

**EC3H08B**

UHF to S Band Low-Noise Amplifier and OSC Applications

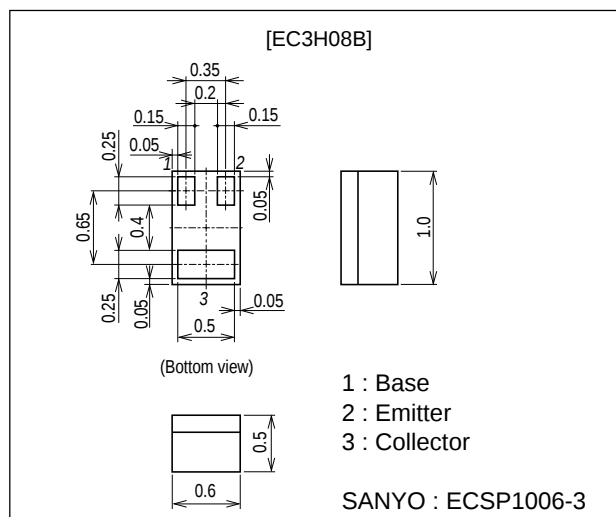
Features

- Low noise : NF=2.6dB typ (f=2GHz).
- High cutoff frequency : $f_T=9.0\text{GHz}$ typ ($V_{CE}=1\text{V}$).
: $f_T=11.5\text{GHz}$ typ ($V_{CE}=3\text{V}$).
- Low operating voltage.
- High gain : $|S_{21e}|^2=10.5\text{dB}$ typ (f=2GHz).
- Ultraminiature (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_{CB0}		9	V
Collector-to-Emitter Voltage	V_{CEO}		4	V
Emitter-to-Base Voltage	V_{EBO}		2	V
Collector Current	I_C		20	mA
Collector Dissipation	P_C		80	mW
Junction Temperature	T_j		150	$^\circ\text{C}$
Storage Temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

Marking : L

Pay attention to handling since it is liable to be affected by static electricity due to the high-frequency process adopted.

- 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

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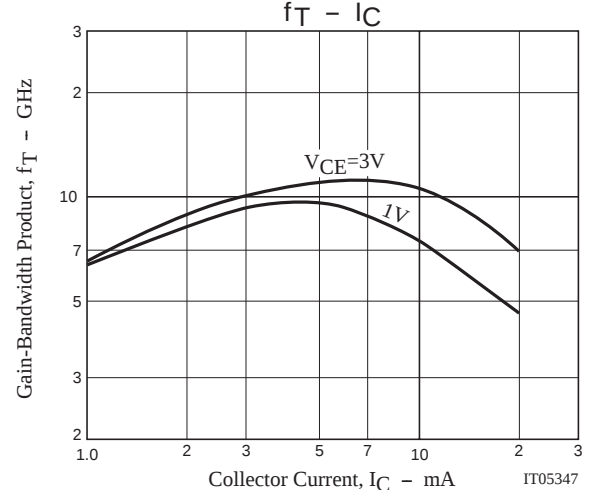
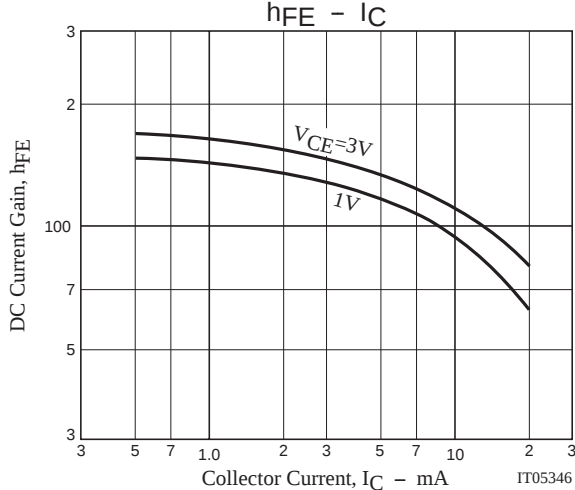
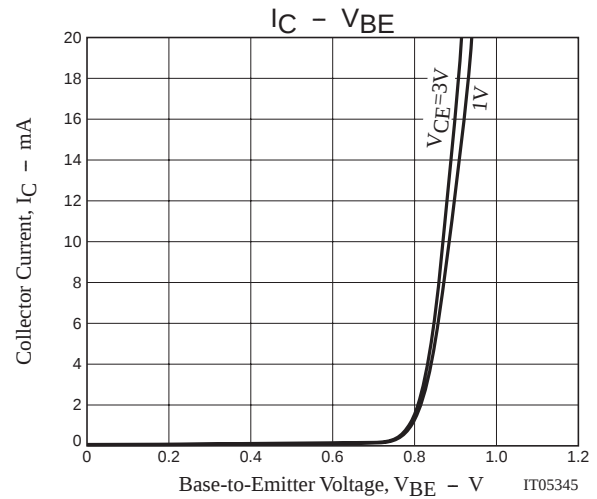
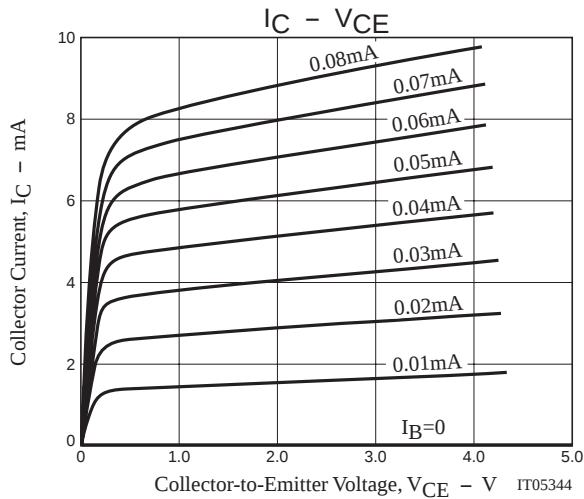
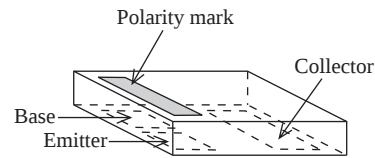
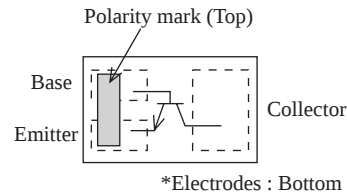
Electrical Characteristics at Ta=25°C

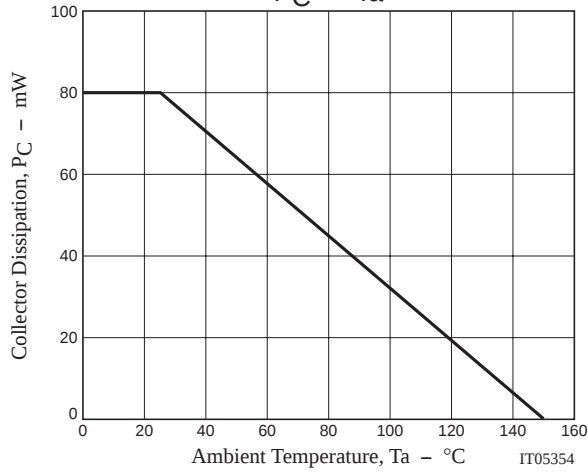
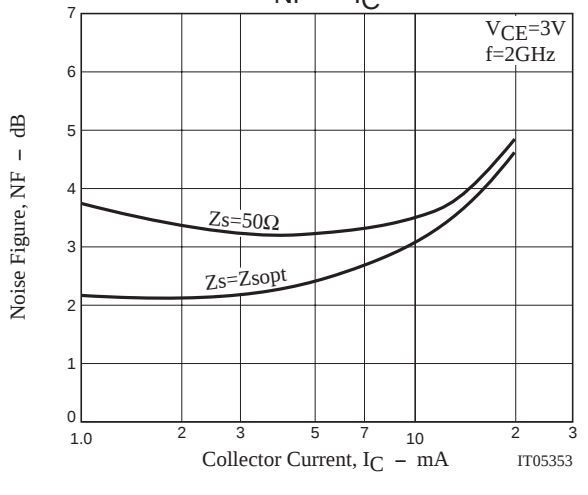
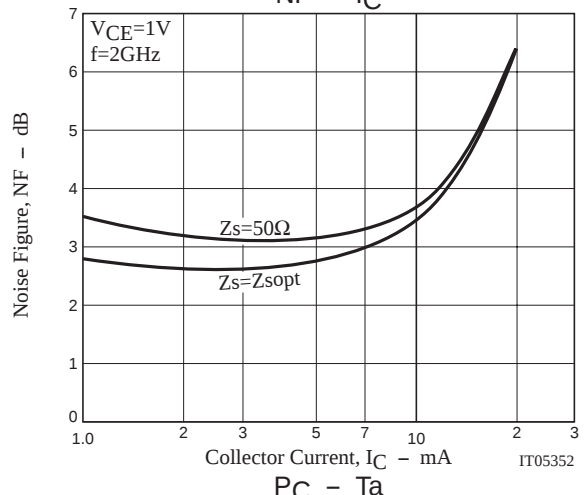
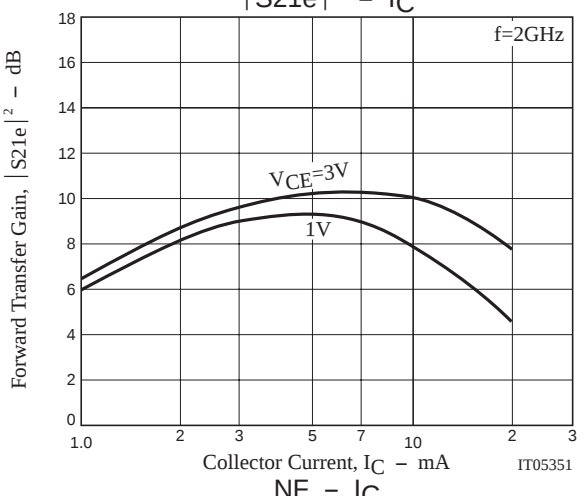
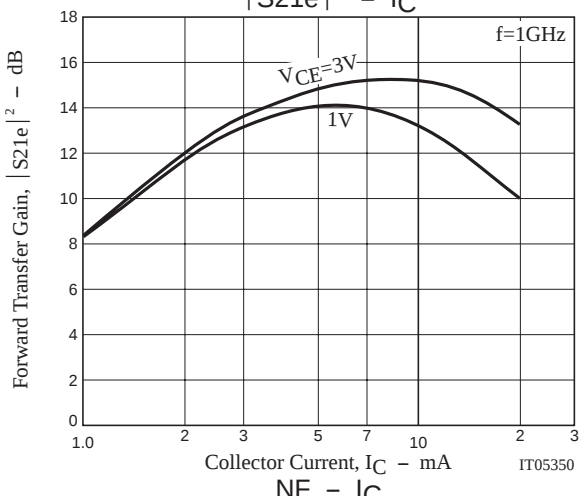
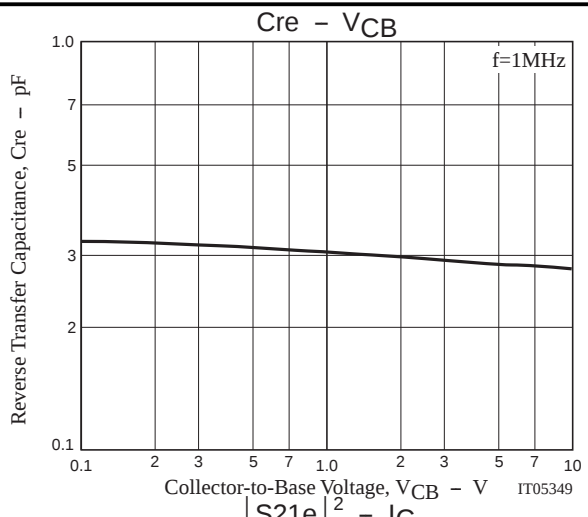
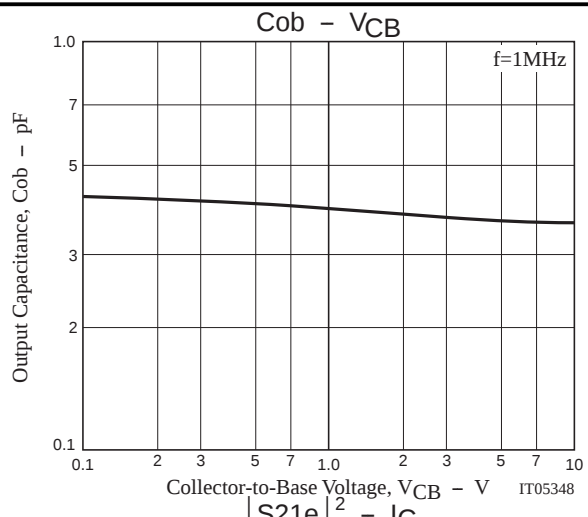
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	$V_{CB}=5V, I_E=0$			1.0	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=1V, I_C=0$			10	μA
DC Current Gain	h_{FE}	$V_{CE}=1V, I_C=5mA$	100		160	
Gain-Bandwidth Product	f_{T1}	$V_{CE}=1V, I_C=3mA$	7.0	9.0		GHz
	f_{T2}	$V_{CE}=3V, I_C=7mA$	9.5	11.5		GHz
Output Capacitance	C_{ob}	$V_{CB}=1V, f=1MHz$		0.4	0.55	pF
Reverse Transfer Capacitance	C_{re}	$V_{CB}=1V, f=1MHz$		0.3	0.45	pF
Forward Transfer Gain	S21e ₂₁	$V_{CE}=1V, I_C=3mA, f=2GHz$	7.5	9.0		dB
	S21e ₂₂	$V_{CE}=3V, I_C=7mA, f=2GHz$	9.0	10.5		dB
Noise Figure	NF	$V_{CE}=1V, I_C=3mA, f=2GHz$		2.6	3.5	dB

Type No. Indication (Top view)



Electrical Connection (Top view)





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S Parameters (Common emitter)

V_{CE}=1V, I_C=1mA, Z_O=50Ω

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.974	-4.90	3.83	174.13	0.019	85.17	0.998	-4.30
200	0.969	-9.22	3.066	168.39	0.035	81.75	0.987	-8.88
400	0.947	-18.42	2.988	157.38	0.070	72.14	0.974	-17.21
600	0.920	-26.54	2.849	147.38	0.096	67.67	0.941	-24.68
800	0.888	-34.46	2.708	137.24	0.125	62.90	0.915	-31.85
1000	0.850	-40.78	2.581	128.75	0.147	56.62	0.883	-38.15
1200	0.810	-46.88	2.400	120.61	0.164	52.82	0.852	-43.26
1400	0.773	-52.09	2.245	113.14	0.175	48.80	0.818	-47.43
1600	0.739	-57.00	2.149	106.13	0.187	45.80	0.795	-51.99
1800	0.702	-61.47	2.041	99.65	0.197	42.90	0.771	-54.97
2000	0.665	-65.39	1.935	92.84	0.203	40.29	0.747	-58.84
2200	0.637	-68.50	1.820	86.57	0.208	38.44	0.730	-61.94
2400	0.597	-72.31	1.724	81.11	0.218	35.49	0.689	-64.50
2600	0.562	-74.11	1.650	75.76	0.219	33.84	0.682	-66.79
2800	0.533	-76.53	1.544	70.93	0.215	31.96	0.678	-69.26
3000	0.510	-78.69	1.483	66.79	0.218	30.86	0.663	-71.56

V_{CE}=1V, I_C=3mA, Z_O=50Ω

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.926	-8.60	7.240	170.53	0.017	86.44	0.983	-6.59
200	0.907	-16.87	7.069	161.72	0.033	79.92	0.961	-13.48
400	0.839	-31.95	6.486	145.70	0.062	71.00	0.896	-24.86
600	0.759	-44.44	5.788	132.53	0.084	61.59	0.822	-33.80
800	0.683	-54.84	5.099	121.01	0.101	57.04	0.758	-40.72
1000	0.617	-62.15	4.523	112.02	0.116	54.44	0.701	-46.20
1200	0.561	-69.26	4.017	104.05	0.126	51.18	0.659	-49.57
1400	0.516	-73.34	3.570	97.18	0.138	51.30	0.625	-52.46
1600	0.482	-77.37	3.278	90.82	0.144	49.80	0.607	-55.24
1800	0.441	-81.84	3.018	84.97	0.153	49.18	0.586	-57.35
2000	0.411	-84.69	2.748	79.50	0.161	49.09	0.573	-59.22
2200	0.388	-86.37	2.556	74.50	0.169	47.69	0.565	-61.27
2400	0.356	-90.09	2.357	69.98	0.182	46.89	0.532	-62.73
2600	0.331	-90.38	2.217	65.30	0.184	47.33	0.536	-64.00
2800	0.305	-91.24	2.043	61.36	0.189	45.37	0.535	-65.01
3000	0.285	-92.31	1.941	57.70	0.198	45.08	0.526	-67.22

V_{CE}=1V, I_C=5mA, Z_O=50Ω

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.877	-11.82	9.878	168.07	0.018	79.80	0.971	-8.19
200	0.843	-22.64	9.426	156.79	0.033	75.47	0.930	-16.24
400	0.739	-41.58	8.194	138.04	0.059	66.96	0.834	-28.70
600	0.639	-55.67	6.883	123.74	0.076	59.86	0.734	-36.89
800	0.555	-66.63	5.832	112.40	0.091	56.27	0.669	-42.86
1000	0.491	-73.95	5.017	104.07	0.101	55.42	0.618	-46.74
1200	0.440	-80.25	4.359	96.60	0.110	53.49	0.585	-49.21
1400	0.405	-84.25	3.844	90.11	0.120	54.61	0.561	-51.24
1600	0.377	-88.02	3.479	84.81	0.131	55.274	0.545	-53.49
1800	0.350	-91.35	3.156	79.33	0.139	54.86	0.535	-54.79
2000	0.324	-94.16	2.858	74.37	0.150	51.69	0.528	-56.81
2200	0.301	-95.66	2.650	69.56	0.160	53.28	0.524	-58.61
2400	0.274	-99.10	2.433	65.49	0.175	51.15	0.498	-59.92
2600	0.251	-99.88	2.282	61.32	0.179	51.78	0.504	-60.82
2800	0.234	-100.27	2.100	57.17	0.190	52.19	0.513	-62.80
3000	0.214	-101.20	1.983	54.04	0.195	51.39	0.500	-63.97

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V_{CE}=1V, I_C=10mA, Z_O=50Ω

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.763	-18.72	12.952	162.81	0.018	81.63	0.921	-10.60
200	0.698	-35.11	11.722	147.63	0.029	70.81	0.854	-19.95
400	0.557	-59.84	9.021	125.55	0.052	64.57	0.717	-31.49
600	0.454	-75.87	6.983	111.54	0.064	59.72	0.622	-36.75
800	0.390	-87.32	5.629	101.25	0.077	59.65	0.570	-40.41
1000	0.344	-94.90	4.680	93.67	0.086	58.71	0.540	-43.10
1200	0.309	-101.29	3.993	87.24	0.098	59.97	0.521	-44.49
1400	0.285	-105.19	3.472	81.88	0.107	59.98	0.512	-46.50
1600	0.267	-108.73	3.106	76.61	0.121	60.09	0.516	-48.72
1800	0.250	-112.71	2.800	71.84	0.133	60.15	0.513	-50.54
2000	0.233	-116.07	2.544	67.10	0.142	59.96	0.509	-52.74
2200	0.217	-118.13	2.333	62.45	0.153	60.13	0.518	-55.20
2400	0.203	-122.47	2.149	58.874	0.167	58.11	0.498	-56.12
2600	0.181	-124.29	2.002	54.59	0.176	58.37	0.509	-58.16
2800	0.168	-127.42	1.844	50.76	0.188	57.67	0.515	-60.46
3000	0.155	-129.68	1.738	47.68	0.197	57.51	0.513	-62.74

V_{CE}=3V, I_C=1mA, Z_O=50Ω

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.976	-4.45	3.091	174.54	0.017	91.84	0.997	-3.91
200	0.972	-8.63	3.033	168.86	0.033	83.16	0.989	-8.32
400	0.956	-16.85	2.938	158.58	0.064	76.20	0.974	-16.11
600	0.929	-24.50	2.828	148.74	0.092	69.27	0.947	-23.43
800	0.897	-32.10	2.734	139.24	0.115	63.13	0.926	-30.23
1000	0.863	-37.84	2.564	131.15	0.142	59.25	0.895	-36.39
1200	0.828	-43.71	2.435	123.02	0.154	54.27	0.866	-41.03
1400	0.796	-48.41	2.276	115.76	0.167	50.46	0.834	-45.68
1600	0.761	-53.05	2.181	108.95	0.179	48.88	0.816	-49.85
1800	0.727	-57.28	2.074	102.34	0.188	45.58	0.794	-53.15
2000	0.696	-61.09	1.964	95.80	0.195	42.03	0.769	-56.62
2200	0.662	-63.97	1.867	89.48	0.199	40.61	0.752	-59.67
2400	0.627	-67.74	1.772	84.14	0.212	37.55	0.711	-62.26
2600	0.591	-69.30	1.688	78.57	0.211	35.48	0.706	-64.39
2800	0.562	-71.08	1.576	73.98	0.208	32.98	0.692	-66.86
3000	0.536	-73.56	1.530	69.45	0.210	33.62	0.680	-69.38

V_{CE}=3V, I_C=3mA, Z_O=50Ω

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.936	-7.84	7.113	171.27	0.017	84.12	0.986	-6.04
200	0.919	-15.16	7.005	163.02	0.031	78.84	0.966	-12.29
400	0.857	-28.68	6.472	148.08	0.058	69.83	0.915	-23.25
600	0.789	-39.95	5.851	135.43	0.079	63.41	0.844	-31.59
800	0.713	-49.81	5.223	124.09	0.097	61.48	0.785	-38.68
1000	0.654	-56.71	4.675	115.40	0.110	56.40	0.731	-43.95
1200	0.597	-63.13	4.169	107.35	0.123	52.50	0.692	-47.64
1400	0.550	-66.89	3.724	100.44	0.129	51.39	0.656	-50.44
1600	0.515	-70.47	3.456	94.06	0.142	51.75	0.634	-53.62
1800	0.479	-74.97	3.155	88.15	0.147	49.69	0.614	-55.40
2000	0.447	-77.48	2.925	83.16	0.157	49.56	0.596	-57.30
2200	0.424	-78.83	2.698	77.35	0.3164	48.94	0.588	-59.34
2400	0.385	-81.73	2.490	73.05	0.177	48.30	0.554	-60.98
2600	0.358	-82.74	2.350	68.35	0.179	46.97	0.556	-61.94
2800	0.336	-83.52	2.164	64.30	0.186	46.25	0.554	-62.65
3000	0.317	-84.50	20.56	60.75	0.192	46.38	0.540	-64.74

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

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.894	-10.30	9.991	168.89	0.015	87.70	0.978	-7.50
200	0.862	-20.13	9.620	158.73	0.031	77.04	0.942	-14.83
400	0.769	-36.60	8.512	141.00	0.057	69.21	0.859	-26.97
600	0.676	-49.99	7.284	127.19	0.074	64.04	0.768	-35.08
800	0.592	-59.87	6.252	115.74	0.088	57.57	0.703	-41.38
1000	0.531	-66.82	6.410	107.66	0.096	56.93	0.647	-45.21
1200	0.479	-72.71	4.736	100.11	0.108	54.94	0.610	-48.07
1400	0.437	-76.08	4.173	93.69	0.118	55.57	0.582	-50.04
1600	0.406	-79.80	3.789	87.99	0.128	54.53	0.566	-52.24
1800	0.379	-82.97	3.450	82.75	0.138	55.31	0.551	-54.04
2000	0.354	-84.76	3.157	78.08	0.145	53.92	0.543	-55.25
2200	0.332	-85.98	2.898	72.56	0.155	54.07	0.539	-56.71
2400	0.303	-88.87	2.657	68.70	0.167	53.33	0.510	-58.04
2600	0.276	-88.94	2.496	64.45	0.174	52.62	0.516	-59.00
2800	0.259	-89.09	2.301	60.61	0.182	51.88	0.518	-60.16
3000	0.241	-88.67	2.171	57.22	0.192	51.82	0.509	-61.61

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

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.804	-14.97	13.786	165.13	0.015	74.21	0.959	-9.42
200	0.750	-28.23	12.768	151.92	0.029	73.04	0.905	-17.96
400	0.623	-49.52	10.347	131.22	0.048	66.98	0.778	-29.89
600	0.519	-63.68	8.262	117.31	0.062	62.72	0.676	-36.35
800	0.441	-73.91	6.766	106.75	0.074	62.42	0.616	-40.79
1000	0.389	-80.49	5.689	98.96	0.087	60.68	0.574	-42.98
1200	0.349	-84.91	4.888	92.23	0.096	60.30	0.550	-45.02
1400	0.321	-89.28	4.234	86.33	0.106	60.43	0.535	-46.36
1600	0.299	-92.00	3.832	81.54	0.115	60.95	0.527	-48.22
1800	0.279	-95.43	3.456	76.84	0.130	61.30	0.521	-49.21
2000	0.261	-96.51	3.137	72.52	0.137	61.58	0.525	-50.97
2200	0.245	-97.46	2.872	67.50	0.148	60.73	0.519	-52.62
2400	0.223	-101.15	2.631	63.82	0.162	58.23	0.495	-54.72
2600	0.204	-102.34	2.476	59.80	0.170	58.18	0.507	-54.86
2800	0.182	-100.60	2.260	56.07	0.180	58.15	0.511	-56.48
3000	0.170	-102.12	2.133	52.98	0.187	57.17	0.511	-58.20

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