



EC3H06B

UHF to S Band Low-Noise Amplifier and OSC Applications

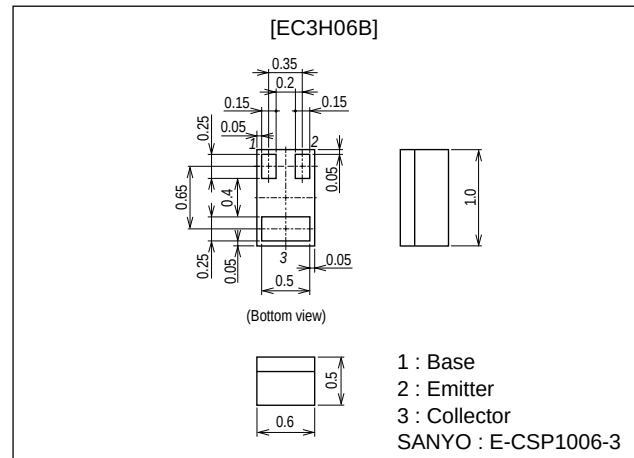
Features

- Low noise : NF=0.9dB typ (f=1GHz).
: NF=1.4dB typ (f=1.5GHz).
- High gain : $|S_{21e}|^2=10\text{dB}$ typ (f=1.5GHz).
- High cutoff frequency : $f_T=11\text{GHz}$ typ.
- Low voltage, low current operation.
($V_{CE}=1\text{V}$, $I_C=1\text{mA}$)
: $f_T=7\text{GHz}$ typ.
: $|S_{21e}|^2=5.5\text{dB}$ typ (f=1.5GHz).
- Ultrasmall (1006size), slim (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}		10	V
Emitter-to-Base Voltage	V_{EBO}		1.5	V
Collector Current	I_C		30	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	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=1\text{V}$, $I_C=0$			10	μA
DC Current Gain	h_{FE}	$V_{CE}=5\text{V}$, $I_C=10\text{mA}$	100		180	
Gain-Bandwidth Product	f_{T1}	$V_{CE}=5\text{V}$, $I_C=10\text{mA}$	8	11		GHz
	f_{T2}	$V_{CE}=1\text{V}$, $I_C=1\text{mA}$		7		GHz
Output Capacitance	C_{ob}	$V_{CB}=10\text{V}$, $f=1\text{MHz}$		0.45	0.7	pF
Reverse Transfer Capacitance	C_{re}	$V_{CB}=10\text{V}$, $f=1\text{MHz}$		0.30		pF
Forward Transfer Gain	$ S_{21e} ^2 1$	$V_{CE}=5\text{V}$, $I_C=10\text{mA}$, $f=1.5\text{GHz}$	8	10		dB
	$ S_{21e} ^2 2$	$V_{CE}=1\text{V}$, $I_C=1\text{mA}$, $f=1.5\text{GHz}$		5.5		dB
Noise Figure	NF1	$V_{CE}=5\text{V}$, $I_C=5\text{mA}$, $f=1.5\text{GHz}$		1.4	3.0	dB
	NF2	$V_{CE}=2\text{V}$, $I_C=3\text{mA}$, $f=1\text{GHz}$		0.9		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.

SANYO Electric Co.,Ltd. Semiconductor Company

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

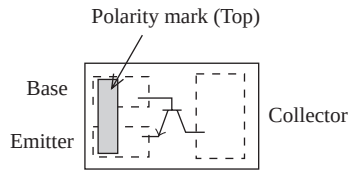
92500TS (KOTO) TA-2482 No.6524-1/5

EC3H06B

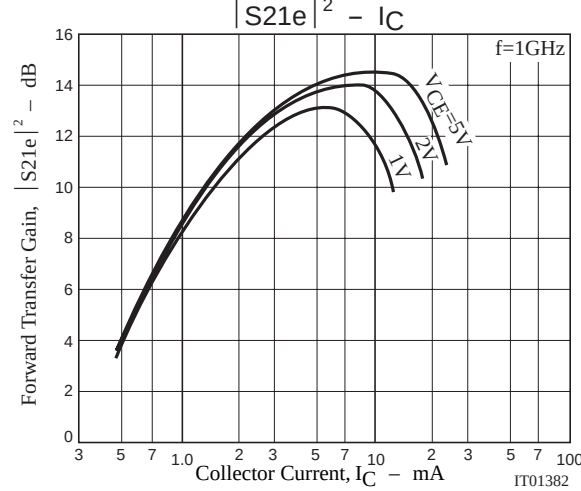
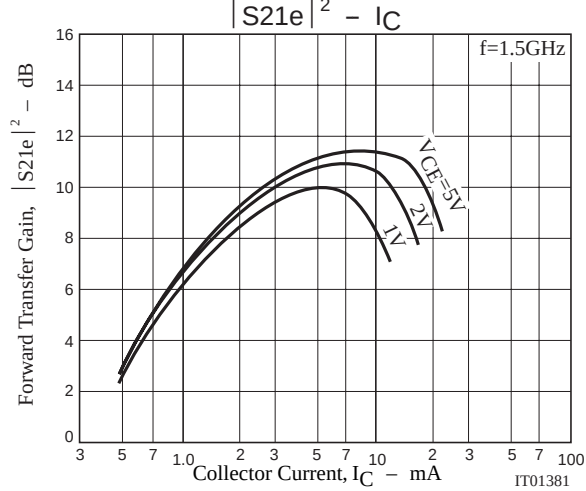
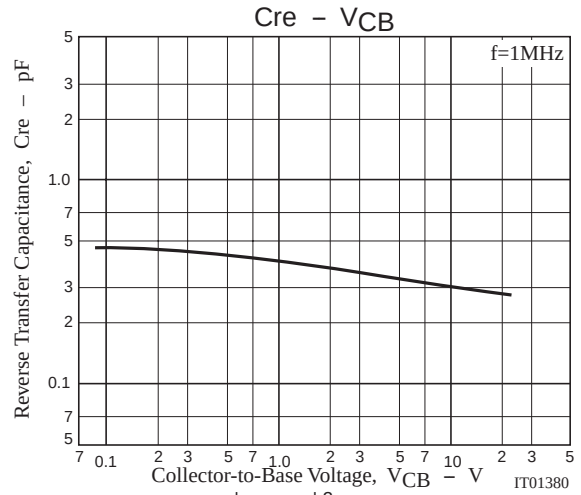
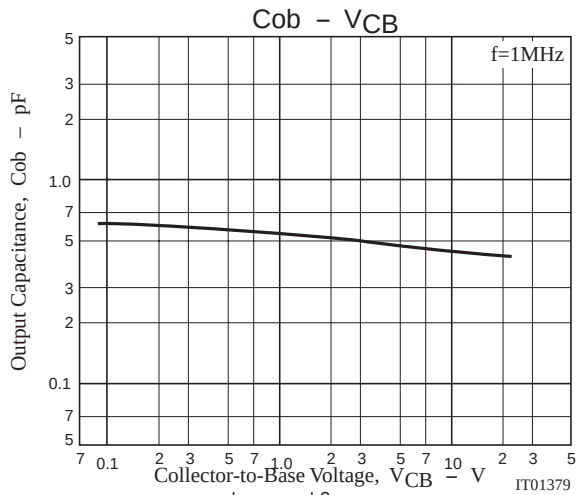
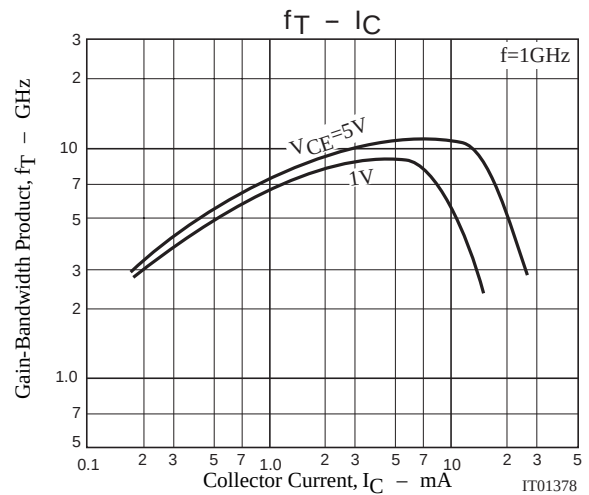
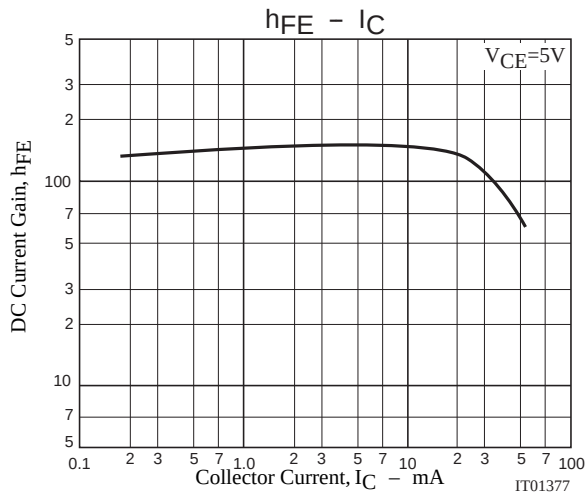
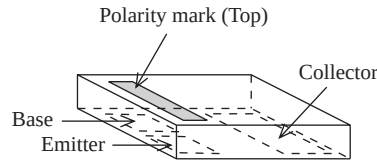
Type No. Indication (Top view)



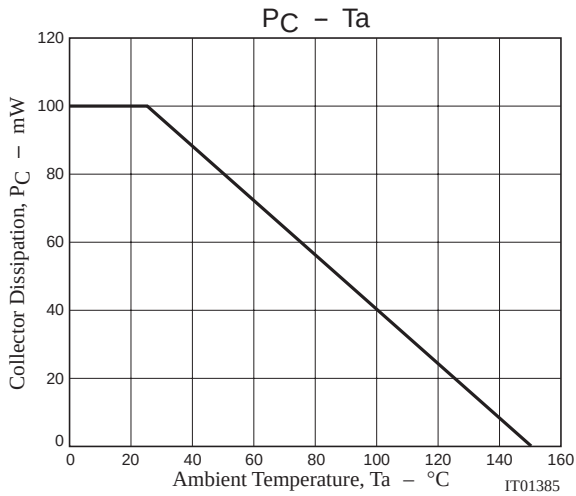
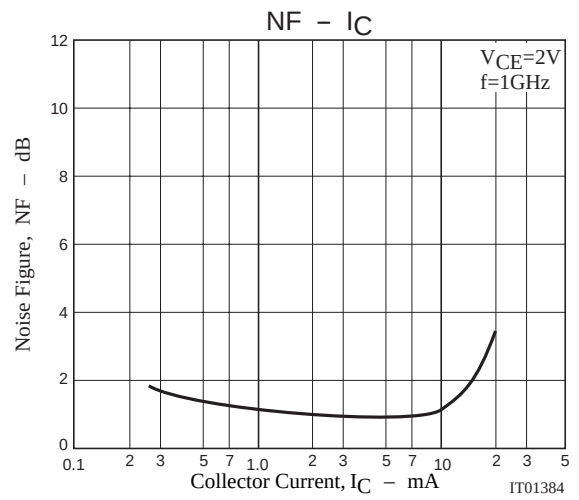
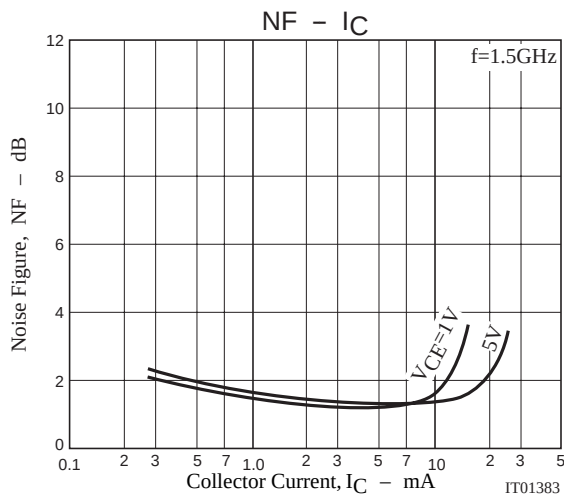
Electrical Connection (Top view)



* Electrodes : on the bottom



EC3H06B



S Parameters (Common emitter)

$V_{CE}=1\text{V}$, $I_C=1\text{mA}$, $Z_O=50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.967	-9.3	3.308	171.4	0.028	83.6	0.990	-5.4
200	0.945	-19.5	3.305	163.3	0.055	77.5	0.976	-10.2
400	0.896	-37.8	3.149	148.2	0.102	66.3	0.922	-20.1
600	0.827	-52.9	2.936	135.4	0.140	55.9	0.854	-28.5
800	0.772	-66.7	2.696	123.6	0.167	48.2	0.787	-34.9
1000	0.738	-77.6	2.381	112.3	0.181	41.9	0.721	-41.0
1200	0.681	-89.3	2.241	104.7	0.198	37.3	0.685	-44.1
1400	0.654	-100.1	1.985	97.2	0.202	33.8	0.670	-46.4
1600	0.631	-106.9	1.755	89.8	0.204	31.8	0.623	-50.4
1800	0.587	-116.8	1.727	83.5	0.216	28.8	0.604	-53.8
2000	0.570	-122.7	1.616	78.0	0.218	27.0	0.590	-56.7

EC3H06B

$V_{CE}=1V$, $I_C=5mA$, $Z_O=50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.840	-24.4	13.287	161.8	0.026	76.0	0.944	-14.8
200	0.780	-44.6	11.885	147.0	0.047	66.3	0.850	-27.0
400	0.648	-77.8	9.149	125.2	0.073	53.1	0.655	-42.6
600	0.556	-100.8	7.016	111.6	0.086	48.5	0.519	-49.8
800	0.504	-117.0	5.630	101.9	0.097	47.4	0.434	-53.9
1000	0.473	-129.4	4.700	94.6	0.107	47.3	0.382	-56.2
1200	0.456	-137.7	4.005	88.6	0.115	49.0	0.345	-58.0
1400	0.439	-144.8	3.501	83.5	0.125	49.8	0.317	-59.5
1600	0.431	-151.6	3.135	79.0	0.135	50.6	0.300	-60.6
1800	0.431	-156.4	2.824	74.9	0.145	51.9	0.288	-62.0
2000	0.427	-160.2	2.579	71.0	0.156	52.7	0.286	-63.6

$V_{CE}=2V$, $I_C=3mA$, $Z_O=50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.902	-15.9	9.012	167.2	0.023	80.4	0.976	-9.1
200	0.873	-29.3	8.417	156.1	0.044	72.2	0.929	-17.2
400	0.771	-54.9	7.291	137.1	0.074	59.8	0.806	-29.7
600	0.670	-75.9	6.048	122.7	0.093	51.5	0.688	-37.7
800	0.595	-91.9	5.110	111.7	0.105	47.6	0.599	-42.6
1000	0.543	-105.5	4.426	103.3	0.115	45.4	0.543	-45.7
1200	0.508	-114.9	3.811	96.2	0.122	44.9	0.494	-47.9
1400	0.482	-122.2	3.396	90.2	0.128	44.9	0.456	-49.4
1600	0.461	-130.7	3.093	84.9	0.136	45.2	0.435	-51.2
1800	0.454	-137.2	2.781	80.2	0.143	46.3	0.421	-52.8
2000	0.445	-142.4	2.552	75.8	0.149	47.3	0.414	-54.6

$V_{CE}=2V$, $I_C=7mA$, $Z_O=50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.803	-26.1	16.966	160.2	0.022	76.4	0.939	-14.9
200	0.727	-48.8	14.766	144.6	0.038	65.7	0.835	-26.5
400	0.586	-82.8	10.927	122.8	0.058	55.6	0.633	-40.0
600	0.498	-105.2	8.256	109.8	0.070	52.1	0.504	-45.0
800	0.451	-120.7	6.551	100.7	0.080	52.4	0.426	-47.2
1000	0.426	-131.7	5.426	93.6	0.090	53.6	0.378	-48.1
1200	0.410	-140.3	4.609	88.2	0.099	55.4	0.351	-48.7
1400	0.397	-146.8	4.005	83.6	0.109	57.3	0.330	-49.1
1600	0.391	-152.5	3.571	79.4	0.119	57.9	0.315	-49.5
1800	0.389	-158.0	3.215	75.5	0.131	59.0	0.309	-50.9
2000	0.387	-161.4	2.931	72.0	0.142	59.3	0.309	-52.4

EC3H06B

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

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.861	-19.3	13.088	164.6	0.019	79.2	0.964	-10.5
200	0.809	-36.1	12.414	151.0	0.035	70.3	0.897	-19.2
400	0.680	-64.6	9.973	130.4	0.057	58.6	0.740	-30.9
600	0.574	-85.3	7.846	116.7	0.069	53.3	0.620	-36.0
800	0.505	-101.2	6.411	106.6	0.079	51.8	0.542	-38.5
1000	0.458	-114.1	5.376	99.0	0.087	52.3	0.493	-39.9
1200	0.434	-122.9	4.629	92.8	0.095	53.0	0.460	-40.6
1400	0.408	-131.0	4.068	87.5	0.103	53.7	0.437	-41.4
1600	0.391	-138.4	3.636	83.1	0.112	55.5	0.421	-42.2
1800	0.388	-143.7	3.285	78.6	0.120	56.3	0.409	-43.2
2000	0.382	-148.1	2.998	74.8	0.129	57.6	0.407	-44.6

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

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.761	-29.0	20.734	158.1	0.017	76.5	0.931	-14.8
200	0.676	-53.1	17.775	141.1	0.030	65.5	0.814	-25.2
400	0.529	-87.9	12.546	119.3	0.046	57.3	0.614	-35.0
600	0.446	-109.3	9.228	107.1	0.056	56.3	0.503	-36.9
800	0.404	-124.2	7.248	98.7	0.065	58.0	0.442	-37.1
1000	0.384	-135.2	5.968	92.3	0.075	59.7	0.407	-37.0
1200	0.371	-142.5	5.052	87.2	0.084	61.6	0.389	-36.9
1400	0.361	-148.6	4.386	82.9	0.094	63.0	0.376	-37.2
1600	0.355	-154.5	3.904	79.0	0.105	64.2	0.366	-37.6
1800	0.355	-159.2	3.510	75.3	0.115	65.2	0.362	-38.9
2000	0.354	-162.4	3.194	71.9	0.126	65.5	0.365	-40.5

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