

TOSHIBA FIELD EFFECT TRANSISTOR GaAs N CHANNEL SINGLE GATE MODULATION DOPE TYPE

2SK3179

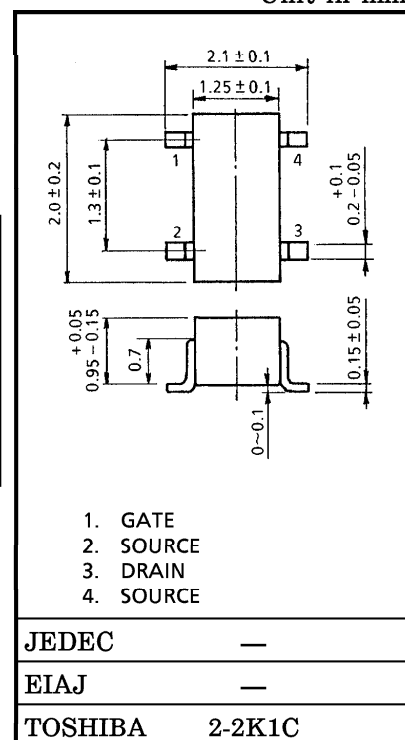
UHF~SHF BAND LOW NOISE AMPLIFIER APPLICATIONS

Unit in mm

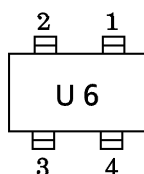
- Low Noise Figure
- High Gain

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Gate-Drain Voltage	V _{GDO}	−4	V
Gate-Source Voltage	V _{GSO}	−3	V
Drain Current	I _D	80	mA
Power Dissipation	P _D	100	mW
Channel Temperature	T _{ch}	125	°C
Storage Temperature Range	T _{stg}	−55~125	°C



MARKING



ELECTRICAL CHARACTERISTICS (Ta = 25°C)

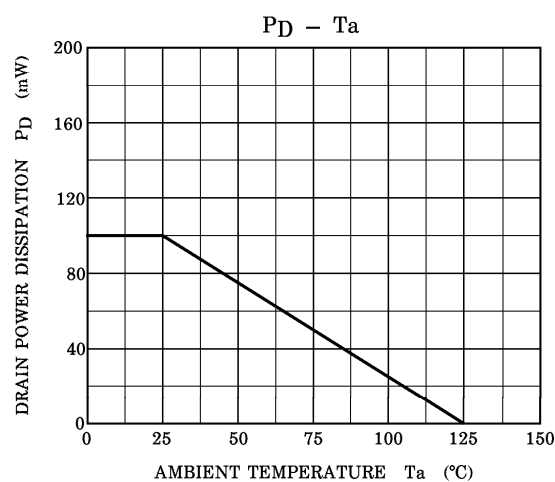
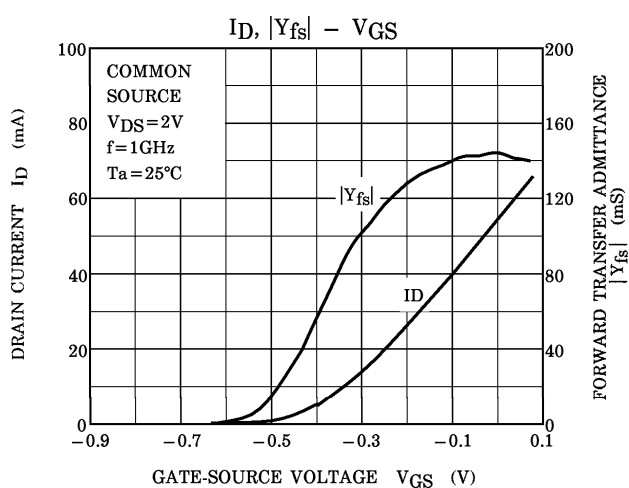
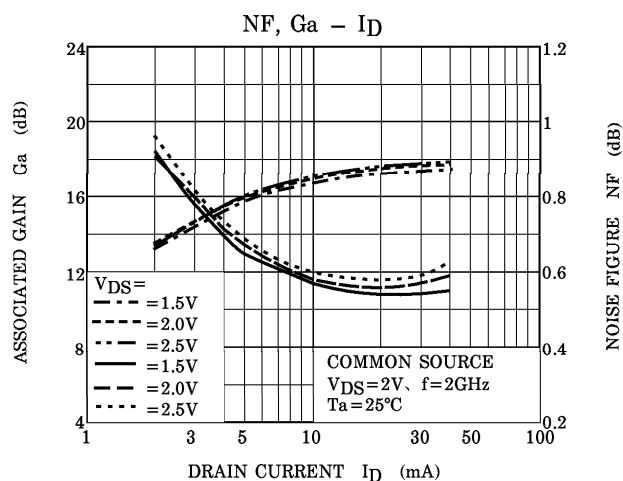
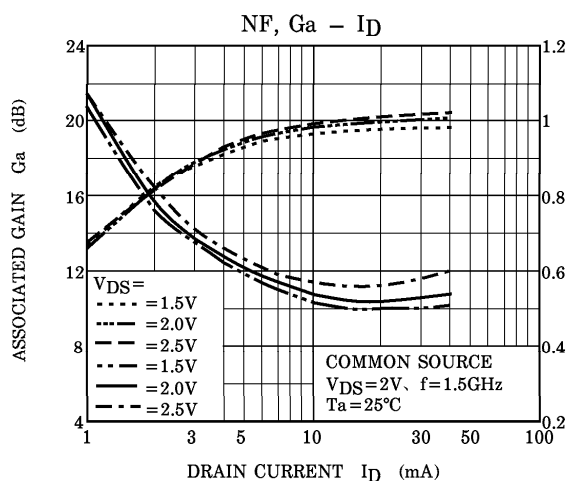
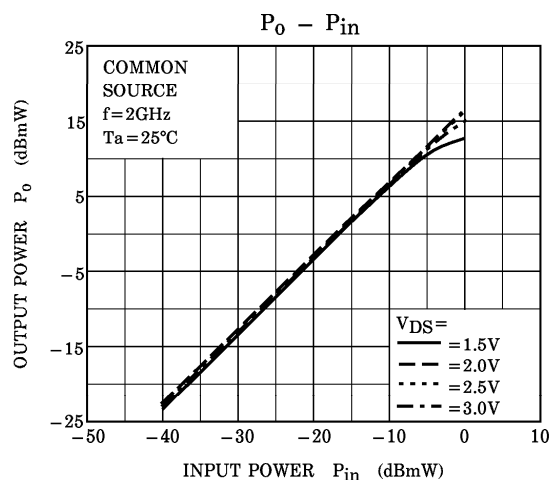
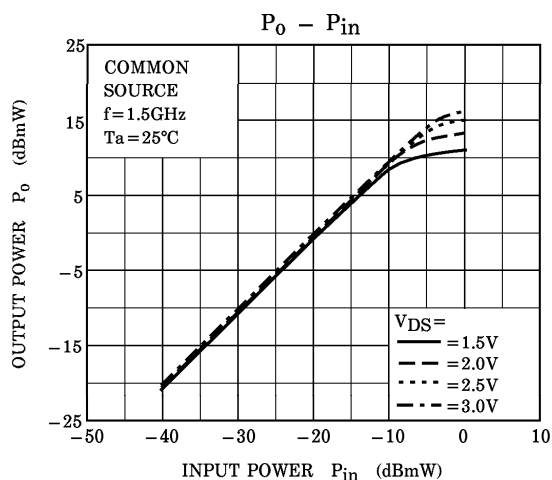
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current	I _{GSS}	V _{DS} = 0, V _{GS} = −2V	—	—	−20	μA
Drain Current	I _{DSS}	V _{DS} = 2V, V _{GS} = 0	40	55	80	mA
Gate-Source Cut-off Voltage	V _{GS} (OFF)	V _{DS} = 2V, I _D = 100 μA	−0.2	−0.8	−2	V
Forward Transfer Admittance	Y _{fs}	V _{DS} = 2V, I _D = 10mA, f = 1kHz	—	95	—	mS
Noise Figure 1	NF1	V _{DS} = 2V, I _D = 10mA, f = 1.5GHz	—	0.55	1.0	dB
Associated Gain 1	Ga1	V _{DS} = 2V, I _D = 10mA, f = 1.5GHz	17	19.5	—	dB
Noise Figure 2	NF2	V _{DS} = 2V, I _D = 10mA, f = 2GHz	—	0.6	—	dB
Associated Gain 2	Ga2	V _{DS} = 2V, I _D = 10mA, f = 2GHz	—	17	—	dB

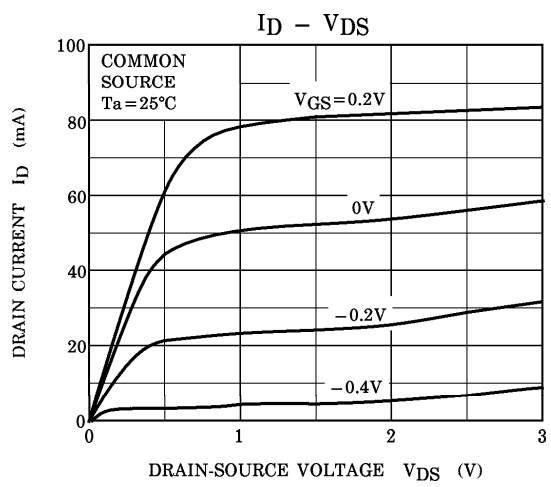
CAUTION

This device electrostatic sensitivity. Please handle with caution.

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S-PARAMETER

(COMMON SOURCE, $V_{DS}=1.5V$, $I_D=2mA$, $T_a=25^\circ C$, $Z_L=Z_S=50\Omega$)

FREQ. (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.996	-3.1	3.523	177.0	0.0066	85.7	0.846	-2.2
200	0.995	-6.4	3.534	174.2	0.0135	83.5	0.845	-4.7
300	0.994	-9.6	3.526	171.0	0.0204	82.9	0.841	-7.0
400	0.989	-13.1	3.505	168.3	0.0271	81.2	0.838	-9.0
500	0.980	-15.9	3.455	165.4	0.0340	79.6	0.836	-11.0
600	0.979	-18.6	3.506	162.7	0.0404	77.6	0.834	-13.3
700	0.977	-22.0	3.460	159.7	0.0471	74.9	0.829	-15.6
800	0.967	-25.2	3.480	157.4	0.0533	73.0	0.822	-17.8
900	0.959	-28.5	3.425	154.7	0.0595	72.4	0.819	-19.9
1000	0.951	-30.8	3.396	151.7	0.0656	69.2	0.810	-22.0
1100	0.947	-33.8	3.375	149.6	0.0713	67.4	0.809	-24.6
1200	0.931	-36.8	3.360	145.9	0.0784	66.5	0.802	-26.5
1300	0.921	-39.9	3.320	144.2	0.0841	64.0	0.796	-28.5
1400	0.919	-42.7	3.317	140.8	0.0894	62.6	0.787	-30.7
1500	0.900	-45.1	3.297	138.0	0.0948	59.8	0.783	-32.7
1600	0.891	-48.4	3.289	135.7	0.0985	58.8	0.773	-34.7
1700	0.890	-51.4	3.263	133.1	0.1053	57.2	0.767	-36.8
1800	0.866	-53.3	3.214	130.1	0.1100	55.8	0.763	-38.7
1900	0.871	-57.3	3.196	128.9	0.1142	54.0	0.751	-40.6
2000	0.851	-59.6	3.135	125.0	0.1188	51.7	0.738	-42.7
2100	0.830	-61.1	3.107	124.1	0.1233	50.2	0.731	-44.2
2200	0.813	-64.0	3.039	120.4	0.1273	49.0	0.723	-46.0
2300	0.808	-66.2	3.002	119.1	0.1306	46.8	0.711	-47.7
2400	0.786	-68.2	2.977	115.3	0.1341	45.1	0.701	-49.4
2500	0.784	-71.9	2.963	113.7	0.1377	43.9	0.693	-51.2
2600	0.755	-74.7	2.916	110.5	0.1411	41.8	0.674	-52.9

(COMMON SOURCE, $V_{DS}=1.5V$, $I_D=5mA$, $T_a=25^\circ C$, $Z_L=Z_S=50\Omega$)

FREQ. (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.992	-3.8	5.834	176.1	0.0063	87.5	0.738	-3.0
200	0.991	-7.9	5.843	172.7	0.0121	84.7	0.740	-5.5
300	0.996	-11.5	5.809	169.1	0.0188	82.0	0.735	-8.1
400	0.980	-15.3	5.764	165.7	0.0250	80.6	0.733	-10.5
500	0.976	-19.0	5.642	162.2	0.0318	78.8	0.728	-13.1
600	0.968	-22.6	5.689	159.0	0.0368	77.5	0.721	-15.5
700	0.960	-26.3	5.596	155.5	0.0433	75.0	0.715	-18.1
800	0.942	-30.1	5.578	152.7	0.0484	73.3	0.708	-20.7
900	0.926	-33.4	5.435	149.5	0.0545	70.5	0.699	-23.0
1000	0.923	-36.3	5.395	145.9	0.0596	68.5	0.691	-25.7
1100	0.907	-40.0	5.311	143.7	0.0652	66.8	0.684	-28.1
1200	0.890	-43.2	5.248	139.6	0.0708	65.4	0.677	-30.5
1300	0.881	-46.5	5.123	137.5	0.0764	62.9	0.667	-32.7
1400	0.865	-49.2	5.093	133.7	0.0801	60.9	0.658	-35.0
1500	0.848	-52.5	5.037	130.8	0.0848	60.1	0.650	-37.0
1600	0.834	-56.0	4.954	128.5	0.0877	58.4	0.639	-39.1
1700	0.827	-58.8	4.869	125.2	0.0933	56.8	0.631	-41.1
1800	0.799	-61.7	4.789	122.1	0.0971	55.1	0.622	-43.4
1900	0.801	-65.0	4.714	120.5	0.1020	54.0	0.613	-45.4
2000	0.770	-67.7	4.621	116.9	0.1051	51.7	0.595	-47.3
2100	0.750	-70.1	4.527	115.8	0.1074	50.9	0.585	-48.9
2200	0.723	-72.1	4.382	112.4	0.1107	49.5	0.573	-50.7
2300	0.712	-74.9	4.320	110.7	0.1139	48.0	0.563	-52.3
2400	0.691	-77.7	4.233	107.2	0.1172	46.8	0.554	-54.0
2500	0.686	-80.5	4.179	105.3	0.1207	45.4	0.542	-55.2
2600	0.652	-83.5	4.083	102.3	0.1247	43.9	0.527	-56.8

S-PARAMETER

(COMMON SOURCE, $V_{DS}=1.5V$, $I_D=10mA$, $T_a=25^\circ C$, $Z_L=Z_s=50\Omega$)

FREQ. (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.990	-4.5	8.048	175.4	0.0060	90.0	0.629	-3.2
200	0.986	-9.0	8.028	171.4	0.0116	87.0	0.630	-6.0
300	0.987	-13.2	8.008	167.3	0.0179	82.6	0.623	-8.8
400	0.974	-17.9	7.914	163.2	0.0229	80.8	0.620	-11.7
500	0.960	-22.0	7.704	159.2	0.0288	78.2	0.615	-14.3
600	0.948	-25.7	7.682	155.5	0.0344	77.5	0.610	-17.3
700	0.934	-29.7	7.526	151.4	0.0391	74.3	0.602	-20.0
800	0.918	-33.8	7.419	148.2	0.0441	73.2	0.591	-22.8
900	0.896	-37.5	7.217	144.5	0.0504	70.8	0.581	-25.3
1000	0.880	-41.2	7.117	140.7	0.0545	68.8	0.573	-28.0
1100	0.869	-44.8	6.952	138.1	0.0589	67.8	0.565	-30.4
1200	0.835	-48.8	6.794	134.1	0.0647	66.4	0.554	-33.0
1300	0.825	-52.1	6.600	131.6	0.0676	63.5	0.544	-35.2
1400	0.795	-54.8	6.498	128.0	0.0725	62.5	0.534	-37.3
1500	0.788	-58.0	6.367	124.6	0.0759	61.3	0.527	-39.4
1600	0.767	-62.2	6.250	122.1	0.0799	58.9	0.519	-41.4
1700	0.758	-64.1	6.081	119.1	0.0838	58.7	0.508	-43.6
1800	0.731	-67.4	5.910	116.2	0.0883	57.9	0.500	-45.6
1900	0.729	-70.9	5.832	114.1	0.0918	56.3	0.491	-47.6
2000	0.698	-73.3	5.635	110.4	0.0947	54.0	0.476	-49.4
2100	0.669	-75.5	5.523	109.5	0.0976	53.4	0.465	-50.5
2200	0.647	-79.2	5.321	106.3	0.1004	52.8	0.455	-52.2
2300	0.642	-79.5	5.162	104.5	0.1022	51.8	0.445	-53.5
2400	0.609	-82.9	5.103	101.0	0.1058	50.2	0.434	-54.9
2500	0.598	-86.3	4.972	99.2	0.1084	49.2	0.425	-56.1
2600	0.569	-88.8	4.859	96.4	0.1130	48.2	0.412	-57.2

(COMMON SOURCE, $V_{DS}=1.5V$, $I_D=20mA$, $T_a=25^\circ C$, $Z_L=Z_s=50\Omega$)

FREQ. (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.995	-5.0	10.038	174.8	0.0060	87.6	0.516	-3.3
200	0.991	-10.2	10.039	170.2	0.0109	85.7	0.514	-6.2
300	0.980	-14.6	9.906	165.5	0.0155	81.7	0.511	-9.3
400	0.962	-20.0	9.731	160.9	0.0218	82.4	0.507	-12.2
500	0.955	-23.7	9.428	156.2	0.0263	79.7	0.502	-14.9
600	0.928	-29.0	9.398	152.2	0.0311	76.9	0.496	-17.7
700	0.914	-32.8	9.135	147.8	0.0368	75.6	0.488	-20.4
800	0.897	-37.2	8.969	144.3	0.0399	74.8	0.479	-23.2
900	0.866	-41.2	8.641	140.7	0.0453	73.3	0.470	-25.9
1000	0.846	-44.9	8.450	136.6	0.0495	70.3	0.461	-28.5
1100	0.822	-48.6	8.200	133.9	0.0549	69.9	0.454	-30.8
1200	0.799	-52.3	7.977	129.5	0.0589	68.5	0.443	-33.5
1300	0.781	-55.8	7.699	127.0	0.0625	66.4	0.436	-35.3
1400	0.754	-58.2	7.524	123.2	0.0663	64.9	0.428	-37.6
1500	0.738	-62.1	7.342	120.0	0.0697	64.2	0.420	-39.5
1600	0.714	-65.6	7.148	117.3	0.0730	62.9	0.414	-41.4
1700	0.700	-69.3	6.922	114.4	0.0772	62.5	0.407	-43.4
1800	0.676	-72.4	6.703	111.5	0.0809	60.9	0.400	-45.3
1900	0.672	-75.0	6.566	109.3	0.0849	59.4	0.393	-46.9
2000	0.644	-76.7	6.311	106.0	0.0873	58.6	0.379	-48.4
2100	0.621	-78.9	6.157	104.8	0.0911	57.6	0.370	-49.2
2200	0.587	-82.2	5.943	101.7	0.0939	56.5	0.361	-50.7
2300	0.583	-83.8	5.757	100.3	0.0975	55.7	0.355	-52.1
2400	0.553	-85.7	5.659	96.7	0.1006	54.9	0.345	-52.9
2500	0.552	-89.3	5.490	95.1	0.1037	54.0	0.339	-53.9
2600	0.508	-92.6	5.359	92.1	0.1073	53.3	0.328	-55.2

S-PARAMETER

(COMMON SOURCE, $V_{DS}=2V$, $I_D=2mA$, $T_a=25^\circ C$, $Z_L=Z_S=50\Omega$)

FREQ. (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.996	-3.2	3.539	176.9	0.0063	86.6	0.851	-2.4
200	0.993	-5.9	3.562	174.2	0.0134	85.6	0.852	-4.5
300	0.995	-9.3	3.548	171.2	0.0194	83.3	0.850	-6.7
400	0.988	-12.6	3.534	168.4	0.0263	81.2	0.845	-9.0
500	0.984	-15.6	3.470	165.5	0.0323	79.3	0.844	-10.8
600	0.980	-18.6	3.528	163.0	0.0382	78.8	0.841	-13.2
700	0.974	-21.3	3.477	160.0	0.0449	75.4	0.842	-15.4
800	0.969	-25.0	3.517	157.7	0.0509	74.1	0.831	-17.4
900	0.961	-27.6	3.430	155.1	0.0577	72.0	0.828	-19.9
1000	0.954	-30.5	3.429	151.9	0.0642	69.3	0.818	-21.7
1100	0.944	-33.2	3.398	150.2	0.0692	68.5	0.817	-23.8
1200	0.934	-36.1	3.397	146.4	0.0753	66.1	0.809	-26.0
1300	0.923	-39.0	3.343	144.8	0.0810	64.2	0.804	-28.0
1400	0.922	-41.9	3.341	141.2	0.0863	62.2	0.797	-30.1
1500	0.909	-44.5	3.324	138.6	0.0912	60.8	0.789	-32.0
1600	0.896	-47.3	3.306	136.4	0.0950	58.8	0.782	-33.9
1700	0.897	-50.4	3.281	133.7	0.1010	58.2	0.775	-36.0
1800	0.862	-52.9	3.246	130.7	0.1053	56.0	0.768	-37.9
1900	0.872	-55.6	3.225	129.4	0.1107	54.0	0.763	-39.9
2000	0.844	-58.5	3.184	125.6	0.1164	52.3	0.748	-41.8
2100	0.840	-60.5	3.149	124.7	0.1192	50.6	0.738	-43.2
2200	0.812	-63.2	3.066	121.3	0.1234	49.2	0.730	-45.3
2300	0.808	-65.1	3.050	119.9	0.1267	47.9	0.720	-46.7
2400	0.795	-67.5	3.001	116.3	0.1309	46.2	0.708	-48.7
2500	0.778	-70.6	2.998	114.5	0.1330	44.4	0.700	-50.1
2600	0.754	-72.5	2.945	111.2	0.1391	42.2	0.685	-51.9

(COMMON SOURCE, $V_{DS}=2V$, $I_D=5mA$, $T_a=25^\circ C$, $Z_L=Z_S=50\Omega$)

FREQ. (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	1.001	-4.0	6.027	176.3	0.0058	86.2	0.747	-2.8
200	0.991	-7.6	6.036	172.8	0.0118	81.2	0.746	-5.2
300	0.988	-11.5	6.027	169.0	0.0177	84.6	0.742	-7.9
400	0.974	-15.4	5.961	165.7	0.0245	79.6	0.739	-10.4
500	0.970	-18.7	5.834	162.1	0.0299	78.8	0.733	-12.9
600	0.968	-22.6	5.902	159.1	0.0354	77.0	0.731	-15.6
700	0.960	-25.8	5.796	155.4	0.0416	75.3	0.724	-17.9
800	0.946	-29.7	5.782	152.7	0.0463	73.0	0.715	-20.3
900	0.925	-33.5	5.637	149.4	0.0522	71.7	0.705	-22.9
1000	0.922	-36.2	5.591	145.8	0.0575	68.8	0.697	-25.2
1100	0.902	-39.7	5.503	143.6	0.0625	68.1	0.690	-27.5
1200	0.893	-42.9	5.411	139.7	0.0684	65.4	0.681	-30.0
1300	0.871	-46.3	5.301	137.6	0.0719	63.4	0.672	-32.0
1400	0.854	-49.3	5.262	133.8	0.0777	62.1	0.662	-34.3
1500	0.835	-51.7	5.176	130.7	0.0816	60.0	0.655	-36.4
1600	0.828	-56.1	5.129	128.5	0.0836	58.8	0.646	-38.5
1700	0.813	-58.9	5.031	125.5	0.0894	57.7	0.636	-40.5
1800	0.797	-60.7	4.925	122.5	0.0932	56.0	0.629	-42.5
1900	0.795	-64.8	4.890	120.6	0.0970	54.3	0.620	-44.6
2000	0.771	-67.2	4.750	116.8	0.1003	51.9	0.602	-46.2
2100	0.750	-69.5	4.675	115.8	0.1030	50.7	0.593	-47.9
2200	0.724	-72.5	4.525	112.4	0.1052	49.7	0.581	-49.4
2300	0.708	-74.0	4.440	111.0	0.1098	49.1	0.569	-51.1
2400	0.695	-77.0	4.379	107.5	0.1122	48.0	0.558	-52.5
2500	0.672	-79.2	4.298	105.6	0.1152	46.8	0.548	-53.8
2600	0.646	-82.3	4.223	102.3	0.1174	45.2	0.536	-55.7

S-PARAMETER

(COMMON SOURCE, $V_{DS}=2V$, $I_D=10mA$, $T_a=25^\circ C$, $Z_L=Z_S=50\Omega$)

FREQ. (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	1.000	-4.4	8.113	175.6	0.0055	85.7	0.655	-3.0
200	0.993	-8.5	8.084	171.6	0.0113	86.8	0.654	-5.8
300	0.986	-12.9	8.039	167.5	0.0167	81.2	0.650	-8.7
400	0.970	-17.4	7.944	163.4	0.0225	80.0	0.642	-11.5
500	0.965	-21.4	7.785	159.1	0.0277	78.8	0.641	-14.0
600	0.949	-25.4	7.755	155.9	0.0333	77.0	0.634	-16.9
700	0.935	-29.8	7.613	151.6	0.0387	75.7	0.627	-19.3
800	0.923	-33.6	7.519	148.2	0.0426	73.2	0.618	-22.0
900	0.898	-37.2	7.297	144.9	0.0484	72.5	0.609	-24.7
1000	0.885	-40.4	7.194	141.1	0.0525	69.0	0.597	-27.2
1100	0.863	-44.7	7.036	138.4	0.0574	68.2	0.588	-29.7
1200	0.842	-47.6	6.875	134.6	0.0620	66.2	0.579	-32.1
1300	0.833	-51.3	6.691	132.0	0.0665	64.9	0.567	-34.0
1400	0.808	-54.8	6.593	128.2	0.0694	62.5	0.558	-36.4
1500	0.781	-57.3	6.478	125.2	0.0747	61.4	0.550	-38.4
1600	0.773	-59.9	6.334	122.8	0.0763	60.0	0.539	-40.2
1700	0.769	-63.3	6.175	119.7	0.0818	58.8	0.531	-42.6
1800	0.727	-66.6	6.003	116.5	0.0849	58.3	0.523	-44.1
1900	0.726	-69.8	5.897	114.7	0.0885	56.5	0.515	-46.1
2000	0.701	-72.6	5.718	111.1	0.0912	53.9	0.498	-47.9
2100	0.683	-74.3	5.575	110.1	0.0939	53.9	0.488	-48.6
2200	0.647	-77.1	5.395	106.7	0.0969	52.8	0.479	-50.6
2300	0.635	-78.6	5.265	105.3	0.0993	52.1	0.469	-52.0
2400	0.626	-81.0	5.176	101.6	0.1039	51.2	0.460	-53.1
2500	0.607	-84.5	5.044	99.8	0.1053	49.5	0.449	-54.3
2600	0.569	-86.7	4.943	96.9	0.1088	48.7	0.436	-55.6

(COMMON SOURCE, $V_{DS}=2V$, $I_D=20mA$, $T_a=25^\circ C$, $Z_L=Z_S=50\Omega$)

FREQ. (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.994	-5.1	10.235	174.8	0.0054	87.5	0.556	-3.4
200	0.994	-9.7	10.222	170.3	0.0102	87.1	0.554	-6.2
300	0.982	-14.5	10.077	165.5	0.0153	85.0	0.549	-9.1
400	0.964	-19.2	9.902	161.0	0.0207	81.6	0.543	-11.9
500	0.951	-23.9	9.625	156.6	0.0256	80.5	0.538	-14.5
600	0.930	-28.1	9.577	152.6	0.0305	78.3	0.532	-17.4
700	0.917	-32.5	9.313	148.1	0.0351	77.3	0.524	-20.0
800	0.897	-37.0	9.128	144.3	0.0384	74.2	0.514	-22.6
900	0.869	-41.2	8.813	140.7	0.0440	72.7	0.505	-25.3
1000	0.846	-43.9	8.604	136.9	0.0484	71.2	0.495	-27.5
1100	0.823	-48.0	8.332	134.0	0.0528	69.5	0.487	-30.1
1200	0.795	-51.7	8.130	129.9	0.0566	68.5	0.476	-32.4
1300	0.782	-54.7	7.846	127.3	0.0608	66.5	0.469	-34.3
1400	0.757	-58.3	7.679	123.6	0.0645	64.3	0.459	-36.2
1500	0.744	-61.8	7.475	120.2	0.0676	63.7	0.451	-38.1
1600	0.713	-64.8	7.275	117.7	0.0709	62.0	0.445	-39.9
1700	0.703	-67.9	7.053	114.7	0.0756	61.9	0.437	-42.0
1800	0.675	-70.5	6.877	111.6	0.0783	60.5	0.430	-43.7
1900	0.664	-72.7	6.701	109.8	0.0821	59.5	0.422	-45.1
2000	0.638	-75.1	6.448	106.2	0.0849	57.9	0.408	-47.2
2100	0.617	-77.6	6.258	105.3	0.0876	57.8	0.399	-47.6
2200	0.592	-80.7	6.035	102.3	0.0908	56.5	0.393	-49.1
2300	0.578	-82.0	5.866	100.6	0.0933	56.2	0.384	-50.3
2400	0.549	-84.0	5.767	97.2	0.0977	55.8	0.375	-51.3
2500	0.538	-87.6	5.609	95.7	0.0992	53.4	0.369	-52.0
2600	0.511	-90.8	5.437	92.7	0.1035	52.9	0.360	-52.6

S-PARAMETER

(COMMON SOURCE, $V_{DS}=2.5V$, $I_D=2mA$, $T_a=25^\circ C$, $Z_L=Z_S=50\Omega$)

FREQ. (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.996	-3.4	3.442	177.0	0.0066	87.8	0.857	-2.3
200	0.993	-6.2	3.471	174.4	0.0128	84.5	0.856	-4.3
300	0.991	-9.0	3.468	171.4	0.0184	81.7	0.851	-6.4
400	0.983	-12.3	3.442	168.5	0.0252	81.7	0.852	-8.6
500	0.978	-15.3	3.379	165.8	0.0319	80.8	0.850	-10.7
600	0.981	-17.9	3.437	163.6	0.0378	76.4	0.846	-12.9
700	0.975	-21.3	3.397	160.3	0.0434	74.9	0.842	-14.9
800	0.967	-24.2	3.430	158.3	0.0496	74.0	0.835	-17.0
900	0.955	-27.1	3.357	155.5	0.0562	72.6	0.833	-19.2
1000	0.949	-29.7	3.357	152.4	0.0615	70.4	0.823	-21.2
1100	0.943	-33.0	3.320	150.7	0.0678	69.3	0.823	-23.4
1200	0.932	-35.8	3.313	147.0	0.0733	66.7	0.816	-25.5
1300	0.926	-37.6	3.257	145.3	0.0774	64.7	0.809	-27.4
1400	0.917	-41.0	3.262	142.0	0.0844	63.1	0.802	-29.3
1500	0.913	-43.4	3.256	139.5	0.0891	60.7	0.799	-31.3
1600	0.900	-46.2	3.253	137.2	0.0924	59.0	0.789	-33.2
1700	0.899	-49.5	3.208	134.3	0.0991	57.7	0.781	-35.2
1800	0.873	-51.4	3.183	131.7	0.1039	56.4	0.777	-37.0
1900	0.879	-54.4	3.174	130.6	0.1083	54.8	0.773	-39.0
2000	0.855	-57.4	3.130	126.2	0.1130	52.2	0.757	-41.0
2100	0.842	-58.7	3.093	125.8	0.1164	51.5	0.751	-42.4
2200	0.825	-61.9	3.018	122.0	0.1201	49.4	0.741	-44.4
2300	0.814	-63.3	2.981	120.9	0.1242	48.9	0.732	-45.9
2400	0.800	-65.7	2.978	117.4	0.1278	46.5	0.720	-47.5
2500	0.790	-69.6	2.952	115.6	0.1313	44.8	0.710	-49.2
2600	0.761	-72.2	2.911	112.5	0.1343	43.0	0.698	-51.0

(COMMON SOURCE, $V_{DS}=2.5V$, $I_D=5mA$, $T_a=25^\circ C$, $Z_L=Z_S=50\Omega$)

FREQ. (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.996	-3.9	5.846	176.3	0.0058	86.1	0.760	-2.7
200	0.991	-7.4	5.855	173.0	0.0120	84.6	0.759	-5.1
300	0.987	-10.8	5.842	169.4	0.0175	82.4	0.758	-7.7
400	0.980	-14.9	5.796	166.1	0.0235	80.5	0.752	-10.1
500	0.968	-18.1	5.683	162.7	0.0292	78.8	0.749	-12.4
600	0.967	-21.8	5.725	159.7	0.0344	77.8	0.745	-15.0
700	0.957	-25.4	5.648	156.0	0.0404	74.4	0.737	-17.3
800	0.944	-28.9	5.627	153.4	0.0460	73.5	0.730	-19.8
900	0.928	-32.6	5.490	150.4	0.0510	72.2	0.722	-22.1
1000	0.919	-35.2	5.456	146.7	0.0555	69.1	0.716	-24.6
1100	0.905	-39.0	5.369	144.3	0.0614	68.0	0.707	-26.8
1200	0.894	-41.9	5.310	140.6	0.0660	66.4	0.700	-29.1
1300	0.876	-45.5	5.194	138.3	0.0705	63.9	0.689	-31.1
1400	0.857	-47.9	5.143	134.8	0.0754	62.3	0.681	-33.2
1500	0.851	-51.0	5.080	131.7	0.0787	60.5	0.673	-35.5
1600	0.835	-54.0	5.023	129.1	0.0831	58.6	0.664	-37.4
1700	0.815	-56.6	4.940	126.5	0.0864	57.5	0.652	-39.3
1800	0.793	-60.3	4.838	123.4	0.0922	56.4	0.645	-41.4
1900	0.799	-63.2	4.791	122.0	0.0941	54.9	0.634	-43.4
2000	0.773	-65.6	4.688	118.2	0.0988	53.6	0.621	-45.2
2100	0.758	-68.3	4.593	116.8	0.1008	51.6	0.613	-46.7
2200	0.733	-70.4	4.455	113.5	0.1040	50.3	0.598	-48.2
2300	0.722	-71.7	4.378	112.0	0.1073	49.1	0.588	-49.8
2400	0.698	-74.8	4.330	108.5	0.1105	48.2	0.579	-51.4
2500	0.679	-78.5	4.249	106.8	0.1132	46.4	0.568	-52.7
2600	0.650	-79.8	4.153	103.6	0.1158	45.0	0.556	-54.3

S-PARAMETER

(COMMON SOURCE, $V_{DS}=2.5V$, $I_D=10mA$, $T_a=25^\circ C$, $Z_L=Z_S=50\Omega$)

FREQ. (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.990	-4.6	8.150	175.6	0.0056	85.9	0.668	-3.1
200	0.986	-8.8	8.178	171.6	0.0105	82.3	0.668	-5.7
300	0.988	-13.0	8.080	167.4	0.0159	80.6	0.660	-8.3
400	0.970	-17.5	8.012	163.4	0.0220	81.2	0.657	-11.2
500	0.964	-21.1	7.821	159.3	0.0268	79.3	0.652	-13.6
600	0.947	-25.4	7.840	156.0	0.0314	77.5	0.645	-16.2
700	0.931	-28.9	7.703	152.0	0.0371	75.7	0.639	-18.9
800	0.926	-33.1	7.581	148.7	0.0420	72.2	0.630	-21.4
900	0.897	-36.8	7.365	145.4	0.0472	71.3	0.620	-24.1
1000	0.879	-39.8	7.259	141.6	0.0510	70.1	0.609	-26.5
1100	0.865	-43.6	7.082	138.7	0.0555	67.9	0.603	-28.8
1200	0.840	-46.9	6.936	134.8	0.0593	66.3	0.591	-31.2
1300	0.821	-50.8	6.738	132.4	0.0642	64.9	0.582	-33.3
1400	0.807	-53.9	6.637	128.6	0.0678	63.2	0.572	-35.4
1500	0.785	-56.3	6.522	125.4	0.0715	61.6	0.561	-37.3
1600	0.767	-60.1	6.397	123.0	0.0727	60.1	0.552	-39.2
1700	0.751	-61.8	6.230	119.9	0.0789	59.3	0.545	-41.3
1800	0.734	-66.4	6.064	116.8	0.0831	58.0	0.538	-43.0
1900	0.721	-68.6	5.960	115.1	0.0863	57.1	0.530	-45.1
2000	0.701	-71.2	5.775	111.4	0.0884	54.9	0.509	-46.4
2100	0.681	-73.1	5.648	110.3	0.0904	53.7	0.502	-47.7
2200	0.644	-76.4	5.444	107.2	0.0931	53.3	0.491	-49.0
2300	0.640	-78.4	5.313	105.4	0.0970	52.7	0.481	-50.5
2400	0.614	-80.5	5.241	102.0	0.0998	51.9	0.472	-51.8
2500	0.603	-83.1	5.096	100.4	0.1023	50.7	0.463	-52.8
2600	0.563	-85.0	4.989	97.4	0.1046	48.6	0.451	-54.0

(COMMON SOURCE, $V_{DS}=2.5V$, $I_D=20mA$, $T_a=25^\circ C$, $Z_L=Z_S=50\Omega$)

FREQ. (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.993	-4.9	10.342	174.8	0.0049	86.5	0.580	-3.3
200	0.985	-9.7	10.308	170.3	0.0099	83.1	0.578	-6.1
300	0.983	-14.4	10.190	165.6	0.0145	83.7	0.573	-8.9
400	0.959	-19.1	10.023	160.9	0.0201	81.7	0.567	-11.6
500	0.953	-23.4	9.746	156.6	0.0249	80.2	0.562	-14.2
600	0.932	-27.9	9.703	152.4	0.0301	78.7	0.557	-17.0
700	0.908	-32.1	9.424	148.2	0.0340	75.4	0.547	-19.6
800	0.889	-36.5	9.263	144.7	0.0378	74.7	0.538	-22.2
900	0.870	-40.1	8.907	140.7	0.0420	73.0	0.527	-24.4
1000	0.844	-43.6	8.707	137.0	0.0471	70.6	0.517	-27.0
1100	0.826	-47.2	8.477	133.9	0.0506	69.6	0.509	-29.2
1200	0.787	-51.1	8.211	130.1	0.0547	68.6	0.498	-31.5
1300	0.778	-54.4	7.950	127.4	0.0587	66.2	0.489	-33.2
1400	0.747	-57.5	7.789	123.7	0.0611	65.4	0.480	-35.1
1500	0.732	-60.9	7.562	120.5	0.0650	63.9	0.473	-37.1
1600	0.716	-64.0	7.368	117.9	0.0678	62.3	0.466	-38.8
1700	0.692	-67.1	7.146	114.9	0.0722	62.0	0.458	-40.6
1800	0.674	-68.8	6.921	111.8	0.0761	61.1	0.450	-42.4
1900	0.658	-73.0	6.774	110.2	0.0786	59.6	0.443	-44.0
2000	0.632	-74.8	6.531	106.5	0.0819	58.4	0.429	-45.4
2100	0.615	-76.9	6.355	105.6	0.0840	57.7	0.420	-46.1
2200	0.588	-79.3	6.122	102.7	0.0865	57.3	0.411	-47.5
2300	0.575	-80.4	5.938	100.8	0.0897	56.9	0.406	-48.6
2400	0.557	-84.7	5.837	97.4	0.0926	55.2	0.397	-49.6
2500	0.536	-86.8	5.671	95.9	0.0955	54.0	0.390	-50.3
2600	0.511	-88.8	5.530	93.1	0.0990	53.5	0.379	-51.2

S-PARAMETER

(COMMON SOURCE, $V_{DS}=3V$, $I_D=2mA$, $T_a=25^\circ C$, $Z_L=Z_S=50\Omega$)

FREQ. (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.995	-3.5	3.428	177.2	0.0065	85.8	0.855	-2.1
200	0.993	-6.1	3.444	174.5	0.0122	83.9	0.852	-4.4
300	0.994	-8.8	3.445	171.6	0.0185	82.0	0.848	-6.4
400	0.979	-12.3	3.423	168.8	0.0247	82.0	0.850	-8.5
500	0.984	-15.0	3.362	165.9	0.0311	80.7	0.845	-10.4
600	0.972	-17.9	3.411	163.6	0.0363	77.5	0.843	-12.7
700	0.975	-20.8	3.394	160.6	0.0422	75.6	0.839	-14.5
800	0.966	-23.8	3.400	158.5	0.0479	74.0	0.835	-16.9
900	0.959	-26.3	3.340	156.0	0.0540	71.8	0.832	-18.7
1000	0.943	-29.1	3.340	152.7	0.0597	70.2	0.825	-20.8
1100	0.934	-31.5	3.316	151.0	0.0653	68.3	0.820	-22.9
1200	0.929	-35.0	3.284	147.4	0.0706	67.3	0.813	-25.0
1300	0.927	-37.9	3.269	145.7	0.0763	64.6	0.808	-26.8
1400	0.912	-40.0	3.250	142.5	0.0816	62.9	0.802	-29.0
1500	0.913	-43.3	3.251	139.8	0.0861	61.5	0.796	-30.8
1600	0.890	-46.0	3.238	137.6	0.0904	59.3	0.789	-32.6
1700	0.885	-48.9	3.206	135.0	0.0952	58.5	0.781	-34.5
1800	0.871	-50.8	3.164	132.2	0.1011	57.3	0.773	-36.4
1900	0.878	-54.3	3.169	130.6	0.1058	55.1	0.770	-38.3
2000	0.858	-56.2	3.106	127.1	0.1095	53.6	0.759	-40.3
2100	0.847	-58.1	3.098	126.4	0.1133	52.1	0.746	-41.7
2200	0.819	-61.2	3.016	122.9	0.1163	50.1	0.740	-43.4
2300	0.811	-62.3	2.982	121.4	0.1204	48.9	0.731	-45.1
2400	0.806	-65.5	2.965	117.9	0.1240	47.0	0.721	-46.9
2500	0.792	-68.2	2.948	116.0	0.1280	45.6	0.712	-48.4
2600	0.759	-70.8	2.911	113.0	0.1308	43.9	0.699	-50.1

(COMMON SOURCE, $V_{DS}=3V$, $I_D=5mA$, $T_a=25^\circ C$, $Z_L=Z_S=50\Omega$)

FREQ. (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.987	-4.3	5.844	176.4	0.0057	80.6	0.759	-2.6
200	0.987	-7.4	5.871	173.3	0.0111	82.4	0.760	-5.1
300	0.982	-10.9	5.841	169.5	0.0165	84.0	0.758	-7.6
400	0.974	-14.8	5.801	166.2	0.0225	79.8	0.753	-9.9
500	0.974	-18.0	5.691	162.7	0.0285	79.8	0.747	-12.3
600	0.959	-21.4	5.721	159.8	0.0336	77.6	0.746	-14.7
700	0.956	-25.1	5.654	156.2	0.0390	74.5	0.739	-16.9
800	0.944	-28.6	5.633	153.5	0.0445	72.9	0.731	-19.4
900	0.931	-31.5	5.501	150.3	0.0495	71.4	0.724	-21.7
1000	0.915	-34.5	5.466	147.0	0.0541	69.1	0.716	-24.1
1100	0.903	-38.4	5.366	144.5	0.0593	67.8	0.709	-26.2
1200	0.877	-41.4	5.316	140.9	0.0642	66.7	0.700	-28.5
1300	0.879	-44.9	5.201	138.9	0.0683	64.0	0.691	-30.5
1400	0.856	-47.4	5.163	135.0	0.0725	62.2	0.683	-32.7
1500	0.838	-50.3	5.099	132.2	0.0767	60.7	0.678	-34.5
1600	0.829	-53.9	5.038	129.7	0.0797	59.1	0.665	-36.6
1700	0.822	-56.9	4.964	126.8	0.0841	57.7	0.656	-38.5
1800	0.802	-59.1	4.871	123.9	0.0880	57.4	0.647	-40.4
1900	0.797	-62.6	4.795	122.1	0.0920	55.3	0.642	-42.5
2000	0.764	-65.0	4.709	118.5	0.0958	53.4	0.623	-44.3
2100	0.749	-67.1	4.632	117.5	0.0977	52.4	0.615	-45.5
2200	0.720	-69.4	4.486	113.8	0.1017	50.6	0.605	-47.2
2300	0.714	-71.3	4.402	112.5	0.1036	50.2	0.594	-48.6
2400	0.701	-74.0	4.355	108.8	0.1076	47.9	0.582	-50.3
2500	0.684	-77.2	4.264	107.2	0.1096	47.1	0.575	-51.4
2600	0.654	-79.7	4.184	104.2	0.1119	45.7	0.562	-53.1

S-PARAMETER

(COMMON SOURCE, $V_{DS}=3V$, $I_D=10mA$, $T_a=25^\circ C$, $Z_L=Z_S=50\Omega$)

FREQ. (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.995	-4.6	8.223	175.7	0.0059	85.2	0.673	-3.1
200	0.986	-8.9	8.213	171.8	0.0105	86.3	0.673	-5.5
300	0.982	-12.8	8.169	167.7	0.0152	82.1	0.667	-8.7
400	0.962	-17.1	8.050	163.6	0.0204	81.5	0.663	-10.9
500	0.959	-20.7	7.870	159.4	0.0258	80.7	0.660	-13.3
600	0.949	-24.7	7.936	155.9	0.0307	77.2	0.654	-16.0
700	0.931	-28.8	7.710	152.0	0.0354	74.8	0.645	-18.4
800	0.917	-32.5	7.624	148.9	0.0400	74.0	0.637	-21.0
900	0.899	-36.3	7.406	145.4	0.0453	72.2	0.629	-23.4
1000	0.873	-39.5	7.309	141.6	0.0494	69.5	0.617	-26.0
1100	0.859	-43.0	7.130	138.9	0.0541	68.4	0.609	-28.0
1200	0.830	-46.4	6.996	135.1	0.0577	67.2	0.599	-30.5
1300	0.828	-50.0	6.783	132.4	0.0622	65.4	0.589	-32.2
1400	0.798	-53.4	6.687	128.8	0.0658	63.5	0.577	-34.7
1500	0.783	-56.5	6.542	125.6	0.0689	61.8	0.571	-36.3
1600	0.764	-59.2	6.434	123.1	0.0722	61.0	0.560	-38.1
1700	0.752	-62.1	6.256	120.3	0.0754	59.6	0.550	-40.0
1800	0.729	-65.2	6.099	117.0	0.0801	58.0	0.544	-42.1
1900	0.724	-68.2	5.983	115.4	0.0832	56.8	0.536	-43.7
2000	0.694	-70.6	5.807	111.6	0.0856	55.0	0.519	-45.4
2100	0.676	-73.0	5.698	110.6	0.0881	54.5	0.511	-46.4
2200	0.651	-75.8	5.494	107.4	0.0909	53.7	0.500	-47.8
2300	0.634	-76.5	5.357	106.0	0.0937	53.1	0.490	-49.2
2400	0.614	-79.1	5.258	102.5	0.0963	52.2	0.483	-50.3
2500	0.592	-83.0	5.136	100.6	0.0982	50.7	0.473	-51.4
2600	0.565	-84.3	5.025	97.7	0.1022	49.5	0.462	-52.6

(COMMON SOURCE, $V_{DS}=3V$, $I_D=20mA$, $T_a=25^\circ C$, $Z_L=Z_S=50\Omega$)

FREQ. (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.990	-4.9	10.329	174.8	0.0052	80.7	0.601	-3.2
200	0.989	-9.7	10.281	170.3	0.0096	83.6	0.598	-6.0
300	0.974	-14.5	10.214	165.6	0.0141	83.6	0.593	-8.8
400	0.958	-19.0	10.042	161.3	0.0194	81.6	0.588	-11.4
500	0.941	-23.4	9.743	156.8	0.0238	80.3	0.582	-14.0
600	0.928	-27.6	9.709	152.6	0.0277	77.5	0.577	-16.4
700	0.905	-31.4	9.438	148.2	0.0329	76.8	0.568	-19.0
800	0.890	-35.7	9.225	145.0	0.0365	75.1	0.557	-21.5
900	0.868	-39.6	8.892	141.1	0.0414	71.9	0.546	-24.0
1000	0.843	-43.4	8.747	137.2	0.0446	71.1	0.537	-26.3
1100	0.827	-46.7	8.458	134.3	0.0492	69.5	0.528	-28.5
1200	0.792	-51.1	8.229	130.4	0.0535	68.1	0.519	-30.6
1300	0.780	-53.8	7.954	127.8	0.0565	66.7	0.510	-32.4
1400	0.745	-57.2	7.790	123.8	0.0599	65.5	0.500	-34.4
1500	0.728	-60.8	7.598	120.9	0.0633	64.3	0.493	-36.1
1600	0.716	-63.0	7.422	118.2	0.0664	62.6	0.483	-37.7
1700	0.689	-66.3	7.188	115.1	0.0702	62.1	0.476	-39.6
1800	0.673	-68.7	6.991	112.1	0.0738	61.6	0.469	-41.1
1900	0.661	-71.4	6.773	110.5	0.0761	59.7	0.464	-42.9
2000	0.636	-74.3	6.566	107.0	0.0803	57.8	0.447	-44.3
2100	0.612	-76.4	6.374	106.0	0.0812	57.8	0.439	-44.9
2200	0.589	-79.0	6.130	102.8	0.0847	57.4	0.431	-46.2
2300	0.571	-79.9	5.978	101.2	0.0869	56.5	0.423	-47.3
2400	0.543	-82.7	5.862	97.9	0.0896	55.2	0.417	-48.2
2500	0.532	-85.1	5.688	96.3	0.0934	54.2	0.408	-48.8
2600	0.512	-87.3	5.522	93.4	0.0965	54.2	0.401	-50.0

NOISE PARAMETER

(COMMON SOURCE, $V_{DS}=2V$, $T_a=25^\circ C$)

f (GHz)	I_D (mA)	NF min (dB)	$ \Gamma_{opt} $	$\angle \Gamma_{opt}$	R_n (Ω)
1.5	2	0.80	0.59	16	25
1.5	5	0.60	0.56	19	15
1.5	10	0.55	0.54	26	11
2	2	0.90	0.58	26	15
2	5	0.65	0.54	28	10
2	10	0.60	0.50	29	7