



SANYO Semiconductors

DATA SHEET

MCH3007

— NPN Epitaxial Planar Silicon Transistor

High-Frequency Low-Noise Amplifier

Features

- Low-noise use : $NF=1.2\text{dB typ (f=1GHz)}$
- High cut-off frequency : $f_T=8\text{GHz typ (V}_{CE}=5\text{V)}$
- High gain : $|S_{21e}|^2=12\text{dB typ (f=1GHz)}$
- Halogen free compliance

Specifications

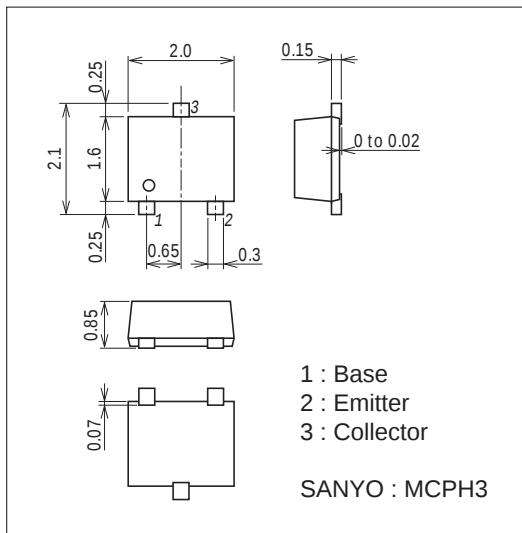
Absolute Maximum Ratings at $T_a=25^\circ\text{C}$

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		30	mA
Collector Dissipation	P_C		350	mW
Junction Temperature	T_j		150	$^\circ\text{C}$
Storage Temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

Package Dimensions

unit : mm (typ)

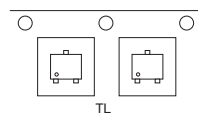
7019A-004



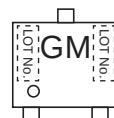
Product & Package Information

- Package : MCPH3
- JEITA, JEDEC : SC-70, SOT-323
- Minimum Packing Quantity : 3,000 pcs./reel

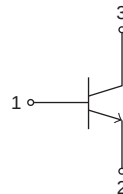
Packing Type: TL



Marking



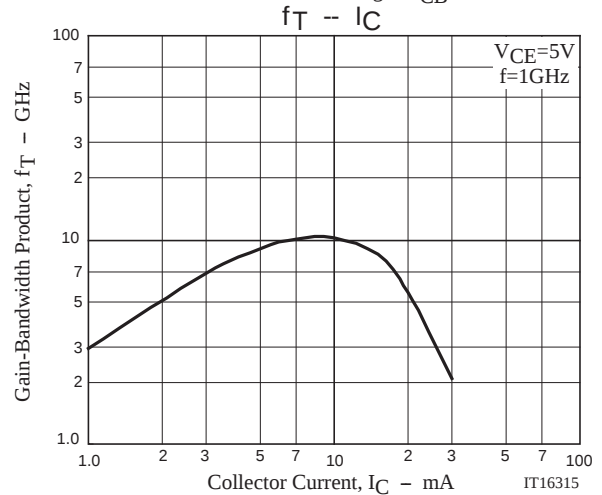
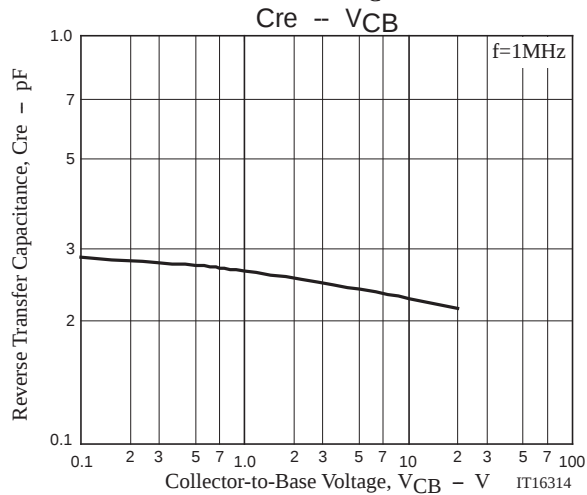
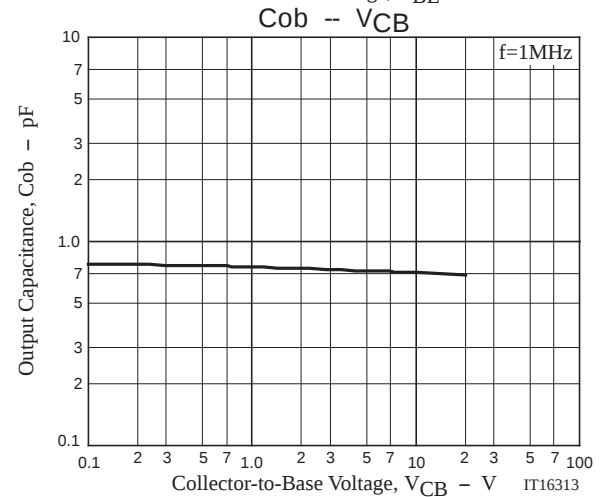
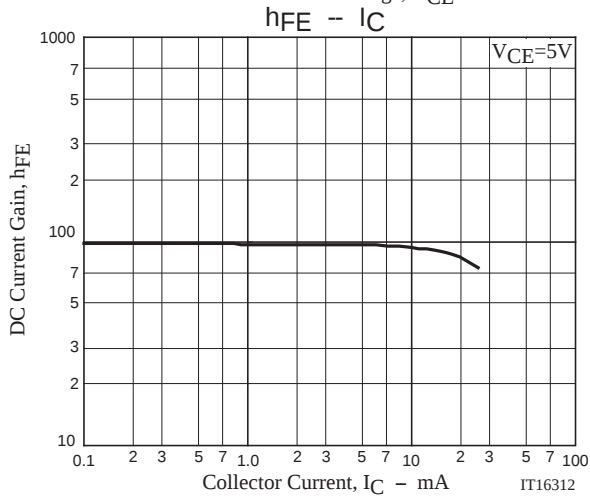
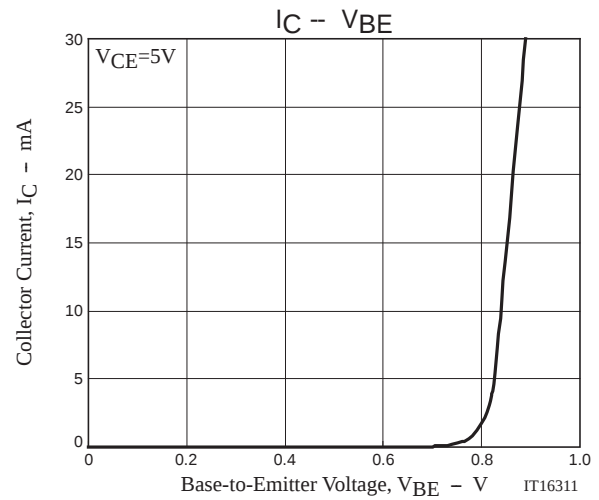
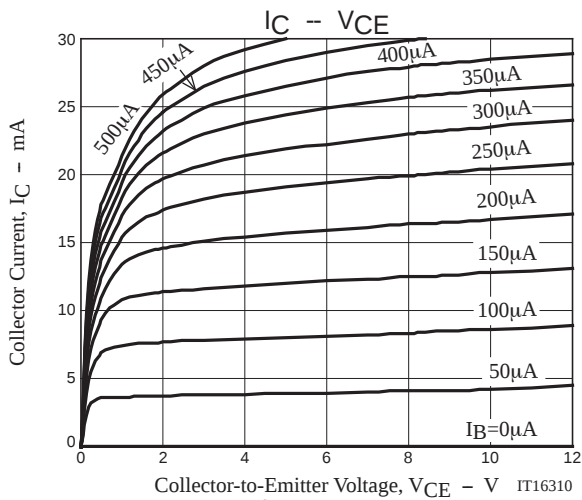
Electrical Connection

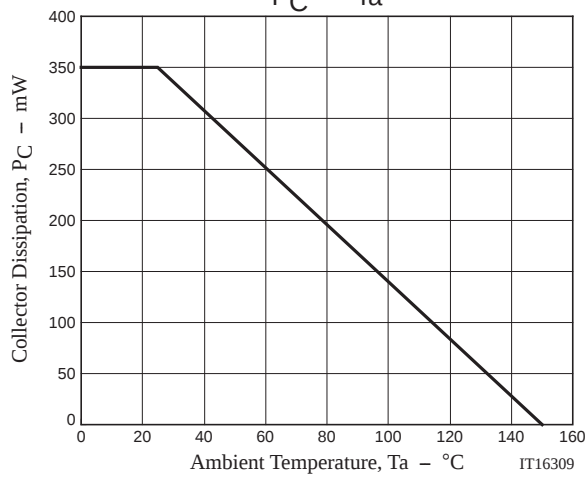
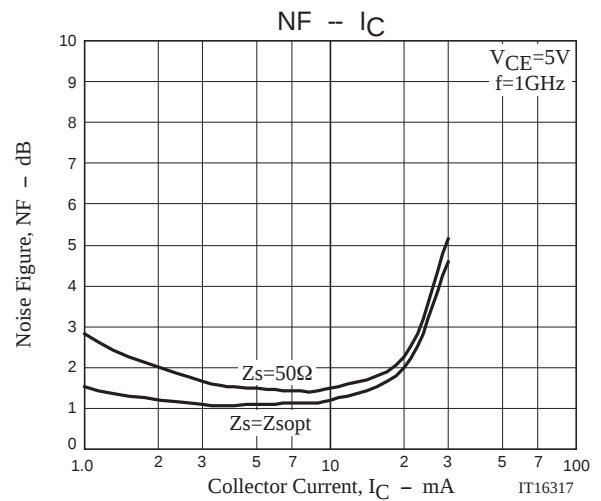
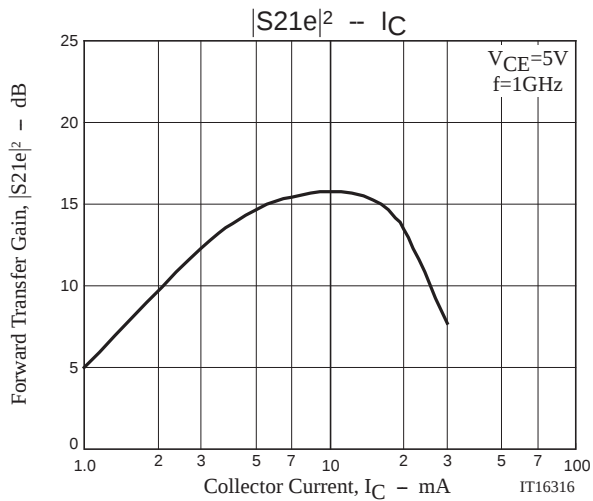


Electrical Characteristics at $T_a=25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	$V_{CB}=5\text{V}, I_E=0\text{A}$			1.0	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=1\text{V}, I_C=0\text{A}$			1.0	μA
DC Current Gain	h_{FE}	$V_{CE}=5\text{V}, I_C=5\text{mA}$	60		150	
Gain-Bandwidth Product	f_T	$V_{CE}=5\text{V}, I_C=10\text{mA}$	6	8		GHz
Forward Transfer Gain	$ S_{21e} ^2$	$V_{CE}=5\text{V}, I_C=10\text{mA}, f=1\text{GHz}$	9	12		dB
Noise Figure	NF	$V_{CE}=5\text{V}, I_C=10\text{mA}, f=1\text{GHz}$		1.2	1.8	dB

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





S Parameters (Common emitter)

$V_{CE}=3V$, $I_C=5\text{mA}$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.889	-11.8	9.020	164.0	0.011	87.1	0.978	-9.1
200	0.872	-18.1	8.560	151.7	0.026	81.8	0.945	-17.9
300	0.802	-32.2	8.281	142.9	0.037	77.5	0.892	-25.3
400	0.784	-37.9	7.883	136.4	0.046	74.5	0.843	-32.1
500	0.687	-55.5	7.588	125.7	0.057	71.6	0.771	-39.3
600	0.651	-64.3	7.221	119.3	0.065	70.4	0.724	-43.5
700	0.591	-76.2	6.686	111.7	0.073	69.0	0.675	-48.4
800	0.535	-85.9	6.254	105.1	0.080	68.2	0.632	-52.3
900	0.498	266.2	5.783	100.0	0.086	67.7	0.598	-55.7
1000	0.450	258.0	5.404	94.8	0.093	67.9	0.562	-58.4
1200	0.389	244.7	4.684	86.9	0.105	68.1	0.514	-63.0
1400	0.352	234.1	4.101	80.8	0.118	68.7	0.482	-66.0
1600	0.322	224.9	3.651	75.6	0.131	69.4	0.463	-68.3
1800	0.300	216.6	3.291	70.9	0.146	70.1	0.447	-70.1
2000	0.282	208.5	3.004	66.6	0.161	70.5	0.437	-71.9
2200	0.266	200.9	2.776	62.6	0.177	70.7	0.435	-73.7
2400	0.258	193.5	2.586	58.5	0.194	70.6	0.433	-76.6
2600	0.246	186.5	2.415	55.0	0.211	70.5	0.428	-78.6
2800	0.243	180.9	2.292	51.7	0.231	70.4	0.435	-80.0
3000	0.250	174.2	2.191	47.7	0.252	69.3	0.450	-83.4

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S Parameters (Common emitter)

$V_{CE}=3V$, $I_C=10mA$

Freq(MHz)	S11	∠S11	S21	∠S21	S12	∠S12	S22	∠S22
100	0.772	-19.6	14.343	158.2	0.013	80.2	0.952	-12.0
200	0.726	-30.9	13.500	143.9	0.022	77.5	0.880	-22.0
300	0.614	-53.6	12.251	130.6	0.031	75.2	0.798	-28.8
400	0.570	-64.5	11.116	122.3	0.038	74.7	0.734	-34.3
500	0.471	-86.8	9.957	110.0	0.046	74.0	0.660	-40.2
600	0.440	262.6	8.696	103.7	0.053	74.4	0.616	-43.1
700	0.404	251.3	7.844	97.4	0.061	74.8	0.577	-46.7
800	0.380	242.5	6.991	92.7	0.068	75.3	0.543	-49.6
900	0.362	235.0	6.325	88.6	0.075	75.7	0.519	-52.1
1000	0.344	228.3	5.731	85.1	0.083	76.0	0.492	-54.3
1200	0.321	216.8	4.838	79.0	0.098	76.7	0.461	-58.0
1400	0.308	207.2	4.189	74.0	0.113	77.0	0.443	-60.4
1600	0.296	199.1	3.703	69.6	0.129	77.2	0.434	-62.6
1800	0.287	191.6	3.324	65.5	0.146	77.2	0.428	-64.4
2000	0.282	184.3	3.023	61.6	0.164	76.9	0.425	-66.3
2200	0.275	177.4	2.784	57.9	0.182	76.5	0.429	-68.5
2400	0.274	171.5	2.591	54.2	0.201	75.7	0.432	-71.7
2600	0.269	165.4	2.413	50.8	0.220	75.1	0.432	-74.0
2800	0.270	160.9	2.285	47.8	0.242	74.3	0.442	-75.8
3000	0.281	155.9	2.182	44.0	0.266	72.7	0.460	-79.7

$V_{CE}=3V$, $I_C=15mA$

Freq(MHz)	S11	∠S11	S21	∠S21	S12	∠S12	S22	∠S22
100	0.655	-30.6	16.942	153.3	0.011	76.6	0.912	-13.3
200	0.578	-51.1	14.095	136.7	0.020	73.6	0.814	-22.0
300	0.473	-82.5	12.741	120.1	0.026	73.3	0.735	-26.7
400	0.432	260.6	11.464	110.2	0.033	74.3	0.682	-30.1
500	0.403	240.3	9.665	100.5	0.039	75.4	0.624	-34.4
600	0.395	230.3	7.746	94.9	0.045	77.1	0.595	-36.4
700	0.390	220.9	6.764	89.7	0.052	79.1	0.570	-39.3
800	0.387	213.3	5.958	85.7	0.059	80.2	0.547	-41.8
900	0.386	207.3	5.331	81.9	0.067	81.4	0.533	-44.0
1000	0.381	201.6	4.798	78.8	0.074	82.1	0.515	-46.2
1200	0.379	192.3	4.009	73.0	0.090	83.1	0.498	-50.2
1400	0.380	184.7	3.460	68.0	0.106	83.8	0.491	-53.3
1600	0.378	178.1	3.047	63.5	0.124	84.1	0.491	-56.3
1800	0.378	171.9	2.733	59.3	0.143	83.9	0.491	-59.2
2000	0.380	165.9	2.482	55.2	0.162	83.7	0.493	-62.2
2200	0.379	160.0	2.282	51.4	0.183	83.0	0.502	-65.4
2400	0.383	155.1	2.118	47.5	0.205	82.0	0.508	-69.5
2600	0.383	149.7	1.968	44.0	0.227	81.0	0.510	-72.8
2800	0.386	145.4	1.860	40.8	0.253	79.8	0.523	-75.6
3000	0.398	141.2	1.771	36.9	0.280	77.7	0.544	-80.4

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S Parameters (Common emitter)

V_{CE}=3V, I_C=20mA

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.542	-48.6	17.664	147.6	0.011	72.1	0.855	-13.7
200	0.472	-85.2	13.659	127.1	0.018	65.7	0.759	-19.6
300	0.442	241.9	10.775	110.5	0.023	68.0	0.699	-22.4
400	0.437	225.3	8.448	101.0	0.028	72.9	0.667	-24.8
500	0.458	210.5	6.847	92.9	0.033	76.5	0.628	-28.3
600	0.464	203.4	5.771	87.9	0.039	80.6	0.611	-30.2
700	0.475	196.8	4.937	83.2	0.046	82.9	0.597	-33.1
800	0.480	191.5	4.332	79.4	0.053	84.9	0.584	-35.8
900	0.486	187.1	3.842	75.8	0.060	86.7	0.576	-38.3
1000	0.487	183.0	3.458	72.6	0.068	87.8	0.565	-40.9
1200	0.492	176.0	2.876	66.7	0.084	89.4	0.557	-45.7
1400	0.497	170.0	2.478	61.7	0.102	90.4	0.556	-49.9
1600	0.500	164.4	2.179	56.9	0.121	90.6	0.561	-53.9
1800	0.503	159.0	1.952	52.4	0.142	90.4	0.565	-57.9
2000	0.508	153.8	1.771	48.2	0.165	89.7	0.569	-61.9
2200	0.510	148.4	1.625	44.3	0.189	88.6	0.579	-66.1
2400	0.515	143.7	1.503	40.3	0.214	87.2	0.587	-71.0
2600	0.517	138.5	1.392	36.8	0.240	85.6	0.588	-75.3
2800	0.520	134.0	1.311	33.8	0.270	83.8	0.600	-78.9
3000	0.529	129.8	1.243	30.0	0.301	81.0	0.622	-84.4

V_{CE}=5V, I_C=5mA

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.893	-11.5	9.065	164.4	0.013	88.3	0.978	-8.8
200	0.878	-17.5	8.626	152.2	0.025	80.9	0.949	-17.3
300	0.809	-31.3	8.332	143.4	0.036	79.1	0.898	-24.4
400	0.792	-36.9	7.943	137.0	0.045	75.9	0.852	-31.1
500	0.696	-54.2	7.444	126.3	0.055	72.7	0.782	-38.2
600	0.659	-62.9	6.985	119.8	0.063	71.1	0.736	-42.3
700	0.599	-74.6	6.740	112.3	0.071	69.9	0.687	-47.1
800	0.542	-84.3	6.322	105.6	0.078	69.2	0.644	-51.0
900	0.504	268.0	5.839	100.6	0.084	68.6	0.610	-54.3
1000	0.455	259.8	5.465	95.2	0.090	68.4	0.573	-57.1
1200	0.392	246.7	4.739	87.3	0.103	68.8	0.526	-61.6
1400	0.353	236.1	4.152	81.2	0.116	69.6	0.495	-64.5
1600	0.323	227.1	3.696	75.9	0.129	70.3	0.475	-66.7
1800	0.299	218.7	3.332	71.2	0.143	70.8	0.460	-68.5
2000	0.281	210.6	3.040	66.9	0.158	71.4	0.450	-70.3
2200	0.263	203.0	2.809	62.9	0.174	71.7	0.447	-72.2
2400	0.255	195.6	2.618	58.8	0.191	71.6	0.446	-75.1
2600	0.242	188.7	2.444	55.2	0.208	71.5	0.442	-77.1
2800	0.239	183.0	2.320	51.9	0.228	71.4	0.449	-78.4
3000	0.246	176.1	2.218	47.9	0.250	70.3	0.464	-81.9

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S Parameters (Common emitter)

V_{CE}=5V, I_C=10mA

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.792	-17.6	14.870	159.5	0.013	88.0	0.957	-11.5
200	0.754	-27.7	13.544	145.4	0.022	77.9	0.892	-21.2
300	0.642	-48.6	12.776	132.5	0.030	77.7	0.815	-28.1
400	0.601	-58.2	11.567	124.3	0.037	75.8	0.751	-33.7
500	0.489	-79.8	10.460	111.9	0.045	75.0	0.677	-39.6
600	0.452	269.8	9.468	105.4	0.053	75.3	0.632	-42.7
700	0.410	258.3	8.253	98.9	0.060	75.7	0.592	-46.4
800	0.380	249.3	7.358	94.0	0.067	76.0	0.556	-49.3
900	0.359	241.6	6.641	89.8	0.075	76.4	0.530	-51.8
1000	0.338	234.7	6.018	86.3	0.082	76.6	0.503	-54.1
1200	0.310	222.9	5.069	80.2	0.097	77.1	0.470	-57.7
1400	0.294	213.1	4.384	75.2	0.112	77.4	0.450	-60.0
1600	0.280	204.7	3.871	70.7	0.129	77.5	0.441	-62.1
1800	0.270	196.8	3.472	66.6	0.145	77.4	0.433	-63.8
2000	0.262	189.2	3.157	62.8	0.162	77.1	0.429	-65.6
2200	0.254	182.2	2.905	59.2	0.181	76.8	0.432	-67.6
2400	0.253	176.0	2.700	55.5	0.199	75.9	0.435	-70.7
2600	0.246	169.6	2.514	52.1	0.218	75.2	0.435	-72.9
2800	0.247	165.1	2.381	49.1	0.239	74.5	0.445	-74.5
3000	0.258	159.8	2.273	45.3	0.263	72.9	0.462	-78.3

V_{CE}=5V, I_C=15mA

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.691	-25.3	18.098	155.5	0.011	81.7	0.936	-12.7
200	0.628	-41.7	16.001	139.7	0.020	76.6	0.847	-22.0
300	0.505	-68.7	14.151	123.7	0.027	76.2	0.766	-27.6
400	0.452	-83.3	12.511	114.0	0.033	77.5	0.706	-31.7
500	0.394	256.4	10.390	103.8	0.040	77.5	0.640	-36.6
600	0.376	245.9	9.124	98.0	0.047	78.9	0.604	-38.8
700	0.360	235.9	7.856	92.7	0.054	79.7	0.573	-41.9
800	0.350	227.5	6.939	88.5	0.062	80.6	0.545	-44.5
900	0.342	220.8	6.231	84.9	0.069	81.0	0.526	-46.7
1000	0.333	214.6	5.620	81.6	0.077	81.4	0.504	-48.7
1200	0.322	204.2	4.714	76.0	0.092	82.0	0.481	-52.4
1400	0.318	195.8	4.071	71.3	0.109	82.3	0.469	-55.0
1600	0.312	188.4	3.591	67.0	0.125	82.2	0.466	-57.4
1800	0.308	181.5	3.219	62.9	0.143	82.0	0.463	-59.6
2000	0.307	175.0	2.925	59.1	0.162	81.6	0.463	-62.0
2200	0.304	168.7	2.690	55.4	0.181	81.0	0.469	-64.6
2400	0.306	163.5	2.501	51.7	0.202	80.0	0.475	-68.2
2600	0.302	157.8	2.327	48.3	0.222	79.1	0.477	-70.9
2800	0.305	153.6	2.202	45.2	0.245	78.2	0.488	-73.1
3000	0.317	149.2	2.101	41.4	0.271	76.3	0.508	-77.4

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S Parameters (Common emitter)

V_{CE}=5V, I_C=20mA

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.591	-37.1	19.539	151.2	0.010	86.0	0.904	-12.7
200	0.508	-64.2	15.394	132.6	0.017	73.2	0.808	-20.0
300	0.425	264.1	13.138	115.7	0.023	75.0	0.740	-23.8
400	0.396	246.9	10.561	106.1	0.028	77.4	0.696	-26.6
500	0.393	228.4	8.791	97.4	0.034	79.7	0.648	-30.4
600	0.393	219.4	7.452	92.2	0.041	81.8	0.625	-32.3
700	0.398	211.1	6.426	87.4	0.047	83.9	0.605	-35.1
800	0.400	204.4	5.644	83.5	0.054	85.1	0.586	-37.6
900	0.403	199.0	5.020	79.9	0.062	86.4	0.574	-39.9
1000	0.402	194.0	4.518	76.8	0.069	87.1	0.559	-42.2
1200	0.404	185.7	3.761	71.1	0.085	88.2	0.546	-46.5
1400	0.408	178.9	3.240	66.2	0.102	88.9	0.541	-49.9
1600	0.409	172.7	2.850	61.6	0.120	89.1	0.544	-53.4
1800	0.410	166.9	2.552	57.4	0.140	88.9	0.545	-56.7
2000	0.414	161.3	2.316	53.3	0.161	88.2	0.548	-60.1
2200	0.415	155.6	2.127	49.5	0.183	87.4	0.557	-63.7
2400	0.419	150.9	1.971	45.6	0.207	86.2	0.565	-68.1
2600	0.420	145.6	1.830	42.1	0.230	84.9	0.567	-71.8
2800	0.424	141.3	1.728	38.9	0.258	83.5	0.580	-74.8
3000	0.435	137.2	1.644	35.0	0.287	81.0	0.602	-79.9

V_{CE}=8V, I_C=5mA

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.898	-11.4	9.031	164.6	0.014	81.3	0.979	-8.5
200	0.883	-17.3	8.611	152.5	0.023	80.9	0.951	-16.8
300	0.815	-31.0	8.301	143.8	0.034	78.7	0.903	-23.6
400	0.798	-36.5	7.927	137.3	0.044	76.2	0.858	-30.2
500	0.702	-53.6	7.625	126.6	0.054	72.7	0.790	-37.1
600	0.665	-62.3	6.978	120.2	0.062	71.9	0.744	-41.1
700	0.605	-73.7	6.732	112.7	0.069	70.5	0.697	-45.8
800	0.547	-83.4	6.322	106.0	0.076	69.6	0.654	-49.6
900	0.510	269.0	5.840	100.9	0.082	69.3	0.620	-52.9
1000	0.460	260.8	5.471	95.5	0.089	69.3	0.584	-55.5
1200	0.396	247.8	4.746	87.5	0.101	69.6	0.537	-60.0
1400	0.356	237.3	4.159	81.4	0.113	70.3	0.507	-62.8
1600	0.325	228.3	3.705	76.0	0.127	71.1	0.488	-65.1
1800	0.301	219.9	3.339	71.3	0.141	71.8	0.473	-66.8
2000	0.282	211.8	3.046	67.0	0.156	72.3	0.463	-68.7
2200	0.264	204.3	2.814	62.9	0.172	72.7	0.461	-70.6
2400	0.256	196.9	2.622	58.8	0.188	72.7	0.460	-73.5
2600	0.243	189.9	2.448	55.2	0.206	72.7	0.457	-75.5
2800	0.239	184.2	2.323	51.9	0.226	72.6	0.464	-76.9
3000	0.246	177.3	2.222	47.9	0.248	71.4	0.480	-80.5

MCH3007

S Parameters (Common emitter)

V_{CE}=8V, I_C=10mA

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.804	-16.7	15.064	160.0	0.010	91.9	0.962	-10.7
200	0.769	-26.5	14.343	146.1	0.021	79.2	0.899	-20.5
300	0.657	-46.8	12.917	133.2	0.030	77.6	0.825	-27.2
400	0.617	-55.8	11.712	125.2	0.037	76.1	0.762	-32.7
500	0.500	-77.3	10.577	112.7	0.044	75.4	0.689	-38.6
600	0.461	-87.5	9.195	106.1	0.052	75.9	0.645	-41.6
700	0.416	260.9	8.345	99.5	0.059	76.1	0.605	-45.2
800	0.385	251.9	7.445	94.5	0.066	76.6	0.569	-48.2
900	0.363	244.1	6.716	90.3	0.073	77.0	0.543	-50.6
1000	0.340	237.2	6.084	86.7	0.080	77.1	0.516	-52.8
1200	0.310	225.3	5.122	80.6	0.095	77.7	0.482	-56.5
1400	0.293	215.4	4.430	75.5	0.111	78.0	0.462	-58.8
1600	0.278	206.9	3.909	71.1	0.126	78.2	0.453	-60.8
1800	0.267	198.9	3.505	66.9	0.143	78.1	0.445	-62.5
2000	0.259	191.3	3.187	63.1	0.160	77.9	0.441	-64.4
2200	0.250	184.2	2.932	59.4	0.178	77.5	0.445	-66.4
2400	0.248	177.9	2.724	55.7	0.197	76.8	0.447	-69.5
2600	0.241	171.4	2.536	52.4	0.215	76.1	0.448	-71.7
2800	0.242	166.8	2.402	49.3	0.237	75.4	0.458	-73.3
3000	0.253	161.3	2.293	45.6	0.260	73.9	0.476	-77.1

V_{CE}=8V, I_C=15mA

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.714	-23.1	18.714	156.7	0.012	82.8	0.944	-12.2
200	0.657	-37.9	16.515	141.0	0.019	77.5	0.861	-21.6
300	0.531	-62.8	14.794	125.3	0.026	76.8	0.780	-27.3
400	0.473	-75.9	12.583	115.8	0.033	77.8	0.720	-31.6
500	0.401	264.1	10.957	105.3	0.040	78.3	0.652	-36.6
600	0.377	253.6	9.432	99.4	0.047	79.4	0.614	-39.0
700	0.356	243.3	8.297	94.0	0.054	80.2	0.582	-42.1
800	0.341	234.5	7.333	89.7	0.062	80.8	0.552	-44.8
900	0.331	227.5	6.576	86.0	0.069	81.2	0.531	-47.0
1000	0.319	221.1	5.934	82.8	0.076	81.5	0.508	-49.0
1200	0.305	210.1	4.973	77.2	0.092	81.9	0.483	-52.6
1400	0.298	201.2	4.291	72.5	0.108	82.1	0.469	-55.0
1600	0.290	193.5	3.781	68.2	0.125	82.1	0.465	-57.3
1800	0.285	186.3	3.387	64.2	0.142	81.8	0.461	-59.3
2000	0.282	179.4	3.078	60.4	0.160	81.4	0.460	-61.5
2200	0.278	172.9	2.829	56.8	0.179	80.7	0.466	-63.9
2400	0.279	167.4	2.628	53.1	0.199	79.8	0.471	-67.3
2600	0.275	161.5	2.445	49.8	0.219	79.0	0.472	-69.9
2800	0.277	157.3	2.313	46.8	0.242	78.1	0.484	-71.8
3000	0.289	152.7	2.208	43.0	0.267	76.2	0.504	-76.0

MCH3007

S Parameters (Common emitter)

V_{CE}=8V, I_C=20mA

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.625	-31.7	20.496	153.2	0.010	85.3	0.924	-12.4
200	0.547	-54.4	16.242	135.3	0.018	74.6	0.832	-20.6
300	0.441	-82.8	14.433	118.7	0.023	75.1	0.757	-25.0
400	0.396	261.2	11.734	109.0	0.029	78.6	0.708	-28.2
500	0.371	241.9	9.955	100.1	0.035	80.3	0.652	-32.3
600	0.363	232.1	8.478	94.7	0.042	82.4	0.623	-34.3
700	0.360	222.8	7.373	89.9	0.049	83.6	0.599	-37.1
800	0.357	215.2	6.487	85.9	0.056	84.8	0.576	-39.6
900	0.356	209.3	5.797	82.4	0.064	85.5	0.561	-41.8
1000	0.352	203.5	5.218	79.3	0.071	86.0	0.543	-44.0
1200	0.350	194.2	4.357	73.7	0.087	86.8	0.525	-47.9
1400	0.350	186.7	3.757	69.0	0.103	87.1	0.518	-50.9
1600	0.349	180.0	3.309	64.6	0.121	87.1	0.518	-53.9
1800	0.348	173.7	2.964	60.5	0.140	86.8	0.517	-56.6
2000	0.350	167.7	2.691	56.6	0.159	86.3	0.519	-59.6
2200	0.349	161.7	2.472	52.9	0.180	85.5	0.527	-62.7
2400	0.352	156.9	2.295	49.1	0.202	84.4	0.534	-66.7
2600	0.351	151.4	2.132	45.7	0.224	83.2	0.536	-69.9
2800	0.354	147.2	2.016	42.6	0.250	82.1	0.549	-72.5
3000	0.367	143.1	1.922	38.7	0.277	79.9	0.570	-77.2

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