

**2SC5782**

UHF to S Band Low-Noise Amplifier and OSC Applications

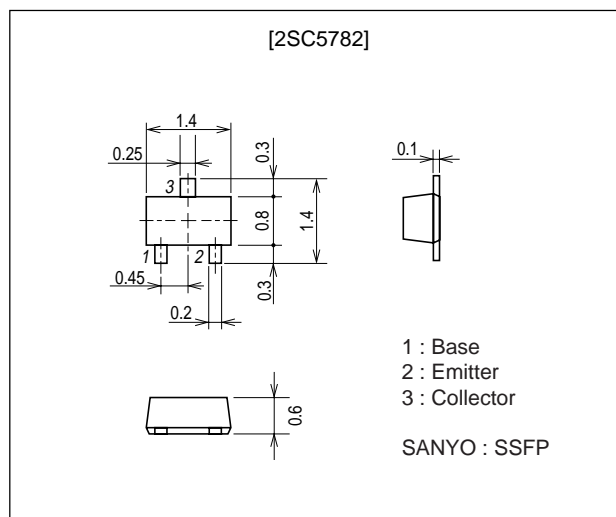
Features

- Low noise : NF=1.3dB typ (f=2GHz).
- High cutoff frequency : $f_T=8.5\text{GHz typ (V}_{CE}=1\text{V})$.
: $f_T=12.5\text{GHz typ (V}_{CE}=3\text{V})$.
- Low operating voltage.
- High gain : $|S_{21e}|^2=10.5\text{dB typ (f=2GHz)}$.
- Ultraminiature and thin flat lead package.
(1.4mmX0.8mmX0.6mm)

Package Dimensions

unit : mm

2159



Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		9	V
Collector-to-Emitter Voltage	V_{CEO}		4	V
Emitter-to-Base Voltage	V_{EBO}		2	V
Collector Current	I_C		40	mA
Collector Dissipation	P_C		100	mW
Junction Temperature	T_J		150	$^\circ\text{C}$
Storage Temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

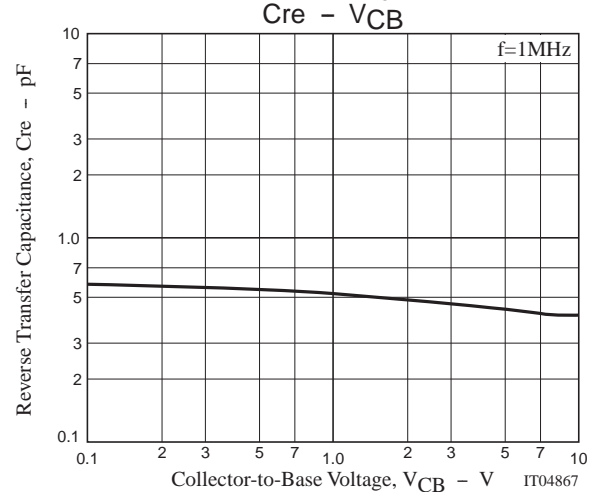
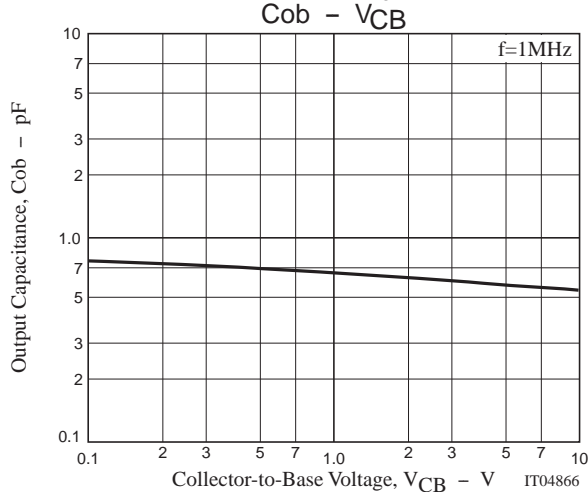
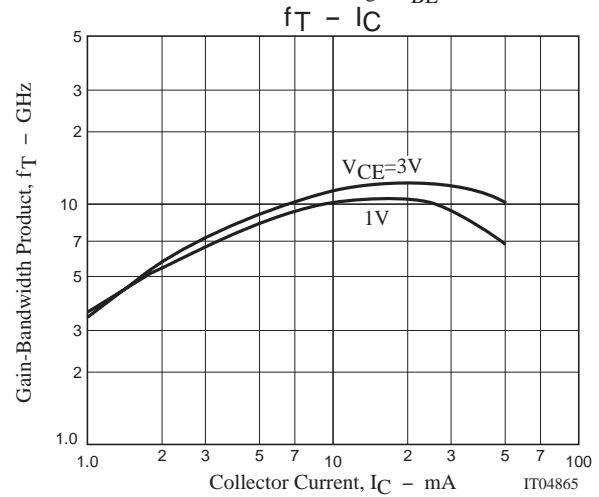
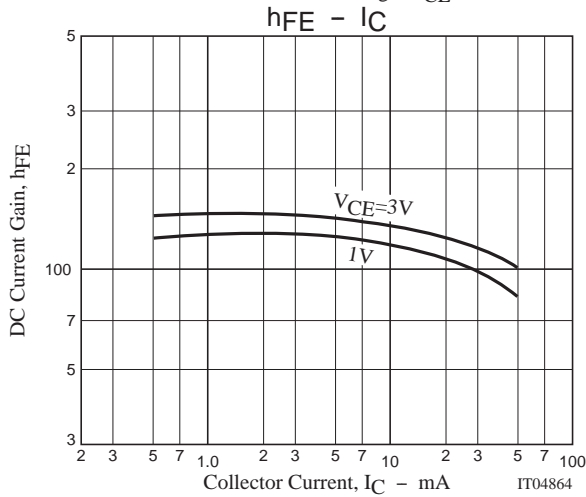
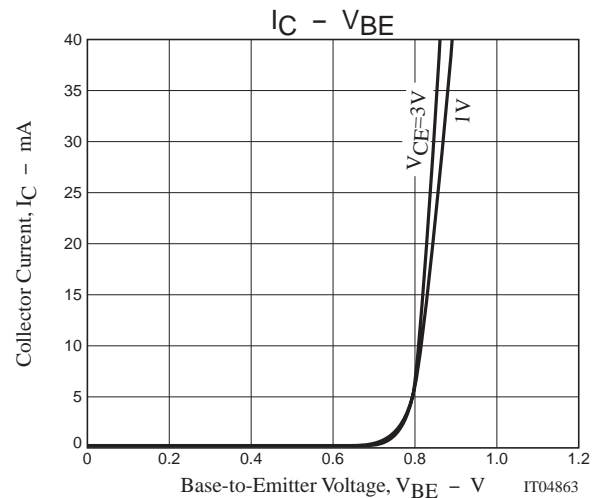
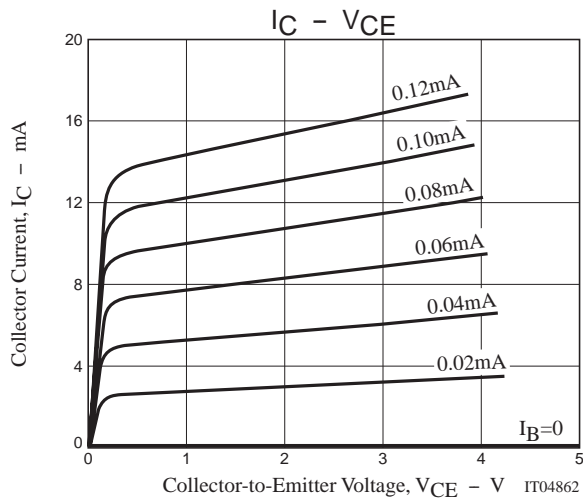
Marking : NJ

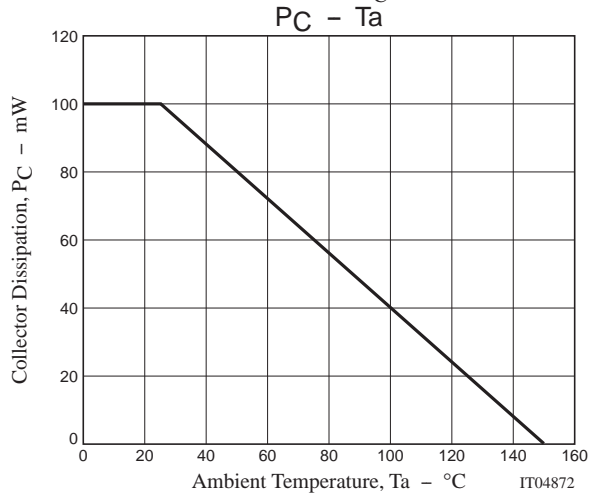
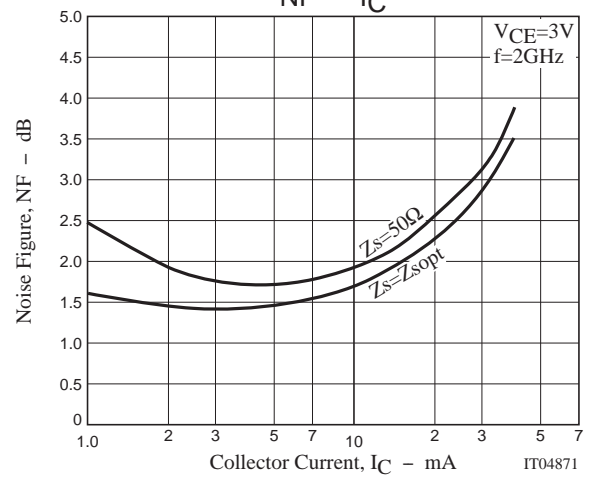
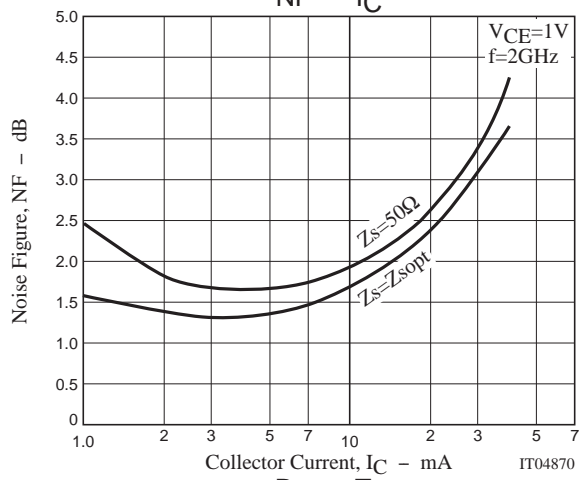
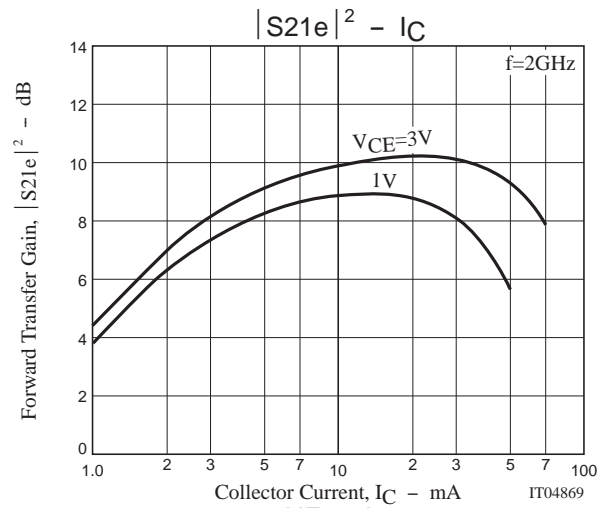
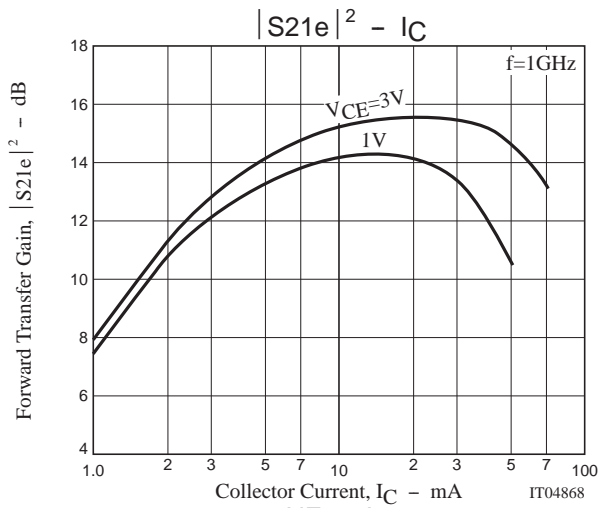
This product adopts a high-frequency process. Please be careful when handling it because it is susceptible to static electricity.

- 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.

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

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	$V_{CB}=5\text{V}, I_E=0$			1.0	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=1\text{V}, I_C=0$			10	μA
DC Current Gain	h_{FE}	$V_{CE}=1\text{V}, I_C=5\text{mA}$	100		160	
Gain-Bandwidth Product	f_T1	$V_{CE}=1\text{V}, I_C=5\text{mA}$	7.0	8.5		GHz
	f_T2	$V_{CE}=3\text{V}, I_C=20\text{mA}$	10.5	12.5		GHz
Output Capacitance	C_{ob}	$V_{CB}=1\text{V}, f=1\text{MHz}$		0.65	0.8	pF
Reverse Transfer Capacitance	C_{re}	$V_{CB}=1\text{V}, f=1\text{MHz}$		0.5	0.7	pF
Forward Transfer Gain	S21e 21	$V_{CE}=1\text{V}, I_C=5\text{mA}, f=2\text{GHz}$	7.0	8.5		dB
	S21e 22	$V_{CE}=3\text{V}, I_C=20\text{mA}, f=2\text{GHz}$	9.0	10.5		dB
Noise Figure	NF	$V_{CE}=1\text{V}, I_C=3\text{mA}, f=2\text{GHz}$		1.3	2.0	dB





2SC5782

S Parameters (Common emitter)

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

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.972	-9.50	3.324	171.60	0.032	82.87	0.985	-6.84
200	0.962	-18.52	3.264	163.75	0.064	76.84	0.975	-13.64
400	0.928	-36.08	3.112	148.65	0.119	64.51	0.930	-26.12
600	0.889	-52.39	2.888	134.98	0.163	53.46	0.872	-37.37
800	0.837	-66.26	2.648	122.57	0.193	44.87	0.810	-46.61
1000	0.809	-79.08	2.483	111.70	0.218	37.46	0.764	-54.56
1200	0.763	-90.61	2.275	101.43	0.231	30.91	0.719	-61.92
1400	0.726	-100.35	2.073	91.95	0.239	25.83	0.685	-67.13
1600	0.691	-109.24	1.934	83.55	0.248	21.58	0.658	-72.68
1800	0.654	-117.33	1.797	76.03	0.247	17.83	0.637	-76.93
2000	0.626	-124.10	1.677	69.00	0.247	14.84	0.625	-81.06
2200	0.601	-130.16	1.565	62.27	0.246	11.92	0.612	-84.63
2400	0.580	-135.57	1.448	56.66	0.240	9.07	0.602	-86.88
2600	0.560	-141.25	1.383	51.43	0.235	8.12	0.599	-90.79
2800	0.548	-146.06	1.296	46.36	0.227	7.30	0.596	-93.36
3000	0.540	-151.31	1.249	41.73	0.225	7.79	0.601	-96.39

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

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.872	-21.68	12.424	163.67	0.030	77.47	0.937	-15.86
200	0.826	-41.24	11.523	149.85	0.056	67.08	0.868	-29.71
400	0.723	-73.67	9.250	128.43	0.091	52.54	0.709	-50.70
600	0.646	-98.00	7.400	113.04	0.107	44.46	0.582	-65.09
800	0.588	-113.87	5.977	102.50	0.119	40.46	0.498	-74.79
1000	0.568	-127.08	5.082	93.56	0.130	38.70	0.448	-81.90
1200	0.541	-137.25	4.353	86.36	0.136	37.62	0.409	-89.26
1400	0.521	-145.89	3.779	79.99	0.144	37.47	0.386	-93.45
1600	0.508	-152.60	3.369	74.29	0.151	37.93	0.374	-97.90
1800	0.494	-158.57	3.041	69.09	0.159	37.54	0.366	-101.22
2000	0.479	-164.53	2.754	64.22	0.165	37.88	0.362	-104.12
2200	0.470	-169.56	2.541	59.57	0.174	38.32	0.356	-107.88
2400	0.450	-173.39	2.325	55.66	0.180	38.11	0.346	-109.32
2600	0.448	-177.87	2.184	52.18	0.188	38.95	0.355	-112.14
2800	0.435	-178.40	2.038	47.80	0.196	38.61	0.354	-114.46
3000	0.435	-174.57	1.942	44.45	0.206	39.00	0.356	-116.77

$V_{CE}=1V$, $I_C=10mA$, $Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.767	-32.72	19.369	157.20	0.028	73.89	0.884	-22.79
200	0.702	-60.20	16.622	139.80	0.050	61.86	0.764	-40.71
400	0.600	-98.47	11.711	117.56	0.073	50.38	0.562	-63.93
600	0.555	-121.75	8.693	103.81	0.084	46.35	0.444	-78.10
800	0.522	-135.28	6.774	95.19	0.094	45.68	0.377	-87.30
1000	0.519	-146.32	5.626	87.43	0.107	45.55	0.344	-94.09
1200	0.505	-154.32	4.763	81.47	0.115	47.16	0.321	-101.46
1400	0.497	-161.23	4.095	76.00	0.126	47.73	0.307	-104.91
1600	0.491	-166.53	3.641	71.09	0.137	47.78	0.302	-109.07
1800	0.482	-171.39	3.277	66.41	0.148	47.81	0.300	-112.30
2000	0.474	-176.01	2.953	62.13	0.157	47.96	0.304	-114.55
2200	0.467	-179.16	2.716	57.99	0.171	48.25	0.302	-117.84
2400	0.449	-175.64	2.486	54.42	0.180	46.94	0.294	-119.01
2600	0.451	-171.55	2.335	51.37	0.190	47.57	0.305	-121.57
2800	0.439	-168.24	2.169	47.30	0.201	46.53	0.303	-124.11
3000	0.441	-165.15	2.060	43.97	0.213	46.46	0.311	-125.83

2SC5782

$V_{CE}=1V$, $I_C=20mA$, $Z_O=50\Omega$

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.624	-48.93	25.263	149.69	0.026	68.05	0.798	-30.65
200	0.573	-83.86	19.625	130.01	0.042	57.52	0.635	-51.44
400	0.534	-122.60	12.438	109.06	0.060	50.66	0.435	-74.81
600	0.522	-141.81	8.844	97.32	0.071	50.88	0.340	-88.70
800	0.510	-152.47	6.781	89.82	0.082	51.50	0.294	-97.53
1000	0.513	-160.65	5.576	83.02	0.094	53.06	0.276	-103.58
1200	0.510	-167.04	4.699	77.81	0.106	54.44	0.265	-110.10
1400	0.504	-171.93	4.022	72.79	0.118	55.03	0.259	-113.13
1600	0.502	-176.18	3.569	68.25	0.132	54.71	0.263	-116.54
1800	0.498	179.48	3.198	63.88	0.144	54.38	0.266	-119.43
2000	0.490	175.62	2.885	59.85	0.155	54.69	0.271	-121.43
2200	0.485	171.39	2.657	55.73	0.169	53.58	0.275	-124.43
2400	0.470	168.21	2.428	52.46	0.180	52.54	0.269	-125.54
2600	0.472	165.02	2.275	49.30	0.193	52.53	0.282	-127.34
2800	0.462	161.86	2.125	45.18	0.204	51.72	0.283	-129.73
3000	0.463	158.77	2.015	42.21	0.217	50.75	0.293	-131.71

$V_{CE}=3V$, $I_C=1mA$, $Z_O=50\Omega$

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.975	-8.66	3.445	172.15	0.028	81.31	0.985	-6.17
200	0.967	-16.98	3.433	164.80	0.055	76.44	0.976	-12.30
400	0.936	-33.23	3.246	150.82	0.103	66.22	0.938	-23.51
600	0.902	-48.25	3.077	137.92	0.143	56.46	0.887	-34.03
800	0.852	-61.32	2.808	126.00	0.169	47.64	0.831	-42.68
1000	0.823	-73.92	2.665	115.50	0.192	40.56	0.790	-50.10
1200	0.778	-84.76	2.457	105.44	0.206	34.32	0.743	-57.30
1400	0.738	-94.63	2.253	96.16	0.215	29.67	0.706	-62.54
1600	0.702	-103.47	2.112	87.81	0.223	25.08	0.683	-67.67
1800	0.666	-111.22	1.980	80.41	0.225	21.94	0.661	-71.83
2000	0.637	-118.10	1.836	73.35	0.225	19.29	0.648	-75.76
2200	0.608	-124.15	1.720	66.40	0.224	16.85	0.632	-79.73
2400	0.582	-130.15	1.586	60.88	0.221	13.39	0.622	-81.91
2600	0.565	-135.55	1.527	55.77	0.216	12.71	0.621	-85.36
2800	0.546	-140.09	1.425	50.29	0.212	12.10	0.616	-87.99
3000	0.537	-145.90	1.374	45.93	0.207	12.28	0.616	-91.19

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

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.892	-18.34	12.380	165.31	0.025	79.51	0.944	-13.38
200	0.847	-35.62	11.581	152.73	0.049	69.85	0.886	-25.65
400	0.749	-64.64	9.619	132.37	0.081	57.01	0.746	-44.10
600	0.661	-87.51	7.903	117.21	0.100	47.28	0.625	-57.12
800	0.593	-103.50	6.509	106.16	0.111	44.19	0.536	-66.29
1000	0.565	-117.10	5.568	97.29	0.122	41.61	0.482	-72.86
1200	0.529	-127.82	4.808	89.67	0.128	40.03	0.440	-79.72
1400	0.505	-136.27	4.175	83.22	0.135	39.91	0.413	-83.40
1600	0.489	-143.82	3.738	77.50	0.143	39.55	0.396	-87.67
1800	0.472	-150.40	3.380	72.06	0.151	40.01	0.387	-90.90
2000	0.456	-156.03	3.071	67.21	0.156	40.31	0.380	-93.96
2200	0.442	-161.65	2.832	62.45	0.167	40.39	0.374	-97.28
2400	0.423	-166.05	2.581	58.45	0.171	39.88	0.362	-98.53
2600	0.417	-170.82	2.435	54.91	0.179	40.34	0.367	-101.52
2800	0.406	-174.62	2.274	50.37	0.188	40.16	0.365	-104.01
3000	0.407	-178.72	2.156	47.23	0.194	41.30	0.369	-106.34

2SC5782

$V_{CE}=3V$, $I_C=10mA$, $Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.802	-26.99	19.371	159.74	0.026	74.65	0.905	-18.69
200	0.739	-50.17	17.050	143.85	0.044	63.96	0.802	-34.40
400	0.619	-85.36	12.605	122.03	0.067	53.64	0.613	-54.88
600	0.551	-108.81	9.584	107.91	0.082	49.65	0.490	-67.55
800	0.507	-123.64	7.571	98.69	0.091	47.84	0.412	-75.99
1000	0.493	-135.48	6.328	90.89	0.101	48.72	0.371	-82.01
1200	0.476	-144.54	5.375	84.54	0.110	48.18	0.342	-88.43
1400	0.460	-152.33	4.640	79.00	0.120	49.17	0.323	-91.82
1600	0.451	-158.14	4.128	74.06	0.130	48.99	0.317	-95.73
1800	0.444	-163.53	3.708	69.38	0.140	49.61	0.309	-98.72
2000	0.435	-168.64	3.362	65.10	0.149	49.59	0.310	-101.80
2200	0.428	-173.80	3.088	60.84	0.161	49.19	0.308	-105.18
2400	0.408	-177.50	2.815	57.15	0.171	48.23	0.298	-106.20
2600	0.407	178.38	2.646	53.94	0.181	49.10	0.308	-108.71
2800	0.397	174.27	2.464	50.04	0.191	48.09	0.306	-111.72
3000	0.400	171.20	2.336	46.78	0.203	48.31	0.312	-113.88

$V_{CE}=3V$, $I_C=20mA$, $Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.681	-38.13	26.466	153.51	0.022	70.92	0.847	-24.70
200	0.606	-67.79	21.551	134.97	0.038	59.90	0.702	-42.79
400	0.519	-106.19	14.298	113.61	0.054	54.68	0.497	-63.18
600	0.485	-127.90	10.362	101.29	0.068	52.45	0.387	-74.58
800	0.462	-140.45	8.010	93.52	0.078	54.39	0.325	-82.24
1000	0.462	-150.06	6.613	86.54	0.091	54.96	0.298	-87.57
1200	0.454	-157.53	5.586	81.00	0.101	55.31	0.278	-94.11
1400	0.448	-163.38	4.798	76.11	0.111	56.28	0.267	-96.85
1600	0.444	-168.29	4.257	71.65	0.125	56.18	0.268	-100.57
1800	0.437	-173.02	3.824	67.28	0.138	55.37	0.265	-103.27
2000	0.432	-177.44	3.449	63.40	0.149	55.72	0.271	-105.82
2200	0.430	177.96	3.177	59.25	0.164	54.84	0.271	-110.06
2400	0.412	174.56	2.890	55.78	0.171	53.07	0.262	-110.91
2600	0.414	171.18	2.722	52.85	0.183	53.37	0.273	-113.29
2800	0.403	167.51	2.530	48.88	0.194	53.09	0.273	-115.69
3000	0.407	164.62	2.396	45.77	0.208	52.49	0.282	-118.20

- 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 February, 2003. Specifications and information herein are subject to change without notice.