NPN SILICON RF TRANSISTOR
NE678M04 / 2SC5753 JEITA Part No.

NPN SILICON RF TRANSISTOR FOR MEDIUM OUTPUT POWER AMPLIFICATION (60 mW) FLAT-LEAD 4-PIN THIN-TYPE SUPER MINIMOLD

FEATURES

- Ideal for medium output power amplification
- $P_{O\ (1\ dB)}$ = 18.0 dBm TYP. @ V_{CE} = 2.8 V, f = 1.8 GHz, P_{in} = 7 dBm
- HFT3 technology (f_T = 12 GHz) adopted
- High reliability through use of gold electrodes
- Flat-lead 4-pin thin-type super minimold package

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
NE678M04-A 2SC5753-A	50 pcs (Non reel)	• 8 mm wide embossed taping
NE678M04-T2-A 2SC5753-T2-A	3 kpcs/reel	• Pin 1 (Emitter), Pin 2 (Collector) face the perforation side of the tape

Remark To order evaluation samples, please contact your nearby sales office.
Unit sample quantity is 50 pcs.

ABSOLUTE MAXIMUM RATINGS (T_A = +25°C)

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	V_{CBO}	9.0	V
Collector to Emitter Voltage	V_{CEO}	6.0	V
Emitter to Base Voltage	V_{EBO}	2.0	V
Collector Current	I_C	100	mA
Total Power Dissipation	P_{tot} Note	205	mW
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	–65 to +150	°C

Note Mounted on 1.08 cm^2 × 1.0 mm (t) glass epoxy PCB

Caution: Observe precautions when handling because these devices are sensitive to electrostatic discharge

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THERMAL RESISTANCE

Parameter	Symbol	Value	Unit
Junction to Ambient Resistance	$R_{th\ j\text{-}a}$ Note	600	°C/W

Note Mounted on 1.08 cm^2 × 1.0 mm (t) glass epoxy PCB

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	–	–	100	nA
Emitter Cut-off Current	I_{EBO}	V_{BE} = 1 V, I_C = 0 mA	–	–	100	nA
DC Current Gain	h_{FE} Note 1	V_{CE} = 3 V, I_C = 30 mA	75	120	150	–
RF Characteristics						
Gain Bandwidth Product	f_T	V_{CE} = 3 V, I_C = 30 mA, f = 2 GHz	–	12.0	–	GHz
Insertion Power Gain	$\vert S_{21e}\vert^2$	V_{CE} = 3 V, I_C = 30 mA, f = 2 GHz	8.0	10.5	–	dB
Noise Figure	NF	V_{CE} = 3 V, I_C = 7 mA, f = 2 GHz, $Z_S = Z_{opt}$	–	1.7	2.5	dB
Reverse Transfer Capacitance	C_{re} Note 2	V_{CB} = 3 V, I_E = 0 mA, f = 1 MHz	–	0.42	0.7	pF
Maximum Available Power Gain	MAG Note 3	V_{CE} = 3 V, I_C = 30 mA, f = 2 GHz	–	13.5	–	dB
Linear Gain	G_L	V_{CE} = 2.8 V, I_{Cq} = 10 mA, f = 1.8 GHz, P_{in} = –5 dBm	–	13.0	–	dB
Gain 1 dB Compression Output Power	$P_{O\ (1\ dB)}$	V_{CE} = 2.8 V, I_{Cq} = 10 mA, f = 1.8 GHz, P_{in} = 7 dBm	–	18.0	–	dBm
Collector Efficiency	η_C	V_{CE} = 2.8 V, I_{Cq} = 10 mA, f = 1.8 GHz, P_{in} = 7 dBm	–	55	–	%

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

2. Collector to base capacitance when the emitter grounded

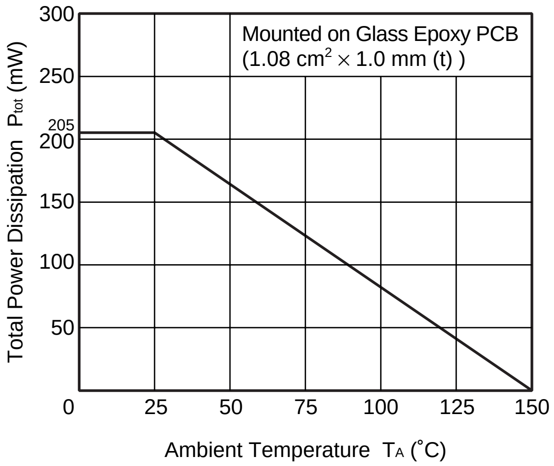
3. $MAG = \left|\frac{S_{21}}{S_{12}}\right|(K - \sqrt{(K^2 - 1)})$

h_{FE} CLASSIFICATION

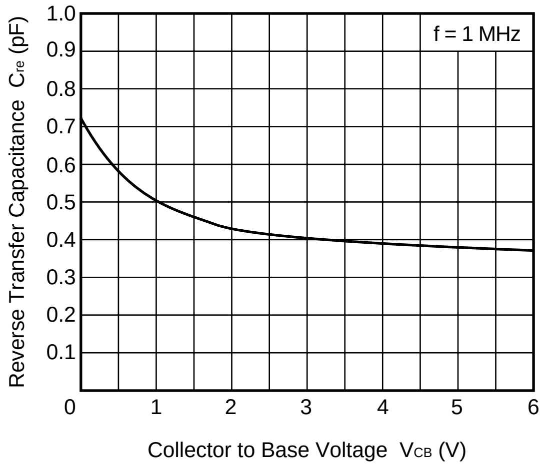
Rank	FB
Marking	R55
h_{FE} Value	75 to 150

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

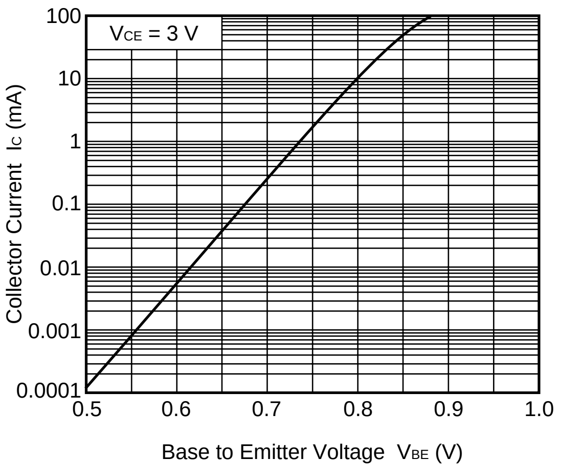
TOTAL POWER DISSIPATION
vs. AMBIENT TEMPERATURE



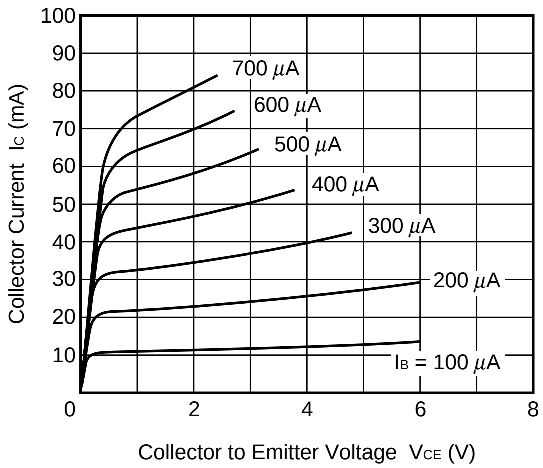
REVERSE TRANSFER CAPACITANCE
vs. COLLECTOR TO BASE VOLTAGE



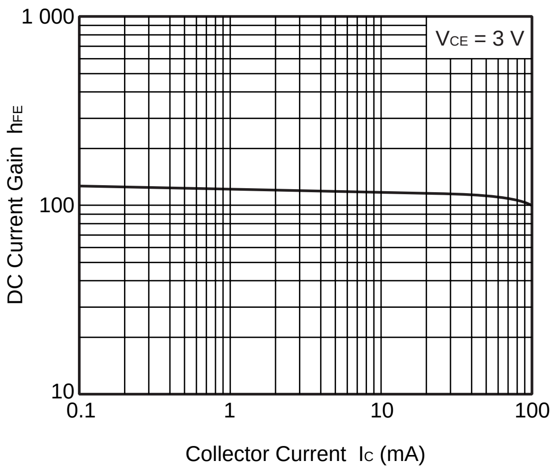
COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE



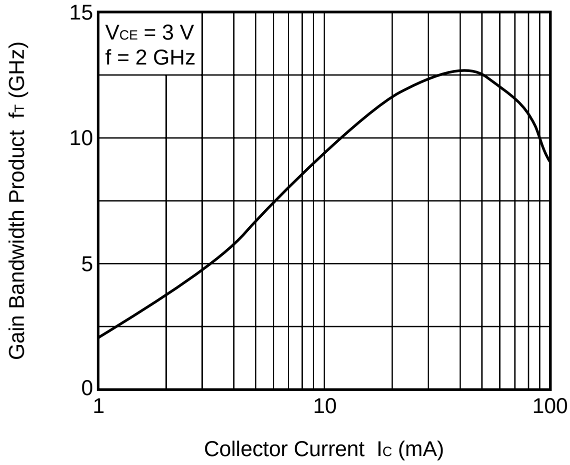
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



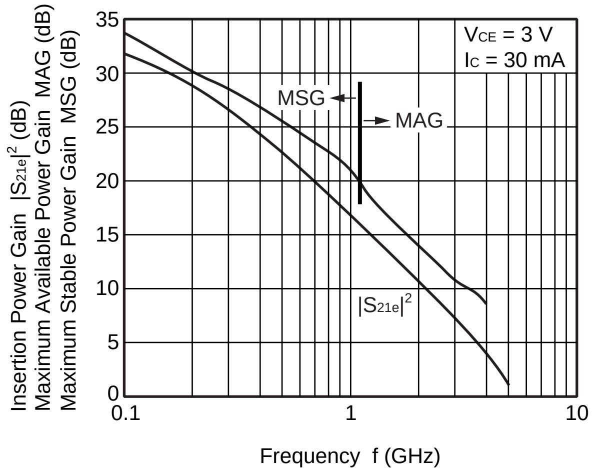
DC CURRENT GAIN vs.
COLLECTOR CURRENT



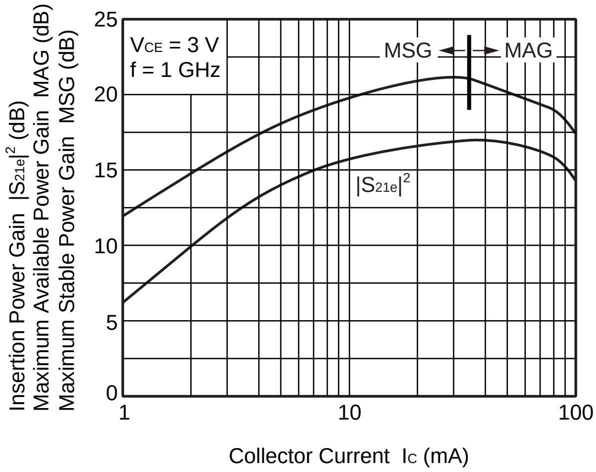
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



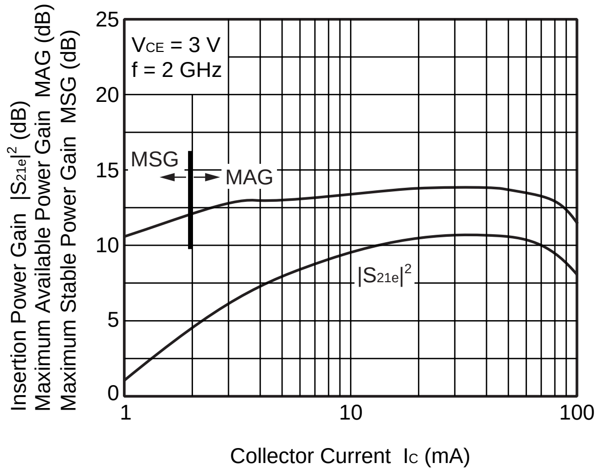
INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY



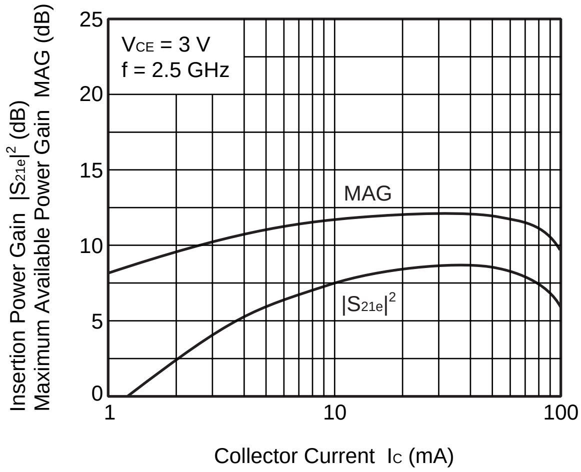
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



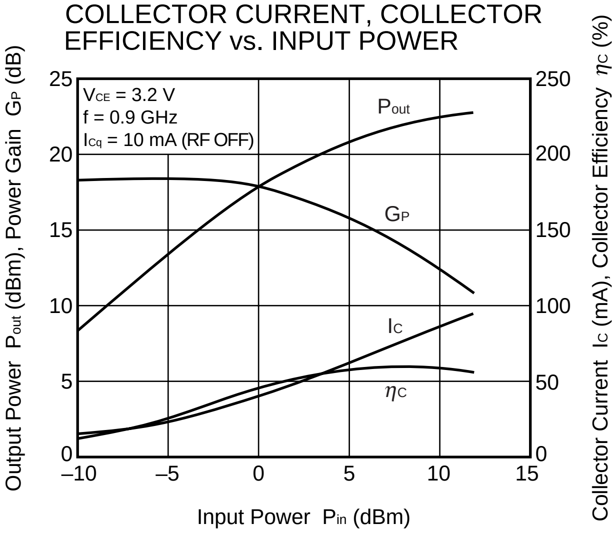
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



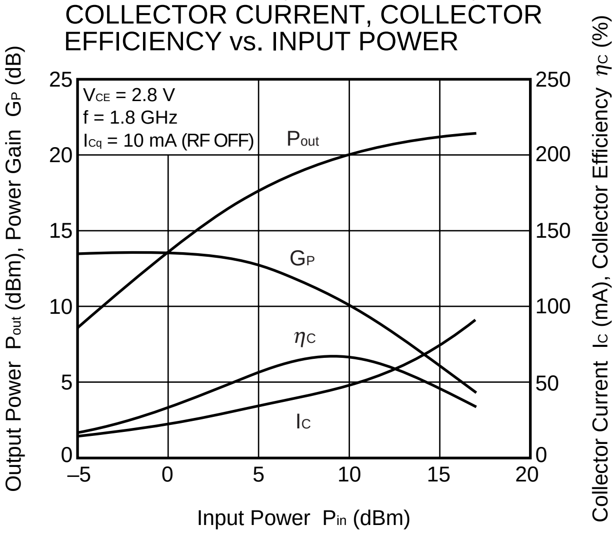
INSERTION POWER GAIN, MAG vs. COLLECTOR CURRENT



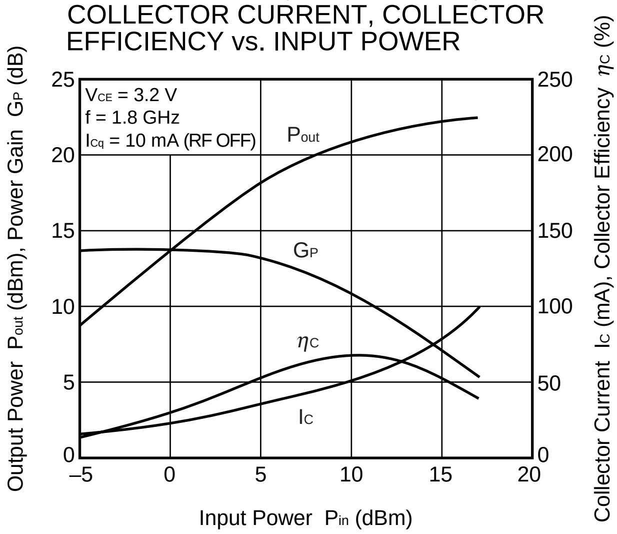
OUTPUT POWER, POWER GAIN, COLLECTOR CURRENT, COLLECTOR EFFICIENCY vs. INPUT POWER



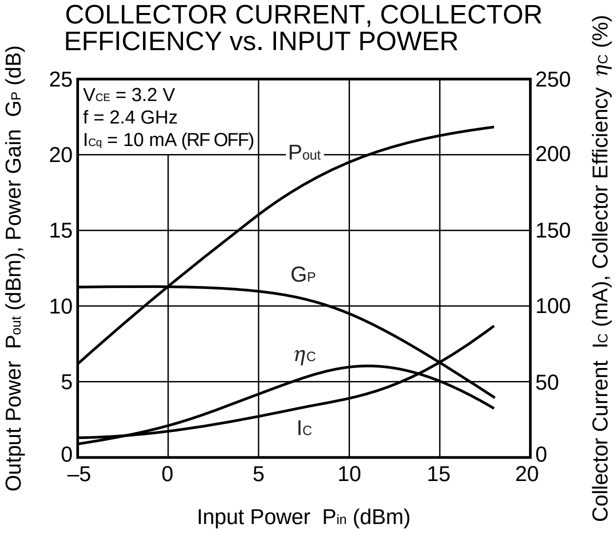
OUTPUT POWER, POWER GAIN, COLLECTOR CURRENT, COLLECTOR EFFICIENCY vs. INPUT POWER



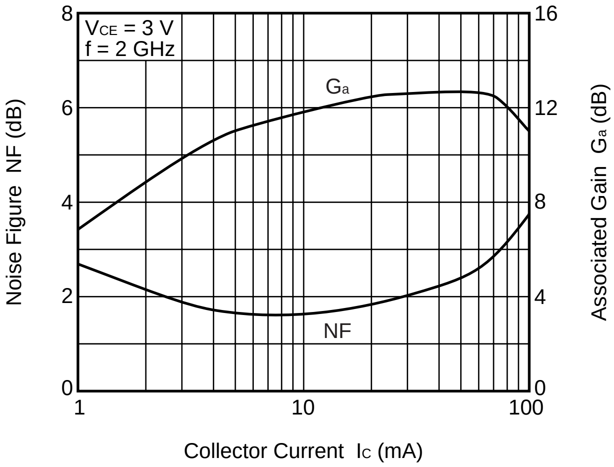
OUTPUT POWER, POWER GAIN, COLLECTOR CURRENT, COLLECTOR EFFICIENCY vs. INPUT POWER



OUTPUT POWER, POWER GAIN, COLLECTOR CURRENT, COLLECTOR EFFICIENCY vs. INPUT POWER



NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



Remark The graphs indicate nominal characteristics.

S-PARAMETERS

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

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

V_{CE} = 3 V, I_C = 1 mA, Z_O = 50 Ω

Frequency (GHz)	S11 MAG.	S11 ANG. (deg.)	S21 MAG.	S21 ANG. (deg.)	S12 MAG.	S12 ANG. (deg.)	S22 MAG.	S22 ANG. (deg.)	K	MAG/MSG[Note] (dB)
0.1	0.960	−15.6	3.628	169.4	0.025	75.7	0.998	−6.6	0.094	21.54
0.2	0.955	−31.3	3.476	157.2	0.050	69.6	0.976	−13.4	0.074	18.43
0.3	0.931	−47.1	3.363	145.9	0.071	60.5	0.958	−19.6	0.095	16.73
0.4	0.903	−61.1	3.161	135.7	0.090	51.7	0.924	−25.7	0.129	15.47
0.5	0.874	−74.1	2.967	126.2	0.104	43.3	0.895	−31.1	0.167	14.56
0.6	0.847	−86.6	2.756	117.8	0.114	35.9	0.856	−36.0	0.199	13.82
0.7	0.822	−97.7	2.565	109.7	0.122	29.6	0.826	−40.4	0.233	13.22
0.8	0.804	−107.6	2.373	102.5	0.126	23.7	0.793	−44.8	0.275	12.74
0.9	0.786	−117.2	2.222	95.5	0.130	18.4	0.771	−48.6	0.309	12.31
1.0	0.775	−126.0	2.069	89.0	0.131	13.7	0.748	−52.6	0.346	11.98
1.1	0.766	−134.2	1.939	83.1	0.132	9.2	0.736	−56.4	0.373	11.67
1.2	0.756	−142.0	1.809	77.6	0.131	5.3	0.720	−60.2	0.412	11.41
1.3	0.753	−149.1	1.707	71.9	0.129	1.2	0.714	−64.0	0.441	11.21
1.4	0.748	−155.6	1.600	66.6	0.126	−2.2	0.704	−67.8	0.490	11.04
1.5	0.748	−161.8	1.507	61.6	0.123	−5.6	0.702	−71.8	0.520	10.90
1.6	0.745	−167.6	1.415	56.6	0.118	−8.4	0.695	−75.6	0.582	10.77
1.7	0.749	−172.8	1.341	52.0	0.113	−11.1	0.694	−79.7	0.616	10.73
1.8	0.751	−177.8	1.259	47.4	0.108	−13.3	0.686	−83.6	0.690	10.65
1.9	0.751	177.2	1.190	43.1	0.103	−15.2	0.692	−87.7	0.740	10.62
2.0	0.755	172.8	1.123	38.6	0.097	−16.6	0.686	−91.8	0.829	10.62
2.1	0.763	168.7	1.067	34.7	0.092	−17.0	0.696	−96.2	0.844	10.65
2.2	0.763	165.1	1.012	30.6	0.085	−17.0	0.695	−100.1	0.963	10.74
2.3	0.766	161.1	0.963	26.8	0.079	−16.4	0.707	−104.5	1.022	9.96
2.4	0.770	157.7	0.917	23.1	0.073	−14.9	0.707	−108.2	1.151	8.66
2.5	0.774	154.2	0.872	19.7	0.067	−12.7	0.713	−112.5	1.252	8.10
2.6	0.778	151.0	0.824	16.4	0.063	−8.8	0.716	−116.4	1.375	7.50
2.7	0.784	147.7	0.786	13.1	0.061	−3.3	0.719	−120.5	1.420	7.23
2.8	0.790	145.0	0.748	10.3	0.062	0.6	0.719	−124.0	1.405	7.00
2.9	0.793	142.5	0.720	7.6	0.061	0.3	0.719	−126.7	1.510	6.52
3.0	0.793	139.6	0.687	4.7	0.056	4.4	0.719	−130.4	1.765	5.78
4.0	0.836	115.8	0.425	−16.0	0.087	39.7	0.759	−166.7	1.580	2.42

V_{CE} = 3 V, I_C = 3 mA, Z_O = 50 Ω

Frequency	S11		S21		S12		S22		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.902	−21.1	9.755	165.3	0.023	74.9	0.981	−11.4	0.086	26.28
0.2	0.874	−44.6	9.014	150.2	0.046	64.7	0.924	−22.2	0.086	22.90
0.3	0.830	−64.7	8.271	136.9	0.063	53.2	0.862	−31.3	0.140	21.18
0.4	0.789	−81.9	7.402	126.0	0.075	44.8	0.787	−39.0	0.178	19.94
0.5	0.748	−96.5	6.634	116.5	0.083	37.1	0.724	−45.2	0.234	19.02
0.6	0.722	−109.6	5.921	108.6	0.088	31.1	0.663	−50.5	0.281	18.28
0.7	0.701	−121.0	5.351	101.3	0.092	26.5	0.619	−54.6	0.326	17.66
0.8	0.685	−130.4	4.816	95.2	0.093	22.5	0.578	−58.8	0.381	17.15
0.9	0.673	−139.6	4.407	89.4	0.094	19.0	0.550	−62.5	0.427	16.70
1.0	0.665	−147.3	4.033	83.9	0.094	16.5	0.524	−66.0	0.483	16.33
1.1	0.666	−154.7	3.729	78.9	0.094	13.9	0.507	−69.5	0.519	15.99
1.2	0.659	−161.0	3.449	74.6	0.093	12.2	0.491	−73.0	0.579	15.70
1.3	0.660	−167.2	3.212	69.8	0.092	10.3	0.483	−76.3	0.624	15.43
1.4	0.661	−172.5	2.989	65.5	0.090	9.1	0.473	−80.0	0.681	15.19
1.5	0.665	−177.9	2.795	61.5	0.089	8.1	0.469	−83.4	0.729	14.98
1.6	0.667	177.6	2.623	57.4	0.087	7.4	0.461	−87.0	0.794	14.79
1.7	0.670	173.3	2.469	53.6	0.085	7.0	0.462	−90.6	0.849	14.62
1.8	0.675	169.4	2.320	49.9	0.083	6.9	0.457	−94.2	0.917	14.44
1.9	0.680	165.4	2.193	46.3	0.082	7.2	0.462	−98.1	0.967	14.29
2.0	0.684	161.4	2.063	42.4	0.080	7.5	0.460	−101.8	1.040	12.87
2.1	0.691	158.3	1.968	38.9	0.079	9.0	0.470	−105.9	1.064	12.41
2.2	0.695	154.9	1.861	35.5	0.078	10.3	0.472	−109.5	1.134	11.57
2.3	0.697	152.1	1.778	32.3	0.077	12.1	0.484	−113.3	1.177	11.10
2.4	0.705	149.1	1.694	28.8	0.076	13.9	0.487	−116.7	1.218	10.67
2.5	0.708	146.2	1.615	25.6	0.076	15.8	0.497	−120.4	1.257	10.24
2.6	0.716	143.6	1.537	22.7	0.076	18.1	0.503	−123.8	1.273	9.89
2.7	0.724	140.9	1.468	19.6	0.078	20.6	0.512	−127.6	1.250	9.71
2.8	0.732	138.6	1.403	16.7	0.082	21.5	0.516	−130.9	1.218	9.54
2.9	0.740	136.7	1.345	14.0	0.082	20.3	0.518	−133.7	1.229	9.27
3.0	0.736	133.9	1.296	11.3	0.081	21.9	0.520	−136.8	1.333	8.59

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	0.838	−28.3	14.824	162.0	0.025	72.2	0.963	−15.4	0.102	27.76
0.2	0.805	−55.1	13.172	144.8	0.043	60.5	0.873	−29.1	0.120	24.91
0.3	0.755	−78.0	11.588	130.4	0.056	49.3	0.780	−39.8	0.181	23.16
0.4	0.711	−96.3	10.045	119.5	0.065	41.4	0.687	−48.4	0.241	21.92
0.5	0.682	−111.1	8.751	110.6	0.070	35.1	0.613	−54.8	0.301	20.97
0.6	0.659	−124.0	7.650	103.2	0.073	30.5	0.549	−60.2	0.364	20.19
0.7	0.643	−134.8	6.808	96.6	0.076	27.4	0.504	−64.4	0.423	19.53
0.8	0.631	−143.5	6.069	91.1	0.077	24.9	0.465	−68.6	0.491	18.99
0.9	0.628	−151.5	5.506	85.9	0.078	22.8	0.436	−72.2	0.546	18.51
1.0	0.625	−158.7	5.017	81.1	0.078	21.4	0.414	−76.0	0.602	18.09
1.1	0.626	−165.2	4.607	76.7	0.078	20.2	0.399	−79.5	0.654	17.71
1.2	0.625	−170.8	4.236	72.9	0.078	19.5	0.385	−83.2	0.713	17.33
1.3	0.630	−176.3	3.937	68.4	0.078	18.8	0.377	−86.4	0.757	17.01
1.4	0.632	179.0	3.656	64.7	0.078	18.5	0.369	−90.2	0.818	16.69
1.5	0.635	174.2	3.415	61.0	0.078	18.5	0.366	−93.4	0.868	16.40
1.6	0.639	170.3	3.199	57.3	0.078	18.7	0.360	−97.2	0.925	16.12
1.7	0.646	166.4	3.011	54.0	0.078	18.9	0.361	−100.7	0.964	15.86
1.8	0.651	162.8	2.827	50.6	0.078	19.3	0.358	−104.4	1.020	14.72
1.9	0.655	159.3	2.665	47.2	0.079	19.8	0.364	−108.1	1.058	13.84
2.0	0.659	155.9	2.516	43.8	0.079	20.5	0.364	−111.8	1.106	13.04
2.1	0.670	153.0	2.396	40.6	0.080	21.7	0.373	−115.7	1.108	12.76
2.2	0.672	150.3	2.271	37.5	0.080	22.9	0.377	−119.1	1.158	12.10
2.3	0.676	147.2	2.167	34.4	0.081	23.9	0.389	−122.5	1.177	11.71
2.4	0.684	145.0	2.064	31.2	0.083	24.9	0.394	−125.7	1.189	11.34
2.5	0.688	142.3	1.978	28.3	0.084	26.1	0.405	−129.0	1.198	11.03
2.6	0.694	139.8	1.886	25.4	0.086	27.1	0.412	−132.0	1.205	10.67
2.7	0.703	137.4	1.802	22.5	0.089	28.2	0.423	−135.6	1.180	10.49
2.8	0.713	135.1	1.720	19.8	0.093	28.1	0.428	−138.8	1.152	10.32
2.9	0.720	133.3	1.652	17.2	0.093	26.8	0.432	−141.6	1.157	10.07
3.0	0.716	130.8	1.597	14.5	0.094	27.5	0.434	−144.4	1.220	9.49

V_{CE} = 3 V, I_C = 7 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	0.810	−33.1	18.981	159.3	0.022	68.5	0.943	−18.7	0.128	29.30
0.2	0.754	−63.1	16.372	140.6	0.040	57.5	0.828	−34.7	0.159	26.11
0.3	0.703	−88.1	13.946	126.0	0.051	47.1	0.717	−46.4	0.219	24.40
0.4	0.663	−106.8	11.785	115.2	0.057	40.4	0.615	−55.5	0.293	23.13
0.5	0.639	−121.6	10.092	106.7	0.061	35.1	0.539	−62.0	0.364	22.17
0.6	0.624	−133.6	8.735	99.9	0.064	31.4	0.477	−67.5	0.437	21.35
0.7	0.614	−144.0	7.702	93.7	0.066	29.5	0.433	−71.9	0.502	20.66
0.8	0.607	−151.9	6.827	88.6	0.067	28.0	0.397	−76.4	0.576	20.06
0.9	0.606	−159.2	6.169	83.9	0.069	26.6	0.371	−80.2	0.635	19.54
1.0	0.606	−166.0	5.598	79.3	0.070	26.1	0.351	−84.3	0.694	19.05
1.1	0.609	−171.7	5.128	75.3	0.070	25.7	0.338	−87.9	0.746	18.62
1.2	0.609	−177.0	4.698	71.6	0.071	25.6	0.327	−91.8	0.808	18.19
1.3	0.613	178.1	4.355	67.6	0.072	25.4	0.320	−95.2	0.853	17.80
1.4	0.617	173.8	4.045	64.0	0.073	25.7	0.314	−99.0	0.905	17.43
1.5	0.623	169.6	3.777	60.7	0.074	26.0	0.312	−102.3	0.942	17.07
1.6	0.627	165.8	3.537	57.3	0.075	26.3	0.307	−106.2	0.992	16.73
1.7	0.635	162.3	3.327	54.1	0.076	26.5	0.309	−109.7	1.018	15.58
1.8	0.639	159.1	3.124	51.0	0.077	27.1	0.308	−113.5	1.064	14.52
1.9	0.644	155.6	2.946	47.8	0.079	27.3	0.314	−117.2	1.092	13.89
2.0	0.649	152.5	2.780	44.6	0.080	28.1	0.316	−120.8	1.123	13.26
2.1	0.656	149.8	2.649	41.6	0.082	28.7	0.325	−124.4	1.126	12.92
2.2	0.662	147.1	2.507	38.6	0.084	29.4	0.331	−127.7	1.151	12.40
2.3	0.666	144.6	2.395	35.7	0.086	30.2	0.342	−130.8	1.160	12.04
2.4	0.673	142.1	2.281	32.6	0.087	30.6	0.347	−133.8	1.174	11.65
2.5	0.679	139.8	2.187	29.7	0.090	31.2	0.359	−136.8	1.167	11.40
2.6	0.684	137.6	2.089	27.1	0.092	31.5	0.366	−139.6	1.168	11.06
2.7	0.692	135.1	2.001	24.3	0.096	32.1	0.378	−142.7	1.151	10.85
2.8	0.700	132.9	1.909	21.6	0.099	31.6	0.384	−145.9	1.132	10.62
2.9	0.711	131.1	1.838	18.9	0.101	30.2	0.388	−148.6	1.120	10.52
3.0	0.707	128.8	1.778	16.6	0.101	30.4	0.390	−151.3	1.172	9.94

V_{CE} = 3 V, I_C = 10 mA, Z_O = 50 Ω

Frequency (GHz)	S11 MAG.	S11 ANG. (deg.)	S21 MAG.	S21 ANG. (deg.)	S12 MAG.	S12 ANG. (deg.)	S22 MAG.	S22 ANG. (deg.)	K	MAG/MSG (dB)
0.1	0.750	−39.3	23.934	156.0	0.022	67.6	0.918	−22.9	0.142	30.39
0.2	0.689	−73.0	19.813	135.8	0.037	54.3	0.774	−41.0	0.210	27.30
0.3	0.653	−99.4	16.269	121.1	0.045	45.2	0.646	−53.7	0.274	25.56
0.4	0.623	−118.0	13.426	111.1	0.050	39.8	0.543	−63.3	0.358	24.27
0.5	0.605	−132.2	11.340	103.0	0.053	35.6	0.469	−70.0	0.443	23.28
0.6	0.596	−143.3	9.711	96.7	0.056	33.7	0.411	−76.0	0.524	22.39
0.7	0.588	−152.5	8.486	91.0	0.058	32.7	0.370	−80.6	0.602	21.66
0.8	0.590	−160.0	7.507	86.4	0.059	32.1	0.338	−85.5	0.671	21.01
0.9	0.591	−166.6	6.758	81.9	0.061	31.6	0.316	−89.6	0.731	20.43
1.0	0.590	−172.5	6.112	77.8	0.063	31.9	0.300	−94.2	0.793	19.87
1.1	0.597	−177.9	5.593	74.0	0.064	32.0	0.289	−98.0	0.839	19.38
1.2	0.598	177.4	5.135	70.6	0.066	32.3	0.281	−102.4	0.892	18.89
1.3	0.605	173.0	4.742	67.0	0.068	32.4	0.276	−105.9	0.927	18.43
1.4	0.610	168.9	4.398	63.6	0.070	32.7	0.271	−110.0	0.969	17.99
1.5	0.616	165.3	4.101	60.5	0.072	33.1	0.271	−113.2	0.998	17.57
1.6	0.620	161.7	3.837	57.3	0.074	33.3	0.269	−117.2	1.036	16.00
1.7	0.626	158.7	3.610	54.2	0.076	33.5	0.272	−120.7	1.055	15.35
1.8	0.631	155.6	3.393	51.3	0.078	33.8	0.272	−124.5	1.090	14.58
1.9	0.637	152.5	3.198	48.3	0.080	33.8	0.280	−128.0	1.102	14.07
2.0	0.642	149.3	3.017	45.3	0.082	34.1	0.283	−131.5	1.126	13.48
2.1	0.649	146.9	2.872	42.3	0.085	34.4	0.293	−134.8	1.127	13.13
2.2	0.656	144.3	2.723	39.6	0.087	34.8	0.299	−137.8	1.138	12.68
2.3	0.659	142.1	2.601	36.7	0.090	35.0	0.310	−140.7	1.139	12.34
2.4	0.665	139.6	2.480	33.8	0.092	35.0	0.316	−143.3	1.148	11.96
2.5	0.671	137.6	2.376	31.1	0.095	35.3	0.327	−145.8	1.142	11.70
2.6	0.676	135.3	2.273	28.7	0.098	35.2	0.334	−148.3	1.141	11.37
2.7	0.685	133.1	2.175	26.0	0.102	35.2	0.346	−151.2	1.122	11.18
2.8	0.694	131.0	2.081	23.3	0.106	34.3	0.354	−154.2	1.102	11.00
2.9	0.703	129.3	1.998	20.7	0.107	32.7	0.359	−156.9	1.101	10.79
3.0	0.700	126.9	1.937	18.5	0.108	32.7	0.360	−159.3	1.136	10.29
4.0	0.751	109.1	1.355	−3.1	0.130	28.2	0.437	176.8	1.142	7.90

V_{CE} = 3 V, I_C = 20 mA, Z_O = 50 Ω

Frequency	S11		S21		S12		S22		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.610	−55.9	34.181	148.7	0.019	62.1	0.853	−31.8	0.209	32.56
0.2	0.594	−95.5	25.762	126.9	0.030	51.6	0.661	−53.8	0.289	29.37
0.3	0.582	−121.8	19.844	113.1	0.035	45.1	0.522	−67.9	0.396	27.48
0.4	0.571	−138.1	15.813	104.3	0.039	42.0	0.426	−78.4	0.511	26.04
0.5	0.568	−149.8	13.058	97.2	0.042	40.8	0.362	−85.9	0.610	24.92
0.6	0.568	−159.1	11.068	91.9	0.045	40.3	0.317	−92.9	0.699	23.95
0.7	0.570	−166.4	9.596	87.1	0.047	41.0	0.286	−98.5	0.772	23.07
0.8	0.572	−172.4	8.436	83.0	0.050	41.8	0.265	−104.5	0.841	22.28
0.9	0.577	−177.6	7.564	79.1	0.053	42.3	0.250	−109.5	0.887	21.56
1.0	0.580	177.3	6.829	75.5	0.056	42.7	0.241	−114.9	0.931	20.87
1.1	0.587	173.1	6.229	72.2	0.059	43.1	0.236	−118.9	0.964	20.27
1.2	0.588	169.2	5.712	69.1	0.062	43.5	0.234	−123.9	1.000	19.53
1.3	0.597	165.7	5.260	65.8	0.065	43.5	0.232	−127.2	1.020	18.24
1.4	0.600	162.2	4.873	62.8	0.068	43.6	0.233	−131.6	1.048	17.23
1.5	0.609	158.9	4.542	59.9	0.071	43.8	0.235	−134.4	1.058	16.59
1.6	0.615	155.8	4.241	57.1	0.074	43.5	0.236	−138.6	1.074	15.91
1.7	0.622	153.2	3.994	54.4	0.077	43.5	0.242	−141.6	1.081	15.41
1.8	0.627	150.4	3.752	51.7	0.080	43.2	0.245	−145.3	1.097	14.80
1.9	0.633	147.6	3.533	48.9	0.084	42.6	0.255	−148.2	1.102	14.31
2.0	0.637	145.1	3.337	46.1	0.087	42.3	0.260	−151.1	1.115	13.79
2.1	0.647	142.7	3.173	43.4	0.090	42.0	0.270	−153.7	1.106	13.49
2.2	0.652	140.4	3.007	41.0	0.094	41.7	0.277	−156.2	1.111	13.04
2.3	0.654	138.2	2.871	38.3	0.097	41.4	0.288	−158.2	1.116	12.66
2.4	0.661	136.1	2.741	35.6	0.100	41.0	0.295	−160.5	1.113	12.34
2.5	0.669	134.0	2.630	33.1	0.103	40.4	0.305	−162.2	1.103	12.12
2.6	0.673	132.0	2.516	30.8	0.107	39.7	0.311	−164.2	1.101	11.78
2.7	0.681	129.9	2.414	28.2	0.111	39.3	0.324	−166.3	1.085	11.62
2.8	0.690	128.0	2.311	25.6	0.114	38.1	0.332	−169.0	1.073	11.41
2.9	0.698	126.6	2.219	23.2	0.116	36.5	0.338	−171.5	1.071	11.19
3.0	0.695	124.3	2.152	21.1	0.118	36.0	0.338	−173.8	1.098	10.72
4.0	0.742	107.1	1.524	0.8	0.140	27.9	0.406	166.3	1.114	8.32

V_{CE} = 3 V, I_C = 30 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	0.544	−66.7	39.410	144.7	0.017	62.8	0.809	−36.9	0.227	33.67
0.2	0.549	−107.7	28.114	122.6	0.027	50.3	0.600	−60.6	0.362	30.19
0.3	0.560	−132.6	21.063	109.4	0.031	45.9	0.464	−75.3	0.480	28.33
0.4	0.560	−147.0	16.586	101.3	0.035	44.6	0.377	−86.3	0.599	26.77
0.5	0.557	−157.7	13.593	94.8	0.038	44.1	0.322	−94.2	0.705	25.56
0.6	0.564	−165.9	11.461	89.9	0.041	44.6	0.283	−101.9	0.788	24.51
0.7	0.565	−172.1	9.910	85.4	0.044	46.1	0.258	−107.9	0.855	23.52
0.8	0.571	−177.5	8.708	81.7	0.047	46.8	0.242	−114.3	0.912	22.68
0.9	0.574	177.5	7.797	77.9	0.050	47.3	0.231	−119.5	0.952	21.90
1.0	0.583	173.3	7.035	74.5	0.054	47.9	0.227	−125.1	0.982	21.17
1.1	0.587	169.5	6.397	71.3	0.057	48.0	0.223	−129.1	1.008	19.94
1.2	0.590	166.0	5.861	68.5	0.061	48.3	0.225	−133.9	1.034	18.71
1.3	0.598	162.4	5.405	65.1	0.064	48.1	0.225	−137.0	1.047	17.93
1.4	0.603	159.3	5.003	62.4	0.068	48.1	0.227	−141.3	1.067	17.11
1.5	0.610	156.3	4.649	59.6	0.071	48.0	0.230	−143.9	1.075	16.47
1.6	0.614	153.3	4.360	56.9	0.075	47.7	0.233	−147.9	1.088	15.84
1.7	0.624	150.9	4.100	54.1	0.078	47.0	0.240	−150.4	1.086	15.42
1.8	0.630	148.5	3.850	51.6	0.082	46.7	0.244	−154.0	1.094	14.86
1.9	0.635	145.7	3.630	49.0	0.085	45.9	0.254	−156.4	1.099	14.37
2.0	0.639	143.1	3.425	46.3	0.089	45.2	0.261	−159.1	1.108	13.86
2.1	0.646	140.9	3.256	43.7	0.092	44.8	0.271	−161.4	1.104	13.50
2.2	0.652	139.0	3.086	41.3	0.096	44.2	0.278	−163.6	1.104	13.10
2.3	0.657	136.7	2.947	38.7	0.100	43.6	0.289	−165.4	1.103	12.76
2.4	0.664	134.5	2.813	36.1	0.103	43.0	0.295	−167.4	1.101	12.44
2.5	0.668	132.8	2.698	33.7	0.106	42.4	0.305	−168.8	1.098	12.16
2.6	0.671	130.7	2.584	31.4	0.110	41.4	0.311	−170.7	1.097	11.81
2.7	0.682	128.6	2.478	28.8	0.114	40.7	0.323	−172.5	1.078	11.68
2.8	0.691	126.6	2.371	26.4	0.118	39.5	0.332	−175.0	1.066	11.47
2.9	0.701	125.0	2.279	23.9	0.119	37.8	0.339	−177.3	1.060	11.31
3.0	0.697	123.1	2.211	22.0	0.121	37.3	0.339	−179.6	1.087	10.82
4.0	0.745	106.2	1.573	2.1	0.144	28.1	0.402	161.8	1.099	8.48

V_{CE} = 3 V, I_C = 40 mA, Z_O = 50 Ω

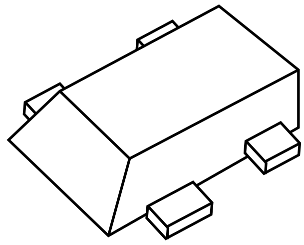
Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.527	−73.8	42.107	142.0	0.017	60.5	0.775	−40.3	0.260	34.03
0.2	0.537	−116.7	29.136	119.9	0.025	50.6	0.560	−64.8	0.401	30.75
0.3	0.553	−139.2	21.480	107.4	0.029	46.4	0.429	−79.7	0.534	28.70
0.4	0.553	−152.3	16.778	99.6	0.032	46.3	0.349	−91.0	0.665	27.15
0.5	0.560	−162.1	13.713	93.5	0.035	46.6	0.299	−99.1	0.761	25.89
0.6	0.567	−169.6	11.529	88.7	0.039	47.9	0.266	−107.2	0.839	24.73
0.7	0.572	−175.5	9.975	84.4	0.042	48.8	0.244	−113.3	0.894	23.72
0.8	0.575	179.6	8.750	80.8	0.046	49.7	0.231	−119.9	0.946	22.80
0.9	0.580	175.2	7.828	77.2	0.049	50.1	0.222	−125.0	0.981	22.01
1.0	0.585	171.1	7.054	73.7	0.053	50.7	0.220	−130.4	1.007	20.69
1.1	0.591	167.5	6.420	70.7	0.057	50.8	0.218	−134.4	1.030	19.47
1.2	0.594	164.1	5.889	68.0	0.061	50.8	0.220	−139.1	1.048	18.53
1.3	0.601	160.8	5.422	64.7	0.064	50.4	0.222	−141.9	1.061	17.76
1.4	0.607	157.8	5.014	62.0	0.068	50.5	0.225	−146.1	1.077	16.99
1.5	0.615	154.8	4.662	59.3	0.072	50.0	0.229	−148.5	1.079	16.41
1.6	0.619	152.1	4.368	56.6	0.075	49.7	0.233	−152.2	1.091	15.79
1.7	0.627	149.8	4.108	54.0	0.079	48.9	0.240	−154.7	1.091	15.33
1.8	0.632	147.2	3.862	51.5	0.083	48.3	0.245	−158.0	1.098	14.79
1.9	0.637	144.7	3.631	48.9	0.086	47.4	0.255	−160.3	1.105	14.28
2.0	0.642	142.2	3.434	46.2	0.090	46.8	0.262	−162.9	1.106	13.82
2.1	0.652	140.1	3.263	43.7	0.093	46.1	0.272	−165.0	1.101	13.50
2.2	0.656	138.2	3.094	41.4	0.097	45.5	0.280	−167.1	1.103	13.07
2.3	0.661	135.9	2.953	38.7	0.101	44.7	0.290	−168.7	1.100	12.74
2.4	0.665	133.9	2.821	36.1	0.104	44.1	0.296	−170.7	1.101	12.39
2.5	0.672	131.9	2.704	33.7	0.108	43.4	0.306	−172.0	1.094	12.13
2.6	0.675	129.9	2.586	31.6	0.112	42.4	0.313	−173.8	1.095	11.77
2.7	0.687	128.0	2.480	29.1	0.116	41.6	0.324	−175.4	1.072	11.68
2.8	0.695	125.9	2.377	26.6	0.119	40.3	0.334	−177.9	1.063	11.45
2.9	0.704	124.7	2.280	24.2	0.121	38.7	0.340	179.9	1.058	11.26
3.0	0.702	122.4	2.219	22.1	0.123	38.0	0.341	177.6	1.078	10.86
4.0	0.744	106.0	1.573	2.7	0.146	28.2	0.403	159.7	1.102	8.38

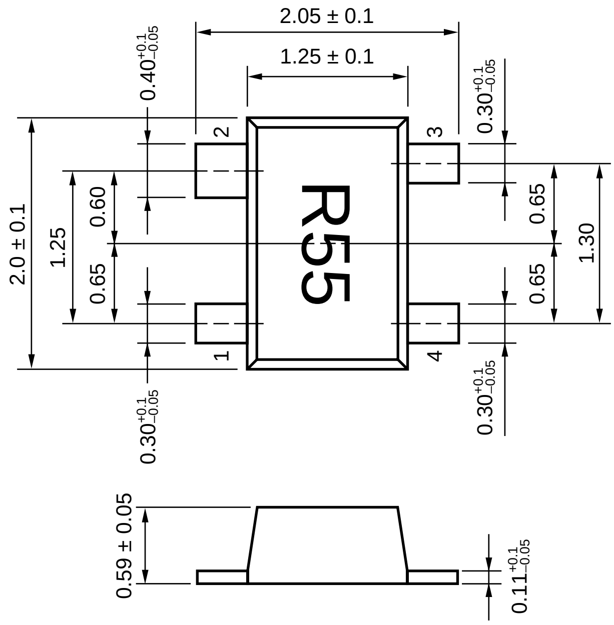
V_{CE} = 3 V, I_C = 80 mA, Z_O = 50 Ω

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	0.476	−99.1	42.800	135.1	0.016	56.9	0.663	−48.2	0.364	34.30
0.2	0.542	−135.9	27.390	113.7	0.022	48.4	0.449	−73.5	0.529	30.92
0.3	0.574	−153.8	19.547	102.4	0.025	48.0	0.340	−88.2	0.682	28.87
0.4	0.588	−164.1	15.094	95.5	0.029	48.9	0.279	−99.7	0.796	27.13
0.5	0.591	−171.7	12.238	90.0	0.032	50.5	0.242	−107.6	0.898	25.76
0.6	0.598	−177.5	10.240	85.7	0.036	51.6	0.220	−115.7	0.968	24.53
0.7	0.605	177.5	8.834	81.7	0.040	53.4	0.207	−121.6	1.013	22.74
0.8	0.609	173.6	7.729	78.2	0.044	54.0	0.201	−128.2	1.054	21.04
0.9	0.612	169.8	6.920	74.8	0.048	54.5	0.197	−132.8	1.080	19.89
1.0	0.618	166.0	6.227	71.5	0.052	54.9	0.199	−137.9	1.098	18.89
1.1	0.624	163.0	5.666	68.6	0.056	54.7	0.201	−141.2	1.111	18.05
1.2	0.628	159.9	5.192	65.8	0.060	54.6	0.206	−145.4	1.122	17.25
1.3	0.635	157.0	4.765	62.8	0.064	54.2	0.209	−147.7	1.131	16.54
1.4	0.639	154.4	4.422	60.0	0.068	53.7	0.215	−151.5	1.141	15.87
1.5	0.649	151.7	4.111	57.4	0.072	53.2	0.221	−153.4	1.136	15.34
1.6	0.651	149.2	3.845	54.7	0.076	52.6	0.226	−156.9	1.146	14.74
1.7	0.657	146.8	3.613	52.2	0.079	51.7	0.235	−158.9	1.146	14.26
1.8	0.664	144.4	3.397	49.6	0.083	51.0	0.241	−161.9	1.149	13.77
1.9	0.669	141.9	3.199	47.0	0.087	50.0	0.252	−163.9	1.147	13.31
2.0	0.674	139.7	3.018	44.5	0.091	49.1	0.260	−166.3	1.147	12.85
2.1	0.680	137.7	2.865	41.9	0.095	48.3	0.271	−168.1	1.144	12.49
2.2	0.687	135.6	2.719	39.5	0.099	47.6	0.280	−170.0	1.140	12.12
2.3	0.687	133.7	2.592	36.9	0.103	46.8	0.291	−171.5	1.147	11.70
2.4	0.693	131.8	2.475	34.3	0.106	46.1	0.299	−173.3	1.143	11.38
2.5	0.700	129.8	2.369	32.0	0.110	45.1	0.308	−174.5	1.131	11.14
2.6	0.703	127.9	2.272	29.8	0.114	44.1	0.316	−176.2	1.129	10.82
2.7	0.712	125.9	2.177	27.3	0.118	43.0	0.327	−177.8	1.110	10.65
2.8	0.721	124.1	2.082	24.9	0.122	41.7	0.337	179.9	1.098	10.42
2.9	0.729	122.7	2.004	22.4	0.124	40.1	0.345	178.0	1.088	10.28
3.0	0.724	120.6	1.943	20.4	0.126	39.5	0.346	175.7	1.119	9.79

PACKAGE DIMENSIONS

FLAT-LEAD 4-PIN THIN-TYPE SUPER MINIMOLD (UNIT: mm)





PIN CONNECTIONS

1. Emitter
2. Collector
3. Emitter
4. Base

OCEAN CHIPS
Океан Электроники
Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения **«JONHON»**, а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов **«FORSTAR»**.

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).

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