



# EC3H03B

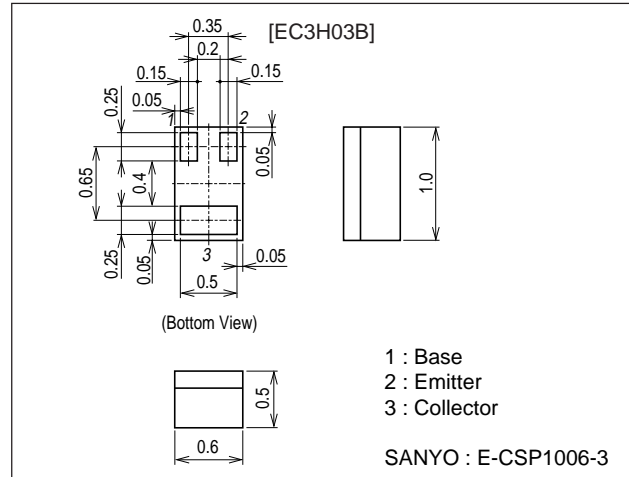
## VHF to UHF Wide-Band Low-Noise Amplifier and OSC Applications

### Features

- Low noise : NF=1.1dB typ (f=1GHz).
- High gain :  $|S_{21e}|^2=12\text{dB}$  typ (f=1GHz).
- High cut-off frequency :  $f_T=7.5\text{GHz}$  typ.
- Ultraminiature (1006 size) and thin (0.5mm) leadless package.

### Package Dimensions

unit : mm  
2183



### 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	$V_{EBO}$		2	V
Collector Current	$I_C$		100	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	$I_{CBO}$	$V_{CB}=10\text{V}, I_E=0$			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	$h_{FE}$	$V_{CE}=5\text{V}, I_C=30\text{mA}$	100		180	
Gain Bandwidth Product	$f_T$	$V_{CE}=5\text{V}, I_C=30\text{mA}$	6	7.5		GHz
Output Capacitance	$C_{ob}$	$V_{CB}=10\text{V}, f=1\text{MHz}$		0.9	1.4	pF
Reverse Transfer Capacitance	$C_{re}$	$V_{CB}=10\text{V}, f=1\text{MHz}$		0.65		pF
Forward Transfer Gain	$ S_{21e} ^2$	$V_{CE}=5\text{V}, I_C=30\text{mA}, f=1\text{GHz}$	10	12		dB
Noise Figure	NF	$V_{CE}=5\text{V}, I_C=7\text{mA}, f=1\text{GHz}$		1.1	2.0	dB

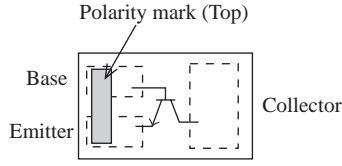
■ Any and all SANYO products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious 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.

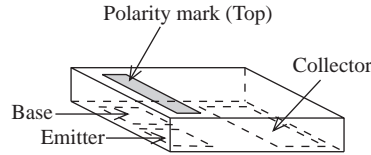
Type No. Indication (Top view)



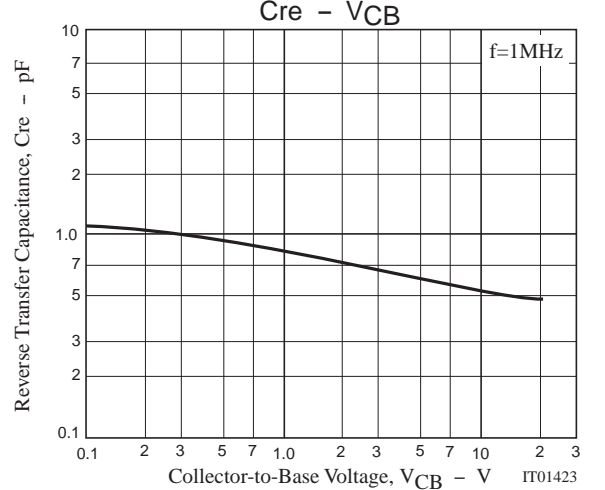
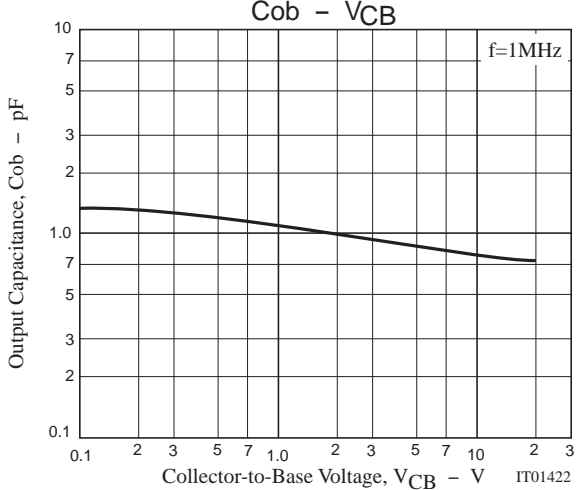
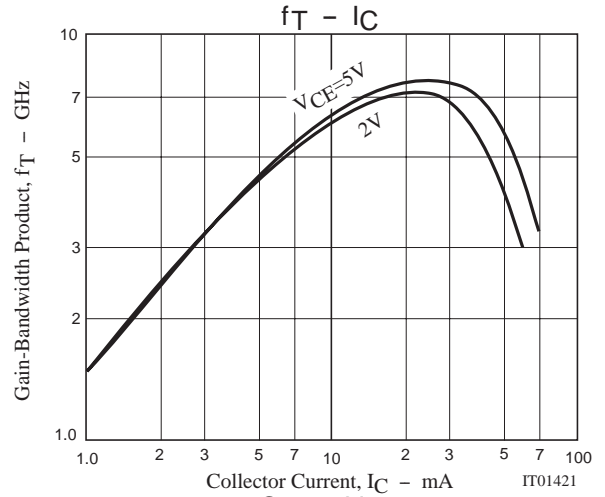
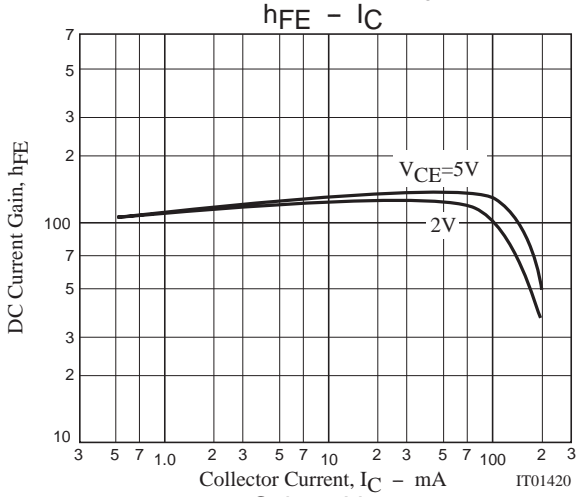
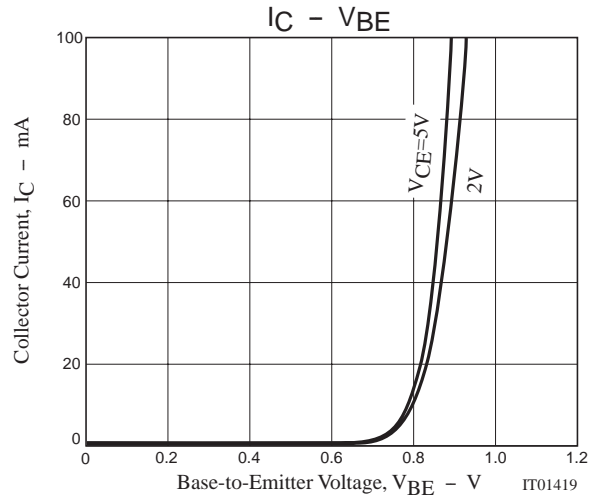
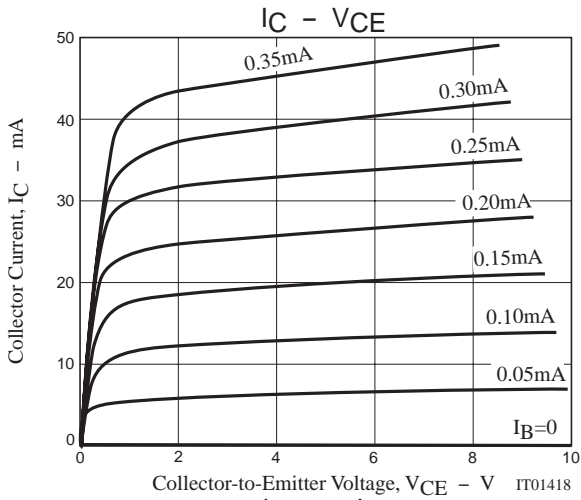
Electrical Connection (Top view)



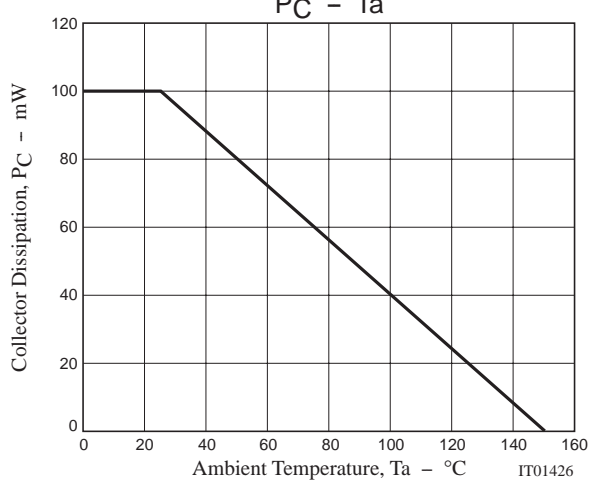
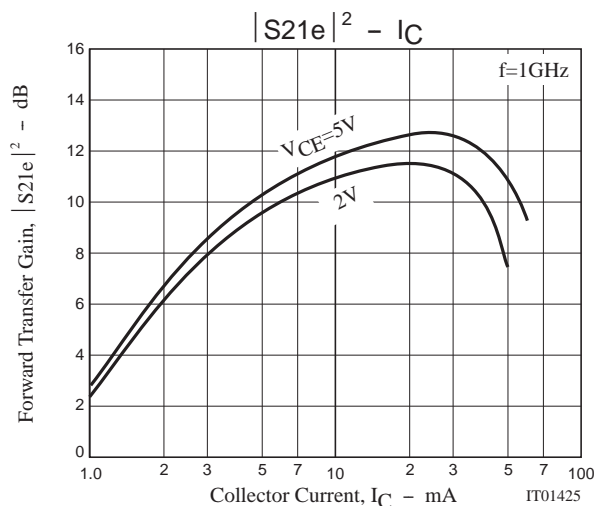
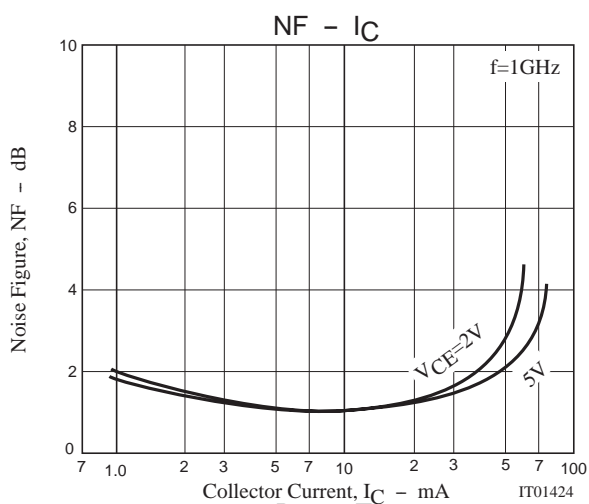
\*Electrodes : on the bottom



This product adopts a high-frequency process. Please be careful when handling it because it is susceptible to static electricity.



# EC3H03B



## S Parameters (Common emitter)

VCE=2V, IC=1mA, ZO=50Ω

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.964	-19.7	3.124	165.8	0.045	78.6	0.978	-9.0
200	0.935	-39.7	2.708	153.5	0.082	65.9	0.939	-16.3
400	0.897	-67.9	2.474	129.9	0.138	49.5	0.836	-27.7
600	0.833	-93.6	2.245	113.2	0.163	36.1	0.744	-35.1
800	0.778	-114.5	1.987	99.4	0.177	27.8	0.689	-39.9
1000	0.759	-127.0	1.874	88.7	0.188	20.5	0.657	-44.0
1200	0.720	-140.2	1.499	80.2	0.179	17.2	0.622	-48.2
1400	0.731	-146.4	1.211	71.9	0.166	16.5	0.625	-52.1
1600	0.738	-151.5	1.105	65.2	0.157	15.4	0.657	-55.1
1800	0.741	-156.8	1.016	59.4	0.148	16.0	0.610	-60.5
2000	0.720	-164.1	1.014	54.3	0.140	15.6	0.599	-64.9

VCE=2V, IC=5mA, ZO=50Ω

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.838	-40.4	13.956	153.7	0.038	70.0	0.905	-22.6
200	0.773	-70.4	11.300	134.6	0.063	55.1	0.747	-39.0
400	0.668	-112.8	7.451	111.9	0.087	41.8	0.521	-55.2
600	0.630	-133.8	5.422	99.0	0.094	39.5	0.406	-61.2
800	0.609	-147.0	4.241	89.9	0.103	40.2	0.334	-65.8
1000	0.600	-155.3	3.447	83.2	0.110	41.0	0.294	-69.9
1200	0.593	-162.1	2.923	77.3	0.119	42.9	0.268	-73.4
1400	0.590	-167.1	2.558	72.1	0.127	45.8	0.255	-76.1
1600	0.583	-172.2	2.297	67.5	0.135	47.9	0.253	-78.2
1800	0.578	-175.8	2.053	63.1	0.145	50.0	0.259	-79.7
2000	0.576	-179.7	1.861	58.7	0.155	52.6	0.254	-82.2

## EC3H03B

$V_{CE}=2V, I_C=20mA, Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.618	-80.4	28.462	135.0	0.029	58.2	0.705	-46.8
200	0.574	-119.9	18.357	114.6	0.039	48.7	0.461	-69.0
400	0.558	-149.5	10.129	98.0	0.053	52.8	0.273	-89.1
600	0.554	-161.5	6.930	89.8	0.066	57.1	0.203	-99.8
800	0.552	-168.7	5.257	83.8	0.081	60.9	0.170	-108.1
1000	0.549	-173.6	4.252	78.9	0.098	62.6	0.156	-113.9
1200	0.545	-177.4	3.595	74.5	0.115	63.7	0.148	-117.2
1400	0.546	-179.4	3.104	70.6	0.129	64.5	0.142	-121.2
1600	0.544	-176.5	2.742	66.8	0.147	64.0	0.140	-123.8
1800	0.541	-173.9	2.470	63.4	0.162	63.8	0.140	-126.9
2000	0.541	-171.5	2.241	59.6	0.178	63.8	0.133	-128.1

$V_{CE}=5V, I_C=3mA, Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.907	-27.4	9.110	161.3	0.032	74.5	0.956	-12.6
200	0.857	-51.5	8.122	145.5	0.057	62.3	0.881	-21.8
400	0.737	-91.8	6.152	122.5	0.085	46.8	0.698	-34.9
600	0.682	-114.8	4.800	107.6	0.096	38.9	0.588	-39.9
800	0.650	-130.1	3.718	97.3	0.100	37.7	0.516	-43.1
1000	0.638	-140.2	3.112	89.3	0.104	35.8	0.458	-46.2
1200	0.628	-148.2	2.749	81.8	0.109	37.1	0.458	-47.0
1400	0.612	-156.0	2.487	75.8	0.112	36.7	0.453	-49.0
1600	0.597	-163.0	2.161	70.6	0.115	41.4	0.450	-51.6
1800	0.595	-167.0	1.930	65.7	0.118	44.5	0.437	-54.6
2000	0.599	-171.1	1.679	60.7	0.125	51.1	0.424	-57.2

$V_{CE}=5V, I_C=10mA, Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.751	-49.5	22.017	148.6	0.027	67.7	0.860	-25.8
200	0.660	-84.6	16.702	128.2	0.042	53.2	0.664	-40.9
400	0.572	-123.4	10.313	107.1	0.056	49.0	0.437	-52.3
600	0.543	-142.1	7.243	96.4	0.066	50.6	0.342	-54.4
800	0.530	-153.3	5.571	88.8	0.077	53.2	0.289	-55.6
1000	0.525	-160.2	4.531	83.1	0.088	55.2	0.259	-56.7
1200	0.518	-166.2	3.831	78.1	0.098	58.2	0.244	-57.7
1400	0.515	-170.5	3.312	73.6	0.110	60.6	0.235	-59.4
1600	0.514	-174.4	2.943	69.5	0.122	61.5	0.232	-60.3
1800	0.509	-177.2	2.636	65.7	0.135	62.4	0.234	-62.8
2000	0.511	-179.6	2.387	61.7	0.148	63.4	0.230	-63.9

- 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 July, 2000. Specifications and information herein are subject to change without notice.