# Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: http://www.renesas.com

April 1<sup>st</sup>, 2010 Renesas Electronics Corporation

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# RENESAS

# SILICON TRANSISTOR 2SC5008

# NPN SILICON EPITAXIAL TRANSISTOR 3 PINS ULTRA SUPER MINI MOLD

#### DESCRIPTION

The 2SC5008 is an NPN epitaxial silicon transistor designed for use in low noise and small signal amplifiers from VHF band to L band. Low noise figure, high gain, and high current capability achieve a very wide dynamic range and excellent linearity. This is achieved by direct nitride passivated base surface, process (NEST2 process) which is an NEC proprietary fabrication technique.

#### **FEATURES**

- Low Voltage Use.
- High fr: 8.0 GHz TYP. (@ Vce = 3 V, Ic = 5 mA, f = 2 GHz)
- Low Cre: 0.3 pF TYP. (@ Vce = 3 V, Ie = 0, f = 1 MHz)
- Low NF: 1.9 dB TYP. (@ Vce = 3 V, Ic = 5 mA, f = 2 GHz)
- High |S<sub>21e</sub>|<sup>2</sup>: 7.5 dB TYP. (@ VcE = 3 V, lc = 5 mA, f = 2 GHz)
- Ultra Super Mini Mold Package.

#### ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
2SC5008	50 pcs./Unit	Embossed tape 8 mm wide.
2SC5008-T1	3 kpcs./Reel	of the tape.

\* Please contact with responsible NEC person, if you require evaluation sample. Unit sample quantity shall be 50 pcs.

#### ABSOLUTE MAXIMUM RATINGS (TA = 25 $^{\circ}$ C)

Collector to Base Voltage	Vсво	20	V
Collector to Emitter Voltage	Vceo	10	V
Emitter to Base Voltage	Vebo	1.5	V
Collector Current	lc	35	mA
Total Power Dissipation	Р⊤	125 mW	
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-65 to + 150	°C





## ELECTRICAL CHARACTERISTICS (TA = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
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	80		160		Vce = 3 V, Ic = 5 mA*1
Gain Bandwidth Product	f⊤	5.5	8.0		GHz	Vce = 3 V, Ic = 5 mA
Feed-back Capacitance	Cre		0.3	0.7	pF	Vcb = 3 V, IE = 0, f = 1 MHz*2
Insertion Power Gain	S <sub>21e</sub>   <sup>2</sup>	5.5	7.5		dB	Vce = 3 V, Ic = 5 mA, f = 2 GHz
Noise Figure	NF		1.9	3.2	dB	Vce = 3 V, Ic = 5 mA, f = 2 GHz

\*1 Pulse Measurement PW  $\leq$  350  $\mu$ s, Duty Cycle  $\leq$  2 %

\*2 The emitter terminal and the case shall be connected to the guard terminal of the three-terminal capacitance bridge.

#### hFE Classification

RANK	FB
Marking	44
hfe	80 to 160

TYPICAL CHARACTERISTICS (TA = 25 °C)







$V_{CE} = 3 V, I_{C} = 10 m$	A, Zo = 50	Ω						
FREQUENCY	S	511	S2	21	S	12	S	22
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	739	-23.1	15 190	151 5	016	74.9	922	-13.6
200.00	617	-45.5	13 966	131.0	027	63.0	804	-22.2
300.00	507	-64.6	12 474	115.9	035	57.3	699	-25.8
400.00	414	-81.0	10.826	102.7	042	51.8	632	-27.3
500.00	.344	-94.7	9.421	91.8	.049	49.7	.583	-28.1
600.00	.296	-105.9	8.147	82.9	.055	47.0	.550	-28.1
700.00	.260	-116.6	7.211	74.9	.062	44.4	.525	-28.3
800.00	.236	-126.3	6.434	67.7	.068	41.8	.506	-28.7
900.00	.218	-136.2	5.806	60.9	.075	39.1	.490	-28.9
1000.00	.205	-144.8	5.288	54.6	.083	36.4	.477	-29.6
1100.00	.199	-153.1	4.864	48.6	.089	33.4	.466	-29.9
1200.00	.194	-161.6	4.500	42.7	.096	30.2	.457	-31.0
1300.00	.193	-168.9	4.191	37.0	.102	27.7	.449	-31.7
1400.00	.194	-175.6	3.908	31.4	.111	24.2	.441	-32.8
1500.00	.196	178.7	3.680	26.2	.118	21.0	.435	-33.9
1600.00	.202	173.5	3.489	20.7	.125	17.6	.429	-35.5
1700.00	.214	167.9	3.317	15.0	.133	12.6	.417	-37.2
1800.00	.222	161.7	3.154	9.6	.139	9.4	.406	-38.2
1900.00	.229	156.3	2.994	4.2	.145	6.0	.397	-39.4
2000.00	.237	151.7	2.857	-1.0	.152	2.6	.390	-40.5
2100.00	.246	147.5	2.748	-6.1	.159	9	.381	-42.1
2200.00	.253	144.6	2.626	-11.1	.167	-4.6	.374	-43.6
2300.00	.263	140.9	2.539	-16.2	.174	-8.0	.366	-45.2
2400.00	.271	137.9	2.445	-21.3	.182	-11.6	.357	-46.8
2500.00	.283	134.8	2.363	-26.3	.190	-15.2	.347	-48.4
2600.00	.292	132.0	2.288	-31.4	.197	-19.2	.338	-50.6
2700.00	.303	129.7	2.218	-36.4	.204	-22.9	.328	-52.5
2800.00	.315	127.4	2.147	-41.4	.211	-26.7	.318	-54.8
2900.00	.326	125.0	2.085	-46.3	.220	-30.8	.309	-56.9
3000.00	.339	122.7	2.032	-51.2	.227	-34.2	.299	-59.5
Vce = 3 V, Ic = 7 m/	Α, Zo = 50 Ω	2						
FREQUENCY	S	511	S2	21	S	12	S	22

	-				-		-	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.815	-17.7	11.972	155.6	.016	77.0	.947	-11.5
200.00	.732	-34.0	11.228	138.4	.029	63.4	.855	-20.4
300.00	.634	-50.1	10.480	123.5	.039	56.1	.757	-25.1
400.00	.539	-64.9	9.549	110.7	.047	51.8	.687	-27.9
500.00	.455	-78.9	8.722	99.0	.054	47.4	.630	-29.6
600.00	.392	-89.6	7.703	89.1	.060	44.0	.589	-30.5
700.00	.336	-100.4	6.951	80.3	.066	41.4	.557	-30.9
800.00	.297	-110.0	6.265	72.2	.073	38.5	.532	-31.5
900.00	.268	-119.5	5.700	64.9	.079	35.8	.511	-31.9
1000.00	.244	-128.0	5.221	58.3	.086	32.7	.494	-32.5
1100.00	.228	-136.6	4.802	51.8	.092	29.7	.480	-32.9
1200.00	.216	-145.2	4.479	45.5	.098	27.4	.468	-33.8
1300.00	.208	-153.4	4.169	39.6	.106	24.0	.459	-34.4
1400.00	.203	-160.8	3.900	33.9	.113	21.1	.449	-35.6
1500.00	.202	-167.7	3.674	28.2	.121	17.5	.440	-36.6
1600.00	.205	-173.8	3.478	22.7	.128	14.3	.433	-37.8
1700.00	.214	179.6	3.316	17.3	.135	10.2	.421	-39.7
1800.00	.219	172.5	3.153	11.6	.141	6.4	.409	-40.7
1900.00	.223	165.7	3.001	6.0	.146	3.5	.399	-41.7
2000.00	.230	160.0	2.874	.7	.153	0.0	.391	-43.0
2100.00	.236	155.4	2.753	-4.6	.160	-3.2	.382	-44.4
2200.00	.244	151.6	2.631	-9.6	.167	-6.9	.374	-45.7
2300.00	.254	147.1	2.548	-14.9	.174	-10.4	.365	-47.2
2400.00	.262	143.5	2.453	-20.0	.181	-13.8	.356	-49.0
2500.00	.273	140.2	2.370	-25.0	.189	-17.4	.346	-50.5
2600.00	.281	137.1	2.295	-30.2	.196	-21.0	.337	-52.7
2700.00	.293	134.1	2.228	-35.2	.203	-24.9	.328	-54.6
2800.00	.303	131.4	2.156	-40.2	.211	-28.3	.317	-56.7
2900.00	.315	128.6	2.092	-45.2	.218	-32.3	.307	-58.8
3000.00	.326	126.2	2.040	-50.1	.227	-36.1	.298	-61.4

Vce	= 3 V, Ic = 5 mA	, Zo = 50 G	2						
	FREQUENCY	S	511	S2	21	S	12	S	22
		MAC		MAC	ANC	MAC		MAC	
	100.00	IVIAG	ANG	MAG 0.007		MAG		MAG 004	ANG
	100.00	.870	-13.9	9.067	158.8	.017	76.2	.964	-9.7
	200.00	.809	-27.3	8.687	143.1	.031	65.8	.897	-17.8
	300.00	.733	-40.3	8.368	129.3	.042	58.0	.814	-23.3
	400.00	.661	-53.0	7.864	117.5	.052	51.2	.748	-27.0
	500.00	.575	-66.1	7.479	106.3	.059	45.9	.687	-29.5
	600.00	.510	-76.2	6.765	96.3	.066	41.4	.643	-31.2
	700.00	.440	-87.2	6.297	86.6	.072	38.2	.604	-32.3
	800.00	387	-96.8	5 812	77 7	078	34.7	574	-33.3
	000.00	345	106.1	5 265	60.7	.070	22.7	547	22.0
	900.00	.345	-100.1	3.303	09.7	.003	32.7	.047	-33.9
	1000.00	.309	-114.9	4.964	62.4	.090	29.2	.527	-34.7
	1100.00	.283	-123.3	4.616	55.4	.096	25.9	.509	-35.2
	1200.00	.261	-131.9	4.298	49.0	.101	23.0	.493	-36.1
	1300.00	.246	-139.7	4.032	42.4	.107	20.4	.481	-36.7
	1400.00	.234	-147.4	3.784	36.7	.115	17.1	.471	-37.8
	1500.00	.227	-154.7	3.568	30.8	.122	14.2	.460	-38.9
	1600.00	.227	-161.3	3,385	25.0	.129	11.2	.450	-40.2
	1700.00	231	-168.9	3 230	10.0	137	7 1	438	_41.9
	1800.00	.201	176.7	3 060	12.5	1/1	2.4	.400	42.9
	1000.00	.231	-170.7	3.009	13.5	.141	5.4	.425	-42.0
	1900.00	.233	176.3	2.929	7.8	.148	./	.413	-44.0
	2000.00	.237	169.5	2.802	2.3	.153	-2.4	.405	-45.2
	2100.00	.242	163.9	2.690	-3.0	.159	-6.1	.396	-46.5
	2200.00	.247	159.4	2.583	-8.3	.166	-9.3	.387	-48.0
	2300.00	.256	154.3	2.495	-13.6	.173	-12.8	.377	-49.5
	2400.00	.264	150.1	2.404	-18.8	.179	-16.2	.367	-51.1
	2500.00	274	146.2	2 324	-23.9	187	_19.3	358	-52.7
	2600.00	202	140.2	2.024	20.0	10/	22.2	249	54.9
	2000.00	.202	142.5	2.201	-29.2	.194	-23.3	.340	-54.0
	2700.00	.292	139.2	2.100	-34.3	.200	-26.9	.339	-30.8
	2800.00	.303	135.9	2.117	-39.4	.207	-30.2	.328	-59.0
	2900.00	.313	132.9	2.056	-44.5	.215	-34.1	.319	-60.9
	3000.00	.325	130.0	2.003	-49.5	.223	-37.5	.309	-63.5
<b>.</b> /		7 50 6							
Vce	= 3 V, Ic = 3 mA FREQUENCY	α, Zo = 50 Ω S	2 511	S2	21	S	12	S	22
Vce	= 3 V, Ic = 3 mA FREQUENCY MHz	A, Zo = 50 Ω S MAG	2 511 ANG	S2 MAG	21 ANG	S MAG	12 ANG	S MAG	22 ANG
Vce	= 3 V, Ic = 3 mA FREQUENCY MHz 100.00	م, Zo = 50 Ω S MAG 936	2 511 ANG -10.5	S2 MAG 5 612	21 ANG 163.6	S MAG 017	12 ANG 79.6	S MAG 981	22 ANG _7 1
Vce	= 3 V, Ic = 3 mA FREQUENCY MHz 100.00 200.00	A, Zo = 50 Ω S MAG .936 892	2 511 ANG -10.5 -20.4	S2 MAG 5.612 5.628	ANG 163.6	S MAG .017 034	12 ANG 79.6 69.7	S MAG .981 944	22 ANG -7.1
Vce	= 3 V, Ic = 3 mA FREQUENCY MHz 100.00 200.00	MAG .936 .892	2 511 ANG -10.5 -20.4 20.5	S2 MAG 5.612 5.628 5.623	ANG 163.6 148.9	S MAG .017 .034 .048	12 ANG 79.6 69.7	S MAG .981 .944 .97	22 ANG -7.1 -14.0
Vce	= 3 V, Ic = 3 mA FREQUENCY MHz 100.00 200.00 300.00	MAG .936 .892 .842	2 511 ANG -10.5 -20.4 -30.5	S2 MAG 5.612 5.628 5.602	ANG 163.6 148.9 136.8	S MAG .017 .034 .048	12 ANG 79.6 69.7 60.6	S MAG .981 .944 .887	22 ANG -7.1 -14.0 -19.3
Vce	= 3 V, lc = 3 mA FREQUENCY MHz 100.00 200.00 300.00 400.00	MAG .936 .892 .842 .785	2 511 ANG -10.5 -20.4 -30.5 -41.2	S2 MAG 5.612 5.628 5.602 5.393	ANG 163.6 148.9 136.8 126.0	S MAG .017 .034 .048 .060	12 ANG 79.6 69.7 60.6 53.2	S MAG .981 .944 .887 .837	22 ANG -7.1 -14.0 -19.3 -23.7
Vce	= 3 V, Ic = 3 mA FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00	MAG .936 .892 .842 .785 .732	2 ANG -10.5 -20.4 -30.5 -41.2 -50.8	S2 MAG 5.612 5.628 5.602 5.393 5.328	ANG 163.6 148.9 136.8 126.0 116.2	S MAG .017 .034 .048 .060 .069	12 ANG 79.6 69.7 60.6 53.2 46.4	S .981 .944 .887 .837 .782	22 ANG -7.1 -14.0 -19.3 -23.7 -27.2
Vce	= 3 V, Ic = 3 mA FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00	MAG .936 .892 .842 .785 .732 .681	2 ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924	ANG 163.6 148.9 136.8 126.0 116.2 106.6	S MAG .017 .034 .048 .060 .069 .077	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6	S .981 .944 .887 .837 .782 .740	22 ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9
Vce	= 3 V, Ic = 3 mA FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00	MAG .936 .892 .842 .785 .732 .681 .618	2 ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2	S MAG .017 .034 .048 .060 .069 .077 .084	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8	S MAG .981 .944 .887 .837 .782 .740 .698	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0
Vce	= 3 V, Ic = 3 mA FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00	MAG .936 .892 .842 .785 .732 .681 .618 .564	2 ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0	S MAG .017 .034 .048 .060 .069 .077 .084 .090	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0	S MAG .981 .944 .887 .837 .782 .740 .698 .663	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9
Vce	= 3 V, Ic = 3 mA FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510	2 ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2
Vce	= 3 V, Ic = 3 mA FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459	2 ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5
Vce	= 3 V, Ic = 3 mA FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 413	2 ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62 9	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 106	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 577	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5
Vce	= 3 V, Ic = 3 mA FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1200.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 375	2 ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55 7	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 558	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5
Vce	= 3 V, Ic = 3 mA FREQUENCY 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 .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375	2 ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 2.588	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -20.6
Vce	= 3 V, Ic = 3 mA FREQUENCY 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 .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2	S MAG .981 .944 .887 .782 .740 .698 .663 .627 .599 .577 .558 .542	22 ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -38.5 -39.6
Vce	= 3 V, Ic = 3 mA FREQUENCY 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 1400.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588 3.410	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .542 .525	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8
Vce	= 3 V, Ic = 3 mA FREQUENCY 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 1400.00 1500.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307	2 ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3 -135.8	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588 3.410 3.234	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .542 .525 .513	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -35.2 -36.5 -35.5 -38.5 -39.6 -40.8 -41.8
Vce	= 3 V, Ic = 3 mA FREQUENCY 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	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295	2 ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3 -135.8 -142.9	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.790 3.588 3.410 3.234 3.086	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -37.5 -38.5 -38.5 -38.5 -38.5 -38.5 -38.5 -40.8 -41.8 -41.2
Vce	= 3 V, Ic = 3 mA FREQUENCY 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	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289	2 ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -135.8 -142.9 -150.9	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.790 3.588 3.410 3.234 3.086 2.960	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -43.2 -44.8
Vce	= 3 V, Ic = 3 mA FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283	2 ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3 -135.8 -142.9 -150.9 -158.6	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588 3.410 3.234 3.086 2.960 2.830	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -43.2 -44.8 -46.0
Vce	= 3 V, Ic = 3 mA FREQUENCY 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 1400.00 1500.00 1800.00 1900.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3 -135.8 -142.9 -150.9 -158.6 -166.4	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .148	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6	S MAG .981 .944 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457	22 ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -37.5 -38.5 -39.6 -40.8 -41.8 -41.8 -43.2 -44.8 -45.2 -44.8 -46.0 -47.1
Vce	= 3 V, Ic = 3 mA FREQUENCY 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 1400.00 1500.00 1600.00 1900.00 2000.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3 -135.8 -142.9 -150.9 -158.6 -166.4 -174.1	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.597	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5 4	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .148 .153	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8 5	S MAG .981 .944 .887 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448	22 ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -43.2 -44.8 -43.2 -44.8 -45.2 -44.8 -45.2 -44.8 -45.2 -44.8 -45.2 -44.8 -45.2 -44.8 -45.2
Vce	= 3 V, Ic = 3 mA FREQUENCY 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 1400.00 1500.00 1600.00 1900.00 2000.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273	2 ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3 -135.8 -142.9 -150.9 -158.6 -166.4 -174.1 1706	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.597 2.597	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4 - 3	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .148 .159	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5 -11.6	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448 .435	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -35.2 -36.5 -35.5 -38.5 -39.6 -40.8 -41.8 -43.2 -44.8 -46.0 -47.1 -48.4 -49.8
Vce	= 3 V, Ic = 3 mA FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1200.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 2000.00 2100.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273 .275	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -120.8 -128.3 -135.8 -142.9 -150.9 -158.6 -166.4 -174.1 179.6 174.0	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.597 2.504 2.405	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4 3 5.2	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .148 .153 .159	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5 -11.6	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448 .435	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -37.5 -38.5 -39.6 -40.8 -41.8 -43.2 -44.8 -46.0 -47.1 -48.4 -49.8 -41.2
Vce	= 3 V, Ic = 3 mA FREQUENCY 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	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273 .275 .275	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -120.8 -128.3 -135.8 -142.9 -150.9 -158.6 -166.4 -174.1 179.6 174.0 474.0 -174.0	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.597 2.504 2.405	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4 3 -5.9	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .148 .153 .159 .164	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5 -11.6 -14.4	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448 .435 .428	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -43.2 -44.8 -46.0 -47.1 -48.4 -49.8 -51.3 -5.7
Vce	= 3 V, Ic = 3 mA FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1000.00 1100.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 2000.00 2100.00 2300.00 2300.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273 .275 .280	2 ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -135.8 -142.9 -150.9 -158.6 -166.4 -174.1 179.6 174.0 167.8	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.597 2.504 2.405 2.332	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4 3 -5.9 -11.5	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .148 .153 .159 .164 .170	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5 -11.6 -14.4 -17.9	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448 .435 .428 .417	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -41.8 -43.2 -44.8 -45.2 -44.8 -45.2 -44.8 -45.2 -44.8 -45.2 -44.8 -45.2 -44.8 -45.2 -44.8 -45.2 -44.8 -45.2 -55.2
Vce	= 3 V, Ic = 3 mA FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1000.00 1000.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 2000.00 2100.00 2200.00 2300.00 2400.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273 .275 .280 .284	2 ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3 -135.8 -142.9 -150.9 -150.9 -156.4 -174.1 179.6 174.0 167.8 162.6	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.597 2.504 2.405 2.332 2.248	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4 3 -5.9 -11.5 -16.9	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .148 .153 .159 .164 .170 .176	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5 -11.6 -14.4 -17.9 -20.9	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448 .435 .428 .417 .406	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -41.8 -43.2 -44.8 -46.0 -47.1 -48.4 -49.8 -51.3 -52.7 -54.2
Vce	= 3 V, Ic = 3 mA FREQUENCY 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 1400.00 1500.00 1600.00 1700.00 1800.00 2000.00 2100.00 2200.00 2300.00 2500.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273 .275 .280 .284 .292	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -120.8 -128.3 -135.8 -142.9 -150.9 -158.6 -166.4 -174.1 179.6 174.0 167.8 162.6 157.7	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.597 2.504 2.405 2.332 2.248 2.177	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4 3 -5.9 -11.5 -16.9 -22.2	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .143 .148 .153 .159 .164 .170 .176 .182	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5 -11.6 -14.4 -17.9 -20.9 -23.8	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448 .435 .428 .417 .406 .396	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -43.2 -44.8 -43.2 -44.8 -45.3 -52.7 -54.2 -55.9
Vce	= 3 V, Ic = 3 mA FREQUENCY 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 1400.00 1500.00 1600.00 1700.00 2000.00 2100.00 2300.00 2400.00 2500.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273 .275 .280 .284 .292 .288	2 ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3 -135.8 -142.9 -150.9 -158.6 -166.4 -174.1 179.6 174.0 167.8 162.6 157.7 152.8	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.597 2.504 2.405 2.332 2.248 2.177 2.109	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4 -5.9 -11.5 -5.9 -11.5 -16.9 -22.2 -27.6	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .148 .153 .159 .164 .170 .176 .182 .187	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5 -11.6 -14.4 -17.9 -20.9 -23.8 -27.3	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448 .435 .428 .417 .406 .396 .386	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -43.2 -44.8 -43.2 -44.8 -45.2 -44.8 -45.2 -51.3 -52.7 -55.9 -57.9 -57.9
Vce	= 3 V, Ic = 3 mA FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1200.00 1200.00 1200.00 1400.00 1500.00 1600.00 1700.00 2000.00 2000.00 2300.00 2500.00 2600.00 2700.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273 .275 .280 .284 .292 .288 .307	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -120.8 -128.3 -135.8 -142.9 -150.9 -158.6 -166.4 -174.1 179.6 174.0 167.8 162.6 157.7 152.8 148.7	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.597 2.504 2.405 2.332 2.248 2.177 2.109 2.051	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4 3 -5.9 -11.5 -16.9 -22.2 -27.6 -32.9	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .148 .153 .159 .164 .170 .176 .182 .187 .194	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5 -11.6 -14.4 -17.9 -20.9 -23.8 -27.3 -20.7	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448 .435 .428 .417 .406 .396 .386 .376	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -37.5 -37.5 -38.5 -37.5 -39.6 -40.8 -41.8 -41.8 -43.2 -44.8 -45.2 -44.8 -45.2 -51.3 -52.7 -55.9 -57.9 -59.9 -59.9
Vce	= 3 V, Ic = 3 mA FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1200.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 2000.00 2100.00 2200.00 2300.00 2400.00 2500.00 2600.00 2700.00 2800.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273 .275 .280 .284 .292 .284 .292 .298 .307 .316	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -120.8 -120.8 -128.3 -135.8 -142.9 -150.9 -158.6 -166.4 -174.1 179.6 174.0 167.8 162.6 157.7 152.8 148.7 144.7	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.597 2.504 2.405 2.332 2.248 2.177 2.504 2.051 1.988	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4 3 5.9 11.5 16.9 22.2 27.6 32.9 38.1	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .106 .110 .116 .121 .126 .134 .140 .143 .148 .153 .159 .164 .170 .176 .182 .187 .194 .200	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5 -11.6 -14.4 -17.9 -23.8 -27.3 -30.7 -33.8	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .513 .499 .486 .471 .457 .448 .435 .428 .417 .406 .396 .376 .366	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -37.5 -38.5 -38.5 -38.5 -38.5 -40.8 -41.8 -43.2 -44.8 -43.2 -44.8 -45.2 -44.8 -45.2 -51.3 -52.7 -54.2 -55.9 -57.9 -59.9 -59.9 -59.9 -59.9 -61.8
Vce	= 3 V, Ic = 3 mA FREQUENCY 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 200000000	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273 .275 .280 .284 .292 .284 .292 .298 .307 .316 .326	2 ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -120.8 -135.8 -142.9 -150.9 -158.6 -166.4 -174.1 179.6 157.7 152.8 148.7 144.7 140.9	S2 MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.597 2.504 2.405 2.332 2.248 2.177 2.109 2.051 1.988 1.934	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4 3 -5.9 -11.5 -16.9 -22.2 -27.6 -32.9 -38.1 -43.4	S MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .106 .110 .116 .121 .126 .134 .140 .143 .148 .153 .159 .164 .170 .176 .182 .187 .194 .200 .207	12 ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5 -11.6 -14.4 -17.9 -20.9 -23.8 -27.3 -30.7 -33.8 -37.3	S MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448 .435 .428 .417 .406 .396 .386 .376 .366 .356	22 ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -43.2 -44.8 -43.2 -44.8 -45.3 -52.7 -54.2 -55.9 -57.9 -57.9 -59.9 -57.9 -59.9 -61.8 -64.0

Vce = 3 V, Ic = 1 mA	, Zo = 50 G	2						
FREQUENCY	S	11	S2	21	S	12	S	22
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.986	-6.4	1.963	167.5	.019	82.2	.996	-4.0
200.00	.971	-13.0	2.022	157.2	.036	73.4	.987	-8.1
300.00	.958	-19.5	2.075	147.4	.053	66.7	.966	-11.8
400.00	.936	-26.5	2.082	137.6	.070	58.7	.953	-15.4
500.00	.914	-32.8	2.114	129.5	.084	52.1	.929	-18.7
600.00	.890	-39.0	2.011	120.8	.098	45.0	.909	-22.0
700.00	.859	-45.3	1.993	112.4	.109	38.5	.883	-24.9
800.00	.833	-51.7	1.967	103.7	.120	32.1	.859	-27.7
900.00	.801	-58.0	1.916	95.7	.127	25.8	.830	-30.5
1000.00	.769	-65.2	1.952	88.0	.137	20.2	.803	-33.0
1100.00	.732	-72.5	1.972	79.8	.143	14.4	.776	-35.0
1200.00	.693	-80.0	1.987	72.4	.148	9.7	.754	-37.1
1300.00	.663	-86.7	1.945	64.6	.154	4.5	.734	-39.0
1400.00	.626	-93.9	1.936	57.2	.157	1	.712	-41.1
1500.00	.596	-100.5	1.893	49.6	.162	-4.4	.693	-42.9
1600.00	.570	-107.2	1.852	42.8	.165	-8.3	.676	-44.6
1700.00	.542	-114.9	1.845	35.3	.170	-12.9	.660	-46.5
1800.00	.523	-121.5	1.786	28.6	.172	-17.5	.640	-48.3
1900.00	.497	-129.1	1.766	21.5	.174	-21.5	.622	-49.9
2000.00	.471	-137.3	1.746	14.6	.174	-25.3	.610	-51.7
2100.00	.456	-144.2	1.707	8.2	.174	-28.5	.595	-53.3
2200.00	.443	-151.0	1.661	1.6	.176	-31.9	.583	-55.0
2300.00	.430	-158.3	1.648	-4.8	.177	-35.1	.567	-56.8
2400.00	.424	-164.8	1.598	-10.9	.178	-38.1	.557	-58.6
2500.00	.419	-171.3	1.565	-17.0	.180	-40.5	.545	-60.5
2600.00	.414	-177.8	1.534	-23.1	.182	-43.6	.534	-62.6
2700.00	.412	176.4	1.504	-29.1	.183	-46.5	.523	-64.6
2800.00	.413	170.5	1.466	-34.9	.186	-48.7	.515	-66.9
2900.00	.414	164.7	1.442	-40.6	.189	-51.4	.504	-69.2
3000.00	.419	159.5	1.413	-46.3	.191	-53.5	.495	-71.7
Vсе = 1 V, Iс = 5 mA	, Zo = 50 Ω	2						
FREQUENCY	S	11	S2	21	S	12	S	22
MHz 100.00	MAG 849	ANG 	MAG 8 397	ANG 156.6	MAG	ANG	MAG 949	ANG _11 9

MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.849	-19.1	8.397	156.6	.021	75.5	.949	-11.9
200.00	.764	-34.1	8.259	139.2	.037	63.8	.866	-21.8
300.00	.681	-49.1	7.901	125.1	.051	54.8	.767	-28.2
400.00	.612	-63.6	7.397	113.1	.060	48.4	.689	-32.3
500.00	.534	-78.0	7.006	101.8	.068	42.2	.623	-35.2
600.00	.473	-89.5	6.297	91.7	.076	38.7	.573	-37.0
700.00	.414	-101.5	5.833	82.2	.082	35.3	.531	-38.1
800.00	.371	-112.1	5.352	73.6	.089	31.9	.499	-39.2
900.00	.339	-122.2	4.924	65.7	.095	28.7	.472	-39.9
1000.00	.314	-131.4	4.557	58.5	.103	25.6	.448	-40.9
1100.00	.295	-140.2	4.219	51.6	.109	22.8	.429	-41.2
1200.00	.283	-148.3	3.935	45.2	.115	20.1	.414	-42.2
1300.00	.275	-156.2	3.672	38.8	.122	16.9	.398	-42.8
1400.00	.270	-163.3	3.448	32.9	.129	13.8	.385	-44.0
1500.00	.267	-170.3	3.242	26.9	.136	10.7	.374	-45.0
1600.00	.268	-176.4	3.081	21.1	.143	7.5	.362	-46.4
1700.00	.273	177.8	2.927	15.4	.153	3.9	.353	-47.9
1800.00	.280	172.2	2.783	9.6	.160	1	.340	-49.5
1900.00	.288	165.8	2.663	3.9	.165	-3.8	.326	-51.1
2000.00	.294	160.1	2.540	-1.7	.171	-6.8	.316	-52.2
2100.00	.301	155.4	2.445	-7.0	.177	-10.1	.304	-53.7
2200.00	.307	151.6	2.347	-12.4	.186	-13.8	.293	-55.4
2300.00	.317	147.3	2.260	-17.8	.192	-17.2	.284	-57.0
2400.00	324	143.6	2.177	-23.0	.199	-20.8	.272	-58.9
2500.00	.334	140.2	2.105	-28.2	.207	-23.9	.261	-60.8
2600.00	.345	137.0	2.037	-33.5	.214	-27.8	.251	-63.7
2700.00	.354	134.0	1.977	-38.6	.221	-31.4	.241	-65.9
2800.00	.365	131.0	1.913	-43.8	.228	-35.3	.230	-68.6
2900.00	.377	128.2	1.856	-48.9	.235	-39.0	.220	-71.2
3000.00	.387	125.5	1.808	-53.8	.244	-42.9	.210	-74.5

Vce = 1 V, Ic = 3 mA FREQUENCY	, Zo = 50 Ω S	<u>)</u> 11	S2	21	S	12	S	22
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	928	-11.2	5 570	160.2	022	78.7	974	-8.7
200.00	.876	-22.9	5.562	146.9	.040	67.5	.928	-16.9
300.00	.821	-34.2	5.509	134.3	.057	57.4	.859	-23.0
400.00	.758	-45.7	5.289	123.2	.070	49.7	.798	-28.0
500.00	.705	-56.7	5.198	113.1	.081	43.3	.738	-32.0
600.00	.652	-66.1	4.787	103.2	.089	37.0	.689	-35.2
700.00	.588	-76.8	4.617	93.6	.097	31.9	.640	-37.5
800.00	.535	-87.1	4.406	84.1	.103	27.6	.601	-39.4
900.00	.484	-97.1	4.187	75.5	.108	23.9	.565	-41.0
1000.00	.438	-107.0	3.986	67.1	.115	20.3	.533	-42.6
1100.00	.401	-116.3	3.771	59.1	.120	16.5	.508	-43.6
1200.00	.371	-125.4	3.566	51.8	.125	13.4	.486	-44.7
1300.00	.350	-133.4	3.362	44.8	.131	10.3	.468	-45.7
1400.00	.333	-141.3	3.177	38.3	.137	7.0	.449	-47.2
1500.00	.320	-148.7	3.015	31.8	.143	4.1	.436	-48.3
1600.00	.312	-156.1	2.872	25.8	.149	1.1	.421	-49.7
1700.00	.310	-162.9	2.745	19.5	.157	-2.5	.408	-51.4
1800.00	.310	-170.2	2.623	13.4	.162	-6.5	.391	-52.9
1900.00	.309	-177.5	2.514	7.3	.165	-9.7	.377	-54.2
2000.00	.310	175.4	2.407	1.4	.171	-12.7	.366	-55.5
2100.00	.313	169.8	2.318	-4.2	.177	-16.1	.351	-57.2
2200.00	.317	164.9	2.227	-9.8	.182	-19.1	.343	-58.5
2300.00	.324	159.5	2.157	-15.4	.188	-22.3	.330	-60.4
2400.00	.331	155.0	2.076	-20.8	.194	-25.6	.319	-62.2
2500.00	.338	150.6	2.012	-26.2	.200	-28.8	.307	-64.1
2600.00	.346	146.5	1.947	-31.7	.207	-32.4	.296	-66.8
2700.00	.356	142.6	1.894	-36.9	.213	-35.6	.285	-69.0
2800.00	.365	139.0	1.833	-42.3	.220	-39.1	.274	-71.8
2900.00	.375	135.7	1.782	-47.5	.226	-42.7	.265	-74.3
Vce = 1 V, Ic = 1 mA FREQUENCY	, Zo = 50 Ω S	2 11	S2	21	S	12	S	22
MU-7	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
	083	_6.8	1 986	166 5	022	83 1	MAG 003	_1 6
200.00	.903	-0.0	2.016	156.0	.022	72.1	.993	-4.0
200.00	.900	-14.0	2.010	130.0	.044	65.2	.903	-9.3
400.00	.952	-21.0	2 ( 11) /		116/			-13.0
+00.00	925	-28.5	2.064	135.0	.064	56 Z	.939	_17 7
500.00	.925	-28.5	2.064	135.9	.064 .083 100	56.7	.939 .942	-17.7 -21.6
500.00	.925 .904 878	-28.5 -35.3 -41.8	2.064 2.096 1.992	135.9 127.1 118 1	.064 .083 .100 116	56.7 49.8 42.7	.959 .942 .913 .889	-17.7 -21.6 -25.2
500.00 600.00 700.00	.925 .904 .878 .844	-28.5 -35.3 -41.8 -48.6	2.064 2.096 1.992 1.971	135.9 127.1 118.1 109.4	.064 .083 .100 .116 .129	56.7 49.8 42.7 35.5	.959 .942 .913 .889 .859	-17.7 -21.6 -25.2 -28.5
500.00 600.00 700.00 800.00	.925 .904 .878 .844 .816	-28.5 -35.3 -41.8 -48.6 -55.6	2.064 2.096 1.992 1.971 1.945	135.9 127.1 118.1 109.4 100.6	.064 .083 .100 .116 .129 .141	56.7 49.8 42.7 35.5 28.7	.939 .942 .913 .889 .859 .829	-17.7 -21.6 -25.2 -28.5 -31.7
500.00 600.00 700.00 800.00 900.00	.925 .904 .878 .844 .816 .782	-28.5 -35.3 -41.8 -48.6 -55.6 -62.3	2.064 2.096 1.992 1.971 1.945 1.900	135.9 127.1 118.1 109.4 100.6 92.3	.064 .083 .100 .116 .129 .141 .151	56.7 49.8 42.7 35.5 28.7 22.5	.939 .942 .913 .889 .859 .829 .795	-17.7 -21.6 -25.2 -28.5 -31.7 -34.8
500.00 600.00 700.00 800.00 900.00 1000.00	.925 .904 .878 .844 .816 .782 .749	-28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9	2.064 2.096 1.992 1.971 1.945 1.900 1.926	135.9 127.1 118.1 109.4 100.6 92.3 84.3	.064 .083 .100 .116 .129 .141 .151 .159	56.7 49.8 42.7 35.5 28.7 22.5 16.3	.939 .942 .913 .889 .859 .829 .795 .765	-17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4
500.00 600.00 700.00 800.00 900.00 1000.00 1100.00	.925 .904 .878 .844 .816 .782 .749 .709	-28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8	2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940	135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0	.064 .083 .100 .116 .129 .141 .151 .159 .166	56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1	.939 .942 .913 .889 .859 .829 .795 .765 .736	-17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7
500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1200.00	.925 .904 .878 .844 .816 .782 .749 .709 .673	-28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8	2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952	135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2	.064 .083 .100 .116 .129 .141 .151 .159 .166 .172	56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8	.939 .942 .913 .889 .859 .829 .795 .765 .736 .736	-17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0
500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1200.00 1300.00	.925 .904 .878 .844 .816 .782 .749 .709 .673 .639	-28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8	2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904	135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4	.064 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178	56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8	.939 .942 .913 .889 .859 .829 .795 .765 .736 .736 .709 .686	-17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2
500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1200.00 1300.00 1400.00	.925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606	-28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6	2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889	135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8	.064 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182	56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9	.939 .942 .913 .889 .859 .829 .795 .765 .736 .736 .709 .686 .661	-17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3
500.00 600.00 700.00 800.00 900.00 1000.00 1200.00 1300.00 1400.00 1500.00	.925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578	-28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5	2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837	135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2	.064 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .182 .185	56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -8.9	.939 .942 .913 .889 .859 .829 .795 .765 .736 .736 .709 .686 .661 .641	-17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -48.2
500.00 600.00 700.00 800.00 900.00 1000.00 1200.00 1300.00 1400.00 1500.00 1600.00	.925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551	-28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5 -114.6	2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801	135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0	.064 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189	56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -8.9 -12.8	.939 .942 .913 .889 .859 .829 .795 .765 .736 .736 .709 .686 .661 .641 .621	-17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -48.2 -50.2
500.00 600.00 700.00 800.00 900.00 1000.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00	.925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526	-28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5 -114.6 -122.6	2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801 1.782	132.7 135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7	.064 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189 .195	56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -8.9 -12.8 -17.6	.939 .942 .913 .889 .859 .829 .795 .765 .736 .736 .709 .686 .661 .641 .621 .603	-17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -44.2 -46.3 -48.2 -50.2 -52.2
500.00 600.00 700.00 800.00 900.00 1000.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00	.925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509	-28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5 -114.6 -122.6 -129.5	2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801 1.782 1.727	132.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7 23.8	.064 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .185 .189 .195 .196	56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -8.9 -12.8 -17.6 -22.3	.939 .942 .913 .889 .859 .829 .795 .765 .736 .736 .709 .686 .661 .641 .621 .621 .603 .582	-17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -48.2 -50.2 -52.2 -52.4
500.00 600.00 700.00 800.00 900.00 1000.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00	.925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509 .487	-28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5 -114.6 -122.6 -129.5 -137.3	2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801 1.782 1.727 1.702	135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7 23.8 16.9	.064 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189 .195 .196 .196	56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -8.9 -12.8 -17.6 -22.3 -26.3	.939 .942 .913 .889 .859 .795 .765 .736 .709 .686 .661 .641 .621 .603 .582 .562	-17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -46.3 -46.3 -46.2 -50.2 -52.2 -52.4 -55.2
500.00 600.00 700.00 800.00 900.00 1000.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00	.925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509 .487 .466	$\begin{array}{c} -28.5 \\ -35.3 \\ -41.8 \\ -48.6 \\ -55.6 \\ -62.3 \\ -69.9 \\ -77.8 \\ -85.8 \\ -92.8 \\ -100.6 \\ -107.5 \\ -114.6 \\ -122.6 \\ -129.5 \\ -137.3 \\ -145.4 \end{array}$	2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801 1.782 1.727 1.702 1.674	135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7 23.8 16.9 9.8	.064 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189 .195 .196 .196 .198	56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -12.8 -17.6 -22.3 -26.3 -30.1	.939 .942 .913 .889 .859 .795 .765 .736 .709 .686 .661 .641 .621 .603 .582 .562 .548	-17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -44.2 -50.2 -52.2 -54.4 -55.1 -57.9
500.00 600.00 700.00 800.00 900.00 1000.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 2000.00 2100.00	.925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509 .487 .466 .454	$\begin{array}{c} -28.5 \\ -35.3 \\ -41.8 \\ -48.6 \\ -55.6 \\ -62.3 \\ -69.9 \\ -77.8 \\ -85.8 \\ -92.8 \\ -100.6 \\ -107.5 \\ -114.6 \\ -122.6 \\ -129.5 \\ -137.3 \\ -145.4 \\ -152.5 \end{array}$	2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801 1.782 1.727 1.702 1.674 1.637	135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7 23.8 16.9 9.8 3.4	.064 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .182 .185 .189 .195 .196 .196 .198 .198	56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -12.8 -17.6 -22.3 -26.3 -30.1 -33.7	.939 .942 .913 .889 .829 .795 .765 .765 .736 .709 .686 .661 .641 .621 .603 .582 .562 .548 .530	-17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -48.2 -50.2 -52.2 -52.2 -52.4 -55.1 -57.9 -59.6
500.00 600.00 700.00 800.00 900.00 1000.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 2000.00 2100.00 2200.00	.925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509 .487 .466 .454 .446	-28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5 -114.6 -122.6 -129.5 -137.3 -145.4 -152.5 -159.2	2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801 1.782 1.727 1.702 1.674 1.637 1.590	135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7 23.8 16.9 9.8 3.4 -3.1	.064 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189 .195 .196 .196 .198 .198 .198 .199	56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -12.8 -17.6 -22.3 -26.3 -30.1 -33.7 -36.9	.939 .942 .913 .889 .829 .795 .765 .736 .709 .686 .661 .641 .621 .603 .582 .562 .548 .530 .519	-17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -48.2 -50.2 -52.2 -52.4 -52.2 -54.4 -57.9 -59.6 -61.7
500.00 600.00 700.00 800.00 900.00 1000.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 2000.00 2100.00 2200.00 2300.00	.925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509 .487 .466 .454 .454 .446 .437	$\begin{array}{c} -28.5 \\ -35.3 \\ -41.8 \\ -48.6 \\ -55.6 \\ -62.3 \\ -69.9 \\ -77.8 \\ -85.8 \\ -92.8 \\ -100.6 \\ -107.5 \\ -114.6 \\ -122.6 \\ -122.5 \\ -137.3 \\ -145.4 \\ -152.5 \\ -159.2 \\ -166.3 \end{array}$	2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801 1.782 1.727 1.702 1.674 1.637 1.590 1.571	135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7 23.8 16.9 9.8 3.4 -3.1 -9.5	.064 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189 .195 .196 .196 .198 .198 .198 .199 .200	56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -8.9 -12.8 -17.6 -22.3 -26.3 -26.3 -30.1 -33.7 -36.9 -40.5	.939 .942 .913 .889 .829 .795 .765 .736 .709 .686 .661 .641 .621 .603 .582 .562 .562 .548 .530 .519 .502	-17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -50.2 -50.2 -52.2 -52.4 -56.1 -57.9 -59.6 -61.7 -63.5
500.00 600.00 700.00 800.00 900.00 1000.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 2000.00 2100.00 2200.00 2300.00 2400.00	.925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509 .487 .466 .454 .454 .446 .437 .433	-28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5 -114.6 -122.6 -122.6 -137.3 -145.4 -152.5 -159.2 -166.3 -172.8	2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801 1.782 1.727 1.702 1.674 1.637 1.590 1.571 1.520	135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7 23.8 16.9 9.8 3.4 -3.1 -9.5 -15.7	.064 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189 .195 .196 .196 .198 .198 .198 .199 .200 .201	56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -12.8 -17.6 -22.3 -26.3 -26.3 -26.3 -30.1 -33.7 -36.9 -40.5 -43.8	.939 .942 .913 .889 .859 .795 .765 .736 .709 .686 .661 .641 .621 .603 .582 .562 .548 .530 .519 .502 .502 .490	-17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -50.2 -52.2 -52.2 -52.4 -56.1 -57.9 -59.6 -61.7 -63.5 -65.7
500.00 600.00 700.00 800.00 900.00 1000.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 2000.00 2100.00 2200.00 2300.00 2400.00	.925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509 .487 .466 .454 .454 .446 .437 .433 .430	$\begin{array}{c} -28.5 \\ -35.3 \\ -41.8 \\ -48.6 \\ -55.6 \\ -62.3 \\ -69.9 \\ -77.8 \\ -85.8 \\ -92.8 \\ -100.6 \\ -107.5 \\ -114.6 \\ -122.6 \\ -122.6 \\ -137.3 \\ -145.4 \\ -152.5 \\ -137.3 \\ -145.4 \\ -152.5 \\ -159.2 \\ -166.3 \\ -172.8 \\ -179.0 \end{array}$	2.004 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801 1.782 1.727 1.702 1.674 1.637 1.590 1.571 1.520 1.488	135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7 23.8 16.9 9.8 3.4 -3.1 -9.5 -15.7 -21.7	.064 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189 .195 .196 .196 .198 .198 .198 .199 .200 .201 .201	56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -12.8 -17.6 -22.3 -26.3 -30.1 -33.7 -36.9 -40.5 -43.8 -46.5	.939 .942 .913 .889 .859 .795 .765 .736 .709 .686 .661 .641 .641 .621 .603 .582 .562 .548 .523 .519 .502 .502 .490 .477	-17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -50.2 -52.2 -54.4 -57.9 -59.6 -61.7 -63.5 -65.7 -67.7
500.00 600.00 700.00 800.00 900.00 1000.00 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	.925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509 .487 .466 .454 .446 .437 .433 .430 .429	$\begin{array}{c} -28.5 \\ -35.3 \\ -41.8 \\ -48.6 \\ -55.6 \\ -62.3 \\ -69.9 \\ -77.8 \\ -85.8 \\ -92.8 \\ -100.6 \\ -107.5 \\ -114.6 \\ -122.6 \\ -122.6 \\ -137.3 \\ -145.4 \\ -152.5 \\ -159.2 \\ -166.3 \\ -172.8 \\ -179.0 \\ 174.8 \end{array}$	2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801 1.782 1.727 1.702 1.674 1.637 1.590 1.571 1.520 1.488 1.459	135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7 23.8 16.9 9.8 3.4 -3.1 -9.5 -15.7 -21.7 -27.8	.064 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189 .195 .196 .196 .198 .198 .198 .198 .199 .200 .201 .201 .201 .203	56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -8.9 -12.8 -17.6 -22.3 -26.3 -30.1 -33.7 -36.9 -40.5 -43.8 -46.5 -49.3	.939 .942 .913 .889 .829 .795 .765 .736 .709 .686 .661 .641 .641 .621 .603 .582 .562 .548 .530 .519 .502 .490 .477 .466	$\begin{array}{c} -17.7 \\ -21.6 \\ -25.2 \\ -28.5 \\ -31.7 \\ -34.8 \\ -37.4 \\ -39.7 \\ -42.0 \\ -44.2 \\ -46.3 \\ -44.2 \\ -50.2 \\ -52.2 \\ -52.2 \\ -54.4 \\ -56.1 \\ -57.9 \\ -59.6 \\ -61.7 \\ -63.5 \\ -65.7 \\ -67.7 \\ -70.0 \end{array}$
500.00 600.00 700.00 800.00 900.00 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	.925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509 .487 .466 .454 .454 .446 .437 .433 .430 .429 .429	$\begin{array}{c} -28.5 \\ -35.3 \\ -41.8 \\ -48.6 \\ -55.6 \\ -62.3 \\ -69.9 \\ -77.8 \\ -85.8 \\ -92.8 \\ -100.6 \\ -107.5 \\ -114.6 \\ -122.6 \\ -129.5 \\ -137.3 \\ -145.4 \\ -152.5 \\ -159.2 \\ -166.3 \\ -172.8 \\ -179.0 \\ 174.8 \\ 169.2 \end{array}$	2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801 1.782 1.727 1.702 1.674 1.637 1.590 1.571 1.520 1.488 1.459 1.425	$\begin{array}{c} 135.9\\ 125.1\\ 135.9\\ 127.1\\ 118.1\\ 109.4\\ 100.6\\ 92.3\\ 84.3\\ 76.0\\ 68.2\\ 60.4\\ 52.8\\ 45.2\\ 38.0\\ 30.7\\ 23.8\\ 16.9\\ 9.8\\ 3.4\\ -3.1\\ -9.5\\ -15.7\\ -21.7\\ -27.8\\ -33.7\end{array}$	.064 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189 .195 .196 .198 .198 .198 .198 .198 .199 .200 .201 .201 .201 .203 .204	50.2 56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 -3.9 -4.9 -12.8 -17.6 -22.3 -30.1 -33.7 -36.9 -40.5 -43.8 -46.5 -49.3 -52.3	.939 .942 .913 .889 .829 .795 .765 .736 .709 .686 .661 .641 .621 .641 .621 .603 .582 .562 .548 .530 .519 .502 .490 .477 .466 .453	$\begin{array}{c} -17.7 \\ -21.6 \\ -25.2 \\ -28.5 \\ -31.7 \\ -34.8 \\ -37.4 \\ -39.7 \\ -42.0 \\ -44.2 \\ -46.3 \\ -48.2 \\ -50.2 \\ -52.2 \\ -54.4 \\ -56.1 \\ -57.9 \\ -59.6 \\ -61.7 \\ -63.5 \\ -65.7 \\ -67.7 \\ -70.0 \\ -72.4 \end{array}$

2900.00

3000.00

.437

.443

158.6

153.5

1.363

1.336

-45.3

-50.9

.208

.211

-57.9

-60.2

.431

.421

-77.5

-80.5

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