

NPN SILICON EPITAXIAL TRANSISTOR

SUPER MINI MOLD

DESCRIPTION

The 2SC4570 is a low supply voltage transistor designed for UHF OSC/MIX.

It is suitable for a high density surface mount assembly since the transistor has been applied super mini mold package.

FEATURES

- High f_T : 5.5 GHz TYP. (@ $V_{CE} = 5\text{ V}$, $I_C = 5\text{ mA}$, $f = 1\text{ GHz}$)
- Low C_{ob} : 0.7 pF TYP. (@ $V_{CB} = 5\text{ V}$, $I_E = 0$, $f = 1\text{ MHz}$)
- Super Mini Mold Package. (EIAJ : SC-70)

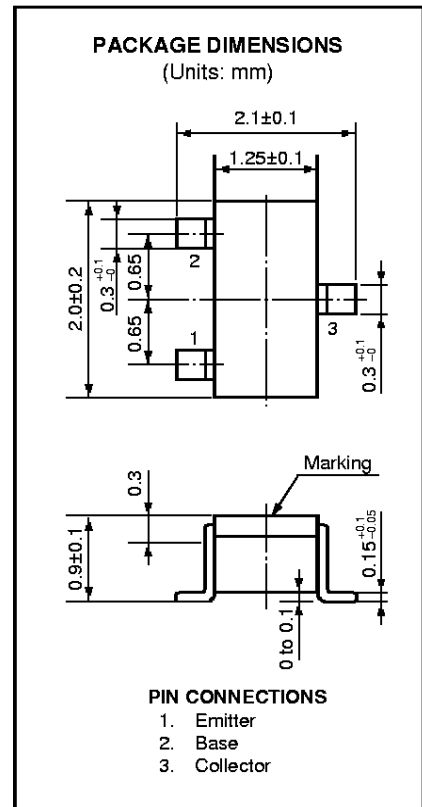
ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
2SC4570-T1	3 kpcs./Reel	Embossed tape 8 mm wide. Pin 3 (Collector) face to perforation side of the tape.
2SC4570-T2	3 kpcs./Reel	Embossed tape 8 mm wide. Pin 1 (Emitter), Pin 2 (Base) face to perforation side of the tape.

* Please contact with responsible NEC person, if you require evaluation sample. Unit sample quantity shall be 50 pcs. (Part No.: 2SC4570)

ABSOLUTE MAXIMUM RATINGS ($T_A = 25\text{ }^{\circ}\text{C}$)

Collector to Base Voltage	V_{CBO}	20	V
Collector to Emitter Voltage	V_{CEO}	12	V
Emitter to Base Voltage	V_{EBO}	3	V
Collector Current	I_C	30	mA
Total Power Dissipation	P_T	120	mW
Junction Temperature	T_j	125	$^{\circ}\text{C}$
Storage Temperature	T_{sig}	-55 to +125	$^{\circ}\text{C}$



ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

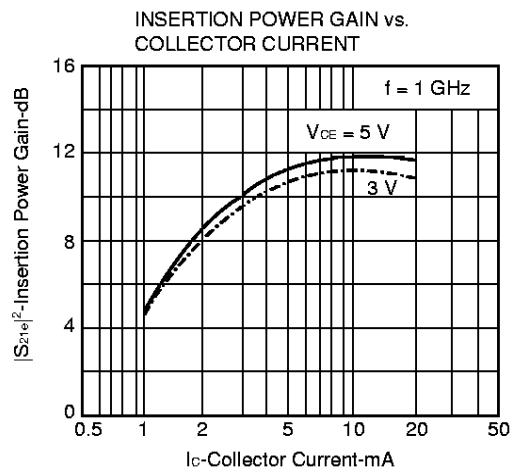
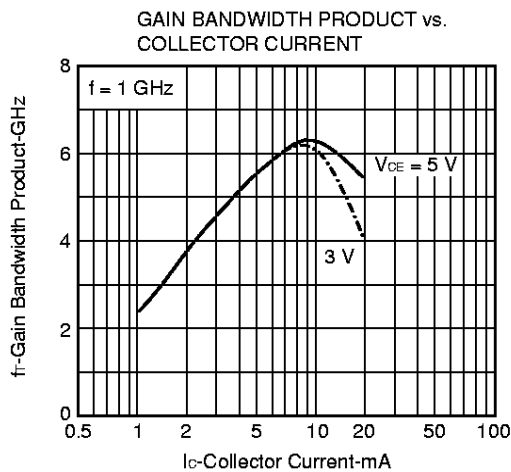
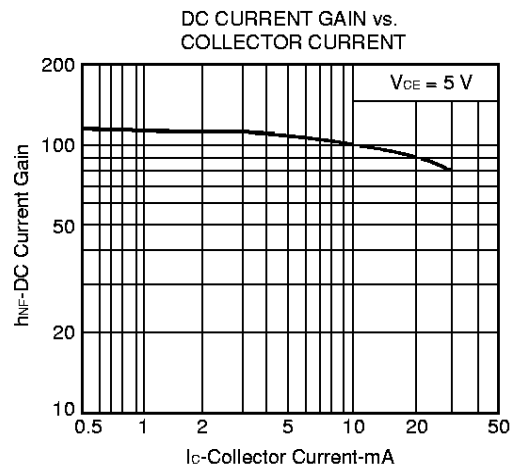
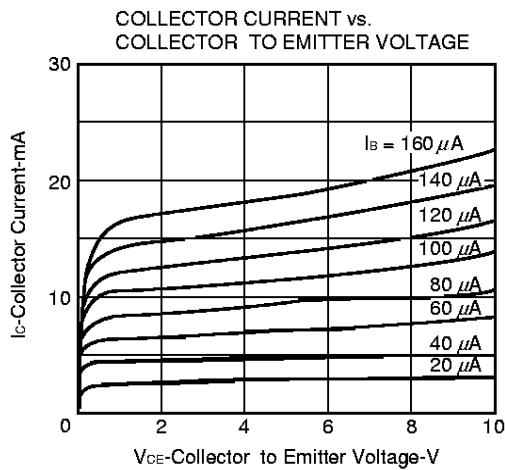
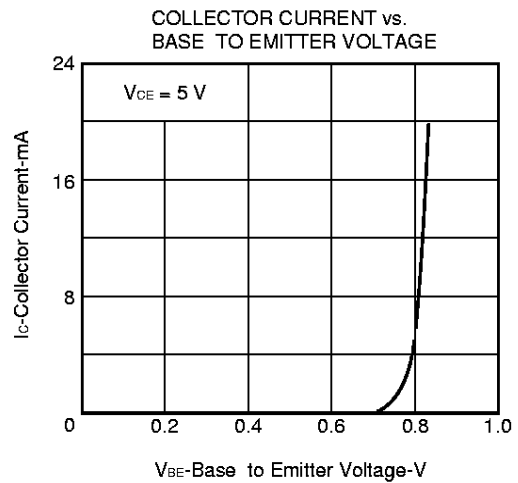
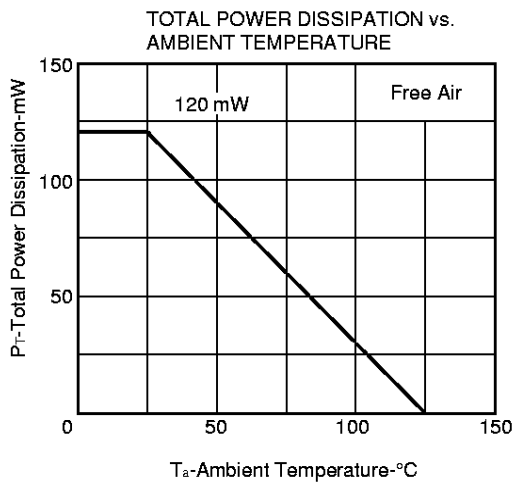
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	I _{CO}			0.1	μA	V _{CB} = 15 V, I _E = 0
Emitter Cutoff Current	I _{EO}			0.1	μA	V _{EB} = 1 V, I _C = 0
Collector Saturation Voltage	V _{CE(sat)}			0.5	V	h _{FE} = 10, I _C = 5 mA
DC Current Gain	h _{FE}	40	100	200		V _{CE} = 5 V, I _C = 5 mA *1
Gain Bandwidth Product	f _T		5.5		GHz	V _{CE} = 5 V, I _C = 5 mA, f = 1 GHz
Output Capacitance	C _{ob}		0.7	0.9	pF	V _{CB} = 3 V, I _E = 0, f = 1 MHz
Insertion Power Gain	S _{21e} ²	5.0			dB	V _{CE} = 5 V, I _C = 5 mA, f = 1 GHz

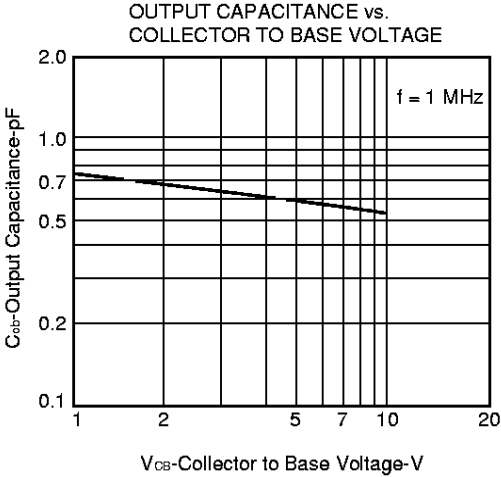
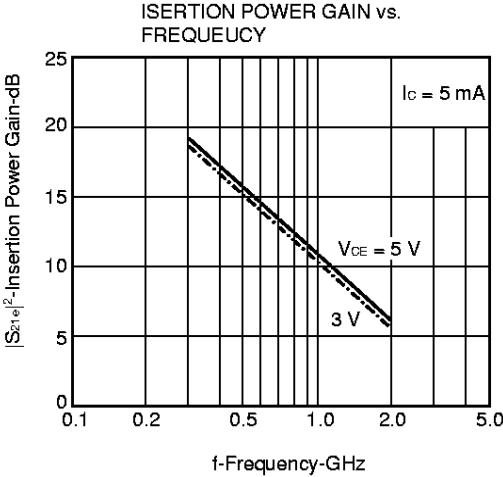
*1 Pulse Measurement PW ≤ 350 μs, Duty Cycle ≤ 2 %

h_{FE} Classification

Rank	T72	T73	T74
Marking	T72	T73	T74
h _{FE}	40 to 80	60 to 120	100 to 200

TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)





S-PARAMETER

(V_{CE} = 5 V, I_C = 5 mA, Z_O = 50 Ω)

FREQUENCY	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.887	-16.9	8.517	156.4	.024	76.9	.940	-13.3
200.00	.781	-34.4	8.107	140.8	.042	68.3	.832	-22.8
300.00	.663	-49.9	7.483	127.9	.057	62.6	.735	-28.2
400.00	.555	-63.2	6.775	117.0	.067	60.4	.662	-31.4
500.00	.456	-74.9	6.086	107.9	.076	59.2	.606	-33.4
600.00	.388	-83.6	5.369	100.7	.085	58.1	.567	-35.0
700.00	.328	-92.0	4.815	94.4	.094	58.3	.540	-36.3
800.00	.285	-99.2	4.342	89.2	.103	57.9	.520	-37.6
900.00	.250	-106.3	3.955	84.3	.111	58.0	.503	-38.8
1000.00	.223	-113.2	3.618	80.2	.122	56.7	.490	-40.1
1100.00	.201	-120.2	3.334	76.5	.129	57.1	.482	-41.5
1200.00	.184	-127.0	3.101	72.8	.138	56.5	.474	-42.9
1300.00	.169	-133.9	2.899	69.4	.147	55.9	.467	-44.4
1400.00	.159	-140.6	2.724	66.0	.156	55.6	.463	-45.7
1500.00	.150	-148.7	2.561	63.1	.166	55.0	.457	-47.1
1600.00	.145	-155.8	2.428	60.1	.174	54.2	.453	-48.4
1700.00	.141	-162.4	2.314	57.1	.183	53.5	.448	-49.8
1800.00	.137	-168.8	2.206	54.5	.193	53.2	.445	-51.3
1900.00	.136	-175.8	2.114	51.6	.201	52.4	.439	-52.7
2000.00	.139	-177.0	2.029	48.8	.210	51.4	.429	-54.9
2100.00	.140	-170.8	1.946	46.4	.219	50.6	.423	-56.7
2200.00	.141	-165.7	1.875	43.9	.229	49.5	.417	-58.9
2300.00	.145	-160.2	1.816	41.3	.239	48.5	.413	-61.1
2400.00	.148	-155.2	1.757	38.9	.247	47.7	.406	-63.7
2500.00	.154	-150.9	1.708	36.4	.258	46.3	.401	-66.8
2600.00	.158	-146.8	1.658	34.1	.266	45.5	.397	-70.0
2700.00	.163	-142.4	1.614	31.8	.273	44.3	.393	-73.0
2800.00	.167	-138.3	1.570	29.5	.284	43.3	.394	-76.5
2900.00	.173	-135.3	1.534	27.3	.291	42.4	.395	-79.8
3000.00	.179	-131.3	1.498	25.1	.299	41.2	.396	-82.7

(V_{CE} = 5 V, I_C = 5 mA, Z_O = 50 Ω)

FREQUENCY	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.929	-14.0	5.432	162.2	.025	78.4	.968	-10.1
200.00	.868	-26.8	5.334	147.4	.046	70.8	.900	-18.5
300.00	.785	-39.6	5.158	135.7	.063	64.4	.823	-24.5
400.00	.700	-51.3	4.873	125.9	.076	59.3	.756	-29.0
500.00	.613	-62.7	4.628	116.9	.086	56.7	.698	-32.2
600.00	.543	-71.7	4.216	109.1	.096	55.1	.656	-34.8
700.00	.469	-80.8	3.934	101.8	.103	53.8	.620	-36.7
800.00	.412	-88.7	3.645	95.5	.112	52.9	.594	-38.6
900.00	.363	-96.1	3.383	89.9	.119	52.4	.572	-40.0
1000.00	.323	-102.8	3.153	84.8	.126	51.5	.554	-41.6
1100.00	.290	-109.7	2.936	80.4	.135	51.6	.542	-43.0
1200.00	.262	-116.1	2.752	76.2	.143	51.6	.534	-44.8
1300.00	.241	-122.4	2.577	72.3	.149	51.3	.523	-46.1
1400.00	.224	-129.3	2.438	68.6	.157	50.5	.517	-47.4
1500.00	.208	-136.0	2.310	65.3	.165	50.4	.509	-48.9
1600.00	.197	-142.4	2.193	61.9	.173	50.1	.502	-50.2
1700.00	.189	-148.9	2.095	58.7	.181	49.4	.497	-51.6
1800.00	.180	-155.2	2.000	55.7	.189	49.1	.491	-53.2
1900.00	.174	-161.7	1.918	52.7	.198	48.7	.484	-54.9
2000.00	.171	-169.2	1.848	49.9	.207	48.1	.478	-56.8
2100.00	.170	-175.5	1.779	47.1	.215	47.6	.469	-58.6
2200.00	.168	-178.7	1.719	44.2	.223	46.8	.464	-60.9
2300.00	.169	-172.8	1.664	41.7	.231	46.0	.458	-63.1
2400.00	.170	-167.5	1.609	39.1	.239	45.4	.452	-65.7
2500.00	.173	-162.3	1.566	36.6	.248	44.4	.446	-68.7
2600.00	.175	-157.6	1.522	34.1	.257	43.6	.443	-72.0
2700.00	.179	-152.6	1.483	31.6	.263	42.6	.440	-74.9
2800.00	.183	-147.9	1.444	29.2	.274	42.0	.440	-78.3
2900.00	.187	-144.0	1.411	26.9	.282	40.9	.441	-81.4
3000.00	.191	-139.8	1.380	24.7	.289	40.1	.442	-84.5

S-PARAMETER

(V_{CE} = 5 V, I_c = 1 mA, Z₀ = 50 Ω)

FREQUENCY	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.974	-8.7	1.934	166.8	.026	83.1	.993	-5.8
200.00	.957	-18.0	1.952	156.5	.051	76.3	.970	-11.2
300.00	.922	-27.1	1.975	146.8	.073	69.1	.941	-16.4
400.00	.882	-35.5	1.960	138.2	.092	63.4	.911	-20.8
500.00	.837	-44.3	1.956	130.5	.108	58.5	.874	-24.9
600.00	.793	-52.1	1.846	122.9	.123	54.3	.844	-28.6
700.00	.741	-60.0	1.815	115.4	.133	50.5	.812	-32.0
800.00	.693	-67.7	1.768	108.5	.142	47.2	.785	-34.9
900.00	.645	-75.0	1.726	102.2	.148	44.9	.757	-37.7
1000.00	.596	-82.7	1.706	96.0	.155	42.6	.735	-40.1
1100.00	.547	-90.0	1.668	90.3	.160	40.8	.716	-42.3
1200.00	.504	-97.0	1.625	84.9	.166	39.7	.704	-44.6
1300.00	.470	-103.2	1.568	79.9	.170	38.8	.690	-46.6
1400.00	.438	-109.9	1.523	75.1	.174	37.9	.680	-48.4
1500.00	.410	-116.0	1.461	70.9	.178	37.2	.669	-50.1
1600.00	.386	-122.2	1.421	66.6	.180	36.9	.660	-52.0
1700.00	.362	-128.5	1.376	62.5	.184	36.6	.651	-53.8
1800.00	.344	-134.4	1.331	58.9	.189	36.3	.643	-55.7
1900.00	.329	-140.3	1.293	55.2	.193	36.5	.635	-57.7
2000.00	.312	-147.2	1.261	51.8	.198	36.3	.626	-59.7
2100.00	.302	-153.2	1.225	48.5	.201	36.5	.618	-61.8
2200.00	.293	-158.9	1.189	45.2	.206	36.4	.613	-64.3
2300.00	.285	-165.1	1.166	42.2	.211	36.6	.605	-66.7
2400.00	.280	-170.8	1.129	39.2	.217	36.4	.600	-69.6
2500.00	.276	-176.5	1.107	36.4	.222	36.4	.594	-72.6
2600.00	.272	-177.7	1.078	33.6	.228	36.7	.591	-75.9
2700.00	.271	-172.4	1.055	30.9	.233	36.4	.588	-79.1
2800.00	.270	-167.1	1.030	28.3	.241	36.4	.589	-82.4
2900.00	.270	-162.1	1.012	26.0	.247	36.4	.588	-85.6
3000.00	.271	-157.0	.989	23.6	.253	36.4	.588	-88.6

(V_{CE} = 3 V, I_c = 5 mA, Z₀ = 50 Ω)

FREQUENCY	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.879	-17.8	8.523	155.5	.027	75.6	.932	-15.0
200.00	.768	-36.6	8.074	139.8	.047	66.8	.812	-25.5
300.00	.646	-53.1	7.436	126.6	.061	61.3	.704	-31.5
400.00	.536	-67.3	6.691	115.7	.073	58.7	.627	-35.1
500.00	.442	-80.0	5.987	106.5	.082	57.5	.568	-37.3
600.00	.375	-89.5	5.261	99.5	.092	56.7	.528	-39.0
700.00	.319	-98.7	4.707	93.2	.101	56.9	.496	-40.3
800.00	.279	-106.9	4.239	87.9	.110	56.5	.475	-41.7
900.00	.247	-114.8	3.852	83.3	.120	56.0	.456	-42.8
1000.00	.222	-122.5	3.526	79.1	.129	55.4	.443	-44.2
1100.00	.203	-130.1	3.239	75.1	.139	55.6	.434	-45.6
1200.00	.189	-137.5	3.013	71.5	.148	55.0	.427	-47.0
1300.00	.178	-144.8	2.814	68.2	.157	54.6	.419	-48.3
1400.00	.170	-152.1	2.641	64.8	.167	54.2	.415	-49.7
1500.00	.163	-159.6	2.498	62.0	.177	53.4	.408	-51.0
1600.00	.160	-166.3	2.366	58.8	.187	52.5	.403	-52.4
1700.00	.159	-173.0	2.245	55.9	.196	51.8	.398	-54.0
1800.00	.156	-178.7	2.145	52.9	.205	51.3	.392	-55.4
1900.00	.157	-175.0	2.051	50.5	.215	50.4	.385	-57.0
2000.00	.161	-168.3	1.974	47.7	.224	49.5	.378	-59.0
2100.00	.164	-163.1	1.903	45.1	.234	48.8	.370	-60.7
2200.00	.166	-158.3	1.828	42.6	.244	47.5	.364	-63.4
2300.00	.170	-153.3	1.771	40.1	.253	46.4	.359	-65.7
2400.00	.173	-149.2	1.714	37.6	.262	45.5	.353	-68.6
2500.00	.179	-145.1	1.664	35.2	.272	44.5	.347	-71.8
2600.00	.183	-141.2	1.613	32.9	.282	43.3	.345	-75.2
2700.00	.189	-137.8	1.573	30.5	.291	42.2	.340	-78.6
2800.00	.193	-133.9	1.530	28.2	.300	40.9	.342	-82.2
2900.00	.199	-130.8	1.494	26.0	.309	39.8	.342	-85.6
3000.00	.205	-127.5	1.462	23.9	.316	38.7	.343	-88.8

S-PARAMETER

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

FREQUENCY	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.920	-14.3	5.495	160.8	.028	77.6	.962	-11.3
200.00	.860	-28.2	5.327	146.5	.051	69.7	.886	-20.5
300.00	.774	-41.7	5.129	134.7	.069	63.1	.802	-27.2
400.00	.689	-54.1	4.838	124.8	.083	58.5	.731	-32.1
500.00	.600	-66.2	4.584	115.6	.094	55.3	.669	-35.5
600.00	.530	-75.7	4.162	107.8	.103	53.2	.623	-38.2
700.00	.456	-85.4	3.873	100.4	.112	52.1	.585	-40.3
800.00	.402	-94.0	3.577	94.1	.120	51.3	.556	-42.2
900.00	.354	-101.9	3.323	88.6	.129	50.4	.533	-43.9
1000.00	.317	-109.3	3.082	83.5	.136	50.3	.513	-45.3
1100.00	.286	-116.4	2.865	79.2	.144	50.2	.500	-47.0
1200.00	.261	-123.8	2.687	74.9	.152	49.6	.491	-48.5
1300.00	.241	-130.3	2.518	71.0	.160	49.6	.480	-49.9
1400.00	.228	-137.6	2.381	67.2	.168	49.0	.471	-51.3
1500.00	.214	-144.5	2.255	64.0	.177	48.5	.464	-52.5
1600.00	.205	-151.3	2.144	60.6	.185	48.2	.458	-54.1
1700.00	.198	-157.9	2.045	57.3	.194	47.6	.451	-55.6
1800.00	.192	-163.9	1.956	54.3	.202	47.1	.444	-57.1
1900.00	.188	-170.5	1.873	51.3	.210	46.6	.437	-58.8
2000.00	.187	-177.6	1.802	48.4	.219	46.2	.429	-60.9
2100.00	.187	176.7	1.738	45.8	.227	45.4	.421	-62.8
2200.00	.187	171.2	1.675	43.0	.236	44.4	.416	-65.2
2300.00	.189	165.7	1.626	40.3	.245	43.6	.408	-67.4
2400.00	.191	160.8	1.574	37.7	.253	42.9	.402	-70.4
2500.00	.195	155.9	1.531	35.2	.263	42.1	.397	-73.7
2600.00	.197	151.5	1.486	32.7	.272	41.1	.395	-76.8
2700.00	.202	147.3	1.449	30.3	.279	40.3	.392	-80.3
2800.00	.205	143.1	1.413	27.8	.288	39.2	.391	-83.6
2900.00	.209	139.4	1.379	25.6	.297	38.2	.392	-86.8
3000.00	.214	135.5	1.350	23.3	.305	37.5	.394	-90.1

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

FREQUENCY	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.973	-9.2	1.928	166.5	.029	82.1	.990	-6.3
200.00	.954	-18.7	1.948	155.8	.057	74.4	.967	-12.2
300.00	.918	-28.1	1.975	145.9	.080	68.1	.935	-17.6
400.00	.878	-36.9	1.954	137.0	.102	62.2	.901	-22.5
500.00	.831	-46.1	1.948	129.2	.120	56.9	.860	-26.9
600.00	.785	-54.0	1.838	121.4	.134	52.4	.827	-30.9
700.00	.733	-62.3	1.808	113.9	.145	49.0	.794	-34.5
800.00	.684	-70.4	1.758	106.9	.156	45.3	.764	-37.6
900.00	.634	-77.9	1.717	100.5	.163	42.9	.734	-40.5
1000.00	.586	-85.8	1.689	94.2	.169	40.8	.711	-43.0
1100.00	.539	-93.2	1.649	88.5	.175	38.7	.693	-45.3
1200.00	.495	-100.5	1.607	83.0	.179	37.4	.677	-47.5
1300.00	.464	-107.2	1.549	78.1	.184	36.1	.661	-49.5
1400.00	.433	-114.0	1.449	73.3	.188	35.2	.649	-51.5
1500.00	.406	-120.4	1.440	69.1	.191	34.8	.639	-53.3
1600.00	.383	-126.8	1.396	64.9	.195	34.5	.627	-55.2
1700.00	.363	-133.3	1.359	60.7	.198	33.9	.619	-57.2
1800.00	.346	-139.4	1.310	57.0	.203	33.8	.609	-59.1
1900.00	.331	-145.4	1.273	53.4	.206	33.7	.601	-61.0
2000.00	.318	-152.2	1.242	49.9	.210	33.5	.591	-63.4
2100.00	.308	-158.4	1.206	46.6	.215	33.7	.582	-65.5
2200.00	.300	-164.1	1.169	43.3	.220	33.3	.576	-68.1
2300.00	.294	-170.1	1.148	40.3	.224	33.3	.568	-70.6
2400.00	.290	-175.5	1.112	37.4	.229	33.3	.563	-73.7
2500.00	.288	-178.7	1.091	34.6	.235	33.1	.558	-76.9
2600.00	.286	-173.3	1.064	31.9	.241	33.2	.554	-80.2
2700.00	.284	-168.1	1.042	29.2	.247	32.9	.551	-83.5
2800.00	.284	-162.9	1.015	26.5	.253	33.1	.551	-86.9
2900.00	.285	-158.3	.997	24.2	.259	32.8	.552	-90.2
3000.00	.286	-153.5	.977	21.8	.265	33.2	.552	-93.4

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NEC devices are classified into the following three quality grades:

"Standard", "Special", and "Specific". The Specific quality grade applies only to devices developed based on a customer designated "quality assurance program" for a specific application. The recommended applications of a device depend on its quality grade, as indicated below. Customers must check the quality grade of each device 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: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

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Anti-radioactive design is not implemented in this product.