NPN SILICON RF TRANSISTOR
2SC5751

NPN SILICON RF TRANSISTOR FOR MEDIUM OUTPUT POWER AMPLIFICATION (30 mW) FLAT-LEAD 4-PIN THIN-TYPE SUPER MINIMOLD

FEATURES

- Ideal for medium output power amplification
- $P_{O\ (1\ dB)}$ = 15.0 dBm TYP. @ V_{CE} = 2.8 V, f = 1.8 GHz, P_{in} = 1 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
2SC5751	50 pcs (Non reel)	• 8 mm wide embossed taping
2SC5751-T2	3 kpcs/reel	• Pin 1 (Emitter), Pin 2 (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}	9.0	V
Collector to Emitter Voltage	V_{CEO}	6.0	V
Emitter to Base Voltage	V_{EBO}	2.0	V
Collector Current	I_C	50	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 $cm^2 \times$ 1.0 mm (t) glass epoxy PCB

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

Document No. P15657EJ1V0DS00 (1st edition)
Date Published August 2001 NS CP(K)
Printed in Japan

THERMAL RESISTANCE

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

Note Mounted on 1.08 $cm^2 \times 1.0$ 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 = 20 mA	75	120	150	–
RF Characteristics						
Gain Bandwidth Product	f_T	V_{CE} = 3 V, I_C = 20 mA, f = 2 GHz	–	15.0	–	GHz
Insertion Power Gain	$\lvert S_{21e} \rvert^2$	V_{CE} = 3 V, I_C = 20 mA, f = 2 GHz	10.0	13.5	–	dB
Noise Figure	NF	V_{CE} = 3 V, I_C = 5 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	–	0.22	0.5	pF
Maximum Available Power Gain	MAG Note 3	V_{CE} = 3 V, I_C = 20 mA, f = 2 GHz	–	16.0	–	dB
Linear Gain	G_L	V_{CE} = 2.8 V, I_{Cq} = 8 mA, f = 1.8 GHz, P_{in} = –10 dBm	–	15.5	–	dB
Gain 1 dB Compression Output Power	$P_{O\ (1\ dB)}$	V_{CE} = 2.8 V, I_{Cq} = 8 mA, f = 1.8 GHz, P_{in} = 1 dBm	–	15.0	–	dBm
Collector Efficiency	η_C	V_{CE} = 2.8 V, I_{Cq} = 8 mA, f = 1.8 GHz, P_{in} = 1 dBm	–	50	–	%

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

2. Collector to base capacitance when the emitter grounded

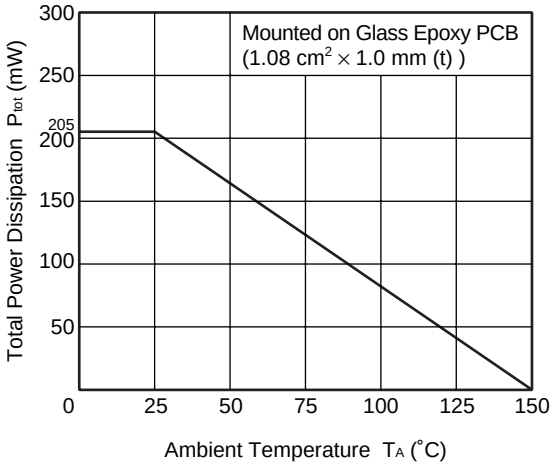
3. $MAG = \left| \frac{S_{21}}{S_{12}} \right| (K - \sqrt{(K^2 - 1)})$

h_{FE} CLASSIFICATION

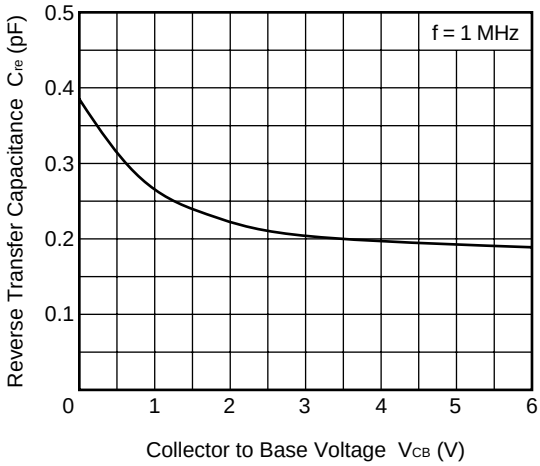
Rank	FB
Marking	R54
h_{FE} Value	75 to 150

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

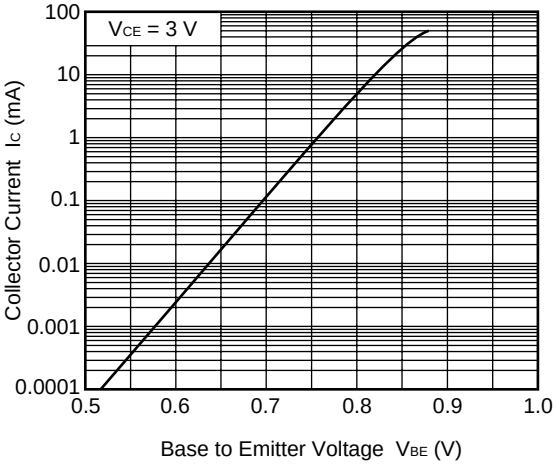
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



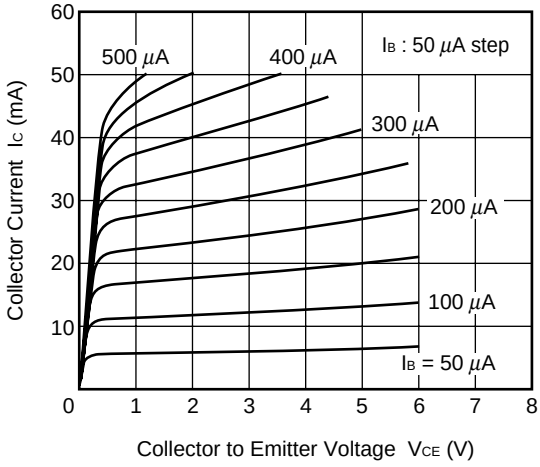
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



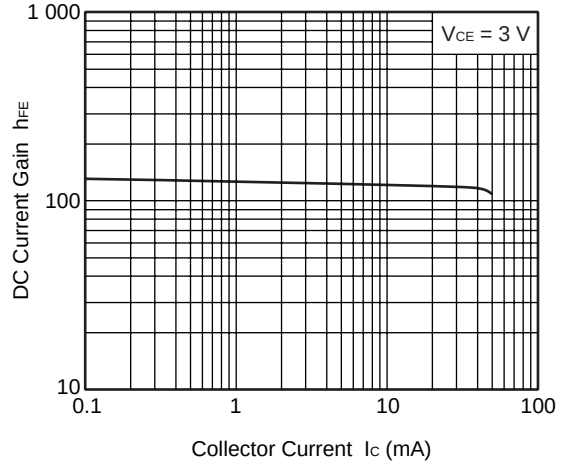
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



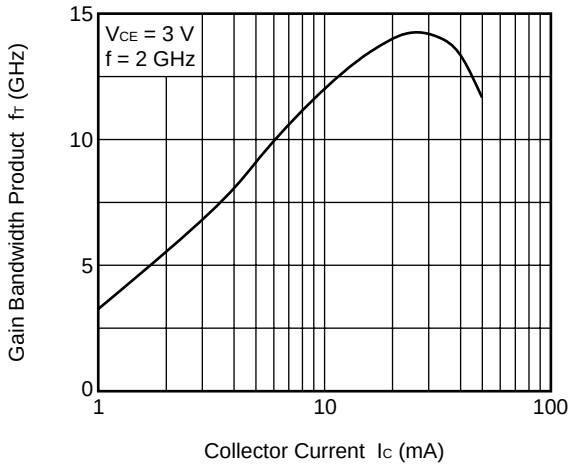
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



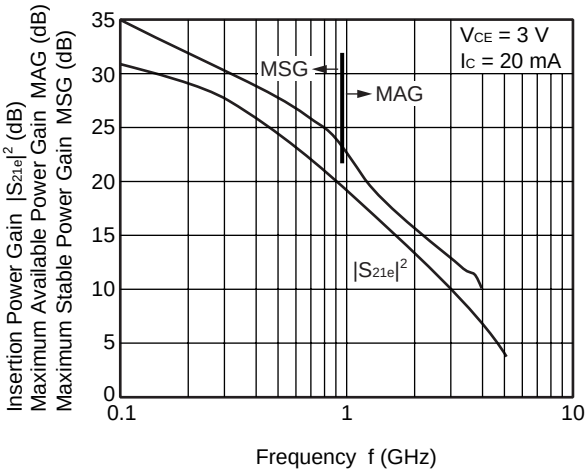
DC CURRENT GAIN vs. COLLECTOR CURRENT



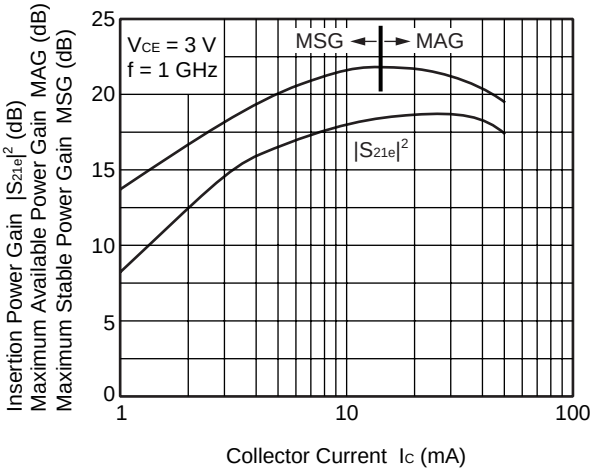
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



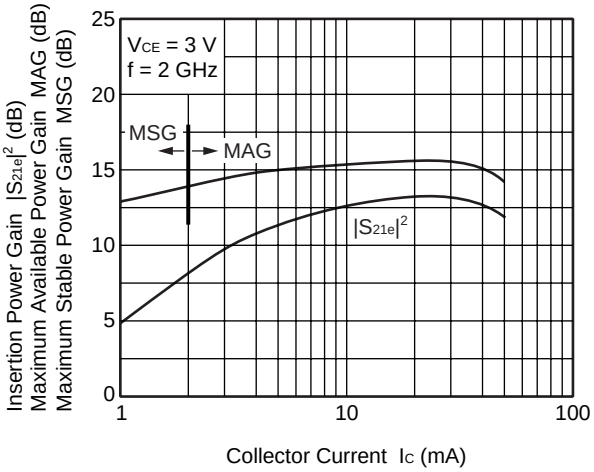
INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



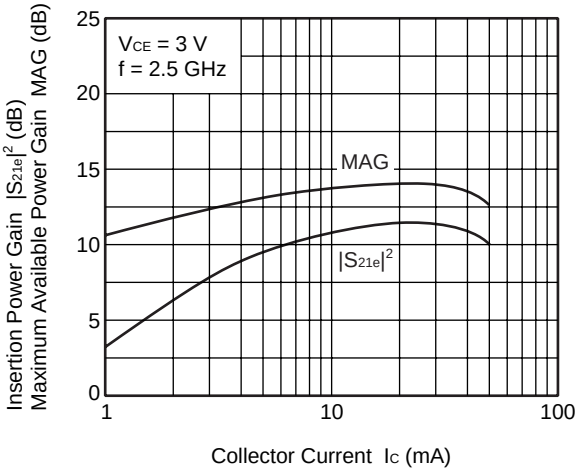
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



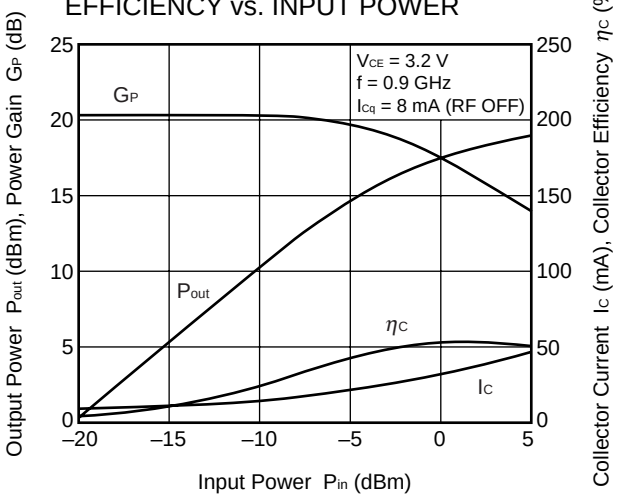
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



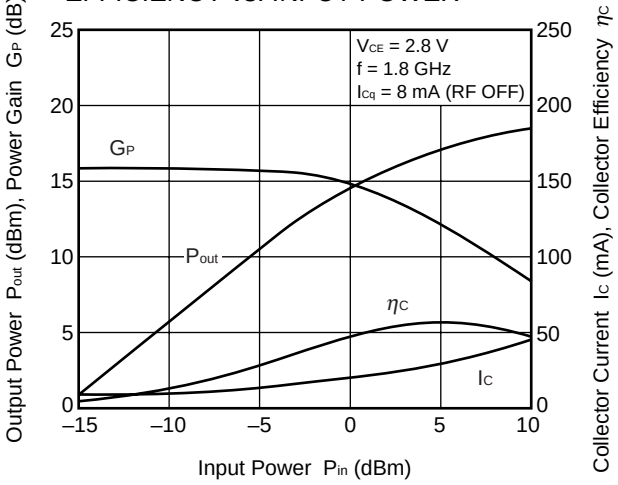
INSERTION POWER GAIN, MAG
vs. COLLECTOR CURRENT



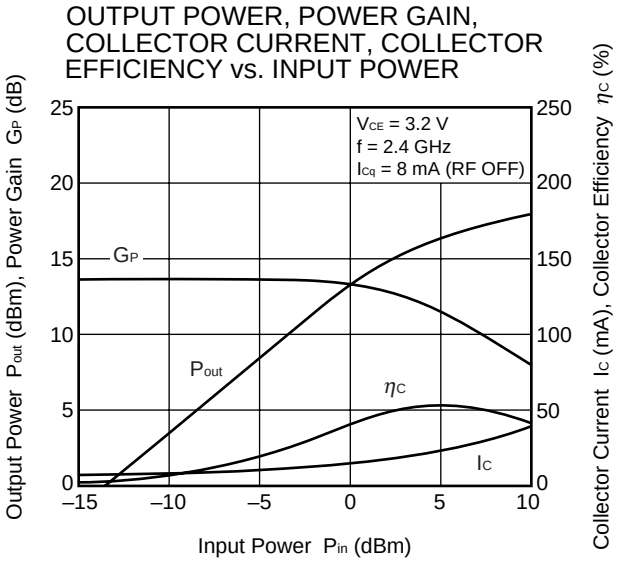
OUTPUT POWER, POWER GAIN, COLLECTOR CURRENT, COLLECTOR EFFICIENCY vs. INPUT POWER



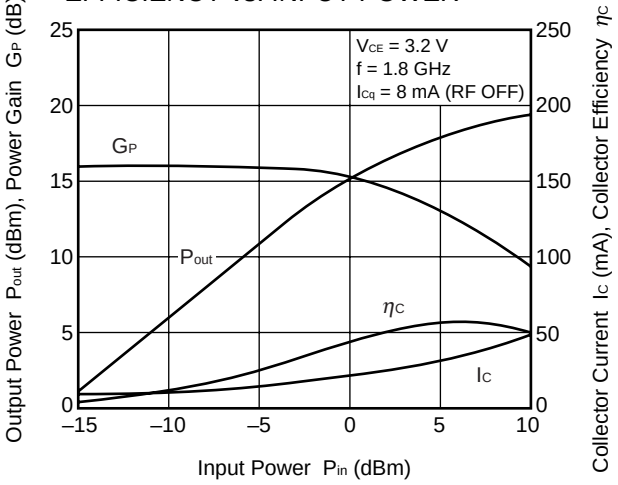
OUTPUT POWER, POWER GAIN, COLLECTOR CURRENT, COLLECTOR EFFICIENCY vs. INPUT POWER



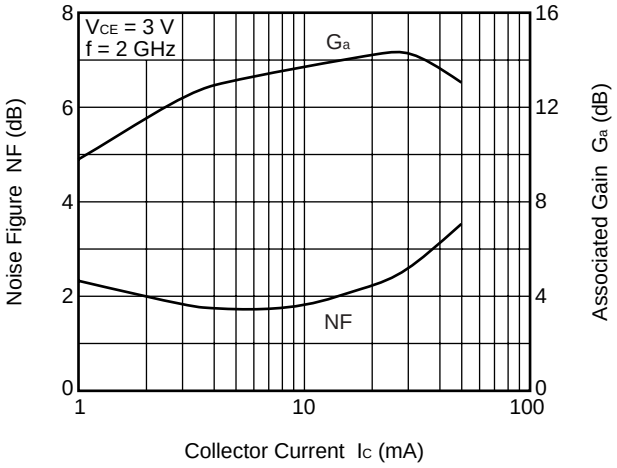
OUTPUT POWER, POWER GAIN, COLLECTOR CURRENT, COLLECTOR EFFICIENCY vs. INPUT POWER



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	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	0.967	–9.4	3.650	173.0	0.013	85.0	1.002	–4.3	–0.007	24.39
0.2	0.962	–18.3	3.553	164.7	0.027	75.4	0.992	–9.2	0.093	21.18
0.3	0.949	–28.5	3.534	156.3	0.039	70.1	0.987	–13.8	0.101	19.55
0.4	0.926	–37.8	3.439	148.6	0.051	64.1	0.971	–18.4	0.127	18.28
0.5	0.900	–46.5	3.339	141.3	0.061	57.7	0.958	–22.9	0.165	17.35
0.6	0.874	–55.3	3.215	134.4	0.070	51.6	0.932	–27.2	0.203	16.61
0.7	0.844	–64.0	3.097	127.5	0.078	46.6	0.910	–31.1	0.234	15.97
0.8	0.815	–72.2	2.953	121.1	0.084	41.1	0.884	–35.1	0.278	15.47
0.9	0.788	–80.4	2.847	114.9	0.089	36.5	0.867	–38.7	0.306	15.03
1.0	0.764	–88.2	2.727	108.8	0.093	32.1	0.842	–42.3	0.352	14.69
1.1	0.742	–96.1	2.620	103.0	0.096	27.8	0.827	–45.8	0.379	14.35
1.2	0.716	–103.8	2.495	97.8	0.098	23.9	0.808	–49.2	0.420	14.05
1.3	0.699	–111.2	2.407	92.2	0.099	19.8	0.799	–52.6	0.451	13.84
1.4	0.682	–118.2	2.295	87.0	0.100	16.2	0.785	–56.0	0.493	13.61
1.5	0.669	–125.5	2.202	82.0	0.100	12.9	0.776	–59.4	0.523	13.44
1.6	0.655	–132.0	2.104	76.9	0.099	9.6	0.761	–62.7	0.585	13.29
1.7	0.649	–138.7	2.018	72.1	0.097	6.7	0.756	–66.2	0.616	13.19
1.8	0.637	–144.5	1.919	67.4	0.095	4.3	0.742	–69.7	0.698	13.07
1.9	0.634	–150.9	1.837	63.0	0.092	1.7	0.741	–73.2	0.730	12.99
2.0	0.629	–156.4	1.754	58.2	0.089	0.1	0.728	–76.5	0.819	12.93
2.1	0.630	–161.7	1.690	54.0	0.086	–1.1	0.733	–80.3	0.841	12.95
2.2	0.626	–166.9	1.615	49.8	0.081	–2.1	0.725	–83.6	0.946	12.97
2.3	0.625	–172.0	1.559	45.8	0.077	–2.7	0.732	–87.5	0.987	13.04
2.4	0.628	–176.5	1.490	41.7	0.073	–2.7	0.726	–90.8	1.100	11.17
2.5	0.630	179.0	1.430	38.0	0.069	–2.1	0.729	–94.7	1.184	10.59
2.6	0.632	174.7	1.368	34.4	0.065	–0.4	0.728	–98.1	1.287	10.00
2.7	0.638	170.4	1.316	30.7	0.063	2.9	0.729	–101.9	1.348	9.71
2.8	0.641	166.3	1.256	27.4	0.064	6.7	0.728	–105.1	1.352	9.40
2.9	0.647	163.2	1.211	24.3	0.065	3.8	0.719	–107.8	1.419	8.88
3.0	0.645	159.5	1.166	21.2	0.060	3.9	0.713	–111.1	1.669	8.12

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	0.904	–12.8	9.781	169.9	0.013	79.1	0.993	–6.9	0.096	28.64
0.2	0.894	–26.7	9.343	158.6	0.025	72.5	0.966	–14.1	0.115	25.72
0.3	0.852	–41.2	8.974	148.2	0.036	64.4	0.937	–20.5	0.154	23.96
0.4	0.807	–53.3	8.431	138.9	0.045	57.3	0.893	–26.6	0.207	22.69
0.5	0.763	–64.9	7.909	130.6	0.053	51.4	0.855	–31.9	0.244	21.78
0.6	0.721	–75.8	7.339	123.1	0.058	45.3	0.804	–36.6	0.303	21.02
0.7	0.679	–86.0	6.844	115.9	0.062	41.0	0.765	–40.7	0.353	20.40
0.8	0.644	–95.1	6.315	109.7	0.065	37.0	0.724	–44.5	0.414	19.87
0.9	0.617	–104.2	5.911	103.8	0.068	33.4	0.692	–47.7	0.464	19.41
1.0	0.589	–112.6	5.519	98.2	0.069	30.5	0.662	–51.1	0.524	19.03
1.1	0.572	–121.0	5.179	93.1	0.070	28.0	0.640	–54.1	0.567	18.69
1.2	0.553	–128.7	4.839	88.6	0.071	26.0	0.618	–57.0	0.627	18.36
1.3	0.543	–136.2	4.561	83.7	0.071	23.9	0.603	–60.0	0.674	18.08
1.4	0.533	–142.7	4.285	79.3	0.071	22.3	0.587	–63.0	0.734	17.80
1.5	0.526	–149.6	4.059	75.1	0.071	21.2	0.577	–65.9	0.781	17.59
1.6	0.521	–155.6	3.835	70.9	0.070	20.1	0.563	–68.9	0.848	17.36
1.7	0.519	–161.5	3.639	67.0	0.070	19.5	0.557	–71.9	0.901	17.19
1.8	0.520	–166.8	3.441	63.2	0.069	19.0	0.544	–75.0	0.975	17.00
1.9	0.519	–172.4	3.269	59.5	0.068	19.0	0.543	–78.3	1.024	15.85
2.0	0.519	–177.1	3.106	55.5	0.068	19.3	0.533	–81.3	1.104	14.66
2.1	0.525	178.7	2.978	52.1	0.067	20.1	0.537	–84.7	1.131	14.29
2.2	0.529	174.4	2.838	48.5	0.066	21.0	0.532	–87.9	1.193	13.65
2.3	0.532	170.2	2.723	45.1	0.066	21.9	0.538	–91.5	1.230	13.27
2.4	0.536	166.7	2.602	41.7	0.065	23.8	0.537	–94.5	1.288	12.77
2.5	0.543	163.2	2.500	38.5	0.065	25.3	0.541	–98.2	1.319	12.45
2.6	0.548	159.9	2.394	35.5	0.066	26.9	0.543	–101.2	1.346	12.09
2.7	0.558	156.2	2.298	32.2	0.068	29.5	0.546	–104.9	1.329	11.87
2.8	0.568	153.2	2.197	29.1	0.072	30.4	0.549	–108.3	1.284	11.67
2.9	0.577	150.5	2.112	26.4	0.073	27.9	0.542	–111.2	1.297	11.33
3.0	0.576	147.3	2.038	23.6	0.072	28.4	0.536	–114.1	1.407	10.73
4.0	0.644	122.5	1.403	–2.7	0.085	37.1	0.569	–146.9	1.521	7.90

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	0.843	–17.5	14.829	167.2	0.012	81.1	0.983	–9.0	0.048	30.78
0.2	0.820	–34.3	13.860	154.1	0.024	70.4	0.937	–17.9	0.136	27.65
0.3	0.770	–50.6	12.954	142.1	0.033	61.7	0.889	–25.5	0.196	25.89
0.4	0.714	–65.2	11.847	132.2	0.041	54.6	0.825	–32.2	0.259	24.65
0.5	0.663	–77.8	10.788	123.5	0.046	48.3	0.767	–37.5	0.331	23.72
0.6	0.619	–89.6	9.763	116.1	0.050	43.2	0.710	–42.1	0.399	22.90
0.7	0.580	–100.8	8.918	109.2	0.053	40.2	0.663	–45.7	0.462	22.28
0.8	0.550	–110.1	8.098	103.2	0.055	37.1	0.621	–49.3	0.535	21.70
0.9	0.529	–119.3	7.476	97.8	0.056	34.6	0.588	–52.2	0.596	21.23
1.0	0.510	–127.8	6.890	92.7	0.057	33.1	0.559	–55.1	0.662	20.79
1.1	0.497	–135.7	6.395	88.1	0.059	31.8	0.538	–57.8	0.717	20.38
1.2	0.486	–143.3	5.938	84.0	0.059	31.0	0.518	–60.7	0.780	20.01
1.3	0.482	–150.0	5.560	79.6	0.060	30.0	0.504	–63.2	0.833	19.68
1.4	0.475	–156.6	5.205	75.7	0.060	29.6	0.490	–66.0	0.897	19.36
1.5	0.476	–162.5	4.882	72.0	0.061	29.5	0.482	–68.8	0.941	19.03
1.6	0.474	–168.2	4.600	68.2	0.062	29.5	0.469	–71.7	1.003	18.38
1.7	0.477	–173.3	4.348	64.7	0.062	29.6	0.464	–74.7	1.049	17.11
1.8	0.480	–178.0	4.120	61.2	0.063	29.7	0.454	–77.7	1.101	16.25
1.9	0.483	176.9	3.906	57.8	0.063	30.3	0.453	–80.8	1.138	15.64
2.0	0.485	172.8	3.702	54.3	0.064	31.0	0.446	–83.9	1.195	14.96
2.1	0.495	169.1	3.542	51.1	0.065	32.0	0.450	–87.5	1.205	14.64
2.2	0.499	165.3	3.373	47.9	0.066	33.0	0.447	–90.6	1.246	14.12
2.3	0.505	162.0	3.236	44.8	0.067	33.9	0.452	–94.1	1.257	13.81
2.4	0.508	158.7	3.091	41.7	0.068	35.0	0.452	–97.1	1.293	13.35
2.5	0.518	155.5	2.968	38.7	0.069	35.9	0.457	–100.6	1.291	13.09
2.6	0.522	152.5	2.850	35.8	0.071	37.0	0.459	–103.7	1.292	12.77
2.7	0.534	149.7	2.737	32.8	0.074	38.3	0.465	–107.4	1.263	12.58
2.8	0.547	146.8	2.622	29.8	0.078	38.3	0.469	–110.9	1.215	12.45
2.9	0.555	144.2	2.512	27.1	0.080	35.6	0.463	–114.2	1.232	12.05
3.0	0.555	141.3	2.428	24.6	0.080	35.7	0.457	–116.8	1.301	11.53
4.0	0.628	118.9	1.693	–0.2	0.096	36.8	0.492	–148.3	1.365	8.85

V_{CE} = 3 V, I_C = 8 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	0.786	–20.9	20.802	163.9	0.012	73.0	0.968	–11.5	0.184	32.26
0.2	0.741	–42.4	18.842	148.9	0.022	66.4	0.900	–22.2	0.197	29.30
0.3	0.678	–61.9	17.033	135.8	0.030	58.4	0.825	–30.6	0.264	27.51
0.4	0.621	–78.0	15.057	125.4	0.036	52.3	0.744	–37.5	0.342	26.25
0.5	0.566	–91.8	13.327	116.8	0.040	46.7	0.676	–42.5	0.434	25.27
0.6	0.530	–104.4	11.796	109.7	0.042	43.2	0.615	–46.6	0.515	24.44
0.7	0.502	–115.6	10.587	103.3	0.045	41.2	0.570	–49.7	0.586	23.73
0.8	0.479	–125.2	9.514	97.9	0.046	39.8	0.528	–52.8	0.670	23.12
0.9	0.465	–133.9	8.683	92.9	0.048	38.5	0.498	–55.4	0.737	22.58
1.0	0.452	–141.9	7.935	88.2	0.049	38.2	0.473	–58.0	0.809	22.08
1.1	0.447	–149.8	7.325	84.2	0.051	37.8	0.455	–60.5	0.861	21.60
1.2	0.441	–156.1	6.767	80.4	0.052	37.9	0.437	–63.2	0.925	21.15
1.3	0.440	–162.6	6.299	76.4	0.053	37.7	0.426	–65.7	0.975	20.74
1.4	0.442	–168.3	5.874	72.8	0.054	38.0	0.414	–68.4	1.025	19.37
1.5	0.447	–173.8	5.511	69.5	0.056	38.3	0.408	–71.1	1.055	18.50
1.6	0.447	–178.7	5.186	66.0	0.057	38.6	0.397	–73.9	1.103	17.60
1.7	0.455	176.6	4.892	62.9	0.059	38.9	0.394	–76.9	1.133	17.00
1.8	0.458	172.7	4.620	59.6	0.060	39.3	0.385	–79.9	1.176	16.32
1.9	0.467	168.4	4.375	56.5	0.062	39.6	0.385	–83.2	1.185	15.88
2.0	0.469	164.4	4.144	53.3	0.064	40.1	0.380	–86.4	1.223	15.28
2.1	0.479	161.5	3.961	50.4	0.066	41.0	0.383	–90.1	1.223	14.96
2.2	0.485	158.1	3.764	47.4	0.068	41.5	0.382	–93.2	1.243	14.49
2.3	0.491	155.3	3.612	44.5	0.070	41.9	0.388	–96.8	1.241	14.20
2.4	0.497	152.2	3.457	41.6	0.071	42.3	0.389	–99.8	1.256	13.81
2.5	0.505	149.4	3.319	38.8	0.074	43.0	0.395	–103.3	1.246	13.55
2.6	0.512	147.1	3.181	36.1	0.076	43.3	0.399	–106.3	1.240	13.25
2.7	0.522	144.2	3.058	33.3	0.079	43.7	0.406	–110.1	1.216	13.05
2.8	0.533	141.8	2.930	30.4	0.084	43.1	0.410	–113.7	1.179	12.86
2.9	0.547	139.7	2.810	27.7	0.086	40.6	0.405	–117.3	1.178	12.58
3.0	0.545	136.6	2.717	25.3	0.086	40.3	0.399	–119.9	1.233	12.07
4.0	0.615	116.2	1.914	1.9	0.105	36.6	0.435	–150.8	1.280	9.44

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	0.755	–23.6	23.975	162.2	0.011	72.6	0.958	–12.9	0.183	33.28
0.2	0.694	–46.8	21.403	146.0	0.022	65.2	0.876	–24.4	0.232	29.97
0.3	0.631	–68.0	18.920	132.6	0.029	56.9	0.790	–33.1	0.303	28.21
0.4	0.574	–84.8	16.444	122.3	0.033	51.2	0.702	–39.9	0.395	26.93
0.5	0.528	–99.0	14.401	113.8	0.037	47.2	0.633	–44.5	0.483	25.93
0.6	0.494	–111.8	12.621	107.0	0.039	43.7	0.573	–48.4	0.574	25.07
0.7	0.469	–122.9	11.242	100.7	0.041	42.9	0.528	–51.3	0.654	24.35
0.8	0.454	–132.2	10.049	95.6	0.043	41.4	0.489	–54.1	0.738	23.68
0.9	0.442	–141.0	9.150	90.8	0.045	40.9	0.462	–56.4	0.801	23.09
1.0	0.433	–148.6	8.348	86.4	0.046	41.2	0.438	–59.1	0.871	22.57
1.1	0.431	–155.6	7.678	82.6	0.048	40.9	0.421	–61.4	0.925	22.06
1.2	0.428	–162.2	7.086	78.9	0.049	41.5	0.405	–64.1	0.984	21.58
1.3	0.431	–168.2	6.579	75.1	0.051	41.2	0.395	–66.6	1.023	20.17
1.4	0.434	–173.5	6.127	71.7	0.053	41.6	0.385	–69.2	1.067	19.08
1.5	0.438	–178.7	5.740	68.5	0.055	42.1	0.378	–71.9	1.094	18.34
1.6	0.442	177.0	5.400	65.1	0.056	42.7	0.369	–74.7	1.132	17.61
1.7	0.450	172.5	5.087	62.0	0.058	42.8	0.366	–77.8	1.159	17.03
1.8	0.454	168.6	4.798	59.1	0.060	43.1	0.358	–80.8	1.188	16.41
1.9	0.459	165.0	4.549	56.1	0.062	43.2	0.359	–84.2	1.203	15.93
2.0	0.464	161.3	4.305	52.9	0.064	43.6	0.354	–87.5	1.230	15.38
2.1	0.475	158.7	4.119	50.1	0.066	44.2	0.357	–91.2	1.222	15.09
2.2	0.482	155.1	3.918	47.2	0.069	44.7	0.357	–94.4	1.234	14.65
2.3	0.488	152.3	3.756	44.4	0.071	45.0	0.363	–98.0	1.229	14.35
2.4	0.492	149.6	3.586	41.5	0.073	45.2	0.364	–101.0	1.245	13.93
2.5	0.504	147.1	3.448	38.7	0.076	45.3	0.371	–104.7	1.223	13.73
2.6	0.510	144.5	3.311	36.1	0.079	45.4	0.375	–107.6	1.217	13.44
2.7	0.520	142.1	3.179	33.4	0.082	45.6	0.382	–111.4	1.195	13.22
2.8	0.532	139.5	3.052	30.5	0.087	45.0	0.387	–115.2	1.155	13.08
2.9	0.545	137.6	2.921	27.9	0.089	42.4	0.382	–118.9	1.157	12.76
3.0	0.542	134.9	2.827	25.7	0.089	41.9	0.377	–121.4	1.211	12.25
4.0	0.615	114.9	1.999	2.7	0.108	36.8	0.414	–152.0	1.245	9.70

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	0.595	–33.4	34.316	156.1	0.011	67.8	0.917	–17.3	0.283	34.86
0.2	0.553	–64.3	28.502	137.4	0.018	63.3	0.790	–30.8	0.321	31.93
0.3	0.502	–89.1	23.611	123.4	0.024	55.7	0.677	–39.4	0.434	29.99
0.4	0.461	–107.1	19.615	113.6	0.027	51.6	0.582	–45.3	0.559	28.62
0.5	0.431	–121.6	16.644	105.9	0.030	49.2	0.516	–48.8	0.670	27.51
0.6	0.420	–133.7	14.305	99.9	0.032	48.7	0.462	–51.7	0.768	26.55
0.7	0.410	–144.1	12.568	94.4	0.034	49.0	0.425	–53.7	0.845	25.67
0.8	0.403	–152.2	11.108	89.9	0.036	49.1	0.394	–56.0	0.930	24.89
0.9	0.404	–159.3	10.024	85.8	0.038	49.4	0.372	–58.0	0.984	24.19
1.0	0.403	–166.0	9.099	81.9	0.041	50.1	0.353	–60.4	1.036	22.35
1.1	0.409	–171.8	8.328	78.4	0.043	50.6	0.341	–62.6	1.070	21.27
1.2	0.409	–177.1	7.666	75.4	0.045	51.1	0.329	–65.4	1.109	20.27
1.3	0.419	178.3	7.111	71.9	0.048	51.2	0.323	–67.9	1.128	19.57
1.4	0.422	173.8	6.597	68.8	0.050	51.7	0.315	–70.7	1.161	18.77
1.5	0.429	170.0	6.163	66.0	0.053	51.9	0.311	–73.5	1.174	18.16
1.6	0.435	166.1	5.795	62.9	0.055	51.9	0.304	–76.4	1.188	17.58
1.7	0.443	162.7	5.463	60.1	0.058	51.8	0.303	–79.7	1.192	17.09
1.8	0.450	159.6	5.142	57.4	0.060	51.9	0.297	–83.0	1.213	16.52
1.9	0.457	156.4	4.862	54.5	0.064	51.4	0.299	–86.8	1.210	16.07
2.0	0.465	153.3	4.612	51.7	0.066	51.6	0.297	–90.3	1.216	15.61
2.1	0.474	150.8	4.403	48.9	0.069	51.5	0.301	–94.1	1.207	15.29
2.2	0.484	148.2	4.184	46.4	0.072	51.3	0.302	–97.6	1.207	14.89
2.3	0.487	145.8	4.009	43.8	0.075	51.2	0.309	–101.4	1.207	14.55
2.4	0.495	143.4	3.832	41.0	0.077	50.9	0.311	–104.6	1.205	14.21
2.5	0.503	141.1	3.688	38.3	0.080	50.5	0.319	–108.2	1.190	13.98
2.6	0.510	139.2	3.540	35.9	0.084	50.2	0.323	–111.2	1.177	13.70
2.7	0.522	136.7	3.400	33.4	0.087	49.9	0.332	–115.1	1.155	13.51
2.8	0.533	134.9	3.260	30.6	0.092	48.7	0.338	–119.1	1.125	13.34
2.9	0.545	132.9	3.126	27.9	0.094	46.2	0.335	–123.1	1.125	13.05
3.0	0.544	130.4	3.022	25.9	0.095	45.6	0.330	–125.7	1.164	12.56
4.0	0.615	112.0	2.148	4.1	0.115	37.4	0.369	–156.0	1.191	10.06

V_{CE} = 3 V, I_C = 30 mA, Z_O = 50 Ω

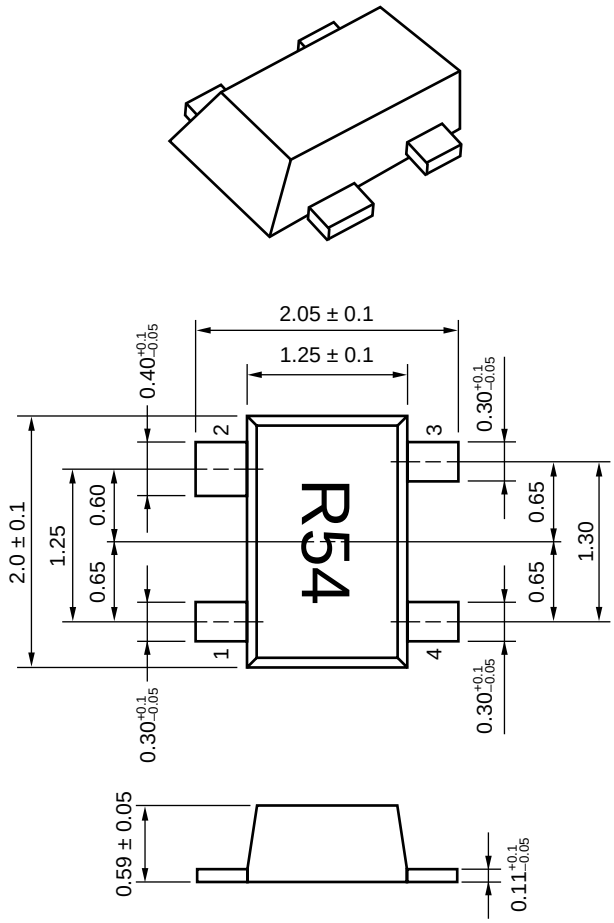
Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.524	–41.0	39.242	152.3	0.010	63.2	0.884	–19.8	0.346	35.74
0.2	0.474	–76.2	31.150	132.5	0.017	60.2	0.734	–33.9	0.415	32.65
0.3	0.446	–102.9	24.960	118.7	0.022	55.2	0.614	–41.8	0.529	30.64
0.4	0.423	–121.3	20.338	109.4	0.024	52.6	0.522	–46.9	0.661	29.24
0.5	0.409	–134.9	17.015	102.2	0.027	51.6	0.461	–49.5	0.773	28.03
0.6	0.403	–145.9	14.506	96.6	0.029	51.4	0.413	–51.8	0.873	26.98
0.7	0.401	–154.7	12.667	91.6	0.031	52.8	0.382	–53.5	0.950	26.06
0.8	0.401	–162.1	11.171	87.5	0.034	53.4	0.355	–55.5	1.021	24.32
0.9	0.404	–168.2	10.065	83.5	0.036	53.6	0.337	–57.4	1.063	22.90
1.0	0.404	–174.3	9.097	79.8	0.039	54.5	0.321	–59.7	1.110	21.68
1.1	0.411	–179.0	8.317	76.5	0.041	55.1	0.312	–62.1	1.136	20.79
1.2	0.415	176.3	7.645	73.6	0.044	55.6	0.302	–64.9	1.162	19.94
1.3	0.424	172.1	7.077	70.3	0.047	55.7	0.297	–67.3	1.176	19.25
1.4	0.428	168.3	6.571	67.3	0.050	55.6	0.290	–70.4	1.198	18.53
1.5	0.439	164.8	6.141	64.5	0.053	55.9	0.288	–73.2	1.199	17.99
1.6	0.444	161.3	5.752	61.5	0.055	55.5	0.282	–76.5	1.214	17.37
1.7	0.453	158.4	5.426	58.9	0.058	55.5	0.282	–79.8	1.212	16.92
1.8	0.460	155.5	5.110	56.2	0.061	55.4	0.278	–83.3	1.224	16.37
1.9	0.467	152.4	4.839	53.5	0.064	54.6	0.280	–87.1	1.223	15.94
2.0	0.474	149.7	4.580	50.7	0.067	54.4	0.278	–90.8	1.228	15.47
2.1	0.484	147.6	4.370	48.1	0.070	54.3	0.283	–95.0	1.211	15.16
2.2	0.491	145.2	4.155	45.5	0.073	54.0	0.285	–98.5	1.215	14.75
2.3	0.497	142.9	3.984	42.9	0.076	53.6	0.292	–102.4	1.205	14.44
2.4	0.504	140.4	3.798	40.2	0.079	53.1	0.295	–105.7	1.207	14.07
2.5	0.513	138.6	3.655	37.7	0.082	52.6	0.303	–109.3	1.188	13.86
2.6	0.518	136.6	3.507	35.3	0.086	52.0	0.308	–112.4	1.180	13.55
2.7	0.530	134.5	3.370	32.6	0.089	51.5	0.318	–116.5	1.153	13.38
2.8	0.542	132.8	3.233	29.9	0.094	50.2	0.324	–120.4	1.125	13.21
2.9	0.555	130.8	3.098	27.4	0.096	47.9	0.321	–124.5	1.123	12.93
3.0	0.555	128.4	2.998	25.3	0.097	47.0	0.317	–127.1	1.156	12.49
4.0	0.622	110.7	2.130	3.9	0.118	38.0	0.359	–157.6	1.182	9.98

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	0.467	–50.8	41.321	149.4	0.010	67.1	0.852	–21.7	0.339	36.34
0.2	0.436	–87.9	31.595	128.8	0.016	56.9	0.688	–35.6	0.488	33.04
0.3	0.422	–114.3	24.696	115.3	0.020	54.5	0.568	–42.7	0.618	31.01
0.4	0.415	–131.5	19.850	106.5	0.023	53.6	0.481	–46.9	0.748	29.44
0.5	0.407	–144.3	16.485	99.6	0.025	53.1	0.427	–48.9	0.853	28.11
0.6	0.406	–154.4	13.993	94.2	0.027	53.4	0.384	–50.8	0.965	27.08
0.7	0.408	–161.9	12.188	89.5	0.030	55.0	0.357	–52.2	1.031	25.01
0.8	0.412	–168.8	10.729	85.5	0.033	55.7	0.334	–54.1	1.092	23.32
0.9	0.413	–174.1	9.633	81.7	0.035	56.2	0.319	–55.9	1.134	22.13
1.0	0.418	–179.6	8.709	78.2	0.038	57.1	0.306	–58.3	1.174	21.09
1.1	0.426	176.1	7.956	75.0	0.041	57.4	0.298	–60.7	1.190	20.26
1.2	0.430	171.8	7.301	72.2	0.044	57.9	0.290	–63.6	1.216	19.43
1.3	0.439	168.1	6.753	68.8	0.046	57.7	0.286	–66.2	1.229	18.76
1.4	0.444	164.7	6.262	66.0	0.049	57.9	0.280	–69.3	1.242	18.07
1.5	0.453	161.2	5.850	63.2	0.052	57.8	0.279	–72.3	1.242	17.52
1.6	0.459	158.2	5.485	60.3	0.055	57.6	0.274	–75.5	1.248	16.95
1.7	0.469	155.5	5.172	57.6	0.058	57.5	0.275	–79.1	1.246	16.49
1.8	0.477	152.8	4.872	55.0	0.061	57.1	0.270	–82.7	1.253	15.98
1.9	0.483	150.1	4.605	52.4	0.065	56.6	0.273	–86.7	1.249	15.53
2.0	0.489	147.6	4.361	49.5	0.068	56.0	0.272	–90.5	1.252	15.07
2.1	0.499	145.3	4.156	47.0	0.071	55.7	0.278	–94.7	1.240	14.74
2.2	0.507	142.9	3.952	44.4	0.074	55.3	0.279	–98.4	1.237	14.34
2.3	0.513	141.0	3.788	41.9	0.077	54.9	0.287	–102.4	1.223	14.05
2.4	0.523	138.7	3.618	39.0	0.080	54.4	0.291	–105.8	1.220	13.73
2.5	0.526	136.8	3.477	36.6	0.083	53.8	0.299	–109.6	1.213	13.43
2.6	0.536	134.7	3.333	34.2	0.087	53.1	0.304	–112.8	1.195	13.18
2.7	0.545	132.8	3.207	31.5	0.091	52.5	0.314	–116.8	1.171	12.98
2.8	0.556	131.0	3.072	28.9	0.095	51.0	0.320	–120.9	1.148	12.77
2.9	0.569	129.3	2.944	26.4	0.097	48.7	0.318	–125.0	1.142	12.51
3.0	0.567	126.9	2.846	24.3	0.099	48.1	0.314	–127.6	1.178	12.05
4.0	0.637	109.7	2.022	2.7	0.120	38.6	0.363	–158.6	1.182	9.67

PACKAGE DIMENSIONS

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



PIN CONNECTIONS

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

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