# **RF Transistor for Low Noise Amplifier**

# 12 V, 100 mA, $f_T = 10$ GHz typ.

This RF transistor is designed for low noise amplifier applications. MCPH package is suitable for use under high temperature environment because it has superior heat radiation characteristics. This RF transistor is AEC-Q101 qualified and PPAP capable for automotive applications.

#### **Features**

- Low-noise Use: NF = 1.2 dB typ. (f = 1 GHz)
- High Cut-off Frequency:  $f_T = 10$  GHz typ.  $(V_{CE} = 5 \text{ V})$
- High Gain:  $|S21e|^2 = 17 \text{ dB typ.}$  (f = 1 GHz)
- MCPH4 Package is Pin-compatible with SC-82FL
- AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb–Free, Halogen Free/BFR Free and are RoHS Compliant

#### **Typical Applications**

- Low Noise Amplifier for Digital Radio
- Low Noise Amplifier for TV
- Low Noise Amplifier for FM Radio
- RF Amplifier for UHF Application

#### **MAXIMUM RATINGS** at $T_A = 25^{\circ}C$

Rating	Symbol	Value	Unit
Collector to Base Voltage	$V_{CBO}$	20	V
Collector to Emitter Voltage	$V_{CEO}$	12	V
Emitter to Base Voltage	V <sub>EBO</sub>	2	V
Collector Current	I <sub>C</sub>	100	mA
Collector Dissipation	P <sub>C</sub>	450	mW
Operating Junction and Storage Temperature	T <sub>J</sub> , T <sub>stg</sub>	–55 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.



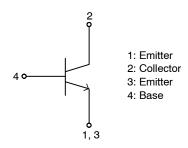
#### ON Semiconductor®

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SC-82FL MCPH4 CASE 419AR

# ELECTRICAL CONNECTION NPN



#### **MARKING DIAGRAM**



GQ = Specific Device Code XX = Lot Number

#### **ORDERING INFORMATION**

Device	Package	Shipping <sup>†</sup>
NSVF4015SG4T1G	SC-82FL (Pb-Free)	3000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

Table 1. ELECTRICAL CHARACTERISTICS at T<sub>A</sub> = 25°C (Note 1)

				Value		
Parameter	Symbol	Conditions	Min	Тур	Max	Unit
Collector Cutoff Current	I <sub>CBO</sub>	V <sub>CB</sub> = 5 V, I <sub>E</sub> = 0 A			1.0	μΑ
Emitter Cutoff Current	I <sub>EBO</sub>	V <sub>EB</sub> = 1 V, I <sub>C</sub> = 0 A			1.0	μΑ
DC Current Gain	h <sub>FE</sub>	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 50 mA	60		150	
Gain-Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 30 mA	8	10		GHz
Forward Transfer Gain	S21e   <sup>2</sup>	$V_{CE} = 5 \text{ V}, I_{C} = 30 \text{ mA}, f = 1 \text{ GHz}$	14	17		dB
Noise Figure	NF	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 10 mA, f = 1 GHz		1.2	1.8	dB

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Pay attention to handling since it is liable to be affected by static electricity due to the high–frequency process adopted.

#### **TYPICAL CHARACTERISTICS**

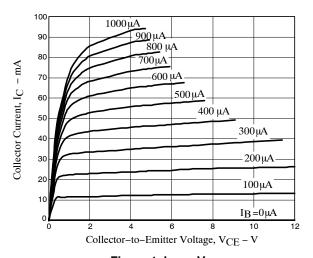


Figure 1.  $I_{\text{C}}$  vs.  $V_{\text{CE}}$ 

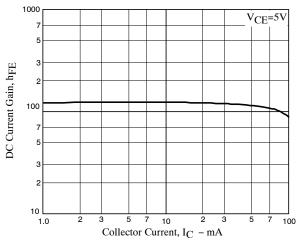


Figure 3. h<sub>FE</sub> vs. I<sub>C</sub>

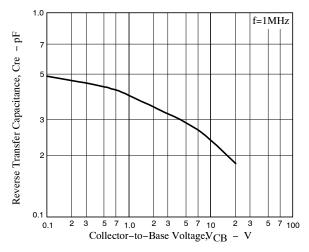


Figure 5. Cre vs.  $V_{CB}$ 

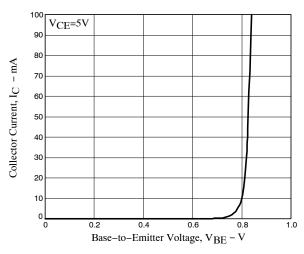


Figure 2.  $I_{\text{C}}$  vs.  $V_{\text{BE}}$ 

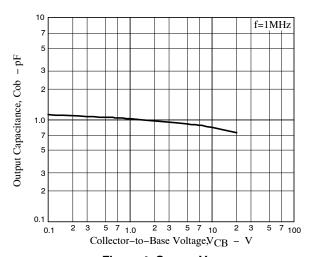


Figure 4.  $C_{ob}$  vs.  $V_{CB}$ 

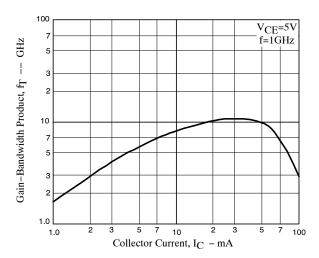


Figure 6.  $f_T$  vs.  $I_C$ 

#### **TYPICAL CHARACTERISTICS**

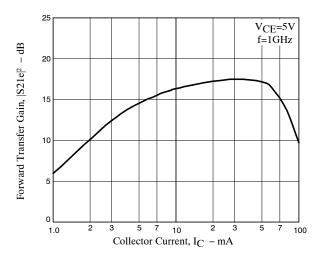


Figure 7. |S21e|2 vs. I<sub>C</sub>

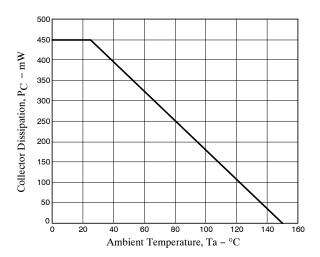


Figure 9.  $P_C$  vs.  $T_A$ 

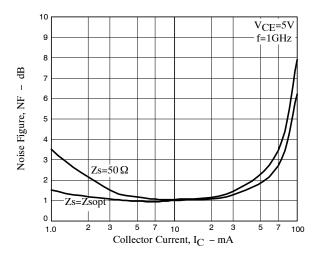


Figure 8. NF vs. I<sub>C</sub>

3 Parameters	(Common er	nitter)						
/CE=3V, IC=1	0mA							
Freq(MHz)	S11	∠S11	S21	∠S21	S12	∠ S12	S22	∠S22
100	0.763	-38.0	22.980	155.3	0.018	71.5	0.923	-22.7
200	0.733	-71.8	20.122	135.9	0.031	58.6	0.798	-40.2
300	0.702	-98.5	17.019	121.3	0.038	50.6	0.703	-53.5
400	0.690	-116.5	14.110	110.7	0.043	46.3	0.626	-62.9
500	0.701	-127.2	12.307	103.5	0.048	45.0	0.592	-67.4
600	0.679	-137.1	10.431	97.5	0.050	43.7	0.531	-72.0
700	0.663	-145.1	8.949	92.7	0.052	43.6	0.484	-75.2
800	0.651	-152.1	7.848	88.4	0.054	43.9	0.446	-78.7
900	0.646	-157.6	6.993	84.8	0.057	44.0	0.422	-81.6
1000	0.639	-162.3	6.272	81.9	0.059	45.1	0.404	-84.4
1200	0.635	-170.2	5.211	76.5	0.063	47.1	0.375	-88.7
1400	0.634	-176.5	4.462	71.7	0.068	49.1	0.362	-92.4
1600	0.633	177.9	3.907	67.3	0.073	51.2	0.352	-95.9
1800	0.636	173.2	3.463	63.4	0.079	52.7	0.351	-99.0
2000	0.637	169.1	3.122	59.5	0.085	54.3	0.352	-102.3
2200	0.637	164.9	2.838	55.8	0.091	55.5	0.356	-105.2
2400	0.638	161.0	2.604	52.1	0.098	56.5	0.364	-108.1
2600	0.639	157.3	2.413	48.7	0.105	57.2	0.372	-111.1
2800	0.642	153.7	2.244	45.1	0.112	57.9	0.384	-113.5
3000	0.641	150.0	2.095	41.8	0.120	57.8	0.396	-116.2

CE=3V, IC=3								
Freq(MHz)	S11	∠S11	S21	∠S21	S12	∠ S12	S22	∠S22
100	0.542	-76.9	42.437	142.3	0.013	63.9	0.801	-36.2
200	0.588	-118.2	30.735	119.6	0.020	53.9	0.602	-56.8
300	0.614	-138.6	22.677	106.5	0.024	52.3	0.505	-69.3
400	0.626	-150.0	17.506	98.4	0.027	53.8	0.448	-77.9
500	0.635	-155.0	14.522	92.7	0.031	55.6	0.423	-79.8
600	0.630	-161.3	12.035	88.5	0.035	57.8	0.381	-83.6
700	0.627	-166.4	10.249	85.2	0.038	59.8	0.350	-86.9
800	0.626	-170.9	8.902	82.2	0.042	61.3	0.327	-90.4
900	0.627	-174.7	7.888	79.5	0.045	62.3	0.314	-93.2
1000	0.626	-177.8	7.046	77.3	0.049	63.4	0.303	-96.1
1200	0.629	176.7	5.835	73.1	0.057	65.4	0.287	-100.4
1400	0.631	171.9	4.976	69.2	0.065	66.2	0.282	-103.8
1600	0.633	167.7	4.344	65.6	0.073	66.5	0.280	-106.9
1800	0.637	163.9	3.854	62.0	0.082	66.8	0.281	-109.7
2000	0.638	160.5	3.474	58.7	0.090	66.6	0.287	-112.5
2200	0.638	156.8	3.160	55.5	0.099	66.5	0.293	-115.1
2400	0.640	153.5	2.900	52.2	0.108	65.8	0.302	-117.3
2600	0.640	150.2	2.684	49.0	0.117	65.2	0.312	-119.5
2800	0.642	146.9	2.499	45.9	0.125	64.3	0.324	-121.6
3000	0.640	143.6	2.337	42.8	0.134	63.6	0.337	-123.8
CE=3V, IC=5 Freq(MHz)	S11	∠S11	S21	∠S21	S12	∠ S12	S22	∠S22
100	0.514	-110.3	43.067	133.3	0.011	59.0	0.700	40.0
200	0.607	141.4			0.011	37.0	0.700	-40.9
205		-141.4	29.221	112.3	0.016	53.1	0.700	-40.9 -58.9
300	0.642	-141.4	29.221 20.818					-
300 400		-154.9	20.818	101.0	0.016 0.019	53.1	0.495 0.417	-58.9 -68.7
	0.642 0.657 0.660				0.016	53.1 55.3	0.495	-58.9
400	0.657	-154.9 -162.5	20.818 15.865	101.0 94.1	0.016 0.019 0.023	53.1 55.3 58.5	0.495 0.417 0.376	-58.9 -68.7 -75.5
400 500	0.657 0.660	-154.9 -162.5 -165.8	20.818 15.865 13.033	101.0 94.1 88.9	0.016 0.019 0.023 0.027	53.1 55.3 58.5 61.4	0.495 0.417 0.376 0.360	-58.9 -68.7 -75.5 -75.7
400 500 600 700	0.657 0.660 0.659 0.658	-154.9 -162.5 -165.8 -170.3 -174.3	20.818 15.865 13.033 10.812 9.213	101.0 94.1 88.9 85.3 82.3	0.016 0.019 0.023 0.027 0.030 0.034	53.1 55.3 58.5 61.4 64.0 66.1	0.495 0.417 0.376 0.360 0.330 0.307	-58.9 -68.7 -75.5 -75.7 -78.7 -81.5
400 500 600	0.657 0.660 0.659	-154.9 -162.5 -165.8 -170.3	20.818 15.865 13.033 10.812	101.0 94.1 88.9 85.3	0.016 0.019 0.023 0.027 0.030	53.1 55.3 58.5 61.4 64.0	0.495 0.417 0.376 0.360 0.330	-58.9 -68.7 -75.5 -75.7 -78.7
400 500 600 700 800	0.657 0.660 0.659 0.658 0.660	-154.9 -162.5 -165.8 -170.3 -174.3 -177.8	20.818 15.865 13.033 10.812 9.213 7.995	101.0 94.1 88.9 85.3 82.3 79.5	0.016 0.019 0.023 0.027 0.030 0.034 0.038	53.1 55.3 58.5 61.4 64.0 66.1 67.8	0.495 0.417 0.376 0.360 0.330 0.307 0.291	-58.9 -68.7 -75.5 -75.7 -78.7 -81.5 -84.5
400 500 600 700 800 900	0.657 0.660 0.659 0.658 0.660 0.663	-154.9 -162.5 -165.8 -170.3 -174.3 -177.8 179.2 176.6	20.818 15.865 13.033 10.812 9.213 7.995 7.097	101.0 94.1 88.9 85.3 82.3 79.5 77.1	0.016 0.019 0.023 0.027 0.030 0.034 0.038 0.042	53.1 55.3 58.5 61.4 64.0 66.1 67.8 68.6	0.495 0.417 0.376 0.360 0.330 0.307 0.291 0.284	-58.9 -68.7 -75.5 -75.7 -78.7 -81.5 -84.5 -87.1
400 500 600 700 800 900 1000	0.657 0.660 0.659 0.658 0.660 0.663 0.662 0.666	-154.9 -162.5 -165.8 -170.3 -174.3 -177.8 179.2	20.818 15.865 13.033 10.812 9.213 7.995 7.097 6.333	101.0 94.1 88.9 85.3 82.3 79.5 77.1 74.8	0.016 0.019 0.023 0.027 0.030 0.034 0.038 0.042 0.046	53.1 55.3 58.5 61.4 64.0 66.1 67.8 68.6 69.6	0.495 0.417 0.376 0.360 0.330 0.307 0.291 0.284 0.277	-58.9 -68.7 -75.5 -75.7 -78.7 -81.5 -84.5 -87.1 -89.7
400 500 600 700 800 900 1000 1200	0.657 0.660 0.659 0.658 0.660 0.663 0.662	-154.9 -162.5 -165.8 -170.3 -174.3 -177.8 179.2 176.6 172.0	20.818 15.865 13.033 10.812 9.213 7.995 7.097 6.333 5.247	101.0 94.1 88.9 85.3 82.3 79.5 77.1 74.8 70.8	0.016 0.019 0.023 0.027 0.030 0.034 0.038 0.042 0.046 0.055	53.1 55.3 58.5 61.4 64.0 66.1 67.8 68.6 69.6 70.9	0.495 0.417 0.376 0.360 0.330 0.307 0.291 0.284 0.277 0.268	-58.9 -68.7 -75.5 -75.7 -78.7 -81.5 -84.5 -87.1 -89.7 -93.7
400 500 600 700 800 900 1000 1200 1400	0.657 0.660 0.659 0.658 0.660 0.663 0.662 0.666 0.670	-154.9 -162.5 -165.8 -170.3 -174.3 -177.8 179.2 176.6 172.0 167.9	20.818 15.865 13.033 10.812 9.213 7.995 7.097 6.333 5.247 4.475	101.0 94.1 88.9 85.3 82.3 79.5 77.1 74.8 70.8 67.0	0.016 0.019 0.023 0.027 0.030 0.034 0.038 0.042 0.046 0.055 0.063	53.1 55.3 58.5 61.4 64.0 66.1 67.8 68.6 69.6 70.9 71.3	0.495 0.417 0.376 0.360 0.330 0.307 0.291 0.284 0.277 0.268 0.269	-58.9 -68.7 -75.5 -75.7 -78.7 -81.5 -84.5 -87.1 -89.7 -93.7 -97.1
400 500 600 700 800 900 1000 1200 1400 1600	0.657 0.660 0.659 0.658 0.660 0.663 0.662 0.666 0.670 0.673 0.676	-154.9 -162.5 -165.8 -170.3 -174.3 -177.8 179.2 176.6 172.0 167.9 164.1	20.818 15.865 13.033 10.812 9.213 7.995 7.097 6.333 5.247 4.475 3.897 3.469	101.0 94.1 88.9 85.3 82.3 79.5 77.1 74.8 70.8 67.0 63.4	0.016 0.019 0.023 0.027 0.030 0.034 0.038 0.042 0.046 0.055 0.063 0.072	53.1 55.3 58.5 61.4 64.0 66.1 67.8 68.6 69.6 70.9 71.3 71.5	0.495 0.417 0.376 0.360 0.330 0.307 0.291 0.284 0.277 0.268 0.269 0.270	-58.9 -68.7 -75.5 -75.7 -78.7 -81.5 -84.5 -87.1 -89.7 -93.7 -97.1 -100.2
400 500 600 700 800 900 1000 1200 1400 1600 1800	0.657 0.660 0.659 0.658 0.660 0.663 0.662 0.666 0.670 0.673	-154.9 -162.5 -165.8 -170.3 -174.3 -177.8 179.2 176.6 172.0 167.9 164.1 160.6	20.818 15.865 13.033 10.812 9.213 7.995 7.097 6.333 5.247 4.475 3.897	101.0 94.1 88.9 85.3 82.3 79.5 77.1 74.8 70.8 67.0 63.4 59.9	0.016 0.019 0.023 0.027 0.030 0.034 0.038 0.042 0.046 0.055 0.063 0.072 0.080	53.1 55.3 58.5 61.4 64.0 66.1 67.8 68.6 69.6 70.9 71.3 71.5 71.4	0.495 0.417 0.376 0.360 0.330 0.307 0.291 0.284 0.277 0.268 0.269 0.270 0.275	-58.9 -68.7 -75.5 -75.7 -78.7 -81.5 -84.5 -87.1 -89.7 -93.7 -97.1 -100.2 -103.3
400 500 600 700 800 900 1000 1200 1400 1600 1800 2000	0.657 0.660 0.659 0.658 0.660 0.663 0.662 0.666 0.670 0.673 0.676 0.678	-154.9 -162.5 -165.8 -170.3 -174.3 -177.8 179.2 176.6 172.0 167.9 164.1 160.6 157.5	20.818 15.865 13.033 10.812 9.213 7.995 7.097 6.333 5.247 4.475 3.897 3.469 3.113	101.0 94.1 88.9 85.3 82.3 79.5 77.1 74.8 70.8 67.0 63.4 59.9 56.5	0.016 0.019 0.023 0.027 0.030 0.034 0.038 0.042 0.046 0.055 0.063 0.072 0.080 0.089	53.1 55.3 58.5 61.4 64.0 66.1 67.8 68.6 69.6 70.9 71.3 71.5 71.4 71.0	0.495 0.417 0.376 0.360 0.330 0.307 0.291 0.284 0.277 0.268 0.269 0.270 0.275 0.284	-58.9 -68.7 -75.5 -75.7 -81.5 -84.5 -87.1 -89.7 -93.7 -97.1 -100.2 -103.3 -106.5
400 500 600 700 800 900 1000 1200 1400 1600 1800 2000 2200	0.657 0.660 0.659 0.658 0.660 0.663 0.662 0.666 0.670 0.673 0.676 0.678 0.679	-154.9 -162.5 -165.8 -170.3 -174.3 -177.8 179.2 176.6 172.0 167.9 164.1 160.6 157.5 154.1	20.818 15.865 13.033 10.812 9.213 7.995 7.097 6.333 5.247 4.475 3.897 3.469 3.113 2.836	101.0 94.1 88.9 85.3 82.3 79.5 77.1 74.8 70.8 67.0 63.4 59.9 56.5 53.1	0.016 0.019 0.023 0.027 0.030 0.034 0.038 0.042 0.046 0.055 0.063 0.072 0.080 0.089 0.098	53.1 55.3 58.5 61.4 64.0 66.1 67.8 68.6 69.6 70.9 71.3 71.5 71.4 71.0 70.4	0.495 0.417 0.376 0.360 0.330 0.307 0.291 0.284 0.277 0.268 0.269 0.270 0.275 0.284 0.293	-58.9 -68.7 -75.5 -75.7 -81.5 -84.5 -87.1 -89.7 -93.7 -97.1 -100.2 -103.3 -106.5 -109.3
400 500 600 700 800 900 1000 1200 1400 1600 1800 2000 2200 2400	0.657 0.660 0.659 0.658 0.660 0.663 0.662 0.666 0.670 0.673 0.676 0.678 0.679 0.681	-154.9 -162.5 -165.8 -170.3 -174.3 -177.8 179.2 176.6 172.0 167.9 164.1 160.6 157.5 154.1 150.9	20.818 15.865 13.033 10.812 9.213 7.995 7.097 6.333 5.247 4.475 3.897 3.469 3.113 2.836 2.598	101.0 94.1 88.9 85.3 82.3 79.5 77.1 74.8 70.8 67.0 63.4 59.9 56.5 53.1 49.8	0.016 0.019 0.023 0.027 0.030 0.034 0.038 0.042 0.046 0.055 0.063 0.072 0.080 0.089 0.098 0.107	53.1 55.3 58.5 61.4 64.0 66.1 67.8 68.6 69.6 70.9 71.3 71.5 71.4 71.0 70.4 69.8	0.495 0.417 0.376 0.360 0.330 0.307 0.291 0.284 0.277 0.268 0.269 0.270 0.275 0.284 0.293 0.304	-58.9 -68.7 -75.5 -75.7 -81.5 -84.5 -87.1 -89.7 -93.7 -97.1 -100.2 -103.3 -106.5 -109.3 -111.9

CE=3V, IC=8			I		1		1	
Freq(MHz)	S11	∠S11	S21	∠S21	S12	∠ S12	S22	∠S22
100	0.662	-146.8	29.622	120.5	0.011	47.5	0.455	-44.8
200	0.751	-164.0	16.762	102.8	0.014	46.9	0.315	-52.9
300	0.774	-171.2	11.369	94.2	0.017	52.5	0.288	-57.1
400	0.783	-175.6	8.549	88.9	0.019	58.6	0.279	-61.3
500	0.778	-178.0	6.977	84.2	0.023	62.0	0.283	-61.0
600	0.778	179.0	5.801	81.0	0.027	66.0	0.272	-62.9
700	0.778	176.3	4.965	78.3	0.030	68.6	0.265	-65.2
800	0.780	173.9	4.316	75.7	0.034	70.2	0.260	-68.0
900	0.782	171.6	3.846	73.3	0.038	71.9	0.263	-70.7
1000	0.782	169.6	3.439	71.0	0.042	73.0	0.263	-73.7
1200	0.787	166.0	2.860	66.6	0.051	74.5	0.268	-78.5
1400	0.789	162.5	2.454	62.4	0.059	75.3	0.278	-83.1
1600	0.792	159.2	2.139	58.4	0.068	75.7	0.288	-87.5
1800	0.796	156.0	1.912	54.5	0.077	75.7	0.300	-91.7
2000	0.797	153.1	1.721	50.8	0.086	75.4	0.314	-96.1
2200	0.797	149.9	1.569	47.1	0.095	75.0	0.328	-100.0
2400	0.799	146.8	1.436	43.4	0.105	74.1	0.343	-103.8
2600	0.800	143.8	1.331	39.9	0.115	73.4	0.359	-107.4
2800	0.801	140.6	1.238	36.5	0.125	72.2	0.377	-110.9
3000	0.799	137.4	1.157	33.3	0.135	71.1	0.394	-114.4
CE=5V, IC=1 Freq(MHz)	S11	∠S11	S21	∠S21	S12	∠ S12	S22	∠S22
100	0.771	-35.8	23.180	156.3	0.016	72.7	0.933	-20.3
200	0.741	-68.2	20.484	137.3	0.028	60.4	0.000	
300	0.706	-94.4	17.503			00	0.820	-36.2
400			17.505	122.8	0.035	53.0	0.820	-36.2 -48.5
400	0.691	-112.7	14.633	122.8 111.9				
500	0.691				0.035	53.0	0.722	-48.5
		-112.7	14.633	111.9	0.035 0.040	53.0 48.5	0.722 0.656	-48.5 -57.3
500	0.701	-112.7 -123.8	14.633 12.817	111.9 104.7	0.035 0.040 0.044	53.0 48.5 47.2	0.722 0.656 0.622	-48.5 -57.3 -61.7
500 600	0.701 0.677 0.659	-112.7 -123.8 -133.9 -142.2	14.633 12.817 10.891 9.349	111.9 104.7 98.4 93.5	0.035 0.040 0.044 0.047 0.049	53.0 48.5 47.2 46.0 45.5	0.722 0.656 0.622 0.560 0.513	-48.5 -57.3 -61.7 -66.0 -68.9
500 600 700	0.701 0.677	-112.7 -123.8 -133.9	14.633 12.817 10.891	111.9 104.7 98.4	0.035 0.040 0.044 0.047	53.0 48.5 47.2 46.0	0.722 0.656 0.622 0.560	-48.5 -57.3 -61.7 -66.0
500 600 700 800	0.701 0.677 0.659 0.646	-112.7 -123.8 -133.9 -142.2 -149.5	14.633 12.817 10.891 9.349 8.209	111.9 104.7 98.4 93.5 89.1	0.035 0.040 0.044 0.047 0.049 0.051	53.0 48.5 47.2 46.0 45.5 45.7	0.722 0.656 0.622 0.560 0.513 0.474	-48.5 -57.3 -61.7 -66.0 -68.9 -72.0
500 600 700 800 900	0.701 0.677 0.659 0.646 0.640	-112.7 -123.8 -133.9 -142.2 -149.5 -155.2	14.633 12.817 10.891 9.349 8.209 7.315	111.9 104.7 98.4 93.5 89.1 85.3	0.035 0.040 0.044 0.047 0.049 0.051 0.053	53.0 48.5 47.2 46.0 45.5 45.7 46.1	0.722 0.656 0.622 0.560 0.513 0.474 0.449	-48.5 -57.3 -61.7 -66.0 -68.9 -72.0 -74.7
500 600 700 800 900 1000	0.701 0.677 0.659 0.646 0.640 0.633	-112.7 -123.8 -133.9 -142.2 -149.5 -155.2 -160.1	14.633 12.817 10.891 9.349 8.209 7.315 6.557	111.9 104.7 98.4 93.5 89.1 85.3 82.3	0.035 0.040 0.044 0.047 0.049 0.051 0.053 0.055	53.0 48.5 47.2 46.0 45.5 45.7 46.1 46.9	0.722 0.656 0.622 0.560 0.513 0.474 0.449 0.428	-48.5 -57.3 -61.7 -66.0 -68.9 -72.0 -74.7 -77.4
500 600 700 800 900 1000 1200	0.701 0.677 0.659 0.646 0.640 0.633 0.628	-112.7 -123.8 -133.9 -142.2 -149.5 -155.2 -160.1 -168.2	14.633 12.817 10.891 9.349 8.209 7.315 6.557 5.459	111.9 104.7 98.4 93.5 89.1 85.3 82.3 76.8	0.035 0.040 0.044 0.047 0.049 0.051 0.053 0.055 0.060	53.0 48.5 47.2 46.0 45.5 45.7 46.1 46.9 49.0	0.722 0.656 0.622 0.560 0.513 0.474 0.449 0.428 0.399	-48.5 -57.3 -61.7 -66.0 -68.9 -72.0 -74.7 -77.4 -81.4
500 600 700 800 900 1000 1200 1400	0.701 0.677 0.659 0.646 0.640 0.633 0.628 0.625	-112.7 -123.8 -133.9 -142.2 -149.5 -155.2 -160.1 -168.2 -174.7	14.633 12.817 10.891 9.349 8.209 7.315 6.557 5.459 4.663	111.9 104.7 98.4 93.5 89.1 85.3 82.3 76.8 71.9	0.035 0.040 0.044 0.047 0.049 0.051 0.053 0.055 0.060 0.064	53.0 48.5 47.2 46.0 45.5 45.7 46.1 46.9 49.0 51.0	0.722 0.656 0.622 0.560 0.513 0.474 0.449 0.428 0.399 0.385	-48.5 -57.3 -61.7 -66.0 -68.9 -72.0 -74.7 -77.4 -81.4 -84.9
500 600 700 800 900 1000 1200 1400 1600	0.701 0.677 0.659 0.646 0.640 0.633 0.628 0.625	-112.7 -123.8 -133.9 -142.2 -149.5 -155.2 -160.1 -168.2 -174.7 179.5	14.633 12.817 10.891 9.349 8.209 7.315 6.557 5.459 4.663 4.086	111.9 104.7 98.4 93.5 89.1 85.3 82.3 76.8 71.9 67.5	0.035 0.040 0.044 0.047 0.049 0.051 0.053 0.055 0.060 0.064 0.069	53.0 48.5 47.2 46.0 45.5 45.7 46.1 46.9 49.0 51.0 53.3	0.722 0.656 0.622 0.560 0.513 0.474 0.449 0.428 0.399 0.385 0.373	-48.5 -57.3 -61.7 -66.0 -68.9 -72.0 -74.7 -77.4 -81.4 -84.9 -88.4
500 600 700 800 900 1000 1200 1400 1600 1800	0.701 0.677 0.659 0.646 0.640 0.633 0.628 0.625 0.625	-112.7 -123.8 -133.9 -142.2 -149.5 -155.2 -160.1 -168.2 -174.7 179.5 174.7	14.633 12.817 10.891 9.349 8.209 7.315 6.557 5.459 4.663 4.086 3.616	111.9 104.7 98.4 93.5 89.1 85.3 82.3 76.8 71.9 67.5 63.5	0.035 0.040 0.044 0.047 0.049 0.051 0.053 0.055 0.060 0.064 0.069 0.075	53.0 48.5 47.2 46.0 45.5 45.7 46.1 46.9 49.0 51.0 53.3 54.8	0.722 0.656 0.622 0.560 0.513 0.474 0.449 0.428 0.399 0.385 0.373 0.372	-48.5 -57.3 -61.7 -66.0 -68.9 -72.0 -74.7 -77.4 -81.4 -84.9 -88.4 -91.5
500 600 700 800 900 1000 1200 1400 1600 1800 2000	0.701 0.677 0.659 0.646 0.640 0.633 0.628 0.625 0.625 0.627 0.628	-112.7 -123.8 -133.9 -142.2 -149.5 -155.2 -160.1 -168.2 -174.7 179.5 174.7 170.5	14.633 12.817 10.891 9.349 8.209 7.315 6.557 5.459 4.663 4.086 3.616 3.260	111.9 104.7 98.4 93.5 89.1 85.3 82.3 76.8 71.9 67.5 63.5 59.5	0.035 0.040 0.044 0.047 0.049 0.051 0.053 0.055 0.060 0.064 0.069 0.075 0.080	53.0 48.5 47.2 46.0 45.5 45.7 46.1 46.9 49.0 51.0 53.3 54.8 56.6	0.722 0.656 0.622 0.560 0.513 0.474 0.449 0.428 0.399 0.385 0.373 0.372 0.372	-48.5 -57.3 -61.7 -66.0 -68.9 -72.0 -74.7 -77.4 -81.4 -84.9 -88.4 -91.5 -94.9
500 600 700 800 900 1000 1200 1400 1600 1800 2000 2200	0.701 0.677 0.659 0.646 0.640 0.633 0.628 0.625 0.625 0.627 0.628	-112.7 -123.8 -133.9 -142.2 -149.5 -155.2 -160.1 -168.2 -174.7 179.5 174.7 170.5 166.2	14.633 12.817 10.891 9.349 8.209 7.315 6.557 5.459 4.663 4.086 3.616 3.260 2.960	111.9 104.7 98.4 93.5 89.1 85.3 82.3 76.8 71.9 67.5 63.5 59.5	0.035 0.040 0.044 0.047 0.049 0.051 0.053 0.055 0.060 0.064 0.069 0.075 0.080 0.086	53.0 48.5 47.2 46.0 45.5 45.7 46.1 46.9 49.0 51.0 53.3 54.8 56.6 57.9	0.722 0.656 0.622 0.560 0.513 0.474 0.449 0.428 0.399 0.385 0.373 0.372 0.372	-48.5 -57.3 -61.7 -66.0 -68.9 -72.0 -74.7 -77.4 -81.4 -84.9 -88.4 -91.5 -94.9 -98.0
500 600 700 800 900 1000 1200 1400 1600 1800 2000 2200 2400	0.701 0.677 0.659 0.646 0.640 0.633 0.628 0.625 0.625 0.627 0.628 0.628	-112.7 -123.8 -133.9 -142.2 -149.5 -155.2 -160.1 -168.2 -174.7 179.5 174.7 170.5 166.2 162.2	14.633 12.817 10.891 9.349 8.209 7.315 6.557 5.459 4.663 4.086 3.616 3.260 2.960 2.715	111.9 104.7 98.4 93.5 89.1 85.3 82.3 76.8 71.9 67.5 63.5 59.5 55.7 52.0	0.035 0.040 0.044 0.047 0.049 0.051 0.053 0.055 0.060 0.064 0.069 0.075 0.080 0.086 0.093	53.0 48.5 47.2 46.0 45.5 45.7 46.1 46.9 49.0 51.0 53.3 54.8 56.6 57.9 58.9	0.722 0.656 0.622 0.560 0.513 0.474 0.449 0.428 0.399 0.385 0.373 0.372 0.372 0.376 0.383	-48.5 -57.3 -61.7 -66.0 -68.9 -72.0 -74.7 -77.4 -81.4 -84.9 -88.4 -91.5 -94.9 -98.0 -101.1

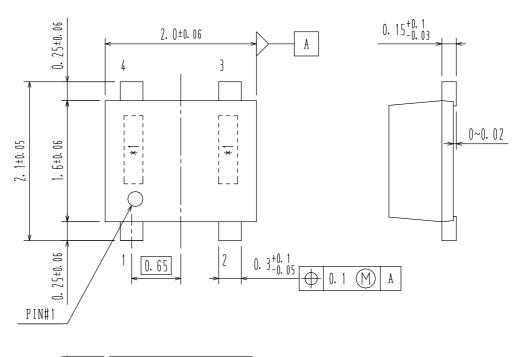
CE=5V, IC=3 Freq(MHz)	S11	∠S11	S21	∠S21	S12	∠ S12	S22	∠S22
100	0.542	-70.6	43.013	144.3	0.012	66.3	0.826	-31.8
200		-70.6		121.4		56.3		
300	0.577	-112.5	32.303	107.8	0.018 0.022	55.0	0.636 0.539	-50.4 -61.6
400			24.068			55.5	-	-69.3
	0.611	-146.5 -151.9	18.636	99.4 93.6	0.025		0.478 0.454	-69.3
500 600			15.457		0.029	57.7 59.6		-71.4
700	0.614	-158.6	12.813	89.2 85.6		61.5	0.410	-74.7
	0.611	-164.1	10.898		0.036		0.376	-
800	0.610	-168.7	9.470	82.5	0.039	62.9	0.351	-80.5
900	0.611	-172.7	8.381	79.8	0.043	64.1	0.337	-83.2
1000	0.610	-176.0	7.487	77.5	0.047	65.3	0.324	-85.8
1200	0.612	178.3	6.186	73.2	0.054	66.8	0.306	-89.7
1400	0.615	173.4	5.277	69.2	0.062	67.7	0.299	-93.1
1600	0.617	169.0	4.596	65.6	0.070	68.2	0.296	-96.3
1800	0.620	165.1	4.085	62.0	0.078	68.6	0.297	-99.3
2000	0.622	161.6	3.669	58.7	0.086	68.4	0.301	-102.5
2200	0.622	158.0	3.344	55.5	0.095	68.3	0.307	-105.1
2400	0.625	154.6	3.065	52.1	0.103	67.8	0.316	-107.9
2600	0.625	151.3	2.835	48.8	0.112	67.2	0.326	-110.5
2800 3000	0.628	148.0 144.6	2.638 2.464	45.7 42.6	0.120 0.129	66.5 65.6	0.339 0.352	-113.0 -115.5
CE=5V, IC=5 Freq(MHz)	S11	∠S11	S21	∠S21	S12	∠ S12	S22	∠S22
100	0.479	-97.2	42.927	137.2	0.010	63.4	0.761	-35.0
200	0.566	-132.9	32.978	115.4	0.015	56.7	0.560	-51.6
300	0.603	-148.8	23.718	103.2	0.018	58.0	0.485	-60.6
400	0.620	-157.8	18.120	95.7	0.021	60.4	0.427	
500	0.625	4.64.4						-66.9
200	0.625	-161.4	14.893	90.4	0.025	63.7	0.410	-66.9 -68.0
600	0.623	-161.4 -166.7	14.893	90.4 86.4				-68.0
					0.025	63.7 66.0 68.0	0.410	
600	0.624	-166.7 -171.0	12.324	86.4	0.025 0.029	66.0	0.410 0.375	-68.0 -70.7 -73.2
600 700	0.624 0.624	-166.7	12.324 10.482	86.4 83.2	0.025 0.029 0.032	66.0 68.0	0.410 0.375 0.348	-68.0 -70.7
600 700 800	0.624 0.624 0.626	-166.7 -171.0 -174.8	12.324 10.482 9.088	86.4 83.2 80.4	0.025 0.029 0.032 0.036	66.0 68.0 69.2	0.410 0.375 0.348 0.328	-68.0 -70.7 -73.2 -75.9 -78.4
600 700 800 900	0.624 0.624 0.626 0.628	-166.7 -171.0 -174.8 -178.1	12.324 10.482 9.088 8.053	86.4 83.2 80.4 77.9	0.025 0.029 0.032 0.036 0.040	66.0 68.0 69.2 70.4	0.410 0.375 0.348 0.328 0.317	-68.0 -70.7 -73.2 -75.9
600 700 800 900 1000	0.624 0.624 0.626 0.628 0.628	-166.7 -171.0 -174.8 -178.1 179.1	12.324 10.482 9.088 8.053 7.184	86.4 83.2 80.4 77.9 75.6	0.025 0.029 0.032 0.036 0.040 0.044	66.0 68.0 69.2 70.4 70.9	0.410 0.375 0.348 0.328 0.317 0.308	-68.0 -70.7 -73.2 -75.9 -78.4 -80.9
600 700 800 900 1000 1200	0.624 0.624 0.626 0.628 0.628 0.633	-166.7 -171.0 -174.8 -178.1 179.1 174.2	12.324 10.482 9.088 8.053 7.184 5.943	86.4 83.2 80.4 77.9 75.6 71.5	0.025 0.029 0.032 0.036 0.040 0.044 0.052	66.0 68.0 69.2 70.4 70.9 72.2	0.410 0.375 0.348 0.328 0.317 0.308 0.295	-68.0 -70.7 -73.2 -75.9 -78.4 -80.9 -84.6
600 700 800 900 1000 1200 1400	0.624 0.624 0.626 0.628 0.628 0.633 0.636	-166.7 -171.0 -174.8 -178.1 179.1 174.2 169.8	12.324 10.482 9.088 8.053 7.184 5.943 5.061	86.4 83.2 80.4 77.9 75.6 71.5 67.7	0.025 0.029 0.032 0.036 0.040 0.044 0.052 0.060	66.0 68.0 69.2 70.4 70.9 72.2 72.7	0.410 0.375 0.348 0.328 0.317 0.308 0.295	-68.0 -70.7 -73.2 -75.9 -78.4 -80.9 -84.6 -88.2
600 700 800 900 1000 1200 1400 1600	0.624 0.624 0.626 0.628 0.628 0.633 0.636 0.640	-166.7 -171.0 -174.8 -178.1 179.1 174.2 169.8 165.9	12.324 10.482 9.088 8.053 7.184 5.943 5.061 4.407	86.4 83.2 80.4 77.9 75.6 71.5 67.7 64.1	0.025 0.029 0.032 0.036 0.040 0.044 0.052 0.060	66.0 68.0 69.2 70.4 70.9 72.2 72.7	0.410 0.375 0.348 0.328 0.317 0.308 0.295 0.292 0.292	-68.0 -70.7 -73.2 -75.9 -78.4 -80.9 -84.6 -88.2 -91.5
600 700 800 900 1000 1200 1400 1600 1800	0.624 0.624 0.626 0.628 0.628 0.633 0.636 0.640 0.643	-166.7 -171.0 -174.8 -178.1 179.1 174.2 169.8 165.9 162.3	12.324 10.482 9.088 8.053 7.184 5.943 5.061 4.407 3.917	86.4 83.2 80.4 77.9 75.6 71.5 67.7 64.1 60.6	0.025 0.029 0.032 0.036 0.040 0.044 0.052 0.060 0.069 0.077	66.0 68.0 69.2 70.4 70.9 72.2 72.7 72.7 72.6	0.410 0.375 0.348 0.328 0.317 0.308 0.295 0.292 0.292	-68.0 -70.7 -73.2 -75.9 -78.4 -80.9 -84.6 -88.2 -91.5 -94.7 -98.1
600 700 800 900 1000 1200 1400 1600 1800 2000	0.624 0.624 0.626 0.628 0.628 0.633 0.636 0.640 0.643 0.645	-166.7 -171.0 -174.8 -178.1 179.1 174.2 169.8 165.9 162.3 159.1	12.324 10.482 9.088 8.053 7.184 5.943 5.061 4.407 3.917 3.518	86.4 83.2 80.4 77.9 75.6 71.5 67.7 64.1 60.6 57.2	0.025 0.029 0.032 0.036 0.040 0.044 0.052 0.060 0.069 0.077 0.086	66.0 68.0 69.2 70.4 70.9 72.2 72.7 72.7 72.6 72.3	0.410 0.375 0.348 0.328 0.317 0.308 0.295 0.292 0.292 0.295 0.301	-68.0 -70.7 -73.2 -75.9 -78.4 -80.9 -84.6 -88.2 -91.5 -94.7 -98.1 -101.1
600 700 800 900 1000 1200 1400 1600 1800 2000 2200	0.624 0.624 0.626 0.628 0.628 0.633 0.636 0.640 0.643 0.645 0.646	-166.7 -171.0 -174.8 -178.1 179.1 174.2 169.8 165.9 162.3 159.1 155.6	12.324 10.482 9.088 8.053 7.184 5.943 5.061 4.407 3.917 3.518 3.202	86.4 83.2 80.4 77.9 75.6 71.5 67.7 64.1 60.6 57.2 54.0	0.025 0.029 0.032 0.036 0.040 0.044 0.052 0.060 0.069 0.077 0.086 0.094	66.0 68.0 69.2 70.4 70.9 72.2 72.7 72.6 72.3 71.8	0.410 0.375 0.348 0.328 0.317 0.308 0.295 0.292 0.292 0.292 0.295 0.301 0.309	-68.0 -70.7 -73.2 -75.9 -78.4 -80.9 -84.6 -88.2 -91.5
600 700 800 900 1000 1200 1400 1600 1800 2000 2200 2400	0.624 0.624 0.626 0.628 0.628 0.633 0.636 0.640 0.643 0.645 0.646 0.648	-166.7 -171.0 -174.8 -178.1 179.1 174.2 169.8 165.9 162.3 159.1 155.6 152.4	12.324 10.482 9.088 8.053 7.184 5.943 5.061 4.407 3.917 3.518 3.202 2.931	86.4 83.2 80.4 77.9 75.6 71.5 67.7 64.1 60.6 57.2 54.0	0.025 0.029 0.032 0.036 0.040 0.044 0.052 0.060 0.069 0.077 0.086 0.094 0.103	66.0 68.0 69.2 70.4 70.9 72.2 72.7 72.6 72.3 71.8 71.1	0.410 0.375 0.348 0.328 0.317 0.308 0.295 0.292 0.292 0.292 0.295 0.301 0.309 0.319	-68.0 -70.7 -73.2 -75.9 -78.4 -80.9 -84.6 -88.2 -91.5 -94.7 -98.1 -101.1 -104.0

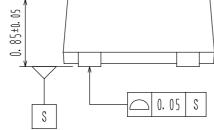
CE=5V, IC=8								
Freq(MHz)	S11	∠S11	S21	∠S21	S12	∠ S12	S22	∠S22
100	0.558	-133.0	39.014	127.8	0.009	54.5	0.618	-33.7
200	0.671	-155.6	23.364	107.6	0.012	52.6	0.457	-41.5
300	0.704	-165.1	16.107	97.6	0.014	57.5	0.415	-45.4
400	0.718	-170.7	12.150	91.5	0.017	62.9	0.395	-49.0
500	0.716	-173.4	9.907	86.7	0.021	66.8	0.385	-50.4
600	0.717	-177.0	8.214	83.3	0.024	69.5	0.378	-52.4
700	0.718	179.9	7.015	80.4	0.028	72.5	0.364	-54.4
800	0.720	177.1	6.091	77.8	0.031	73.9	0.354	-57.0
900	0.723	174.5	5.413	75.3	0.035	75.7	0.351	-59.7
1000	0.723	172.3	4.829	72.9	0.039	76.8	0.346	-62.4
1200	0.728	168.3	4.009	68.8	0.047	78.1	0.343	-67.0
1400	0.731	164.7	3.423	64.7	0.055	78.9	0.347	-71.8
1600	0.735	161.2	2.987	60.8	0.063	78.9	0.352	-76.2
1800	0.738	157.9	2.662	57.1	0.072	79.1	0.359	-80.6
2000	0.740	155.0	2.393	53.5	0.081	78.7	0.369	-85.3
2200	0.741	151.7	2.179	50.0	0.090	78.2	0.379	-89.5
2400	0.743	148.6	1.993	46.4	0.099	77.4	0.391	-93.5
2600	0.744	145.6	1.843	43.0	0.109	76.5	0.404	-97.4
2800	0.746	142.4	1.716	39.6	0.119	75.4	0.418	-101.3
3000	0.744	139.2	1.601	36.3	0.129	74.2	0.433	-105.1
CE=8V, IC=1 Freq(MHz)	S11	∠S11	S21	∠S21	S12	∠ S12	S22	∠S22
100	0.784	-33.9	22.973	157.1	0.014	73.5	0.941	-18.1
200	0.754	-64.8	20.491	138.6	0.025	62.4	0.839	-32.6
300	0.715	-90.5	17.690	124.1	0.000		0.500	
400	0.697	1000			0.032	55.0	0.739	-44.1
		-109.0	14.905	113.1	0.032	50.3	0.739	-44.1 -52.2
500	0.704	-109.0 -120.4	14.905 13.108					
500 600	0.704 0.678			113.1	0.037	50.3	0.685	-52.2
		-120.4	13.108	113.1 105.8	0.037 0.041	50.3 49.3	0.685 0.652	-52.2 -56.5
600	0.678 0.659	-120.4 -130.9	13.108 11.176	113.1 105.8 99.3	0.037 0.041 0.044	50.3 49.3 47.7	0.685 0.652 0.591	-52.2 -56.5 -60.6
600 700	0.678	-120.4 -130.9 -139.5	13.108 11.176 9.599	113.1 105.8 99.3 94.2	0.037 0.041 0.044 0.046	50.3 49.3 47.7 47.3	0.685 0.652 0.591 0.544	-52.2 -56.5 -60.6 -63.3
600 700 800	0.678 0.659 0.645	-120.4 -130.9 -139.5 -146.9	13.108 11.176 9.599 8.439	113.1 105.8 99.3 94.2 89.7	0.037 0.041 0.044 0.046 0.048	50.3 49.3 47.7 47.3 47.3	0.685 0.652 0.591 0.544 0.504	-52.2 -56.5 -60.6 -63.3 -66.1
600 700 800 900	0.678 0.659 0.645 0.638	-120.4 -130.9 -139.5 -146.9 -152.9	13.108 11.176 9.599 8.439 7.523	113.1 105.8 99.3 94.2 89.7 85.8	0.037 0.041 0.044 0.046 0.048 0.050	50.3 49.3 47.7 47.3 47.3 47.5	0.685 0.652 0.591 0.544 0.504 0.478	-52.2 -56.5 -60.6 -63.3 -66.1 -68.7
600 700 800 900 1000	0.678 0.659 0.645 0.638 0.629	-120.4 -130.9 -139.5 -146.9 -152.9 -158.0	13.108 11.176 9.599 8.439 7.523 6.746	113.1 105.8 99.3 94.2 89.7 85.8 82.7	0.037 0.041 0.044 0.046 0.048 0.050 0.052	50.3 49.3 47.7 47.3 47.3 47.5 48.6	0.685 0.652 0.591 0.544 0.504 0.478 0.457	-52.2 -56.5 -60.6 -63.3 -66.1 -68.7 -71.2
600 700 800 900 1000 1200	0.678 0.659 0.645 0.638 0.629 0.623	-120.4 -130.9 -139.5 -146.9 -152.9 -158.0 -166.3	13.108 11.176 9.599 8.439 7.523 6.746 5.618	113.1 105.8 99.3 94.2 89.7 85.8 82.7 77.1	0.037 0.041 0.044 0.046 0.048 0.050 0.052 0.056	50.3 49.3 47.7 47.3 47.3 47.5 48.6 50.5	0.685 0.652 0.591 0.544 0.504 0.478 0.457 0.427	-52.2 -56.5 -60.6 -63.3 -66.1 -68.7 -71.2 -75.0
600 700 800 900 1000 1200 1400	0.678 0.659 0.645 0.638 0.629 0.623 0.621	-120.4 -130.9 -139.5 -146.9 -152.9 -158.0 -166.3 -173.1	13.108 11.176 9.599 8.439 7.523 6.746 5.618 4.797	113.1 105.8 99.3 94.2 89.7 85.8 82.7 77.1 72.1	0.037 0.041 0.044 0.046 0.048 0.050 0.052 0.056 0.060	50.3 49.3 47.7 47.3 47.3 47.5 48.6 50.5 52.6	0.685 0.652 0.591 0.544 0.504 0.478 0.457 0.427 0.411	-52.2 -56.5 -60.6 -63.3 -66.1 -68.7 -71.2 -75.0 -78.5
600 700 800 900 1000 1200 1400 1600	0.678 0.659 0.645 0.638 0.629 0.623 0.621 0.620	-120.4 -130.9 -139.5 -146.9 -152.9 -158.0 -166.3 -173.1 -179.0	13.108 11.176 9.599 8.439 7.523 6.746 5.618 4.797 4.199	113.1 105.8 99.3 94.2 89.7 85.8 82.7 77.1 72.1 67.5	0.037 0.041 0.044 0.046 0.048 0.050 0.052 0.056 0.060 0.065	50.3 49.3 47.7 47.3 47.5 48.6 50.5 52.6 55.0	0.685 0.652 0.591 0.544 0.504 0.478 0.457 0.427 0.411 0.399	-52.2 -56.5 -60.6 -63.3 -66.1 -68.7 -71.2 -75.0 -78.5 -81.8
600 700 800 900 1000 1200 1400 1600 1800	0.678 0.659 0.645 0.638 0.629 0.623 0.621 0.620 0.622	-120.4 -130.9 -139.5 -146.9 -152.9 -158.0 -166.3 -173.1 -179.0 176.1	13.108 11.176 9.599 8.439 7.523 6.746 5.618 4.797 4.199 3.717	113.1 105.8 99.3 94.2 89.7 85.8 82.7 77.1 72.1 67.5 63.4	0.037 0.041 0.044 0.046 0.048 0.050 0.052 0.056 0.060 0.065 0.071	50.3 49.3 47.7 47.3 47.5 48.6 50.5 52.6 55.0 56.9	0.685 0.652 0.591 0.544 0.504 0.478 0.457 0.427 0.411 0.399 0.398	-52.2 -56.5 -60.6 -63.3 -66.1 -68.7 -71.2 -75.0 -78.5 -81.8 -85.2
600 700 800 900 1000 1200 1400 1600 1800 2000	0.678 0.659 0.645 0.638 0.629 0.623 0.621 0.620 0.622 0.623	-120.4 -130.9 -139.5 -146.9 -152.9 -158.0 -166.3 -173.1 -179.0 176.1 171.8	13.108 11.176 9.599 8.439 7.523 6.746 5.618 4.797 4.199 3.717 3.348	113.1 105.8 99.3 94.2 89.7 85.8 82.7 77.1 72.1 67.5 63.4 59.4	0.037 0.041 0.044 0.046 0.048 0.050 0.052 0.056 0.060 0.065 0.071 0.076	50.3 49.3 47.7 47.3 47.3 47.5 48.6 50.5 52.6 55.0 56.9 58.6	0.685 0.652 0.591 0.544 0.504 0.478 0.457 0.427 0.411 0.399 0.398 0.397	-52.2 -56.5 -60.6 -63.3 -66.1 -68.7 -71.2 -75.0 -78.5 -81.8 -85.2 -88.5
600 700 800 900 1000 1200 1400 1600 1800 2000 2200	0.678 0.659 0.645 0.638 0.629 0.623 0.621 0.620 0.622 0.623 0.623	-120.4 -130.9 -139.5 -146.9 -152.9 -158.0 -166.3 -173.1 -179.0 176.1 171.8 167.4	13.108 11.176 9.599 8.439 7.523 6.746 5.618 4.797 4.199 3.717 3.348 3.039	113.1 105.8 99.3 94.2 89.7 85.8 82.7 77.1 72.1 67.5 63.4 59.4 55.5	0.037 0.041 0.044 0.046 0.048 0.050 0.052 0.056 0.060 0.065 0.071 0.076 0.082	50.3 49.3 47.7 47.3 47.5 48.6 50.5 52.6 55.0 56.9 58.6 60.1	0.685 0.652 0.591 0.544 0.504 0.478 0.457 0.427 0.411 0.399 0.398 0.397 0.401	-52.2 -56.5 -60.6 -63.3 -66.1 -68.7 -71.2 -75.0 -78.5 -81.8 -85.2 -88.5 -91.7
600 700 800 900 1000 1200 1400 1600 1800 2000 2200 2400	0.678 0.659 0.645 0.638 0.629 0.623 0.621 0.620 0.622 0.623 0.623 0.623	-120.4 -130.9 -139.5 -146.9 -152.9 -158.0 -166.3 -173.1 -179.0 176.1 171.8 167.4 163.5	13.108 11.176 9.599 8.439 7.523 6.746 5.618 4.797 4.199 3.717 3.348 3.039 2.786	113.1 105.8 99.3 94.2 89.7 85.8 82.7 77.1 72.1 67.5 63.4 59.4 55.5 51.8	0.037 0.041 0.044 0.046 0.048 0.050 0.052 0.056 0.060 0.065 0.071 0.076 0.082 0.089	50.3 49.3 47.7 47.3 47.5 48.6 50.5 52.6 55.0 56.9 58.6 60.1 61.4	0.685 0.652 0.591 0.544 0.504 0.478 0.457 0.427 0.411 0.399 0.398 0.397 0.401 0.407	-52.2 -56.5 -60.6 -63.3 -66.1 -68.7 -71.2 -75.0 -78.5 -81.8 -85.2 -88.5 -91.7 -95.0

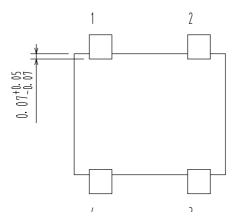
CE=8V, IC=3 Freq(MHz)	S11	∠S11	S21	∠S21	S12	∠ S12	S22	∠S22
100	0.556	-65.2	43.179	145.8	0.011		0.846	-28.0
200	0.578	-106.8		123.0		67.8 57.9	0.669	-44.6
300	0.578	-100.8	32.894 24.775	109.1	0.017 0.021	56.2	0.584	- <del>44</del> .6 -54.7
400	0.594	-129.7	19.256	109.1	0.021	57.0	0.512	-54.7
500	0.604	-142.8	15.997	94.4	0.024	59.0	0.312	-63.9
600	0.614		13.266	89.8	0.028	60.8	0.443	-66.9
700	0.603	-155.8 -161.6		86.1	0.031	62.5	0.409	-69.3
			11.285					
800	0.602	-166.5	9.802	82.9	0.037	64.2	0.382	-72.0
900	0.602	-170.7	8.672	80.0	0.041	65.4	0.366	-74.3
1000	0.600	-174.1	7.739	77.6	0.044	66.3	0.352	-76.7
1200	0.603	179.9	6.401	73.3	0.051	68.1	0.333	-80.3
1400	0.605	174.9	5.453	69.2	0.059	69.2	0.325	-83.7
1600	0.607	170.4	4.753	65.4	0.066	69.8	0.321	-87.0
1800	0.611	166.4	4.215	61.8	0.074	70.0	0.321	-90.2
2000	0.613	162.9	3.791	58.4	0.082	69.9	0.325	-93.4
2200	0.614	159.2	3.445	55.1	0.090	70.1	0.330	-96.5
2400	0.616	155.8	3.155	51.7	0.099	69.6	0.339	-99.4
2600	0.617	152.4	2.916	48.4	0.107	69.1	0.349	-102.4
2800	0.619	149.1	2.711	45.2	0.115	68.5	0.361	-105.3
3000	0.619	145.7	2.531	42.0	0.124	67.5	0.375	-108.2
CE=8V, IC=5						1	1	1
Freq(MHz)	S11	∠S11	S21	∠S21	S12	∠ S12	S22	∠S22
100	0.477	-88.8	42.926	139.6	0.009	65.5	0.793	-30.4
200	0.554	-127.0	34.154	117.2	0.014	59.2	0.603	-45.1
300	0.589	-144.5	24.758	104.4	0.017	59.1	0.529	-53.1
400	0.606	-154.4	18.954	96.6	0.020	61.9	0.478	-58.7
500	0.613	-158.4	15.585	91.2	0.024	64.8	0.453	-60.2
600	0.611	-164.1	12.888	87.0	0.027	67.3	0.416	-62.6
700	0.611	-168.8	10.954	83.7	0.031	69.1	0.388	-64.8
800	0.613	-172.8	9.503	80.7	0.034	70.4	0.366	-67.2
900	0.616	-176.3	8.407	78.1	0.038	71.5	0.355	-69.5
700	0.615	-179.2	7.494	75.7	0.042	72.3	0.343	-71.9
1000	0.020					72.7	0.220	-75.5
	0.619	175.7	6.192	71.6	0.049	73.7	0.329	-/3.3
1000			6.192 5.272	71.6 67.7	0.049 0.057	74.1	0.329	-79.0
1000 1200	0.619	175.7						
1000 1200 1400	0.619 0.623	175.7 171.2	5.272	67.7	0.057	74.1	0.324	-79.0
1000 1200 1400 1600	0.619 0.623 0.626	175.7 171.2 167.2	5.272 4.586	67.7 64.0	0.057 0.065	74.1 74.5	0.324 0.323	-79.0 -82.4
1000 1200 1400 1600 1800	0.619 0.623 0.626 0.631	175.7 171.2 167.2 163.5	5.272 4.586 4.071	67.7 64.0 60.4	0.057 0.065 0.073	74.1 74.5 74.4	0.324 0.323 0.325	-79.0 -82.4 -85.8
1000 1200 1400 1600 1800 2000	0.619 0.623 0.626 0.631 0.633	175.7 171.2 167.2 163.5 160.2	5.272 4.586 4.071 3.658	67.7 64.0 60.4 57.0	0.057 0.065 0.073 0.081	74.1 74.5 74.4 74.0	0.324 0.323 0.325 0.331	-79.0 -82.4 -85.8 -89.4
1000 1200 1400 1600 1800 2000 2200	0.619 0.623 0.626 0.631 0.633 0.634	175.7 171.2 167.2 163.5 160.2 156.7	5.272 4.586 4.071 3.658 3.322	67.7 64.0 60.4 57.0 53.7	0.057 0.065 0.073 0.081 0.090	74.1 74.5 74.4 74.0 73.7	0.324 0.323 0.325 0.331 0.337	-79.0 -82.4 -85.8 -89.4 -92.7
1000 1200 1400 1600 1800 2000 2200 2400	0.619 0.623 0.626 0.631 0.633 0.634 0.637	175.7 171.2 167.2 163.5 160.2 156.7 153.5	5.272 4.586 4.071 3.658 3.322 3.041	67.7 64.0 60.4 57.0 53.7 50.3	0.057 0.065 0.073 0.081 0.090 0.099	74.1 74.5 74.4 74.0 73.7 73.0	0.324 0.323 0.325 0.331 0.337 0.347	-79.0 -82.4 -85.8 -89.4 -92.7 -95.9

#### SC-82FL / MCPH4 CASE 419AR ISSUE O

**DATE 30 DEC 2011** 







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