

SILICON TRANSISTOR

2SC5011

HIGH FREQUENCY LOW NOISE AMPLIFIER NPN SILICON EPITAXIAL TRANSISTOR 4 PINS SUPER MINI MOLD

FEATURES

- · Small Package
- High Gain Bandwidth Product (fT = 6.5 GHz TYP.)
- · Low Noise, High Gain
- Low Voltage Operation

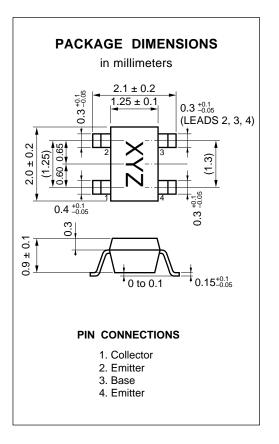
ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
2SC5011-T1	3 Kpcs/Reel.	Embossed tape 8 mm wide. Pin3 (Base), Pin4 (Emitter) face to perforation side of the tape.
2SC5011-T2	3 Kpcs/Reel.	Embossed tape 8 mm wide. Pin1 (Collector), Pin2 (Emitter) face to perforation side of the tape.

* Please contact with responsible NEC person, if you require evaluation sample. It is available for 50 pcs. one unit sample lot. (Part No.: 2SC5011)

ABSOLUTE MAXIMUM RATINGS $(T_A = 25 \degree C)$

Collector to Base Voltage	Vсво	20	V
Collector to Emitter Voltage	Vceo	12	V
Emitter to Base Voltage	Vево	3	V
Collector Current	Ic	100	mΑ
Total Power Dissipation	Рт	150	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-65 to +150	°C



Caution; Electrostatic Sensitive Device.



ELECTRICAL CHARACTERISTICS (TA = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Collector Cutoff Current	Ісво			1.0	μΑ	Vcb = 10 V, IE = 0
Emitter Cutoff Current	ІЕВО			1.0	μΑ	V _{EB} = 1 V, I _C = 0
DC Current Gain	hfe	50	120	250		VcE = 10 V, Ic = 20 mA*1
Gain Bandwidth Product	f⊤		6.5		GHz	VcE = 10 V, Ic = 20 mA
Feed-back Capacitance	Cre		0.5	0.9	pF	VcB = 10 V, IE = 0, f = 1 MHz*2
Insertion Power Gain	S _{21e} ²	11	13		dB	VcE = 10 V, Ic = 20 mA, f = 1.0 GHz
Noise Figure	NF		1.1	2.0	dB	VcE = 10 V, Ic = 7 mA, f = 1.0 GHz

^{*1} Pulse Measurement; PW \leq 350 μ s, Duty Cycle \leq 2 % Pulsed.

hfe Classification

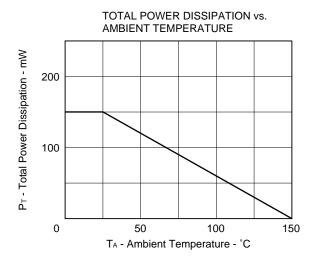
Rank	EB	FB	GB
Marking	R26	R27	R28
hfe	50 to 100	80 to 160	125 to 250

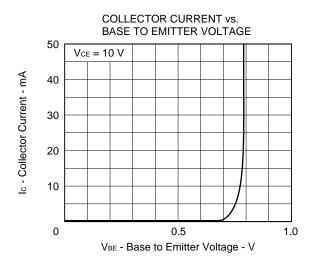
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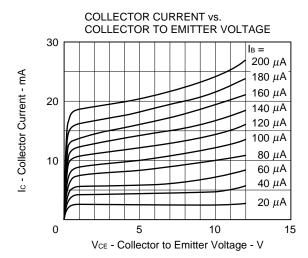
^{*2} Measured with 3 terminals bridge, Emitter and Case should be grounded.

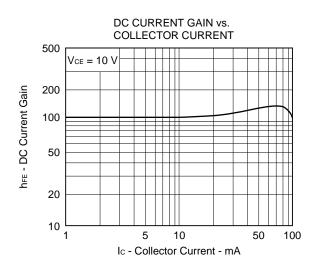


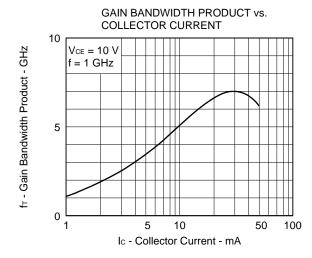
TYPICAL CHARACTERISTICS (TA = 25 °C)

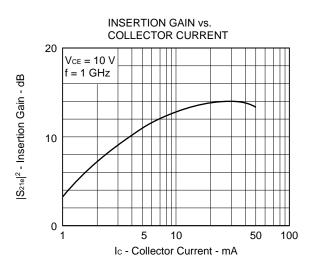




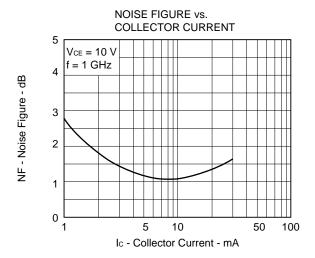


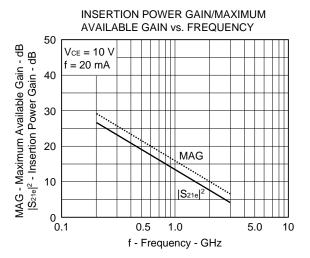


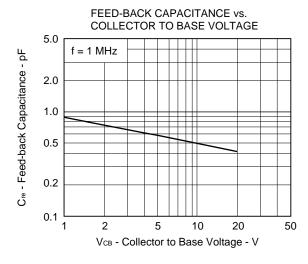












S-PARAMETER

Vce = 10 V, Ic = 20 mA

$V_{CE} = 10 \text{ V}, \text{ Ic} = 20 \text{ n}$	nA							
FREQUENCY	9	S ₁₁	Sa	21	S	12	9	S ₂₂
f (MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
400.00	500	00.5	00.004	4040	000	50.7	700	00.0
100.00 200.00	.583 .514	-80.5 -120.6	32.334 20.817	134.6 113.4	.022 .029	59.7 54.9	.739 .513	-33.6 -41.4
300.00	.498	-141.9	14.898	102.6	.034	52.0	.404	-44.1
400.00	.495	-155.0	11.390	95.6	.037	50.1	.342	-41.9
500.00	.494	-165.0	9.247	90.2	.044	57.2	.300	-41.9
600.00	.499	–171.1 –177.1	7.798	86.0	.049	58.4	.276	-41.0
700.00 800.00	.502 .503	-177.1 178.7	6.768 5.913	82.2 78.5	.055 .064	59.2 60.6	.266 .248	-41.5 -43.9
900.00	.512	174.3	5.293	75.6	.066	61.2	.232	-43.1
1000.00	.512	169.8	4.789	72.2	.070	62.1	.232	-43.3
1100.00	.516	166.1	4.345	69.5	.079	62.6	.226	-45.1
1200.00 1300.00	.524 .530	163.8 160.1	3.959 3.669	67.0 64.4	.087 .093	61.3 61.4	.217 .208	-47.2 -50.1
1400.00	.531	158.0	3.443	61.7	.099	60.7	.207	-49.9
1500.00	.535	154.5	3.203	58.9	.104	59.0	.196	-54.6
1600.00	.541	152.2	2.999	56.3	.115	58.6	.198	-55.2
1700.00 1800.00	.567 .555	149.5 147.2	2.838 2.676	53.7 51.9	.116	59.6 58.2	.186 .190	–59.7 –59.4
1900.00	.556	145.3	2.556	49.5	.125 .128	57.4	.186	-59.4 -65.0
2000.00	.574	143.4	2.434	46.9	.138	57.0	.186	-68.7
2100.00	.570	141.1	2.314	45.1	.140	58.3	.169	-72.8
2200.00	.583	140.1	2.205	42.5	.152	56.4	.181	-73.9
2300.00 2400.00	.579 .585	137.3 135.6	2.124 2.054	40.8 39.3	.156 .157	56.2 54.8	.192 .167	–79.3 –77.1
2500.00	.602	133.0	1.981	36.3	.166	54.4	.180	-86.1
2600.00	.605	131.6	1.918	34.3	.180	52.8	.179	-84.9
2700.00	.607	129.7	1.840	32.2	.179	52.7	.187	-91.7
2800.00 2900.00	.600 .612	127.8 126.4	1.772 1.704	29.2 28.0	.192 .192	50.9 50.8	.193 .190	-94.1 -95.2
3000.00	.594	123.8	1.646	25.3	.200	47.3	.190	-101.8
VcE = 3 V, Ic = 5 mA		,	0		0		,	
Vce = 3 V, Ic = 5 mA	9	S11	Sa			12		S22
VcE = 3 V, Ic = 5 mA		S11 ANG	S2 MAG	an ANG	S MAG	12 ANG	MAG (S22 ANG
Vce = 3 V, Ic = 5 mA	9							
Vce = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00	MAG .794 .727	ANG -49.6 -87.2	MAG 14.255 11.175	ANG 150.2 128.8	MAG .036 .058	ANG 65.6 50.9	MAG .887 .717	ANG -22.7 -37.2
Vce = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00	MAG .794 .727 .675	ANG -49.6 -87.2 -112.2	MAG 14.255 11.175 8.779	ANG 150.2 128.8 114.7	.036 .058 .071	65.6 50.9 40.4	.887 .717 .584	-22.7 -37.2 -45.5
VcE = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00	MAG .794 .727 .675 .653	ANG -49.6 -87.2 -112.2 -129.6	MAG 14.255 11.175 8.779 7.002	ANG 150.2 128.8 114.7 105.0	MAG .036 .058 .071 .079	65.6 50.9 40.4 37.4	MAG .887 .717 .584 .492	-22.7 -37.2 -45.5 -49.4
Vce = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00	MAG .794 .727 .675 .653 .636 .638	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4	MAG 14.255 11.175 8.779 7.002 5.814 4.980	ANG 150.2 128.8 114.7 105.0 97.3 91.3	MAG .036 .058 .071 .079 .081 .083	65.6 50.9 40.4 37.4 35.2 32.0	MAG .887 .717 .584 .492 .424 .380	ANG -22.7 -37.2 -45.5 -49.4 -51.2 -53.7
Vce = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00	MAG .794 .727 .675 .653 .636 .638 .631	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4 -161.0	MAG 14.255 11.175 8.779 7.002 5.814 4.980 4.359	ANG 150.2 128.8 114.7 105.0 97.3 91.3 86.0	.036 .058 .071 .079 .081 .083	65.6 50.9 40.4 37.4 35.2 32.0 35.6	MAG .887 .717 .584 .492 .424 .380 .351	-22.7 -37.2 -45.5 -49.4 -51.2 -53.7 -53.9
Vce = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00	MAG .794 .727 .675 .653 .636 .638 .631 .630	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4 -161.0 -168.1	MAG 14.255 11.175 8.779 7.002 5.814 4.980 4.359 3.827	ANG 150.2 128.8 114.7 105.0 97.3 91.3 86.0 81.2	MAG .036 .058 .071 .079 .081 .083 .084 .087	65.6 50.9 40.4 37.4 35.2 32.0 35.6 34.8	MAG .887 .717 .584 .492 .424 .380 .351 .327	ANG -22.7 -37.2 -45.5 -49.4 -51.2 -53.7 -53.9 -57.4
Vce = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00	MAG .794 .727 .675 .653 .636 .638 .631 .630 .635	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4 -161.0 -168.1 -173.7	MAG 14.255 11.175 8.779 7.002 5.814 4.980 4.359 3.827 3.442	ANG 150.2 128.8 114.7 105.0 97.3 91.3 86.0 81.2 77.5	MAG .036 .058 .071 .079 .081 .083 .084 .087	65.6 50.9 40.4 37.4 35.2 32.0 35.6 34.8 32.2	MAG .887 .717 .584 .492 .424 .380 .351 .327 .306	ANG -22.7 -37.2 -45.5 -49.4 -51.2 -53.7 -53.9 -57.4 -58.6
Vce = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00	MAG .794 .727 .675 .653 .636 .638 .631 .630 .635	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4 -161.0 -168.1 -173.7 -179.6 176.2	MAG 14.255 11.175 8.779 7.002 5.814 4.980 4.359 3.827 3.442 3.123 2.834	ANG 150.2 128.8 114.7 105.0 97.3 91.3 86.0 81.2 77.5 73.0 69.6	MAG .036 .058 .071 .079 .081 .083 .084 .087 .093 .095	ANG 65.6 50.9 40.4 37.4 35.2 32.0 35.6 34.8 32.2 34.4 35.4	MAG .887 .717 .584 .492 .424 .380 .351 .327 .306 .295 .283	ANG -22.7 -37.2 -45.5 -49.4 -51.2 -53.7 -53.9 -57.4 -58.6 -60.4 -63.0
Vce = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1200.00	MAG .794 .727 .675 .653 .636 .638 .631 .630 .635 .631 .635	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4 -161.0 -168.1 -173.7 -179.6 176.2 172.6	MAG 14.255 11.175 8.779 7.002 5.814 4.980 4.359 3.827 3.442 3.123 2.834 2.594	ANG 150.2 128.8 114.7 105.0 97.3 91.3 86.0 81.2 77.5 73.0 69.6 66.6	MAG .036 .058 .071 .079 .081 .083 .084 .087 .093 .095 .098	65.6 50.9 40.4 37.4 35.2 32.0 35.6 34.8 32.2 34.4 35.4 37.7	MAG .887 .717 .584 .492 .424 .380 .351 .327 .306 .295 .283 .276	ANG -22.7 -37.2 -45.5 -49.4 -51.2 -53.7 -53.9 -57.4 -58.6 -60.4 -63.0 -65.0
Vce = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1100.00 1100.00 1200.00 1300.00	MAG .794 .727 .675 .653 .636 .638 .631 .630 .635 .631 .635 .636	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4 -161.0 -168.1 -173.7 -179.6 176.2 172.6 168.3	MAG 14.255 11.175 8.779 7.002 5.814 4.980 4.359 3.827 3.442 3.123 2.834 2.594 2.408	ANG 150.2 128.8 114.7 105.0 97.3 91.3 86.0 81.2 77.5 73.0 69.6 66.6 63.2	MAG .036 .058 .071 .079 .081 .083 .084 .087 .093 .095 .098 .099	ANG 65.6 50.9 40.4 37.4 35.2 32.0 35.6 34.8 32.2 34.4 35.4 37.7 40.1	MAG .887 .717 .584 .492 .424 .380 .351 .327 .306 .295 .283 .276 .260	ANG -22.7 -37.2 -45.5 -49.4 -51.2 -53.7 -53.9 -57.4 -58.6 -60.4 -63.0 -65.0 -68.6
Vce = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1200.00	MAG .794 .727 .675 .653 .636 .638 .631 .630 .635 .631 .635 .636	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4 -161.0 -168.1 -173.7 -179.6 176.2 172.6 168.3 165.3	MAG 14.255 11.175 8.779 7.002 5.814 4.980 4.359 3.827 3.442 3.123 2.834 2.594 2.408 2.255	ANG 150.2 128.8 114.7 105.0 97.3 91.3 86.0 81.2 77.5 73.0 69.6 66.6 63.2 60.1	MAG .036 .058 .071 .079 .081 .083 .084 .087 .093 .095 .098 .099 .104 .103	ANG 65.6 50.9 40.4 37.4 35.2 32.0 35.6 34.8 32.2 34.4 35.4 37.7 40.1 38.9	MAG .887 .717 .584 .492 .424 .380 .351 .327 .306 .295 .283 .276 .260 .267	ANG -22.7 -37.2 -45.5 -49.4 -51.2 -53.7 -53.9 -57.4 -68.6 -60.4 -63.0 -65.0 -68.6 -69.5
Vce = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00	MAG .794 .727 .675 .653 .636 .638 .631 .630 .635 .631 .635 .636 .636 .636	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4 -161.0 -168.1 -173.7 -179.6 176.2 172.6 168.3 165.3 161.7	MAG 14.255 11.175 8.779 7.002 5.814 4.980 4.359 3.827 3.442 3.123 2.834 2.594 2.408 2.255 2.106 1.977	ANG 150.2 128.8 114.7 105.0 97.3 91.3 86.0 81.2 77.5 73.0 69.6 66.6 63.2 60.1 56.9 53.9	MAG .036 .058 .071 .079 .081 .083 .084 .087 .093 .095 .098 .099 .104 .103 .115 .113	65.6 50.9 40.4 37.4 35.2 32.0 35.6 34.8 32.2 34.4 35.4 37.7 40.1 38.9 41.4 39.7	MAG .887 .717 .584 .492 .424 .380 .351 .327 .306 .295 .283 .276 .260 .267 .252	ANG -22.7 -37.2 -45.5 -49.4 -51.2 -53.7 -53.9 -57.4 -58.6 -60.4 -63.0 -68.6 -69.5 -73.5 -76.5
Vce = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00	MAG .794 .727 .675 .653 .636 .638 .631 .630 .635 .631 .635 .636 .641 .643 .653 .663	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4 -161.0 -168.1 -173.7 -179.6 176.2 172.6 168.3 165.3 165.3 161.7 158.4	MAG 14.255 11.175 8.779 7.002 5.814 4.980 4.359 3.827 3.442 3.123 2.834 2.594 2.408 2.255 2.106 1.977 1.869	ANG 150.2 128.8 114.7 105.0 97.3 91.3 86.0 81.2 77.5 73.0 69.6 66.6 63.2 60.1 56.9 53.9 50.8	MAG .036 .058 .071 .079 .081 .083 .084 .087 .093 .095 .098 .099 .104 .103 .115 .113 .120	ANG 65.6 50.9 40.4 37.4 35.2 32.0 35.6 34.8 32.2 34.4 35.4 37.7 40.1 38.9 41.4 39.7 42.3	MAG .887 .717 .584 .492 .424 .380 .351 .327 .306 .295 .283 .276 .260 .267 .252 .249 .241	ANG -22.7 -37.2 -45.5 -49.4 -51.2 -53.7 -53.9 -57.4 -68.6 -60.4 -63.0 -65.0 -68.6 -69.5 -73.5 -76.5 -81.7
Vce = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00	MAG .794 .727 .675 .653 .636 .638 .631 .635 .631 .635 .636 .636 .641 .643 .653 .663	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4 -161.0 -168.1 -173.7 -179.6 176.2 172.6 168.3 165.3 161.7 158.4 155.0 152.3	MAG 14.255 11.175 8.779 7.002 5.814 4.980 4.359 3.827 3.442 3.123 2.834 2.594 2.408 2.255 2.106 1.977 1.869 1.761	ANG 150.2 128.8 114.7 105.0 97.3 91.3 86.0 81.2 77.5 73.0 69.6 66.6 63.2 60.1 56.9 53.9 50.8 48.3	MAG .036 .058 .071 .079 .081 .083 .084 .087 .093 .095 .098 .099 .104 .103 .115 .113 .120 .123	ANG 65.6 50.9 40.4 37.4 35.2 32.0 35.6 34.8 32.2 34.4 35.4 37.7 40.1 38.9 41.4 39.7 42.3 41.9	MAG .887 .717 .584 .492 .424 .380 .351 .327 .306 .295 .283 .276 .260 .267 .252 .249 .241 .253	ANG -22.7 -37.2 -45.5 -49.4 -51.2 -53.7 -53.9 -57.4 -63.0 -65.0 -68.6 -69.5 -73.5 -76.5 -81.7 -84.4
Vce = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00	MAG .794 .727 .675 .653 .636 .638 .631 .630 .635 .631 .635 .636 .641 .643 .653 .663	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4 -161.0 -168.1 -173.7 -179.6 176.2 172.6 168.3 165.3 165.3 161.7 158.4	MAG 14.255 11.175 8.779 7.002 5.814 4.980 4.359 3.827 3.442 3.123 2.834 2.594 2.408 2.255 2.106 1.977 1.869 1.761 1.690	ANG 150.2 128.8 114.7 105.0 97.3 91.3 86.0 81.2 77.5 73.0 69.6 66.6 63.2 60.1 56.9 53.9 50.8	MAG .036 .058 .071 .079 .081 .083 .084 .087 .093 .095 .098 .099 .104 .103 .115 .113 .120	ANG 65.6 50.9 40.4 37.4 35.2 32.0 35.6 34.8 32.2 34.4 35.4 37.7 40.1 38.9 41.4 39.7 42.3	MAG .887 .717 .584 .492 .424 .380 .351 .327 .306 .295 .283 .276 .260 .267 .252 .249 .241	ANG -22.7 -37.2 -45.5 -49.4 -51.2 -53.7 -53.9 -57.4 -58.6 -60.4 -63.0 -65.0 -68.6 -69.5 -73.5 -76.5 -81.7 -84.4 -86.9
Vce = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2100.00	MAG .794 .727 .675 .653 .636 .638 .631 .630 .635 .631 .635 .636 .636 .641 .643 .653 .663 .663 .663 .663	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4 -161.0 -168.1 -173.7 -179.6 176.2 172.6 168.3 165.3 161.7 158.4 155.0 152.3 149.8 147.4 144.2	MAG 14.255 11.175 8.779 7.002 5.814 4.980 4.359 3.827 3.442 3.123 2.834 2.594 2.408 2.255 2.106 1.977 1.869 1.761 1.690 1.602 1.533	ANG 150.2 128.8 114.7 105.0 97.3 91.3 86.0 81.2 77.5 73.0 69.6 66.6 63.2 60.1 56.9 53.9 50.8 48.3 45.9 43.0 39.9	MAG .036 .058 .071 .079 .081 .083 .084 .087 .093 .095 .098 .099 .104 .103 .115 .113 .120 .123 .127 .126 .136	ANG 65.6 50.9 40.4 37.4 35.2 32.0 35.6 34.8 32.2 34.4 35.4 37.7 40.1 38.9 41.4 39.7 42.3 41.9 42.0 46.3 46.6	MAG .887 .717 .584 .492 .424 .380 .351 .327 .306 .295 .283 .276 .260 .267 .252 .249 .241 .253 .248 .255 .259	ANG -22.7 -37.2 -45.5 -49.4 -51.2 -53.7 -53.9 -57.4 -58.6 -60.4 -63.0 -65.0 -68.6 -69.5 -73.5 -76.5 -81.7 -84.4 -86.9 -91.9 -95.1
VCE = 3 V, IC = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2100.00 2200.00	MAG .794 .727 .675 .653 .636 .638 .631 .630 .635 .631 .635 .636 .636 .641 .643 .653 .663 .663 .663 .663 .663	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4 -161.0 -168.1 -173.7 -179.6 176.2 172.6 168.3 165.3 161.7 158.4 155.0 152.3 149.8 147.4 144.2 142.4	MAG 14.255 11.175 8.779 7.002 5.814 4.980 4.359 3.827 3.442 3.123 2.834 2.594 2.408 2.255 2.106 1.977 1.869 1.761 1.690 1.602 1.533 1.447	ANG 150.2 128.8 114.7 105.0 97.3 91.3 86.0 81.2 77.5 73.0 69.6 66.6 63.2 60.1 56.9 53.9 50.8 48.3 45.9 43.0 39.9 37.0	MAG .036 .058 .071 .079 .081 .083 .084 .087 .093 .095 .098 .099 .104 .103 .115 .113 .120 .123 .127 .126 .136 .145	ANG 65.6 50.9 40.4 37.4 35.2 32.0 35.6 34.8 32.2 34.4 37.7 40.1 38.9 41.4 39.7 42.3 41.9 42.0 46.3 46.6 45.1	MAG .887 .717 .584 .492 .424 .380 .351 .327 .306 .295 .283 .276 .260 .267 .252 .249 .241 .253 .248 .255 .259 .253	ANG -22.7 -37.2 -45.5 -49.4 -51.2 -53.7 -53.9 -57.4 -58.6 -60.4 -63.0 -65.0 -68.6 -69.5 -73.5 -76.5 -81.7 -84.4 -86.9 -91.9 -95.1 -99.5
VCE = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2100.00 2200.00 2300.00	MAG .794 .727 .675 .653 .636 .638 .631 .630 .635 .631 .635 .636 .636 .641 .643 .653 .663 .663 .660 .663 .679 .678 .686	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4 -161.0 -168.1 -173.7 -179.6 176.2 172.6 168.3 165.3 165.3 161.7 158.4 155.0 152.3 149.8 147.4 144.2 142.4 139.5	MAG 14.255 11.175 8.779 7.002 5.814 4.980 4.359 3.827 3.442 3.123 2.834 2.594 2.408 2.255 2.106 1.977 1.869 1.761 1.690 1.602 1.533 1.447 1.399	ANG 150.2 128.8 114.7 105.0 97.3 91.3 86.0 81.2 77.5 73.0 69.6 66.6 63.2 60.1 56.9 53.9 50.8 48.3 45.9 43.0 39.9 37.0 34.8	MAG .036 .058 .071 .079 .081 .083 .084 .087 .093 .095 .098 .099 .104 .103 .115 .113 .120 .123 .127 .126 .136 .145 .148	ANG 65.6 50.9 40.4 37.4 35.2 32.0 35.6 34.8 32.2 34.4 35.4 37.7 40.1 38.9 41.4 39.7 42.3 41.9 42.0 46.3 46.6 45.1 46.9	MAG .887 .717 .584 .492 .424 .380 .351 .327 .306 .295 .283 .276 .260 .267 .252 .249 .241 .253 .248 .255 .259 .253	ANG -22.7 -37.2 -45.5 -49.4 -51.2 -53.7 -53.9 -57.4 -58.6 -60.4 -63.0 -65.0 -68.6 -69.5 -73.5 -76.5 -81.7 -84.4 -86.9 -91.9 -95.1 -99.5 -101.3
VCE = 3 V, IC = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2100.00 2200.00	MAG .794 .727 .675 .653 .636 .638 .631 .630 .635 .631 .635 .636 .636 .641 .643 .653 .663 .663 .663 .663 .663	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4 -161.0 -168.1 -173.7 -179.6 176.2 172.6 168.3 165.3 165.3 165.7 158.4 155.0 152.3 149.8 147.4 144.2 142.4 139.5 137.1	MAG 14.255 11.175 8.779 7.002 5.814 4.980 4.359 3.827 3.442 3.123 2.834 2.594 2.408 2.255 2.106 1.977 1.869 1.761 1.690 1.602 1.533 1.447 1.399 1.355	ANG 150.2 128.8 114.7 105.0 97.3 91.3 86.0 81.2 77.5 73.0 69.6 66.6 63.2 60.1 56.9 53.9 50.8 48.3 45.9 43.0 39.9 37.0	MAG .036 .058 .071 .079 .081 .083 .084 .087 .093 .095 .098 .099 .104 .103 .115 .113 .120 .123 .127 .126 .136 .145	ANG 65.6 50.9 40.4 37.4 35.2 32.0 35.6 34.8 32.2 34.4 37.7 40.1 38.9 41.4 39.7 42.3 41.9 42.0 46.3 46.6 45.1	MAG .887 .717 .584 .492 .424 .380 .351 .327 .306 .295 .283 .276 .260 .267 .252 .249 .241 .253 .248 .255 .259 .253	ANG -22.7 -37.2 -45.5 -49.4 -51.2 -53.7 -53.9 -57.4 -58.6 -60.4 -63.0 -65.0 -68.6 -69.5 -73.5 -76.5 -81.7 -84.4 -86.9 -91.9 -95.1 -99.5
VCE = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1100.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1770.00 1800.00 1900.00 2200.00 2300.00 2400.00 2500.00 2600.00	MAG .794 .727 .675 .653 .636 .638 .631 .635 .631 .635 .636 .641 .643 .653 .663 .663 .660 .663 .679 .678 .686 .682 .689 .703 .713	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4 -161.0 -168.1 -173.7 -179.6 176.2 172.6 168.3 165.3 165.3 165.7 158.4 155.0 152.3 149.8 147.4 144.2 142.4 139.5 137.1 135.7	MAG 14.255 11.175 8.779 7.002 5.814 4.980 4.359 3.827 3.442 3.123 2.834 2.594 2.408 2.255 2.106 1.977 1.869 1.761 1.690 1.602 1.533 1.447 1.399 1.355 1.297 1.263	ANG 150.2 128.8 114.7 105.0 97.3 91.3 86.0 81.2 77.5 73.0 69.6 66.6 63.2 60.1 56.9 53.9 50.8 48.3 45.9 43.0 39.9 37.0 34.8 32.8 29.9 28.0	MAG .036 .058 .071 .079 .081 .083 .084 .087 .093 .095 .098 .099 .104 .103 .115 .113 .120 .123 .127 .126 .136 .145 .148 .159 .170 .171	ANG 65.6 50.9 40.4 37.4 35.2 32.0 35.6 34.8 32.2 34.4 35.4 37.7 40.1 38.9 41.4 39.7 42.3 41.9 42.0 46.3 46.6 45.1 46.9 44.8 46.1 46.2	MAG .887 .717 .584 .492 .424 .380 .351 .327 .306 .295 .283 .276 .260 .267 .252 .249 .241 .253 .248 .255 .259 .253 .259 .264 .267 .263	ANG -22.7 -37.2 -45.5 -49.4 -51.2 -53.7 -53.9 -57.4 -68.6 -60.4 -63.0 -65.0 -68.6 -69.5 -73.5 -76.5 -76.5 -81.7 -84.4 -86.9 -91.9 -95.1 -99.5 -101.3 -105.6 -110.6 -111.3
VCE = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 2000.00 2100.00 2200.00 2300.00 2400.00 2500.00 2600.00 2700.00	MAG .794 .727 .675 .653 .636 .638 .631 .635 .631 .635 .636 .641 .643 .653 .663 .660 .663 .669 .679 .678 .686 .682 .689 .703 .713 .698	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4 -161.0 -168.1 -173.7 -179.6 176.2 172.6 168.3 165.3 161.7 158.4 155.0 152.3 149.8 147.4 144.2 142.4 139.5 137.1 135.7 132.9	MAG 14.255 11.175 8.779 7.002 5.814 4.980 4.359 3.827 3.442 3.123 2.834 2.594 2.408 2.255 2.106 1.977 1.869 1.761 1.690 1.602 1.533 1.447 1.399 1.355 1.297 1.263 1.223	ANG 150.2 128.8 114.7 105.0 97.3 91.3 86.0 81.2 77.5 73.0 69.6 66.6 63.2 60.1 56.9 53.9 50.8 48.3 45.9 43.0 39.9 37.0 34.8 32.8 29.9 28.0 26.5	MAG .036 .058 .071 .079 .081 .083 .084 .087 .093 .095 .098 .099 .104 .103 .115 .113 .120 .123 .127 .126 .136 .145 .148 .159 .170 .171	ANG 65.6 50.9 40.4 37.4 35.2 32.0 35.6 34.8 32.2 34.4 35.4 37.7 40.1 38.9 41.4 39.7 42.3 41.9 42.0 46.3 46.6 45.1 46.9 44.8 46.1 46.2 44.5	MAG .887 .717 .584 .492 .424 .380 .351 .327 .306 .295 .283 .276 .260 .267 .252 .249 .241 .253 .248 .255 .259 .253 .259 .264 .267 .263 .265	ANG -22.7 -37.2 -45.5 -49.4 -51.2 -53.7 -53.9 -57.4 -58.6 -60.4 -63.0 -65.0 -68.6 -69.5 -73.5 -76.5 -76.5 -81.7 -84.4 -86.9 -91.9 -95.1 -99.5 -101.3 -105.6 -110.6 -111.3 -115.1
VCE = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 200.00 2100.00 2200.00 2300.00 2400.00 2500.00 2600.00 2700.00 2800.00	MAG .794 .727 .675 .653 .636 .638 .631 .630 .635 .631 .635 .636 .641 .643 .653 .663 .663 .663 .663 .669 .679 .678 .686 .682 .689 .703 .713 .698 .708	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4 -161.0 -168.1 -173.7 -179.6 176.2 172.6 168.3 161.7 158.4 155.0 152.3 149.8 147.4 144.2 142.4 139.5 137.1 135.7 132.9 131.3	MAG 14.255 11.175 8.779 7.002 5.814 4.980 4.359 3.827 3.442 3.123 2.834 2.594 2.408 2.255 2.106 1.977 1.869 1.761 1.690 1.602 1.533 1.447 1.399 1.355 1.297 1.263 1.223 1.174	ANG 150.2 128.8 114.7 105.0 97.3 91.3 86.0 81.2 77.5 73.0 69.6 66.6 63.2 60.1 56.9 53.9 50.8 48.3 45.9 43.0 39.9 37.0 34.8 32.8 29.9 28.0 26.5 22.8	MAG .036 .058 .071 .079 .081 .083 .084 .087 .093 .095 .098 .099 .104 .103 .115 .113 .120 .123 .127 .126 .136 .145 .148 .159 .170 .171 .177 .181	ANG 65.6 50.9 40.4 37.4 35.2 32.0 35.6 34.8 32.2 34.4 35.4 37.7 40.1 38.9 41.4 39.7 42.3 41.9 42.0 46.3 46.6 45.1 46.9 44.8 46.1 46.2 44.5 45.4	MAG .887 .717 .584 .492 .424 .380 .351 .327 .306 .295 .283 .276 .260 .267 .252 .249 .241 .253 .248 .255 .259 .253 .259 .264 .267 .263 .265 .297	ANG -22.7 -37.2 -45.5 -49.4 -51.2 -53.7 -53.9 -57.4 -58.6 -60.4 -63.0 -65.0 -68.6 -69.5 -73.5 -76.5 -81.7 -84.4 -86.9 -91.9 -95.1 -99.5 -101.3 -105.6 -110.6 -111.3 -115.1 -119.2
VCE = 3 V, Ic = 5 mA FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 2000.00 2100.00 2200.00 2300.00 2400.00 2500.00 2600.00 2700.00	MAG .794 .727 .675 .653 .636 .638 .631 .635 .631 .635 .636 .641 .643 .653 .663 .660 .663 .669 .679 .678 .686 .682 .689 .703 .713 .698	ANG -49.6 -87.2 -112.2 -129.6 -143.4 -152.4 -161.0 -168.1 -173.7 -179.6 176.2 172.6 168.3 165.3 161.7 158.4 155.0 152.3 149.8 147.4 144.2 142.4 139.5 137.1 135.7 132.9	MAG 14.255 11.175 8.779 7.002 5.814 4.980 4.359 3.827 3.442 3.123 2.834 2.594 2.408 2.255 2.106 1.977 1.869 1.761 1.690 1.602 1.533 1.447 1.399 1.355 1.297 1.263 1.223	ANG 150.2 128.8 114.7 105.0 97.3 91.3 86.0 81.2 77.5 73.0 69.6 66.6 63.2 60.1 56.9 53.9 50.8 48.3 45.9 43.0 39.9 37.0 34.8 32.8 29.9 28.0 26.5	MAG .036 .058 .071 .079 .081 .083 .084 .087 .093 .095 .098 .099 .104 .103 .115 .113 .120 .123 .127 .126 .136 .145 .148 .159 .170 .171	ANG 65.6 50.9 40.4 37.4 35.2 32.0 35.6 34.8 32.2 34.4 35.4 37.7 40.1 38.9 41.4 39.7 42.3 41.9 42.0 46.3 46.6 45.1 46.9 44.8 46.1 46.2 44.5	MAG .887 .717 .584 .492 .424 .380 .351 .327 .306 .295 .283 .276 .260 .267 .252 .249 .241 .253 .248 .255 .259 .253 .259 .264 .267 .263 .265	ANG -22.7 -37.2 -45.5 -49.4 -51.2 -53.7 -53.9 -57.4 -58.6 -60.4 -63.0 -65.0 -68.6 -69.5 -73.5 -76.5 -76.5 -81.7 -84.4 -86.9 -91.9 -95.1 -99.5 -101.3 -105.6 -110.6 -111.3 -115.1

5



S-PARAMETER

Vce = 3 V, Ic = 3 mA

FREQUENCY	5	S ₁₁	Sa	21	S	12	5	S ₂₂
f (MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.865	-39.1	9.662	155.7	.039	72.5	.937	-16.1
200.00	.804	-72.2	8.150	135.9	.069	51.4	.816	-28.0
300.00	.751	-96.9	6.742	121.3	.085	42.4	.703	-35.7
400.00	.717	-115.5	5.560	110.6	.092	36.0	.612	-39.9
500.00	.685	-130.5	4.707	101.8	.096	32.8	.548	-42.9
600.00	.684	-141.5	4.083	95.1	.099	28.6	.499	-45.2
700.00	.673	-151.7	3.602	88.9	.101	27.0	.466	-46.9
800.00	.667	-159.0	3.177	83.4	.099	25.2	.442	-49.3
900.00	.669	-165.6	2.868	79.2	.104	24.9	.422	-50.7
1000.00	.671	-172.4	2.619	74.2	.103	25.8	.407	-52.1
1100.00	.670	-177.9	2.383	70.3	.103	25.0	.395	-54.9
1200.00	.674	179.0	2.173	66.8	.104	25.9	.388	-57.0
1300.00	.672	173.7	2.020	63.1	.105	25.8	.374	-59.8
1400.00	.676	170.6	1.895	59.7	.103	27.3	.374	-62.4
1500.00	.678	165.9	1.768	56.1	.107	28.1	.361	-66.4
1600.00	.686	162.6	1.661	53.1	.105	30.9	.357	-67.8
1700.00	.702	159.1	1.575	49.7	.110	32.6	.358	-71.1
1800.00	.693	156.1	1.492	46.7	.109	33.2	.362	-74.3
1900.00	.698	153.5	1.422	44.3	.113	36.6	.361	-77.8
2000.00	.704	150.7	1.345	41.3	.110	39.1	.367	-82.2
2100.00	.703	147.0	1.283	38.0	.117	38.7	.363	-85.4
2200.00	.713	144.8	1.220	34.9	.130	41.2	.370	-90.4
2300.00	.710	141.8	1.184	32.5	.130	44.1	.361	-92.5
2400.00	.713	139.6	1.136	31.1	.133	42.4	.361	-95.4
2500.00	.737	137.3	1.093	27.2	.148	43.3	.375	-100.4
2600.00	.740	135.1	1.060	26.0	.155	45.6	.370	-102.5
2700.00	.737	132.7	1.011	24.0	.160	44.7	.380	-107.6
2800.00	.733	130.2	.978	20.0	.162	49.3	.388	-112.4
2900.00	.737	128.7	.954	19.6	.178	47.1	.393	-113.0
3000.00	.733	127.0	.898	16.6	.177	44.7	.393	-117.3
ce = 3 V, Ic = 1 mA								

Vce

FREQUENCY	5	S11	Sz	21	S	12	S	22
f (MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.957	-26.5	3.552	162.8	.044	73.8	.978	-8.1
200.00	.921	-51.4	3.284	146.5	.078	61.3	.931	-15.2
300.00	.882	-72.6	2.966	132.7	.105	50.0	.884	-21.2
400.00	.853	-90.9	2.608	121.0	.124	40.3	.832	-25.5
500.00	.809	-106.5	2.326	110.4	.134	31.8	.783	-29.2
600.00	.805	-119.2	2.090	102.1	.143	26.2	.746	-32.1
700.00	.787	-130.6	1.892	94.2	.146	20.9	.722	-34.4
800.00	.776	-140.2	1.699	87.3	.145	14.7	.699	-38.1
900.00	.775	-148.7	1.553	81.4	.144	13.8	.681	-40.5
1000.00	.769	-156.8	1.430	75.2	.144	10.7	.669	-42.8
1100.00	.763	-163.7	1.317	70.3	.137	6.8	.658	-45.4
1200.00	.760	-168.4	1.206	65.8	.134	6.9	.647	-48.3
1300.00	.760	-174.8	1.135	61.2	.127	3.5	.635	-51.3
1400.00	.759	-178.8	1.064	57.3	.122	2.5	.636	-55.0
1500.00	.758	176.2	.994	52.8	.116	1.3	.623	-58.0
1600.00	.768	171.4	.940	49.1	.109	4.1	.623	-60.9
1700.00	.782	167.3	.899	45.9	.106	6.8	.624	-65.0
1800.00	.775	163.4	.840	42.3	.098	4.2	.628	-68.1
1900.00	.784	160.3	.799	39.4	.089	9.9	.620	-71.5
2000.00	.788	157.1	.761	36.1	.085	13.5	.632	-75.2
2100.00	.784	152.6	.728	32.8	.087	15.9	.627	-79.9
2200.00	.791	150.0	.692	29.2	.082	24.6	.634	-83.7
2300.00	.791	146.7	.658	27.5	.085	33.0	.626	-87.0
2400.00	.795	144.1	.634	26.3	.084	34.7	.625	-90.7
2500.00	.806	140.6	.610	22.7	.094	41.8	.621	-95.2
2600.00	.812	138.6	.585	21.3	.100	47.3	.624	-97.6
2700.00	.811	135.7	.557	20.0	.102	50.1	.639	-102.0
2800.00	.795	132.3	.547	17.2	.120	50.3	.652	-106.4
2900.00	.819	131.0	.528	17.2	.124	54.4	.641	-109.4
3000.00	.797	127.9	.490	14.3	.137	50.9	.658	-113.9

6

[MEMO]

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While NEC Corporation has been making continuous effort to enhance the reliability of its semiconductor devices, the possibility of defects cannot be eliminated entirely. To minimize risks of damage or injury to persons or property arising from a defect in an NEC semiconductor device, customer must incorporate sufficient safety measures in its design, such as redundancy, fire-containment, and anti-failure features.

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.

The quality grade of NEC devices in "Standard" unless otherwise specified in NEC's Data Sheets or Data Books. If customers intend to use NEC devices for applications other than those specified for Standard quality grade, they should contact NEC Sales Representative in advance.

Anti-radioactive design is not implemented in this product.

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