



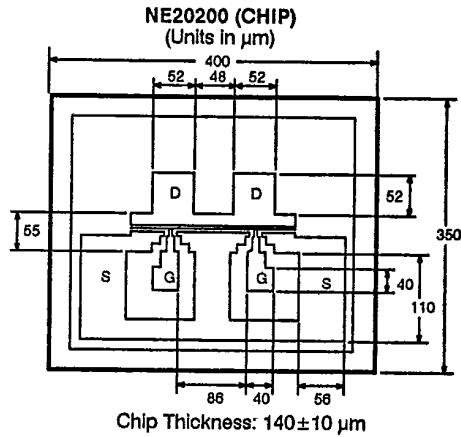
ULTRA LOW NOISE K-BAND HETERO JUNCTION FET

NE202 SERIES

FEATURES

- **LOW NOISE FIGURE:**
1 dB TYP at $f = 12$ GHz (NE202XX)
1.2 dB TYP at $f = 12$ GHz (NE202XX-1.4)
1.8 dB TYP at $f = 18$ GHz (NE20248)
- **HIGH ASSOCIATED GAIN:**
12 dB TYP at $f = 12$ GHz (NE20283A)
9 dB TYP at $f = 18$ GHz (NE20248)
- **n+ AlGaAs/UNDOPED GaAs HETERO-JUNCTION STRUCTURE**
- **GATE LENGTH:** $L_g = 0.3$ microns
- **GATE WIDTH:** $W_g = 200$ microns
- **PASSIVATION ON CHIP FOR HIGH RELIABILITY**

OUTLINE DIMENSIONS

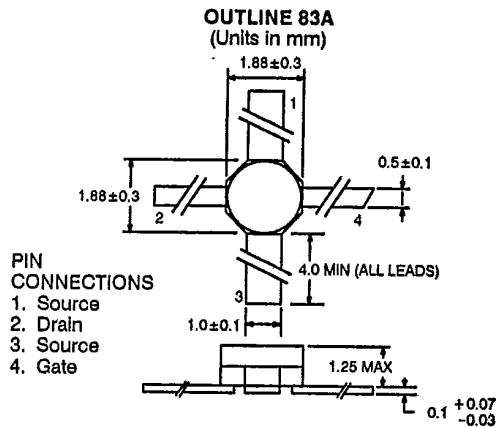
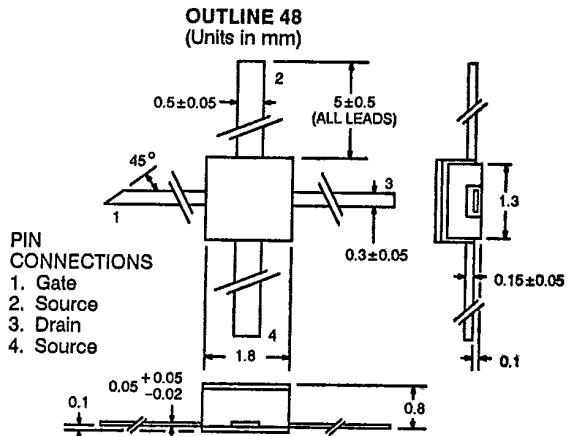


DESCRIPTION

The NE202 is a Hetero Junction FET that utilizes the hetero-junction between Si-doped AlGaAs and undoped GaAs to create high mobility electrons. Its excellent low noise and high associated gain make it suitable for satellite communications and commercial systems. The NE202 is available in two versions, NE202XX for high performance low noise applications and the NE202XX-1.4 for gain stage applications. The device is available in chip and two Hermetic Packages.

ABSOLUTE MAXIMUM RATINGS (TA = 25°C)

| SYMBOLS | PARAMETERS | UNITS | RATINGS |
|------------------|-------------------------|-------|-------------|
| V _{DS} | Drain to Source Voltage | V | 4 |
| V _{GS} | Gate to Source Voltage | V | -3 |
| I _{DS} | Drain Current | mA | 60 |
| P _T | Total Power Dissipation | mW | 200 |
| T _{CH} | Channel Temperature | °C | 175 |
| T _{STG} | Storage Temperature | °C | -65 to +175 |
| I _G | Gate Current | μA | 10 |



NE202 SERIES

ELECTRICAL CHARACTERISTICS (TA = 25°C)

| PART NUMBER PACKAGE OUTLINE | | | NE20200 ¹ 00 (CHIP) | | | NE20200-1.4 ¹ 00 (CHIP) | | | NE20248 48 | | | NE20283A 83A | | | NE20283A-1.4 83A | | |
|--------------------------------|-------------------------------------------------------------------------------------------------------|----------|-----------------------------------|------|------------------|---------------------------------------|------|------------------|---------------|------|-----|-----------------|------|-----|---------------------|------|-----|
| SYMBOLS | PARAMETERS AND CONDITIONS | UNITS | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX |
| I _{DSX} | Drain to Source Leakage Current at V _{DS} = 4 V, V _{GS} = -3 V | μA | | | 100 | | | 100 | | | 100 | | | 100 | | | 100 |
| I _{DSS} | Saturated Drain Current at V _{DS} = 2 V, V _{GS} = 0 | mA | 12 | 30 | 60 | 12 | 30 | 60 | 12 | 30 | 60 | 12 | 30 | 60 | 12 | 30 | 60 |
| I _{GSO} | Gate to Source Leakage Current at V _{GS} = -3 V, I _{DS} = 0 | μA | | 1 | 10 | | 1 | 10 | | 1 | 10 | | 1 | 10 | | 1 | 10 |
| V _{GS (OFF)} | Gate to Source Cutoff Voltage at V _{DS} = 2 V, I _{DS} = 100 μA | V | -0.3 | -0.8 | -2 | -0.3 | -0.8 | -2 | -0.3 | -0.8 | -2 | -0.3 | -0.8 | -2 | -0.3 | -0.8 | -2 |
| g _m | Transconductance at V _{DS} = 2 V, I _{DS} = 10 mA | mS | 30 | 45 | 70 | 30 | 45 | 70 | 30 | 45 | 70 | 30 | 45 | 70 | 30 | 45 | 70 |
| NF | Noise Figure ² at V _{DS} = 2 V, I _{DS} = 10 mA, f = 12 GHz f = 18 GHz | dB dB | | 1 | 1.2 | | 1.2 | 1.4 | | 1.6 | 1.8 | | 1 | 1.2 | | 1.2 | 1.4 |
| GA | Associated Gain at V _{DS} = 2 V, I _{DS} = 10 mA, f = 12 GHz f = 18 GHz | dB dB | 11 | 12 | | 10 | 11 | | 7.5 | 9 | | 11 | 12 | | 10 | 11 | |
| P _{1dB} | Power Output at 1 dB Gain Compression, V _{DS} = 2 V, I _{DS} = 10 mA, f = 12 GHz | dBm | | 9 | | | 9 | | | 9 | | | 9 | | | 9 | |
| R _{TH} | Thermal Resistance (Channel-to-Ambient) | °C/W | | | 260 ³ | | | 260 ³ | | | | | | 700 | | | 700 |

Notes:

- RF performance is determined by packaging and testing 10 chips per wafer; wafer rejection criteria for standard devices is 2 rejects for 10 samples.
- Typical values of noise figures are those obtained when 50% of the devices from a large number of lots were individually measured in a circuit with the input individually tuned to obtain the minimum value. Maximum values are criteria established on the production line as a "go-no-go" screening test with the fixture tuned for the "generic" type but not for each specimen.
- R_{TH} (channel to case) for chip mounted on copper heat sink.

NE20200 TYPICAL NOISE PARAMETERS*

| FREQ. (GHz) | NF _{OPT} (dB) | GA (dB) | Γ _{OPT} ** | | Rn/50 |
|----------------|---------------------------|------------|---------------------|-------|-------|
| | | | (MAG) | (ANG) | |
| 1 | 0.30 | 23.7 | 0.82 | 8 | 0.75 |
| 2 | 0.30 | 20.5 | 0.80 | 15 | 0.60 |
| 4 | 0.37 | 17.2 | 0.74 | 31 | 0.55 |
| 6 | 0.52 | 15.3 | 0.70 | 44 | 0.50 |
| 8 | 0.68 | 13.9 | 0.66 | 58 | 0.45 |
| 10 | 0.84 | 12.9 | 0.62 | 72 | 0.42 |
| 12 | 1.00 | 12.0 | 0.58 | 86 | 0.40 |
| 14 | 1.15 | 11.3 | 0.54 | 98 | 0.38 |
| 16 | 1.31 | 10.7 | 0.51 | 110 | 0.36 |
| 18 | 1.47 | 10.1 | 0.48 | 122 | 0.34 |
| 20 | 1.63 | 9.6 | 0.46 | 132 | 0.32 |
| 22 | 1.82 | 9.1 | 0.44 | 141 | 0.30 |
| 24 | 2.03 | 8.6 | 0.42 | 148 | 0.27 |
| 26 | 2.22 | 8.0 | 0.42 | 156 | 0.25 |
| 28 | 2.43 | 7.5 | 0.42 | 161 | 0.22 |
| 30 | 2.70 | 6.9 | 0.41 | 167 | 0.20 |

NE20283A TYPICAL NOISE PARAMETERS*

| FREQ. (GHz) | NF _{OPT} (dB) | GA (dB) | Γ _{OPT} | | Rn/50 |
|----------------|---------------------------|------------|------------------|-------|-------|
| | | | (MAG) | (ANG) | |
| 2 | 0.35 | 20.5 | 0.76 | 29 | 0.77 |
| 4 | 0.40 | 17.2 | 0.76 | 57 | 0.60 |
| 6 | 0.50 | 15.3 | 0.70 | 82 | 0.41 |
| 8 | 0.70 | 13.9 | 0.61 | 110 | 0.28 |
| 10 | 0.90 | 12.9 | 0.55 | 141 | 0.14 |
| 12 | 1.10 | 12 | 0.50 | 168 | 0.10 |
| 14 | 1.20 | 11 | 0.46 | -161 | 0.09 |
| 16 | 1.35 | 10 | 0.44 | -137 | 0.07 |
| 18 | 1.50 | 8.5 | 0.43 | -113 | 0.05 |

*V_{DS} = 2 V, I_{DS} = 10 mA

** Γ_{OPT} includes bond wires.

Bond wires used during testing:

Gate: 2 wires total, 1 per bond pad, 0.013" long each wire.

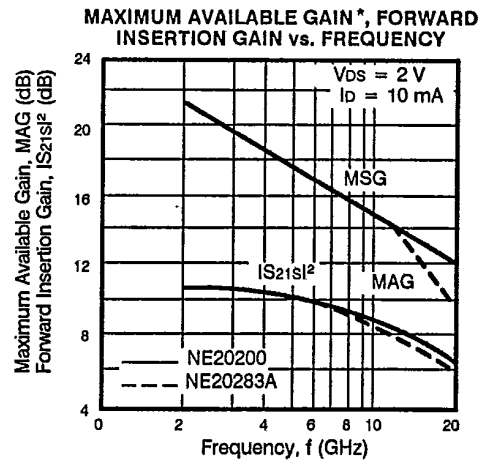
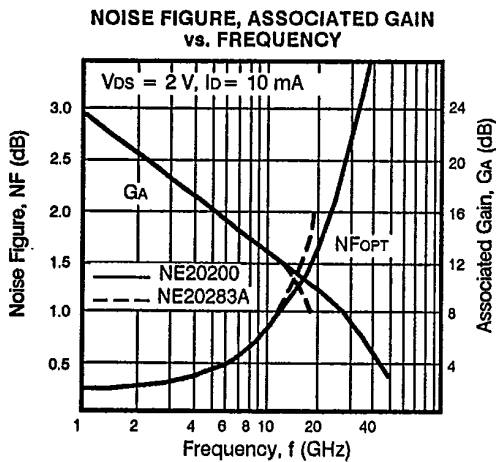
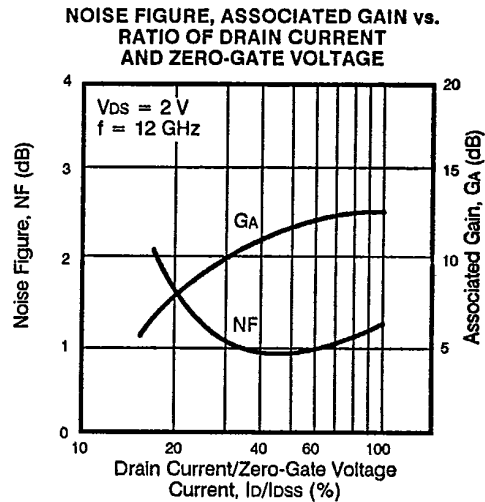
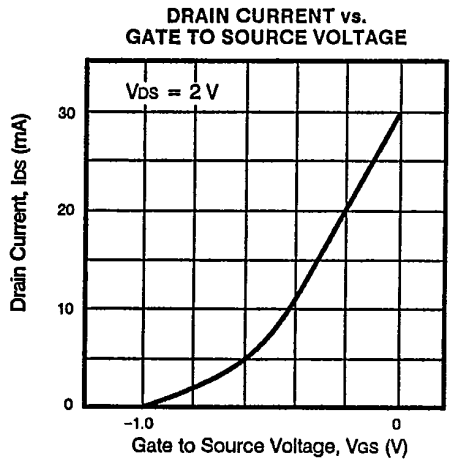
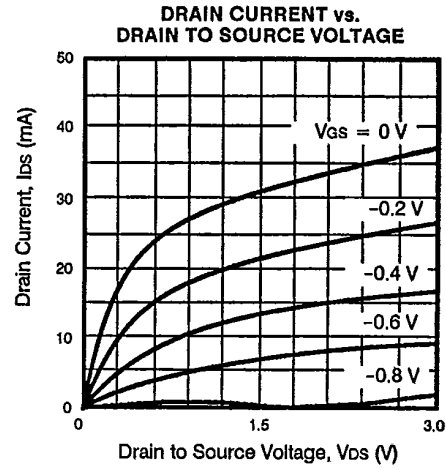
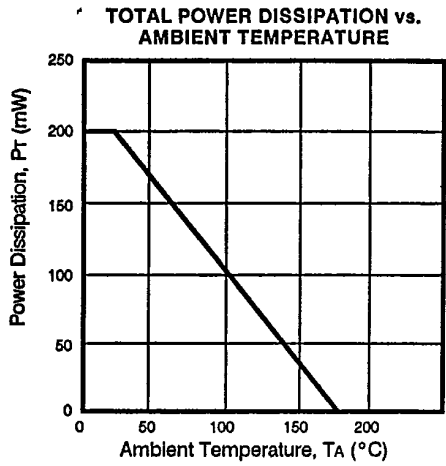
Drain: 2 wires total, 1 per bond pad, 0.015" long each wire.

Source: 4 wires total, 2 per side, 0.007" long each wire.

Noise parameters from 1 to 18 GHz are measured.

Noise parameters from 20 to 30 GHz are interpolated.

TYPICAL PERFORMANCE CHARACTERISTICS (TA = 25°C)

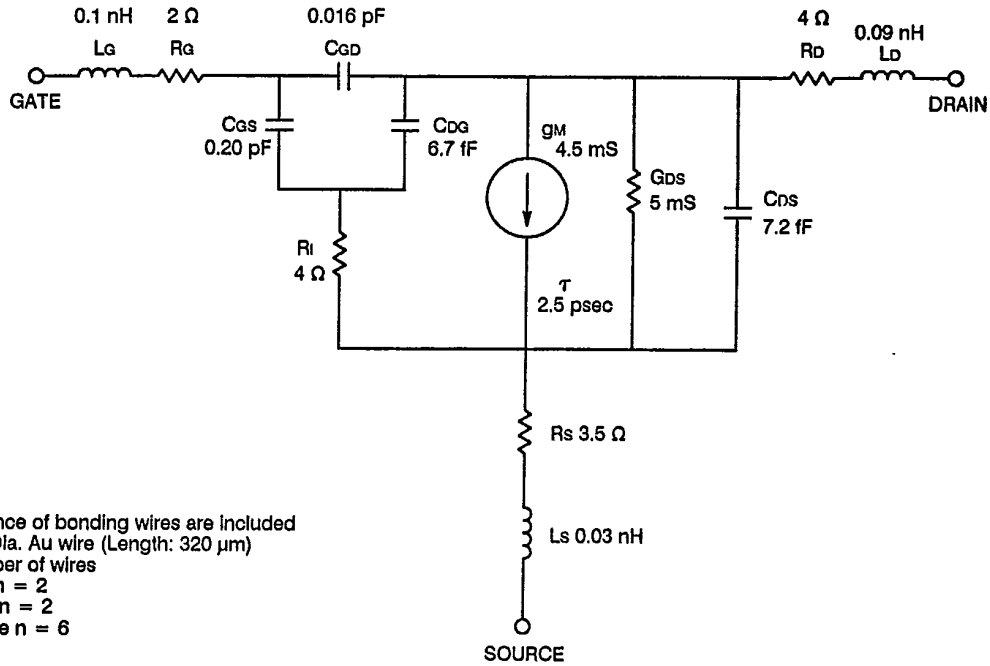


3

*Gain Calculations: $MAG = \frac{|S_{21}|}{|S_{12}|} (K - \sqrt{K^2 - 1})$. When $K \leq 1$, $MAG = MSG$

$MSG = \frac{|S_{21}|}{|S_{12}|}$, $K = \frac{1 + |\Delta|^2 - |S_{11}|^2 - |S_{22}|^2}{2|S_{12}| |S_{21}|}$, $\Delta = S_{11} S_{22} - S_{21} S_{12}$

NE20200 EQUIVALENT CIRCUIT



$I_{DS} = 10 \text{ mA}$
 $V_{DS} = 2 \text{ V}$
 $L_g = 0.3 \mu\text{m}$
 $W_g = 200 \mu\text{m}$

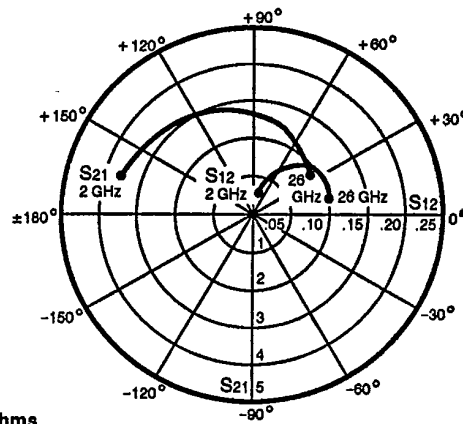
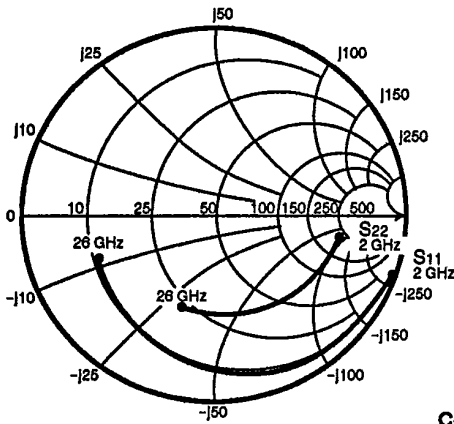
Note: Inductance of bonding wires are included
 20 μm Dia. Au wire (Length: 320 μm)
 n: Number of wires
 Gate n = 2
 Drain n = 2
 Source n = 6

RECOMMENDED DIE ATTACHING AND BONDING CONDITIONS FOR THE NE20200 AND NE20200-1.4

1) Die Attaching:
 Solder : AuSn
 Temperature : $300 \pm 10^\circ\text{C}$
 Atmosphere : N_2
 Within 10 seconds

2) Bonding:
 Wire : 20 μm diameter gold
 Method : Thermocompression Bonding
 Temperature : $260 \pm 10^\circ\text{C}$
 Atmosphere : N_2
 Within 5 minutes

TYPICAL COMMON SOURCE SCATTERING PARAMETERS



NE20200
Coordinates in Ohms
Frequency in GHz
(V_{DS} = 2 V, I_{DS} = 10 mA)

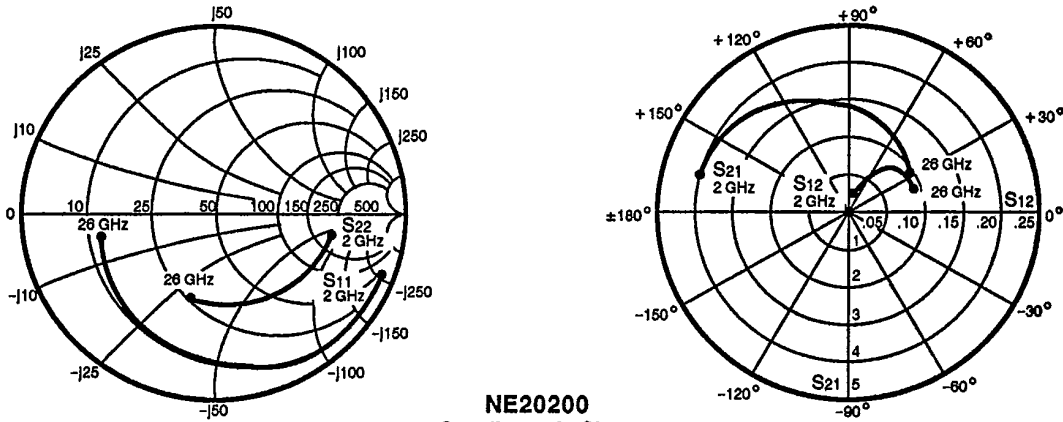
**S-MAGN AND PHASE:
V_{DS} = 2 V, I_{DS} = 10 mA**

| FREQUENCY (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|-----------------|-----------------|------|-----------------|-----|-----------------|----|-----------------|------|
| 2.00 | .99 | -19 | 3.47 | 164 | .03 | 77 | .67 | -11 |
| 3.00 | .97 | -28 | 3.40 | 156 | .04 | 73 | .66 | -16 |
| 4.00 | .96 | -37 | 3.33 | 148 | .05 | 67 | .65 | -21 |
| 5.00 | .94 | -46 | 3.23 | 140 | .06 | 60 | .63 | -26 |
| 6.00 | .92 | -53 | 3.11 | 133 | .06 | 61 | .63 | -30 |
| 7.00 | .91 | -61 | 3.02 | 126 | .07 | 53 | .62 | -35 |
| 8.00 | .89 | -69 | 2.96 | 119 | .08 | 49 | .60 | -40 |
| 9.00 | .86 | -76 | 2.84 | 113 | .08 | 47 | .59 | -45 |
| 10.00 | .85 | -83 | 2.79 | 107 | .09 | 44 | .58 | -50 |
| 11.00 | .83 | -90 | 2.73 | 100 | .10 | 38 | .58 | -56 |
| 12.00 | .81 | -97 | 2.67 | 94 | .10 | 34 | .57 | -61 |
| 13.00 | .80 | -103 | 2.60 | 88 | .11 | 30 | .57 | -66 |
| 14.00 | .78 | -110 | 2.52 | 82 | .11 | 25 | .56 | -70 |
| 15.00 | .77 | -115 | 2.45 | 76 | .11 | 23 | .55 | -74 |
| 16.00 | .76 | -120 | 2.38 | 71 | .11 | 20 | .55 | -76 |
| 17.00 | .74 | -125 | 2.31 | 66 | .10 | 18 | .54 | -79 |
| 18.00 | .73 | -129 | 2.24 | 61 | .11 | 17 | .53 | -80 |
| 19.00 | .70 | -133 | 2.13 | 58 | .10 | 17 | .52 | -82 |
| 20.00 | .70 | -135 | 2.08 | 54 | .10 | 17 | .53 | -84 |
| 21.00 | .69 | -138 | 2.04 | 52 | .10 | 16 | .53 | -85 |
| 22.00 | .69 | -140 | 2.01 | 46 | .10 | 16 | .53 | -87 |
| 23.00 | .69 | -145 | 1.90 | 42 | .09 | 15 | .52 | -90 |
| 24.00 | .67 | -149 | 1.85 | 39 | .10 | 16 | .52 | -96 |
| 25.00 | .64 | -154 | 1.84 | 36 | .10 | 15 | .50 | -104 |
| 26.00 | .62 | -160 | 1.77 | 33 | .10 | 15 | .51 | -107 |

Note: Bond wires are not de-embedded.
 Gate: 2 wires total, 1 per bond pad, 0.013" long each wire.
 Drain: 2 wires total, 1 per bond pad, 0.015" long each wire.
 Source: 4 wires total, 2 per side, 0.007" long each wire.
 Wire: 0.0008": diameter, gold.



TYPICAL COMMON SOURCE SCATTERING PARAMETERS



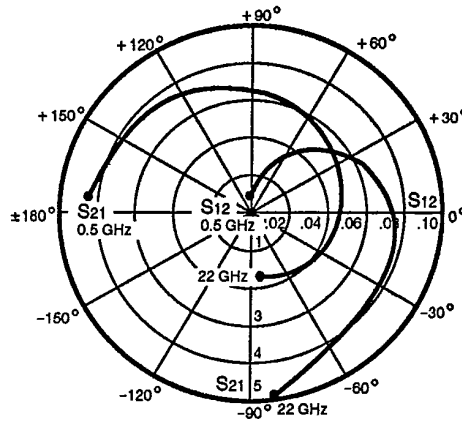
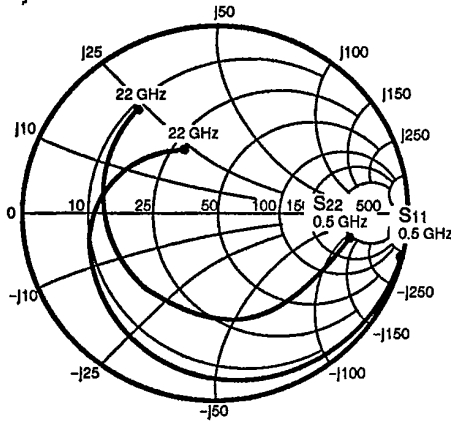
NE20200
Coordinates in Ohms
Frequency in GHz
(V_{DS} = 2 V, I_{DS} = 20 mA)

S-MAGN AND PHASE:
V_{DS} = 2 V, I_{DS} = 20 mA

| FREQUENCY (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|-----------------|-----------------|------|-----------------|-----|-----------------|----|-----------------|------|
| 2.00 | .98 | -21 | 4.10 | 163 | .02 | 76 | .65 | -11 |
| 3.00 | .97 | -30 | 3.99 | 155 | .03 | 72 | .64 | -16 |
| 4.00 | .95 | -40 | 3.90 | 146 | .04 | 67 | .63 | -21 |
| 5.00 | .93 | -49 | 3.76 | 138 | .05 | 60 | .61 | -26 |
| 6.00 | .91 | -56 | 3.59 | 131 | .06 | 62 | .61 | -29 |
| 7.00 | .89 | -65 | 3.47 | 125 | .07 | 54 | .60 | -34 |
| 8.00 | .87 | -73 | 3.37 | 118 | .07 | 50 | .58 | -40 |
| 9.00 | .84 | -80 | 3.23 | 111 | .07 | 47 | .56 | -44 |
| 10.00 | .83 | -87 | 3.16 | 105 | .08 | 45 | .56 | -49 |
| 11.00 | .81 | -94 | 3.07 | 98 | .09 | 39 | .56 | -55 |
| 12.00 | .79 | -101 | 2.99 | 92 | .09 | 35 | .55 | -60 |
| 13.00 | .78 | -108 | 2.89 | 86 | .09 | 31 | .54 | -65 |
| 14.00 | .76 | -114 | 2.79 | 80 | .10 | 28 | .53 | -69 |
| 15.00 | .75 | -120 | 2.70 | 75 | .09 | 25 | .53 | -73 |
| 16.00 | .73 | -125 | 2.62 | 70 | .10 | 24 | .53 | -75 |
| 17.00 | .73 | -129 | 2.54 | 66 | .09 | 23 | .53 | -78 |
| 18.00 | .70 | -134 | 2.46 | 61 | .09 | 21 | .51 | -78 |
| 19.00 | .68 | -137 | 2.33 | 57 | .09 | 21 | .51 | -80 |
| 20.00 | .68 | -139 | 2.27 | 54 | .09 | 24 | .51 | -82 |
| 21.00 | .67 | -142 | 2.22 | 51 | .09 | 22 | .52 | -83 |
| 22.00 | .67 | -144 | 2.19 | 46 | .09 | 23 | .52 | -85 |
| 23.00 | .67 | -149 | 2.06 | 42 | .09 | 24 | .51 | -88 |
| 24.00 | .64 | -153 | 2.03 | 39 | .09 | 22 | .51 | -94 |
| 25.00 | .63 | -158 | 2.00 | 36 | .10 | 22 | .49 | -102 |
| 26.00 | .61 | -164 | 1.92 | 33 | .10 | 23 | .50 | -105 |

Note: Bond wires are not de-embedded.
 Gate: 2 wires total, 1 per bond pad, 0.013" long each wire.
 Drain: 2 wires total, 1 per bond pad, 0.015" long each wire.
 Source: 4 wires total, 2 per side, 0.007" long each wire.
 Wire: 0.0008": diameter, gold.

TYPICAL COMMON SOURCE SCATTERING PARAMETERS



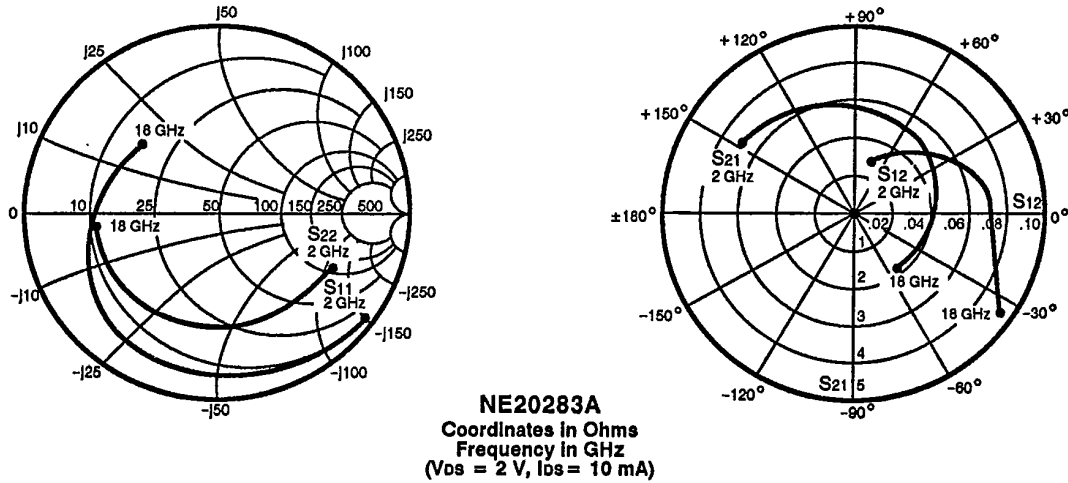
NE20248
Coordinates in Ohms
Frequency in GHz
(Vds = 2 V, Ids = 10 mA)

S-MAGN AND PHASE:
Vds = 2 V, Ids = 10 mA
FREQUENCY (GHz)

| FREQUENCY (GHz) | S11 | S21 | S12 | S22 | | | | |
|-----------------|------|------|------|-----|------|-----|-----|------|
| .50 | 1.00 | -8 | 4.16 | 173 | .007 | 85 | .71 | -10 |
| 1.00 | 1.00 | -15 | 4.16 | 164 | .013 | 76 | .74 | -17 |
| 1.50 | .99 | -23 | 4.01 | 156 | .019 | 71 | .68 | -19 |
| 2.00 | .98 | -30 | 3.95 | 150 | .025 | 69 | .64 | -23 |
| 2.50 | .97 | -37 | 3.95 | 143 | .031 | 60 | .63 | -31 |
| 3.00 | .96 | -45 | 3.86 | 135 | .036 | 54 | .63 | -38 |
| 3.50 | .95 | -52 | 3.77 | 128 | .040 | 50 | .63 | -41 |
| 4.00 | .94 | -59 | 3.73 | 122 | .045 | 46 | .60 | -45 |
| 4.50 | .92 | -67 | 3.68 | 115 | .050 | 40 | .58 | -52 |
| 5.00 | .90 | -74 | 3.59 | 108 | .054 | 35 | .58 | -60 |
| 5.50 | .89 | -80 | 3.51 | 101 | .058 | 30 | .58 | -65 |
| 6.00 | .87 | -87 | 3.43 | 95 | .061 | 28 | .57 | -69 |
| 6.50 | .85 | -94 | 3.35 | 88 | .064 | 20 | .55 | -76 |
| 7.00 | .84 | -100 | 3.25 | 81 | .066 | 15 | .55 | -83 |
| 7.50 | .83 | -105 | 3.15 | 76 | .067 | 11 | .55 | -88 |
| 8.00 | .81 | -111 | 3.08 | 70 | .069 | 8 | .55 | -91 |
| 8.50 | .80 | -116 | 3.01 | 64 | .070 | 4 | .53 | -97 |
| 9.00 | .79 | -121 | 2.83 | 58 | .072 | 1 | .52 | -103 |
| 9.50 | .78 | -126 | 2.86 | 53 | .074 | -3 | .53 | -109 |
| 10.00 | .77 | -131 | 2.81 | 47 | .075 | -6 | .53 | -114 |
| 10.50 | .75 | -136 | 2.75 | 41 | .077 | -10 | .52 | -120 |
| 11.00 | .74 | -141 | 2.68 | 36 | .078 | -14 | .52 | -127 |
| 11.50 | .72 | -145 | 2.61 | 30 | .078 | -18 | .53 | -133 |
| 12.00 | .71 | -150 | 2.56 | 24 | .079 | -21 | .54 | -138 |
| 12.50 | .70 | -154 | 2.50 | 19 | .079 | -25 | .54 | -143 |
| 13.00 | .68 | -159 | 2.44 | 13 | .079 | -28 | .54 | -148 |
| 13.50 | .67 | -163 | 2.38 | 8 | .079 | -31 | .54 | -154 |
| 14.00 | .66 | -167 | 2.33 | 3 | .079 | -34 | .55 | -159 |
| 14.50 | .65 | -171 | 2.28 | -2 | .080 | -37 | .56 | -163 |
| 15.00 | .64 | -175 | 2.24 | -7 | .080 | -39 | .56 | -169 |
| 15.50 | .63 | -179 | 2.21 | -13 | .081 | -42 | .57 | -174 |
| 16.00 | .61 | 177 | 2.17 | -18 | .083 | -45 | .58 | -179 |
| 16.50 | .60 | 173 | 2.13 | -23 | .083 | -49 | .60 | 176 |
| 17.00 | .58 | 169 | 2.09 | -28 | .084 | -52 | .61 | 172 |
| 17.50 | .57 | 164 | 2.06 | -34 | .085 | -55 | .62 | 167 |
| 18.00 | .55 | 160 | 2.02 | -39 | .085 | -59 | .62 | 164 |
| 18.50 | .54 | 157 | 1.96 | -44 | .084 | -62 | .62 | 161 |
| 19.00 | .52 | 152 | 1.92 | -50 | .086 | -64 | .63 | 158 |
| 19.50 | .51 | 149 | 1.88 | -54 | .088 | -68 | .63 | 154 |
| 20.00 | .48 | 144 | 1.85 | -60 | .087 | -72 | .62 | 150 |
| 20.50 | .46 | 141 | 1.82 | -65 | .087 | -74 | .62 | 147 |
| 21.00 | .45 | 137 | 1.78 | -70 | .088 | -76 | .61 | 143 |
| 21.50 | .44 | 134 | 1.72 | -74 | .087 | -79 | .63 | 144 |
| 22.00 | .38 | 118 | 1.72 | -81 | .101 | -83 | .68 | 127 |



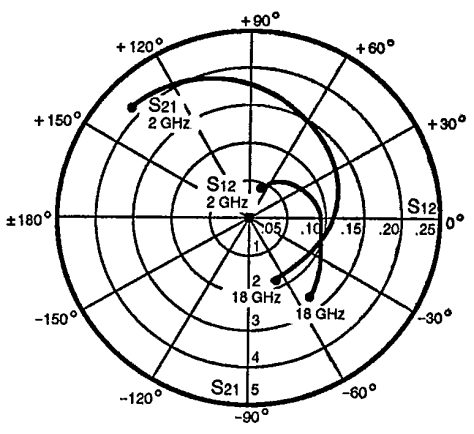
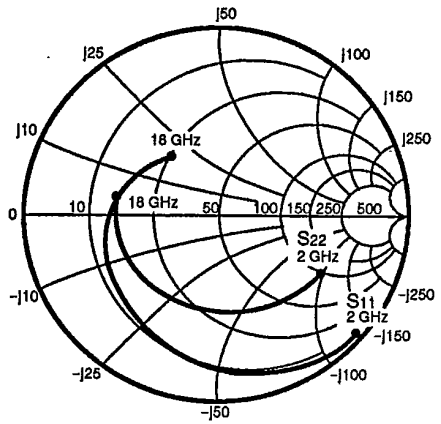
TYPICAL COMMON SOURCE SCATTERING PARAMETERS



S-MAGN AND PHASE:
V_{DS} = 2 V, I_{DS} = 10 mA
FREQUENCY (GHz)

| FREQUENCY (GHz) | S ₁₁ | S ₂₁ | S ₁₂ | S ₂₂ | | | | |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----|-----|-----|------|
| 2.00 | .98 | -34 | 3.55 | 148 | .03 | 68 | .65 | -25 |
| 3.00 | .94 | -50 | 3.39 | 131 | .04 | 55 | .64 | -37 |
| 4.00 | .91 | -65 | 3.22 | 116 | .05 | 45 | .63 | -48 |
| 5.00 | .88 | -81 | 3.09 | 102 | .06 | 34 | .62 | -60 |
| 6.00 | .84 | -95 | 2.91 | 87 | .06 | 25 | .61 | -71 |
| 7.00 | .82 | -109 | 2.83 | 75 | .07 | 18 | .61 | -81 |
| 8.00 | .78 | -120 | 2.63 | 62 | .07 | 11 | .60 | -91 |
| 9.00 | .76 | -132 | 2.52 | 50 | .07 | 5 | .61 | -100 |
| 10.00 | .73 | -144 | 2.36 | 40 | .07 | 1 | .61 | -109 |
| 11.00 | .71 | -153 | 2.22 | 29 | .07 | -3 | .61 | -116 |
| 12.00 | .69 | -164 | 2.22 | 18 | .07 | -7 | .62 | -124 |
| 13.00 | .66 | -174 | 2.24 | 6 | .08 | -12 | .62 | -131 |
| 14.00 | .62 | 176 | 2.09 | -6 | .07 | -16 | .61 | -138 |
| 15.00 | .60 | 166 | 2.01 | -18 | .08 | -18 | .61 | -146 |
| 16.00 | .58 | 156 | 2.00 | -24 | .08 | -24 | .62 | -154 |
| 17.00 | .55 | 145 | 2.00 | -37 | .08 | -37 | .63 | -162 |
| 18.00 | .51 | 133 | 2.00 | -49 | .09 | -49 | .63 | -170 |

TYPICAL COMMON SOURCE SCATTERING PARAMETERS



NE20283A
Coordinates in Ohms
Frequency in GHz
(V_{DS} = 2 V, I_{DS} = 20 mA)

**S-MAGN AND PHASE:
V_{DS} = 2 V, I_{DS} = 20 mA**

| FREQUENCY (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|-----------------|-----------------|------|-----------------|-----|-----------------|-----|-----------------|------|
| 2.00 | .95 | -40 | 4.31 | 140 | .04 | 62 | .61 | -32 |
| 3.00 | .90 | -57 | 3.97 | 124 | .06 | 50 | .59 | -46 |
| 4.00 | .86 | -75 | 3.77 | 106 | .07 | 38 | .57 | -60 |
| 5.00 | .79 | -91 | 3.43 | 91 | .08 | 27 | .54 | -74 |
| 6.00 | .75 | -105 | 3.21 | 75 | .09 | 18 | .52 | -86 |
| 7.00 | .71 | -119 | 2.98 | 62 | .09 | 10 | .52 | -97 |
| 8.00 | .68 | -130 | 2.77 | 50 | .09 | 4 | .51 | -106 |
| 9.00 | .65 | -141 | 2.59 | 37 | .09 | -3 | .52 | -115 |
| 10.00 | .63 | -152 | 2.43 | 26 | .09 | -6 | .52 | -125 |
| 11.00 | .61 | -161 | 2.28 | 15 | .09 | -12 | .52 | -133 |
| 12.00 | .57 | -172 | 2.22 | 2 | .10 | -19 | .52 | -141 |
| 13.00 | .54 | 180 | 2.12 | -8 | .10 | -22 | .52 | -148 |
| 14.00 | .50 | 171 | 2.03 | -19 | .10 | -27 | .51 | -155 |
| 15.00 | .48 | 161 | 2.00 | -32 | .11 | -33 | .51 | -163 |
| 16.00 | .45 | 150 | 1.98 | -40 | .12 | -36 | .51 | -172 |
| 17.00 | .43 | 139 | 1.95 | -54 | .12 | -45 | .51 | 179 |
| 18.00 | .39 | 127 | 1.95 | -66 | .13 | -53 | .51 | 169 |

