

HTT1132E

Silicon NPN Epitaxial Twin Transistor

REJ03G0008-0100Z

Rev.1.00

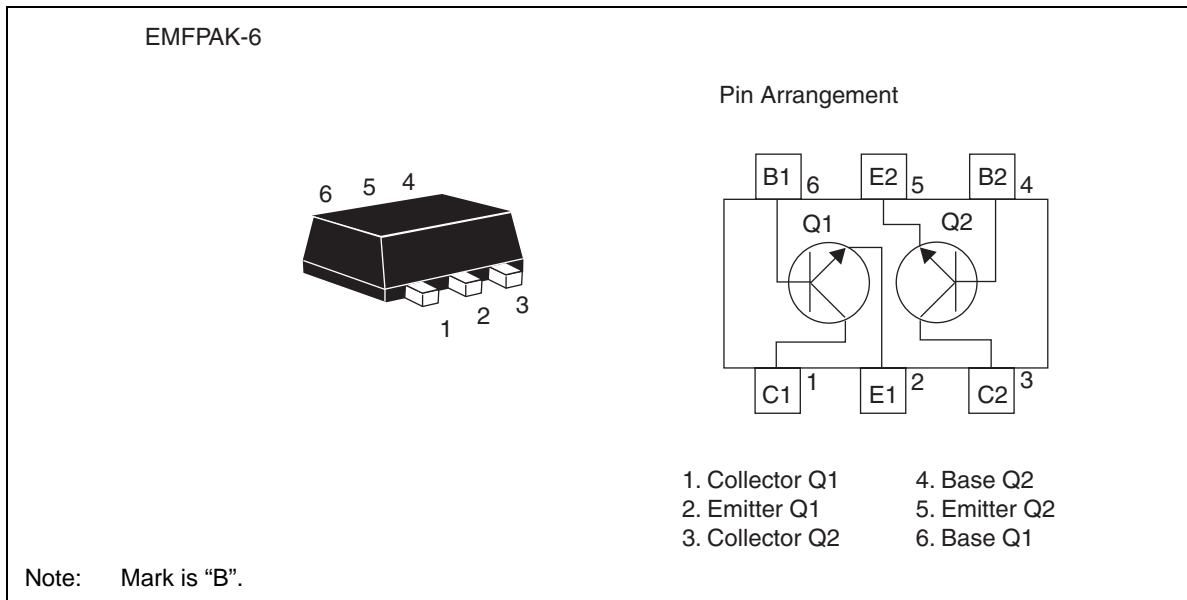
Apr.14.2003

Features

- Include 2 transistors in a small size SMD package: EMFPAK-6 (6 Leads: 1.2 x 0.8 x 0.5 mm)

Q1: Equivalent Buffer transistor	Q2: Equivalent OSC transistor
2SC5872	2SC5849

Outline

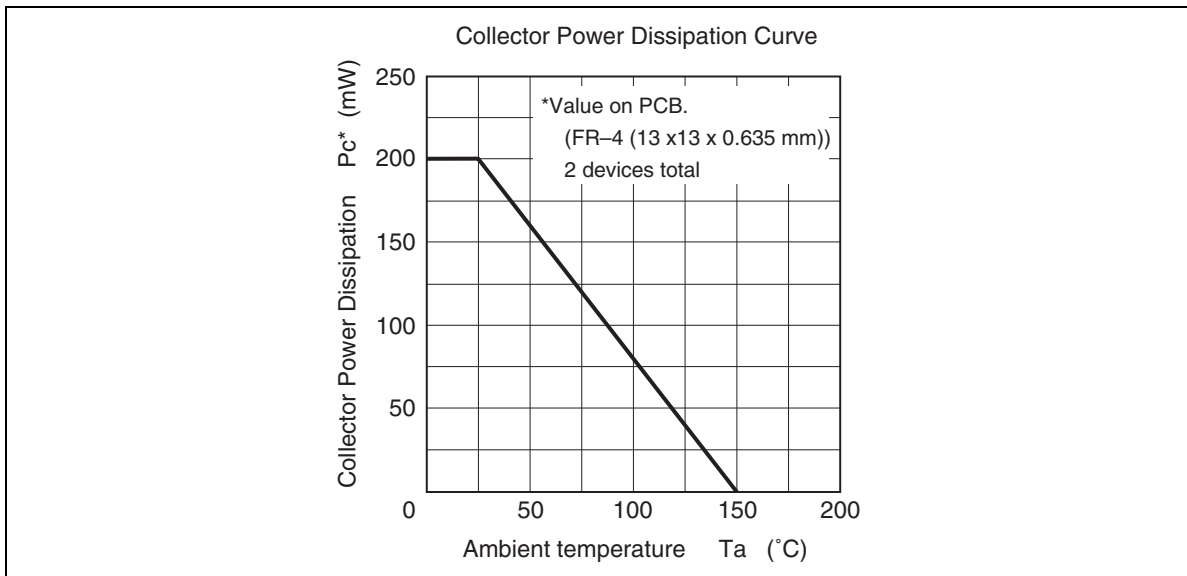


Absolute Maximum Ratings

(Ta = 25 °C)

Item	Symbol	Ratings		Unit
		Q1	Q2	
Collector to base voltage	V _{CBO}	16	15	V
Collector to emitter voltage	V _{CEO}	6	6	V
Emitter to base voltage	V _{EBO}	0.8	1.5	V
Collector current	I _C	50	80	mA
Collector power dissipation	P _C	Total 200*	Total 200*	mW
Junction temperature	T _j	150	150	°C
Storage temperature	T _{stg}	-55 to +150	-55 to +150	°C

*Value on PCB. (FR-4 (13 x 13 x 0.635 mm)).



HTT1132E

Q1 Electrical Characteristics

(T_a = 25°C)

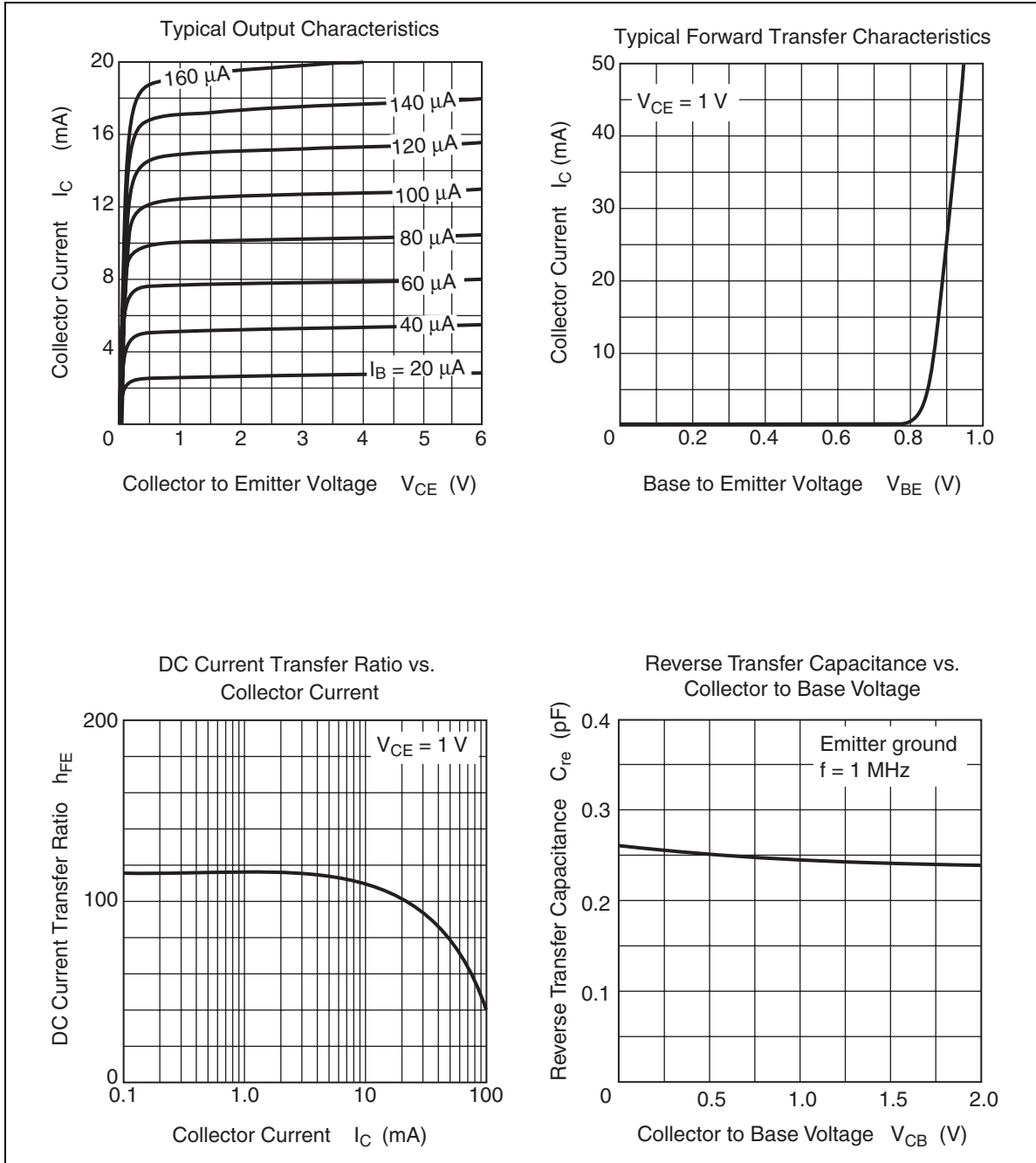
Item	Symbol	Min	Typ	Max	Unit	Test Condition
Collector to base breakdown voltage	V _{(BR)CBO}	16	—	—	V	I _C = 10 μA, I _E = 0
Collector cutoff current	I _{CBO}	—	—	0.1	μA	V _{CB} = 15 V, I _E = 0
Collector cutoff current	I _{CEO}	—	—	0.1	μA	V _{CE} = 6V, R _{BE} = infinite
Emitter cutoff current	I _{EBO}	—	—	0.1	μA	V _{EB} = 0.8 V, I _C = 0
DC current transfer ratio	h _{FE}	90	120	140	—	V _{CE} = 1 V, I _C = 5 mA
Reverse transfer capacitance	C _{re}	—	0.25	0.35	pF	V _{CB} = 1 V, f = 1 MHz Emitter ground
Collector output capacitance	C _{ob}	—	0.38	—	pF	V _{CB} = 1 V, f = 1 MHz
Gain bandwidth product	f _T	8	10	—	GHz	V _{CE} = 1 V, I _C = 5 mA, f = 1 GHz
Gain bandwidth product	f _T	—	12	—	GHz	V _{CE} = 3V, I _C = 15mA, f = 1 GHz
Forward transfer coefficient	S ₂₁ ²	13	16	—	dB	V _{CE} = 1 V, I _C = 5 mA, f = 900 MHz,
Noise figure	NF	—	1.0	1.6	dB	Γ _S = Γ _L = 50 Ω

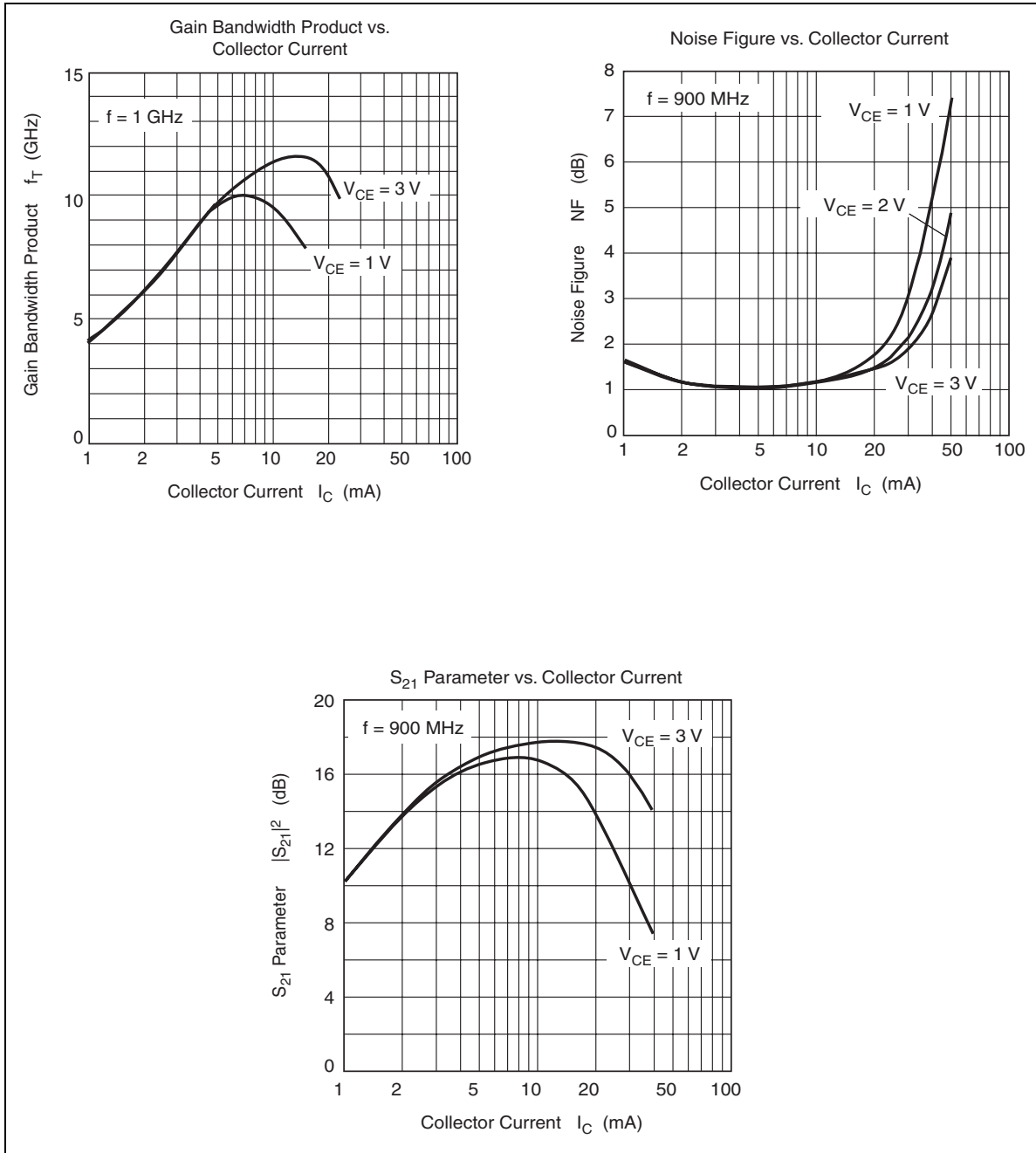
Q2 Electrical Characteristics

(T_a = 25°C)

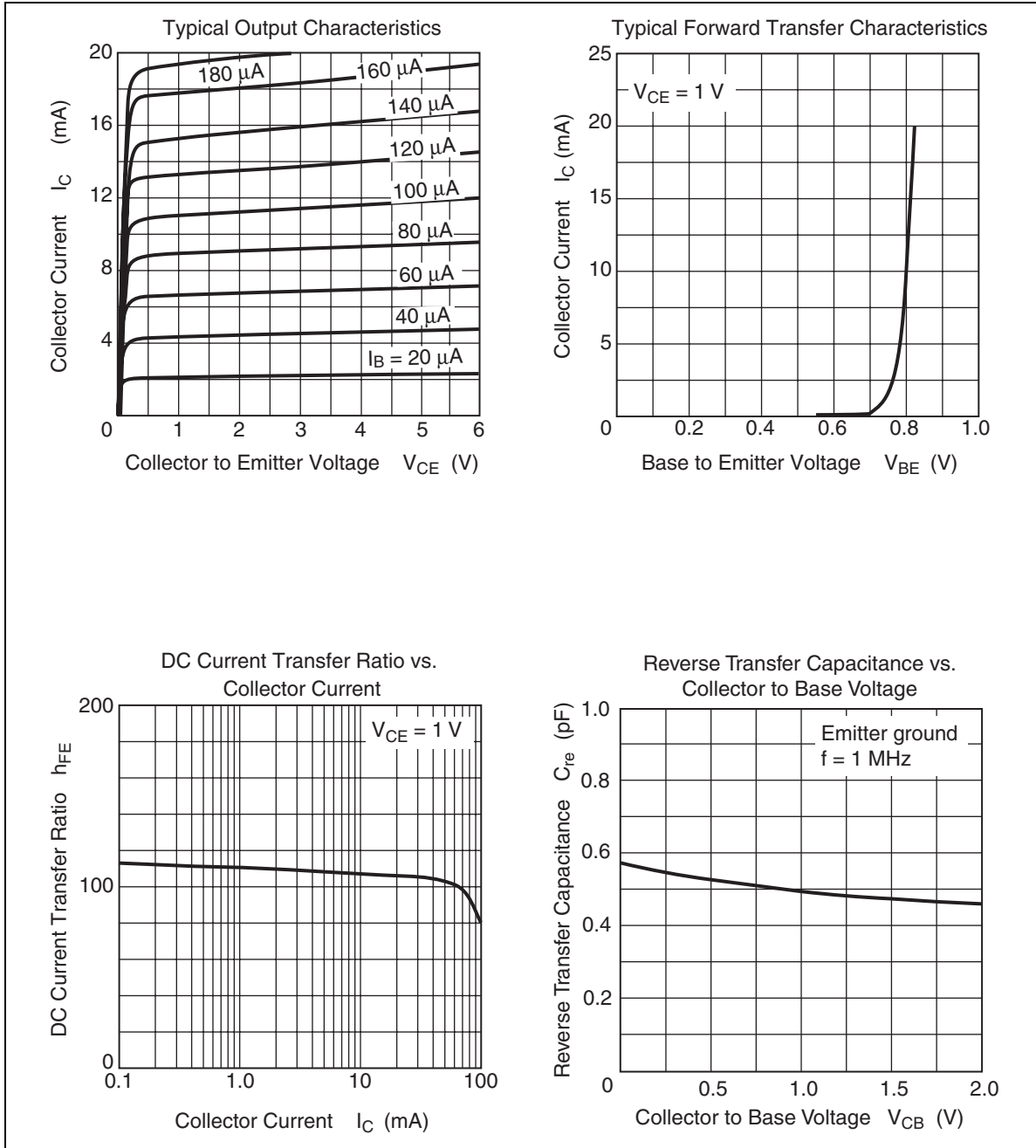
Item	Symbol	Min	Typ	Max	Unit	Test Condition
Collector to base breakdown voltage	V _{(BR)CBO}	15	—	—	V	I _C = 10 μA, I _E = 0
Collector cutoff current	I _{CBO}	—	—	0.1	μA	V _{CB} = 15 V, I _E = 0
Collector cutoff current	I _{CEO}	—	—	0.1	μA	V _{CE} = 6V, R _{BE} = infinite
Emitter cutoff current	I _{EBO}	—	—	0.1	μA	V _{EB} = 1.5V, I _C = 0
DC current transfer ratio	h _{FE}	90	120	140	—	V _{CE} = 1 V, I _C = 5 mA
Reverse transfer capacitance	C _{re}	—	0.50	0.65	pF	V _{CB} = 1 V, f = 1 MHz Emitter ground
Collector output capacitance	C _{ob}	—	0.68	—	pF	V _{CB} = 1 V, f = 1 MHz
Gain bandwidth product	f _T	2	4	—	GHz	V _{CE} = 1 V, I _C = 5 mA, f = 1 GHz
Gain bandwidth product	f _T	—	11	—	GHz	V _{CE} = 3V, I _C = 50mA, f = 1 GHz
Forward transfer coefficient	S ₂₁ ²	7	11	—	dB	V _{CE} = 1 V, I _C = 5 mA, f = 900 MHz
Noise figure	NF	—	1.7	2.3	dB	Γ _S = Γ _L = 50 Ω
Noise figure	NF	—	1.1	—	dB	V _{CE} = 1 V, I _C = 5 mA, f = 900 MHz

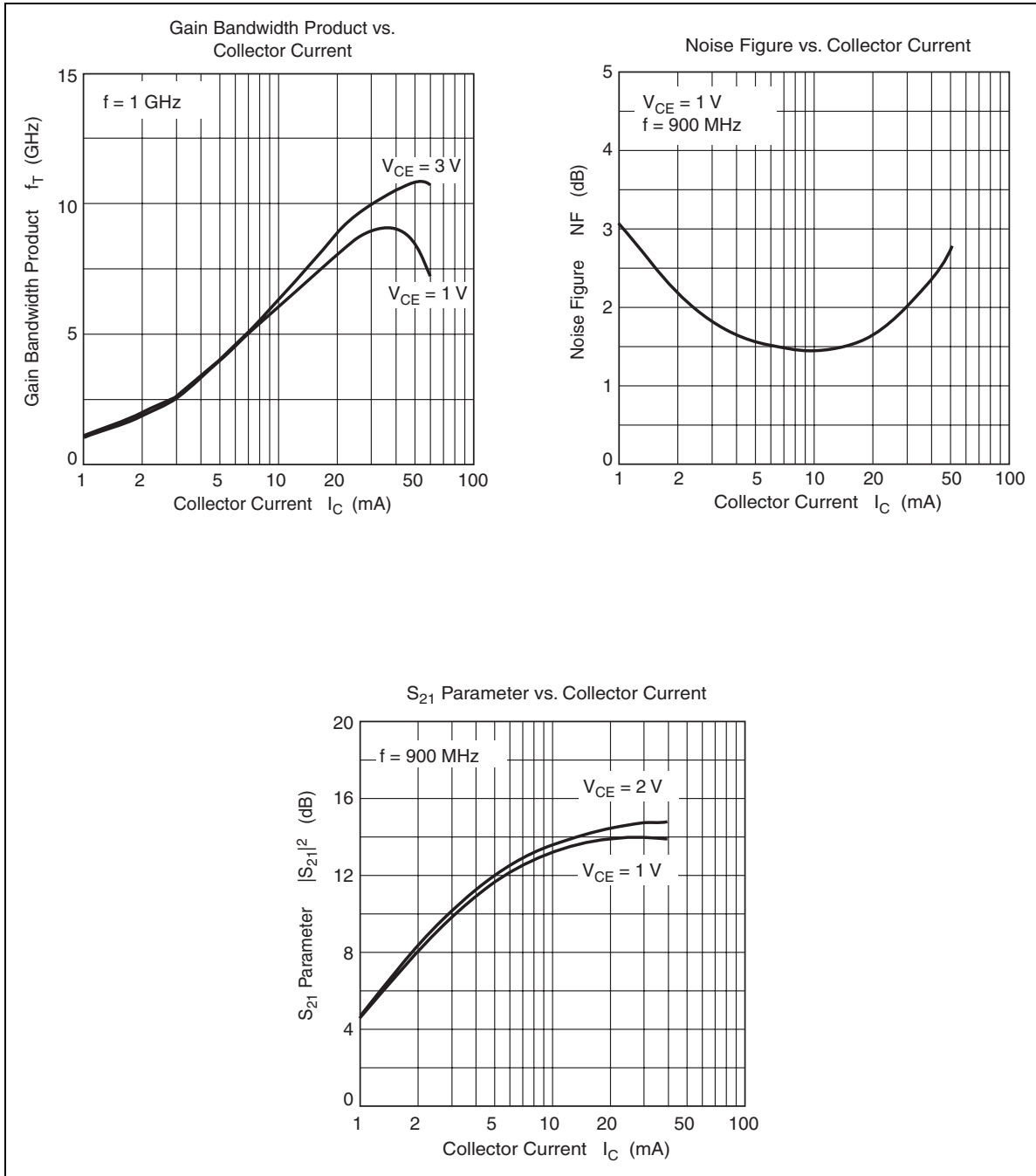
Q1 Main Characteristics





Q2 Main Characteristics





Q1 S Parameter

($V_{CE} = 1\text{ V}$, $I_C = 3\text{ mA}$, $Z_O = 50\ \Omega$)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.916	-12.4	9.04	170.0	0.0329	89.7	0.979	-6.6
200	0.884	-23.8	8.71	160.2	0.0379	77.6	0.953	-13.6
300	0.845	-35.4	8.31	151.3	0.0503	66.2	0.906	-19.7
400	0.800	-46.1	7.92	143.6	0.0588	63.6	0.860	-25.4
500	0.749	-56.8	7.48	136.3	0.0698	61.7	0.809	-29.9
600	0.704	-66.7	7.06	129.8	0.0801	56.1	0.760	-33.7
700	0.658	-76.1	6.61	123.8	0.0892	52.6	0.712	-37.1
800	0.622	-85.0	6.21	118.4	0.0934	51.2	0.670	-39.8
900	0.580	-93.6	5.83	113.4	0.0987	48.4	0.634	-41.8
1000	0.553	-100.9	5.47	109.0	0.1025	47.2	0.598	-43.8
1100	0.523	-108.4	5.13	104.9	0.1076	45.3	0.570	-45.5
1200	0.500	-115.4	4.83	101.1	0.1079	44.9	0.543	-47.0
1300	0.479	-122.4	4.55	97.6	0.1139	43.1	0.520	-48.3
1400	0.464	-128.5	4.30	94.3	0.1156	43.9	0.497	-49.6
1500	0.450	-134.8	4.07	91.2	0.1168	43.1	0.479	-50.6
1600	0.437	-140.5	3.87	88.4	0.1203	42.9	0.462	-51.9
1700	0.429	-146.3	3.68	85.7	0.1232	43.0	0.450	-53.0
1800	0.422	-151.3	3.50	83.1	0.1244	42.5	0.436	-54.0
1900	0.414	-156.7	3.34	80.5	0.1255	43.1	0.422	-54.9
2000	0.411	-161.8	3.20	78.1	0.1299	43.3	0.412	-55.9
2100	0.407	-166.6	3.06	75.7	0.1326	43.1	0.403	-57.1
2200	0.405	-171.0	2.94	73.5	0.1357	43.1	0.395	-58.2
2300	0.405	-175.5	2.83	71.3	0.1373	43.1	0.386	-59.4
2400	0.406	179.9	2.72	69.2	0.1406	43.6	0.380	-60.6
2500	0.408	176.1	2.63	67.2	0.1440	43.5	0.372	-61.7
2600	0.409	172.1	2.54	65.2	0.1468	44.2	0.367	-62.6
2700	0.411	168.5	2.45	63.2	0.1492	44.0	0.359	-64.3
2800	0.415	164.9	2.37	61.3	0.1519	45.0	0.359	-65.4
2900	0.419	161.2	2.30	59.4	0.1550	44.5	0.352	-66.8
3000	0.422	158.0	2.23	57.5	0.1581	44.8	0.351	-68.0

Q1 S Parameter

($V_{CE} = 1 \text{ V}$, $I_C = 5 \text{ mA}$, $Z_O = 50 \Omega$)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.852	-17.6	14.12	165.7	0.0299	74.4	0.965	-9.2
200	0.809	-34.3	13.17	153.2	0.0369	67.3	0.906	-19.5
300	0.739	-49.1	12.12	142.5	0.0472	60.9	0.832	-26.3
400	0.676	-63.5	11.10	133.5	0.0553	63.3	0.756	-32.1
500	0.616	-76.4	10.09	125.5	0.0598	55.4	0.692	-36.5
600	0.566	-88.0	9.18	118.8	0.0674	52.9	0.629	-39.9
700	0.525	-98.1	8.32	113.2	0.0737	52.4	0.580	-42.0
800	0.489	-107.5	7.60	108.3	0.0762	51.1	0.539	-44.1
900	0.461	-116.0	6.97	103.9	0.0793	51.0	0.507	-45.5
1000	0.442	-123.6	6.42	100.1	0.0847	50.1	0.475	-46.5
1100	0.423	-131.2	5.93	96.6	0.0869	50.8	0.453	-47.4
1200	0.409	-138.0	5.51	93.4	0.0917	50.9	0.430	-48.5
1300	0.398	-144.4	5.15	90.5	0.0954	50.5	0.412	-49.2
1400	0.389	-150.2	4.82	87.7	0.0966	49.5	0.396	-50.0
1500	0.386	-155.6	4.53	85.1	0.1027	50.7	0.382	-50.7
1600	0.381	-160.6	4.28	82.8	0.1048	50.7	0.373	-51.6
1700	0.381	-165.9	4.05	80.4	0.1095	50.4	0.362	-52.3
1800	0.376	-170.3	3.84	78.2	0.1130	51.3	0.353	-53.6
1900	0.378	-175.3	3.66	76.0	0.1161	51.7	0.341	-54.5
2000	0.376	-179.5	3.49	73.9	0.1217	51.5	0.338	-55.4
2100	0.378	176.2	3.33	71.9	0.1252	51.8	0.329	-56.5
2200	0.380	172.6	3.19	69.9	0.1281	51.9	0.323	-57.5
2300	0.385	168.9	3.06	68.0	0.1335	52.6	0.318	-58.9
2400	0.386	165.6	2.94	66.2	0.1368	52.5	0.314	-60.1
2500	0.392	162.0	2.83	64.3	0.1412	52.2	0.310	-61.5
2600	0.395	159.0	2.73	62.6	0.1440	53.3	0.307	-62.5
2700	0.399	155.5	2.63	60.8	0.1504	52.9	0.299	-64.1
2800	0.402	152.7	2.55	59.1	0.1540	53.3	0.299	-65.6
2900	0.407	150.0	2.46	57.4	0.1586	52.4	0.294	-67.4
3000	0.412	146.9	2.39	55.6	0.1634	52.2	0.293	-68.4

Q1 S Parameter

($V_{CE} = 1 \text{ V}$, $I_C = 7 \text{ mA}$, $Z_O = 50 \Omega$)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.798	-24.1	18.30	161.7	0.0152	13.2	0.936	-12.7
200	0.726	-44.9	16.53	147.1	0.0357	69.0	0.859	-23.3
300	0.648	-63.1	14.68	135.1	0.0401	59.3	0.760	-31.2
400	0.584	-79.4	12.96	125.6	0.0528	57.8	0.672	-36.3
500	0.528	-93.2	11.40	117.8	0.0531	54.6	0.599	-40.0
600	0.485	-105.3	10.11	111.6	0.0577	54.0	0.544	-42.2
700	0.451	-115.5	8.99	106.6	0.0633	54.1	0.497	-43.7
800	0.430	-124.5	8.09	102.2	0.0680	53.1	0.460	-44.6
900	0.411	-132.5	7.35	98.4	0.0715	53.8	0.432	-45.1
1000	0.398	-140.0	6.71	95.0	0.0761	53.3	0.408	-46.0
1100	0.386	-146.9	6.17	91.9	0.0796	53.7	0.391	-46.4
1200	0.382	-153.3	5.70	89.1	0.0834	55.3	0.373	-47.3
1300	0.378	-159.0	5.31	86.4	0.0859	55.0	0.360	-47.8
1400	0.375	-163.7	4.96	84.0	0.0901	55.8	0.349	-48.5
1500	0.373	-168.7	4.65	81.6	0.0964	56.5	0.337	-48.8
1600	0.372	-173.6	4.38	79.5	0.1015	57.1	0.328	-49.9
1700	0.374	-177.6	4.14	77.4	0.1052	56.6	0.319	-50.7
1800	0.373	178.3	3.92	75.4	0.1095	57.3	0.312	-51.5
1900	0.375	174.2	3.73	73.3	0.1133	56.5	0.304	-52.5
2000	0.377	170.5	3.55	71.4	0.1198	56.7	0.302	-53.3
2100	0.381	167.1	3.39	69.5	0.1232	57.2	0.295	-54.6
2200	0.384	163.7	3.24	67.7	0.1275	57.0	0.291	-55.9
2300	0.388	160.5	3.11	65.9	0.1326	57.4	0.285	-57.2
2400	0.394	157.5	2.98	64.2	0.1375	57.9	0.285	-58.7
2500	0.399	154.4	2.87	62.5	0.1413	57.1	0.280	-60.3
2600	0.400	151.7	2.77	60.8	0.1469	57.6	0.278	-61.2
2700	0.407	149.0	2.67	59.2	0.1510	57.0	0.273	-63.0
2800	0.410	146.7	2.58	57.5	0.1547	57.2	0.271	-64.5
2900	0.416	143.9	2.49	55.9	0.1614	56.7	0.268	-66.4
3000	0.421	141.2	2.42	54.2	0.1669	56.0	0.269	-67.9

Q1 S Parameter

($V_{CE} = 1\text{ V}$, $I_C = 10\text{ mA}$, $Z_0 = 50\ \Omega$)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.708	-33.6	23.08	155.8	0.0200	74.9	0.905	-16.4
200	0.633	-61.6	19.73	138.8	0.0287	59.0	0.780	-28.2
300	0.550	-83.6	16.56	126.0	0.0324	55.8	0.654	-35.5
400	0.503	-101.2	13.97	116.8	0.0430	59.7	0.570	-39.0
500	0.461	-115.6	11.88	109.8	0.0450	55.2	0.502	-41.1
600	0.434	-127.2	10.31	104.3	0.0531	54.1	0.452	-42.4
700	0.417	-136.3	9.04	100.0	0.0562	54.7	0.418	-42.9
800	0.407	-144.6	8.05	96.2	0.0608	57.9	0.388	-42.7
900	0.399	-151.0	7.25	92.8	0.0630	57.1	0.369	-43.1
1000	0.396	-157.7	6.58	89.9	0.0697	58.6	0.352	-43.2
1100	0.391	-163.3	6.02	87.2	0.0721	61.5	0.338	-43.4
1200	0.392	-168.8	5.55	84.6	0.0788	60.0	0.327	-43.7
1300	0.388	-173.4	5.15	82.3	0.0831	61.8	0.316	-43.9
1400	0.391	-177.5	4.80	80.1	0.0870	62.0	0.308	-44.8
1500	0.392	178.2	4.49	77.9	0.0930	60.6	0.300	-45.4
1600	0.394	174.6	4.23	75.9	0.0972	61.4	0.293	-46.1
1700	0.397	171.2	3.99	73.9	0.1037	60.7	0.289	-46.9
1800	0.400	168.0	3.78	72.1	0.1062	62.0	0.285	-48.2
1900	0.403	164.5	3.59	70.1	0.1114	61.4	0.276	-49.4
2000	0.407	161.4	3.42	68.3	0.1180	61.2	0.275	-50.4
2100	0.411	158.3	3.26	66.5	0.1229	61.8	0.270	-51.5
2200	0.414	155.8	3.12	64.8	0.1270	61.3	0.269	-53.0
2300	0.420	153.0	2.98	63.1	0.1305	61.8	0.265	-54.5
2400	0.424	150.6	2.86	61.4	0.1386	60.7	0.263	-56.3
2500	0.431	148.1	2.76	59.8	0.1417	61.3	0.258	-57.4
2600	0.434	145.7	2.65	58.1	0.1488	60.9	0.257	-59.0
2700	0.439	143.2	2.56	56.6	0.1522	60.0	0.254	-60.9
2800	0.443	140.8	2.48	54.9	0.1562	60.1	0.254	-62.7
2900	0.448	138.6	2.39	53.4	0.1611	59.6	0.252	-64.5
3000	0.455	136.3	2.32	51.8	0.1688	59.0	0.251	-66.3

Q1 S Parameter

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

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.862	-16.2	14.11	166.8	0.0156	122.2	0.959	-9.0
200	0.814	-31.2	13.26	154.8	0.0316	77.4	0.917	-17.4
300	0.753	-45.1	12.28	144.4	0.0420	64.4	0.854	-24.3
400	0.692	-58.6	11.32	135.6	0.0522	69.2	0.780	-30.0
500	0.632	-71.2	10.35	127.7	0.0603	56.4	0.714	-34.2
600	0.577	-82.1	9.47	121.0	0.0647	57.1	0.656	-37.4
700	0.531	-92.1	8.61	115.3	0.0691	51.0	0.610	-39.8
800	0.493	-101.3	7.89	110.3	0.0738	52.4	0.567	-41.8
900	0.462	-109.5	7.26	105.9	0.0780	50.3	0.534	-43.1
1000	0.436	-117.6	6.69	102.0	0.0815	51.2	0.506	-43.9
1100	0.416	-124.6	6.20	98.5	0.0854	50.5	0.479	-44.9
1200	0.399	-131.6	5.77	95.2	0.0897	50.7	0.456	-45.8
1300	0.387	-138.1	5.40	92.3	0.0913	51.3	0.439	-46.4
1400	0.377	-144.3	5.06	89.5	0.0946	51.8	0.422	-47.2
1500	0.368	-150.0	4.76	86.9	0.0985	52.8	0.409	-47.9
1600	0.364	-155.7	4.49	84.5	0.1032	52.8	0.397	-48.9
1700	0.359	-161.2	4.26	82.1	0.1062	51.9	0.386	-49.6
1800	0.356	-165.9	4.04	79.9	0.1099	52.9	0.377	-50.5
1900	0.354	-170.9	3.85	77.7	0.1138	53.6	0.367	-51.4
2000	0.355	-175.2	3.67	75.6	0.1171	52.5	0.361	-52.2
2100	0.354	-179.5	3.51	73.6	0.1209	53.2	0.354	-53.3
2200	0.354	176.4	3.36	71.6	0.1241	53.5	0.347	-54.4
2300	0.359	172.2	3.22	69.7	0.1290	53.4	0.340	-55.5
2400	0.362	168.5	3.09	67.8	0.1329	53.3	0.338	-56.7
2500	0.365	165.1	2.98	66.0	0.1356	54.2	0.332	-58.0
2600	0.368	162.0	2.87	64.2	0.1392	53.6	0.327	-58.6
2700	0.372	158.4	2.77	62.5	0.1457	53.3	0.322	-60.2
2800	0.377	155.3	2.68	60.8	0.1483	54.0	0.322	-61.5
2900	0.382	152.3	2.59	59.2	0.1558	53.4	0.315	-62.9
3000	0.387	149.2	2.51	57.3	0.1592	53.9	0.315	-64.1

HTT1132E

Q1 S Parameter

($V_{CE} = 3\text{ V}$, $I_C = 10\text{ mA}$, $Z_0 = 50\ \Omega$)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.735	-27.1	23.94	159.9	0.0152	110.6	0.937	-14.4
200	0.659	-49.0	21.05	143.8	0.0244	74.4	0.823	-25.6
300	0.573	-68.7	18.08	131.2	0.0346	66.6	0.718	-32.5
400	0.503	-85.0	15.52	121.8	0.0384	62.2	0.625	-36.9
500	0.445	-99.3	13.35	114.4	0.0446	59.3	0.557	-39.3
600	0.410	-110.8	11.66	108.6	0.0502	56.3	0.504	-40.9
700	0.383	-121.0	10.27	104.0	0.0534	59.8	0.462	-41.8
800	0.362	-129.9	9.18	100.1	0.0603	59.8	0.431	-42.4
900	0.348	-137.9	8.29	96.6	0.0606	59.3	0.408	-42.8
1000	0.342	-144.9	7.54	93.5	0.0679	58.9	0.389	-42.9
1100	0.332	-151.4	6.91	90.7	0.0742	60.0	0.372	-43.0
1200	0.326	-157.6	6.38	88.1	0.0757	60.5	0.358	-43.6
1300	0.326	-162.9	5.92	85.7	0.0812	62.0	0.346	-44.0
1400	0.323	-168.3	5.52	83.6	0.0873	61.7	0.336	-44.4
1500	0.324	-172.9	5.17	81.4	0.0921	61.3	0.326	-44.9
1600	0.324	-177.3	4.87	79.4	0.0961	61.9	0.320	-45.8
1700	0.326	178.1	4.60	77.4	0.1001	62.1	0.314	-46.3
1800	0.326	174.6	4.35	75.6	0.1047	62.3	0.308	-47.4
1900	0.331	170.6	4.14	73.7	0.1093	62.3	0.301	-48.3
2000	0.333	167.1	3.94	71.9	0.1158	62.4	0.297	-49.1
2100	0.337	163.6	3.76	70.2	0.1193	62.7	0.293	-50.4
2200	0.340	160.4	3.59	68.5	0.1244	62.0	0.289	-51.5
2300	0.345	157.2	3.44	66.8	0.1278	61.3	0.284	-52.7
2400	0.351	154.4	3.30	65.2	0.1361	62.0	0.283	-54.3
2500	0.357	151.6	3.18	63.6	0.1411	61.2	0.277	-55.8
2600	0.359	149.0	3.06	62.0	0.1442	61.1	0.276	-57.0
2700	0.366	146.6	2.95	60.5	0.1493	60.7	0.274	-58.7
2800	0.371	144.2	2.85	59.0	0.1540	61.1	0.272	-60.0
2900	0.375	141.4	2.76	57.4	0.1577	60.5	0.267	-61.8
3000	0.382	138.9	2.67	55.9	0.1656	59.3	0.269	-63.2

Q2 S Parameter

($V_{CE} = 1 \text{ V}$, $I_C = 3 \text{ mA}$, $Z_O = 50 \ \Omega$)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.884	-33.1	8.94	159.3	0.0353	43.6	0.942	-11.6
200	0.845	-61.9	7.95	142.4	0.0593	54.1	0.845	-22.4
300	0.798	-85.5	6.89	129.0	0.0767	51.1	0.743	-28.9
400	0.764	-103.7	5.94	119.0	0.0818	42.8	0.659	-32.6
500	0.745	-117.6	5.12	111.2	0.0847	37.3	0.599	-34.6
600	0.730	-127.9	4.49	104.9	0.0885	34.5	0.556	-36.0
700	0.719	-136.5	3.96	99.9	0.0904	32.5	0.524	-36.9
800	0.714	-143.4	3.55	95.5	0.0894	30.6	0.499	-37.9
900	0.710	-148.8	3.21	91.7	0.0905	31.7	0.481	-38.6
1000	0.708	-154.2	2.93	88.2	0.0894	33.1	0.463	-39.4
1100	0.704	-158.3	2.69	85.0	0.0900	33.1	0.453	-40.6
1200	0.703	-162.1	2.49	82.1	0.0912	36.0	0.444	-41.9
1300	0.703	-165.4	2.32	79.3	0.0892	36.1	0.434	-43.4
1400	0.704	-168.4	2.16	76.8	0.0892	38.1	0.427	-44.7
1500	0.702	-171.2	2.03	74.4	0.0899	40.1	0.423	-46.3
1600	0.701	-173.7	1.92	72.2	0.0914	41.7	0.414	-48.2
1700	0.704	-176.0	1.81	70.0	0.0929	44.2	0.409	-50.1
1800	0.704	-178.2	1.72	67.9	0.0928	47.2	0.407	-52.1
1900	0.706	179.8	1.64	65.8	0.0942	51.1	0.399	-54.1
2000	0.707	177.7	1.57	63.9	0.0981	52.8	0.397	-56.6
2100	0.709	175.8	1.50	61.9	0.1008	56.6	0.393	-58.8
2200	0.710	174.1	1.44	60.1	0.1043	58.7	0.390	-61.2
2300	0.713	172.5	1.39	58.3	0.1088	62.1	0.387	-63.9
2400	0.715	170.9	1.33	56.7	0.1126	63.7	0.385	-66.6
2500	0.718	169.4	1.29	54.9	0.1208	65.4	0.380	-69.1
2600	0.720	168.1	1.25	53.4	0.1257	67.9	0.380	-72.1
2700	0.723	166.5	1.20	51.9	0.1321	71.1	0.374	-75.0
2800	0.724	165.2	1.17	50.4	0.1396	71.6	0.374	-78.1
2900	0.727	163.9	1.14	48.9	0.1457	72.4	0.374	-81.7
3000	0.729	162.5	1.11	47.4	0.1551	73.7	0.371	-84.8

Q2 S Parameter

($V_{CE} = 1 \text{ V}$, $I_C = 5 \text{ mA}$, $Z_O = 50 \Omega$)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.823	-42.7	13.89	154.3	0.0263	74.7	0.908	-18.5
200	0.774	-76.7	11.65	135.3	0.0442	57.7	0.744	-31.4
300	0.719	-101.2	9.55	121.9	0.0625	42.4	0.623	-37.6
400	0.693	-118.3	7.92	112.6	0.0649	44.0	0.532	-40.9
500	0.675	-130.9	6.64	105.7	0.0704	39.9	0.469	-42.6
600	0.668	-140.1	5.72	100.3	0.0717	39.3	0.426	-43.5
700	0.662	-147.2	4.99	96.0	0.0744	37.8	0.394	-43.8
800	0.658	-153.0	4.43	92.3	0.0768	39.8	0.372	-44.5
900	0.659	-157.5	3.98	89.0	0.0791	41.8	0.357	-44.6
1000	0.655	-161.6	3.62	86.0	0.0799	44.5	0.337	-45.7
1100	0.656	-165.1	3.31	83.3	0.0835	45.2	0.327	-46.2
1200	0.654	-168.3	3.05	80.8	0.0836	46.2	0.318	-47.3
1300	0.654	-171.2	2.83	78.4	0.0871	47.8	0.308	-48.5
1400	0.657	-173.7	2.64	76.1	0.0908	50.7	0.301	-49.5
1500	0.655	-176.0	2.48	74.0	0.0918	52.6	0.295	-50.9
1600	0.657	-178.2	2.33	72.0	0.0981	54.2	0.290	-52.7
1700	0.659	179.9	2.21	70.0	0.1009	55.4	0.285	-54.6
1800	0.660	178.1	2.10	68.2	0.1056	58.6	0.281	-56.4
1900	0.662	176.4	2.00	66.2	0.1071	60.2	0.275	-58.8
2000	0.664	174.6	1.90	64.4	0.1120	60.6	0.273	-60.6
2100	0.667	172.9	1.82	62.6	0.1176	63.0	0.267	-63.1
2200	0.669	171.6	1.75	61.0	0.1228	64.5	0.265	-65.6
2300	0.670	170.0	1.68	59.3	0.1289	65.6	0.262	-69.0
2400	0.675	168.7	1.62	57.7	0.1351	66.5	0.260	-71.3
2500	0.677	167.5	1.56	56.2	0.1414	68.3	0.258	-74.5
2600	0.678	166.1	1.51	54.6	0.1463	68.7	0.253	-77.6
2700	0.683	164.9	1.46	53.1	0.1539	69.5	0.255	-81.2
2800	0.684	163.8	1.41	51.6	0.1616	70.4	0.250	-83.8
2900	0.686	162.5	1.37	50.2	0.1686	71.0	0.248	-87.7
3000	0.690	161.4	1.33	48.8	0.1785	71.2	0.249	-90.9

Q2 S Parameter

($V_{CE} = 1 \text{ V}$, $I_C = 7 \text{ mA}$, $Z_O = 50 \Omega$)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.757	-49.8	18.09	150.1	0.0252	99.6	0.858	-23.4
200	0.706	-88.2	14.39	130.0	0.0399	52.6	0.680	-38.0
300	0.664	-112.6	11.31	117.0	0.0469	47.1	0.543	-44.7
400	0.648	-128.5	9.13	108.5	0.0559	45.8	0.446	-47.6
500	0.639	-139.6	7.57	102.3	0.0614	42.4	0.387	-49.2
600	0.631	-147.7	6.46	97.6	0.0630	41.9	0.344	-49.7
700	0.626	-153.8	5.60	93.8	0.0671	45.4	0.315	-49.6
800	0.628	-158.7	4.96	90.4	0.0692	48.0	0.294	-50.0
900	0.629	-163.0	4.45	87.5	0.0723	47.9	0.276	-49.8
1000	0.629	-166.5	4.03	84.8	0.0773	50.6	0.263	-50.7
1100	0.627	-169.4	3.68	82.3	0.0800	53.0	0.252	-51.5
1200	0.627	-172.2	3.39	79.9	0.0847	54.6	0.243	-52.2
1300	0.627	-174.7	3.14	77.8	0.0885	56.2	0.235	-53.4
1400	0.630	-177.0	2.93	75.7	0.0926	56.8	0.229	-54.5
1500	0.630	-178.7	2.74	73.7	0.0958	58.3	0.221	-56.0
1600	0.633	-179.3	2.58	71.9	0.1031	59.5	0.217	-57.6
1700	0.635	-177.4	2.44	70.0	0.1069	61.2	0.211	-59.6
1800	0.637	-175.8	2.32	68.3	0.1112	63.8	0.208	-62.4
1900	0.639	-174.2	2.20	66.5	0.1166	63.9	0.203	-64.5
2000	0.640	-172.7	2.10	64.8	0.1230	65.0	0.200	-66.6
2100	0.641	-171.4	2.01	63.0	0.1284	65.4	0.196	-69.2
2200	0.644	-170.0	1.93	61.4	0.1351	66.5	0.193	-72.3
2300	0.647	-168.6	1.85	59.8	0.1402	67.4	0.189	-75.3
2400	0.651	-167.4	1.78	58.3	0.1467	68.3	0.188	-78.2
2500	0.654	-166.2	1.72	56.9	0.1548	68.0	0.187	-81.5
2600	0.655	-165.0	1.66	55.3	0.1607	69.5	0.183	-85.1
2700	0.658	-164.1	1.61	53.9	0.1674	69.1	0.182	-88.4
2800	0.660	-163.0	1.56	52.5	0.1746	69.9	0.180	-92.4
2900	0.664	-161.7	1.51	51.0	0.1833	69.8	0.180	-95.7
3000	0.666	-160.8	1.47	49.6	0.1911	70.0	0.181	-99.9

Q2 S Parameter

($V_{CE} = 1\text{ V}$, $I_C = 10\text{ mA}$, $Z_0 = 50\ \Omega$)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.687	-61.4	23.30	145.0	0.0300	70.7	0.805	-29.7
200	0.643	-101.9	17.29	124.2	0.0381	49.2	0.587	-46.1
300	0.615	-125.2	13.02	112.2	0.0420	44.0	0.451	-52.5
400	0.606	-139.2	10.28	104.6	0.0534	49.1	0.364	-55.1
500	0.602	-148.6	8.43	99.2	0.0527	47.1	0.305	-57.1
600	0.600	-155.2	7.14	95.0	0.0577	50.3	0.273	-57.4
700	0.599	-160.3	6.18	91.7	0.0618	50.9	0.243	-58.0
800	0.600	-164.4	5.45	88.7	0.0678	53.6	0.225	-58.3
900	0.597	-167.7	4.88	86.0	0.0726	56.4	0.209	-58.4
1000	0.601	-170.8	4.41	83.6	0.0765	58.8	0.195	-59.7
1100	0.601	-173.4	4.02	81.3	0.0822	59.6	0.184	-60.5
1200	0.603	-175.8	3.70	79.2	0.0851	60.7	0.175	-60.9
1300	0.605	-178.0	3.43	77.2	0.0930	62.6	0.168	-62.6
1400	0.608	-179.9	3.19	75.3	0.0958	63.5	0.161	-63.8
1500	0.607	178.3	2.99	73.5	0.1025	63.4	0.154	-66.1
1600	0.612	176.8	2.81	71.8	0.1103	65.2	0.149	-68.2
1700	0.614	175.1	2.66	70.0	0.1123	65.7	0.145	-69.2
1800	0.613	173.7	2.52	68.4	0.1196	66.8	0.142	-72.3
1900	0.616	172.3	2.40	66.7	0.1262	67.5	0.137	-75.5
2000	0.617	170.9	2.29	65.1	0.1331	67.2	0.134	-77.7
2100	0.620	169.5	2.18	63.4	0.1385	68.5	0.131	-81.7
2200	0.623	168.4	2.09	61.9	0.1451	68.2	0.129	-84.9
2300	0.626	167.1	2.01	60.4	0.1512	68.2	0.127	-88.7
2400	0.629	166.0	1.93	59.0	0.1595	68.6	0.126	-92.9
2500	0.633	165.0	1.86	57.5	0.1662	68.5	0.125	-97.0
2600	0.634	164.1	1.80	56.1	0.1714	68.4	0.124	-100.9
2700	0.638	163.0	1.74	54.7	0.1797	68.6	0.123	-106.0
2800	0.640	162.0	1.69	53.3	0.1866	69.0	0.126	-110.4
2900	0.645	161.0	1.64	52.0	0.1952	69.0	0.126	-114.3
3000	0.647	160.2	1.59	50.5	0.2013	68.7	0.128	-117.6

Q2 S Parameter

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

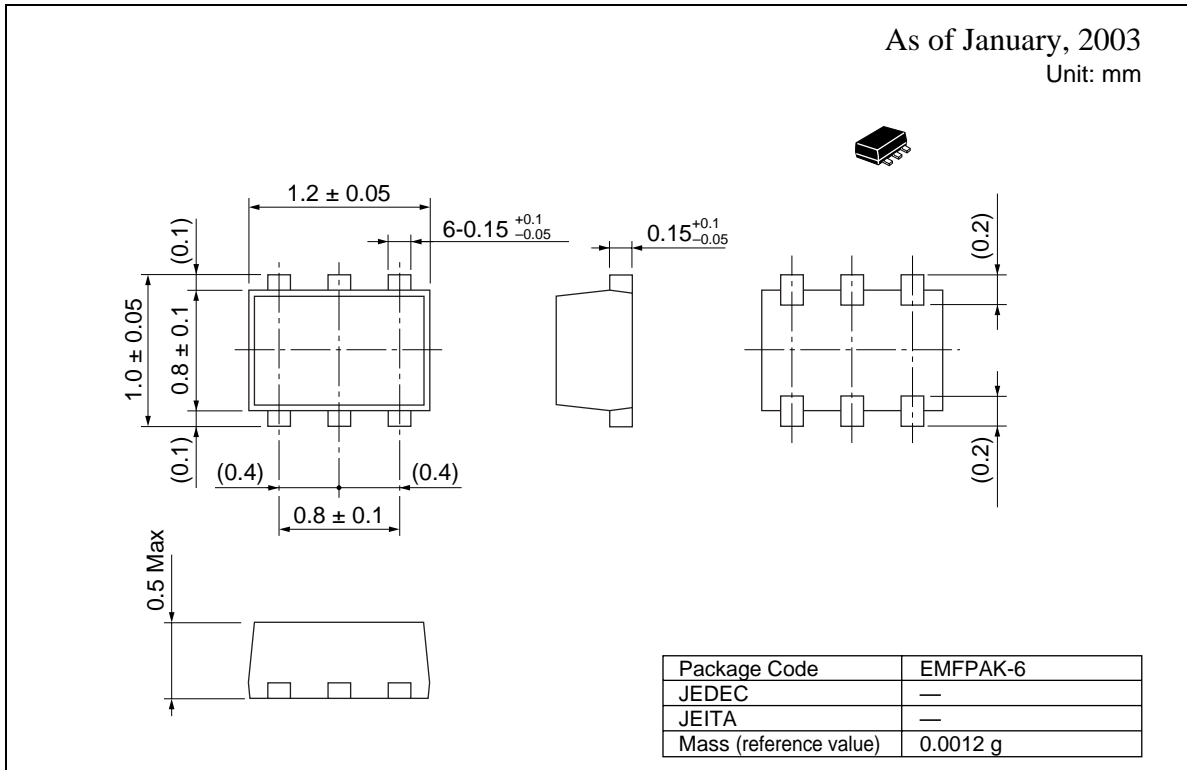
f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.830	-38.7	13.97	156.0	0.0134	59.3	0.917	-15.0
200	0.774	-70.9	11.91	137.7	0.0420	58.7	0.785	-26.1
300	0.711	-95.8	9.90	124.4	0.0474	45.9	0.675	-31.5
400	0.691	-113.5	8.28	114.9	0.0619	45.0	0.587	-34.0
500	0.669	-126.3	7.01	107.8	0.0615	41.8	0.531	-35.1
600	0.658	-136.0	6.07	102.4	0.0641	40.0	0.486	-35.7
700	0.649	-143.6	5.30	98.0	0.0650	40.4	0.458	-35.5
800	0.644	-149.6	4.72	94.3	0.0676	41.1	0.437	-35.9
900	0.641	-154.8	4.25	90.9	0.0711	44.8	0.420	-36.4
1000	0.641	-158.7	3.86	87.9	0.0723	46.3	0.404	-36.6
1100	0.642	-162.7	3.53	85.2	0.0746	47.9	0.393	-36.7
1200	0.640	-166.0	3.26	82.7	0.0761	49.2	0.384	-37.6
1300	0.639	-169.1	3.02	80.3	0.0775	51.2	0.377	-38.6
1400	0.639	-171.6	2.82	78.1	0.0817	52.5	0.369	-39.7
1500	0.641	-174.0	2.65	75.9	0.0828	55.1	0.361	-40.8
1600	0.640	-176.5	2.49	74.0	0.0869	57.7	0.359	-41.8
1700	0.643	-178.5	2.36	72.0	0.0891	59.0	0.354	-43.3
1800	0.642	179.7	2.24	70.2	0.0928	61.4	0.348	-44.9
1900	0.645	177.7	2.13	68.3	0.0975	63.5	0.343	-46.7
2000	0.646	176.0	2.03	66.5	0.1025	64.1	0.339	-48.3
2100	0.649	174.3	1.94	64.8	0.1082	66.3	0.334	-50.3
2200	0.650	172.8	1.86	63.1	0.1121	68.3	0.331	-52.3
2300	0.653	171.4	1.79	61.4	0.1170	69.4	0.324	-54.6
2400	0.657	169.9	1.72	59.9	0.1227	71.0	0.324	-56.7
2500	0.659	168.6	1.66	58.3	0.1294	71.5	0.318	-58.8
2600	0.662	167.4	1.61	56.9	0.1347	73.5	0.315	-61.5
2700	0.664	166.1	1.56	55.4	0.1425	73.7	0.312	-63.9
2800	0.664	164.8	1.51	53.9	0.1477	74.2	0.308	-66.4
2900	0.670	163.7	1.47	52.6	0.1575	74.8	0.306	-69.5
3000	0.670	162.4	1.42	51.0	0.1641	75.8	0.301	-71.9

Q2 S Parameter

($V_{CE} = 3\text{ V}$, $I_C = 10\text{ mA}$, $Z_0 = 50\ \Omega$)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.694	-54.3	23.74	147.6	0.0310	65.3	0.814	-25.6
200	0.640	-94.8	18.11	127.1	0.0349	65.9	0.641	-37.9
300	0.600	-118.1	13.86	114.7	0.0386	52.7	0.503	-43.2
400	0.583	-133.3	11.04	106.8	0.0416	55.9	0.421	-44.8
500	0.582	-143.4	9.09	101.2	0.0514	51.1	0.366	-44.7
600	0.575	-151.1	7.72	96.9	0.0511	54.3	0.331	-43.9
700	0.574	-156.9	6.68	93.4	0.0562	53.6	0.307	-43.5
800	0.574	-161.1	5.90	90.4	0.0599	55.9	0.289	-43.7
900	0.575	-165.1	5.28	87.7	0.0643	57.3	0.273	-42.9
1000	0.575	-168.2	4.78	85.3	0.0691	59.0	0.260	-43.2
1100	0.574	-171.2	4.36	83.0	0.0737	60.7	0.250	-42.8
1200	0.577	-173.5	4.01	80.9	0.0781	63.1	0.241	-43.4
1300	0.579	-175.9	3.72	78.9	0.0820	63.6	0.236	-43.6
1400	0.580	-177.9	3.47	77.0	0.0870	65.0	0.229	-44.3
1500	0.580	-179.6	3.24	75.2	0.0939	65.3	0.223	-45.3
1600	0.582	178.6	3.05	73.5	0.0979	67.5	0.217	-46.6
1700	0.585	176.8	2.88	71.8	0.1025	67.3	0.211	-48.0
1800	0.585	175.3	2.73	70.2	0.1093	68.9	0.208	-49.1
1900	0.590	173.8	2.60	68.6	0.1142	69.5	0.202	-50.8
2000	0.591	172.4	2.48	67.0	0.1207	70.5	0.198	-52.3
2100	0.592	171.0	2.37	65.3	0.1270	70.5	0.195	-54.2
2200	0.596	169.9	2.27	63.9	0.1325	70.7	0.189	-56.4
2300	0.599	168.7	2.18	62.4	0.1399	71.8	0.185	-59.2
2400	0.601	167.6	2.10	61.0	0.1464	71.9	0.181	-61.7
2500	0.605	166.3	2.02	59.4	0.1509	71.8	0.177	-65.0
2600	0.610	165.6	1.95	58.1	0.1575	72.5	0.172	-66.7
2700	0.611	164.5	1.89	56.8	0.1634	72.2	0.170	-69.7
2800	0.612	163.5	1.83	55.4	0.1714	72.4	0.168	-72.8
2900	0.616	162.4	1.77	54.0	0.1788	72.3	0.164	-76.2
3000	0.619	161.5	1.73	52.7	0.1883	72.4	0.161	-78.7

Package Dimensions



Renesas Technology Corp. Sales Strategic Planning Div. Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

Keep safety first in your circuit designs!

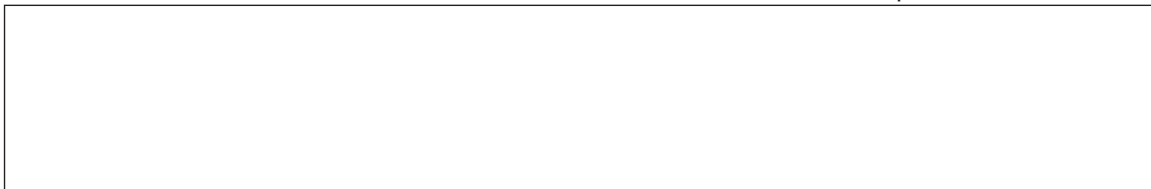
1. Renesas Technology Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

Notes regarding these materials

1. These materials are intended as a reference to assist our customers in the selection of the Renesas Technology Corporation product best suited to the customer's application; they do not convey any license under any intellectual property rights, or any other rights, belonging to Renesas Technology Corporation or a third party.
 2. Renesas Technology Corporation assumes no responsibility for any damage, or infringement of any third-party's rights, originating in the use of any product data, diagrams, charts, programs, algorithms, or circuit application examples contained in these materials.
 3. All information contained in these materials, including product data, diagrams, charts, programs and algorithms represents information on products at the time of publication of these materials, and are subject to change by Renesas Technology Corporation without notice due to product improvements or other reasons. It is therefore recommended that customers contact Renesas Technology Corporation or an authorized Renesas Technology Corporation product distributor for the latest product information before purchasing a product listed herein.
The information described here may contain technical inaccuracies or typographical errors.
Renesas Technology Corporation assumes no responsibility for any damage, liability, or other loss rising from these inaccuracies or errors.
Please also pay attention to information published by Renesas Technology Corporation by various means, including the Renesas Technology Corporation Semiconductor home page (<http://www.renesas.com>).
 4. When using any or all of the information contained in these materials, including product data, diagrams, charts, programs, and algorithms, please be sure to evaluate all information as a total system before making a final decision on the applicability of the information and products. Renesas Technology Corporation assumes no responsibility for any damage, liability or other loss resulting from the information contained herein.
 5. Renesas Technology Corporation semiconductors are not designed or manufactured for use in a device or system that is used under circumstances in which human life is potentially at stake. Please contact Renesas Technology Corporation or an authorized Renesas Technology Corporation product distributor when considering the use of a product contained herein for any specific purposes, such as apparatus or systems for transportation, vehicular, medical, aerospace, nuclear, or undersea repeater use.
 6. The prior written approval of Renesas Technology Corporation is necessary to reprint or reproduce in whole or in part these materials.
 7. If these products or technologies are subject to the Japanese export control restrictions, they must be exported under a license from the Japanese government and cannot be imported into a country other than the approved destination.
Any diversion or reexport contrary to the export control laws and regulations of Japan and/or the country of destination is prohibited.
 8. Please contact Renesas Technology Corporation for further details on these materials or the products contained therein.
-



<http://www.renesas.com>



Copyright © 2003. Renesas Technology Corporation, All rights reserved. Printed in Japan.
Colophon 0.0

This datasheet has been download from:

www.datasheetcatalog.com

Datasheets for electronics components.