NEC

NPN SILICON RF TRANSISTOR
2SC5599

NPN SILICON RF TRANSISTOR FOR LOW NOISE · HIGH-GAIN AMPLIFICATION 3-PIN ULTRA SUPER MINIMOLD

FEATURES

- Low voltage operation, low phase distortion
- Ideal for OSC applications
- 3-pin ultra super minimold package(t = 0.75 mm)

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
2SC5599	50 pcs (Non reel)	• 8 mm wide embossed taping
2SC5599-T1	3 kpcs/reel	• Pin 3 (collector) face the perforation side of the tape

Remark To order evaluation samples, consult your NEC sales representative (Unit sample quantity is 50 pcs).

ABSOLUTE MAXIMUM RATINGS (T_A = +25°C)

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	V_{CBO}	9	V
Collector to Emitter Voltage	V_{CEO}	5.5	V
Emitter to Base Voltage	V_{EBO}	1.5	V
Collector Current	I_C	100	mA
Total Power Dissipation	P_{tot} Note	200	mW
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	−65 to +150	°C

Note Mounted on 1.08 $cm^2 \times$ 1.0 mm (t) glass epoxy substrate

Because this product uses high-frequency technology, avoid excessive static electricity, etc.

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ELECTRICAL CHARACTERISTICS (T_A = +25°C)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
DC Characteristics						
Collector Cut-off Current	I_{CBO}	V_{CB} = 5 V, I_E = 0 mA	–	–	600	nA
Emitter Cut-off Current	I_{EBO}	V_{BE} = 1 V, I_C = 0 mA	–	–	600	nA
DC Current Gain	h_{FE} Note 1	V_{CE} = 1 V, I_C = 5 mA	80	–	160	–
RF Characteristics						
Gain Bandwidth Product (1)	f_T	V_{CE} = 1 V, I_C = 5 mA, f = 2 GHz	3.5	5.0	–	GHz
Gain Bandwidth Product (2)	f_T	V_{CE} = 1 V, I_C = 15 mA, f = 2 GHz	5.5	6.5	–	GHz
Insertion Power Gain (1)	$\|S_{21e}\|^2$	V_{CE} = 1 V, I_C = 5 mA, f = 2 GHz	3.5	4.0	–	dB
Insertion Power Gain (2)	$\|S_{21e}\|^2$	V_{CE} = 1 V, I_C = 15 mA, f = 2 GHz	4.5	5.5	–	dB
Noise Figure	NF	V_{CE} = 1 V, I_C = 5 mA, f = 2 GHz, $Z_S = Z_{opt}$	–	1.5	2.5	dB
Reverse Transfer Capacitance	C_{re} Note 2	V_{CB} = 0.5 V, I_E = 0 mA, f = 1 MHz	–	0.8	1.0	pF

Notes 1. Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%

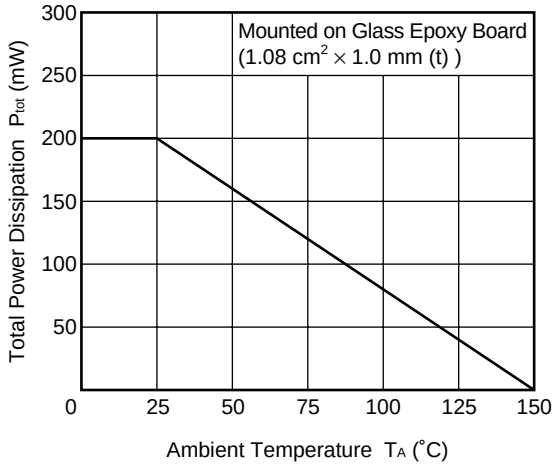
2. Collector to base capacitance measured using capacitance meter (self-balancing bridge method) when the emitter is connected to the guard pin

h_{FE} CLASSIFICATION

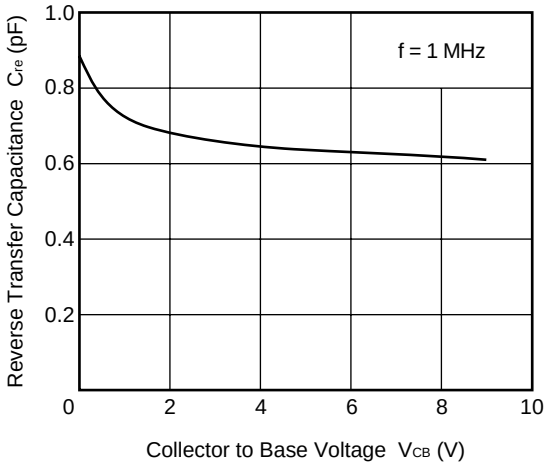
Rank	FB
Marking	TV
h_{FE} Value	80 to 160

TYPICAL CHARACTERISTICS (Unless otherwise specified, T_A = +25°C)

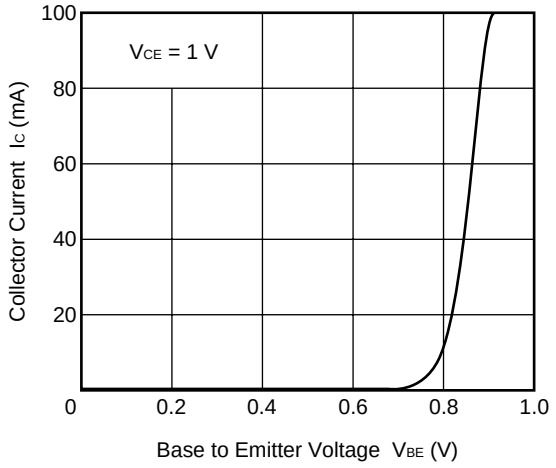
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



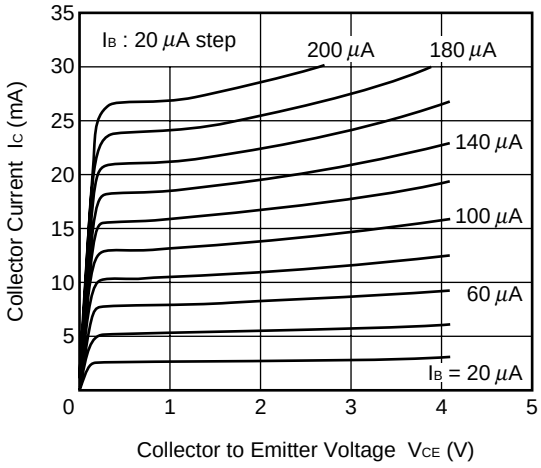
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



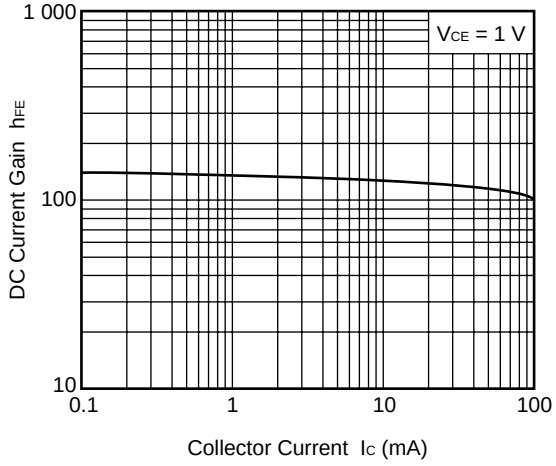
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



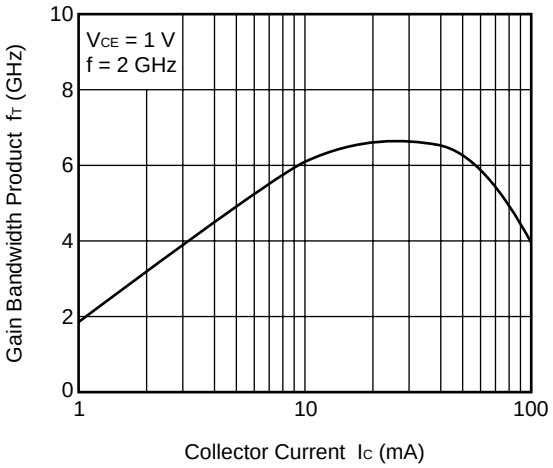
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



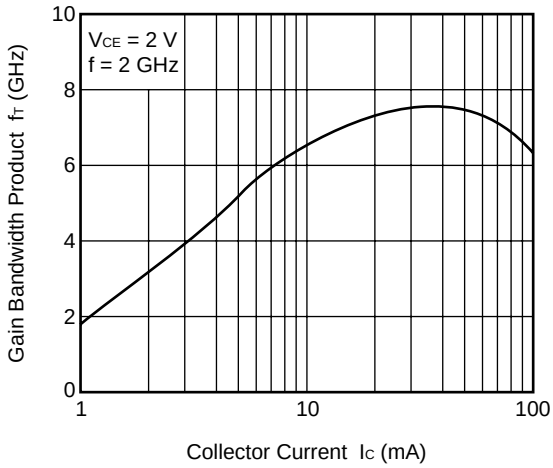
DC CURRENT GAIN vs. COLLECTOR CURRENT



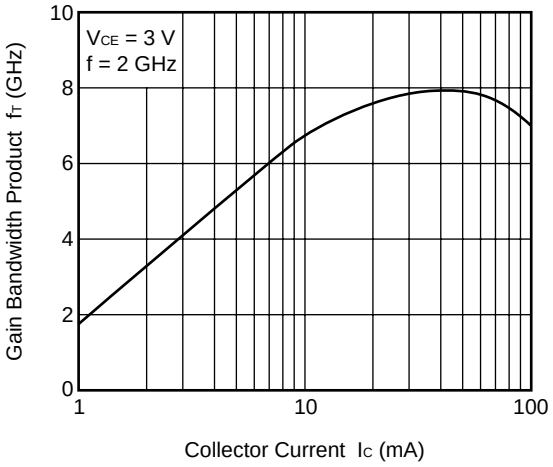
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



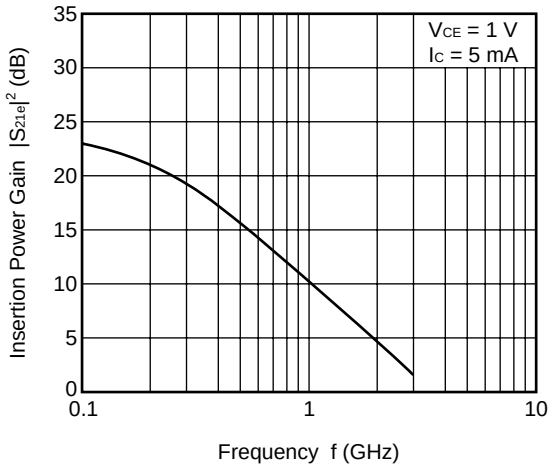
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



INSERTION POWER GAIN vs. FREQUENCY



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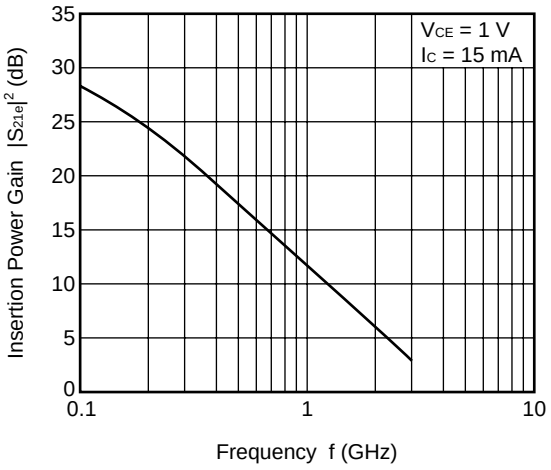

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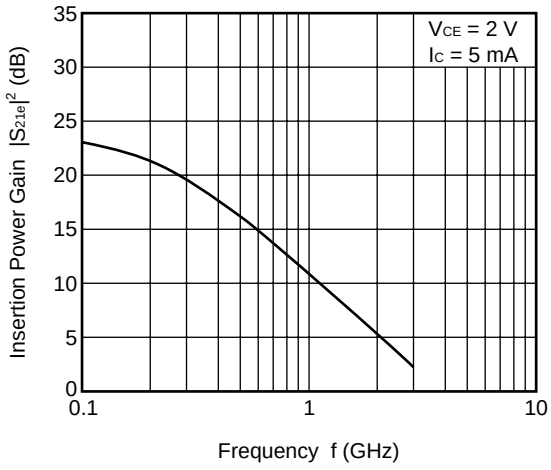

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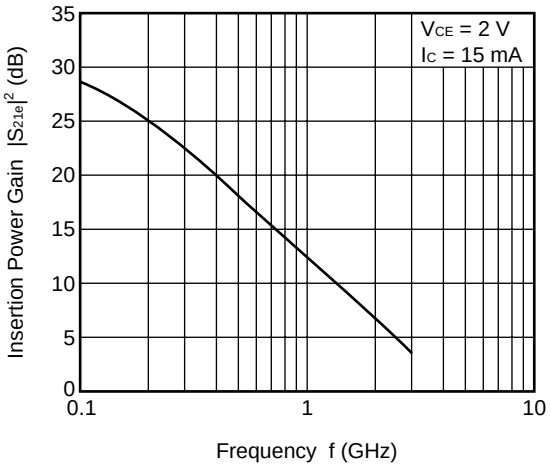

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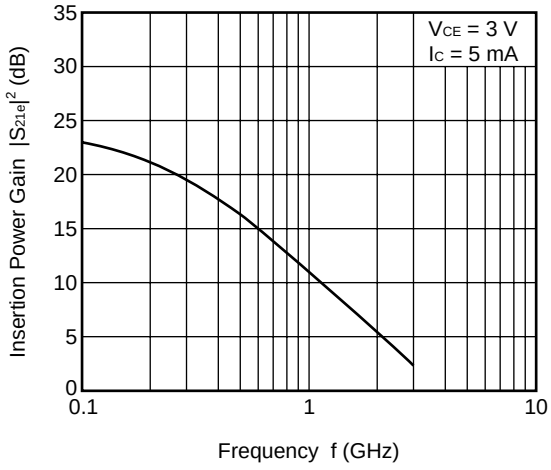

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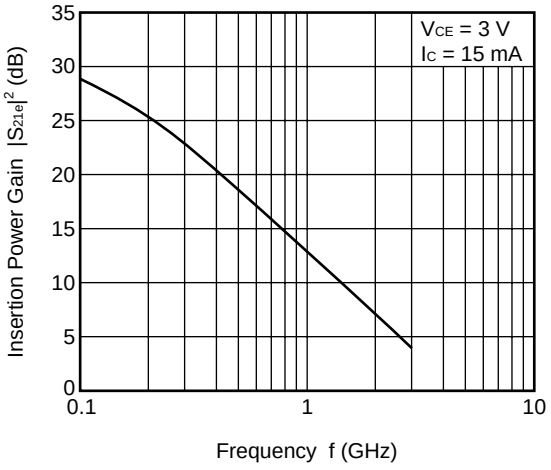
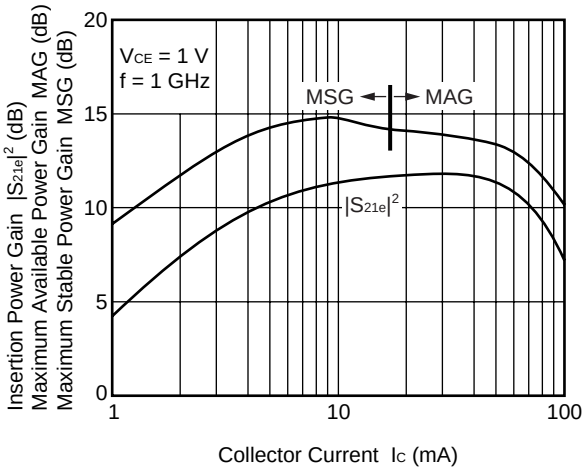


INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



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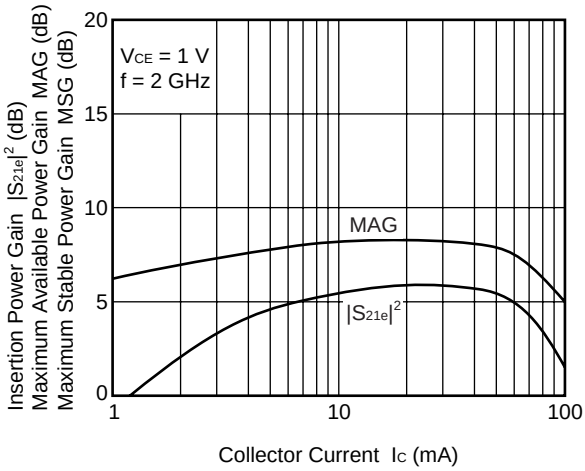

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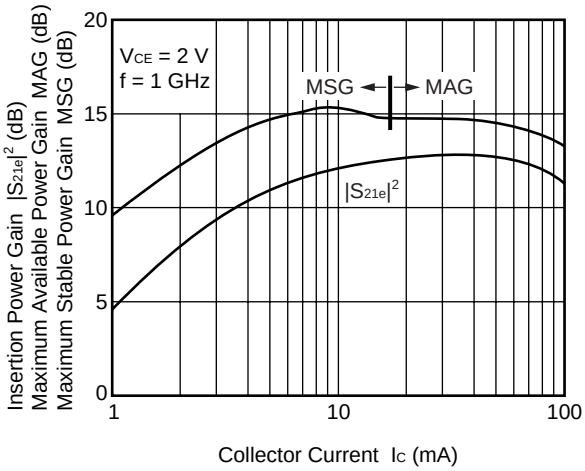

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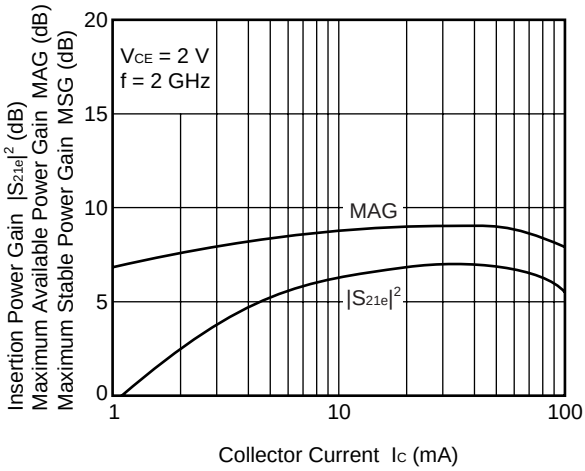

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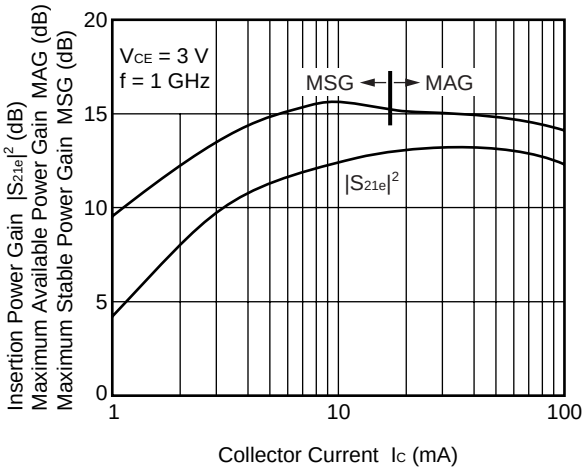

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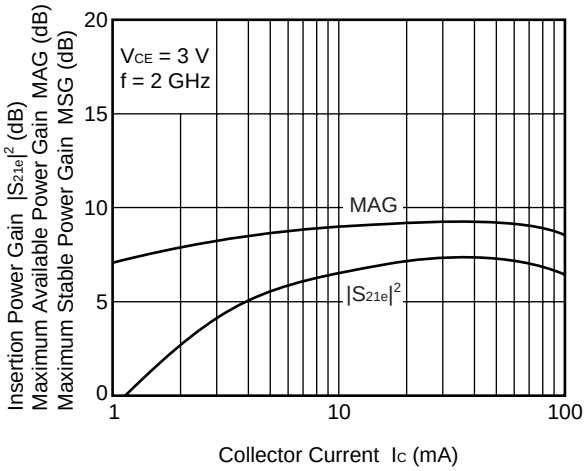
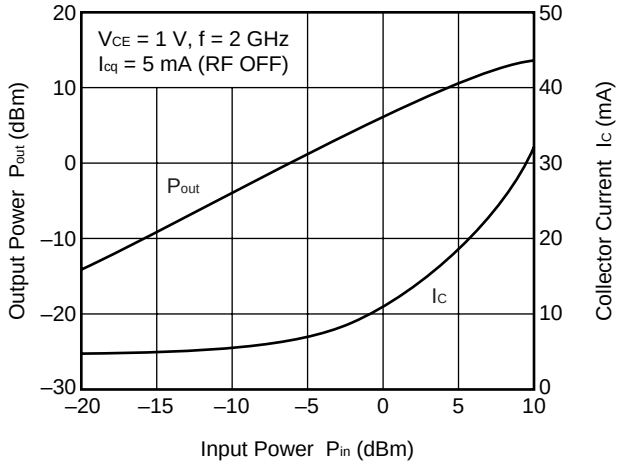
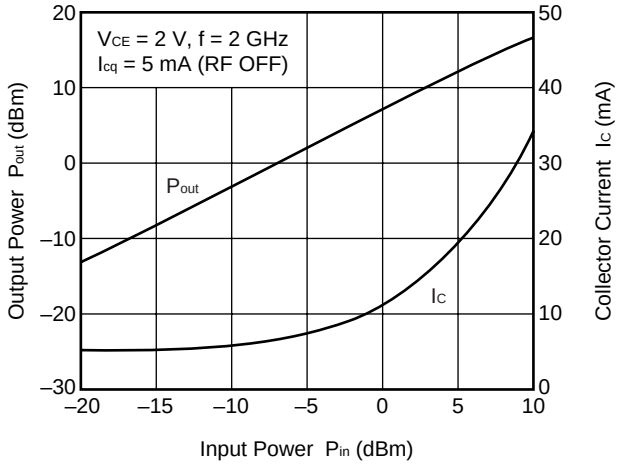


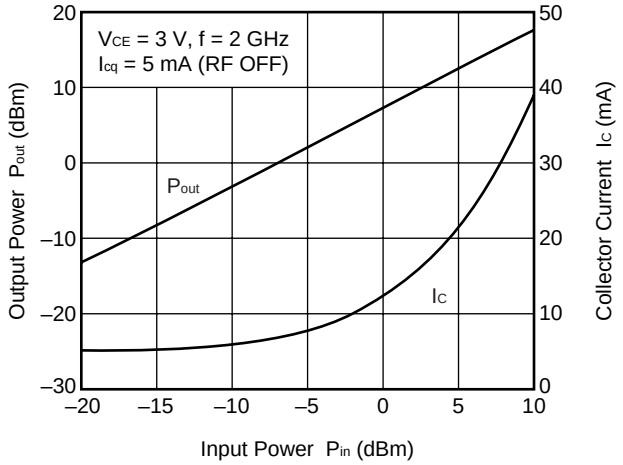
OUTPUT POWER, COLLECTOR CURRENT vs. INPUT POWER



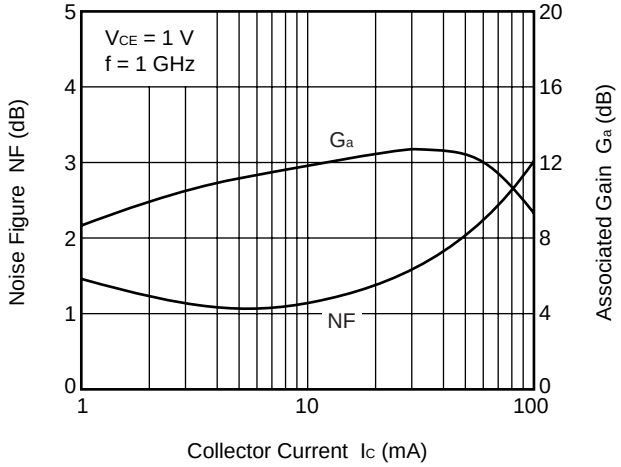
OUTPUT POWER, COLLECTOR CURRENT vs. INPUT POWER



OUTPUT POWER, COLLECTOR CURRENT vs. INPUT POWER



NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



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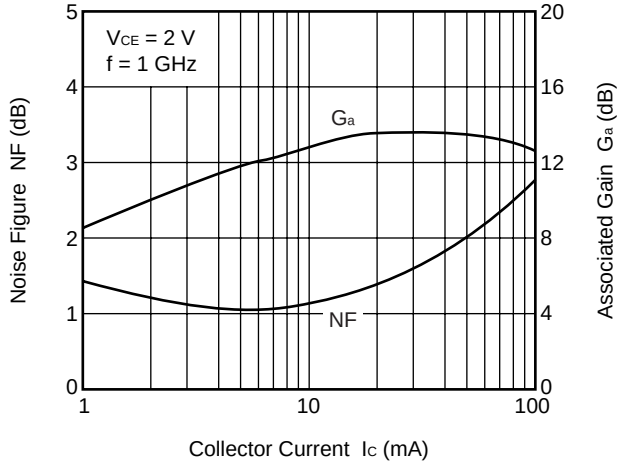

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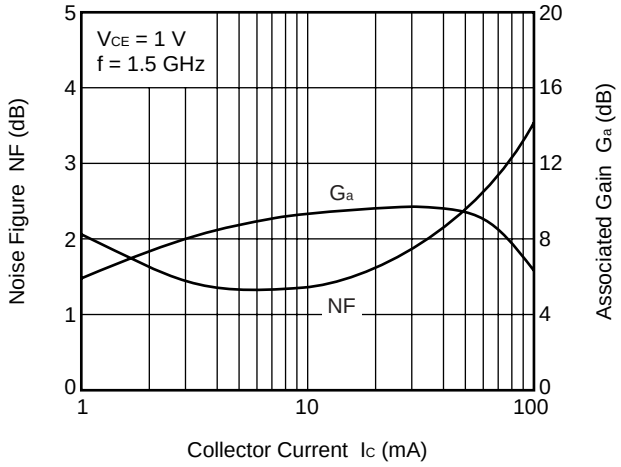
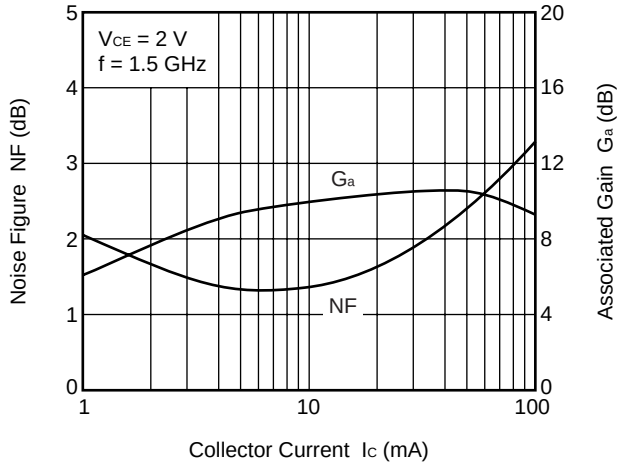


NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



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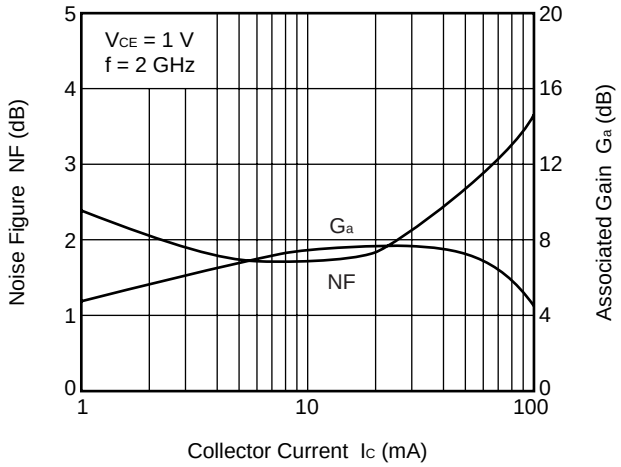

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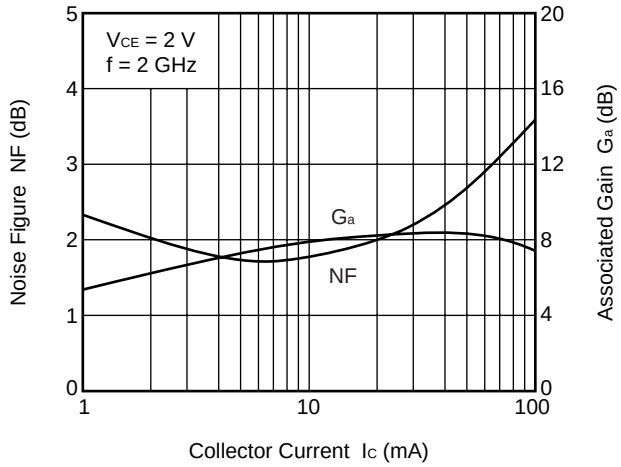


Remark The graphs indicate nominal characteristics.

S-PARAMETERS

Note When $K \geq 1$, the MAG (Maximum Available Gain) is used. $MAG = \left|\frac{S_{21}}{S_{12}}\right| (K - \sqrt{(K^2 - 1)})$

When $K < 1$, the MSG (Maximum Stable Gain) is used. $MSG = \left|\frac{S_{21}}{S_{12}}\right|$

V_{CE} = 1 V, I_C = 3 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG Note
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.888	–32.4	9.519	157.5	0.045	71.5	0.938	–17.4	0.116	23.28
0.2	0.808	–63.4	8.300	138.5	0.081	57.4	0.814	–32.3	0.180	20.13
0.3	0.740	–87.3	6.937	124.5	0.101	47.1	0.688	–42.3	0.257	18.35
0.4	0.691	–105.8	5.850	113.4	0.114	40.5	0.588	–49.7	0.331	17.11
0.5	0.659	–121.2	5.010	104.7	0.122	35.9	0.509	–54.5	0.407	16.15
0.6	0.633	–133.3	4.341	97.5	0.127	33.1	0.449	–58.4	0.485	15.35
0.7	0.621	–143.2	3.823	91.5	0.130	31.4	0.403	–61.3	0.554	14.67
0.8	0.611	–151.5	3.410	86.1	0.133	30.2	0.368	–64.2	0.625	14.08
0.9	0.604	–159.6	3.077	81.1	0.136	29.6	0.339	–66.8	0.692	13.55
1.0	0.602	–166.0	2.804	76.6	0.138	29.5	0.317	–69.4	0.753	13.07
1.1	0.601	–172.0	2.578	72.4	0.140	29.4	0.297	–72.2	0.813	12.64
1.2	0.598	–177.6	2.380	68.6	0.143	29.8	0.282	–74.9	0.874	12.22
1.3	0.604	177.1	2.225	64.6	0.145	30.2	0.269	–77.8	0.913	11.86
1.4	0.605	172.1	2.080	60.9	0.148	30.7	0.257	–80.9	0.961	11.49
1.5	0.611	167.8	1.951	57.3	0.151	31.2	0.249	–84.5	0.992	11.10
1.6	0.612	163.3	1.836	53.7	0.154	32.0	0.239	–88.2	1.039	9.54
1.7	0.618	159.4	1.743	50.5	0.158	32.6	0.231	–92.0	1.063	8.90
1.8	0.628	156.0	1.650	47.4	0.162	33.4	0.225	–96.0	1.075	8.40
1.9	0.633	152.3	1.566	44.4	0.167	34.0	0.220	–100.4	1.100	7.80
2.0	0.641	149.0	1.494	41.3	0.172	34.6	0.216	–104.8	1.102	7.44
2.1	0.646	145.9	1.429	38.4	0.177	35.6	0.211	–109.7	1.117	6.99
2.2	0.651	143.3	1.371	36.0	0.183	36.3	0.210	–114.6	1.124	6.60
2.3	0.659	140.7	1.320	32.9	0.189	36.6	0.210	–120.3	1.116	6.36
2.4	0.664	138.0	1.273	30.2	0.195	36.9	0.209	–125.4	1.119	6.04
2.5	0.672	135.3	1.229	27.7	0.202	37.1	0.212	–131.5	1.109	5.83
2.6	0.675	132.7	1.182	25.2	0.210	37.2	0.216	–136.6	1.110	5.48
2.7	0.681	129.9	1.145	22.6	0.217	37.0	0.223	–142.8	1.105	5.25
2.8	0.679	126.8	1.100	20.0	0.223	36.7	0.227	–148.5	1.132	4.72
2.9	0.669	124.6	1.056	17.2	0.228	36.1	0.236	–154.0	1.181	4.08
3.0	0.649	122.1	1.015	15.7	0.232	36.1	0.240	–160.4	1.279	3.24
4.0	0.767	104.1	0.796	–1.8	0.327	26.0	0.379	156.7	0.966	3.86
5.0	0.827	91.3	0.598	–13.1	0.374	14.5	0.545	128.2	0.963	2.04

V_{CE} = 1 V, I_C = 5 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.801	–44.1	14.211	151.3	0.043	67.6	0.887	–25.2	0.148	25.16
0.2	0.722	–80.1	11.420	130.0	0.070	53.2	0.703	–43.7	0.245	22.13
0.3	0.650	–104.7	8.942	116.3	0.084	45.0	0.555	–54.8	0.361	20.28
0.4	0.612	–122.9	7.248	106.2	0.092	41.3	0.454	–62.6	0.458	18.95
0.5	0.589	–137.0	6.050	98.5	0.099	39.1	0.379	–67.6	0.555	17.87
0.6	0.575	–147.6	5.161	92.4	0.104	38.7	0.326	–72.1	0.641	16.97
0.7	0.569	–156.3	4.509	87.3	0.109	38.7	0.286	–75.5	0.714	16.15
0.8	0.564	–163.2	3.989	82.7	0.114	38.9	0.257	–79.0	0.781	15.42
0.9	0.564	–170.0	3.577	78.4	0.120	39.1	0.233	–82.4	0.839	14.76
1.0	0.564	–175.9	3.246	74.2	0.125	39.9	0.214	–85.7	0.888	14.14
1.1	0.564	179.2	2.976	70.5	0.131	40.3	0.199	–89.8	0.931	13.57
1.2	0.563	174.3	2.738	67.2	0.137	40.7	0.187	–93.5	0.974	13.01
1.3	0.570	169.7	2.552	63.7	0.143	41.1	0.177	–97.5	0.995	12.53
1.4	0.573	165.5	2.380	60.3	0.149	41.3	0.168	–102.0	1.022	11.13
1.5	0.581	161.5	2.230	57.1	0.156	41.4	0.163	–107.0	1.033	10.44
1.6	0.585	157.8	2.093	53.8	0.162	41.5	0.156	–112.3	1.059	9.64
1.7	0.589	154.4	1.984	50.8	0.168	41.5	0.152	–117.4	1.071	9.10
1.8	0.600	151.2	1.880	47.9	0.176	41.4	0.149	–123.1	1.071	8.68
1.9	0.605	147.9	1.781	45.2	0.182	41.2	0.147	–128.9	1.083	8.14
2.0	0.614	145.0	1.694	42.4	0.190	40.8	0.147	–134.5	1.080	7.77
2.1	0.623	142.3	1.622	39.6	0.197	40.8	0.147	–140.8	1.081	7.43
2.2	0.626	140.2	1.557	37.4	0.204	40.7	0.150	–146.2	1.083	7.06
2.3	0.634	137.7	1.500	34.4	0.212	40.1	0.155	–152.6	1.077	6.81
2.4	0.640	135.2	1.439	31.9	0.219	39.6	0.158	–157.8	1.078	6.47
2.5	0.646	132.6	1.390	29.3	0.226	39.0	0.166	–163.7	1.076	6.20
2.6	0.649	130.3	1.336	26.9	0.235	38.4	0.174	–168.2	1.077	5.86
2.7	0.654	127.9	1.294	24.5	0.241	37.6	0.185	–173.5	1.078	5.59
2.8	0.655	125.3	1.243	21.8	0.247	36.8	0.194	–178.6	1.095	5.14
2.9	0.644	123.3	1.195	19.2	0.252	35.8	0.207	177.2	1.137	4.52
3.0	0.634	121.1	1.156	18.0	0.255	35.5	0.215	171.5	1.185	3.96
4.0	0.748	104.0	0.905	–0.4	0.336	23.3	0.356	141.5	0.981	4.30
5.0	0.818	91.8	0.679	–13.0	0.372	12.8	0.515	120.5	0.964	2.61

V_{CE} = 1 V, I_C = 10 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.665	–66.4	21.939	140.4	0.036	61.3	0.767	–39.6	0.230	27.83
0.2	0.584	–107.1	15.239	117.9	0.053	50.3	0.528	–62.0	0.414	24.56
0.3	0.551	–130.7	11.071	106.1	0.062	48.0	0.386	–74.6	0.562	22.49
0.4	0.534	–145.4	8.639	98.0	0.071	48.2	0.304	–83.9	0.680	20.88
0.5	0.527	–156.1	7.059	92.0	0.078	49.0	0.248	–91.0	0.773	19.54
0.6	0.524	–164.6	5.944	87.1	0.086	50.0	0.211	–97.9	0.847	18.39
0.7	0.527	–171.1	5.150	82.8	0.095	51.1	0.185	–104.0	0.895	17.36
0.8	0.527	–176.3	4.541	79.1	0.103	51.6	0.167	–110.3	0.937	16.44
0.9	0.531	178.5	4.059	75.4	0.112	51.9	0.153	–116.7	0.966	15.59
1.0	0.533	174.0	3.669	71.9	0.121	52.2	0.143	–122.7	0.989	14.82
1.1	0.534	169.8	3.353	68.6	0.130	52.1	0.138	–129.3	1.011	13.48
1.2	0.537	165.7	3.080	65.7	0.139	51.7	0.133	–135.3	1.027	12.46
1.3	0.542	162.1	2.867	62.6	0.148	51.4	0.132	–141.0	1.035	11.74
1.4	0.549	158.6	2.665	59.5	0.157	50.9	0.132	–147.4	1.043	11.04
1.5	0.554	155.3	2.498	56.7	0.166	50.1	0.134	–153.1	1.046	10.46
1.6	0.560	152.0	2.339	53.7	0.175	49.3	0.136	–159.4	1.055	9.84
1.7	0.569	149.0	2.212	51.0	0.183	48.6	0.140	–164.9	1.055	9.38
1.8	0.577	146.5	2.096	48.3	0.192	47.7	0.145	–170.3	1.052	8.97
1.9	0.583	143.5	1.985	45.8	0.201	46.6	0.151	–175.2	1.058	8.47
2.0	0.593	141.1	1.888	43.2	0.210	45.6	0.156	–179.7	1.053	8.14
2.1	0.601	138.8	1.804	40.6	0.218	44.8	0.163	175.4	1.052	7.78
2.2	0.604	136.6	1.730	38.4	0.226	43.9	0.169	171.4	1.056	7.39
2.3	0.615	134.6	1.661	35.7	0.235	42.7	0.180	167.5	1.046	7.18
2.4	0.619	132.3	1.596	33.3	0.243	41.7	0.187	164.0	1.049	6.83
2.5	0.627	130.1	1.540	31.0	0.250	40.6	0.199	160.7	1.047	6.57
2.6	0.629	128.1	1.478	28.7	0.259	39.3	0.208	158.0	1.049	6.21
2.7	0.634	125.9	1.432	26.2	0.265	38.2	0.222	154.9	1.052	5.93
2.8	0.633	123.6	1.370	24.1	0.271	37.0	0.234	151.3	1.072	5.41
2.9	0.631	122.2	1.323	21.6	0.275	36.0	0.247	149.2	1.088	5.01
3.0	0.630	120.4	1.289	20.3	0.280	35.3	0.256	145.4	1.100	4.71
4.0	0.731	103.4	1.003	1.9	0.348	20.9	0.383	125.9	0.993	4.59
5.0	0.805	91.6	0.761	–11.1	0.374	10.8	0.520	110.8	0.980	3.09

V_{CE} = 1 V, I_C = 20 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.517	–95.0	28.693	128.9	0.029	56.5	0.614	–56.0	0.398	29.97
0.2	0.513	–132.9	17.524	108.6	0.040	54.6	0.381	–81.7	0.613	26.37
0.3	0.503	–151.7	12.201	99.2	0.050	56.2	0.275	–96.9	0.771	23.87
0.4	0.502	–162.5	9.329	92.6	0.060	58.3	0.223	–109.4	0.864	21.92
0.5	0.505	–170.0	7.563	87.6	0.070	59.5	0.189	–119.7	0.920	20.33
0.6	0.508	–176.2	6.336	83.7	0.080	60.4	0.171	–129.1	0.961	18.97
0.7	0.512	178.8	5.471	80.1	0.091	60.9	0.159	–137.5	0.984	17.79
0.8	0.512	174.9	4.793	76.6	0.102	60.7	0.154	–144.8	1.004	16.32
0.9	0.518	170.6	4.285	73.4	0.113	60.2	0.150	–152.0	1.016	15.04
1.0	0.522	166.8	3.870	70.1	0.123	59.8	0.149	–157.8	1.023	14.03
1.1	0.526	163.7	3.539	67.2	0.134	59.0	0.151	–163.5	1.029	13.17
1.2	0.528	160.2	3.249	64.6	0.145	57.9	0.154	–168.4	1.036	12.34
1.3	0.536	157.0	3.013	61.7	0.155	56.9	0.157	–172.4	1.036	11.72
1.4	0.542	154.1	2.804	58.8	0.165	55.9	0.163	–177.2	1.039	11.09
1.5	0.548	151.1	2.626	56.1	0.176	54.4	0.169	179.0	1.038	10.54
1.6	0.555	148.3	2.454	53.3	0.185	53.3	0.176	174.8	1.044	9.94
1.7	0.560	145.6	2.321	50.7	0.194	52.0	0.183	171.0	1.046	9.46
1.8	0.572	143.2	2.199	48.3	0.205	50.6	0.191	167.3	1.039	9.11
1.9	0.578	140.6	2.081	45.8	0.214	49.3	0.199	164.0	1.041	8.64
2.0	0.586	138.5	1.978	43.4	0.223	47.8	0.206	160.8	1.040	8.25
2.1	0.594	136.1	1.891	40.9	0.231	46.6	0.215	157.5	1.038	7.92
2.2	0.600	134.5	1.808	38.9	0.240	45.3	0.223	154.5	1.038	7.57
2.3	0.609	132.4	1.738	36.1	0.250	43.9	0.234	151.8	1.033	7.32
2.4	0.613	130.2	1.670	33.8	0.257	42.5	0.242	149.1	1.035	6.97
2.5	0.621	128.2	1.609	31.6	0.265	41.2	0.254	146.7	1.034	6.71
2.6	0.626	126.4	1.546	29.4	0.274	39.7	0.263	144.6	1.032	6.42
2.7	0.629	124.4	1.492	27.1	0.280	38.4	0.276	142.2	1.038	6.06
2.8	0.628	121.8	1.431	24.8	0.286	36.9	0.289	139.5	1.054	5.58
2.9	0.623	120.6	1.382	22.5	0.290	35.8	0.302	138.0	1.071	5.16
3.0	0.622	119.0	1.342	21.4	0.294	35.0	0.312	134.7	1.084	4.83
4.0	0.725	102.7	1.045	3.4	0.357	19.5	0.424	118.1	1.000	4.66
5.0	0.802	91.5	0.797	–9.3	0.376	9.5	0.545	105.3	0.987	3.26

V_{CE} = 2 V, I_C = 3 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.890	–30.1	9.363	159.3	0.041	74.2	0.949	–14.7	0.098	23.56
0.2	0.831	–58.7	8.315	141.3	0.072	60.3	0.843	–27.8	0.157	20.64
0.3	0.756	–81.3	7.064	127.6	0.092	49.9	0.729	–36.7	0.243	18.84
0.4	0.704	–99.8	6.040	116.4	0.105	43.0	0.634	–43.3	0.315	17.59
0.5	0.660	–115.0	5.215	107.6	0.113	38.1	0.557	–47.5	0.397	16.64
0.6	0.634	–127.4	4.540	100.3	0.118	35.3	0.497	–50.8	0.470	15.84
0.7	0.619	–138.0	4.020	94.2	0.122	33.3	0.451	–53.1	0.536	15.17
0.8	0.606	–146.7	3.592	88.8	0.125	32.0	0.416	–55.4	0.607	14.59
0.9	0.596	–155.0	3.247	83.7	0.127	31.2	0.387	–57.4	0.675	14.06
1.0	0.592	–162.0	2.964	79.0	0.129	31.2	0.363	–59.4	0.738	13.60
1.1	0.588	–168.4	2.732	74.7	0.131	31.2	0.344	–61.6	0.798	13.18
1.2	0.585	–174.2	2.517	71.0	0.134	31.4	0.328	–63.7	0.861	12.75
1.3	0.588	–179.8	2.357	67.0	0.135	31.9	0.314	–66.0	0.905	12.41
1.4	0.591	175.5	2.201	63.2	0.138	32.6	0.302	–68.3	0.950	12.03
1.5	0.597	170.4	2.069	59.7	0.141	33.2	0.291	–71.3	0.980	11.65
1.6	0.600	166.0	1.944	56.1	0.144	34.0	0.280	–74.1	1.025	10.33
1.7	0.603	161.7	1.846	52.9	0.147	34.9	0.272	–77.0	1.056	9.54
1.8	0.612	158.1	1.749	49.8	0.152	35.7	0.264	–80.3	1.071	8.99
1.9	0.616	154.3	1.657	46.8	0.156	36.6	0.256	–83.9	1.096	8.37
2.0	0.625	150.9	1.584	43.7	0.161	37.4	0.250	–87.5	1.095	8.04
2.1	0.631	147.9	1.514	40.7	0.166	38.6	0.243	–91.5	1.108	7.59
2.2	0.636	145.3	1.454	38.3	0.172	39.5	0.239	–95.7	1.112	7.23
2.3	0.645	142.3	1.400	35.2	0.178	40.0	0.235	–100.6	1.104	6.98
2.4	0.647	139.3	1.349	32.7	0.185	40.4	0.231	–105.1	1.113	6.59
2.5	0.657	136.7	1.305	30.0	0.191	40.6	0.229	–110.9	1.099	6.42
2.6	0.659	133.9	1.253	27.5	0.199	40.8	0.230	–115.8	1.101	6.05
2.7	0.666	131.4	1.213	25.0	0.206	40.8	0.231	–122.0	1.094	5.83
2.8	0.662	128.3	1.165	22.2	0.213	40.6	0.231	–127.6	1.127	5.22
2.9	0.651	126.0	1.119	19.5	0.218	40.1	0.235	–133.7	1.179	4.54
3.0	0.641	124.2	1.081	18.4	0.224	40.3	0.232	–140.1	1.234	3.92
4.0	0.757	105.0	0.845	–0.2	0.325	30.1	0.348	168.8	0.937	4.15
5.0	0.821	92.1	0.630	–12.4	0.379	17.7	0.518	134.8	0.936	2.21

V_{CE} = 2 V, I_C = 5 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.826	–39.9	14.238	153.5	0.039	71.0	0.904	–21.6	0.125	25.64
0.2	0.728	–73.2	11.746	132.8	0.063	55.6	0.740	–37.8	0.248	22.71
0.3	0.655	–98.1	9.350	119.2	0.077	47.3	0.597	–47.7	0.352	20.84
0.4	0.610	–116.4	7.678	108.8	0.086	43.3	0.497	–54.3	0.446	19.52
0.5	0.580	–130.8	6.439	101.0	0.092	41.0	0.421	–58.1	0.544	18.44
0.6	0.560	–142.1	5.514	94.6	0.097	40.5	0.366	–61.2	0.632	17.53
0.7	0.553	–151.0	4.831	89.5	0.102	40.5	0.325	–63.5	0.703	16.74
0.8	0.546	–158.9	4.277	84.8	0.107	40.5	0.294	–65.7	0.769	16.00
0.9	0.542	–166.1	3.845	80.5	0.112	40.9	0.269	–67.9	0.829	15.34
1.0	0.540	–171.9	3.486	76.3	0.117	41.6	0.249	–70.0	0.883	14.73
1.1	0.542	–177.5	3.200	72.6	0.123	41.9	0.232	–72.6	0.922	14.16
1.2	0.540	177.4	2.942	69.3	0.128	42.6	0.218	–75.0	0.965	13.60
1.3	0.545	172.7	2.745	65.8	0.134	42.9	0.207	–77.8	0.991	13.13
1.4	0.550	168.2	2.563	62.3	0.140	43.4	0.195	–80.8	1.015	11.89
1.5	0.555	164.1	2.400	59.2	0.146	43.5	0.187	–84.5	1.030	11.09
1.6	0.560	160.2	2.249	55.9	0.152	43.6	0.178	–88.3	1.054	10.27
1.7	0.567	156.3	2.137	52.9	0.158	43.7	0.170	–92.2	1.061	9.79
1.8	0.575	153.4	2.023	50.2	0.166	43.8	0.163	–96.6	1.064	9.32
1.9	0.580	149.8	1.915	47.4	0.173	43.6	0.157	–101.4	1.078	8.75
2.0	0.589	146.7	1.826	44.5	0.180	43.4	0.153	–106.4	1.073	8.41
2.1	0.597	144.3	1.746	41.7	0.187	43.6	0.147	–111.8	1.075	8.04
2.2	0.602	141.8	1.674	39.4	0.194	43.5	0.145	–117.3	1.077	7.67
2.3	0.612	139.3	1.610	36.5	0.201	43.0	0.144	–124.1	1.067	7.45
2.4	0.615	136.7	1.550	34.0	0.209	42.6	0.144	–129.9	1.072	7.07
2.5	0.624	134.2	1.496	31.5	0.216	42.1	0.146	–137.0	1.065	6.85
2.6	0.626	131.6	1.438	29.2	0.225	41.4	0.150	–142.6	1.069	6.46
2.7	0.632	129.2	1.395	26.6	0.231	40.8	0.156	–149.7	1.065	6.24
2.8	0.632	126.6	1.336	24.1	0.237	39.9	0.161	–156.2	1.086	5.71
2.9	0.626	124.7	1.287	21.4	0.242	39.1	0.170	–162.3	1.119	5.16
3.0	0.612	122.6	1.240	20.2	0.246	38.8	0.174	–169.8	1.175	4.49
4.0	0.733	105.2	0.973	1.3	0.333	26.9	0.309	151.1	0.960	4.66
5.0	0.810	92.5	0.725	–12.4	0.375	15.7	0.478	126.1	0.939	2.87

V_{CE} = 2 V, I_C = 10 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.673	–58.8	22.656	142.9	0.032	64.0	0.796	–34.1	0.235	28.52
0.2	0.586	–98.6	16.206	120.6	0.049	52.9	0.565	–53.8	0.404	25.23
0.3	0.532	–123.4	11.951	108.5	0.058	49.7	0.420	–63.9	0.557	23.14
0.4	0.510	–139.0	9.371	100.1	0.066	50.1	0.331	–70.8	0.674	21.54
0.5	0.496	–150.8	7.686	93.9	0.073	50.4	0.271	–75.3	0.770	20.21
0.6	0.492	–159.8	6.485	88.9	0.081	51.7	0.229	–79.4	0.840	19.03
0.7	0.493	–167.1	5.613	84.7	0.089	52.6	0.198	–83.0	0.890	17.99
0.8	0.489	–172.8	4.947	80.7	0.097	53.2	0.176	–86.7	0.935	17.06
0.9	0.494	–178.4	4.422	77.2	0.105	53.5	0.157	–90.5	0.964	16.23
1.0	0.497	177.0	3.997	73.7	0.114	53.9	0.144	–94.4	0.987	15.45
1.1	0.498	172.6	3.658	70.3	0.122	53.7	0.133	–99.4	1.007	14.23
1.2	0.500	168.2	3.363	67.5	0.131	53.5	0.124	–104.1	1.024	13.14
1.3	0.509	164.4	3.130	64.4	0.139	53.2	0.118	–109.2	1.027	12.50
1.4	0.511	160.9	2.911	61.4	0.148	52.9	0.112	–115.4	1.040	11.70
1.5	0.521	157.2	2.725	58.6	0.158	52.0	0.110	–121.9	1.038	11.19
1.6	0.524	154.0	2.556	55.6	0.166	51.4	0.107	–129.0	1.051	10.51
1.7	0.531	150.9	2.417	53.0	0.174	50.6	0.105	–135.9	1.054	10.01
1.8	0.543	148.1	2.290	50.3	0.183	49.8	0.105	–143.3	1.047	9.64
1.9	0.548	145.0	2.169	47.9	0.191	48.9	0.107	–150.4	1.053	9.14
2.0	0.560	142.7	2.062	45.1	0.200	47.9	0.110	–157.0	1.046	8.82
2.1	0.568	140.3	1.972	42.7	0.208	47.2	0.113	–163.9	1.046	8.46
2.2	0.572	138.2	1.886	40.5	0.216	46.4	0.118	–169.6	1.049	8.05
2.3	0.581	136.3	1.813	37.7	0.225	45.3	0.126	–175.8	1.043	7.80
2.4	0.587	133.8	1.743	35.3	0.233	44.2	0.131	179.3	1.042	7.49
2.5	0.594	131.6	1.681	33.0	0.240	43.1	0.142	174.3	1.042	7.20
2.6	0.598	129.4	1.613	30.8	0.249	41.9	0.149	170.6	1.043	6.84
2.7	0.605	126.9	1.563	28.4	0.256	40.8	0.162	166.4	1.042	6.61
2.8	0.604	124.4	1.499	26.0	0.262	39.5	0.173	162.0	1.060	6.07
2.9	0.596	122.7	1.446	23.2	0.266	38.3	0.188	159.1	1.088	5.55
3.0	0.584	120.6	1.388	22.1	0.268	37.7	0.199	153.4	1.132	4.93
4.0	0.713	104.9	1.093	3.8	0.344	23.9	0.328	131.3	0.977	5.02
5.0	0.794	93.0	0.824	–10.2	0.374	13.3	0.476	114.8	0.961	3.43

V_{CE} = 2 V, I_C = 20 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.522	–84.7	30.424	131.9	0.026	62.7	0.653	–48.0	0.372	30.69
0.2	0.481	–124.6	19.132	111.0	0.038	56.0	0.410	–69.5	0.606	26.99
0.3	0.466	–144.8	13.442	101.3	0.046	57.7	0.290	–80.7	0.763	24.61
0.4	0.461	–156.7	10.325	94.4	0.056	59.5	0.226	–89.4	0.853	22.63
0.5	0.460	–165.6	8.379	89.4	0.066	60.7	0.183	–96.3	0.915	21.05
0.6	0.462	–172.5	7.024	85.2	0.076	61.5	0.155	–103.3	0.954	19.67
0.7	0.468	–177.5	6.072	81.7	0.086	62.0	0.136	–110.1	0.973	18.48
0.8	0.468	178.0	5.327	78.2	0.096	62.1	0.123	–116.9	0.996	17.43
0.9	0.473	173.4	4.749	75.1	0.106	61.5	0.114	–124.0	1.009	15.92
1.0	0.475	169.7	4.286	71.9	0.116	61.1	0.108	–130.6	1.019	14.80
1.1	0.478	165.9	3.926	68.9	0.127	60.4	0.105	–138.0	1.026	13.92
1.2	0.481	162.2	3.603	66.3	0.137	59.6	0.104	–144.3	1.034	13.08
1.3	0.490	159.0	3.345	63.6	0.147	58.7	0.105	–150.2	1.032	12.49
1.4	0.496	155.9	3.112	60.7	0.156	57.7	0.107	–157.1	1.035	11.84
1.5	0.505	152.9	2.907	58.1	0.167	56.3	0.112	–162.8	1.034	11.29
1.6	0.510	150.0	2.721	55.3	0.176	55.2	0.116	–169.0	1.040	10.67
1.7	0.518	147.3	2.576	52.7	0.185	53.9	0.122	–174.5	1.038	10.24
1.8	0.528	144.8	2.437	50.3	0.195	52.7	0.128	–179.9	1.035	9.83
1.9	0.534	142.2	2.309	47.9	0.204	51.3	0.135	175.4	1.037	9.36
2.0	0.546	140.1	2.195	45.5	0.213	49.9	0.142	171.1	1.032	9.03
2.1	0.555	137.9	2.095	43.1	0.221	48.9	0.150	166.5	1.031	8.67
2.2	0.557	135.9	2.005	41.0	0.230	47.6	0.157	162.6	1.035	8.25
2.3	0.567	134.1	1.925	38.3	0.239	46.2	0.168	159.2	1.029	8.00
2.4	0.572	131.8	1.849	36.0	0.247	44.9	0.176	155.9	1.031	7.66
2.5	0.580	129.9	1.783	33.8	0.255	43.5	0.188	153.0	1.030	7.39
2.6	0.584	127.6	1.712	31.6	0.264	42.1	0.196	150.6	1.031	7.04
2.7	0.591	125.5	1.656	29.3	0.271	40.7	0.210	148.0	1.031	6.78
2.8	0.591	122.8	1.588	26.8	0.277	39.2	0.222	145.0	1.045	6.29
2.9	0.586	120.6	1.531	24.1	0.281	37.7	0.238	143.5	1.064	5.82
3.0	0.566	119.0	1.464	23.0	0.281	36.9	0.252	139.2	1.115	5.10
4.0	0.701	104.3	1.154	5.2	0.352	22.2	0.368	121.7	0.989	5.15
5.0	0.786	92.6	0.876	–8.5	0.375	11.8	0.500	108.1	0.975	3.68

V_{CE} = 3 V, I_C = 3 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.888	–29.8	9.612	159.6	0.039	74.3	0.951	–14.2	0.096	23.93
0.2	0.831	–57.3	8.533	141.7	0.069	60.2	0.847	–27.0	0.173	20.94
0.3	0.756	–80.0	7.280	128.2	0.089	50.6	0.735	–35.7	0.246	19.12
0.4	0.701	–98.4	6.233	117.0	0.101	44.0	0.640	–42.1	0.319	17.90
0.5	0.656	–113.2	5.381	108.2	0.109	39.1	0.564	–46.1	0.403	16.94
0.6	0.629	–126.1	4.695	100.9	0.114	36.2	0.505	–49.3	0.473	16.14
0.7	0.610	–136.5	4.156	95.0	0.118	34.3	0.459	–51.5	0.545	15.47
0.8	0.597	–145.5	3.713	89.5	0.121	33.1	0.424	–53.6	0.612	14.86
0.9	0.589	–153.7	3.360	84.4	0.124	32.3	0.394	–55.6	0.680	14.34
1.0	0.583	–160.9	3.065	79.7	0.126	32.2	0.371	–57.4	0.742	13.86
1.1	0.580	–167.2	2.827	75.5	0.128	32.3	0.351	–59.4	0.800	13.44
1.2	0.574	–173.4	2.604	71.8	0.130	32.7	0.335	–61.3	0.867	13.01
1.3	0.579	–179.0	2.439	67.8	0.132	33.3	0.321	–63.5	0.906	12.65
1.4	0.580	175.9	2.279	64.1	0.135	34.0	0.308	–65.6	0.954	12.27
1.5	0.585	171.2	2.140	60.6	0.139	34.6	0.298	–68.3	0.985	11.89
1.6	0.589	166.7	2.011	57.1	0.142	35.3	0.287	–71.1	1.027	10.52
1.7	0.592	162.4	1.910	53.8	0.145	36.1	0.278	–73.8	1.057	9.74
1.8	0.602	158.6	1.811	50.7	0.150	37.1	0.270	–77.0	1.063	9.30
1.9	0.607	154.8	1.716	47.7	0.154	37.8	0.262	–80.2	1.090	8.64
2.0	0.615	151.3	1.638	44.7	0.159	38.6	0.255	–83.6	1.093	8.26
2.1	0.622	148.2	1.566	41.7	0.164	39.7	0.247	–87.3	1.103	7.84
2.2	0.627	145.6	1.504	39.2	0.170	40.6	0.243	–91.2	1.106	7.49
2.3	0.634	142.8	1.449	36.2	0.176	41.0	0.238	–96.0	1.104	7.19
2.4	0.639	139.9	1.394	33.5	0.183	41.4	0.233	–100.4	1.104	6.87
2.5	0.648	137.1	1.347	31.0	0.189	41.6	0.230	–105.9	1.093	6.66
2.6	0.650	134.5	1.292	28.5	0.197	41.8	0.229	–110.6	1.097	6.27
2.7	0.654	131.5	1.256	25.9	0.204	41.8	0.229	–116.7	1.094	6.01
2.8	0.656	128.7	1.204	23.2	0.211	41.5	0.229	–122.3	1.113	5.53
2.9	0.640	126.1	1.156	20.5	0.216	40.9	0.231	–128.4	1.177	4.73
3.0	0.625	124.2	1.113	19.2	0.221	41.1	0.226	–135.1	1.254	3.99
4.0	0.749	105.6	0.876	0.4	0.323	31.2	0.333	172.1	0.932	4.33
5.0	0.817	92.5	0.649	–12.2	0.379	18.7	0.503	136.7	0.930	2.34

V_{CE} = 3 V, I_C = 5 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.831	–37.1	14.051	154.3	0.036	68.5	0.912	–20.1	0.176	25.85
0.2	0.743	–70.3	11.720	134.2	0.062	57.0	0.756	–35.7	0.237	22.78
0.3	0.663	–94.7	9.443	120.6	0.076	48.7	0.618	–45.2	0.341	20.96
0.4	0.613	–113.0	7.768	110.1	0.084	44.2	0.517	–51.5	0.438	19.64
0.5	0.576	–127.4	6.549	102.2	0.091	41.8	0.441	–55.2	0.537	18.57
0.6	0.561	–139.3	5.616	95.8	0.096	40.8	0.386	–58.1	0.617	17.67
0.7	0.547	–148.6	4.919	90.6	0.101	40.7	0.344	–60.0	0.693	16.87
0.8	0.540	–156.4	4.365	85.8	0.106	40.8	0.313	–62.2	0.760	16.15
0.9	0.535	–163.7	3.924	81.4	0.111	41.0	0.286	–63.9	0.821	15.49
1.0	0.535	–169.9	3.564	77.3	0.116	41.7	0.266	–65.8	0.870	14.89
1.1	0.534	–175.8	3.272	73.5	0.121	42.1	0.249	–68.1	0.914	14.33
1.2	0.532	179.1	3.010	70.2	0.126	42.5	0.235	–70.1	0.958	13.78
1.3	0.537	174.3	2.810	66.6	0.131	43.1	0.223	–72.6	0.983	13.31
1.4	0.540	169.8	2.618	63.2	0.137	43.4	0.211	–75.1	1.011	12.16
1.5	0.546	165.3	2.455	60.1	0.143	43.6	0.202	–78.5	1.027	11.33
1.6	0.549	161.4	2.301	56.8	0.149	43.9	0.191	–81.8	1.054	10.46
1.7	0.557	157.6	2.182	53.8	0.155	44.0	0.183	–85.1	1.062	9.96
1.8	0.565	154.2	2.069	50.9	0.162	44.1	0.175	–89.2	1.065	9.50
1.9	0.572	150.8	1.958	48.2	0.169	44.0	0.168	–93.4	1.073	8.99
2.0	0.582	148.0	1.870	45.3	0.176	43.9	0.163	–97.7	1.067	8.67
2.1	0.590	145.1	1.786	42.6	0.183	44.1	0.156	–102.8	1.071	8.27
2.2	0.594	142.7	1.710	40.2	0.190	44.1	0.152	–107.9	1.077	7.85
2.3	0.602	139.9	1.647	37.3	0.197	43.7	0.149	–114.1	1.071	7.60
2.4	0.607	137.4	1.585	34.8	0.204	43.3	0.147	–119.6	1.073	7.25
2.5	0.616	134.9	1.531	32.4	0.212	42.8	0.147	–126.8	1.063	7.05
2.6	0.619	132.5	1.470	29.9	0.220	42.3	0.149	–132.3	1.066	6.69
2.7	0.625	129.9	1.427	27.4	0.227	41.6	0.153	–139.9	1.063	6.45
2.8	0.626	127.0	1.367	24.6	0.233	40.7	0.156	–146.6	1.082	5.94
2.9	0.612	124.9	1.315	22.1	0.238	39.8	0.164	–153.3	1.130	5.24
3.0	0.597	123.0	1.265	20.9	0.241	39.6	0.165	–161.6	1.195	4.53
4.0	0.727	105.6	0.996	1.9	0.329	28.1	0.293	155.2	0.954	4.80
5.0	0.805	92.9	0.743	–12.0	0.374	16.8	0.464	128.3	0.936	2.98

V_{CE} = 3 V, I_C = 10 mA, Z_O = 50 Ω

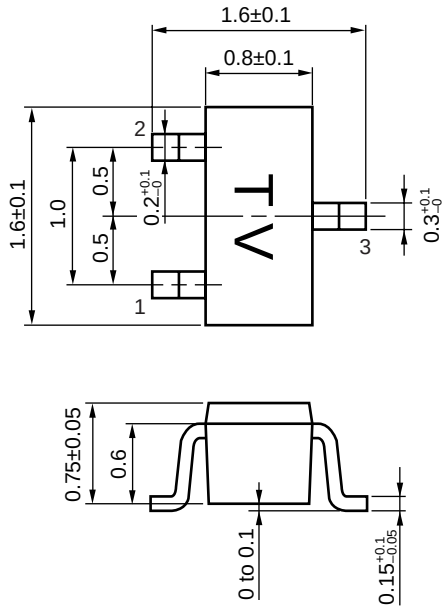
Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.698	–55.2	22.564	144.2	0.030	65.0	0.808	–32.2	0.221	28.70
0.2	0.592	–94.7	16.428	121.9	0.048	53.8	0.584	–51.0	0.397	25.32
0.3	0.535	–118.8	12.208	109.8	0.058	50.5	0.437	–60.7	0.543	23.27
0.4	0.503	–135.7	9.615	101.2	0.065	50.1	0.347	–67.0	0.665	21.70
0.5	0.492	–148.0	7.904	94.8	0.072	50.8	0.285	–70.8	0.755	20.38
0.6	0.483	–157.1	6.682	89.7	0.080	51.7	0.242	–74.4	0.829	19.22
0.7	0.482	–164.4	5.790	85.5	0.088	52.6	0.210	–77.1	0.882	18.20
0.8	0.480	–170.7	5.096	81.6	0.096	53.2	0.186	–80.1	0.925	17.26
0.9	0.481	–176.5	4.555	77.9	0.104	53.6	0.167	–83.4	0.959	16.42
1.0	0.482	178.3	4.121	74.3	0.112	53.9	0.152	–86.4	0.983	15.65
1.1	0.486	174.1	3.771	71.0	0.121	53.8	0.140	–90.6	1.000	14.86
1.2	0.485	169.7	3.466	68.3	0.129	53.6	0.130	–94.6	1.021	13.41
1.3	0.494	165.5	3.225	65.2	0.137	53.5	0.122	–99.0	1.026	12.73
1.4	0.499	161.9	3.001	62.2	0.146	53.1	0.115	–104.4	1.036	11.98
1.5	0.505	158.4	2.808	59.3	0.155	52.3	0.110	–110.5	1.039	11.38
1.6	0.511	155.0	2.636	56.4	0.163	51.7	0.105	–117.3	1.047	10.76
1.7	0.518	151.7	2.490	53.7	0.171	51.1	0.102	–123.9	1.051	10.25
1.8	0.528	149.0	2.360	51.2	0.180	50.3	0.100	–131.5	1.047	9.85
1.9	0.536	145.9	2.234	48.7	0.188	49.3	0.100	–138.9	1.049	9.38
2.0	0.546	143.6	2.123	46.0	0.197	48.4	0.100	–146.1	1.047	9.00
2.1	0.554	141.2	2.029	43.5	0.204	47.8	0.102	–154.1	1.048	8.63
2.2	0.559	139.1	1.949	41.3	0.213	46.9	0.105	–160.5	1.046	8.30
2.3	0.569	136.8	1.868	38.6	0.221	45.8	0.111	–167.7	1.041	8.02
2.4	0.576	134.6	1.799	36.2	0.229	44.8	0.116	–173.4	1.039	7.75
2.5	0.583	132.5	1.735	33.9	0.236	43.7	0.125	–179.3	1.039	7.45
2.6	0.587	130.2	1.666	31.6	0.246	42.6	0.133	176.4	1.039	7.10
2.7	0.594	127.5	1.614	29.3	0.252	41.4	0.144	171.6	1.038	6.87
2.8	0.594	124.8	1.549	26.7	0.258	40.0	0.155	166.7	1.055	6.35
2.9	0.584	122.6	1.489	23.8	0.262	38.8	0.170	163.3	1.088	5.74
3.0	0.563	120.8	1.423	22.8	0.263	38.2	0.182	156.7	1.151	4.98
4.0	0.704	105.3	1.127	4.4	0.341	24.9	0.309	133.3	0.975	5.19
5.0	0.790	93.4	0.850	–9.9	0.373	14.3	0.462	116.1	0.955	3.57

V_{CE} = 3 V, I_C = 20 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.542	–77.8	30.732	133.2	0.026	63.1	0.670	–45.5	0.367	30.72
0.2	0.482	–119.9	19.644	112.2	0.038	56.8	0.427	–65.8	0.590	27.16
0.3	0.457	–140.7	13.844	102.1	0.046	57.4	0.303	–76.1	0.749	24.77
0.4	0.445	–153.8	10.674	95.2	0.056	59.3	0.235	–83.8	0.845	22.81
0.5	0.445	–163.1	8.661	90.1	0.065	60.6	0.189	–89.5	0.907	21.24
0.6	0.447	–170.0	7.276	85.8	0.075	61.5	0.159	–95.5	0.945	19.88
0.7	0.448	–175.7	6.283	82.3	0.085	62.0	0.138	–101.1	0.973	18.70
0.8	0.449	179.6	5.518	78.8	0.095	61.9	0.123	–107.1	0.993	17.65
0.9	0.454	175.0	4.921	75.7	0.104	61.6	0.111	–113.5	1.007	16.22
1.0	0.459	170.8	4.455	72.5	0.115	61.2	0.103	–119.6	1.014	15.17
1.1	0.461	167.2	4.066	69.6	0.125	60.4	0.099	–127.0	1.023	14.21
1.2	0.463	163.7	3.730	67.0	0.135	59.7	0.096	–133.6	1.030	13.36
1.3	0.473	160.2	3.468	64.2	0.144	58.8	0.095	–140.0	1.029	12.77
1.4	0.480	157.1	3.222	61.4	0.154	57.8	0.096	–147.6	1.031	12.12
1.5	0.487	153.7	3.015	58.8	0.164	56.6	0.099	–154.1	1.032	11.54
1.6	0.492	151.0	2.823	56.0	0.173	55.4	0.102	–161.5	1.038	10.93
1.7	0.501	148.4	2.672	53.4	0.182	54.2	0.106	–167.8	1.036	10.49
1.8	0.508	145.7	2.527	51.1	0.192	53.1	0.112	–174.0	1.036	10.04
1.9	0.517	143.0	2.391	48.8	0.201	51.7	0.118	–179.5	1.038	9.57
2.0	0.528	141.1	2.273	46.4	0.210	50.3	0.125	175.6	1.033	9.23
2.1	0.537	138.8	2.170	43.9	0.218	49.3	0.132	170.2	1.033	8.87
2.2	0.542	136.8	2.078	41.8	0.227	48.2	0.139	166.1	1.033	8.50
2.3	0.551	134.9	1.993	39.2	0.236	46.7	0.150	162.1	1.030	8.21
2.4	0.556	132.5	1.917	37.0	0.244	45.3	0.157	158.6	1.032	7.87
2.5	0.565	130.6	1.850	34.7	0.252	44.1	0.169	155.4	1.029	7.63
2.6	0.570	128.4	1.774	32.5	0.261	42.6	0.177	152.7	1.028	7.30
2.7	0.577	126.1	1.716	30.1	0.268	41.3	0.191	150.0	1.030	7.01
2.8	0.576	123.5	1.647	27.6	0.273	39.7	0.203	146.9	1.044	6.52
2.9	0.569	121.1	1.582	24.9	0.277	38.2	0.219	145.2	1.068	5.97
3.0	0.549	119.4	1.512	23.8	0.277	37.4	0.234	140.4	1.119	5.27
4.0	0.689	104.9	1.196	6.1	0.350	23.0	0.350	122.7	0.989	5.34
5.0	0.780	93.3	0.905	–8.0	0.374	12.5	0.486	109.0	0.972	3.84

PACKAGE DIMENSIONS

3-PIN ULTRA SUPER MINIMOLD (UNIT: mm)



PIN CONNECTIONS

1. Emitter
2. Base
3. Collector

[MEMO]

[MEMO]

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