

SILICON TRANSISTOR

2SC5012

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

FEATURES

- Small Package
- High Gain Bandwidth Product (f_T = 9 GHz TYP.)
- · Low Noise, High Gain
- · Low Voltage Operation

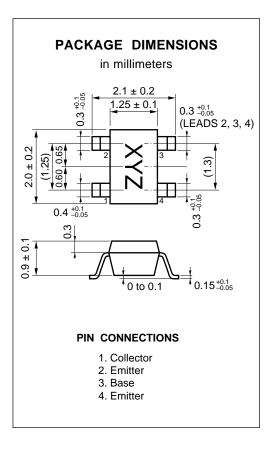
ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
2SC5012-T1	3 Kpcs/Reel.	Embossed tape 8 mm wide. Pin 3 (Base), Pin 4 (Emitter) face to perforation side of the tape.
2SC5012-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. Unit sample quantity shall be 50 pcs. (Part No.: 2SC5012)

ABSOLUTE MAXIMUM RATINGS (TA = 25 °C)

Collector to Base Voltage	Vсво	20	V
Collector to Emitter Voltage	Vceo	10	V
Emitter to Base Voltage	Vево	1.5	V
Collector Current	Ic	65	mΑ
Total Power Dissipation	PT	150	mW
Junction Temperature	T_{j}	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	VEB = 1 V, Ic = 0
DC Current Gain	hfe	50	100	250		Vce = 8 V, Ic = 20 mA*1
Gain Bandwidth Product	f⊤		9.0		GHz	Vce = 8 V, Ic = 20 mA
Feed-back Capacitance	Cre		0.25	0.8	pF	VCB = 10 V, IE = 0, f = 1 MHz*2
Insertion Power Gain	S _{21e} ²	13	15		dB	VcE = 8 V, Ic = 20 mA, f = 1.0 GHz
Noise Figure	NF		1.2	2.5	dB	VcE = 8 V, Ic = 7 mA, f = 1.0 GHz

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

hfe Classification

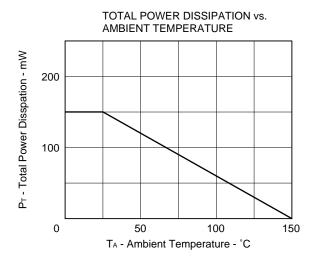
Rank	EB	FB	GB
Marking	R36	R37	R38
hfe	50 to 100	80 to 160	125 to 250

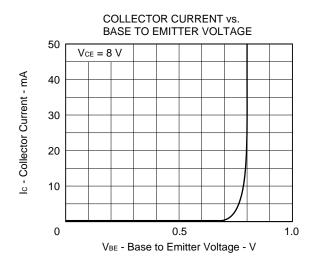
2

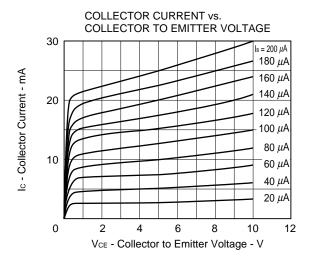
^{*2} Measured with 3 terminals bridge, Emitter and Case should be grounded.

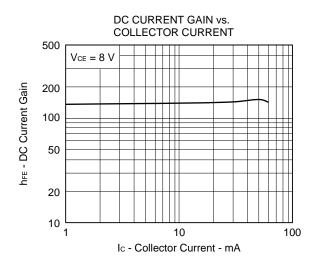


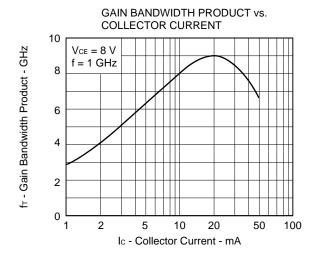
TYPICAL CHARACTERISTICS (TA = 25 °C)

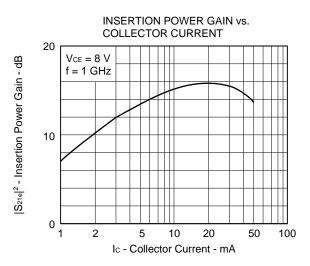




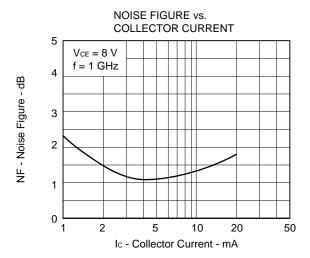


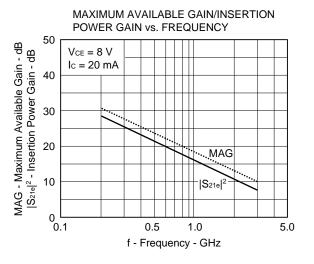


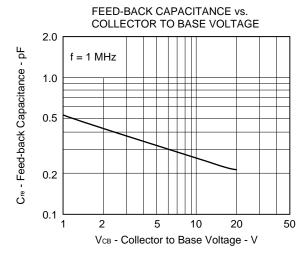














S-PARAMETER

VcE = 8 V, Ic = 20 mA

VOL - 0 V, 10 - 20 1111	•							
FREQUENCY	S	S11	S	21	S	12	S	22
f (MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
,								
100.00	.589	-57.8	34.077	143.4	.016	60.0	.826	-22.7
200.00	.486	-95.2	24.310	121.8	.022	56.3	.644	-30.4
300.00	.436	-119.1	18.108	109.7	.028	59.4	.543	-32.3
400.00	.411	-137.1	14.077	101.8	.031	48.4	.470	-31.9
500.00	.395	-149.6	11.600	95.5	.037	56.9	.430	-32.1
600.00 700.00	.398 .395	–158.1 –166.5	9.826 8.540	91.1 86.9	.040 .045	60.9 63.1	.412 .388	-31.9 -30.4
800.00	.397	-172.9	7.482	83.1	.043	57.9	.372	-30.4 -31.3
900.00	.401	-179.1	6.693	80.0	.057	66.1	.360	-32.8
1000.00	.407	175.4	6.069	76.6	.061	61.4	.358	-31.8
1100.00	.407	170.1	5.483	73.9	.066	59.3	.342	-33.2
1200.00	.407	167.6	5.019	71.3	.069	59.3	.334	-34.8
1300.00	.420	162.3	4.644	68.9	.076	61.8	.317	-36.0
1400.00	.412	160.0	4.338	66.1	.077	61.2	.330	-37.3
1500.00	.433	156.2	4.052	63.4	.083	58.7	.313	-39.0
1600.00 1700.00	.432 .455	153.4 151.2	3.777 3.579	61.2 58.8	.088 .096	61.4 60.0	.310 .297	-41.4 -41.7
1800.00	.456	146.7	3.373	56.5	.090	59.3	.296	-41.7 -42.1
1900.00	.453	145.9	3.208	54.8	.101	60.4	.311	-44.8
2000.00	.463	143.2	3.061	52.5	.106	59.9	.298	-49.9
2100.00	.475	141.0	2.917	49.8	.116	56.0	.287	-49.5
2200.00	.486	138.6	2.801	47.2	.119	59.9	.303	-53.3
2300.00	.481	136.8	2.676	45.2	.125	55.2	.290	-58.2
2400.00	.497	133.4	2.573	43.4	.125	55.8	.268	-56.8
2500.00	.502	132.5	2.469	40.7	.132	54.0	.273	-59.7
2600.00	.511	130.8	2.403	38.9	.147	52.8	.290	-59.6
2700.00 2800.00	.508 .504	129.1 126.7	2.306 2.228	37.2 33.8	.146 .147	54.3 50.0	.269 .271	–67.5 –71.7
2900.00	.504	125.7	2.226	32.5	.159	51.0	.273	-71.7 -66.7
3000.00	.514	123.0	2.068	29.6	.161	46.5	.289	-73.2
0000.00		0.0		_0.0		.0.0	00	
Vce = 3 V, Ic = 5 mA								
·		.	0		0		0	
FREQUENCY		S ₁₁	Sz			12		22
·	S MAG	S ₁₁ ANG	S ₂ MAG	21 ANG	S MAG	12 ANG	S MAG	222 ANG
FREQUENCY f (MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
FREQUENCY f (MHz) 100.00	MAG .826	ANG -29.5	MAG 14.854	ANG 160.0	MAG .024	ANG 78.6	MAG .953	ANG -13.4
FREQUENCY f (MHz) 100.00 200.00	MAG .826 .752	ANG -29.5 -56.0	MAG 14.854 13.074	ANG 160.0 142.7	MAG .024 .039	78.6 62.0	MAG .953 .850	ANG -13.4 -24.2
FREQUENCY f (MHz) 100.00 200.00 300.00	.826 .752 .682	ANG -29.5 -56.0 -77.7	MAG 14.854 13.074 11.233	ANG 160.0 142.7 129.3	.024 .039 .051	78.6 62.0 54.3	.953 .850 .754	-13.4 -24.2 -31.9
FREQUENCY f (MHz) 100.00 200.00	.826 .752 .682 .627	ANG -29.5 -56.0	MAG 14.854 13.074	ANG 160.0 142.7 129.3 119.1	.024 .039 .051 .059	78.6 62.0	MAG .953 .850	ANG -13.4 -24.2
FREQUENCY f (MHz) 100.00 200.00 300.00 400.00	.826 .752 .682	ANG -29.5 -56.0 -77.7 -95.2	MAG 14.854 13.074 11.233 9.484	ANG 160.0 142.7 129.3 119.1 110.4 104.1	.024 .039 .051	78.6 62.0 54.3 48.6	MAG .953 .850 .754 .664	-13.4 -24.2 -31.9 -36.2
FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00	MAG .826 .752 .682 .627 .575 .555	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1	MAG .024 .039 .051 .059 .066 .071 .075	78.6 62.0 54.3 48.6 45.3 41.2 40.8	MAG .953 .850 .754 .664 .586 .531 .492	ANG -13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3
FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00	MAG .826 .752 .682 .627 .575 .555 .536	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9	MAG .024 .039 .051 .059 .066 .071 .075 .078	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9	MAG .953 .850 .754 .664 .586 .531 .492 .452	-13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0
FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00	MAG .826 .752 .682 .627 .575 .555 .536 .524 .517	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8 -150.5	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683 5.136	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9 88.9	MAG .024 .039 .051 .059 .066 .071 .075 .078	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9 41.8	MAG .953 .850 .754 .664 .586 .531 .492 .452 .425	-13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0 -45.4
FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00	MAG .826 .752 .682 .627 .575 .555 .536 .524 .517 .512	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8 -150.5 -158.6	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683 5.136 4.702	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9 88.9 84.5	MAG .024 .039 .051 .059 .066 .071 .075 .078 .083 .083	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9 41.8 43.4	MAG .953 .850 .754 .664 .586 .531 .492 .452 .425 .411	-13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0 -45.4 -45.3
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 .826 .752 .682 .627 .575 .555 .536 .524 .517 .512 .504	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8 -150.5 -158.6 -164.5	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683 5.136 4.702 4.293	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9 88.9 84.5 80.9	MAG .024 .039 .051 .059 .066 .071 .075 .078 .083 .083	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9 41.8 43.4 41.0	MAG .953 .850 .754 .664 .586 .531 .492 .452 .425 .411 .395	ANG -13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0 -45.4 -45.3 -47.5
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 .826 .752 .682 .627 .575 .555 .536 .524 .517 .512 .504 .501	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8 -150.5 -158.6 -164.5 -169.3	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683 5.136 4.702 4.293 3.925	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9 88.9 84.5 80.9 77.7	MAG .024 .039 .051 .059 .066 .071 .075 .078 .083 .083 .086 .093	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9 41.8 43.4 41.0 41.8	MAG .953 .850 .754 .664 .586 .531 .492 .452 .452 .411 .395 .382	ANG -13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0 -45.4 -45.3 -47.5 -47.8
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 .826 .752 .682 .627 .575 .555 .536 .524 .517 .512 .504 .501	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8 -150.5 -158.6 -164.5 -169.3 -175.3 -178.9	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683 5.136 4.702 4.293 3.925 3.661	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9 88.9 84.5 80.9	MAG .024 .039 .051 .059 .066 .071 .075 .078 .083 .083 .086 .093 .096	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9 41.8 43.4 41.0	MAG .953 .850 .754 .664 .586 .531 .492 .452 .425 .411 .395	ANG -13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0 -45.4 -45.3 -47.5 -47.8 -49.4
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 1300.00	MAG .826 .752 .682 .627 .575 .555 .536 .524 .517 .512 .504 .501	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8 -150.5 -158.6 -164.5 -169.3	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683 5.136 4.702 4.293 3.925	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9 88.9 84.5 80.9 77.7 74.4	MAG .024 .039 .051 .059 .066 .071 .075 .078 .083 .083 .086 .093	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9 41.8 43.4 41.0 41.8 42.2	MAG .953 .850 .754 .664 .586 .531 .492 .452 .425 .411 .395 .382 .361	ANG -13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0 -45.4 -45.3 -47.5 -47.8
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 .826 .752 .682 .627 .575 .555 .536 .524 .517 .512 .504 .501 .501 .505 .504	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8 -150.5 -158.6 -164.5 -169.3 -175.3 -178.9 175.0 171.4	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683 5.136 4.702 4.293 3.925 3.661 3.424 3.204 3.009	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9 88.9 84.5 80.9 77.7 74.4 71.3 68.1 65.2	MAG .024 .039 .051 .059 .066 .071 .075 .078 .083 .083 .086 .093 .096 .093	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9 41.8 43.4 41.0 41.8 42.2 43.2 42.0 41.1	MAG .953 .850 .754 .664 .586 .531 .492 .452 .425 .411 .395 .382 .361 .351 .331	ANG -13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0 -45.4 -45.3 -47.5 -47.8 -49.4 -50.2 -52.6 -53.0
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 .826 .752 .682 .627 .575 .555 .536 .524 .517 .512 .504 .501 .501 .505 .504	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8 -150.5 -158.6 -164.5 -169.3 -175.3 -178.9 175.0 171.4 167.9	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683 5.136 4.702 4.293 3.925 3.661 3.424 3.204 3.009 2.858	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9 88.9 84.5 80.9 77.7 74.4 71.3 68.1 65.2 62.6	MAG .024 .039 .051 .059 .066 .071 .075 .078 .083 .083 .086 .093 .096 .093 .099 .103 .110	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9 41.8 43.4 41.0 41.8 42.2 43.2 42.0 41.1 44.3	MAG .953 .850 .754 .664 .586 .531 .492 .452 .425 .411 .395 .382 .361 .351 .331 .330 .319	ANG -13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0 -45.4 -45.3 -47.5 -47.8 -49.4 -50.2 -52.6 -53.0 -54.7
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 .826 .752 .682 .627 .575 .555 .536 .524 .517 .512 .504 .501 .501 .505 .504 .512 .505	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8 -150.5 -158.6 -164.5 -169.3 -175.3 -178.9 175.0 171.4 167.9 164.3	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683 5.136 4.702 4.293 3.925 3.661 3.424 3.204 3.009 2.858 2.698	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9 88.9 84.5 80.9 77.7 74.4 71.3 68.1 65.2 62.6 60.0	MAG .024 .039 .051 .059 .066 .071 .075 .078 .083 .083 .086 .093 .096 .093 .101 .110	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9 41.8 43.4 41.0 41.8 42.2 43.2 42.0 41.1 44.3 43.8	MAG .953 .850 .754 .664 .586 .531 .492 .452 .425 .411 .395 .382 .361 .351 .331 .330 .319 .332	ANG -13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0 -45.4 -45.3 -47.5 -47.8 -49.4 -50.2 -52.6 -53.0 -54.7 -56.5
FREQUENCY f (MHz) 100.00 200.00 300.00 400.00 500.00 700.00 800.00 700.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1800.00	MAG .826 .752 .682 .627 .575 .555 .536 .524 .517 .512 .504 .501 .505 .504 .512 .530 .529 .529	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8 -150.5 -158.6 -164.5 -169.3 -175.3 -178.9 175.0 171.4 167.9 164.3 161.1	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683 5.136 4.702 4.293 3.925 3.661 3.424 3.204 3.009 2.858 2.698 2.579	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9 88.9 84.5 80.9 77.7 74.4 71.3 68.1 65.2 62.6 60.0 57.7	MAG .024 .039 .051 .059 .066 .071 .075 .078 .083 .083 .086 .093 .096 .093 .103 .110 .110 .113	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9 41.8 43.4 41.0 41.8 42.2 43.2 42.0 41.1 44.3 43.8 43.5	MAG .953 .850 .754 .664 .586 .531 .492 .452 .425 .411 .395 .382 .361 .351 .331 .330 .319 .332 .315	ANG -13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0 -45.4 -45.3 -47.5 -47.8 -49.4 -50.2 -52.6 -53.0 -54.7 -56.5 -58.4
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 1700.00 1800.00 1700.00 1800.00 1900.00 2000.00	MAG .826 .752 .682 .627 .575 .555 .536 .524 .517 .512 .504 .501 .501 .505 .504 .512 .530 .529 .529 .543	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8 -150.5 -158.6 -164.5 -169.3 -175.3 -178.9 175.0 171.4 167.9 164.3 161.1 158.3	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683 5.136 4.702 4.293 3.925 3.661 3.424 3.204 3.009 2.858 2.698 2.579 2.455	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9 88.9 84.5 80.9 77.7 74.4 71.3 68.1 65.2 62.6 60.0 57.7 54.6	MAG .024 .039 .051 .059 .066 .071 .075 .078 .083 .083 .086 .093 .096 .093 .103 .110 .1110 .113 .118	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9 41.8 43.4 41.0 41.8 42.2 43.2 42.0 41.1 44.3 43.8 43.5 43.8	MAG .953 .850 .754 .664 .586 .531 .492 .452 .425 .411 .395 .382 .361 .351 .331 .330 .319 .332 .315 .318	ANG -13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0 -45.4 -45.3 -47.5 -47.8 -49.4 -50.2 -52.6 -53.0 -54.7 -56.5 -58.4 -61.3
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 .826 .752 .682 .627 .575 .555 .536 .524 .517 .512 .504 .501 .501 .505 .504 .512 .530 .529 .529 .529 .543 .536	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8 -150.5 -158.6 -164.5 -169.3 -175.3 -178.9 175.0 171.4 167.9 164.3 161.1 158.3 153.8	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683 5.136 4.702 4.293 3.925 3.661 3.424 3.204 3.009 2.858 2.698 2.579 2.455 2.325	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9 88.9 84.5 80.9 77.7 74.4 71.3 68.1 65.2 62.6 60.0 57.7 54.6 51.0	MAG .024 .039 .051 .059 .066 .071 .075 .078 .083 .086 .093 .096 .093 .110 .110 .1113 .118 .122	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9 41.8 43.4 41.0 41.8 42.2 43.2 42.0 41.1 44.3 43.8 43.5 43.8	MAG .953 .850 .754 .664 .586 .531 .492 .452 .452 .411 .395 .382 .361 .351 .331 .330 .319 .332 .315 .318	ANG -13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0 -45.4 -45.3 -47.5 -47.8 -49.4 -50.2 -52.6 -53.0 -54.7 -56.5 -58.4 -61.3 -64.0
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 .826 .752 .682 .627 .575 .555 .536 .524 .517 .512 .504 .501 .505 .504 .512 .530 .529 .529 .529 .543 .536 .552	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8 -150.5 -158.6 -164.5 -169.3 -175.3 -178.9 175.0 171.4 167.9 164.3 161.1 158.3 153.8 151.0	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683 5.136 4.702 4.293 3.925 3.661 3.424 3.204 3.009 2.858 2.698 2.579 2.455 2.325 2.217	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9 88.9 84.5 80.9 77.7 74.4 71.3 68.1 65.2 62.6 60.0 57.7 54.6 51.0 48.0	MAG .024 .039 .051 .059 .066 .071 .075 .078 .083 .083 .086 .093 .096 .093 .099 .103 .110 .110 .113 .118 .122 .128	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9 41.8 43.4 41.0 41.8 42.2 43.2 42.0 41.1 44.3 43.8 43.5 43.8 45.0 42.4	MAG .953 .850 .754 .664 .586 .531 .492 .452 .425 .411 .395 .382 .361 .351 .331 .330 .319 .332 .315 .318	ANG -13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0 -45.4 -45.3 -47.5 -47.8 -49.4 -50.2 -52.6 -53.0 -54.7 -56.5 -58.4 -61.3 -64.0 -67.8
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 .826 .752 .682 .627 .575 .555 .536 .524 .517 .512 .504 .501 .501 .505 .504 .512 .530 .529 .529 .529 .543 .536	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8 -150.5 -158.6 -164.5 -169.3 -175.3 -178.9 175.0 171.4 167.9 164.3 161.1 158.3 153.8	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683 5.136 4.702 4.293 3.925 3.661 3.424 3.204 3.009 2.858 2.698 2.579 2.455 2.325	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9 88.9 84.5 80.9 77.7 74.4 71.3 68.1 65.2 62.6 60.0 57.7 54.6 51.0	MAG .024 .039 .051 .059 .066 .071 .075 .078 .083 .086 .093 .096 .093 .110 .110 .1113 .118 .122	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9 41.8 43.4 41.0 41.8 42.2 43.2 42.0 41.1 44.3 43.8 43.5 43.8	MAG .953 .850 .754 .664 .586 .531 .492 .452 .425 .411 .395 .382 .361 .351 .330 .319 .332 .315 .318 .318 .313	ANG -13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0 -45.4 -45.3 -47.5 -47.8 -49.4 -50.2 -52.6 -53.0 -54.7 -56.5 -58.4 -61.3 -64.0
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 2200.00 2300.00 2400.00 2500.00	MAG .826 .752 .682 .627 .575 .555 .536 .524 .517 .512 .504 .501 .501 .505 .504 .512 .530 .529 .529 .543 .536 .552 .548 .560	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8 -150.5 -158.6 -164.5 -169.3 -175.3 -175.0 171.4 167.9 164.3 161.1 158.3 153.8 151.0 149.3 145.6 143.8	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683 5.136 4.702 4.293 3.925 3.661 3.424 3.204 3.009 2.858 2.698 2.579 2.455 2.325 2.217 2.119 2.057 1.969	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9 88.9 84.5 80.9 77.7 74.4 71.3 68.1 65.2 62.6 60.0 57.7 54.6 51.0 48.0 46.0 44.4 41.0	MAG .024 .039 .051 .059 .066 .071 .075 .078 .083 .083 .086 .093 .096 .093 .110 .110 .113 .118 .122 .128 .130 .135 .137	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9 41.8 43.4 41.0 41.8 42.2 43.2 42.0 41.1 44.3 43.8 43.5 43.8 43.5 43.8 43.5	MAG .953 .850 .754 .664 .586 .531 .492 .452 .425 .411 .395 .382 .361 .351 .330 .319 .332 .315 .318 .313 .300 .294	ANG -13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0 -45.4 -45.3 -47.5 -47.8 -49.4 -50.2 -52.6 -53.0 -54.7 -56.5 -58.4 -61.3 -64.0 -67.8
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 1500.00 1500.00 1600.00 1700.00 1800.00 1900.00 2200.00 2300.00 2400.00 2500.00 2600.00	MAG .826 .752 .682 .627 .575 .555 .536 .524 .517 .512 .504 .501 .501 .505 .504 .512 .530 .529 .529 .543 .536 .552 .552 .548 .560 .572	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8 -150.5 -158.6 -164.5 -169.3 -175.3 -178.9 175.0 171.4 167.9 164.3 161.1 158.3 153.8 151.0 149.3 145.6 143.8 140.8	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683 5.136 4.702 4.293 3.925 3.661 3.424 3.204 3.009 2.858 2.698 2.579 2.455 2.325 2.217 2.119 2.057 1.969 1.913	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9 88.9 84.5 80.9 77.7 74.4 71.3 68.1 65.2 62.6 60.0 57.7 54.6 51.0 48.0 46.0 44.4 41.0 38.9	MAG .024 .039 .051 .059 .066 .071 .075 .078 .083 .083 .086 .093 .096 .093 .110 .110 .113 .118 .122 .128 .130 .135 .137 .140	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9 41.8 43.4 41.0 41.8 42.2 43.2 42.0 41.1 44.3 43.8 43.5 43.8 45.0 42.4 41.5 42.6 44.7 41.9	MAG .953 .850 .754 .664 .586 .531 .492 .452 .425 .411 .395 .382 .361 .351 .331 .330 .319 .332 .315 .318 .313 .300 .294 .288 .290 .279	ANG -13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0 -45.4 -45.3 -47.5 -47.8 -49.4 -50.2 -52.6 -53.0 -54.7 -56.5 -58.4 -61.3 -64.0 -67.8 -67.7 -69.6 -74.7 -75.0
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 1500.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2100.00 2300.00 2400.00 2500.00 2600.00 2700.00	MAG .826 .752 .682 .627 .575 .555 .536 .524 .517 .512 .504 .501 .505 .504 .512 .530 .529 .529 .543 .536 .552 .552 .548 .560 .572 .572	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8 -150.5 -158.6 -164.5 -169.3 -175.3 -178.9 175.0 171.4 167.9 164.3 161.1 158.3 153.8 151.0 149.3 145.6 143.8 140.8 138.3	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683 5.136 4.702 4.293 3.925 3.661 3.424 3.204 3.009 2.858 2.698 2.579 2.455 2.325 2.217 2.119 2.057 1.969 1.913 1.832	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9 88.9 84.5 80.9 77.7 74.4 71.3 68.1 65.2 62.6 60.0 57.7 54.6 51.0 48.0 46.0 44.4 41.0 38.9 37.3	MAG .024 .039 .051 .059 .066 .071 .075 .078 .083 .086 .093 .096 .093 .103 .110 .113 .118 .122 .128 .130 .135 .137 .140 .149	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9 41.8 43.4 41.0 41.8 42.2 42.0 41.1 44.3 43.8 43.5 43.8 45.0 42.4 41.5 42.6 44.7 41.9 40.6	MAG .953 .850 .754 .664 .586 .531 .492 .452 .425 .411 .395 .382 .361 .351 .331 .330 .319 .332 .315 .318 .313 .300 .294 .288 .290 .279 .291	ANG -13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0 -45.4 -45.3 -47.5 -47.8 -49.4 -50.2 -52.6 -53.0 -54.7 -66.5 -58.4 -61.3 -64.0 -67.8 -67.7 -69.6 -74.7 -75.0 -78.0
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 2400.00 2500.00 2600.00 2700.00 2800.00	MAG .826 .752 .682 .627 .575 .555 .536 .524 .517 .512 .504 .501 .501 .505 .504 .512 .530 .529 .529 .543 .536 .552 .548 .560 .572 .572 .562	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8 -150.5 -158.6 -164.5 -169.3 -175.3 -178.9 175.0 171.4 167.9 164.3 161.1 158.3 153.8 151.0 149.3 145.6 143.8 140.8 138.3 136.4	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683 5.136 4.702 4.293 3.925 3.661 3.424 3.204 3.009 2.858 2.698 2.579 2.455 2.325 2.217 2.119 2.057 1.969 1.913 1.832 1.775	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9 88.9 84.5 80.9 77.7 74.4 71.3 68.1 65.2 62.6 60.0 57.7 54.6 51.0 48.0 46.0 44.4 41.0 38.9 37.3 34.4	MAG .024 .039 .051 .059 .066 .071 .075 .078 .083 .083 .086 .093 .096 .093 .103 .110 .113 .118 .122 .128 .130 .135 .137 .140 .149 .153	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9 41.8 43.4 41.0 41.8 42.2 42.0 41.1 44.3 43.8 43.5 43.8 45.0 42.4 41.5 42.6 44.7 41.9 40.6 42.9	MAG .953 .850 .754 .664 .586 .531 .492 .452 .411 .395 .382 .361 .351 .331 .330 .319 .332 .315 .318 .313 .300 .294 .288 .290 .279 .291 .290	ANG -13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0 -45.4 -45.3 -47.5 -47.8 -49.4 -50.2 -52.6 -53.0 -54.7 -56.5 -58.4 -61.3 -64.0 -67.8 -67.7 -69.6 -74.7 -75.0 -78.0 -82.7
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 1500.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2100.00 2300.00 2400.00 2500.00 2600.00 2700.00	MAG .826 .752 .682 .627 .575 .555 .536 .524 .517 .512 .504 .501 .505 .504 .512 .530 .529 .529 .543 .536 .552 .552 .548 .560 .572 .572	ANG -29.5 -56.0 -77.7 -95.2 -111.1 -122.6 -134.3 -142.8 -150.5 -158.6 -164.5 -169.3 -175.3 -178.9 175.0 171.4 167.9 164.3 161.1 158.3 153.8 151.0 149.3 145.6 143.8 140.8 138.3	MAG 14.854 13.074 11.233 9.484 8.193 7.199 6.411 5.683 5.136 4.702 4.293 3.925 3.661 3.424 3.204 3.009 2.858 2.698 2.579 2.455 2.325 2.217 2.119 2.057 1.969 1.913 1.832	ANG 160.0 142.7 129.3 119.1 110.4 104.1 98.1 92.9 88.9 84.5 80.9 77.7 74.4 71.3 68.1 65.2 62.6 60.0 57.7 54.6 51.0 48.0 46.0 44.4 41.0 38.9 37.3	MAG .024 .039 .051 .059 .066 .071 .075 .078 .083 .086 .093 .096 .093 .103 .110 .113 .118 .122 .128 .130 .135 .137 .140 .149	78.6 62.0 54.3 48.6 45.3 41.2 40.8 39.9 41.8 43.4 41.0 41.8 42.2 42.0 41.1 44.3 43.8 43.5 43.8 45.0 42.4 41.5 42.6 44.7 41.9 40.6	MAG .953 .850 .754 .664 .586 .531 .492 .452 .425 .411 .395 .382 .361 .351 .331 .330 .319 .332 .315 .318 .313 .300 .294 .288 .290 .279 .291	ANG -13.4 -24.2 -31.9 -36.2 -39.3 -41.7 -42.3 -45.0 -45.4 -45.3 -47.5 -47.8 -49.4 -50.2 -52.6 -53.0 -54.7 -66.5 -58.4 -61.3 -64.0 -67.8 -67.7 -69.6 -74.7 -75.0 -78.0

5



S-PARAMETER

Vce

ce = 3 V, Ic = 3 mA								
FREQUENCY	NCY S ₁₁		Sa	21	S	12	S 22	
f (MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.887	-22.8	9.939	164.2	.024	78.7	.973	-9.8
200.00	.836	-44.6	9.201	149.5	.044	67.2	.912	-18.1
300.00	.782	-63.0	8.316	137.2	.060	57.2	.847	-25.2
400.00	.724	-79.7	7.309	127.1	.068	52.2	.772	-29.6
500.00	.666	-95.1	6.543	117.6	.078	47.5	.697	-34.0
600.00	.642	-107.2	5.870	110.6	.086	40.1	.640	-36.8
700.00	.610	-119.1	5.313	104.0	.091	36.8	.607	-38.3
800.00	.592	-128.2	4.760	98.2	.092	36.4	.563	-40.8
900.00	.579	-137.4	4.349	93.5	.094	34.7	.535	-42.0
1000.00	.563	-145.9	4.007	88.5	.096	32.8	.510	-42.4
1100.00	.556	-153.1	3.677	84.4	.100	32.5	.488	-43.9
1200.00	.546	-158.5	3.364	80.6	.099	32.1	.475	-46.0
1300.00	.545	-165.0	3.157	76.9	.103	33.0	.452	-47.0
1400.00 1500.00	.544 .543	-169.5 -176.2	2.960 2.775	73.6	.100 .103	32.3 30.6	.449 .427	-49.1 -50.0
1600.00	.543 .552	-176.2 -179.9	2.775	69.9	.103	30.6	.42 <i>1</i> .424	-50.0 -51.1
1700.00	.561	-179.9 175.7	2.487	66.8 63.7	.104	32.6	.424 .414	-51.1 -52.3
1800.00	.561	173.7	2.467	60.9	.103	32.6	.414	-52.3 -55.0
1900.00	.561	168.6	2.349	58.4	.113	32.0	.406	-57.3
2000.00	.580	164.0	2.138	55.0	.120	33.7	.397	-60.1
2100.00	.569	159.2	2.032	51.3	.114	33.3	.403	-62.3
2200.00	.572	156.0	1.936	48.1	.119	34.7	.395	-64.7
2300.00	.574	152.8	1.860	46.0	.121	34.6	.386	-66.2
2400.00	.580	150.6	1.797	43.5	.117	37.4	.382	-67.8
2500.00	.594	147.6	1.727	40.2	.126	35.5	.382	-71.4
2600.00	.596	144.7	1.668	38.4	.132	36.2	.371	-71.6
2700.00	.604	142.5	1.612	36.6	.129	38.1	.373	-76.4
2800.00	.584	140.3	1.567	33.1	.137	38.3	.378	-78.8
2900.00	.603	138.6	1.506	31.9	.135	36.4	.379	-79.6
3000.00	.594	135.0	1.432	28.6	.147	37.3	.380	-84.5
ce = 3 V, Ic = 1 mA								
FREQUENCY	S	11	Sa	21	S	12	S	22
f (MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.968	-14.4	3.598	169.7	.025	77.5	.987	-4.9
200.00	.942	-29.1	3.497	159.2	.047	75.0	.971	-9.9
300.00	.918	-42.4	3.370	149.6	.072	65.0	.952	-14.3
400.00	992	55 Q	2 160	140 6	005	57 Q	019	10/

VCE = 3 V	, Ic = 1	mΑ
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FREQUENCY	S	S11	Sa	21	S	12	S	22
f (MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.968	-14.4	3.598	169.7	.025	77.5	.987	-4.9
200.00	.942	-29.1	3.497	159.2	.047	75.0	.971	-9.9
300.00	.918	-42.4	3.370	149.6	.072	65.0	.952	-14.3
400.00	.882	-55.8	3.169	140.6	.085	57.8	.918	-18.4
500.00	.838	-68.1	3.015	131.3	.101	51.5	.882	-22.2
600.00	.825	-79.9	2.850	124.0	.114	46.3	.848	-25.2
700.00	.789	-90.8	2.702	116.6	.122	41.6	.823	-28.0
800.00	.770	-100.8	2.505	109.4	.132	35.5	.788	-31.1
900.00	.740	-109.9	2.352	103.7	.138	31.4	.757	-32.8
1000.00	.722	-119.0	2.225	97.6	.138	26.9	.747	-34.8
1100.00	.703	-127.3	2.077	92.5	.139	25.8	.720	-37.2
1200.00	.692	-134.3	1.930	87.2	.144	23.0	.703	-39.2
1300.00	.678	-142.1	1.831	82.6	.146	18.7	.682	-40.6
1400.00	.674	-147.6	1.740	78.2	.141	17.1	.681	-43.0
1500.00	.662	-154.5	1.644	73.7	.137	15.1	.655	-45.1
1600.00	.665	-160.7	1.552	69.6	.136	13.0	.644	-46.6
1700.00	.673	-166.6	1.502	66.0	.137	12.0	.640	-48.4
1800.00	.666	-171.6	1.420	61.9	.136	10.0	.641	-51.1
1900.00	.667	-175.3	1.360	59.0	.128	10.0	.629	-53.3
2000.00	.677	179.3	1.301	55.1	.124	8.6	.626	-55.5
2100.00	.671	173.9	1.245	50.8	.122	9.4	.616	-58.8
2200.00	.673	169.5	1.182	46.7	.116	7.5	.618	-60.9
2300.00	.673	166.2	1.145	44.5	.118	11.5	.613	-63.4
2400.00	.669	162.5	1.098	42.0	.107	8.2	.607	-65.8
2500.00	.683	159.6	1.057	38.1	.106	13.2	.603	-69.0
2600.00	.689	155.6	1.030	35.7	.106	14.1	.596	-69.5
2700.00	.695	152.4	.986	33.7	.108	18.2	.599	-72.9
2800.00	.675	149.7	.965	29.9	.101	16.0	.613	-77.4
2900.00	.687	146.9	.929	28.8	.099	16.1	.600	-77.8
3000.00	.674	143.3	.884	24.9	.109	18.0	.600	-81.9

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NEC devices are classified into the following three quality grades:

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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.