
3SK309

GaAs N Channel Dual Gate MES FET
UHF RF Amplifier

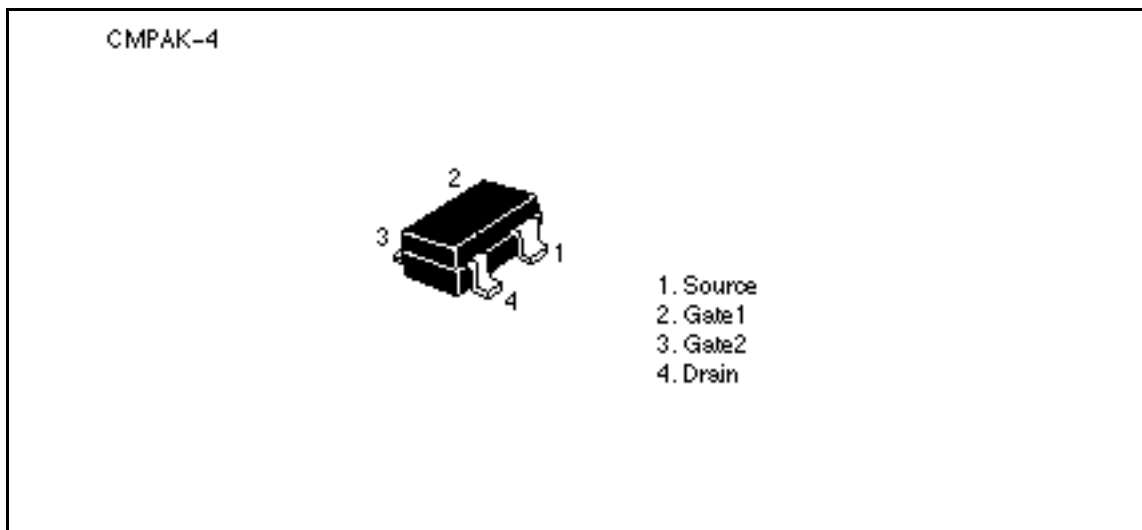
HITACHI

ADE-208-472 A
2nd. Edition

Features

- Capable of low voltage operation ($V_{DS} = 1.5$ to 3 V)
- Excellent low noise characteristics ($NF = 1.25$ dB typ. at $f = 900$ MHz)
- High power gain ($PG = 21.0$ dB typ. at $f = 900$ MHz)

Outline



3SK309

Absolute Maximum Ratings (Ta = 25°C)

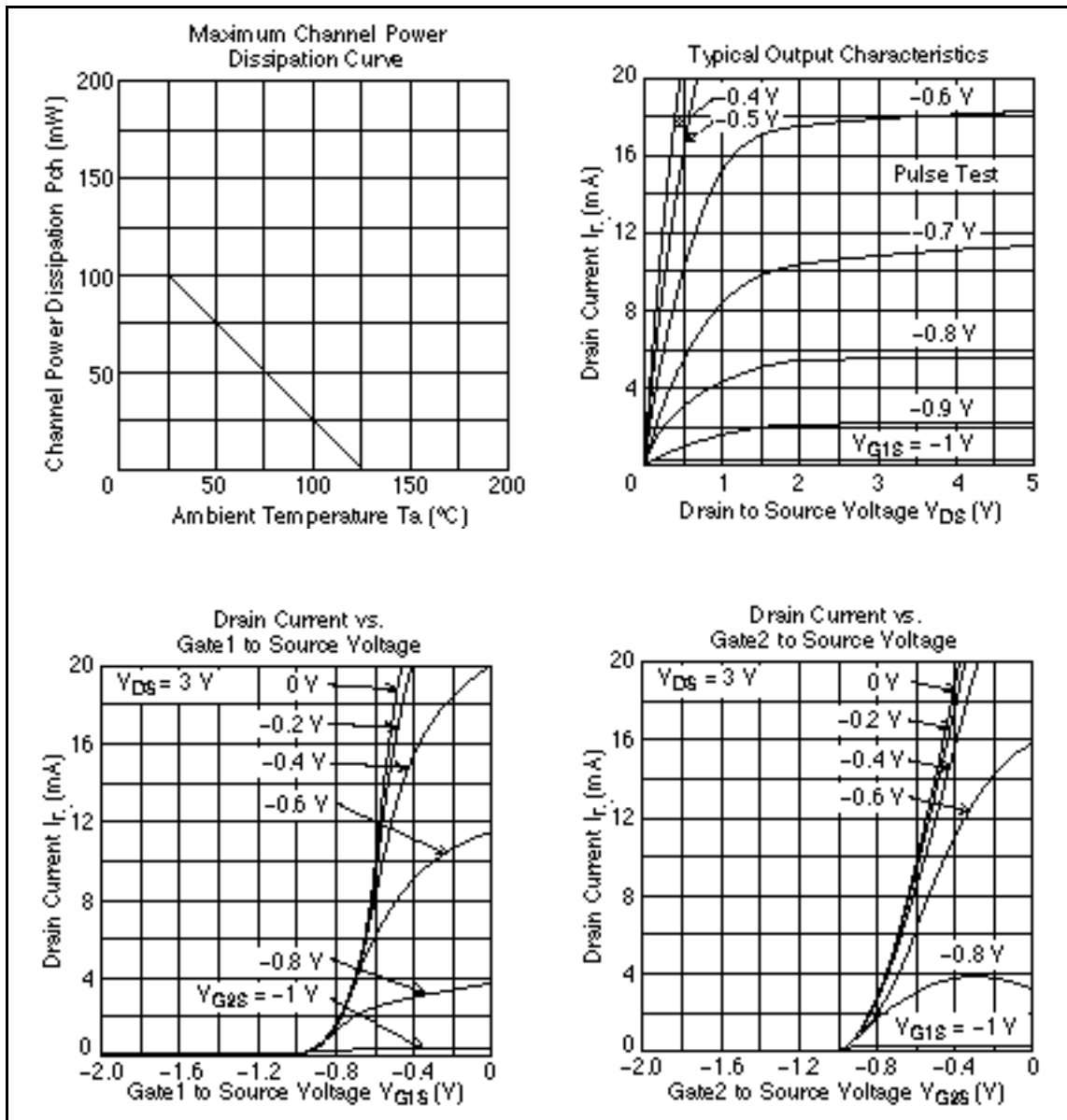
| Item | Symbol | Ratings | Unit |
|---------------------------|-----------|-------------|------|
| Drain to source voltage | V_{DS} | 6 | V |
| Gate 1 to source voltage | V_{G1S} | -4 | V |
| Gate 2 to source voltage | V_{G2S} | -4 | V |
| Drain current | I_D | 18 | mA |
| Channel power dissipation | Pch | 100 | mW |
| Channel temperature | Tch | 125 | °C |
| Storage temperature | Tstg | -55 to +125 | °C |

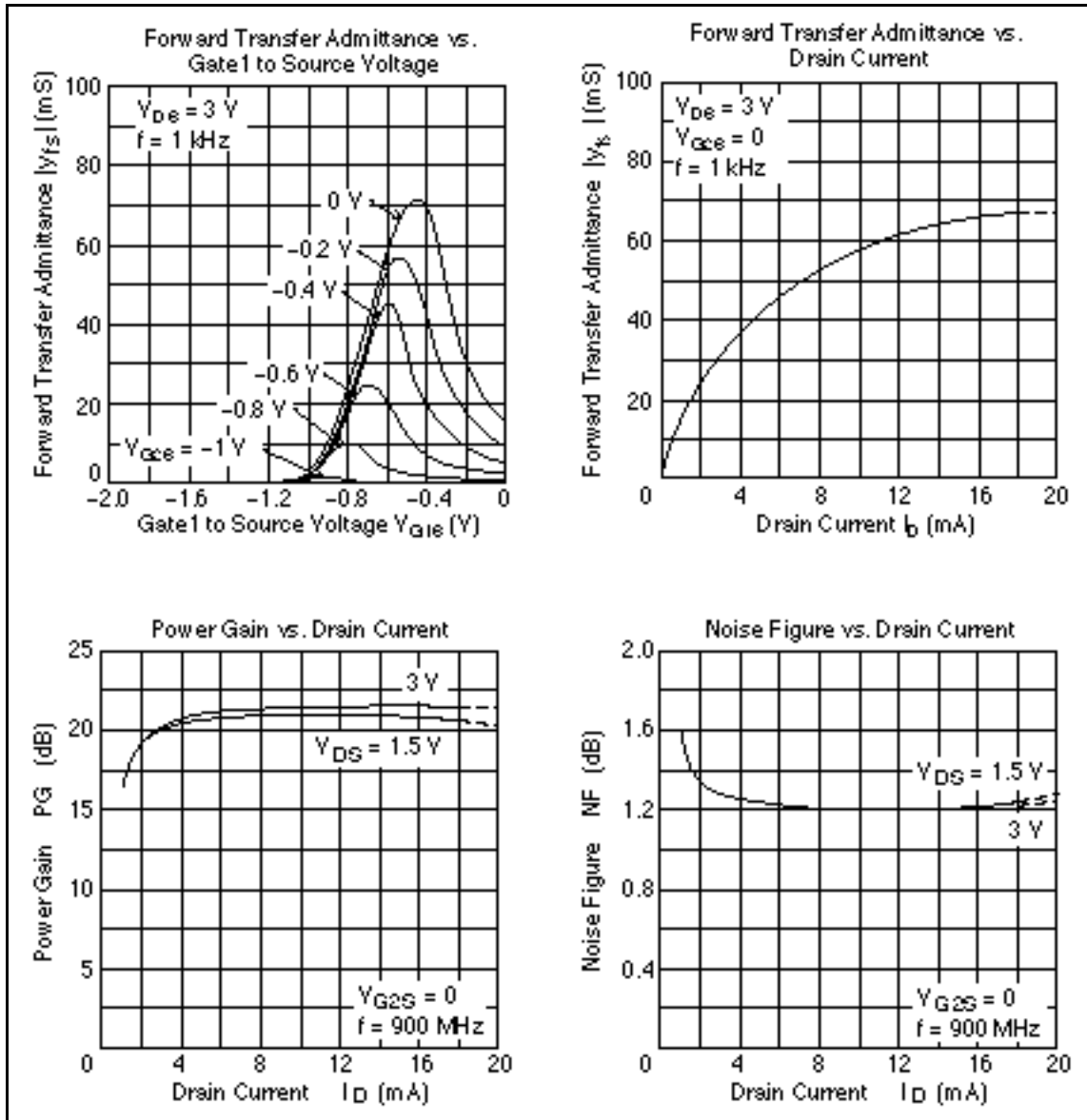
Electrical Characteristics (Ta = 25°C)

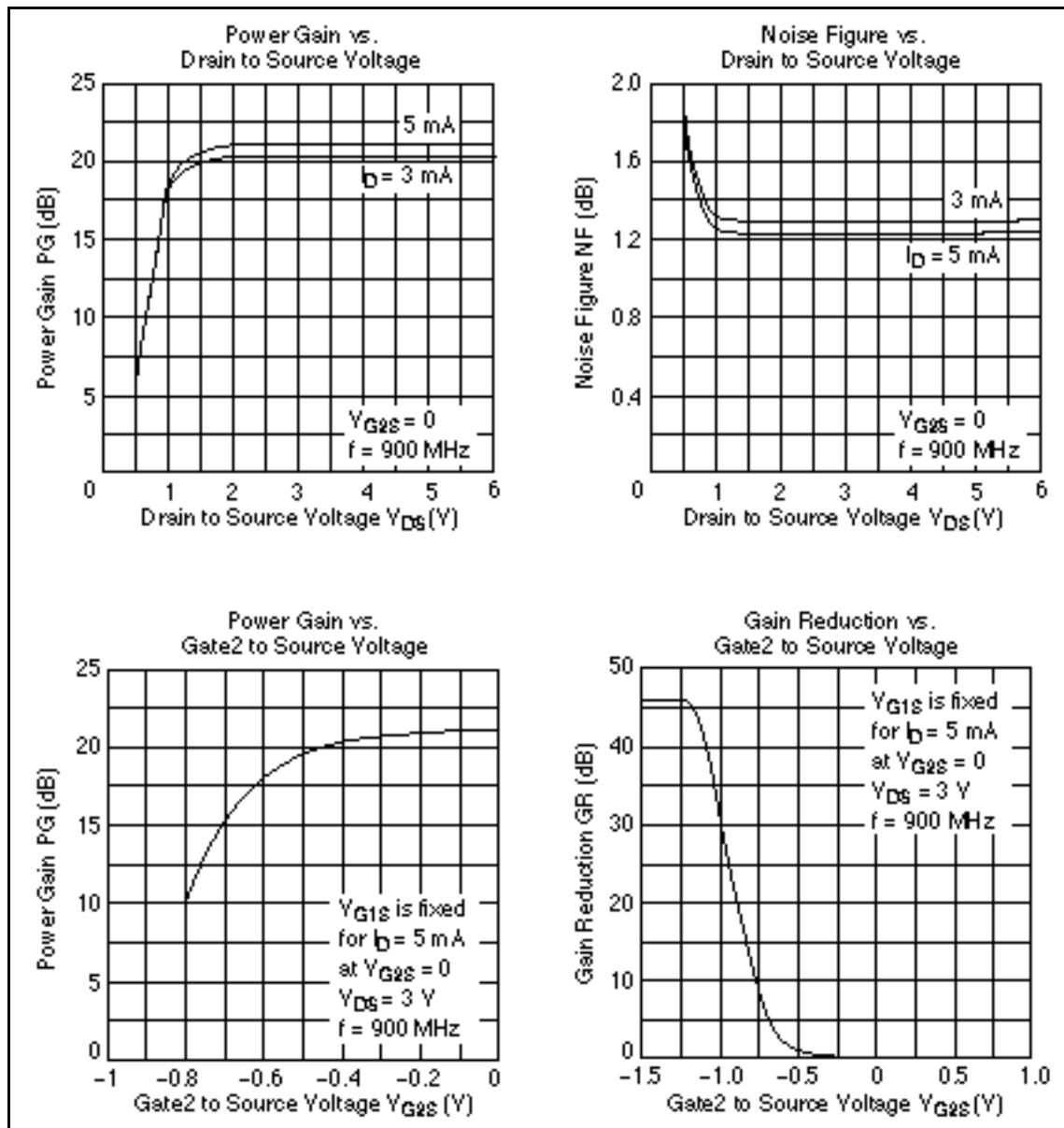
| Item | Symbol | Min | Typ | Max | Unit | Test conditions |
|---------------------------------|----------------|------|------|------|------|--|
| Gate 1 to cutoff current | I_{G1SS} | — | — | -20 | μA | $V_{G1S} = -4$ V $V_{G2S} = V_{DS} = 0$ |
| Gate 2 to cutoff current | I_{G2SS} | — | — | -20 | μA | $V_{G2S} = -4$ V $V_{G1S} = V_{DS} = 0$ |
| Gate 1 to source cutoff voltage | $V_{G1S(off)}$ | -0.2 | — | -1.5 | V | $V_{DS} = 3$ V, $V_{G2S} = 0$ $I_D = 100$ μA |
| Gate 2 to source cutoff voltage | $V_{G2S(off)}$ | -0.2 | — | -1.5 | V | $V_{DS} = 3$ V, $V_{G1S} = 0$ $I_D = 100$ μA |
| Zero gate voltage drain current | I_{DSS} | 25 | 40 | 60 | mA | $V_{DS} = 3$ V, $V_{G1S} = 0$ $V_{G2S} = 0$ |
| Forward transfer admittance | $ y_{fs} $ | 30 | 40 | — | mS | $V_{DS} = 3$ V, $V_{G2S} = 0$ $I_D = 5$ mA, $f = 1$ kHz |
| Power gain | PG | 18 | 21 | — | dB | $V_{DS} = 3$ V, $V_{G2S} = 0$ |
| Noise figure | NF | — | 1.25 | 1.5 | dB | $I_D = 5$ mA, $f = 900$ MHz |
| Power gain | PG | — | 20 | — | dB | $V_{DS} = 1.5$ V, $V_{G2S} = 0$ |
| Noise figure | NF | — | 1.3 | — | dB | $I_D = 3$ mA, $f = 900$ MHz |

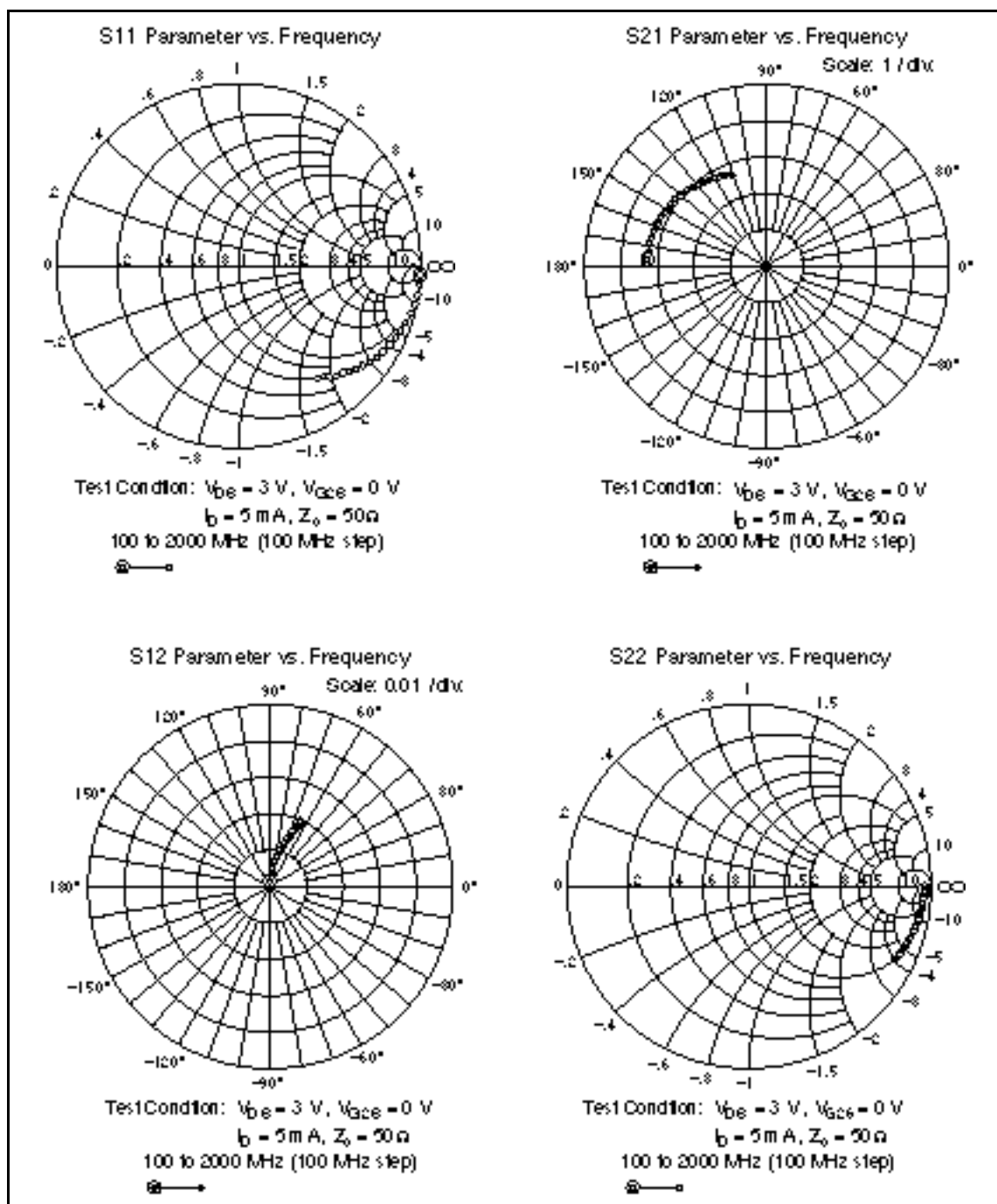
Note: Marking is "XV-"

Main Characteristics



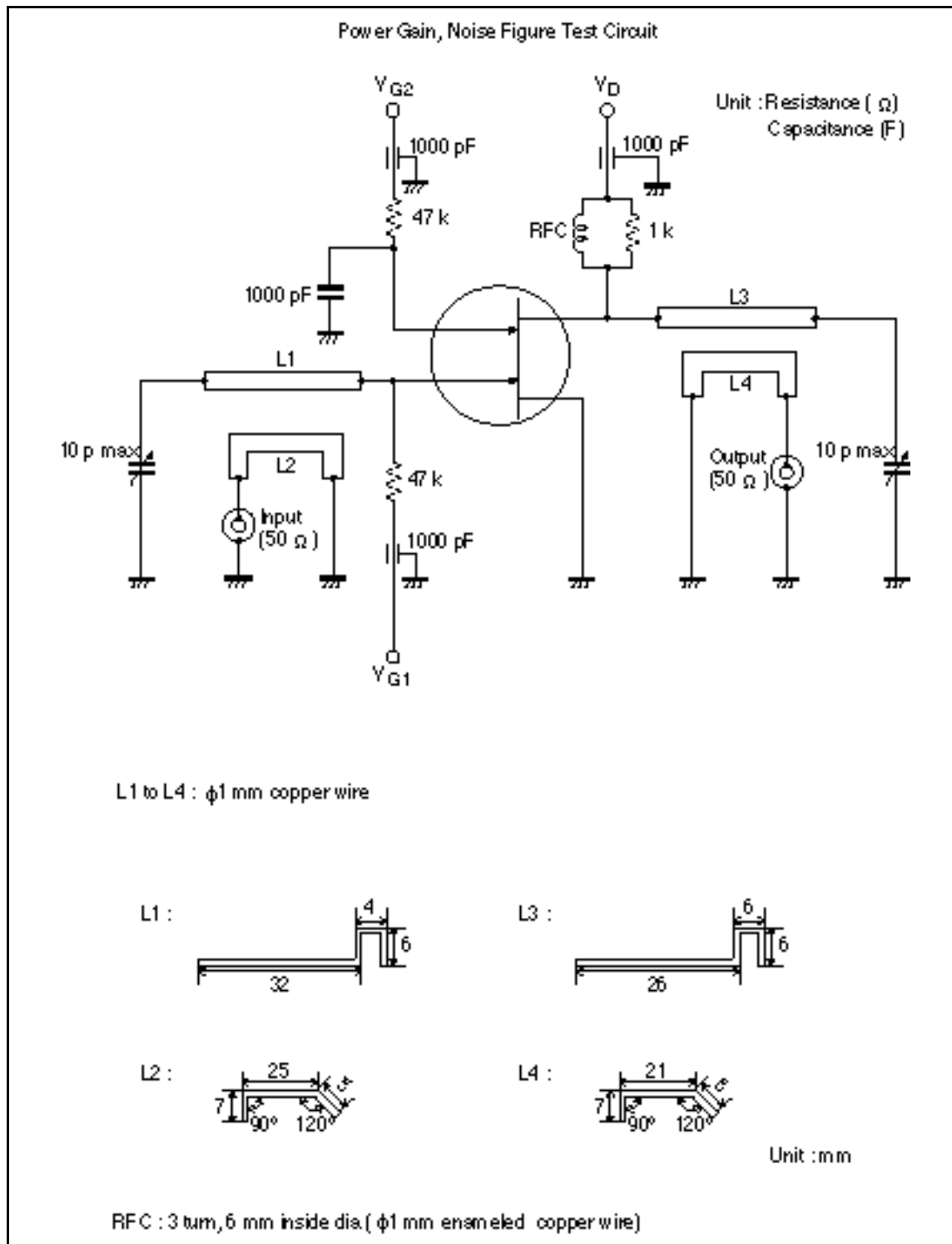






Sparameter ($V_{DS} = 3 \text{ V}$, $V_{GS} = 0$, $I_D = 5 \text{ mA}$, $Z_0 = 50 \text{ } \Omega$)

| Freq. (MHz) | S11 | | S21 | | S12 | | S22 | |
|----------------|-------|-------|------|-------|---------|------|-------|-------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 100 | 0.999 | -2.8 | 3.29 | 176.7 | 0.00167 | 95.2 | 0.963 | -0.9 |
| 200 | 0.997 | -5.9 | 3.27 | 173.1 | 0.00302 | 89.0 | 0.963 | -2.2 |
| 300 | 0.995 | -9.4 | 3.29 | 169.0 | 0.00394 | 80.5 | 0.961 | -3.5 |
| 400 | 0.992 | -12.3 | 3.26 | 165.8 | 0.00506 | 83.7 | 0.959 | -5.0 |
| 500 | 0.981 | -15.2 | 3.23 | 161.9 | 0.00703 | 80.8 | 0.957 | -6.3 |
| 600 | 0.968 | -18.9 | 3.22 | 158.3 | 0.00797 | 78.1 | 0.955 | -8.0 |
| 700 | 0.956 | -21.8 | 3.20 | 154.4 | 0.00911 | 76.9 | 0.953 | -9.2 |
| 800 | 0.949 | -24.5 | 3.15 | 151.3 | 0.0104 | 77.1 | 0.949 | -10.6 |
| 900 | 0.935 | -27.6 | 3.14 | 147.4 | 0.0114 | 73.2 | 0.946 | -12.0 |
| 1000 | 0.922 | -30.7 | 3.12 | 143.7 | 0.0123 | 72.1 | 0.942 | -13.5 |
| 1100 | 0.912 | -33.5 | 3.06 | 140.3 | 0.0137 | 71.9 | 0.939 | -14.7 |
| 1200 | 0.895 | -36.2 | 3.03 | 136.7 | 0.0139 | 70.8 | 0.935 | -16.0 |
| 1300 | 0.873 | -38.7 | 2.97 | 133.3 | 0.0150 | 68.5 | 0.931 | -17.3 |
| 1400 | 0.860 | -41.4 | 2.93 | 130.1 | 0.0161 | 68.5 | 0.926 | -18.6 |
| 1500 | 0.838 | -43.8 | 2.89 | 126.9 | 0.0162 | 67.2 | 0.922 | -20.2 |
| 1600 | 0.822 | -45.6 | 2.85 | 123.6 | 0.0171 | 66.6 | 0.918 | -21.5 |
| 1700 | 0.807 | -48.3 | 2.83 | 120.5 | 0.0178 | 67.2 | 0.913 | -22.7 |
| 1800 | 0.787 | -50.7 | 2.79 | 117.4 | 0.0185 | 66.0 | 0.909 | -23.8 |
| 1900 | 0.767 | -52.4 | 2.74 | 114.4 | 0.0186 | 64.3 | 0.905 | -25.5 |
| 2000 | 0.756 | -55.0 | 2.69 | 110.9 | 0.0190 | 63.7 | 0.901 | -26.6 |



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