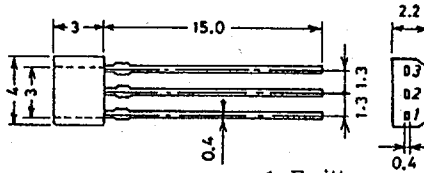
Case Outline 2004A (unit : mm)



JEDEC : TO-92  
EIAJ : SC-43  
SANYO : NP

1 : Base  
2 : Emitter  
3 : Collector

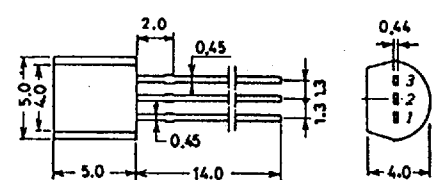
Case Outline 2033 (unit : mm)



1 : Emitter  
2 : Collector  
3 : Base

SANYO : SPA

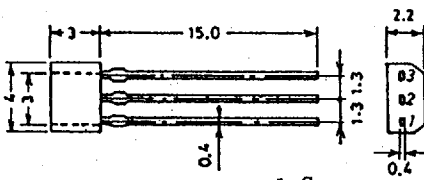
Case Outline 2005A (unit : mm)



JEDEC : TO-92  
EIAJ : SC-43  
SANYO : NP

1 : Drain  
2 : Source  
3 : Gate

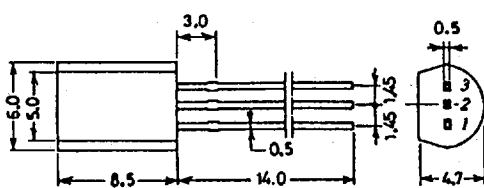
Case Outline 2034/2034A (unit : mm)



1 : Source  
2 : Gate  
3 : Drain

SANYO : SPA

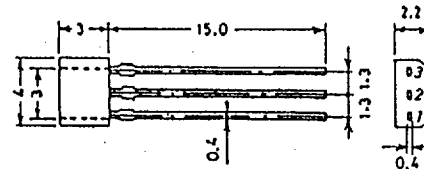
Case Outline 2006A (unit : mm)



EIAJ : SC-51  
SANYO : MP

1 : Emitter  
2 : Collector  
3 : Base

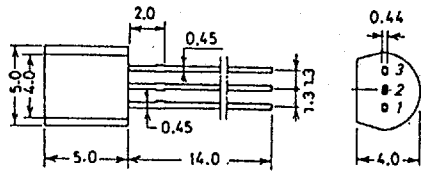
Case Outline 2040 (unit : mm)



1 : Drain  
2 : Source  
3 : Gate

SANYO : SPA

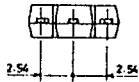
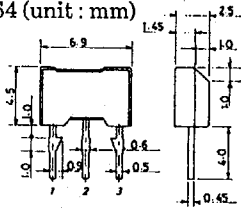
Case Outline 2061 (unit : mm)



JEDEC : TO-92  
EIAJ : SC-43  
SANYO : NP

1: Emitter  
2: Base  
3: Collector

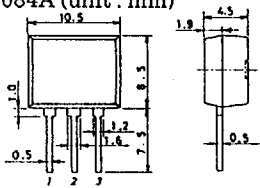
Case Outline 2064 (unit : mm)



1: Emitter  
2: Collector  
3: Base

SANYO : NMP

Case Outline 2084A (unit : mm)



1: Emitter  
2: Collector  
3: Base

SANYO : FLP