

DATA SHEET

NEC

NPN SILICON RF TWIN TRANSISTOR μ PA892TC

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

FEATURES

- Ideal for 3.6 to 4.2 GHz oscillation application
- 21.0 GHz fr high-gain transistor
 $f_T = 21.0 \text{ GHz TYP.}$, $|S_{21e}|^2 = 11.5 \text{ dB TYP. @ } V_{CE} = 2 \text{ V, } I_C = 20 \text{ mA, } f = 2 \text{ GHz}$
- Built-in 2 transistors ($2 \times 2\text{SC}5668$)
- Flat-lead 6-pin thin-type ultra super minimold package

BUILT-IN TRANSISTORS

	Q1, Q2
3-pin thin-type ultra super minimold part No.	2SC5668

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
μ PA892TC	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
μ PA892TC-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.

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.
Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

ABSOLUTE MAXIMUM RATINGS (T_A = +25°C)

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	V _{CBO}	15	V
Collector to Emitter Voltage	V _{CEO}	3.3	V
Emitter to Base Voltage	V _{EBO}	1.5	V
Collector Current	I _C	35	mA
Total Power Dissipation	P _{tot} ^{Note}	115 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 cm² × 1.0 mm (t) glass epoxy substrate

ELECTRICAL CHARACTERISTICS (T_A = +25°C)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
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} = 2 V, I _C = 5 mA	50	70	100	–
Gain Bandwidth Product	f _T	V _{CE} = 2 V, I _C = 20 mA, f = 2 GHz	18.0	21.0	–	GHz
Insertion Power Gain (1)	S _{21e} ²	V _{CE} = 2 V, I _C = 20 mA, f = 2 GHz	9.0	11.5	–	dB
Insertion Power Gain (2)	S _{21e} ²	V _{CE} = 1 V, I _C = 10 mA, f = 2 GHz	8.5	11.0	–	dB
Noise Figure	NF	V _{CE} = 2 V, I _C = 5 mA, f = 2 GHz, Z _S = Z _{opt}	–	1.1	1.5	dB
Reverse Transfer Capacitance	C _{re} ^{Note 2}	V _{CB} = 2 V, I _E = 0 mA, f = 1 MHz	–	0.24	0.3	pF
Maximum Available Power Gain	MAG ^{Note 3}	V _{CE} = 2 V, I _C = 20 mA, f = 2 GHz	–	12.5	–	dB
Maximum Stable Power Gain	MSG ^{Note 4}	V _{CE} = 2 V, I _C = 20 mA, f = 2 GHz	–	13.5	–	dB

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

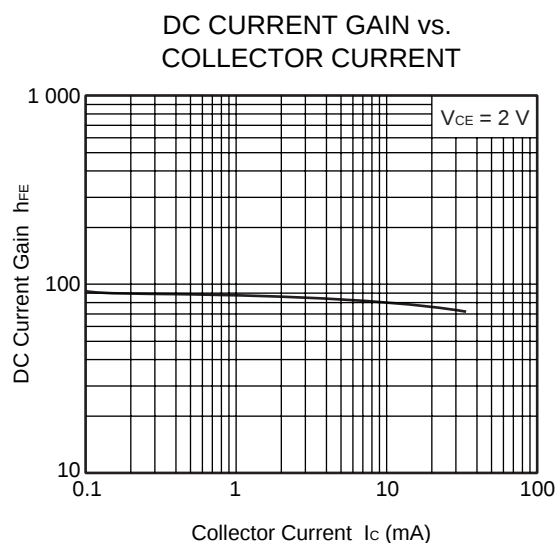
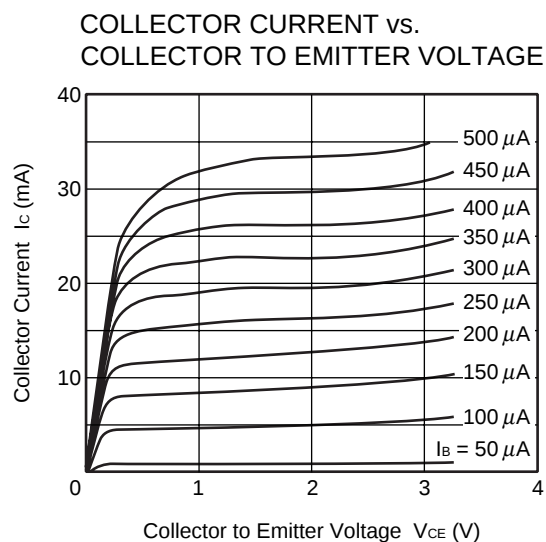
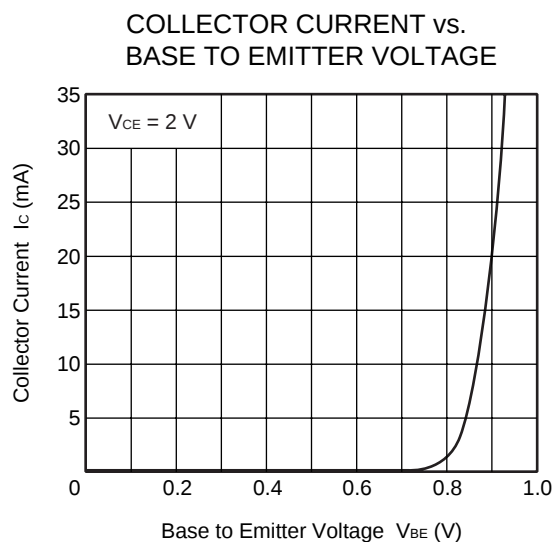
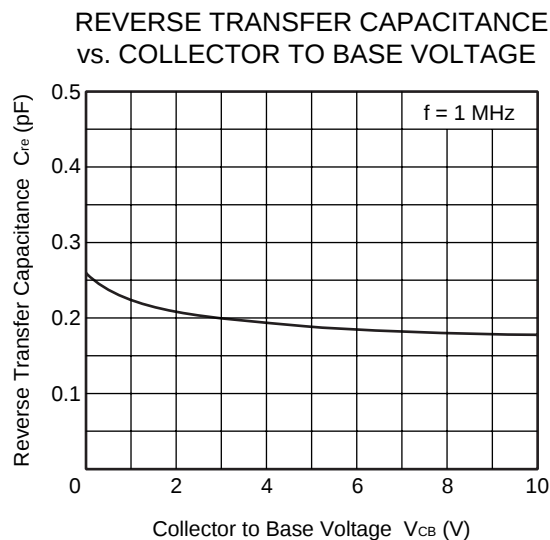
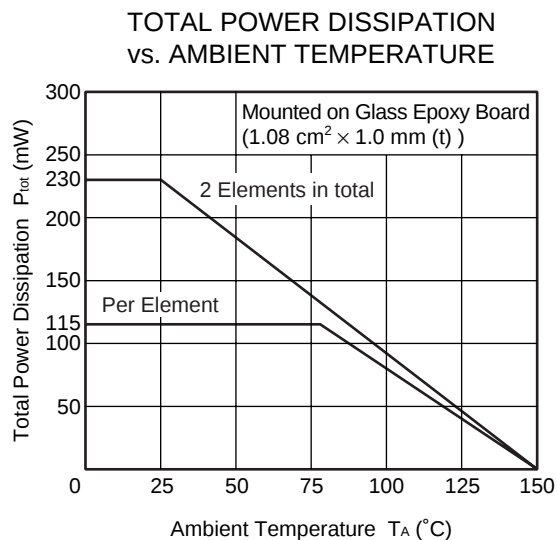
$$3. \text{ MAG} = \left| \frac{S_{21}}{S_{12}} \right| (K - \sqrt{K^2 - 1})$$

$$4. \text{ MSG} = \left| \frac{S_{21}}{S_{12}} \right|$$

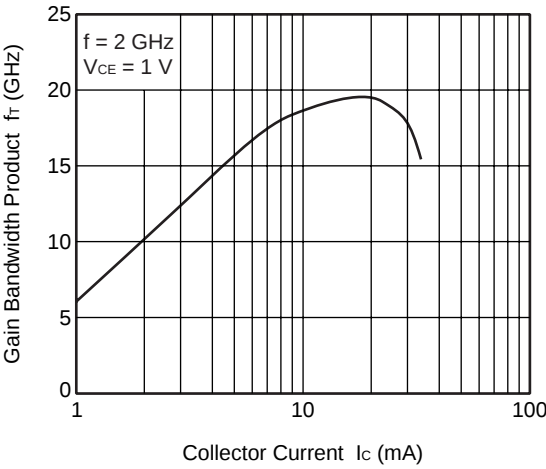
h_{FE} CLASSIFICATION

Rank	FB
Marking	4C
h _{FE} Value	50 to 100

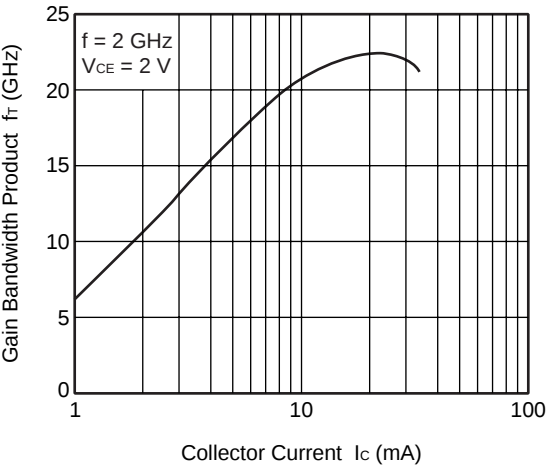
TYPICAL CHARACTERISTICS (Unless otherwise specified, $T_A = +25^\circ\text{C}$)



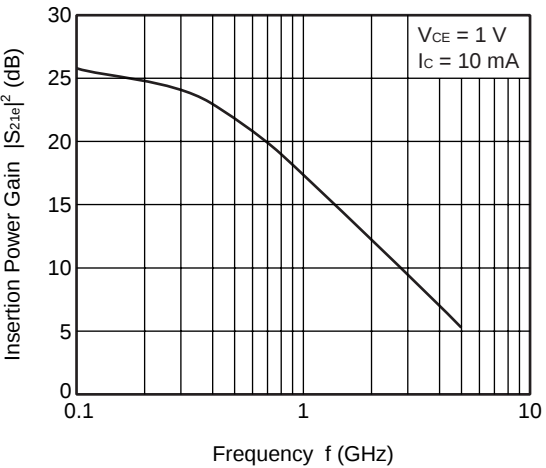
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



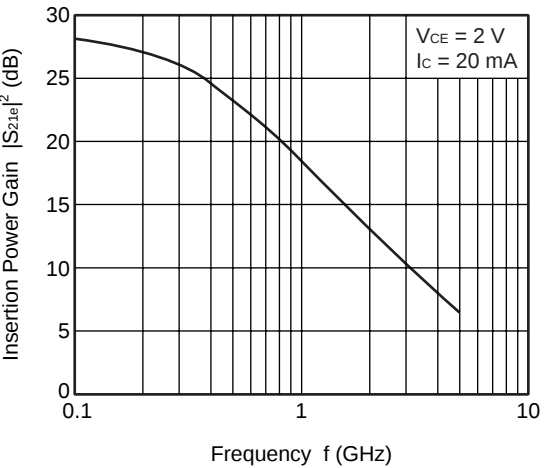
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



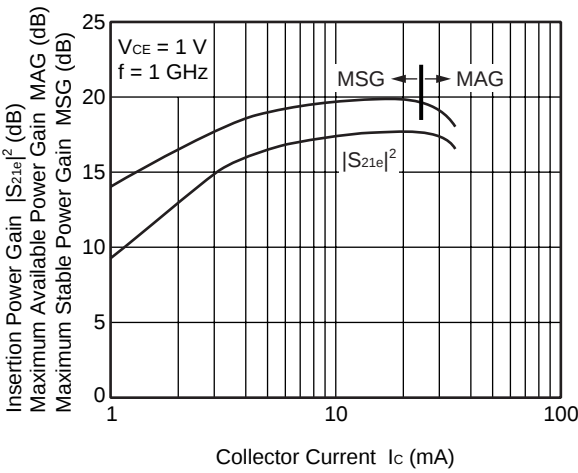
INSERTION POWER GAIN vs. FREQUENCY



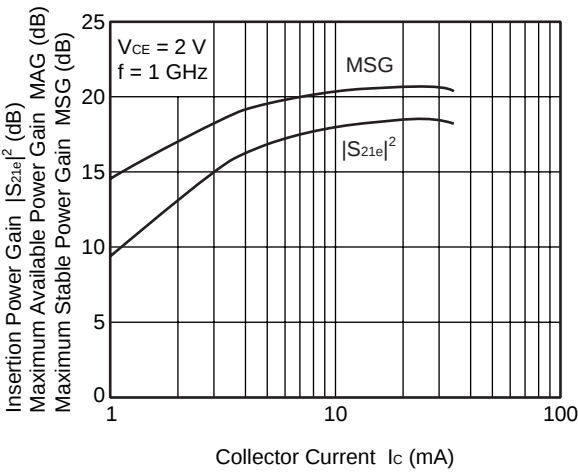
INSERTION POWER GAIN vs. FREQUENCY



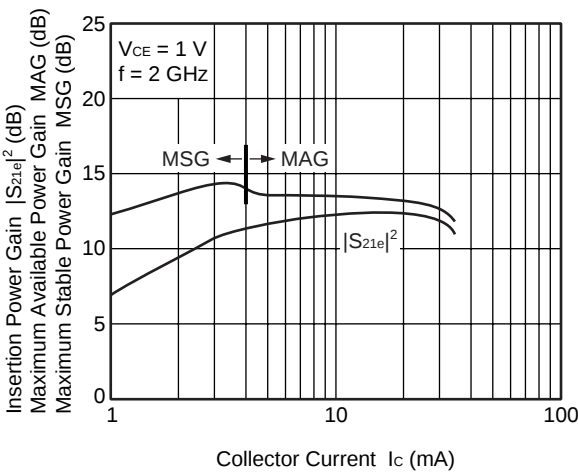
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



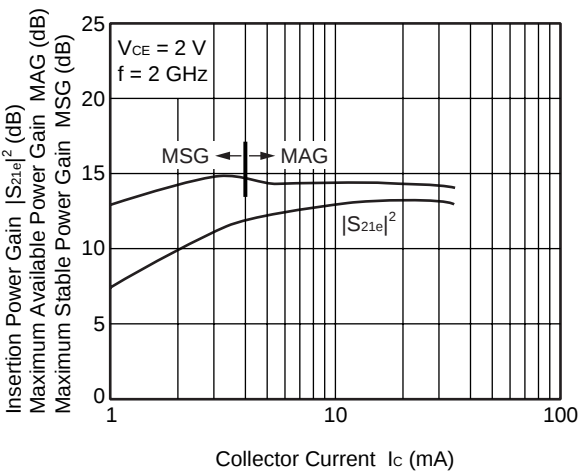
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



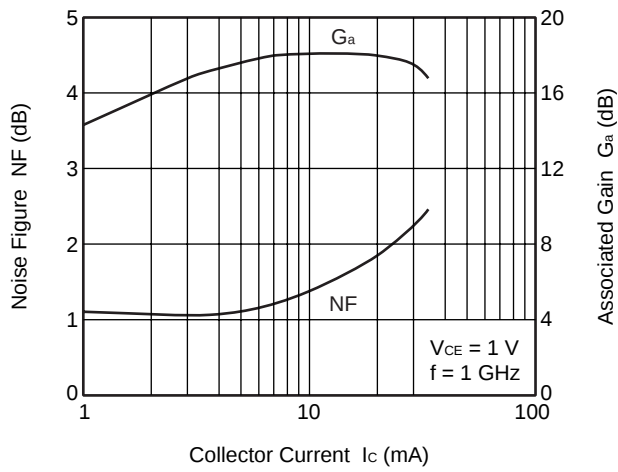
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



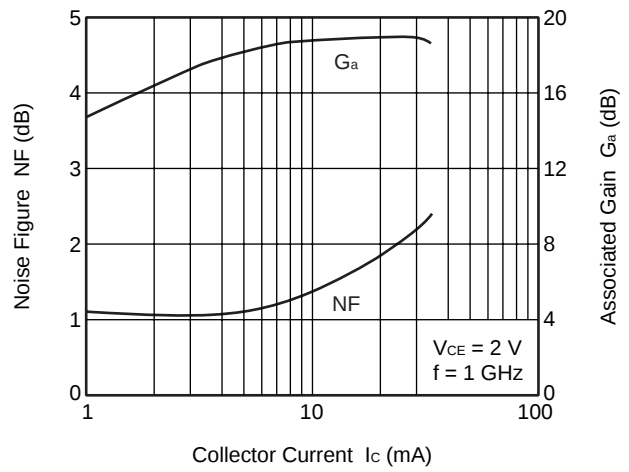
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



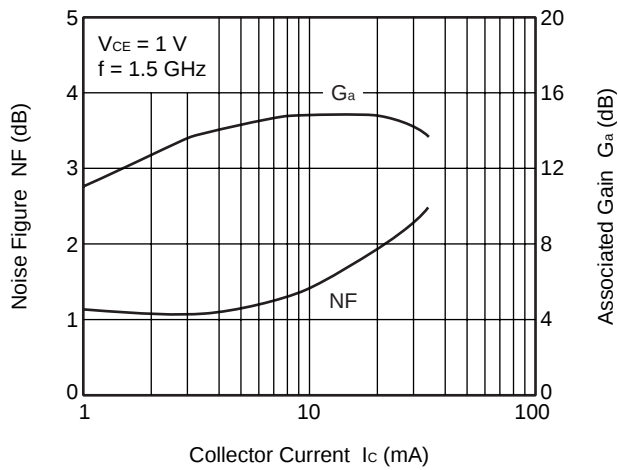
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



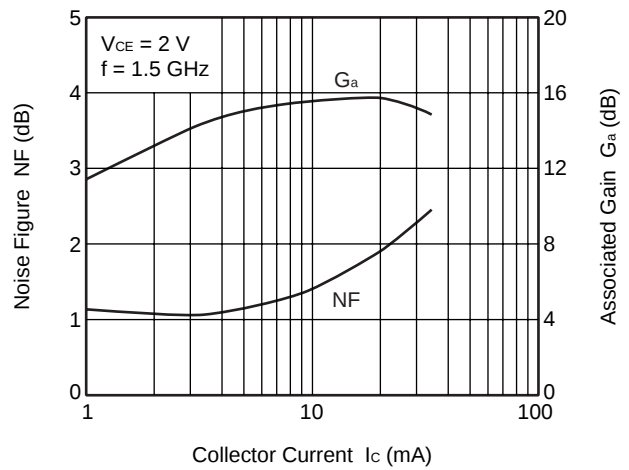
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



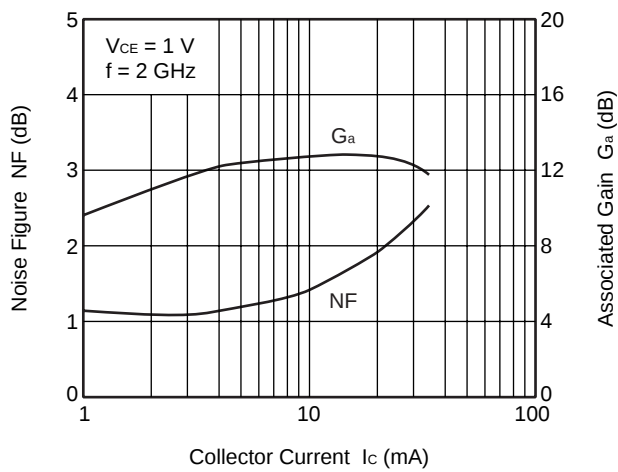
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



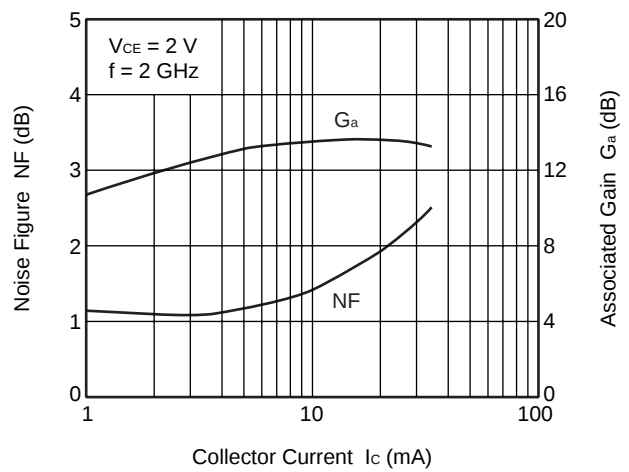
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



Remark The graphs indicate nominal characteristics.

S-PARAMETERS

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

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

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

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)	Note
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)			
0.1	0.955	-6.3	3.322	173.7	0.014	81.6	0.996	-4.5	0.096	23.77	
0.2	0.954	-11.1	3.261	168.0	0.030	82.2	0.987	-8.7	0.061	20.37	
0.3	0.942	-16.5	3.284	162.5	0.044	77.1	0.975	-13.0	0.105	18.73	
0.4	0.938	-22.0	3.227	156.6	0.057	72.9	0.964	-17.4	0.133	17.53	
0.5	0.915	-27.1	3.181	151.1	0.069	68.7	0.947	-21.6	0.170	16.61	
0.6	0.894	-32.6	3.137	145.7	0.081	65.1	0.928	-25.8	0.194	15.87	
0.7	0.871	-38.0	3.068	139.9	0.091	61.2	0.907	-29.7	0.233	15.26	
0.8	0.840	-42.9	3.024	134.8	0.101	57.8	0.884	-33.7	0.267	14.77	
0.9	0.810	-48.3	2.957	129.5	0.109	54.5	0.861	-37.6	0.300	14.33	
1.0	0.782	-53.1	2.899	124.6	0.116	51.3	0.837	-41.5	0.336	13.99	
1.1	0.758	-58.0	2.823	120.0	0.122	48.2	0.814	-45.2	0.365	13.65	
1.2	0.730	-63.3	2.763	114.9	0.126	45.6	0.788	-48.8	0.403	13.40	
1.3	0.706	-68.0	2.707	110.6	0.130	43.0	0.763	-52.4	0.435	13.18	
1.4	0.676	-72.8	2.634	106.1	0.133	40.7	0.737	-56.1	0.479	12.97	
1.5	0.652	-78.1	2.580	101.5	0.135	38.5	0.716	-59.7	0.514	12.82	
1.6	0.627	-82.7	2.504	97.2	0.136	36.7	0.694	-63.0	0.559	12.67	
1.7	0.605	-87.5	2.432	92.7	0.136	35.1	0.674	-66.3	0.607	12.54	
1.8	0.580	-93.1	2.394	89.3	0.134	33.9	0.650	-70.3	0.647	12.50	
1.9	0.558	-97.8	2.322	84.9	0.134	32.8	0.633	-73.5	0.703	12.38	
2.0	0.541	-102.5	2.257	80.9	0.133	32.4	0.615	-76.8	0.757	12.31	
2.1	0.522	-107.8	2.194	77.0	0.130	32.6	0.599	-80.3	0.813	12.26	
2.2	0.510	-112.6	2.149	73.3	0.128	33.5	0.582	-83.5	0.866	12.26	
2.3	0.500	-117.0	2.081	69.9	0.126	34.7	0.570	-86.9	0.922	12.19	
2.4	0.491	-121.6	2.026	66.1	0.124	36.2	0.558	-90.3	0.978	12.15	
2.5	0.478	-126.2	1.988	62.8	0.122	38.2	0.545	-93.9	1.036	10.94	
2.6	0.468	-131.0	1.925	59.1	0.121	40.7	0.535	-98.1	1.097	10.11	
2.7	0.459	-135.2	1.884	56.2	0.122	43.2	0.528	-101.8	1.130	9.70	
2.8	0.451	-139.9	1.836	52.9	0.125	46.2	0.524	-105.4	1.149	9.34	
2.9	0.446	-144.4	1.787	50.2	0.127	48.6	0.516	-108.8	1.175	8.94	
3.0	0.438	-149.2	1.714	46.9	0.132	51.0	0.507	-113.3	1.221	8.31	
4.0	0.508	170.4	1.357	19.9	0.248	62.1	0.525	-155.7	0.864	7.38	
5.0	0.625	141.5	1.019	-1.3	0.391	42.5	0.598	159.4	0.756	4.16	

V_{CE} = 1 V, I_C = 3 mA, Z_O = 50 Ω

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.881	-9.5	8.749	168.9	0.012	79.1	0.981	-6.9	0.177	28.48
0.2	0.868	-16.8	8.374	162.5	0.028	78.9	0.958	-13.3	0.141	24.69
0.3	0.836	-25.1	8.251	153.8	0.041	73.5	0.924	-19.6	0.205	23.09
0.4	0.802	-32.7	7.853	145.6	0.052	69.0	0.885	-25.4	0.265	21.78
0.5	0.751	-39.5	7.429	138.4	0.061	64.9	0.840	-30.7	0.329	20.83
0.6	0.704	-46.4	7.060	131.8	0.070	61.9	0.794	-35.4	0.383	20.04
0.7	0.659	-52.6	6.624	125.2	0.077	59.0	0.748	-39.7	0.443	19.35
0.8	0.609	-58.0	6.269	119.8	0.083	56.9	0.706	-43.7	0.500	18.77
0.9	0.566	-63.6	5.916	114.4	0.088	55.2	0.667	-47.1	0.555	18.27
1.0	0.523	-68.7	5.597	109.5	0.093	53.6	0.630	-50.3	0.611	17.80
1.1	0.492	-73.8	5.264	105.3	0.097	52.7	0.596	-53.3	0.658	17.34
1.2	0.458	-78.7	4.996	100.8	0.101	51.9	0.565	-56.1	0.708	16.95
1.3	0.431	-83.6	4.747	96.9	0.104	51.3	0.536	-58.9	0.752	16.57
1.4	0.403	-88.0	4.503	93.1	0.108	51.1	0.510	-61.7	0.797	16.20
1.5	0.380	-93.0	4.310	89.4	0.111	50.9	0.487	-64.5	0.833	15.88
1.6	0.357	-97.3	4.103	85.9	0.115	50.9	0.464	-67.0	0.876	15.53
1.7	0.338	-102.4	3.918	82.5	0.119	50.9	0.446	-69.5	0.909	15.19
1.8	0.320	-107.9	3.761	79.8	0.122	51.3	0.427	-72.5	0.939	14.89
1.9	0.303	-113.1	3.607	76.3	0.126	51.3	0.411	-75.0	0.968	14.56
2.0	0.296	-117.7	3.469	73.2	0.130	51.6	0.396	-77.6	0.989	14.26
2.1	0.285	-123.6	3.333	70.2	0.134	52.2	0.382	-80.4	1.011	13.32
2.2	0.280	-128.5	3.225	67.4	0.138	52.9	0.369	-83.1	1.024	12.73
2.3	0.276	-132.8	3.099	64.7	0.143	53.4	0.359	-86.1	1.040	12.14
2.4	0.271	-136.7	2.994	61.9	0.147	53.8	0.350	-89.0	1.052	11.68
2.5	0.267	-142.3	2.907	59.4	0.152	54.2	0.339	-92.3	1.060	11.30
2.6	0.263	-146.5	2.809	56.5	0.158	54.5	0.334	-95.9	1.067	10.92
2.7	0.263	-151.0	2.734	54.1	0.164	54.6	0.328	-99.7	1.065	10.67
2.8	0.260	-155.2	2.657	51.7	0.170	54.8	0.323	-103.6	1.066	10.36
2.9	0.261	-159.9	2.567	49.4	0.176	54.7	0.317	-107.3	1.072	10.00
3.0	0.258	-165.0	2.472	46.8	0.182	54.5	0.310	-112.2	1.085	9.54
4.0	0.359	160.6	1.975	24.6	0.270	51.8	0.332	-154.2	0.952	8.64
5.0	0.506	139.5	1.558	3.2	0.374	37.3	0.437	163.3	0.838	6.20

V_{CE} = 1 V, I_C = 5 mA, Z_O = 50 Ω

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.808	-12.1	12.742	166.7	0.013	77.2	0.966	-8.7	0.225	29.80
0.2	0.794	-21.0	11.967	158.1	0.027	76.7	0.929	-16.6	0.209	26.43
0.3	0.745	-30.7	11.489	147.6	0.038	71.9	0.875	-23.9	0.291	24.76
0.4	0.694	-39.5	10.618	138.4	0.048	68.0	0.817	-30.2	0.364	23.43
0.5	0.631	-46.6	9.770	130.6	0.056	64.4	0.758	-35.4	0.449	22.40
0.6	0.578	-53.6	9.019	123.8	0.064	62.2	0.700	-40.1	0.516	21.51
0.7	0.524	-59.7	8.263	117.6	0.069	60.3	0.647	-43.7	0.588	20.75
0.8	0.474	-64.9	7.672	112.1	0.075	59.4	0.602	-47.1	0.650	20.10
0.9	0.434	-70.2	7.110	107.2	0.080	58.5	0.563	-49.9	0.705	19.48
1.0	0.395	-75.6	6.612	102.7	0.085	58.0	0.527	-52.6	0.755	18.91
1.1	0.368	-80.0	6.156	98.8	0.090	57.6	0.494	-55.0	0.800	18.35
1.2	0.338	-84.9	5.782	94.9	0.095	57.5	0.466	-57.2	0.843	17.87
1.3	0.316	-89.4	5.448	91.4	0.100	57.6	0.441	-59.3	0.875	17.38
1.4	0.292	-94.2	5.129	87.9	0.104	57.4	0.418	-61.9	0.909	16.91
1.5	0.275	-99.5	4.870	84.7	0.109	57.5	0.399	-64.0	0.934	16.50
1.6	0.257	-103.5	4.611	81.6	0.114	57.6	0.381	-66.3	0.960	16.06
1.7	0.243	-108.9	4.384	78.8	0.120	57.5	0.365	-68.5	0.978	15.64
1.8	0.231	-114.9	4.189	76.2	0.125	57.6	0.348	-71.2	0.995	15.25
1.9	0.219	-121.0	4.009	73.3	0.131	57.5	0.336	-73.6	1.008	14.33
2.0	0.215	-125.5	3.845	70.5	0.136	57.4	0.322	-75.9	1.019	13.67
2.1	0.208	-132.0	3.682	67.9	0.142	57.6	0.310	-78.7	1.029	13.09
2.2	0.208	-137.4	3.558	65.3	0.148	57.6	0.299	-81.4	1.032	12.72
2.3	0.208	-142.1	3.408	63.0	0.153	57.5	0.290	-84.4	1.040	12.24
2.4	0.204	-146.1	3.286	60.5	0.160	57.4	0.283	-87.3	1.045	11.84
2.5	0.204	-151.6	3.188	58.3	0.166	57.2	0.274	-90.7	1.047	11.51
2.6	0.204	-155.6	3.074	55.5	0.172	56.8	0.269	-94.4	1.049	11.16
2.7	0.206	-160.9	2.985	53.5	0.179	56.4	0.263	-98.6	1.048	10.88
2.8	0.208	-164.6	2.900	51.2	0.186	56.1	0.259	-103.0	1.046	10.62
2.9	0.213	-169.5	2.802	49.3	0.192	55.5	0.253	-107.0	1.049	10.29
3.0	0.211	-175.0	2.693	46.8	0.199	54.8	0.247	-112.5	1.060	9.82
4.0	0.325	154.2	2.151	26.6	0.281	49.0	0.272	-157.1	0.970	8.83
5.0	0.469	136.8	1.725	6.4	0.372	35.1	0.377	161.5	0.882	6.66

V_{CE} = 1 V, I_C = 7 mA, Z_O = 50 Ω

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.764	-14.0	15.802	165.0	0.012	78.0	0.954	-10.1	0.231	31.24
0.2	0.736	-23.9	14.611	154.6	0.027	76.5	0.903	-18.9	0.258	27.41
0.3	0.673	-34.8	13.702	143.2	0.037	71.4	0.834	-26.9	0.355	25.72
0.4	0.612	-43.9	12.369	133.5	0.046	67.8	0.765	-33.2	0.444	24.32
0.5	0.546	-51.3	11.152	125.6	0.053	65.0	0.697	-38.3	0.533	23.26
0.6	0.488	-58.1	10.136	119.0	0.060	63.4	0.636	-42.5	0.607	22.29
0.7	0.441	-64.1	9.142	112.8	0.066	62.6	0.582	-45.7	0.677	21.44
0.8	0.392	-69.2	8.390	107.7	0.071	61.8	0.539	-48.5	0.738	20.71
0.9	0.357	-74.2	7.708	103.0	0.077	61.3	0.500	-50.8	0.790	20.02
1.0	0.320	-79.1	7.125	98.9	0.082	61.2	0.467	-53.0	0.837	19.39
1.1	0.297	-83.4	6.591	95.3	0.088	61.2	0.439	-55.0	0.872	18.77
1.2	0.269	-88.3	6.150	91.6	0.093	61.0	0.414	-56.8	0.907	18.22
1.3	0.253	-93.1	5.764	88.4	0.098	61.2	0.392	-58.9	0.931	17.68
1.4	0.232	-97.9	5.412	85.4	0.104	61.0	0.371	-61.1	0.955	17.15
1.5	0.220	-103.2	5.128	82.3	0.110	60.9	0.354	-63.1	0.971	16.69
1.6	0.205	-107.7	4.841	79.5	0.116	60.9	0.338	-65.2	0.991	16.22
1.7	0.196	-113.7	4.609	76.7	0.122	60.7	0.323	-67.3	1.001	15.62
1.8	0.186	-120.5	4.385	74.4	0.128	60.6	0.309	-69.9	1.011	14.71
1.9	0.175	-127.5	4.190	71.7	0.135	60.2	0.297	-72.3	1.020	14.07
2.0	0.174	-131.7	4.020	69.1	0.141	59.8	0.284	-74.7	1.026	13.58
2.1	0.172	-139.3	3.842	66.7	0.147	59.7	0.274	-77.4	1.032	13.08
2.2	0.174	-145.0	3.708	64.4	0.153	59.6	0.264	-80.2	1.033	12.73
2.3	0.176	-149.3	3.551	62.1	0.160	59.3	0.256	-83.2	1.037	12.29
2.4	0.177	-153.7	3.422	59.7	0.166	58.7	0.249	-86.3	1.039	11.93
2.5	0.178	-158.9	3.314	57.7	0.173	58.4	0.241	-89.7	1.040	11.61
2.6	0.177	-163.4	3.186	55.0	0.180	57.7	0.236	-93.7	1.044	11.21
2.7	0.183	-167.9	3.101	53.1	0.187	57.1	0.231	-98.1	1.039	10.99
2.8	0.184	-172.4	3.009	50.9	0.194	56.5	0.226	-102.9	1.039	10.70
2.9	0.192	-176.5	2.910	49.1	0.200	55.8	0.222	-107.3	1.040	10.40
3.0	0.191	177.4	2.795	46.7	0.207	54.9	0.215	-113.2	1.051	9.93
4.0	0.311	150.1	2.231	27.6	0.288	47.7	0.243	-160.1	0.977	8.90
5.0	0.455	134.5	1.794	8.1	0.373	33.9	0.349	159.3	0.905	6.82

V_{CE} = 1 V, I_C = 10 mA, Z_O = 50 Ω

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.704	-15.1	19.149	162.9	0.012	76.4	0.938	-11.7	0.291	31.94
0.2	0.657	-27.9	17.352	150.9	0.025	75.6	0.869	-21.6	0.317	28.47
0.3	0.588	-39.1	15.831	138.6	0.035	71.1	0.786	-29.9	0.432	26.61
0.4	0.525	-48.7	13.968	128.6	0.043	68.1	0.706	-36.2	0.528	25.12
0.5	0.457	-55.9	12.321	120.8	0.050	66.0	0.634	-40.7	0.626	23.94
0.6	0.405	-62.5	11.025	114.4	0.057	65.3	0.572	-44.3	0.697	22.90
0.7	0.357	-68.0	9.834	108.5	0.062	64.7	0.521	-47.0	0.767	21.97
0.8	0.317	-72.9	8.933	103.8	0.069	64.5	0.479	-49.3	0.819	21.15
0.9	0.285	-77.8	8.157	99.4	0.074	64.5	0.445	-51.1	0.861	20.40
1.0	0.255	-82.8	7.489	95.6	0.080	64.2	0.416	-52.9	0.898	19.69
1.1	0.235	-87.2	6.894	92.2	0.087	64.3	0.390	-54.6	0.926	19.01
1.2	0.212	-92.7	6.421	88.9	0.092	64.2	0.368	-56.1	0.952	18.42
1.3	0.200	-97.4	6.006	86.0	0.099	64.1	0.349	-57.8	0.968	17.85
1.4	0.184	-102.7	5.617	83.2	0.105	64.0	0.331	-59.9	0.985	17.28
1.5	0.172	-108.5	5.314	80.1	0.111	63.7	0.316	-61.9	0.996	16.79
1.6	0.161	-114.2	5.018	77.7	0.118	63.4	0.301	-63.9	1.008	15.76
1.7	0.155	-120.2	4.755	75.2	0.125	63.1	0.289	-66.0	1.015	15.07
1.8	0.148	-128.0	4.516	72.9	0.131	62.8	0.276	-68.4	1.022	14.45
1.9	0.143	-135.1	4.323	70.3	0.138	62.1	0.265	-71.0	1.026	13.97
2.0	0.146	-141.1	4.142	67.8	0.145	61.6	0.253	-73.5	1.027	13.55
2.1	0.145	-148.8	3.955	65.5	0.152	61.3	0.244	-76.3	1.032	13.06
2.2	0.151	-153.6	3.809	63.3	0.159	60.9	0.235	-79.1	1.031	12.73
2.3	0.154	-158.4	3.646	61.2	0.165	60.4	0.227	-82.3	1.035	12.29
2.4	0.156	-162.2	3.514	58.9	0.172	59.7	0.220	-85.5	1.035	11.95
2.5	0.161	-168.0	3.398	56.9	0.179	59.1	0.213	-89.2	1.035	11.64
2.6	0.163	-171.8	3.272	54.4	0.186	58.3	0.209	-93.3	1.036	11.28
2.7	0.170	-176.0	3.182	52.7	0.193	57.5	0.203	-98.2	1.033	11.05
2.8	0.172	179.8	3.083	50.6	0.201	56.8	0.200	-103.4	1.033	10.75
2.9	0.178	176.0	2.978	48.8	0.207	55.9	0.195	-108.3	1.035	10.43
3.0	0.181	170.1	2.862	46.6	0.214	54.8	0.190	-114.8	1.044	9.99
4.0	0.306	145.7	2.277	28.2	0.293	46.6	0.222	-164.0	0.983	8.90
5.0	0.448	132.4	1.838	9.4	0.374	32.7	0.330	156.5	0.920	6.91

V_{CE} = 1 V, I_C = 20 mA, Z_o = 50 Ω

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.547	-20.1	24.880	158.9	0.011	77.4	0.890	-14.6	0.394	33.48
0.2	0.501	-35.2	21.478	143.9	0.023	73.9	0.792	-26.3	0.466	29.63
0.3	0.428	-48.8	18.648	130.7	0.032	71.5	0.686	-34.7	0.581	27.66
0.4	0.366	-58.6	15.760	120.7	0.040	69.9	0.598	-40.2	0.684	25.97
0.5	0.310	-65.9	13.527	113.4	0.046	68.8	0.527	-43.8	0.773	24.65
0.6	0.269	-72.8	11.828	107.5	0.054	68.9	0.471	-46.3	0.832	23.44
0.7	0.234	-78.0	10.384	102.3	0.060	68.8	0.426	-48.2	0.887	22.38
0.8	0.204	-84.1	9.359	98.0	0.067	68.9	0.391	-49.6	0.921	21.46
0.9	0.181	-89.6	8.456	94.2	0.074	68.9	0.363	-50.8	0.950	20.60
1.0	0.159	-97.3	7.721	90.7	0.080	68.7	0.340	-52.2	0.970	19.82
1.1	0.149	-102.3	7.095	87.8	0.087	68.5	0.320	-53.5	0.986	19.10
1.2	0.138	-109.6	6.561	84.8	0.094	68.2	0.303	-54.9	0.999	18.43
1.3	0.130	-116.0	6.125	82.0	0.101	67.8	0.287	-56.5	1.008	17.28
1.4	0.123	-123.0	5.715	79.5	0.109	67.4	0.273	-58.5	1.016	16.44
1.5	0.121	-132.0	5.379	76.9	0.116	66.8	0.261	-60.5	1.020	15.80
1.6	0.115	-138.2	5.071	74.3	0.123	66.3	0.249	-62.7	1.027	15.15
1.7	0.117	-146.2	4.810	72.0	0.130	65.7	0.238	-64.9	1.029	14.64
1.8	0.119	-153.5	4.559	70.2	0.137	65.1	0.227	-67.5	1.032	14.10
1.9	0.122	-162.7	4.346	67.7	0.145	64.2	0.218	-70.5	1.032	13.66
2.0	0.130	-167.1	4.162	65.4	0.153	63.5	0.208	-73.1	1.031	13.28
2.1	0.137	-173.6	3.971	63.2	0.160	62.8	0.199	-76.3	1.033	12.84
2.2	0.145	-176.3	3.825	61.2	0.167	62.2	0.191	-79.6	1.030	12.52
2.3	0.153	-179.9	3.653	59.2	0.175	61.4	0.184	-83.5	1.032	12.10
2.4	0.157	177.3	3.515	57.0	0.182	60.5	0.179	-87.1	1.032	11.75
2.5	0.164	173.3	3.399	55.2	0.189	59.6	0.173	-91.4	1.031	11.46
2.6	0.170	170.2	3.272	52.8	0.197	58.6	0.170	-96.4	1.031	11.12
2.7	0.177	166.7	3.179	51.1	0.204	57.5	0.165	-102.2	1.029	10.87
2.8	0.181	163.9	3.075	49.2	0.212	56.7	0.163	-108.5	1.030	10.56
2.9	0.191	161.2	2.974	47.4	0.219	55.6	0.160	-114.4	1.030	10.27
3.0	0.197	155.6	2.855	45.3	0.225	54.4	0.157	-122.0	1.038	9.83
4.0	0.326	138.6	2.262	27.7	0.304	44.8	0.207	-174.0	0.987	8.72
5.0	0.461	127.3	1.827	9.7	0.379	30.8	0.319	149.9	0.938	6.83

V_{CE} = 2 V, I_C = 1 mA, Z_o = 50 Ω

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.949	-6.3	3.349	174.1	0.012	80.3	0.996	-4.1	0.114	24.51
0.2	0.958	-10.6	3.284	168.2	0.026	81.2	0.990	-8.1	0.084	21.09
0.3	0.950	-15.5	3.307	163.3	0.038	77.8	0.978	-12.2	0.101	19.34
0.4	0.942	-20.6	3.253	157.6	0.050	73.6	0.967	-16.3	0.134	18.11
0.5	0.921	-25.6	3.217	152.2	0.061	69.7	0.953	-20.2	0.168	17.20
0.6	0.899	-30.9	3.173	147.0	0.072	66.2	0.934	-24.2	0.193	16.45
0.7	0.878	-36.0	3.116	141.3	0.081	62.8	0.914	-27.9	0.229	15.86
0.8	0.853	-40.6	3.076	136.5	0.089	59.4	0.894	-31.6	0.262	15.38
0.9	0.822	-45.5	3.012	131.4	0.096	56.3	0.874	-35.3	0.296	14.95
1.0	0.794	-50.1	2.954	126.6	0.102	53.2	0.849	-39.0	0.333	14.60
1.1	0.771	-55.0	2.881	122.1	0.108	50.4	0.827	-42.6	0.361	14.27
1.2	0.741	-59.8	2.828	117.2	0.112	47.9	0.803	-46.0	0.402	14.04
1.3	0.720	-64.7	2.774	112.9	0.115	45.4	0.781	-49.4	0.429	13.82
1.4	0.692	-69.1	2.707	108.6	0.118	43.4	0.758	-53.0	0.470	13.62
1.5	0.669	-74.0	2.655	103.9	0.119	41.4	0.736	-56.2	0.512	13.49
1.6	0.639	-78.5	2.581	99.7	0.120	39.9	0.715	-59.6	0.561	13.33
1.7	0.619	-83.2	2.508	95.4	0.120	38.5	0.695	-62.7	0.606	13.20
1.8	0.597	-88.5	2.479	92.1	0.119	37.7	0.673	-66.4	0.644	13.20
1.9	0.570	-92.8	2.402	87.6	0.118	37.0	0.656	-69.5	0.709	13.08
2.0	0.554	-97.6	2.345	83.5	0.117	36.9	0.638	-72.5	0.762	13.02
2.1	0.535	-102.7	2.282	79.6	0.115	37.7	0.622	-75.8	0.821	12.98
2.2	0.519	-107.2	2.236	76.0	0.113	39.1	0.606	-79.0	0.879	12.97
2.3	0.508	-111.5	2.175	72.5	0.111	40.8	0.593	-82.2	0.933	12.92
2.4	0.498	-115.8	2.115	68.8	0.110	43.0	0.582	-85.5	0.988	12.84
2.5	0.484	-120.5	2.078	65.5	0.109	45.5	0.567	-88.9	1.045	11.49
2.6	0.473	-124.6	2.016	61.8	0.109	48.7	0.557	-92.7	1.098	10.74
2.7	0.465	-129.4	1.976	58.9	0.112	51.6	0.551	-96.4	1.111	10.45
2.8	0.453	-133.7	1.931	55.6	0.116	55.0	0.546	-99.9	1.120	10.11
2.9	0.448	-138.2	1.874	52.9	0.120	57.6	0.539	-103.1	1.135	9.70
3.0	0.437	-143.0	1.805	49.6	0.126	60.1	0.528	-107.5	1.167	9.09
4.0	0.497	175.7	1.439	22.2	0.256	68.2	0.538	-148.9	0.793	7.51
5.0	0.620	145.0	1.080	-0.3	0.406	45.8	0.607	164.1	0.705	4.25

V_{CE} = 2 V, I_C = 3 mA, Z_O = 50 Ω

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.883	-9.0	8.743	169.2	0.012	78.7	0.984	-6.3	0.189	28.61
0.2	0.876	-15.5	8.392	163.3	0.025	78.9	0.963	-12.1	0.148	25.31
0.3	0.847	-23.1	8.290	154.9	0.036	74.4	0.932	-17.8	0.208	23.64
0.4	0.814	-30.2	7.918	147.1	0.046	70.6	0.898	-23.2	0.257	22.34
0.5	0.768	-36.6	7.557	140.2	0.055	66.6	0.858	-28.0	0.323	21.40
0.6	0.723	-42.9	7.176	133.6	0.062	63.7	0.814	-32.4	0.377	20.60
0.7	0.677	-48.6	6.752	127.2	0.069	61.0	0.773	-36.3	0.438	19.90
0.8	0.634	-53.5	6.441	121.8	0.074	59.0	0.733	-39.8	0.495	19.37
0.9	0.589	-58.4	6.083	116.8	0.079	57.5	0.695	-43.2	0.549	18.85
1.0	0.548	-63.2	5.767	111.9	0.083	56.1	0.661	-46.2	0.603	18.40
1.1	0.514	-67.6	5.454	107.5	0.087	55.2	0.627	-48.9	0.656	17.95
1.2	0.480	-72.5	5.171	103.1	0.091	54.5	0.597	-51.4	0.704	17.54
1.3	0.454	-76.4	4.932	99.3	0.094	54.1	0.570	-54.1	0.746	17.18
1.4	0.425	-80.4	4.701	95.5	0.098	53.9	0.544	-56.7	0.791	16.82
1.5	0.399	-85.0	4.496	91.6	0.101	54.0	0.522	-59.0	0.832	16.49
1.6	0.375	-88.8	4.282	88.3	0.104	54.1	0.499	-61.4	0.873	16.13
1.7	0.354	-93.2	4.100	84.9	0.108	54.4	0.481	-63.7	0.906	15.80
1.8	0.334	-97.9	3.940	82.2	0.111	54.9	0.463	-66.2	0.937	15.51
1.9	0.314	-102.6	3.786	78.8	0.115	55.1	0.448	-68.5	0.964	15.17
2.0	0.304	-106.9	3.647	75.7	0.119	55.7	0.432	-70.8	0.984	14.86
2.1	0.290	-111.9	3.513	72.6	0.123	56.3	0.418	-73.2	1.006	14.09
2.2	0.283	-116.8	3.399	69.9	0.127	57.3	0.406	-75.8	1.018	13.44
2.3	0.279	-121.0	3.268	67.1	0.131	57.9	0.395	-78.4	1.031	12.87
2.4	0.270	-124.5	3.160	64.3	0.136	58.5	0.386	-81.0	1.042	12.40
2.5	0.264	-129.6	3.070	61.8	0.141	59.0	0.376	-83.8	1.048	12.02
2.6	0.259	-133.6	2.968	58.9	0.147	59.5	0.369	-87.1	1.052	11.65
2.7	0.254	-138.0	2.894	56.7	0.153	59.6	0.362	-90.6	1.051	11.39
2.8	0.251	-142.4	2.813	54.2	0.160	59.9	0.357	-94.1	1.047	11.14
2.9	0.248	-147.0	2.723	52.0	0.166	59.9	0.350	-97.3	1.050	10.78
3.0	0.244	-152.3	2.622	49.2	0.173	59.6	0.341	-101.9	1.060	10.31
4.0	0.332	169.7	2.117	27.0	0.266	57.4	0.349	-142.1	0.912	9.02
5.0	0.491	145.8	1.684	4.7	0.379	41.8	0.443	172.5	0.790	6.48

V_{CE} = 2 V, I_C = 5 mA, Z_O = 50 Ω

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.836	-10.9	12.756	167.2	0.012	77.0	0.971	-7.7	0.234	30.29
0.2	0.802	-18.8	12.044	159.0	0.023	78.1	0.938	-14.9	0.206	27.11
0.3	0.761	-28.1	11.614	149.1	0.034	73.4	0.889	-21.5	0.284	25.33
0.4	0.714	-35.6	10.808	140.2	0.043	69.5	0.837	-27.3	0.362	24.03
0.5	0.658	-42.2	9.995	132.8	0.050	66.2	0.782	-32.1	0.441	23.00
0.6	0.601	-48.5	9.266	126.0	0.057	64.0	0.730	-36.2	0.511	22.12
0.7	0.547	-54.0	8.532	119.5	0.062	62.6	0.679	-39.7	0.584	21.36
0.8	0.503	-58.8	7.960	114.4	0.068	61.6	0.636	-42.6	0.642	20.70
0.9	0.460	-63.2	7.386	109.4	0.072	61.0	0.597	-45.1	0.700	20.08
1.0	0.423	-67.3	6.901	104.9	0.077	60.4	0.564	-47.5	0.751	19.53
1.1	0.391	-71.4	6.442	100.9	0.082	60.2	0.533	-49.7	0.795	18.97
1.2	0.359	-75.4	6.048	97.0	0.086	60.0	0.506	-51.6	0.840	18.49
1.3	0.337	-79.1	5.712	93.7	0.090	60.1	0.482	-53.6	0.871	18.00
1.4	0.312	-82.9	5.396	90.3	0.095	60.3	0.459	-55.6	0.904	17.53
1.5	0.291	-87.2	5.127	87.0	0.100	60.4	0.440	-57.6	0.930	17.12
1.6	0.272	-90.8	4.851	84.0	0.104	60.6	0.422	-59.7	0.956	16.67
1.7	0.256	-95.4	4.613	81.1	0.109	60.7	0.407	-61.4	0.975	16.25
1.8	0.239	-100.0	4.425	78.7	0.115	61.0	0.390	-63.6	0.991	15.87
1.9	0.224	-105.2	4.238	75.7	0.120	60.9	0.377	-65.7	1.004	15.09
2.0	0.218	-109.6	4.071	72.9	0.126	60.9	0.364	-67.7	1.012	14.44
2.1	0.207	-115.1	3.904	70.3	0.131	61.2	0.352	-70.0	1.022	13.83
2.2	0.205	-120.4	3.774	67.8	0.137	61.4	0.341	-72.4	1.023	13.48
2.3	0.202	-124.7	3.620	65.4	0.142	61.6	0.332	-74.9	1.030	12.99
2.4	0.197	-129.0	3.495	62.9	0.148	61.4	0.324	-77.4	1.034	12.60
2.5	0.194	-133.7	3.390	60.7	0.154	61.3	0.315	-80.2	1.035	12.28
2.6	0.191	-138.6	3.272	58.1	0.161	61.1	0.309	-83.4	1.036	11.93
2.7	0.188	-143.2	3.183	56.0	0.167	60.8	0.303	-86.9	1.034	11.67
2.8	0.187	-147.6	3.088	53.8	0.174	60.5	0.297	-90.7	1.032	11.39
2.9	0.187	-152.2	2.991	51.8	0.181	60.0	0.290	-94.2	1.033	11.07
3.0	0.186	-158.4	2.882	49.3	0.188	59.3	0.282	-99.1	1.040	10.64
4.0	0.285	164.2	2.321	29.1	0.273	54.2	0.284	-141.0	0.942	9.29
5.0	0.442	144.2	1.878	8.1	0.373	39.6	0.377	173.4	0.843	7.02

V_{CE} = 2 V, I_C = 7 mA, Z_O = 50 Ω

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.783	-11.7	15.876	165.6	0.012	80.1	0.961	-9.0	0.222	31.22
0.2	0.749	-21.4	14.757	155.8	0.023	76.3	0.916	-16.9	0.268	28.07
0.3	0.694	-30.8	13.937	145.0	0.032	73.4	0.854	-24.0	0.348	26.33
0.4	0.634	-39.2	12.673	135.4	0.041	69.3	0.791	-29.8	0.441	24.94
0.5	0.572	-45.5	11.501	127.6	0.047	66.8	0.727	-34.3	0.532	23.87
0.6	0.519	-51.7	10.499	121.1	0.054	65.5	0.672	-38.2	0.598	22.90
0.7	0.467	-56.7	9.521	115.0	0.059	64.3	0.620	-41.1	0.675	22.08
0.8	0.423	-61.3	8.773	109.9	0.064	64.1	0.578	-43.4	0.730	21.34
0.9	0.383	-64.9	8.079	105.3	0.069	63.6	0.541	-45.4	0.786	20.66
1.0	0.346	-68.7	7.474	101.0	0.074	63.6	0.510	-47.4	0.832	20.03
1.1	0.320	-72.0	6.943	97.4	0.080	63.5	0.480	-49.1	0.869	19.41
1.2	0.292	-76.2	6.485	93.8	0.084	63.6	0.456	-50.5	0.904	18.86
1.3	0.273	-79.8	6.096	90.7	0.090	63.7	0.436	-52.2	0.925	18.32
1.4	0.251	-83.2	5.724	87.7	0.095	63.8	0.416	-54.1	0.951	17.79
1.5	0.236	-87.4	5.433	84.6	0.100	63.8	0.398	-55.9	0.967	17.34
1.6	0.217	-90.7	5.142	81.8	0.106	63.8	0.383	-57.6	0.986	16.86
1.7	0.206	-95.5	4.883	79.0	0.112	63.7	0.369	-59.4	0.996	16.41
1.8	0.192	-100.7	4.657	76.8	0.118	63.8	0.355	-61.4	1.006	15.51
1.9	0.178	-106.1	4.458	74.1	0.124	63.4	0.343	-63.5	1.013	14.86
2.0	0.172	-111.0	4.275	71.5	0.130	63.2	0.331	-65.4	1.019	14.34
2.1	0.164	-117.6	4.092	69.0	0.136	63.3	0.320	-67.6	1.025	13.82
2.2	0.164	-122.6	3.954	66.7	0.142	63.2	0.310	-69.9	1.023	13.51
2.3	0.161	-127.4	3.790	64.5	0.148	62.9	0.302	-72.4	1.028	13.05
2.4	0.162	-131.5	3.659	62.2	0.155	62.6	0.294	-75.0	1.027	12.73
2.5	0.157	-137.1	3.542	60.2	0.161	62.2	0.286	-77.8	1.029	12.38
2.6	0.155	-142.3	3.416	57.6	0.168	61.7	0.280	-81.1	1.030	12.03
2.7	0.157	-146.6	3.324	55.7	0.174	61.2	0.274	-84.6	1.026	11.81
2.8	0.156	-152.2	3.228	53.6	0.182	60.8	0.268	-88.6	1.024	11.55
2.9	0.158	-156.8	3.123	51.7	0.188	60.0	0.261	-92.3	1.026	11.21
3.0	0.157	-163.9	3.007	49.4	0.195	59.1	0.252	-97.4	1.033	10.77
4.0	0.263	160.3	2.416	30.2	0.278	52.8	0.253	-141.1	0.955	9.39
5.0	0.421	142.8	1.966	10.1	0.372	38.5	0.343	172.9	0.869	7.23

V_{CE} = 2 V, I_C = 10 mA, Z_O = 50 Ω

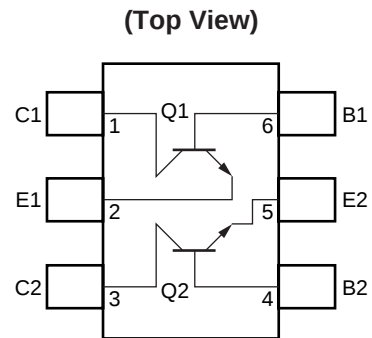
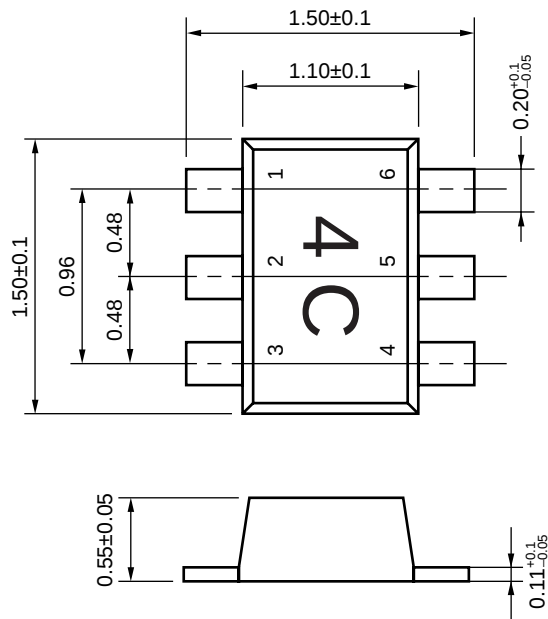
Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.728	-13.6	19.317	163.6	0.010	85.0	0.947	-10.2	0.193	32.74
0.2	0.682	-24.1	17.623	152.2	0.022	76.8	0.888	-19.1	0.316	29.06
0.3	0.615	-34.4	16.228	140.4	0.031	72.6	0.812	-26.5	0.427	27.23
0.4	0.554	-42.6	14.421	130.8	0.038	69.9	0.740	-32.0	0.523	25.75
0.5	0.489	-48.8	12.834	122.9	0.045	68.3	0.672	-36.2	0.616	24.60
0.6	0.435	-54.2	11.534	116.5	0.051	67.2	0.613	-39.3	0.691	23.55
0.7	0.390	-58.4	10.320	110.7	0.056	66.9	0.565	-41.6	0.758	22.63
0.8	0.345	-61.9	9.420	106.0	0.062	66.6	0.524	-43.6	0.814	21.82
0.9	0.311	-65.8	8.618	101.6	0.067	66.6	0.491	-45.2	0.857	21.08
1.0	0.281	-69.9	7.927	97.7	0.073	66.6	0.463	-46.5	0.891	20.37
1.1	0.260	-72.3	7.332	94.5	0.079	66.6	0.437	-47.8	0.920	19.70
1.2	0.237	-76.0	6.820	91.2	0.084	66.7	0.417	-49.2	0.946	19.10
1.3	0.221	-79.2	6.397	88.2	0.090	66.7	0.398	-50.6	0.962	18.53
1.4	0.203	-83.2	5.982	85.4	0.096	66.6	0.381	-52.3	0.978	17.95
1.5	0.187	-87.2	5.670	82.6	0.102	66.6	0.366	-53.8	0.989	17.46
1.6	0.171	-90.7	5.347	79.9	0.108	66.3	0.352	-55.4	1.004	16.59
1.7	0.161	-95.5	5.076	77.5	0.114	66.1	0.340	-57.1	1.010	15.89
1.8	0.151	-101.3	4.833	75.3	0.120	65.9	0.327	-59.1	1.015	15.29
1.9	0.140	-107.7	4.620	72.7	0.127	65.3	0.317	-61.1	1.018	14.78
2.0	0.138	-113.1	4.433	70.3	0.134	64.9	0.305	-63.0	1.019	14.35
2.1	0.131	-120.9	4.243	68.0	0.140	64.7	0.295	-65.2	1.023	13.89
2.2	0.131	-126.3	4.092	65.8	0.147	64.4	0.286	-67.5	1.022	13.55
2.3	0.132	-131.6	3.917	63.8	0.153	64.0	0.278	-69.9	1.025	13.12
2.4	0.131	-135.9	3.777	61.6	0.160	63.4	0.271	-72.5	1.025	12.77
2.5	0.132	-141.8	3.661	59.6	0.166	62.9	0.263	-75.4	1.023	12.50
2.6	0.131	-147.5	3.526	57.2	0.173	62.1	0.257	-78.8	1.024	12.14
2.7	0.134	-152.8	3.430	55.3	0.180	61.5	0.251	-82.5	1.020	11.93
2.8	0.133	-156.8	3.326	53.3	0.188	60.8	0.245	-86.6	1.019	11.63
2.9	0.136	-162.9	3.218	51.5	0.194	60.0	0.238	-90.5	1.021	11.31
3.0	0.138	-169.9	3.095	49.3	0.201	59.0	0.229	-95.9	1.027	10.86
4.0	0.250	157.0	2.490	31.0	0.282	51.7	0.227	-141.7	0.962	9.46
5.0	0.406	141.0	2.032	11.8	0.371	37.4	0.317	171.9	0.889	7.38

$V_{CE} = 2 \text{ V}$, $I_C = 20 \text{ mA}$, $Z_0 = 50 \Omega$

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.590	-15.7	25.430	160.0	0.011	79.0	0.915	-12.3	0.360	33.83
0.2	0.536	-29.0	22.234	145.8	0.020	76.1	0.830	-22.5	0.445	30.39
0.3	0.469	-39.3	19.543	133.1	0.028	73.6	0.733	-29.8	0.569	28.45
0.4	0.403	-46.9	16.685	123.2	0.035	72.2	0.651	-34.6	0.673	26.77
0.5	0.350	-52.9	14.440	115.8	0.041	71.0	0.583	-37.6	0.760	25.48
0.6	0.305	-57.4	12.702	110.0	0.047	71.3	0.528	-39.6	0.822	24.29
0.7	0.266	-61.1	11.192	104.7	0.053	71.2	0.486	-40.9	0.875	23.21
0.8	0.235	-64.5	10.105	100.5	0.060	71.3	0.452	-42.0	0.910	22.29
0.9	0.214	-66.8	9.165	96.6	0.066	71.3	0.425	-42.9	0.939	21.45
1.0	0.186	-69.6	8.370	93.2	0.072	71.1	0.403	-43.9	0.962	20.66
1.1	0.173	-72.5	7.703	90.2	0.079	71.1	0.384	-44.7	0.976	19.92
1.2	0.154	-76.7	7.119	87.3	0.084	70.9	0.367	-45.8	0.992	19.26
1.3	0.145	-80.2	6.663	84.7	0.091	70.6	0.353	-47.0	0.999	18.65
1.4	0.130	-84.2	6.225	82.1	0.098	70.3	0.339	-48.5	1.008	17.50
1.5	0.120	-89.9	5.873	79.5	0.104	69.9	0.327	-50.0	1.013	16.82
1.6	0.110	-93.4	5.538	77.2	0.111	69.4	0.316	-51.6	1.018	16.15
1.7	0.103	-100.6	5.259	74.9	0.118	68.9	0.305	-53.3	1.018	15.66
1.8	0.098	-108.1	4.991	73.0	0.125	68.5	0.295	-55.2	1.021	15.13
1.9	0.088	-117.3	4.776	70.6	0.132	67.7	0.286	-57.3	1.021	14.70
2.0	0.090	-122.7	4.562	68.4	0.139	67.0	0.275	-59.2	1.021	14.26
2.1	0.089	-134.1	4.364	66.2	0.146	66.5	0.266	-61.5	1.021	13.86
2.2	0.095	-140.5	4.208	64.3	0.153	66.0	0.258	-63.8	1.018	13.57
2.3	0.098	-146.7	4.025	62.3	0.160	65.4	0.250	-66.4	1.020	13.15
2.4	0.101	-151.5	3.882	60.3	0.167	64.6	0.244	-69.1	1.018	12.83
2.5	0.103	-158.8	3.751	58.5	0.174	63.8	0.237	-72.0	1.018	12.52
2.6	0.105	-162.8	3.613	56.2	0.181	62.8	0.231	-75.6	1.018	12.18
2.7	0.112	-167.9	3.509	54.4	0.188	61.9	0.224	-79.6	1.015	11.96
2.8	0.114	-172.6	3.412	52.6	0.196	61.1	0.218	-84.2	1.013	11.71
2.9	0.121	-177.1	3.294	50.8	0.203	60.1	0.211	-88.3	1.014	11.38
3.0	0.126	175.3	3.170	48.7	0.210	59.0	0.202	-94.1	1.020	10.94
4.0	0.248	149.7	2.543	31.4	0.290	50.5	0.202	-143.6	0.967	9.43
5.0	0.403	136.9	2.078	12.9	0.375	36.1	0.291	169.3	0.907	7.44

PACKAGE DIMENSIONS

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



PIN CONNECTIONS

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

[MEMO]

- **The information in this document is current as of February, 2001. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC's data sheets or data books, etc., for the most up-to-date specifications of NEC semiconductor products. Not all products and/or types are available in every country. Please check with an NEC sales representative for availability and additional information.**
- No part of this document may be copied or reproduced in any form or by any means without prior written consent of NEC. NEC assumes no responsibility for any errors that may appear in this document.
- NEC does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from the use of NEC semiconductor products listed in this document or any other liability arising from the use of such products. No license, express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC or others.
- Descriptions of circuits, software and other related information in this document are provided for illustrative purposes in semiconductor product operation and application examples. The incorporation of these circuits, software and information in the design of customer's equipment shall be done under the full responsibility of customer. NEC assumes no responsibility for any losses incurred by customers or third parties arising from the use of these circuits, software and information.
- While NEC endeavours to enhance the quality, reliability and safety of NEC semiconductor products, customers agree and acknowledge that the possibility of defects thereof cannot be eliminated entirely. To minimize risks of damage to property or injury (including death) to persons arising from defects in NEC semiconductor products, customers must incorporate sufficient safety measures in their design, such as redundancy, fire-containment, and anti-failure features.
- NEC semiconductor products are classified into the following three quality grades:
 "Standard", "Special" and "Specific". The "Specific" quality grade applies only to semiconductor products developed based on a customer-designated "quality assurance program" for a specific application. The recommended applications of a semiconductor product depend on its quality grade, as indicated below. Customers must check the quality grade of each semiconductor product before using it in a particular application.
 "Standard": Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots
 "Special": Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)
 "Specific": Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems and medical equipment for life support, etc.
 The quality grade of NEC semiconductor products is "Standard" unless otherwise expressly specified in NEC's data sheets or data books, etc. If customers wish to use NEC semiconductor products in applications not intended by NEC, they must contact an NEC sales representative in advance to determine NEC's willingness to support a given application.
 (Note)
 (1) "NEC" as used in this statement means NEC Corporation and also includes its majority-owned subsidiaries.
 (2) "NEC semiconductor products" means any semiconductor product developed or manufactured by or for NEC (as defined above).