Ordering number : ENN*0000

N-Channel GaAs MESFET

SGF9

For C to X-band Local Oscillator and Amplifier

Preliminary

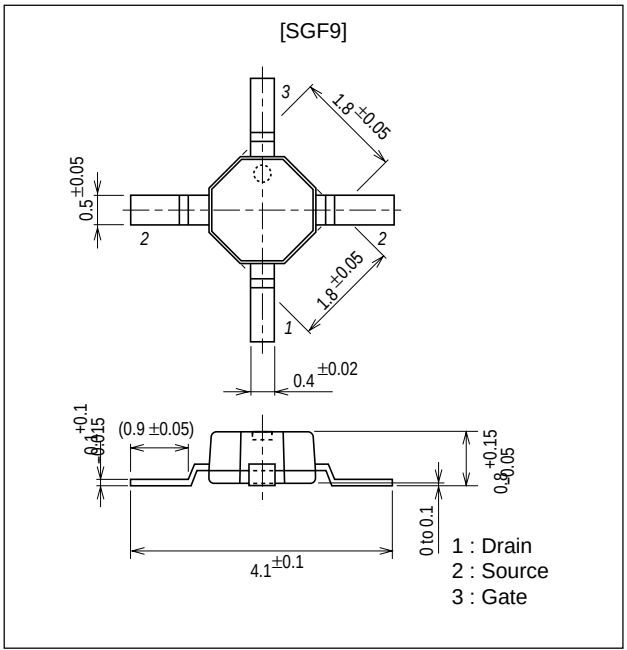
Features

- Mold package-owing to the cross-mold technology, this product can maintain the same performance as the ceramic package.
- The chip surface is covered with the highly reliable protection film.
- Automatic surface mounting is available.

Package Dimensions

unit : mm

0000



Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	V_{DS}		6.0	V
Gate-to-Source Voltage	V_{GS}		−5.0	V
Drain Current	I_D		100	mA
Allowable Power Dissipation	P_D		130	mW
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		−55 to +150	°C

Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Gate-to-Source Leak Current	$V_{(BR)GSO}$	I_{GS}=−10μA	−5.0			V
Saturated Drain Current	I_{DSS}	V_{DS}=3V, V_{GS}=0	30	40	70	mA
Gate-to-Source Cutoff Voltage	$V_{GS(off)}$	V_{DS}=3V, I_D=100μA	−0.5		−5.0	V
Forward Transfer Admittance	|yfs|	V_{DS}=3V, I_D=10mA	20	35		mS

Continued on next page.

SANYO Electric Co.,Ltd. Semiconductor Company
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

Continued from preceding page.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Minimum Noise Figure	NF min	V_{DS}=3V, I_D=10mA, f=12GHz		2.5		dB
Associated Gain	Ga	V_{DS}=3V, I_D=10mA, f=12GHz		5.0		dB
Maximum Available Gain	MAG	V_{DS}=3V, I_D=10mA, f=12GHz		7.0		dB

S-Parameter

SGF9 V_{DS}=3V, I_{DS}=10mA

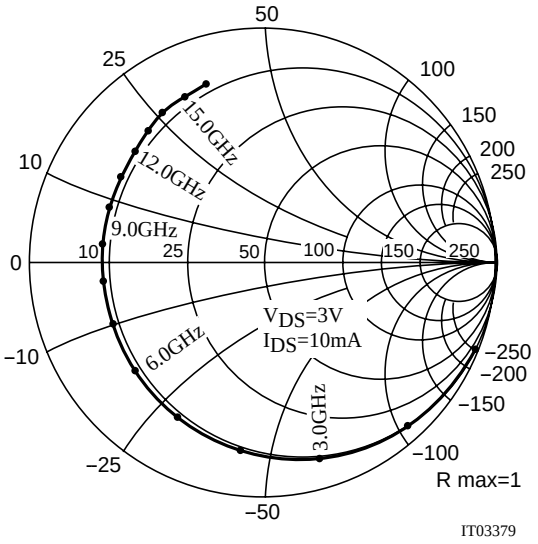
FREQUENCY	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
1000.0000	0.978	−25.5	3.020	157.3	0.042	71.7	0.741	−14.5
2000.0000	0.928	−50.3	2.868	136.6	0.078	56.9	0.702	−28.1
3000.0000	0.872	−74.4	2.696	116.9	0.107	42.4	0.649	−41.4
4000.0000	0.810	−97.8	2.468	97.8	0.124	29.5	0.585	−53.9
5000.0000	0.758	−119.5	2.241	80.9	0.134	18.1	0.529	−66.4
6000.0000	0.729	−140.1	2.046	64.5	0.138	8.1	0.480	−79.5
7000.0000	0.704	−157.7	1.829	49.3	0.134	−0.1	0.446	−92.7
8000.0000	0.701	−172.8	1.661	36.0	0.127	−5.1	0.429	−106.3
9000.0000	0.701	173.2	1.509	23.1	0.121	−9.2	0.423	−120.2
10000.0000	0.705	160.4	1.370	10.7	0.115	−12.4	0.422	−135.1
11000.0000	0.720	149.0	1.255	−0.9	0.109	−12.6	0.434	−150.1
12000.0000	0.733	138.5	1.134	−12.8	0.102	−12.4	0.458	−164.3
13000.0000	0.750	131.2	1.007	−22.3	0.100	−9.6	0.495	−177.4
14000.0000	0.777	122.8	0.929	−32.1	0.104	−7.3	0.535	170.6
15000.0000	0.785	115.3	0.836	−41.2	0.109	−6.5	0.577	160.0
16000.0000	0.799	108.0	0.763	−49.6	0.118	−7.0	0.610	149.5

SGF9 V_{DS}=3V, I_{DS}=10mA

FREQUENCY	GU max	GA max	|S21|^2	|S12|^2	K	Delay	Mason's U	G1	G2
MHz	dB	dB	dB	dB		ns	dB	dB	dB
1000.0000	26.67		9.60	−27.54	0.15	0.060	26.521	13.61	3.46
2000.0000	20.68		9.15	−22.16	0.25	0.058	24.262	8.58	2.95
3000.0000	17.19		8.61	−19.41	0.33	0.055	22.599	6.20	2.37
4000.0000	14.30		7.85	−18.13	0.45	0.052	20.846	4.64	1.82
5000.0000	12.15		7.01	−17.46	0.56	0.046	18.943	3.71	1.43
6000.0000	10.65		6.22	−17.20	0.65	0.046	18.621	3.29	1.14
7000.0000	9.18		5.24	−17.46	0.79	0.041	16.467	2.97	0.96
8000.0000	8.23		4.41	−17.92	0.90	0.037	16.145	2.94	0.88
9000.0000	7.37	10.53	3.57	−18.34	1.00	0.036	15.317	2.94	0.86
10000.0000	6.57	8.60	2.73	−18.79	1.13	0.033	13.909	2.98	0.85
11000.0000	6.05	7.96	1.97	−19.25	1.19	0.033	13.557	3.17	0.91
12000.0000	5.46	7.16	1.09	−19.83	1.30	0.034	11.820	3.35	1.02
13000.0000	4.87	6.59	0.06	−20.00	1.33	0.025	10.636	3.59	1.22
14000.0000	4.84	7.22	−0.64	−19.66	1.14	0.027	11.879	4.02	1.46
15000.0000	4.36	7.03	−1.56	−19.25	1.09	0.024	10.633	4.16	1.76
16000.0000	4.09		−2.35	−18.56	0.97	0.021	10.480	4.42	2.02

S-Parameter

S11



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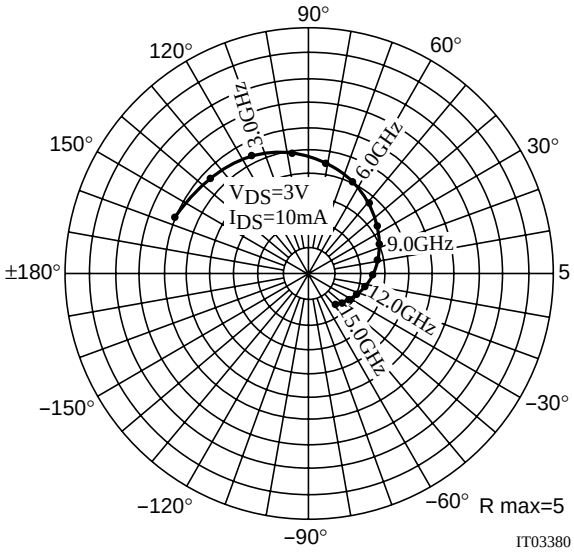

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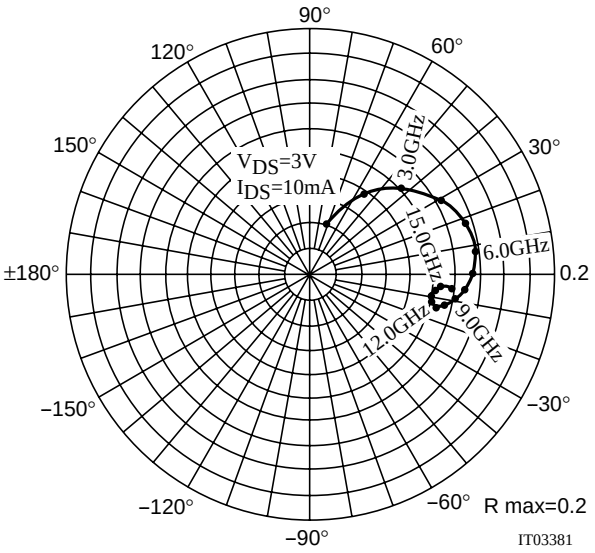

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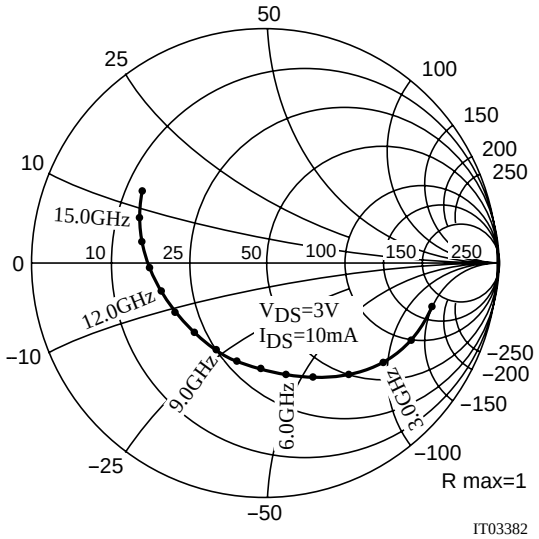


START 1GHz
STOP 16GHz

S-Parameter

SGF9 V_{DS}=3V, I_{DS}=20mA

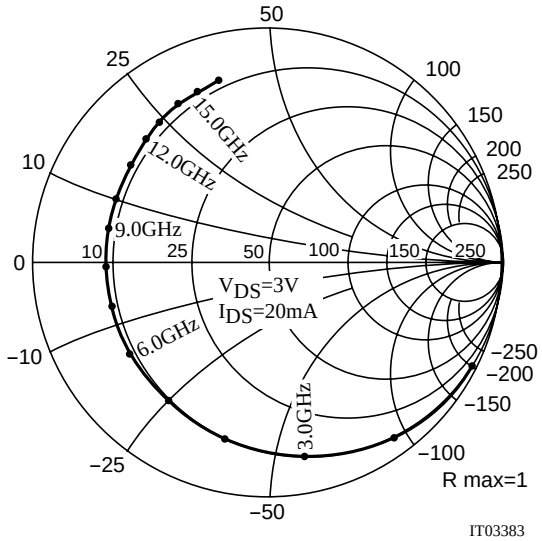
FREQUENCY	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
1000.0000	0.973	-27.7	3.699	156.7	0.039	70.9	0.715	-15.0
2000.0000	0.915	-54.4	3.454	134.6	0.071	56.0	0.670	-23.7
3000.0000	0.852	-79.9	3.187	114.7	0.095	41.8	0.613	-41.8
4000.0000	0.787	-104.0	2.861	95.7	0.108	29.6	0.547	-53.8
5000.0000	0.737	-126.0	2.559	79.2	0.116	19.4	0.491	-65.8
6000.0000	0.713	-146.3	2.306	63.3	0.118	10.6	0.444	-73.4
7000.0000	0.693	-163.6	2.045	48.6	0.114	4.7	0.412	-91.4
8000.0000	0.693	-178.1	1.846	35.8	0.110	1.7	0.397	-104.7
9000.0000	0.696	168.3	1.671	23.4	0.107	-0.8	0.391	-118.7
10000.0000	0.703	156.0	1.513	11.4	0.105	-2.3	0.390	-133.8
11000.0000	0.720	145.1	1.383	0.1	0.103	-1.7	0.405	-149.0
12000.0000	0.734	135.0	1.249	-11.4	0.102	-0.9	0.429	-164.1
13000.0000	0.751	128.1	1.114	-20.7	0.104	0.8	0.467	-176.8
14000.0000	0.779	119.9	1.026	-30.4	0.111	1.5	0.507	171.2
15000.0000	0.785	112.6	0.926	-39.3	0.120	1.5	0.550	160.6
16000.0000	0.800	105.6	0.848	-47.8	0.130	-1.1	0.585	150.2

SGF9 V_{DS}=3V, I_{DS}=20mA

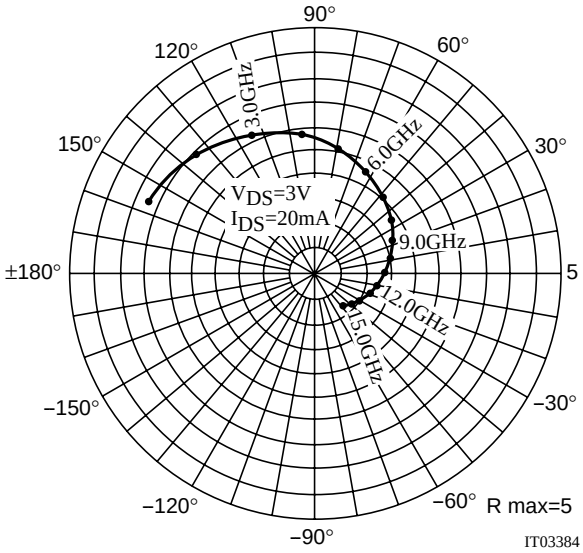
FREQUENCY	GU max	GA max	|S21|^2	|S12|^2	K	Delay	Mason's U	G1	G2
MHz	dB	dB	dB	dB		ns	dB	dB	dB
1000.0000	27.21		11.36	-28.18	0.16	0.062	27.458	12.74	3.11
2000.0000	21.24		10.77	-22.97	0.26	0.060	25.596	7.88	2.59
3000.0000	17.74		10.07	-20.45	0.36	0.056	24.093	5.62	2.05
4000.0000	14.87		9.13	-19.33	0.49	0.051	21.882	4.19	1.54
5000.0000	12.76		8.16	-18.71	0.61	0.045	20.065	3.40	1.20
6000.0000	11.29		7.26	-18.56	0.71	0.044	19.513	3.08	0.95
7000.0000	9.86		6.21	-18.86	0.87	0.040	17.573	2.84	0.81
8000.0000	8.91		5.32	-19.17	0.97	0.036	17.350	2.84	0.74
9000.0000	8.06	10.34	4.46	-19.41	1.07	0.034	16.472	2.88	0.72
10000.0000	7.27	9.15	3.60	-19.58	1.16	0.032	15.167	2.96	0.72
11000.0000	6.77	8.62	2.82	-19.74	1.19	0.032	14.730	3.17	0.78
12000.0000	6.18	7.93	1.93	-19.83	1.24	0.032	13.060	3.36	0.88
13000.0000	5.61	7.46	0.94	-19.66	1.22	0.025	11.860	3.61	1.07
14000.0000	5.57	8.49	0.22	-19.09	1.04	0.027	13.079	4.05	1.29
15000.0000	5.06		-0.67	-18.42	0.98	0.023	11.592	4.16	1.56
16000.0000	4.82		-1.43	-17.72	0.86	0.021	11.773	4.44	1.82

S-Parameter

S11



S21



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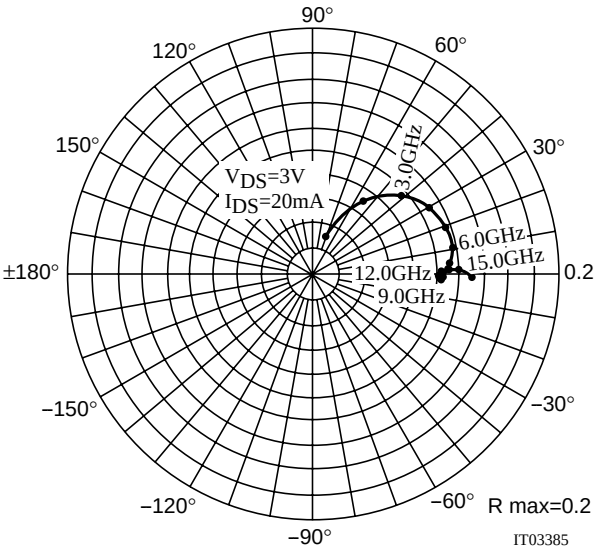
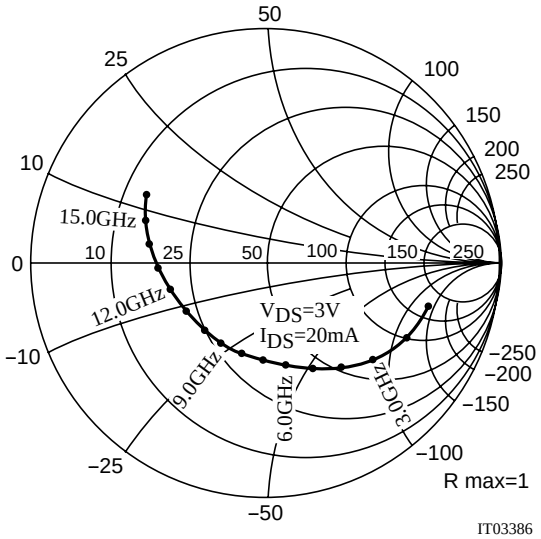


S22



START 1GHz
STOP 16GHz

S-Parameter

SGF9 V_{DS}=3V, I_{DS}=30mA

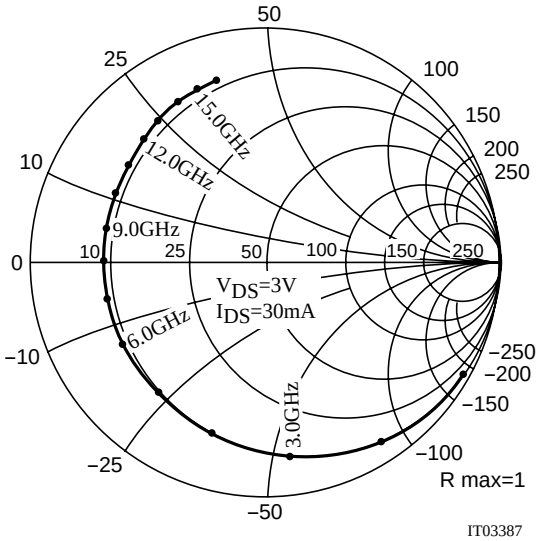
FREQUENCY	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
1000.0000	0.970	-29.2	4.062	155.9	0.036	70.4	0.713	-15.0
2000.0000	0.908	-57.0	3.764	133.4	0.066	55.7	0.666	-28.4
3000.0000	0.841	-83.1	3.432	113.3	0.087	41.6	0.607	-41.1
4000.0000	0.775	-107.6	3.051	94.4	0.098	29.8	0.543	-52.5
5000.0000	0.728	-129.5	2.709	78.0	0.104	20.6	0.488	-64.0
6000.0000	0.708	-149.7	2.427	62.4	0.106	13.2	0.444	-76.1
7000.0000	0.690	-166.7	2.147	48.1	0.102	8.1	0.415	-88.7
8000.0000	0.693	179.0	1.935	35.4	0.099	6.3	0.400	-101.9
9000.0000	0.697	165.8	1.746	23.1	0.097	5.3	0.396	-115.7
10000.0000	0.706	153.7	1.581	11.3	0.098	4.6	0.394	-130.7
11000.0000	0.724	143.1	1.443	0.1	0.099	6.3	0.408	-146.0
12000.0000	0.739	133.3	1.303	-11.4	0.102	6.8	0.432	-161.4
13000.0000	0.756	126.5	1.161	-20.6	0.107	8.1	0.469	-174.3
14000.0000	0.785	118.5	1.070	-30.4	0.116	7.7	0.511	173.4
15000.0000	0.790	111.3	0.965	-39.2	0.125	6.2	0.552	162.7
16000.0000	0.805	104.2	0.885	-47.8	0.137	3.5	0.587	152.1

SGF9 V_{DS}=3V, I_{DS}=30mA

FREQUENCY	GU max	GA max	|S21|^2	|S12|^2	K	Delay	Mason's U	G1	G2
MHz	dB	dB	dB	dB		ns	dB	dB	dB
1000.0000	27.54		12.17	-28.87	0.17	0.064	28.076	12.28	3.03
2000.0000	21.62		11.51	-23.61	0.27	0.061	26.836	7.56	2.55
3000.0000	18.04		10.71	-21.21	0.38	0.056	24.721	5.34	2.00
4000.0000	15.19		9.69	-20.18	0.52	0.051	22.314	3.99	1.52
5000.0000	13.12		8.66	-19.66	0.64	0.045	20.778	3.28	1.18
6000.0000	11.68		7.70	-19.49	0.74	0.043	20.850	3.02	0.95
7000.0000	10.27		6.64	-19.83	0.91	0.039	18.328	2.81	0.82
8000.0000	9.33	12.31	5.73	-20.09	1.01	0.035	18.191	2.84	0.76
9000.0000	8.47	10.55	4.84	-20.26	1.11	0.034	17.137	2.89	0.74
10000.0000	7.71	9.59	3.98	-20.18	1.17	0.032	16.068	3.00	0.73
11000.0000	7.20	9.15	3.19	-20.09	1.17	0.032	15.611	3.23	0.79
12000.0000	6.63	8.62	2.30	-19.83	1.16	0.032	14.114	3.43	0.90
13000.0000	6.06	8.27	1.30	-19.41	1.12	0.024	12.816	3.68	1.08
14000.0000	6.06		0.59	-18.71	0.92	0.027	14.586	4.16	1.31
15000.0000	5.52		-0.31	-18.06	0.88	0.023	12.541	4.25	1.58
16000.0000	5.31		-1.06	-17.27	0.77	0.022	12.617	4.53	1.83

S-Parameter

S11



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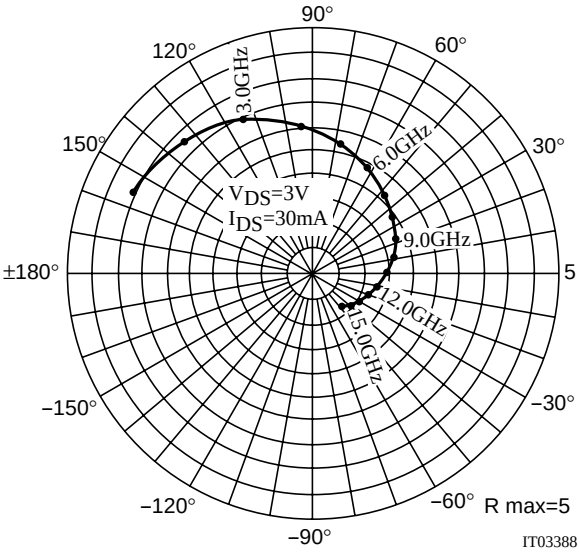
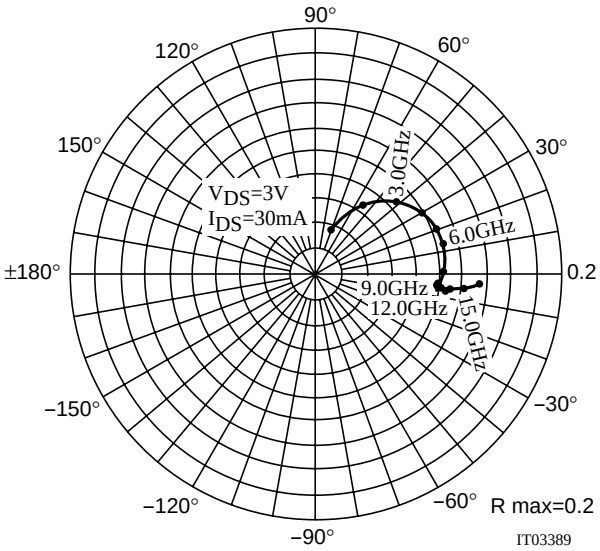
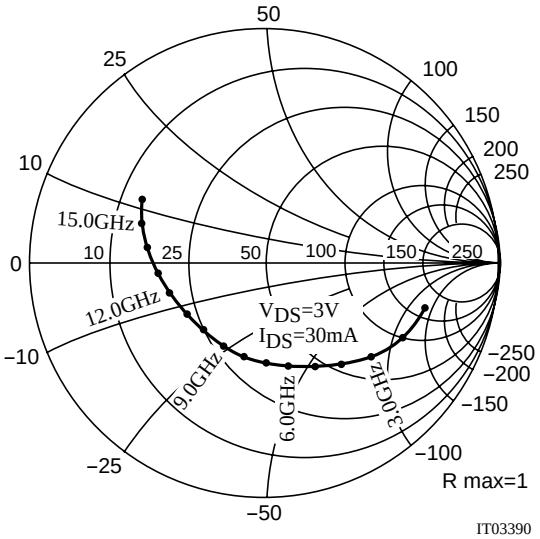


S12



S22



START 1GHz
STOP 16GHz