PRELIMINARY DATA SHEET

NEC

NPN SILICON RF TWIN TRANSISTOR

μPA843TC

NPN SILICON RF TRANSISTOR (WITH 2 DIFFERENT ELEMENTS) IN A FLAT-LEAD 6-PIN THIN-TYPE ULTRA SUPER MINIMOLD

FEATURES

- Flat-lead 6-pin thin-type ultra super minimold package
- 2 different built-in transistors (2SC5603, 2SC5600)
- Low voltage operation

  Q1: Built-in high gain transistor

  f_T = 13.5 GHz, $|S_{21e}|^2$ = 10.0 dB @ V_{CE} = 1 V, I_C = 5 mA, f = 2 GHz

  Q2: Built-in low phase distortion transistor suited for OSC operation

  f_T = 5.0 GHz, $|S_{21e}|^2$ = 4.0 dB @ V_{CE} = 1 V, I_C = 5 mA, f = 2 GHz

BUILT-IN TRANSISTORS

	Q1	Q2
3-pin thin-type ultra super minimold part No.	2SC5603	2SC5600

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
μPA843TC	50 pcs (Non reel)	• 8 mm wide embossed taping • Pin 6 (Q1 Base), Pin 5 (Q2 Emitter), Pin 4 (Q2 Base) face the perforation side of the tape
μPA843TC-T1	3 kpcs/reel	

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

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

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The mark ★ shows major revised points.

ABSOLUTE MAXIMUM RATINGS (T_A = +25 °C)

Parameter	Symbol	Ratings		Unit
		Q1	Q2	
Collector to Base Voltage	V_{CBO}	15	9	V
Collector to Emitter Voltage	V_{CEO}	6	5.5	V
Emitter to Base Voltage	V_{EBO}	2	1.5	V
Collector Current	I_C	35	100	mA
Total Power Dissipation	P_{tot} Note	200 in 1 element 230 in 2 elements		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

ELECTRICAL CHARACTERISTICS (T_A = +25 °C)

(1) Q1

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Collector Cut-off Current	I_{CBO}	V_{CB} = 5 V, I_E = 0 mA	–	–	200	nA
Emitter Cut-off Current	I_{EBO}	V_{EB} = 1 V, I_C = 0 mA	–	–	200	nA
DC Current Gain	h_{FE} Note 1	V_{CE} = 1 V, I_C = 5 mA	60	90	120	–
Gain Bandwidth Product	f_T	V_{CE} = 1 V, I_C = 5 mA, f = 2 GHz	12	13.5	–	GHz
Insertion Power Gain	$\lvert S_{21e} \rvert^2$	V_{CE} = 1 V, I_C = 5 mA, f = 2 GHz	8.5	10	–	dB
Noise Figure	NF	V_{CE} = 1 V, I_C = 5 mA, f = 2 GHz, $Z_S = Z_{opt}$	–	1.3	2.5	dB
Reverse Transfer Capacitance	C_{re} Note 2	V_{CB} = 0.5 V, I_E = 0 mA, f = 1 MHz	–	0.25	0.5	pF

(2) Q2

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Collector Cut-off Current	I_{CBO}	V_{CB} = 5 V, I_E = 0 mA	–	–	600	nA
Emitter Cut-off Current	I_{EBO}	V_{EB} = 1 V, I_C = 0 mA	–	–	600	nA
DC Current Gain	h_{FE} Note 1	V_{CE} = 1 V, I_C = 5 mA	100	–	160	–
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)	$\lvert S_{21e} \rvert^2$	V_{CE} = 1 V, I_C = 5 mA, f = 2 GHz	3.5	4.0	–	dB
Insertion Power Gain (2)	$\lvert S_{21e} \rvert^2$	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 %

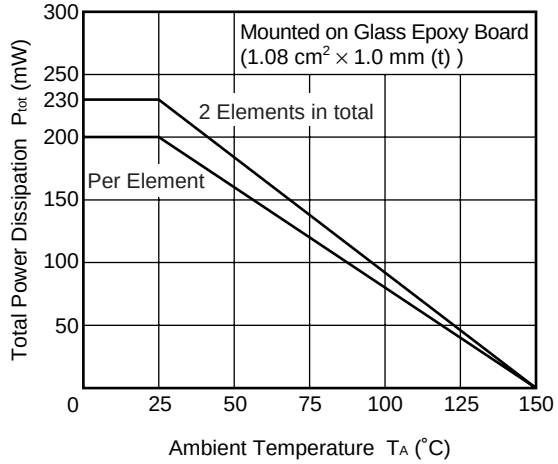
2. Collector to base capacitance measured using capacitance meter (self-balancing bridge method) when the emitter is connected to the guard pin

h_{FE} CLASSIFICATION

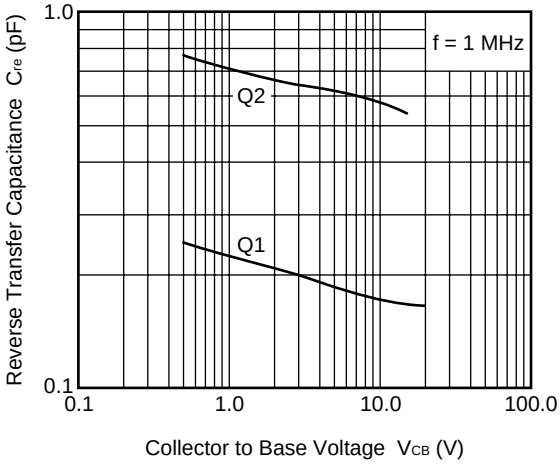
Rank	FB
Marking	2C
h_{FE} Value of Q1	60 to 120
h_{FE} Value of Q2	100 to 160

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

TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE

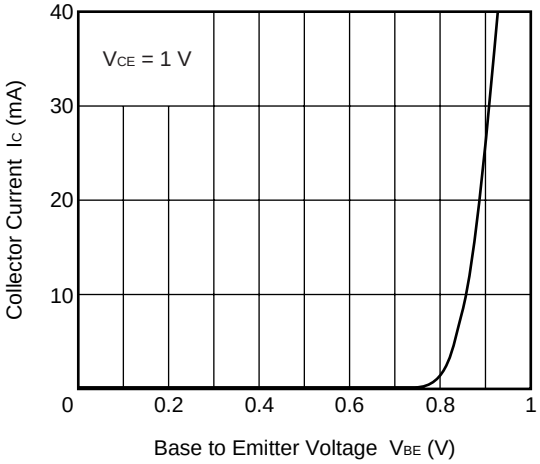


REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE

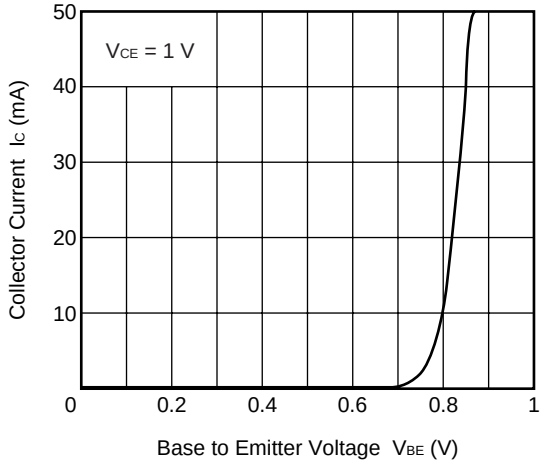


DC Characteristics Q1 **Q2**

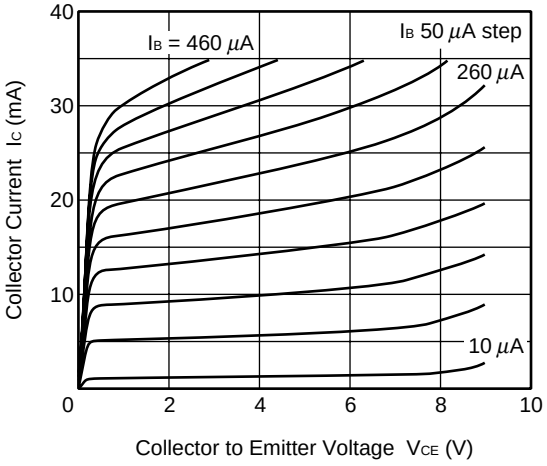
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



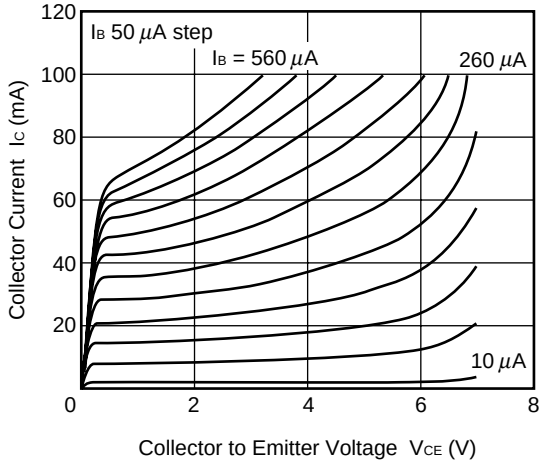
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE

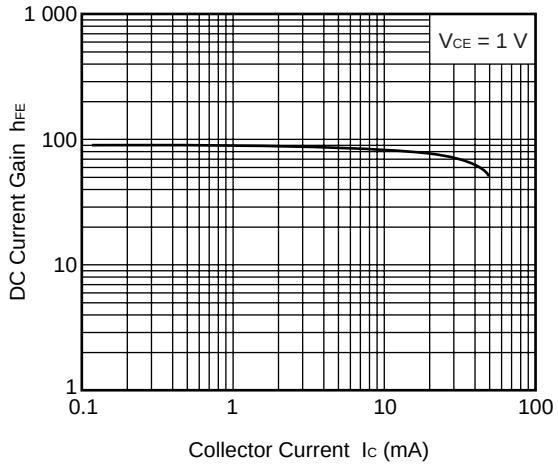


COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



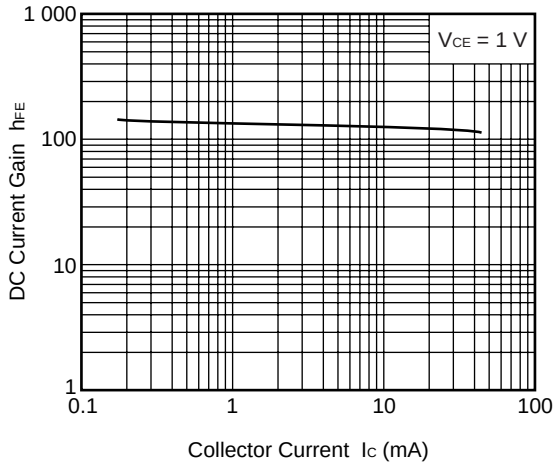
DC Characteristics **Q1**

DC CURRENT GAIN vs.
COLLECTOR CURRENT



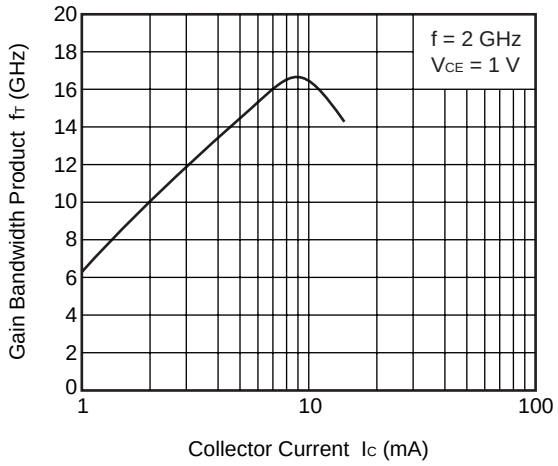
Q2

DC CURRENT GAIN vs.
COLLECTOR CURRENT



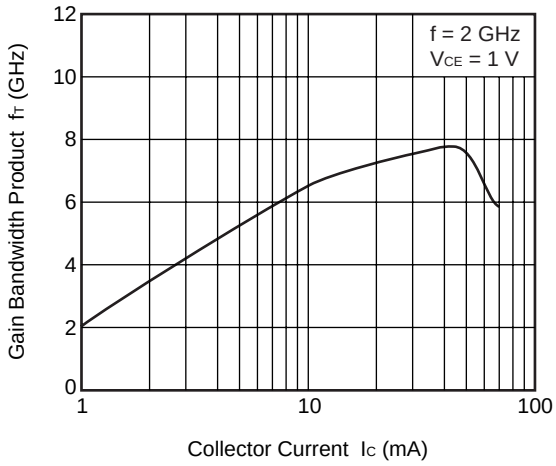
fT Characteristics **Q1**

GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



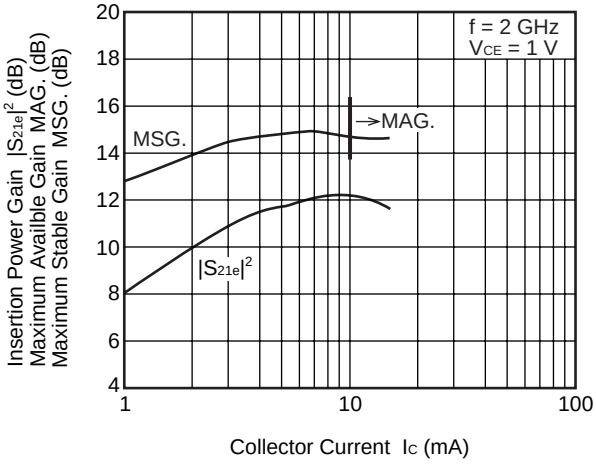
Q2

GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



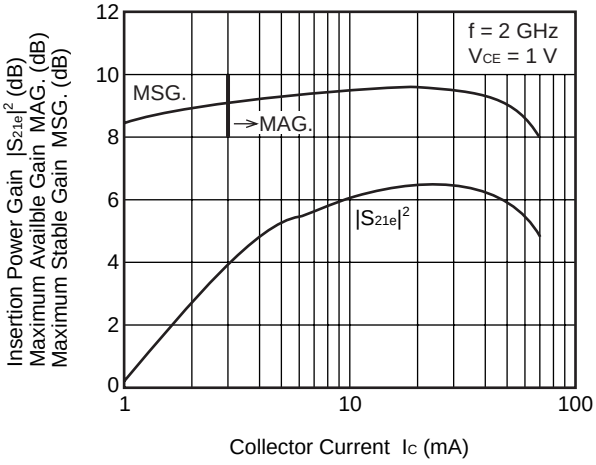
Gain Characteristics **Q1**

INSERTION POWER GAIN,
MAXIMUM AVAILABLE GAIN,
MAXIMUM STABLE GAIN
vs. COLLECTOR CURRENT



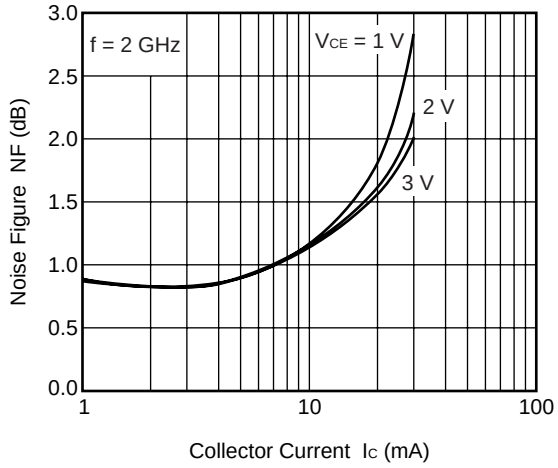
Q2

INSERTION POWER GAIN,
MAXIMUM AVAILABLE GAIN,
MAXIMUM STABLE GAIN
vs. COLLECTOR CURRENT

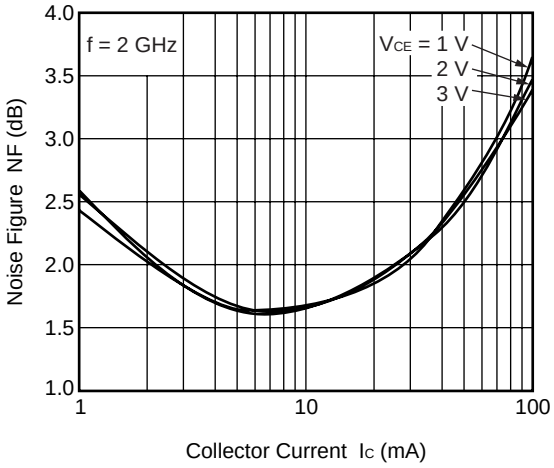


Noise Characteristics **Q1** **Q2**

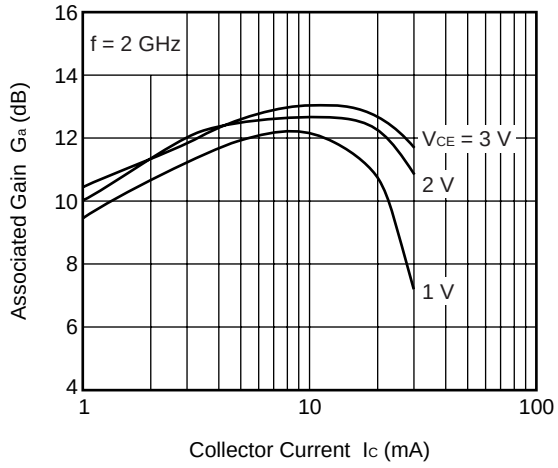
NOISE FIGURE vs.
COLLECTOR CURRENT



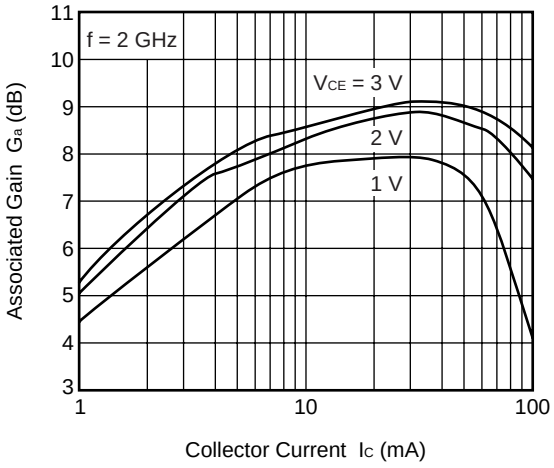
NOISE FIGURE vs.
COLLECTOR CURRENT



ASSOCIATED GAIN vs.
COLLECTOR CURRENT



ASSOCIATED GAIN vs.
COLLECTOR CURRENT



Remark The graphs indicate nominal characteristics.

S-PARAMETERS Q1

V_{CE} = 1 V, I_C = 1 mA, Z_O = 50 Ω

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.981	–5.0	4.101	175.0	0.019	77.8	1.007	–4.9
200	0.992	–10.9	4.151	169.1	0.027	76.4	1.008	–8.6
300	0.975	–17.6	4.096	161.7	0.041	77.5	1.009	–13.4
400	0.959	–25.3	4.081	154.2	0.059	72.0	1.001	–18.2
500	0.927	–32.0	3.954	147.6	0.073	67.1	0.989	–23.1
600	0.890	–38.1	3.809	141.8	0.084	63.5	0.961	–27.6
700	0.851	–43.7	3.654	136.2	0.096	58.5	0.939	–32.1
800	0.821	–49.2	3.560	131.9	0.103	54.5	0.904	–36.3
900	0.792	–54.4	3.466	126.7	0.113	51.3	0.875	–39.9
1000	0.769	–60.3	3.420	121.7	0.117	47.8	0.843	–43.4
1100	0.743	–65.5	3.320	117.0	0.122	45.1	0.814	–47.0
1200	0.715	–71.6	3.224	111.9	0.125	42.8	0.789	–50.0
1300	0.682	–77.3	3.120	107.0	0.130	41.0	0.761	–53.3
1400	0.651	–82.7	3.015	102.2	0.132	38.9	0.734	–56.6
1500	0.618	–88.0	2.894	98.0	0.131	36.6	0.711	–60.0
1600	0.585	–93.1	2.808	93.7	0.133	35.5	0.691	–62.9
1700	0.562	–98.2	2.717	90.0	0.133	32.9	0.671	–66.3
1800	0.541	–104.0	2.649	86.2	0.133	32.8	0.656	–69.1
1900	0.519	–110.3	2.577	81.8	0.132	32.5	0.637	–72.0
2000	0.507	–116.1	2.506	77.6	0.131	32.1	0.626	–75.5
2100	0.487	–122.2	2.422	73.7	0.128	31.7	0.606	–78.4
2200	0.477	–128.0	2.362	70.0	0.126	32.6	0.599	–81.8
2300	0.465	–133.8	2.287	66.5	0.123	33.6	0.588	–84.3
2400	0.455	–139.3	2.210	63.4	0.122	34.5	0.574	–87.5
2500	0.448	–144.9	2.150	60.1	0.122	36.7	0.565	–90.5
2600	0.447	–149.7	2.069	57.0	0.119	38.6	0.557	–93.5
2700	0.446	–155.6	2.017	54.0	0.119	41.0	0.552	–96.3
2800	0.447	–159.8	1.953	51.1	0.119	43.7	0.548	–98.9
2900	0.442	–164.2	1.897	48.1	0.124	47.1	0.543	–101.4
3000	0.447	–169.7	1.850	44.8	0.129	49.2	0.545	–104.7

V_{CE} = 1 V, I_C = 3 mA, Z_O = 50 Ω

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.904	–8.6	9.491	172.3	0.020	88.8	0.995	–6.9
200	0.907	–17.7	9.400	162.5	0.023	76.5	0.978	–13.4
300	0.868	–27.6	9.013	153.0	0.037	71.3	0.956	–20.1
400	0.816	–37.5	8.656	143.7	0.052	67.5	0.918	–26.4
500	0.760	–46.0	8.141	135.7	0.063	63.1	0.876	–32.1
600	0.697	–53.7	7.586	128.8	0.070	60.6	0.820	–37.2
700	0.643	–60.6	7.054	122.9	0.079	56.2	0.772	–41.7
800	0.597	–67.0	6.646	117.9	0.084	53.2	0.723	–45.6
900	0.554	–73.4	6.256	112.5	0.090	51.4	0.682	–48.5
1000	0.517	–79.8	5.952	107.4	0.092	50.6	0.641	–51.4
1100	0.483	–85.1	5.594	103.0	0.096	49.9	0.609	–54.1
1200	0.451	–91.2	5.310	98.5	0.099	48.9	0.581	–56.6
1300	0.419	–97.4	4.990	94.2	0.102	48.8	0.556	–59.2
1400	0.389	–102.9	4.719	90.4	0.106	49.1	0.529	–61.6
1500	0.365	–108.5	4.470	86.9	0.106	48.7	0.508	–64.2
1600	0.340	–114.7	4.246	83.3	0.111	49.3	0.491	–66.8
1700	0.323	–120.4	4.055	80.4	0.114	48.8	0.475	–69.3
1800	0.311	–127.0	3.891	77.1	0.116	49.9	0.460	–71.6
1900	0.294	–134.1	3.720	73.9	0.120	50.4	0.448	–74.2
2000	0.292	–141.1	3.574	70.5	0.126	50.8	0.438	–77.0
2100	0.283	–147.7	3.417	67.6	0.126	50.2	0.423	–79.8
2200	0.287	–153.5	3.307	64.7	0.130	52.0	0.420	–82.9
2300	0.282	–159.2	3.170	62.0	0.134	52.2	0.412	–85.0
2400	0.285	–164.8	3.058	59.4	0.138	52.5	0.402	–88.2
2500	0.289	–170.0	2.957	56.9	0.145	53.2	0.395	–91.0
2600	0.291	–174.7	2.842	54.6	0.145	54.1	0.390	–93.6
2700	0.300	–179.9	2.754	52.0	0.151	54.6	0.385	–96.5
2800	0.306	–177.0	2.651	49.7	0.157	54.2	0.385	–98.8
2900	0.306	–172.5	2.573	47.1	0.164	55.7	0.381	–101.3
3000	0.316	–168.0	2.514	44.5	0.172	55.4	0.386	–104.4

V_{CE} = 1 V, I_C = 5 mA, Z_O = 50 Ω

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.864	–10.3	12.805	170.2	0.013	73.2	0.987	–8.5
200	0.842	–22.0	12.547	158.7	0.023	69.9	0.954	–16.3
300	0.789	–33.3	11.776	147.9	0.034	72.8	0.917	–24.0
400	0.722	–44.6	11.046	137.7	0.049	66.5	0.860	–30.6
500	0.655	–54.0	10.103	129.2	0.059	62.6	0.799	–36.2
600	0.589	–62.1	9.225	122.4	0.064	60.7	0.737	–40.9
700	0.528	–69.5	8.433	116.2	0.072	56.8	0.683	–45.0
800	0.484	–76.0	7.821	111.5	0.075	54.0	0.634	–48.2
900	0.443	–82.6	7.251	106.4	0.080	54.1	0.592	–50.7
1000	0.410	–89.2	6.797	101.5	0.085	54.1	0.557	–53.1
1100	0.379	–94.5	6.325	97.5	0.089	53.9	0.528	–55.2
1200	0.348	–101.0	5.935	93.5	0.091	53.1	0.502	–57.4
1300	0.322	–107.5	5.541	89.6	0.097	54.7	0.481	–59.6
1400	0.300	–112.8	5.228	86.2	0.101	53.9	0.458	–61.6
1500	0.280	–119.0	4.904	83.0	0.103	55.3	0.441	–64.1
1600	0.264	–125.9	4.653	79.8	0.109	55.7	0.426	–66.3
1700	0.250	–132.3	4.423	77.2	0.112	54.6	0.414	–68.9
1800	0.244	–139.9	4.229	74.1	0.115	55.8	0.401	–71.1
1900	0.236	–147.5	4.038	71.1	0.122	56.7	0.390	–73.5
2000	0.235	–154.6	3.865	68.1	0.128	56.1	0.383	–76.2
2100	0.235	–161.4	3.689	65.5	0.131	56.1	0.369	–79.2
2200	0.242	–166.9	3.555	62.9	0.138	57.3	0.368	–82.3
2300	0.245	–172.4	3.411	60.4	0.142	57.0	0.360	–84.3
2400	0.248	–177.6	3.287	58.0	0.146	56.9	0.352	–87.9
2500	0.258	177.7	3.176	55.7	0.153	56.7	0.347	–90.6
2600	0.262	174.1	3.042	53.6	0.155	56.9	0.342	–93.3
2700	0.274	169.0	2.950	51.3	0.161	57.4	0.338	–96.2
2800	0.281	166.4	2.846	49.0	0.168	56.8	0.338	–98.8
2900	0.283	162.3	2.752	46.7	0.176	56.7	0.335	–101.4
3000	0.295	158.0	2.681	44.2	0.184	56.9	0.340	–104.7

V_{CE} = 1 V, I_C = 10 mA, Z_O = 50 Ω

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.741	–17.6	20.220	165.0	0.009	91.2	0.955	–12.5
200	0.685	–34.1	18.956	149.4	0.017	65.4	0.883	–22.4
300	0.598	–48.6	16.762	136.4	0.031	70.5	0.804	–30.7
400	0.510	–62.0	14.746	125.4	0.041	63.2	0.721	–37.0
500	0.442	–72.5	12.871	117.1	0.051	63.2	0.648	–41.4
600	0.383	–81.6	11.324	110.7	0.053	63.9	0.586	–44.7
700	0.336	–90.0	10.048	105.3	0.059	60.9	0.535	–47.4
800	0.304	–97.5	9.102	101.0	0.065	61.2	0.495	–49.1
900	0.275	–105.1	8.273	96.6	0.071	61.6	0.462	–50.7
1000	0.256	–113.9	7.613	92.5	0.076	61.7	0.435	–52.2
1100	0.236	–119.7	7.006	89.2	0.081	62.5	0.416	–53.4
1200	0.221	–126.7	6.526	85.8	0.085	62.8	0.398	–55.2
1300	0.210	–135.2	6.035	82.6	0.092	62.5	0.383	–56.8
1400	0.200	–141.7	5.639	79.8	0.098	62.9	0.368	–58.4
1500	0.193	–149.2	5.296	76.9	0.102	63.3	0.357	–60.8
1600	0.190	–157.5	4.982	74.2	0.110	63.4	0.346	–63.1
1700	0.191	–164.1	4.717	72.1	0.114	62.5	0.339	–65.5
1800	0.197	–171.3	4.485	69.4	0.120	63.6	0.329	–67.8
1900	0.200	–179.0	4.282	66.7	0.128	63.9	0.323	–70.4
2000	0.210	176.7	4.084	64.2	0.133	62.6	0.317	–73.5
2100	0.216	170.3	3.886	61.9	0.138	62.3	0.307	–76.4
2200	0.230	167.5	3.742	59.6	0.146	62.5	0.307	–80.1
2300	0.237	163.7	3.579	57.4	0.152	62.4	0.304	–81.9
2400	0.247	159.8	3.440	55.3	0.157	61.0	0.295	–86.1
2500	0.257	156.6	3.326	53.2	0.166	60.9	0.293	–88.8
2600	0.265	154.8	3.185	51.1	0.170	60.6	0.289	–91.9
2700	0.279	151.2	3.077	49.2	0.176	60.1	0.285	–95.2
2800	0.287	149.3	2.971	47.1	0.182	59.4	0.288	–97.8
2900	0.293	145.8	2.876	44.7	0.192	59.0	0.284	–100.7
3000	0.305	143.2	2.805	42.6	0.199	58.7	0.291	–104.4

S-PARAMETERS Q2

V_{CE} = 1 V, I_C = 1 mA, Z_O = 50 Ω

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.997	–19.3	3.813	166.9	0.050	78.5	0.991	–8.8
200	0.985	–39.6	3.681	152.6	0.089	66.0	0.962	–15.6
300	0.939	–58.7	3.376	139.0	0.124	56.8	0.918	–23.0
400	0.894	–76.8	3.074	126.6	0.153	46.9	0.861	–29.0
500	0.846	–91.6	2.742	116.6	0.175	39.5	0.808	–34.1
600	0.809	–103.8	2.472	108.6	0.182	33.0	0.754	–38.0
700	0.786	–114.5	2.251	101.6	0.191	27.4	0.710	–41.5
800	0.778	–123.9	2.085	95.4	0.195	23.0	0.669	–44.6
900	0.766	–132.9	1.926	89.0	0.197	19.8	0.636	–46.9
1000	0.763	–140.9	1.797	82.8	0.196	16.2	0.609	–49.5
1100	0.754	–148.2	1.669	77.5	0.192	14.5	0.589	–52.0
1200	0.744	–154.8	1.560	72.6	0.189	11.8	0.571	–54.4
1300	0.736	–160.9	1.448	67.7	0.185	10.4	0.554	–57.2
1400	0.729	–166.0	1.365	64.0	0.180	9.5	0.539	–60.3
1500	0.729	–170.9	1.292	59.9	0.173	8.3	0.529	–63.2
1600	0.730	–176.1	1.224	56.0	0.168	8.4	0.518	–66.1
1700	0.734	179.4	1.172	52.8	0.162	7.5	0.510	–69.6
1800	0.744	174.5	1.119	48.8	0.155	8.7	0.504	–72.8
1900	0.741	170.0	1.065	45.1	0.149	10.3	0.498	–76.4
2000	0.746	166.1	1.016	41.5	0.144	12.0	0.496	–80.6
2100	0.745	162.6	0.964	38.6	0.139	14.2	0.489	–84.6
2200	0.748	159.3	0.924	35.6	0.134	17.3	0.490	–89.2
2300	0.751	156.0	0.888	33.2	0.133	21.6	0.488	–93.1
2400	0.761	153.5	0.855	30.9	0.134	25.9	0.483	–98.1
2500	0.764	150.9	0.827	28.6	0.136	30.3	0.482	–102.9
2600	0.764	147.9	0.790	26.2	0.137	34.2	0.481	–107.2
2700	0.774	144.9	0.764	24.0	0.143	38.3	0.483	–112.2
2800	0.776	142.9	0.733	22.2	0.149	41.1	0.487	–116.5
2900	0.776	140.5	0.710	20.1	0.162	44.7	0.488	–121.1
3000	0.779	137.6	0.688	18.3	0.173	46.0	0.495	–126.0

V_{CE} = 1 V, I_C = 3 mA, Z_O = 50 Ω

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.923	–30.5	9.367	160.0	0.043	77.2	0.957	–17.2
200	0.880	–59.8	8.397	141.2	0.078	56.8	0.843	–29.9
300	0.804	–83.3	7.107	126.4	0.099	47.7	0.738	–40.0
400	0.743	–103.1	5.996	114.5	0.115	40.2	0.635	–47.4
500	0.695	–118.1	5.099	105.8	0.125	36.3	0.555	–52.4
600	0.671	–129.4	4.433	99.2	0.130	33.5	0.487	–56.0
700	0.658	–139.2	3.911	93.3	0.133	30.7	0.440	–58.6
800	0.656	–147.0	3.533	88.4	0.137	29.6	0.400	–61.2
900	0.650	–154.5	3.194	83.3	0.139	29.4	0.368	–63.1
1000	0.650	–161.1	2.926	78.3	0.140	28.8	0.343	–65.6
1100	0.642	–166.7	2.683	74.5	0.142	29.5	0.325	–67.5
1200	0.637	–172.1	2.483	70.6	0.142	29.8	0.308	–70.2
1300	0.635	–176.7	2.287	66.7	0.147	29.9	0.294	–72.9
1400	0.634	179.2	2.147	63.6	0.149	30.8	0.280	–76.2
1500	0.638	175.3	2.022	60.5	0.149	31.5	0.269	–79.4
1600	0.641	171.2	1.902	57.2	0.154	32.8	0.259	–82.9
1700	0.645	167.6	1.810	54.5	0.156	33.3	0.252	–87.0
1800	0.655	163.7	1.722	51.1	0.156	34.8	0.243	–90.8
1900	0.656	160.0	1.630	48.1	0.162	35.8	0.239	–94.2
2000	0.663	157.0	1.554	44.9	0.167	36.5	0.236	–99.6
2100	0.664	154.0	1.473	42.2	0.170	37.1	0.230	–104.3
2200	0.671	151.6	1.410	39.6	0.176	38.4	0.234	–109.4
2300	0.674	149.4	1.353	37.3	0.181	39.6	0.229	–114.0
2400	0.683	147.2	1.302	35.1	0.186	40.1	0.231	–119.9
2500	0.688	145.0	1.259	32.7	0.195	40.7	0.231	–124.8
2600	0.690	142.7	1.210	30.5	0.199	41.5	0.236	–129.5
2700	0.700	140.4	1.164	28.3	0.206	42.0	0.240	–135.1
2800	0.703	138.7	1.122	26.1	0.213	41.9	0.246	–139.3
2900	0.701	136.4	1.088	23.9	0.224	42.8	0.251	–144.2
3000	0.710	134.0	1.057	21.6	0.233	42.4	0.262	–148.7

V_{CE} = 1 V, I_C = 5 mA, Z_O = 50 Ω

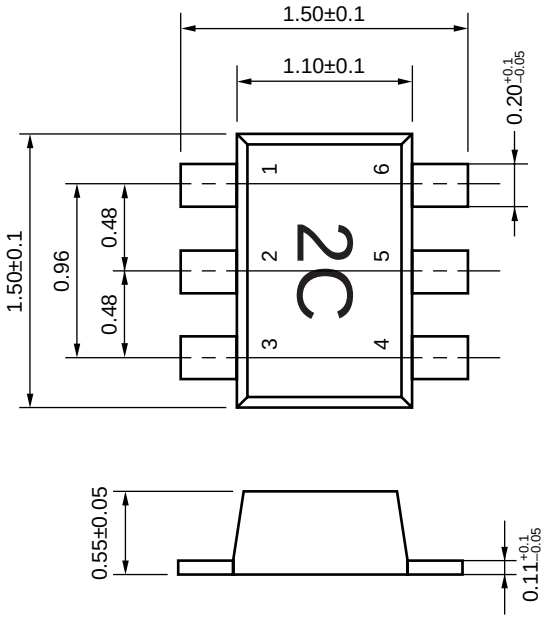
FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.865	–42.3	14.470	154.0	0.038	72.1	0.900	–25.4
200	0.782	–76.8	12.021	132.0	0.064	50.0	0.730	–42.0
300	0.700	–102.3	9.472	117.4	0.080	44.7	0.589	–53.4
400	0.647	–121.6	7.654	106.8	0.093	39.7	0.478	–61.2
500	0.621	–135.1	6.340	99.2	0.101	39.6	0.403	–66.2
600	0.604	–145.1	5.422	93.5	0.102	38.6	0.344	–70.0
700	0.599	–153.6	4.718	88.5	0.109	37.8	0.301	–73.2
800	0.601	–160.0	4.234	84.3	0.114	39.1	0.269	–76.2
900	0.598	–166.2	3.798	80.0	0.120	39.4	0.243	–78.8
1000	0.604	–171.6	3.458	75.7	0.126	39.7	0.222	–82.3
1100	0.598	–176.4	3.149	72.4	0.129	41.8	0.206	–84.8
1200	0.596	179.2	2.916	69.0	0.135	41.5	0.193	–88.6
1300	0.595	175.4	2.678	65.7	0.142	42.3	0.183	–92.3
1400	0.595	171.8	2.504	62.9	0.147	42.8	0.172	–96.8
1500	0.601	168.6	2.353	60.0	0.151	43.2	0.166	–102.3
1600	0.605	164.8	2.210	57.1	0.160	43.8	0.160	–107.6
1700	0.614	161.6	2.100	54.7	0.164	43.2	0.155	–113.0
1800	0.623	158.4	1.994	51.5	0.171	44.3	0.152	–118.4
1900	0.625	154.9	1.890	48.8	0.178	44.3	0.150	–123.9
2000	0.633	152.6	1.792	45.9	0.186	44.2	0.150	–129.9
2100	0.636	150.0	1.702	43.6	0.192	43.8	0.150	–136.8
2200	0.641	147.8	1.628	41.2	0.199	44.3	0.157	–141.6
2300	0.646	145.9	1.555	38.8	0.206	44.1	0.157	–146.7
2400	0.653	144.1	1.503	36.7	0.213	43.7	0.165	–153.3
2500	0.662	142.1	1.453	34.7	0.222	43.7	0.168	–158.1
2600	0.660	140.0	1.389	32.4	0.226	43.3	0.177	–162.1
2700	0.675	137.7	1.342	30.2	0.233	43.3	0.185	–167.3
2800	0.673	136.4	1.291	28.4	0.240	42.8	0.193	–170.2
2900	0.673	134.5	1.247	25.9	0.251	43.0	0.203	–174.1
3000	0.684	132.2	1.222	23.7	0.260	42.0	0.214	–177.3

V_{CE} = 1 V, I_C = 10 mA, Z_O = 50 Ω

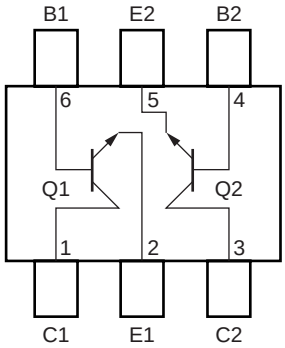
FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.731	–63.9	23.366	142.0	0.041	66.5	0.776	–41.1
200	0.640	–105.9	16.634	118.7	0.050	45.7	0.537	–61.9
300	0.581	–129.6	12.010	106.0	0.059	47.0	0.401	–74.7
400	0.563	–145.4	9.282	98.0	0.067	46.9	0.309	–84.0
500	0.552	–155.7	7.530	92.2	0.078	49.5	0.252	–90.9
600	0.552	–163.0	6.357	87.7	0.083	51.3	0.213	–97.5
700	0.552	–169.2	5.485	83.7	0.092	51.2	0.183	–103.6
800	0.556	–173.9	4.872	80.3	0.102	52.2	0.164	–109.9
900	0.561	–178.8	4.357	76.6	0.111	53.1	0.147	–116.0
1000	0.564	177.5	3.937	73.1	0.119	53.2	0.138	–123.3
1100	0.561	173.8	3.602	70.0	0.128	54.5	0.130	–128.1
1200	0.562	170.3	3.308	67.2	0.137	53.5	0.128	–135.2
1300	0.566	167.2	3.035	64.4	0.147	54.2	0.127	–140.8
1400	0.566	164.4	2.836	61.9	0.156	53.1	0.126	–148.7
1500	0.573	161.7	2.652	59.4	0.162	52.6	0.129	–154.0
1600	0.581	158.5	2.498	57.0	0.173	52.2	0.132	–160.5
1700	0.586	155.9	2.363	54.6	0.182	51.2	0.139	–165.6
1800	0.596	153.1	2.244	51.6	0.189	51.3	0.144	–170.8
1900	0.602	150.1	2.121	49.3	0.198	50.7	0.150	–175.7
2000	0.607	148.1	2.010	46.7	0.206	49.4	0.157	–179.4
2100	0.612	145.9	1.908	44.7	0.213	48.4	0.167	175.0
2200	0.617	144.3	1.821	42.5	0.222	48.2	0.176	173.4
2300	0.623	142.2	1.742	40.1	0.230	47.4	0.181	168.8
2400	0.632	140.7	1.678	38.2	0.238	46.4	0.194	165.9
2500	0.638	139.0	1.620	36.2	0.247	45.8	0.200	162.4
2600	0.640	137.2	1.549	34.2	0.252	45.1	0.209	160.9
2700	0.652	135.3	1.496	32.1	0.259	44.3	0.219	157.6
2800	0.652	133.9	1.442	30.3	0.267	43.2	0.226	156.2
2900	0.651	132.1	1.398	28.1	0.278	42.8	0.238	153.6
3000	0.662	129.9	1.366	26.1	0.284	41.7	0.246	152.3

PACKAGE DIMENSIONS

FLAT-LEAD 6 PIN THIN-TYPE ULTRA SUPER MINIMOLD (UNIT: mm)



(Top View)



PIN CONNECTIONS

1. Collector (Q1)
2. Emitter (Q1)
3. Collector (Q2)
4. Base (Q2)
5. Emitter (Q2)
6. Base (Q1)

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