

**2SC4931**

## VHF to UHF Wide-Band Low-Noise Amplifier Applications

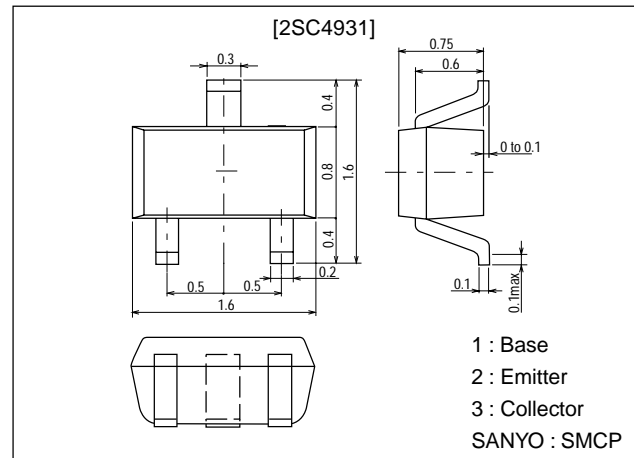
### Features

- Low noise :  $NF=1.2\text{dB}$  typ ( $f=1\text{GHz}$ ).
- High gain :  $|S_{21e}|^2=13\text{dB}$  typ ( $f=1\text{GHz}$ ).
- High cutoff frequency :  $f_T=9.0\text{GHz}$  typ.
- Very small-sized package permitting 2SC4931-applied sets to be made small and slim.

### Package Dimensions

unit:mm

2106A



### Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CB0}$		16	V
Collector-to-Emitter Voltage	$V_{CE0}$		8	V
Emitter-to-Base Voltage	$V_{EBO}$		1.5	V
Collector Current	$I_C$		50	mA
Collector Dissipation	$P_C$		100	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	$I_{CB0}$	$V_{CB}=10\text{V}, I_E=0$			1.0	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=1\text{V}, I_C=0$			10	$\mu\text{A}$
DC Current Gain	$h_{FE}$	$V_{CE}=5\text{V}, I_C=15\text{mA}$	60*		270*	
Gain-Bandwidth Product	$f_T$	$V_{CE}=5\text{V}, I_C=15\text{mA}$		9.0		GHz
Output Capacitance	$C_{ob}$	$V_{CB}=10\text{V}, f=1\text{MHz}$		0.55	1.2	pF
Forward Transfer Gain	$ S_{21e} ^2$	$V_{CE}=5\text{V}, I_C=15\text{mA}, f=1\text{GHz}$	10	13		dB
Noise Figure	NF	$V_{CE}=5\text{V}, I_C=5\text{mA}, f=1\text{GHz}$		1.2	2.5	dB

\* : The 2SC4931 is classified by 15mA  $h_{FE}$  as follows :

Marking	B1	B2	B3
$h_{FE}$	60 to 120	90 to 180	135 to 270

■ Any and all SANYO products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your SANYO representative nearest you before using any SANYO products described or contained herein in such applications.

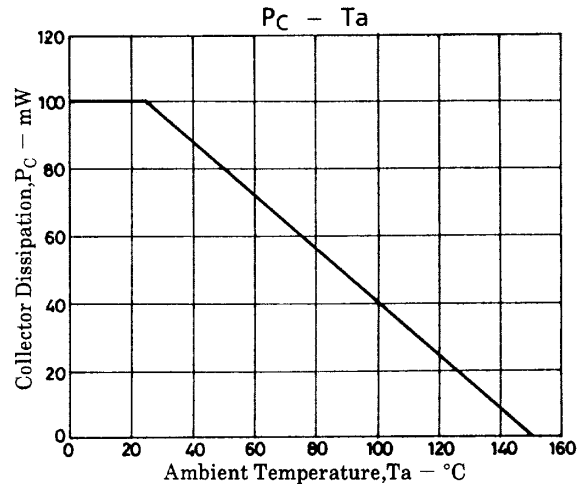
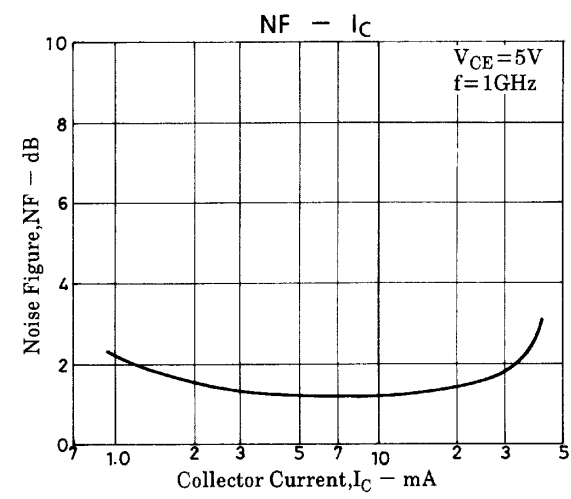
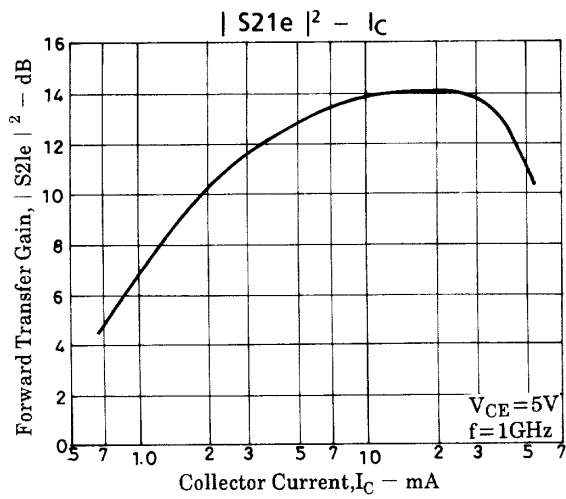
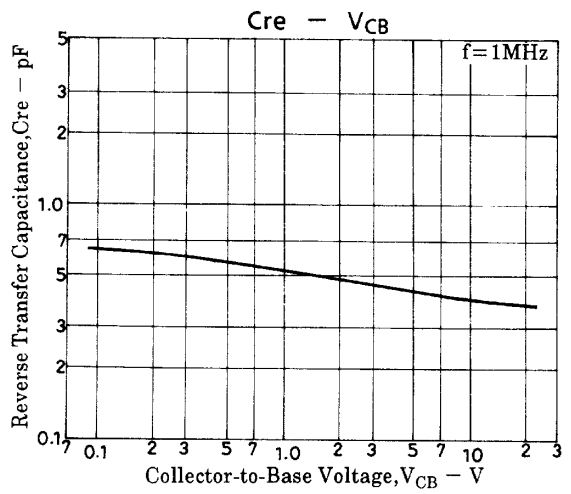
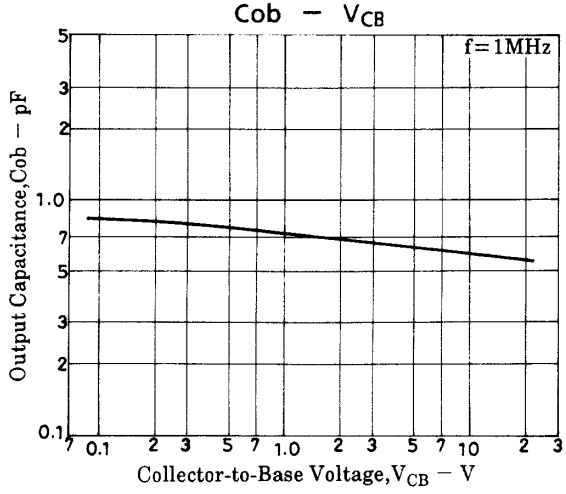
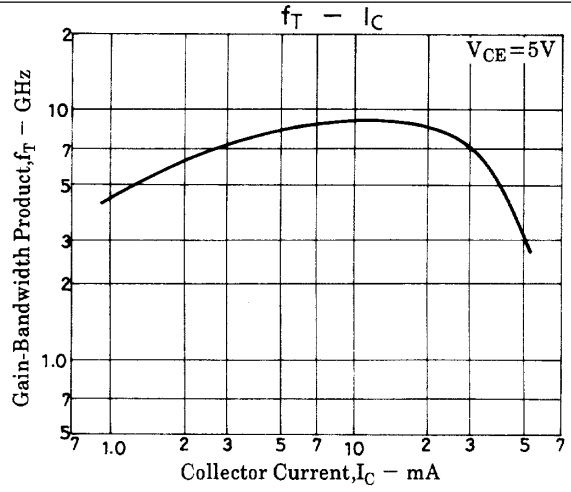
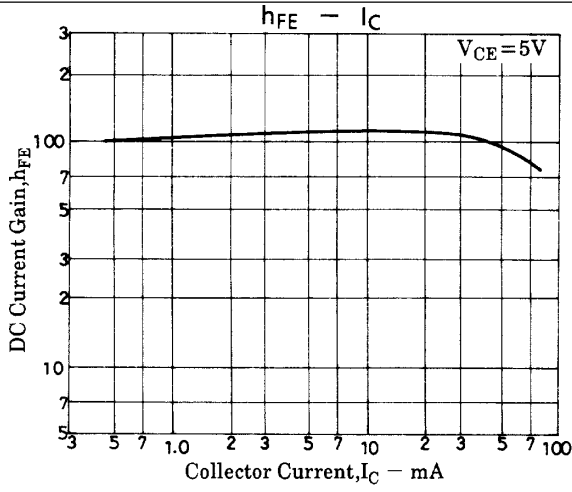
■ SANYO assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all SANYO products described or contained herein.

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

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

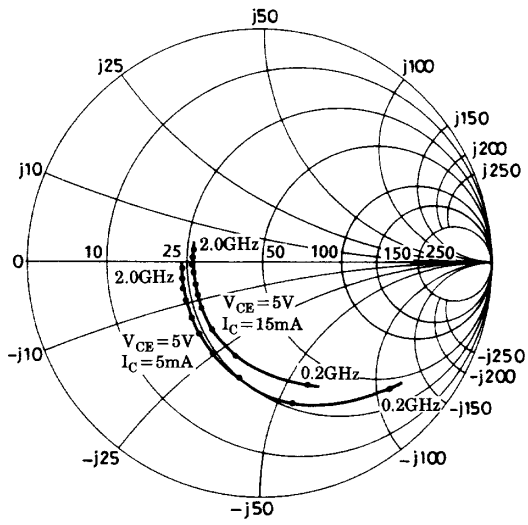
12599HA (KT)/40196TS (KOTO) TA-0210 No.5295-1/4

# 2SC4931

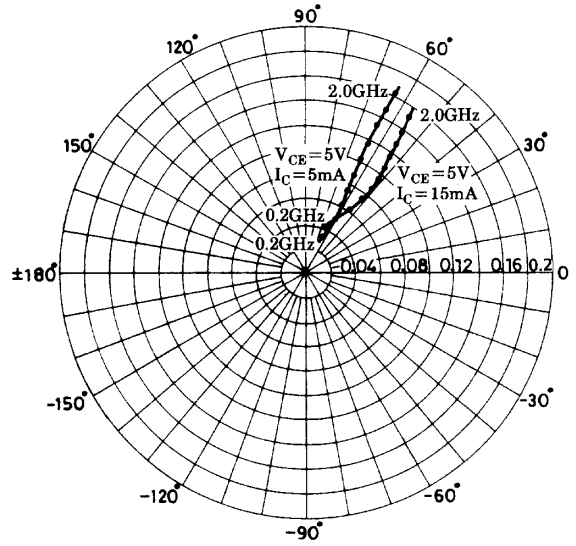


S parameter

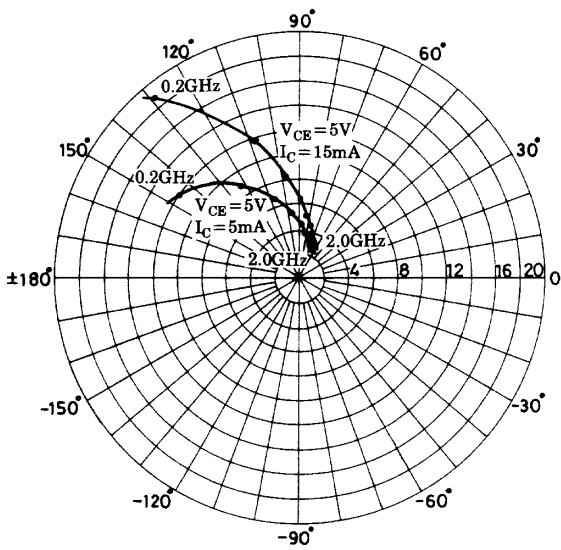
S11e  
f = 200 to 2000MHz (200MHz Step)



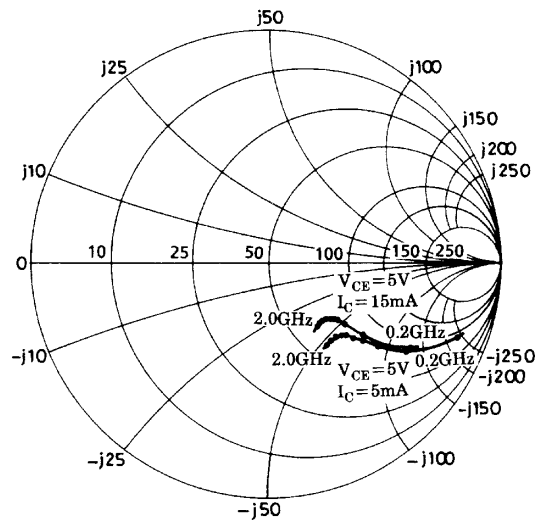
S12e  
f = 200 to 2000MHz (200MHz Step)



S21e  
f = 200 to 2000MHz (200MHz Step)



S22e  
f = 200 to 2000MHz (200MHz Step)



**S parameter (Common emitter)** $V_{CE}=5V, I_C=5mA, Z_O=50\Omega$ 

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.775	-45.2	11.958	144.8	0.040	67.3	0.872	-21.4
400	0.620	-78.1	8.989	122.3	0.063	56.2	0.704	-32.1
600	0.517	-100.9	6.908	107.9	0.076	52.2	0.594	-36.7
800	0.451	-117.9	5.487	97.6	0.087	51.3	0.529	-39.2
1000	0.411	-131.5	4.553	89.8	0.097	51.9	0.491	-40.9
1200	0.385	-142.0	3.899	83.4	0.107	52.7	0.467	-42.5
1400	0.372	-152.5	3.411	77.3	0.117	53.7	0.451	-44.1
1600	0.364	-161.7	3.052	71.3	0.129	54.7	0.438	-46.2
1800	0.353	-168.5	2.740	66.7	0.139	55.4	0.435	-48.8
2000	0.349	-176.6	2.507	62.7	0.152	56.2	0.435	-51.2

 $V_{CE}=5V, I_C=15mA, Z_O=50\Omega$ 

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.560	-70.0	19.044	129.1	0.032	63.2	0.710	-31.1
400	0.422	-106.3	11.887	108.4	0.048	59.7	0.515	-37.2
600	0.364	-127.3	8.449	97.5	0.061	61.3	0.430	-37.9
800	0.330	-143.0	6.510	89.6	0.075	62.5	0.391	-38.8
1000	0.315	-153.4	5.285	83.6	0.089	63.5	0.371	-39.7
1200	0.306	-161.8	4.484	78.4	0.103	64.1	0.360	-41.0
1400	0.302	-170.7	3.898	73.4	0.118	64.2	0.352	-42.7
1600	0.309	-178.5	3.464	68.5	0.133	64.0	0.346	-45.1
1800	0.302	176.0	3.094	64.7	0.147	63.6	0.344	-48.0
2000	0.299	170.6	2.828	61.2	0.163	63.1	0.348	-50.8

- Specifications of any and all SANYO products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.
- SANYO Electric Co., Ltd. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all SANYO products(including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of SANYO Electric Co., Ltd.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the SANYO product that you intend to use.
- 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.

This catalog provides information as of January, 1999. Specifications and information herein are subject to change without notice.