

4W/8W C-BAND POWER GaAs FET NEZ Series

4W/8W C-BAND POWER GaAs FET N-CHANNEL GaAs MES FET

DESCRIPTION

The NEZ Series of microwave power GaAs FETs offer high output power, high gain and high efficiency at C-band for microwave and satellite communications.

Internal input and output circuits matched to $50\ \Omega$ are designed to provide good flatness of gain and output power in allocated band.

To reduce the thermal resistance, the device has a PHS (Plated Heat Sink) structure.

NEC's stringent quality assurance and test procedures guarantee the highest reliability and performance.

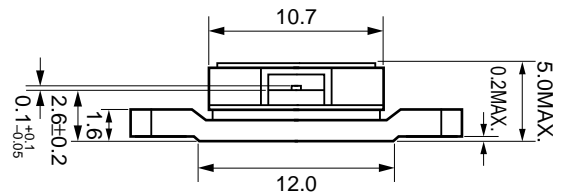
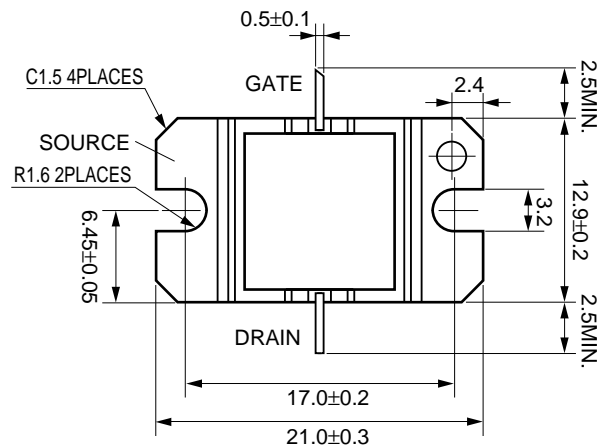
SELECTION CHART

| NEZ PART NUMBER | FREQUENCY BAND (GHz) |
|-------------------------|----------------------|
| NEZ3642-4D, 8D, 8DD | 3.6 to 4.2 |
| NEZ4450-4D, 4DD/8D, 8DD | 4.4 to 5.0 |
| NEZ5964-4D, 4DD/8D, 8DD | 5.9 to 6.45 |
| NEZ6472-4D, 4DD/8D, 8DD | 6.4 to 7.2 |
| NEZ7177-4D, 4DD/8D, 8DD | 7.1 to 7.7 |
| NEZ7785-4D, 4DD/8D, 8DD | 7.7 to 8.5 |

FEATURES

- Internally matched to $50\ \Omega$
- High power output
- High linear gain
- High reliability
- Low distortion

PACKAGE DIMENSIONS (unit: mm)



ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

| CHARACTERISTIC | SYMBOL | RATINGS | | UNIT |
|-------------------------|------------------|---------------|---------------|------|
| | | NEZ-4D, 4DD | NEZ-8D, 8DD | |
| Drain to Source Voltage | V _{DS} | 15 | 15 | V |
| Gate to Source Voltage | V _{GS} | - 12 | -12 | V |
| Gate to Drain Voltage | V _{GD} | - 18 | - 18 | V |
| Drain Current | I _D | 4.5 | 9.0 | A |
| Gate Current | I _G | 25 | 50 | mA |
| Total Power Dissipation | P _T * | 25 | 50 | W |
| Channel Temperature | T _{ch} | 175 | 175 | °C |
| Storage Temperature | T _{stg} | - 65 to + 175 | - 65 to + 175 | °C |

*T_C = 25 °C

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

| CHARACTERISTIC | SYMBOL | Part No. | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|-------------------------|-------------------|-------------|-------|-------|-------|------|--|
| Saturated Drain Current | I _{DSS} | NEZ-4D | 1.0 | 2.3 | 3.5 | A | V _{DS} = 2.5 V, V _{GS} = 0 V |
| | | NEZ-8D, 8DD | 2.0 | 4.5 | 7.0 | | |
| Pinch-off Voltage | V _P | NEZ-4D, 4DD | - 3.5 | - 2.0 | - 0.5 | V | V _{DS} = 2.5 V, I _{DS} = 15 mA |
| | | NEZ-8D, 8DD | - 3.5 | - 2.0 | - 0.5 | | V _{DS} = 2.5 V, I _{DS} = 30 mA |
| Trans-Conductance | g _m | NEZ-4D, 4DD | — | 1300 | — | mS | V _{DS} = 2.5 V, I _{DS} = 1 A |
| | | NEZ-8D, 8DD | — | 2600 | — | | V _{DS} = 2.5 V, I _{DS} = 2 A |
| Gate to Drain Voltage | B _{VGD0} | NEZ-4D, 4DD | 20 | 22 | — | V | I _{GD} = 15 mA |
| | | NEZ-8D, 8DD | 20 | 22 | — | | I _{GD} = 30 mA |
| Thermal Resistance | R _{th} | NEZ-4D, 4DD | — | 5.0 | 6.0 | °C/W | Channel to Case |
| | | NEZ-8D, 8DD | — | 2.5 | 3.0 | | |

4W PERFORMANCE SPECIFICATIONS (T_A = 25 °C, Z_s = Z_L = 50 Ω)

| PART NUMBER | P1dB (dBm) *1 | | GL (dB) | | IDS (A) *2 | | ΔGL (dB) *3, 4 | IM ₃ (dBc) *4 | | η _{add} (%) | TEST CONDITIONS | | | |
|-----------------|---------------------|------|------------|------|------------------|------|----------------------|--------------------------------|------|-------------------------|------------------------|------------------------------------|---------------|----------------------|
| | MIN. | TYP. | MIN. | TYP. | TYP. | MAX. | MAX. | TYP. | MAX. | TYP. | V _{DS} (V) | I _{DS} (A) (RF OFF) | FREQUENCY | IM ₃ TEST |
| | | | | | | | | | | | | | BAND (GHz) | FREQ. (GHz) *5 |
| NEZ3642-4D | 35.5 | 36.5 | 10.0 | 11.0 | 1.2 | 1.5 | 1.0 | - 45 | - 42 | 43 | 10 | 0.8 | 3.6 to 4.2 | 4.2 |
| NEZ4450-4D, 4DD | 35.5 | 36.5 | 9.5 | 10.5 | 1.2 | 1.5 | 1.0 | - 45 | - 42 | 40 | 10 | 0.8 | 4.4 to 5.0 | 5.0 |
| NEZ5964-4D, 4DD | 35.5 | 36.5 | 9.0 | 10.0 | 1.2 | 1.5 | 1.0 | - 45 | - 42 | 37 | 10 | 0.8 | 5.9 to 6.45 | 6.45 |
| NEZ6472-4D, 4DD | 35.5 | 36.5 | 8.0 | 9.0 | 1.2 | 1.5 | 1.0 | - 45 | - 42 | 35 | 10 | 0.8 | 6.4 to 7.2 | 7.2 |
| NEZ7177-4D, 4DD | 35.5 | 36.5 | 7.5 | 8.5 | 1.2 | 1.5 | 1.0 | - 45 | - 42 | 33 | 10 | 0.8 | 7.1 to 7.7 | 7.7 |
| NEZ7785-4D, 4DD | 35.5 | 36.5 | 7.0 | 8.0 | 1.2 | 1.5 | 1.0 | - 45 | - 42 | 33 | 10 | 0.8 | 7.7 to 8.5 | 8.5 |

Notes *1 Output power at 1dB gain compression point

*2 IDS values are specified at P1dB point.

*3 Gain flatness

*4 Applies to - 4DD option only

*5 IM₃ test conditions: Δf = 10 MHz, 2 tones test, P_o = 26dBm (single carrier level)

MAXIMUM OPERATING LIMITS

| | |
|----------------------------|-----------------------------|
| R _g max. (Ω) | V _{DS} max. (V) |
| 200 | 10 |

R_g max is the maximum series resistance between the gate supply and the FET gate.

8W PERFORMANCE SPECIFICATIONS (T_A = 25 °C, Z_s = Z_L = 50 Ω)

| PART NUMBER | P1dB (dBm) *1 | | GL (dB) | | IDS (A) *2 | | ΔGL (dB) *3, 4 | IM ₃ (dBc) *4 | | η _{add} (%) | TEST CONDITIONS | | | |
|-----------------|---------------------|------|------------|------|------------------|------|----------------------|--------------------------------|------|-------------------------|------------------------|------------------------------------|---------------|----------------------|
| | MIN. | TYP. | MIN. | TYP. | TYP. | MAX. | MAX. | TYP. | MAX. | TYP. | V _{DS} (V) | I _{DS} (A) (RF OFF) | FREQUENCY | IM ₃ TEST |
| | | | | | | | | | | | | | BAND (GHz) | FREQ. (GHz) *5 |
| NEZ3642-8D, 8DD | 38.5 | 39.5 | 10.0 | 11.0 | 2.4 | 3.0 | 1.0 | - 45 | - 42 | 40 | 10 | 1.6 | 3.6 to 4.2 | 4.2 |
| NEZ4450-8D, 8DD | 38.5 | 39.5 | 9.5 | 10.5 | 2.4 | 3.0 | 1.0 | - 45 | - 42 | 37 | 10 | 1.6 | 4.4 to 5.0 | 5.0 |
| NEZ5964-8D, 8DD | 38.5 | 39.5 | 8.5 | 9.5 | 2.4 | 3.0 | 1.0 | - 45 | - 42 | 35 | 10 | 1.6 | 5.9 to 6.45 | 6.45 |
| NEZ6472-8D, 8DD | 38.5 | 39.5 | 7.5 | 8.5 | 2.4 | 3.0 | 1.0 | - 45 | - 42 | 32 | 10 | 1.6 | 6.4 to 7.2 | 7.2 |
| NEZ7177-8D, 8DD | 38.5 | 39.5 | 7.0 | 8.0 | 2.4 | 3.0 | 1.0 | - 45 | - 42 | 30 | 10 | 1.6 | 7.1 to 7.7 | 7.7 |
| NEZ7785-8D, 8DD | 38.5 | 39.5 | 6.5 | 7.5 | 2.4 | 3.0 | 1.0 | - 45 | - 42 | 30 | 10 | 1.6 | 7.7 to 8.5 | 8.5 |

Notes *1 Output power at 1dB gain compression point

*2 IDS values are specified at P1dB point.

*3 Gain flatness

*4 Applies to – 8DD option only

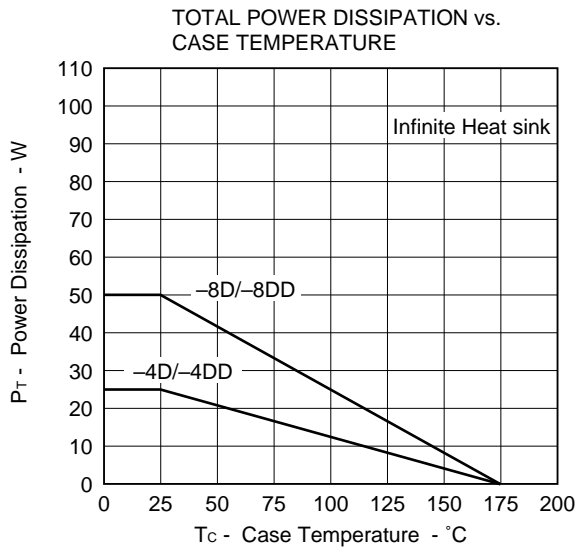
*5 IM₃ test conditions: Δf = 10 MHz, 2 tones test, P_o = 29dBm (single carrier level)

MAXIMUM OPERATING LIMITS

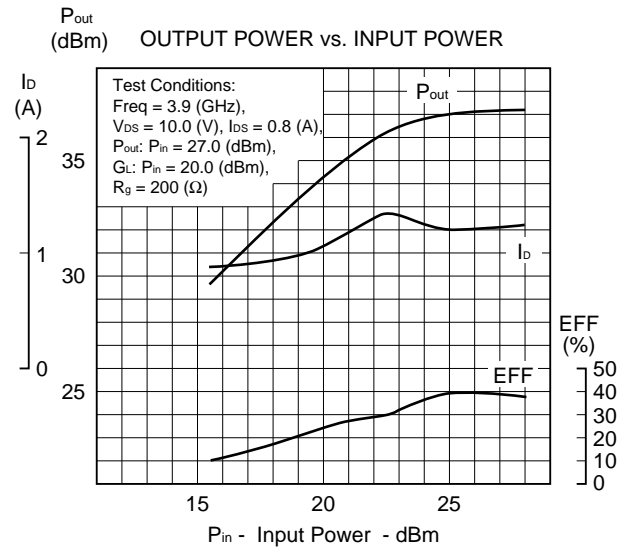
| | |
|----------------------------|-----------------------------|
| R _g max. (Ω) | V _{DS} max. (V) |
| 100 | 10 |

R_g max is the maximum series resistance between the gate supply and the FET gate.

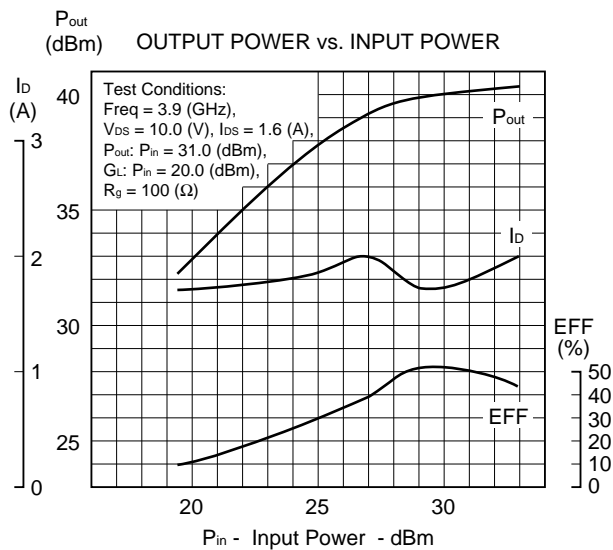
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$)



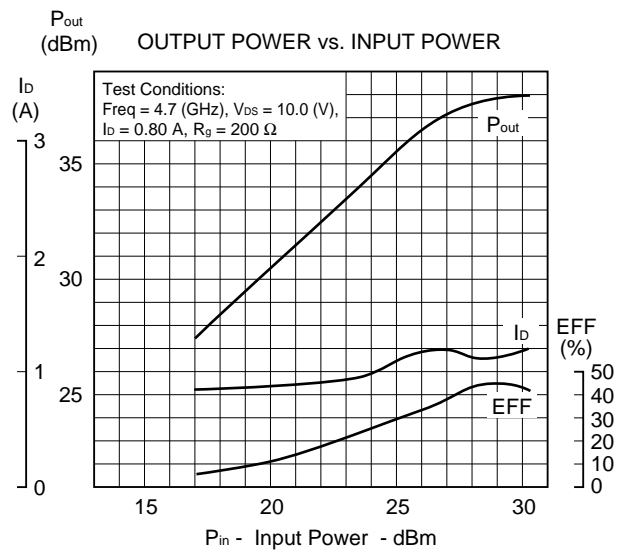
NEZ3642-4D



NEZ3642-8D/8DD

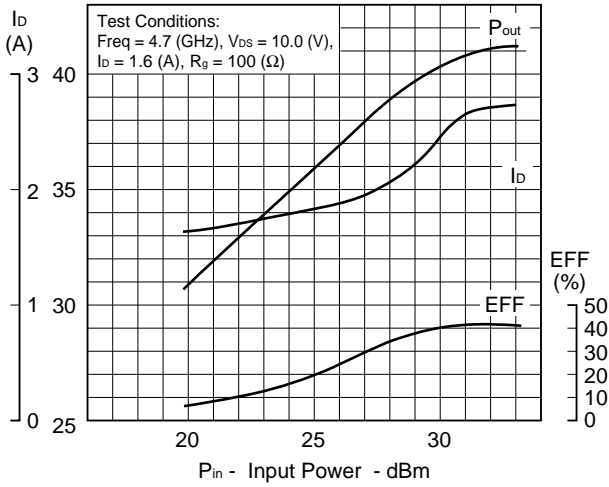


NEZ4450-4D/4DD



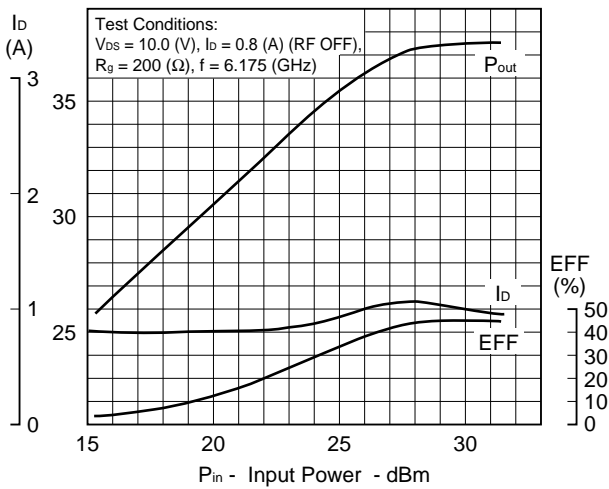
NEZ4450-8D/8DD

P_{out} (dBm) OUTPUT POWER vs. INPUT POWER

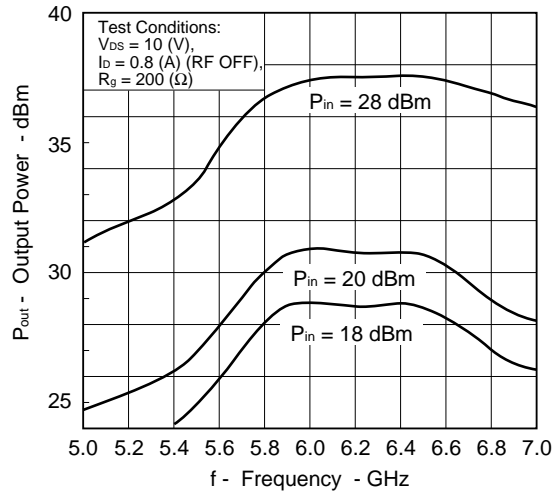


NEZ5964-4D, 4DD

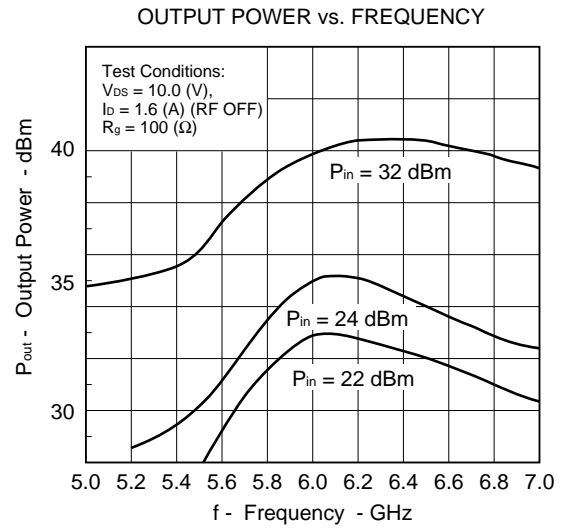
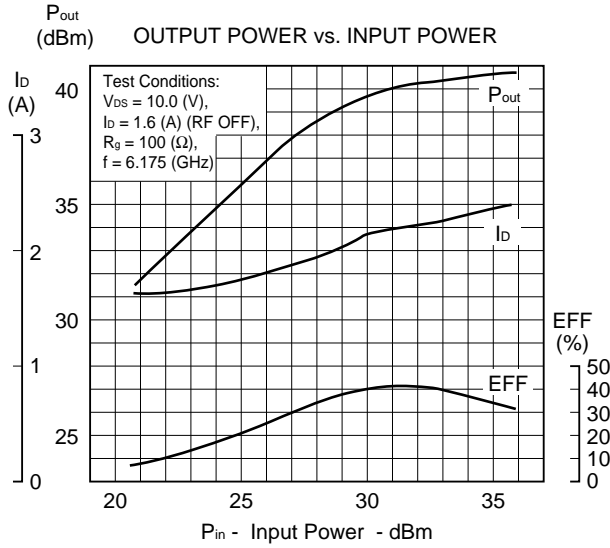
P_{out} (dBm) OUTPUT POWER vs. INPUT POWER



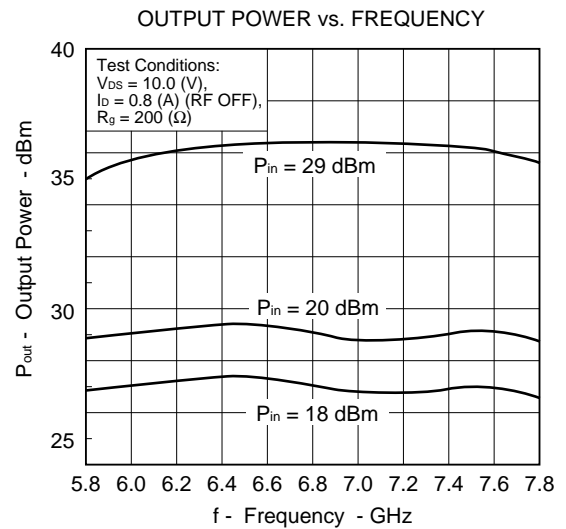
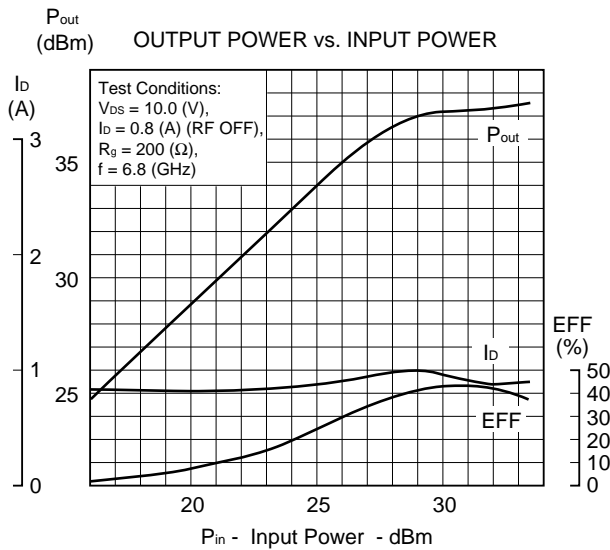
OUTPUT POWER vs. FREQUENCY



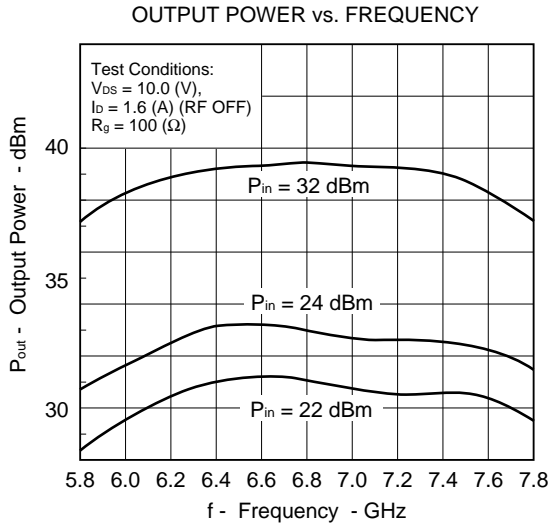
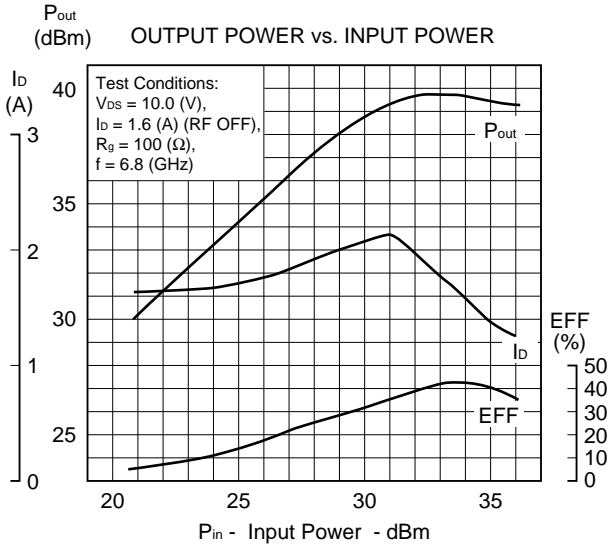
NEZ5964-8D, 8DD



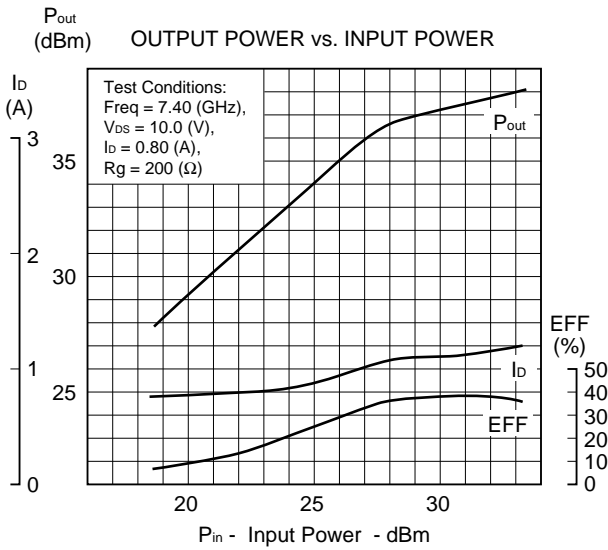
NEZ6472-4D, 4DD



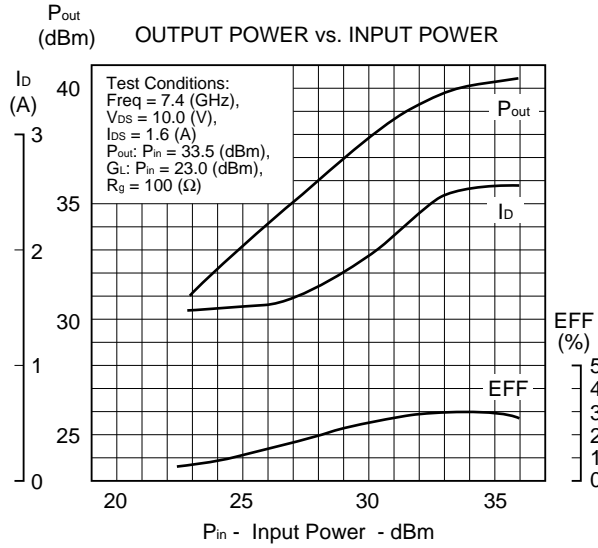
NEZ6472-8D, 8DD



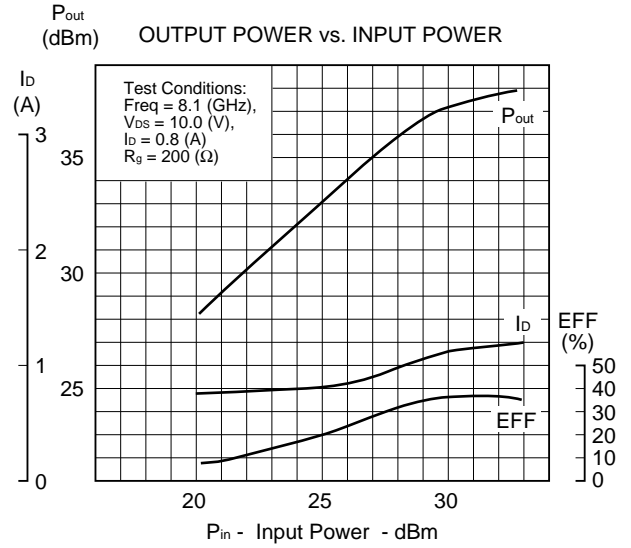
NEZ7177-4D/4DD



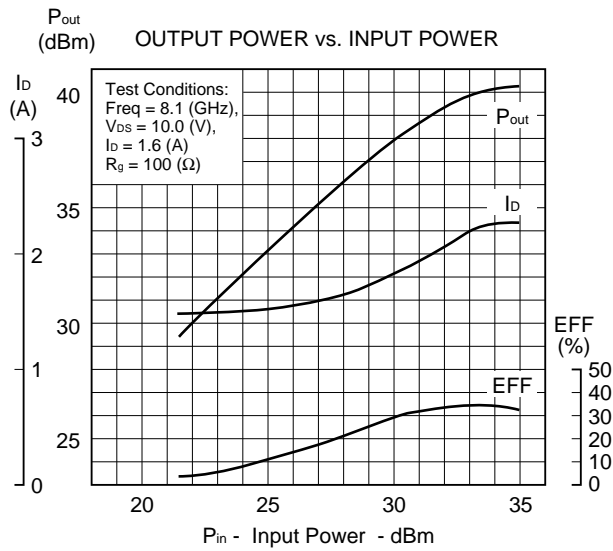
NEZ7177-8D/8DD



NEZ7785-4D/4DD



NEZ7785-8D/8DD



S-PARAMETER

NEZ3642-4D

V_{DS} = 10 V, I_{DS} = 800 mA, V_{GS} = -1.486 V, I_G = 0.0 mA, R_G = 100 Ω

| FREQUENCY GHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|--------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.100 | 0.957 | -129.5 | 11.354 | 104.3 | 0.005 | 11.4 | 0.587 | 180.0 |
| 0.200 | 0.957 | -158.1 | 6.114 | 82.7 | 0.007 | 8.6 | 0.634 | -179.7 |
| 0.500 | 0.960 | 171.4 | 2.444 | 43.0 | 0.006 | 12.8 | 0.700 | 173.2 |
| 1.000 | 0.968 | 142.4 | 1.231 | -6.3 | 0.006 | 7.1 | 0.792 | 156.5 |
| 1.500 | 0.954 | 112.3 | 0.949 | -50.2 | 0.009 | -2.6 | 0.824 | 134.9 |
| 2.000 | 0.931 | 78.9 | 1.034 | -93.9 | 0.012 | -24.2 | 0.836 | 111.9 |
| 2.250 | 0.911 | 57.5 | 1.233 | -119.1 | 0.012 | -50.6 | 0.836 | 98.5 |
| 2.500 | 0.878 | 28.8 | 1.590 | -148.5 | 0.012 | -77.8 | 0.808 | 82.7 |
| 2.750 | 0.827 | -10.4 | 2.182 | 174.7 | 0.008 | -133.1 | 0.781 | 63.7 |
| 3.000 | 0.749 | -64.1 | 2.985 | 130.2 | 0.006 | 109.4 | 0.704 | 39.3 |
| 3.200 | 0.699 | -113.6 | 3.665 | 90.3 | 0.017 | 38.8 | 0.601 | 12.8 |
| 3.300 | 0.685 | -138.9 | 4.020 | 69.3 | 0.023 | 18.4 | 0.535 | -3.5 |
| 3.400 | 0.676 | -163.7 | 4.356 | 47.7 | 0.029 | -4.1 | 0.460 | -23.8 |
| 3.500 | 0.664 | 172.3 | 4.682 | 25.3 | 0.036 | -27.0 | 0.387 | -50.4 |
| 3.600 | 0.638 | 149.2 | 4.967 | 2.0 | 0.044 | -48.5 | 0.342 | -83.8 |
| 3.700 | 0.594 | 126.6 | 5.181 | -21.9 | 0.050 | -71.4 | 0.337 | -122.0 |
| 3.800 | 0.523 | 103.9 | 5.295 | -46.3 | 0.058 | -94.7 | 0.364 | -157.7 |
| 3.900 | 0.427 | 80.7 | 5.316 | -70.7 | 0.063 | -119.1 | 0.401 | 171.9 |
| 4.000 | 0.315 | 54.5 | 5.211 | -95.4 | 0.068 | -145.8 | 0.422 | 145.3 |
| 4.100 | 0.194 | 15.8 | 5.015 | -119.5 | 0.070 | -173.0 | 0.401 | 122.0 |
| 4.200 | 0.162 | -58.7 | 4.877 | -143.0 | 0.072 | 158.6 | 0.329 | 101.3 |
| 4.300 | 0.295 | -119.5 | 4.622 | -168.2 | 0.069 | 129.5 | 0.209 | 85.3 |
| 4.400 | 0.455 | -153.4 | 4.219 | 166.7 | 0.065 | 104.2 | 0.089 | 91.7 |
| 4.500 | 0.590 | -176.1 | 3.774 | 144.1 | 0.061 | 80.8 | 0.082 | 172.8 |
| 4.600 | 0.697 | 165.3 | 3.344 | 122.1 | 0.057 | 57.5 | 0.185 | -176.1 |
| 4.700 | 0.781 | 149.2 | 3.016 | 101.5 | 0.053 | 37.7 | 0.293 | 176.4 |
| 4.800 | 0.830 | 135.4 | 2.715 | 82.0 | 0.050 | 18.5 | 0.385 | 168.0 |
| 5.000 | 0.840 | 110.0 | 2.300 | 42.9 | 0.047 | -16.7 | 0.525 | 151.1 |
| 6.000 | 0.980 | 95.5 | 0.316 | 165.9 | 0.007 | 158.6 | 0.982 | 83.9 |

NEZ4450-4DD

V_{DS} = 10 V, I_{DS} = 800 mA, V_{GS} = -1.409 V, I_G = 0.0 mA

| FREQUENCY GHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|--------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.100 | 0.961 | -116.2 | 11.641 | 114.8 | 0.005 | 24.8 | 0.627 | 179.2 |
| 0.200 | 0.964 | -149.8 | 6.618 | 94.4 | 0.007 | 24.1 | 0.654 | 175.7 |
| 0.500 | 0.970 | 177.3 | 2.841 | 62.2 | 0.008 | 5.1 | 0.666 | 164.4 |
| 1.000 | 0.971 | 150.5 | 1.555 | 22.4 | 0.008 | -6.1 | 0.675 | 147.8 |
| 1.500 | 0.961 | 125.8 | 1.187 | -16.3 | 0.010 | -22.0 | 0.682 | 128.3 |
| 2.000 | 0.949 | 102.0 | 1.079 | -55.1 | 0.012 | -52.2 | 0.699 | 107.2 |
| 2.500 | 0.929 | 74.2 | 1.138 | -96.0 | 0.013 | -91.6 | 0.698 | 83.6 |
| 3.000 | 0.907 | 39.2 | 1.410 | -142.0 | 0.015 | -139.5 | 0.689 | 57.8 |
| 3.500 | 0.830 | -8.9 | 1.937 | 162.5 | 0.019 | 144.3 | 0.657 | 25.8 |
| 3.700 | 0.773 | -33.7 | 2.221 | 137.5 | 0.020 | 122.0 | 0.628 | 9.8 |
| 3.800 | 0.742 | -47.7 | 2.383 | 124.0 | 0.023 | 103.5 | 0.614 | 0.9 |
| 3.900 | 0.711 | -63.6 | 2.579 | 109.3 | 0.025 | 92.0 | 0.595 | -9.3 |
| 4.000 | 0.685 | -81.3 | 2.684 | 92.6 | 0.032 | 69.8 | 0.574 | -21.1 |
| 4.100 | 0.680 | -100.6 | 2.874 | 76.5 | 0.042 | 61.1 | 0.551 | -34.2 |
| 4.200 | 0.656 | -122.2 | 3.000 | 59.7 | 0.054 | 31.6 | 0.499 | -46.0 |
| 4.300 | 0.632 | -142.8 | 3.114 | 43.5 | 0.057 | 5.1 | 0.456 | -57.1 |
| 4.400 | 0.621 | -162.6 | 3.252 | 27.4 | 0.056 | -14.4 | 0.432 | -67.1 |
| 4.500 | 0.625 | 177.7 | 3.360 | 10.2 | 0.055 | -32.7 | 0.417 | -79.0 |
| 4.600 | 0.626 | 158.7 | 3.452 | -8.0 | 0.056 | -47.9 | 0.400 | -91.9 |
| 4.700 | 0.632 | 140.2 | 3.484 | -25.4 | 0.057 | -65.0 | 0.389 | -104.7 |
| 4.800 | 0.629 | 122.5 | 3.471 | -43.5 | 0.059 | -79.0 | 0.375 | -117.6 |
| 4.900 | 0.626 | 105.6 | 3.493 | -60.9 | 0.063 | -96.6 | 0.368 | -129.5 |
| 5.000 | 0.619 | 88.9 | 3.482 | -78.3 | 0.064 | -114.0 | 0.363 | -140.1 |
| 5.100 | 0.606 | 72.2 | 3.458 | -96.9 | 0.068 | -130.2 | 0.359 | -150.1 |
| 5.200 | 0.591 | 54.0 | 3.463 | -115.6 | 0.070 | -148.7 | 0.357 | -158.4 |

NEZ5964-4DD

$V_{DS} = 10\text{ V}$, $I_{DS} = 800\text{ mA}$, $V_{GS} = -1.327\text{ V}$, $I_G = 0.0\text{ mA}$

| FREQUENCY GHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|--------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.100 | 0.947 | -107.2 | 13.855 | 120.4 | 0.007 | 36.0 | 0.633 | -177.3 |
| 0.200 | 0.958 | -142.9 | 8.208 | 99.3 | 0.008 | 15.4 | 0.661 | 178.4 |
| 0.500 | 0.964 | -177.3 | 3.525 | 69.5 | 0.009 | 3.2 | 0.674 | 167.7 |
| 1.000 | 0.968 | 158.0 | 1.854 | 35.9 | 0.009 | -16.8 | 0.693 | 153.0 |
| 1.500 | 0.963 | 137.0 | 1.271 | 3.9 | 0.010 | -25.6 | 0.708 | 137.0 |
| 2.000 | 0.961 | 119.1 | 1.008 | -25.9 | 0.010 | -41.1 | 0.734 | 120.4 |
| 2.500 | 0.951 | 101.9 | 0.873 | -53.7 | 0.011 | -57.7 | 0.750 | 103.1 |
| 3.000 | 0.960 | 83.2 | 0.837 | -82.8 | 0.011 | -79.9 | 0.761 | 84.9 |
| 3.500 | 0.975 | 63.3 | 0.864 | -112.9 | 0.012 | -104.1 | 0.763 | 65.7 |
| 4.000 | 0.967 | 42.9 | 0.942 | -145.0 | 0.016 | -128.7 | 0.752 | 45.3 |
| 4.200 | 0.958 | 34.7 | 0.997 | -158.1 | 0.018 | -159.6 | 0.750 | 36.4 |
| 4.400 | 0.939 | 25.6 | 1.060 | -171.4 | 0.013 | 177.5 | 0.733 | 27.1 |
| 4.600 | 0.912 | 16.9 | 1.143 | 174.7 | 0.014 | 179.2 | 0.717 | 18.2 |
| 4.800 | 0.890 | 7.4 | 1.261 | 160.6 | 0.018 | 165.7 | 0.704 | 8.5 |
| 5.000 | 0.859 | -3.7 | 1.404 | 144.8 | 0.023 | 148.4 | 0.684 | -2.6 |
| 5.200 | 0.816 | -14.2 | 1.621 | 125.9 | 0.029 | 126.1 | 0.632 | -13.1 |
| 5.400 | 0.748 | -27.7 | 1.836 | 108.2 | 0.034 | 100.3 | 0.590 | -24.6 |
| 5.600 | 0.656 | -45.2 | 2.135 | 89.5 | 0.043 | 75.5 | 0.541 | -39.4 |
| 5.800 | 0.542 | -69.5 | 2.483 | 67.7 | 0.055 | 49.0 | 0.466 | -58.0 |
| 6.000 | 0.420 | -104.4 | 2.878 | 43.5 | 0.064 | 19.8 | 0.377 | -81.3 |
| 6.200 | 0.345 | -156.5 | 3.201 | 16.7 | 0.077 | -10.8 | 0.274 | -115.9 |
| 6.400 | 0.377 | 146.0 | 3.370 | -12.7 | 0.086 | -44.0 | 0.200 | -165.7 |
| 6.600 | 0.470 | 104.7 | 3.352 | -41.9 | 0.090 | -73.4 | 0.193 | 140.5 |
| 6.800 | 0.528 | 74.1 | 3.171 | -68.6 | 0.091 | -101.6 | 0.221 | 99.9 |
| 7.000 | 0.540 | 50.6 | 2.929 | -92.7 | 0.088 | -126.4 | 0.241 | 74.9 |

NEZ6472-4DD

$V_{DS} = 10\text{ V}$, $I_{DS} = 800\text{ mA}$, $V_{GS} = -1.458\text{ V}$, $I_G = 0.0\text{ mA}$

| FREQUENCY GHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|--------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.100 | 0.942 | -103.4 | 13.187 | 121.3 | 0.008 | 62.3 | 0.625 | 179.6 |
| 0.200 | 0.958 | -141.0 | 7.998 | 100.9 | 0.008 | 16.7 | 0.677 | 177.2 |
| 0.500 | 0.963 | -177.8 | 3.473 | 71.0 | 0.009 | -0.6 | 0.691 | 166.6 |
| 1.000 | 0.968 | 155.5 | 1.846 | 37.5 | 0.010 | -12.2 | 0.701 | 151.7 |
| 1.500 | 0.960 | 133.3 | 1.294 | 6.3 | 0.010 | -25.4 | 0.709 | 134.5 |
| 2.000 | 0.955 | 113.5 | 1.050 | -23.5 | 0.011 | -41.3 | 0.726 | 118.8 |
| 3.000 | 0.949 | 71.5 | 0.914 | -82.4 | 0.013 | -85.6 | 0.748 | 84.7 |
| 4.000 | 0.930 | 23.9 | 1.047 | -147.7 | 0.020 | -148.4 | 0.756 | 48.6 |
| 4.500 | 0.872 | -3.2 | 1.262 | 174.5 | 0.019 | 161.2 | 0.759 | 28.0 |
| 5.000 | 0.749 | -35.9 | 1.547 | 134.8 | 0.024 | 127.1 | 0.728 | 5.8 |
| 5.500 | 0.590 | -87.0 | 2.027 | 88.7 | 0.042 | 71.5 | 0.645 | -21.3 |
| 6.000 | 0.528 | -167.7 | 2.631 | 33.8 | 0.065 | 7.7 | 0.484 | -59.5 |
| 6.200 | 0.562 | 158.3 | 2.849 | 9.7 | 0.072 | -20.1 | 0.395 | -78.7 |
| 6.300 | 0.580 | 141.4 | 2.907 | -3.5 | 0.075 | -32.9 | 0.345 | -90.2 |
| 6.400 | 0.600 | 126.3 | 3.002 | -16.1 | 0.080 | -46.7 | 0.305 | -102.6 |
| 6.500 | 0.613 | 112.6 | 3.061 | -28.6 | 0.083 | -59.1 | 0.265 | -117.9 |
| 6.600 | 0.617 | 98.8 | 3.134 | -41.7 | 0.087 | -71.9 | 0.234 | -135.4 |
| 6.700 | 0.604 | 86.3 | 3.189 | -54.2 | 0.092 | -83.9 | 0.218 | -154.9 |
| 6.800 | 0.580 | 73.1 | 3.195 | -67.9 | 0.095 | -97.7 | 0.204 | -178.2 |
| 6.900 | 0.552 | 60.7 | 3.245 | -81.2 | 0.101 | -110.3 | 0.211 | 159.7 |
| 7.000 | 0.506 | 49.0 | 3.167 | -94.1 | 0.103 | -123.7 | 0.224 | 139.5 |
| 7.100 | 0.470 | 33.6 | 3.236 | -108.6 | 0.107 | -138.5 | 0.240 | 117.8 |
| 7.200 | 0.404 | 19.3 | 3.152 | -121.6 | 0.106 | -150.7 | 0.244 | 102.2 |
| 7.300 | 0.342 | 2.3 | 3.164 | -135.6 | 0.110 | -163.6 | 0.254 | 88.0 |
| 7.400 | 0.271 | -17.1 | 3.068 | -147.9 | 0.110 | -175.1 | 0.248 | 76.6 |

NEZ7177-4DD

$V_{DS} = 10\text{ V}$, $I_{DS} = 800\text{ mA}$, $V_{GS} = -2.002\text{ V}$, $I_G = 0.0\text{ mA}$

| FREQUENCY GHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|--------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.100 | 0.964 | -96.7 | 13.227 | 126.5 | 0.007 | 39.2 | 0.623 | -178.2 |
| 0.200 | 0.961 | -135.6 | 8.162 | 104.3 | 0.008 | 19.7 | 0.659 | 178.3 |
| 0.500 | 0.960 | -173.9 | 3.583 | 73.2 | 0.009 | 10.4 | 0.680 | 168.7 |
| 1.000 | 0.959 | 162.3 | 2.441 | 41.5 | 0.011 | 1.0 | 0.694 | 154.4 |
| 1.500 | 0.959 | 138.5 | 1.299 | 9.9 | 0.013 | -8.4 | 0.709 | 140.2 |
| 2.000 | 0.952 | 119.9 | 1.092 | -18.4 | 0.014 | -26.2 | 0.733 | 124.1 |
| 3.000 | 0.953 | 80.9 | 0.864 | -74.8 | 0.016 | -61.8 | 0.776 | 92.1 |
| 4.000 | 0.922 | 37.6 | 0.901 | -134.7 | 0.015 | -108.6 | 0.806 | 58.5 |
| 5.000 | 0.801 | -19.0 | 1.230 | 157.3 | 0.021 | 176.3 | 0.803 | 19.8 |
| 5.500 | 0.717 | -52.9 | 1.501 | 121.3 | 0.031 | 130.4 | 0.789 | -1.2 |
| 6.000 | 0.581 | -105.9 | 2.002 | 74.0 | 0.045 | 59.6 | 0.714 | -28.3 |
| 6.300 | 0.508 | -148.6 | 2.354 | 42.3 | 0.055 | 17.8 | 0.641 | -45.5 |
| 6.500 | 0.478 | 178.0 | 2.596 | 19.0 | 0.058 | -8.5 | 0.581 | -58.0 |
| 6.700 | 0.465 | 141.6 | 2.807 | -5.1 | 0.066 | -31.7 | 0.520 | -71.1 |
| 6.900 | 0.460 | 105.8 | 3.011 | -31.2 | 0.072 | -54.5 | 0.453 | -85.9 |
| 7.000 | 0.455 | 88.2 | 3.038 | -44.5 | 0.074 | -68.5 | 0.419 | -93.3 |
| 7.100 | 0.448 | 71.9 | 3.039 | -57.8 | 0.079 | -77.6 | 0.389 | -101.2 |
| 7.200 | 0.431 | 55.8 | 3.040 | -70.3 | 0.080 | -91.1 | 0.352 | -112.1 |
| 7.300 | 0.414 | 39.6 | 2.915 | -82.9 | 0.088 | -102.8 | 0.314 | -122.4 |
| 7.400 | 0.395 | 23.3 | 2.902 | -96.1 | 0.087 | -116.3 | 0.268 | -134.4 |
| 7.500 | 0.380 | 6.7 | 2.897 | -106.9 | 0.098 | -128.8 | 0.228 | -148.4 |
| 7.600 | 0.358 | -10.2 | 2.841 | -120.1 | 0.098 | -139.7 | 0.185 | -164.4 |
| 7.700 | 0.332 | -29.7 | 2.867 | -132.6 | 0.104 | -155.7 | 0.144 | 175.5 |
| 7.800 | 0.318 | -49.5 | 2.819 | -144.8 | 0.104 | -168.2 | 0.116 | 150.4 |
| 7.900 | 0.307 | -70.0 | 2.759 | -158.7 | 0.108 | 178.2 | 0.091 | 117.1 |

NEZ7785-4DD

$V_{DS} = 10\text{ V}$, $I_{DS} = 800\text{ mA}$, $V_{GS} = -1.324\text{ V}$, $I_G = 0.0\text{ mA}$

| FREQUENCY GHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|--------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.100 | 0.960 | -96.7 | 14.856 | 126.3 | 0.007 | 40.9 | 0.630 | -177.3 |
| 0.200 | 0.957 | -135.4 | 9.147 | 104.7 | 0.009 | 19.9 | 0.671 | 179.0 |
| 0.500 | 0.956 | -174.0 | 4.012 | 74.3 | 0.010 | 3.8 | 0.693 | 168.6 |
| 1.000 | 0.958 | 159.5 | 2.093 | 42.6 | 0.011 | -5.6 | 0.707 | 155.4 |
| 1.500 | 0.957 | 137.4 | 1.435 | 13.2 | 0.013 | -11.0 | 0.714 | 141.0 |
| 2.000 | 0.955 | 119.1 | 1.118 | -14.5 | 0.014 | -24.9 | 0.739 | 125.8 |
| 2.500 | 0.942 | 101.0 | 0.940 | -41.3 | 0.015 | -39.7 | 0.753 | 109.6 |
| 3.000 | 0.955 | 82.8 | 0.862 | -67.2 | 0.017 | -56.8 | 0.774 | 94.3 |
| 3.500 | 0.963 | 63.3 | 0.837 | -93.8 | 0.017 | -77.7 | 0.790 | 79.0 |
| 4.000 | 0.956 | 43.7 | 0.852 | -121.5 | 0.021 | -91.5 | 0.795 | 63.3 |
| 4.500 | 0.914 | 25.0 | 0.868 | -151.3 | 0.015 | -113.4 | 0.807 | 45.7 |
| 5.000 | 0.869 | 1.5 | 0.994 | 180.0 | 0.024 | -144.1 | 0.793 | 27.8 |
| 5.500 | 0.801 | -26.8 | 1.222 | 147.2 | 0.028 | 161.3 | 0.775 | 7.9 |
| 6.000 | 0.689 | -62.7 | 1.567 | 108.7 | 0.037 | 105.5 | 0.727 | -14.7 |
| 6.500 | 0.559 | -114.9 | 2.070 | 64.4 | 0.046 | 47.6 | 0.641 | -41.3 |
| 6.700 | 0.515 | -143.2 | 2.306 | 44.4 | 0.052 | 24.8 | 0.591 | -53.1 |
| 6.900 | 0.490 | -176.0 | 2.566 | 21.8 | 0.057 | 4.1 | 0.527 | -67.0 |
| 7.100 | 0.495 | 149.6 | 2.710 | -1.8 | 0.061 | -19.0 | 0.456 | -80.1 |
| 7.300 | 0.510 | 115.1 | 2.728 | -26.7 | 0.067 | -40.7 | 0.380 | -94.4 |
| 7.500 | 0.527 | 85.0 | 2.680 | -48.8 | 0.071 | -63.5 | 0.312 | -110.4 |
| 7.700 | 0.547 | 58.0 | 2.665 | -71.1 | 0.079 | -84.4 | 0.243 | -129.8 |
| 7.900 | 0.544 | 33.6 | 2.598 | -93.3 | 0.087 | -107.1 | 0.187 | -156.4 |
| 8.100 | 0.526 | 10.9 | 2.557 | -114.8 | 0.089 | -130.0 | 0.157 | 168.7 |
| 8.300 | 0.496 | -11.7 | 2.479 | -137.8 | 0.094 | -151.8 | 0.151 | 123.7 |
| 8.500 | 0.456 | -34.2 | 2.343 | -159.7 | 0.095 | -174.5 | 0.166 | 84.0 |
| 8.700 | 0.419 | -59.8 | 2.277 | 179.9 | 0.098 | 164.9 | 0.180 | 54.3 |

NEZ3642-8D

$V_{DS} = 10 \text{ V}$, $I_{DS} = 1 \text{ 600 mA}$, $V_{GS} = -1.618 \text{ V}$, $I_G = 0.0 \text{ mA}$, $R_G = 100 \Omega$

| FREQUENCY GHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|--------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.100 | 0.960 | -154.1 | 6.626 | 92.5 | 0.004 | 46.5 | 0.759 | 176.4 |
| 0.200 | 0.967 | -171.7 | 3.388 | 76.5 | 0.006 | 16.8 | 0.790 | 176.1 |
| 0.500 | 0.974 | 166.7 | 1.332 | 41.8 | 0.004 | 31.5 | 0.821 | 167.3 |
| 1.000 | 0.980 | 142.0 | 0.671 | -4.1 | 0.007 | 26.5 | 0.869 | 150.8 |
| 1.500 | 0.966 | 115.0 | 0.521 | -45.2 | 0.008 | 7.8 | 0.883 | 130.4 |
| 2.000 | 0.949 | 85.3 | 0.566 | -85.9 | 0.012 | -14.4 | 0.886 | 108.6 |
| 2.250 | 0.935 | 67.0 | 0.676 | -108.9 | 0.013 | -37.9 | 0.884 | 95.8 |
| 2.500 | 0.910 | 43.1 | 0.881 | -135.6 | 0.015 | -57.5 | 0.854 | 80.8 |
| 2.750 | 0.877 | 10.9 | 1.244 | -169.0 | 0.013 | -88.3 | 0.827 | 63.0 |
| 3.000 | 0.808 | -33.9 | 1.828 | 149.7 | 0.011 | -133.2 | 0.765 | 40.7 |
| 3.200 | 0.741 | -79.7 | 2.439 | 110.2 | 0.005 | 163.2 | 0.686 | 16.4 |
| 3.300 | 0.711 | -105.5 | 2.782 | 88.6 | 0.005 | 96.7 | 0.634 | 1.7 |
| 3.400 | 0.691 | -132.9 | 3.111 | 66.0 | 0.008 | 35.6 | 0.566 | -16.0 |
| 3.500 | 0.678 | -161.0 | 3.422 | 42.1 | 0.014 | -0.1 | 0.498 | -37.7 |
| 3.600 | 0.669 | 171.4 | 3.684 | 17.5 | 0.023 | -32.0 | 0.440 | -63.5 |
| 3.650 | 0.666 | 157.7 | 3.788 | 5.1 | 0.025 | -44.4 | 0.415 | -78.2 |
| 3.700 | 0.657 | 144.3 | 3.871 | -7.4 | 0.030 | -58.9 | 0.400 | -93.2 |
| 3.750 | 0.644 | 131.2 | 3.920 | -19.8 | 0.032 | -70.1 | 0.390 | -108.1 |
| 3.800 | 0.633 | 117.1 | 3.978 | -32.6 | 0.037 | -83.9 | 0.384 | -123.1 |
| 3.850 | 0.619 | 103.5 | 3.987 | -45.2 | 0.040 | -97.1 | 0.381 | -138.1 |
| 3.900 | 0.598 | 89.5 | 4.003 | -57.5 | 0.043 | -109.7 | 0.385 | -150.8 |
| 3.950 | 0.578 | 75.0 | 3.984 | -70.1 | 0.048 | -123.2 | 0.386 | -163.2 |
| 4.000 | 0.558 | 60.6 | 3.950 | -82.3 | 0.050 | -135.9 | 0.386 | -174.2 |
| 4.050 | 0.535 | 45.5 | 3.907 | -94.4 | 0.054 | -150.1 | 0.383 | 176.3 |
| 4.100 | 0.519 | 28.9 | 3.855 | -106.0 | 0.055 | -163.2 | 0.366 | 168.9 |
| 4.150 | 0.512 | 10.7 | 3.864 | -117.9 | 0.055 | -176.0 | 0.354 | 164.6 |
| 4.200 | 0.512 | -9.2 | 3.886 | -130.5 | 0.056 | 172.8 | 0.350 | 161.2 |
| 4.250 | 0.509 | -30.8 | 3.826 | -144.1 | 0.056 | 161.0 | 0.347 | 158.6 |
| 4.300 | 0.521 | -51.1 | 3.711 | -157.1 | 0.056 | 149.7 | 0.341 | 157.0 |
| 4.350 | 0.536 | -71.0 | 3.584 | -170.4 | 0.057 | 139.1 | 0.343 | 155.7 |
| 4.400 | 0.561 | -89.2 | 3.413 | 176.7 | 0.057 | 126.9 | 0.346 | 155.3 |
| 4.500 | 0.626 | -119.5 | 3.071 | 152.7 | 0.055 | 105.5 | 0.364 | 155.4 |
| 4.600 | 0.692 | -144.7 | 2.720 | 129.6 | 0.052 | 82.6 | 0.395 | 154.1 |
| 4.700 | 0.758 | -165.3 | 2.446 | 107.7 | 0.049 | 63.8 | 0.447 | 151.5 |
| 4.800 | 0.803 | 178.1 | 2.181 | 86.8 | 0.044 | 46.1 | 0.495 | 148.8 |
| 4.900 | 0.830 | 163.6 | 1.955 | 65.8 | 0.041 | 28.0 | 0.543 | 144.9 |
| 5.000 | 0.837 | 151.5 | 1.759 | 44.9 | 0.038 | 9.7 | 0.591 | 141.1 |
| 5.100 | 0.835 | 141.6 | 1.593 | 24.0 | 0.035 | -7.0 | 0.647 | 137.2 |
| 5.200 | 0.821 | 133.5 | 1.435 | 2.2 | 0.028 | -28.5 | 0.707 | 133.7 |
| 5.300 | 0.812 | 127.3 | 1.278 | -20.2 | 0.027 | -42.1 | 0.781 | 129.3 |
| 5.400 | 0.806 | 123.5 | 1.111 | -43.0 | 0.021 | -64.0 | 0.849 | 124.5 |
| 5.500 | 0.828 | 120.1 | 0.969 | -78.2 | 0.018 | -95.8 | 0.864 | 118.9 |
| 6.000 | 0.972 | 98.7 | 0.263 | -166.1 | 0.003 | -13.5 | 1.045 | 82.8 |

NEZ4450-8DD

$V_{DS} = 10\text{ V}$, $I_{DS} = 1\ 600\text{ mA}$, $V_{GS} = -1.809\text{ V}$, $I_G = 0.0\text{ mA}$

| FREQUENCY GHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|--------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.100 | 0.962 | -147.3 | 7.146 | 101.1 | 0.002 | 14.6 | 0.776 | 176.8 |
| 0.200 | 0.977 | -167.8 | 3.743 | 87.9 | 0.004 | 24.1 | 0.802 | 173.6 |
| 0.500 | 0.985 | 169.6 | 1.576 | 63.7 | 0.005 | 25.3 | 0.804 | 162.0 |
| 1.000 | 0.984 | 146.7 | 0.894 | 30.4 | 0.008 | 20.9 | 0.793 | 144.4 |
| 1.500 | 0.978 | 122.9 | 0.715 | -4.6 | 0.011 | 1.7 | 0.771 | 124.1 |
| 2.000 | 0.967 | 100.2 | 0.696 | -40.2 | 0.013 | -25.8 | 0.748 | 102.8 |
| 2.500 | 0.949 | 73.7 | 0.792 | -78.7 | 0.016 | -55.9 | 0.702 | 79.1 |
| 3.000 | 0.935 | 41.3 | 1.062 | -123.3 | 0.018 | -101.6 | 0.642 | 53.7 |
| 3.500 | 0.865 | -2.0 | 1.601 | -178.3 | 0.022 | -161.5 | 0.559 | 22.8 |
| 3.700 | 0.799 | -24.4 | 1.918 | 156.5 | 0.022 | 169.5 | 0.521 | 7.2 |
| 3.800 | 0.761 | -36.6 | 2.116 | 143.0 | 0.025 | 150.0 | 0.505 | -1.5 |
| 3.900 | 0.720 | -50.9 | 2.349 | 128.0 | 0.028 | 133.9 | 0.487 | -12.4 |
| 4.000 | 0.668 | -67.1 | 2.545 | 110.5 | 0.035 | 107.0 | 0.480 | -25.4 |
| 4.100 | 0.633 | -86.2 | 2.824 | 93.5 | 0.045 | 88.4 | 0.474 | -40.1 |
| 4.200 | 0.572 | -109.4 | 3.036 | 75.7 | 0.050 | 51.6 | 0.438 | -56.5 |
| 4.300 | 0.505 | -133.6 | 3.239 | 57.6 | 0.051 | 25.1 | 0.406 | -71.7 |
| 4.400 | 0.454 | -159.8 | 3.462 | 39.2 | 0.051 | 4.9 | 0.389 | -87.5 |
| 4.500 | 0.421 | 171.2 | 3.610 | 19.8 | 0.052 | -14.9 | 0.380 | -104.9 |
| 4.600 | 0.393 | 140.4 | 3.719 | -1.1 | 0.054 | -33.3 | 0.371 | -124.2 |
| 4.700 | 0.381 | 110.2 | 3.731 | -20.8 | 0.056 | -54.6 | 0.365 | -142.9 |
| 4.800 | 0.373 | 80.4 | 3.637 | -40.5 | 0.059 | -73.6 | 0.356 | -162.0 |
| 4.900 | 0.371 | 52.8 | 3.561 | -60.2 | 0.062 | -93.7 | 0.348 | -179.6 |
| 5.000 | 0.374 | 26.4 | 3.438 | -78.2 | 0.063 | -112.0 | 0.337 | 163.3 |
| 5.100 | 0.380 | 1.3 | 3.296 | -96.7 | 0.064 | -130.0 | 0.321 | 146.6 |
| 5.200 | 0.396 | -23.5 | 3.194 | -115.0 | 0.067 | -149.2 | 0.295 | 129.6 |

NEZ5964-8DD

$V_{DS} = 10\text{ V}$, $I_{DS} = 1\ 600\text{ mA}$, $V_{GS} = -1.644\text{ V}$, $I_G = 0.0\text{ mA}$

| FREQUENCY GHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|--------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.100 | 0.952 | -140.0 | 8.776 | 105.5 | 0.005 | 34.1 | 0.799 | 179.0 |
| 0.200 | 0.975 | -163.2 | 4.698 | 90.6 | 0.005 | 10.7 | 0.805 | 175.7 |
| 0.500 | 0.980 | 173.5 | 1.952 | 67.4 | 0.005 | 14.7 | 0.808 | 166.4 |
| 1.000 | 0.985 | 152.3 | 1.045 | 37.5 | 0.006 | 1.7 | 0.813 | 152.5 |
| 1.500 | 0.977 | 131.5 | 0.746 | 7.3 | 0.007 | -4.4 | 0.811 | 138.4 |
| 2.000 | 0.972 | 113.2 | 0.625 | -21.3 | 0.009 | -16.9 | 0.823 | 123.6 |
| 2.500 | 0.962 | 95.1 | 0.580 | -48.9 | 0.010 | -35.9 | 0.821 | 108.2 |
| 3.000 | 0.967 | 74.7 | 0.604 | -78.4 | 0.011 | -60.7 | 0.821 | 91.8 |
| 3.500 | 0.974 | 52.0 | 0.684 | -110.3 | 0.013 | -87.0 | 0.814 | 74.5 |
| 4.000 | 0.944 | 27.4 | 0.838 | -145.8 | 0.017 | -117.8 | 0.799 | 55.8 |
| 4.200 | 0.923 | 17.1 | 0.934 | -160.7 | 0.020 | -152.6 | 0.796 | 47.5 |
| 4.400 | 0.892 | 4.8 | 1.051 | -176.4 | 0.015 | -178.1 | 0.778 | 38.5 |
| 4.600 | 0.853 | -6.4 | 1.230 | 165.2 | 0.015 | 174.1 | 0.796 | 31.4 |
| 4.800 | 0.798 | -20.7 | 1.433 | 146.9 | 0.022 | 160.8 | 0.779 | 21.2 |
| 5.000 | 0.718 | -38.0 | 1.675 | 126.6 | 0.029 | 129.0 | 0.751 | 10.2 |
| 5.200 | 0.623 | -60.7 | 1.996 | 103.8 | 0.036 | 95.2 | 0.705 | -1.8 |
| 5.400 | 0.507 | -92.1 | 2.362 | 79.0 | 0.047 | 62.1 | 0.628 | -17.0 |
| 5.600 | 0.421 | -136.0 | 2.777 | 51.2 | 0.056 | 26.9 | 0.519 | -34.9 |
| 5.800 | 0.414 | 171.2 | 3.134 | 20.6 | 0.070 | -7.9 | 0.367 | -60.0 |
| 6.000 | 0.465 | 124.2 | 3.374 | -11.8 | 0.081 | -43.4 | 0.205 | -97.7 |
| 6.200 | 0.481 | 86.7 | 3.426 | -44.5 | 0.088 | -77.6 | 0.132 | -178.7 |
| 6.400 | 0.421 | 55.6 | 3.344 | -76.4 | 0.092 | -108.7 | 0.228 | 122.6 |
| 6.600 | 0.301 | 27.3 | 3.198 | -107.4 | 0.095 | -138.8 | 0.333 | 95.6 |
| 6.800 | 0.146 | -7.6 | 3.000 | -138.0 | 0.097 | -167.8 | 0.394 | 75.3 |
| 7.000 | 0.083 | -125.5 | 2.888 | -168.8 | 0.100 | 164.6 | 0.412 | 57.6 |

NEZ6472-8DD

V_{DS} = 10 V, I_{DS} = 1 100 mA, V_{GS} = -1.686 V, I_G = 0.0 mA

| FREQUENCY GHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|--------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.100 | 0.971 | -136.9 | 8.298 | 106.7 | 0.004 | -16.4 | 0.801 | 177.0 |
| 0.200 | 0.975 | -161.5 | 4.465 | 92.4 | 0.005 | 18.2 | 0.830 | 175.1 |
| 0.500 | 0.981 | 174.4 | 1.859 | 69.8 | 0.005 | 9.8 | 0.834 | 165.6 |
| 1.000 | 0.985 | 153.4 | 0.991 | 41.4 | 0.007 | 8.5 | 0.835 | 151.2 |
| 1.500 | 0.978 | 133.4 | 0.703 | 13.5 | 0.008 | 0.8 | 0.833 | 136.2 |
| 2.000 | 0.973 | 115.9 | 0.579 | -13.1 | 0.010 | -13.9 | 0.838 | 121.7 |
| 2.500 | 0.962 | 98.3 | 0.520 | -39.2 | 0.011 | -33.9 | 0.833 | 106.5 |
| 3.000 | 0.972 | 79.4 | 0.516 | -66.4 | 0.012 | -50.9 | 0.837 | 90.6 |
| 3.500 | 0.984 | 59.3 | 0.547 | -95.1 | 0.014 | -72.0 | 0.837 | 74.6 |
| 4.000 | 0.973 | 38.6 | 0.615 | -126.0 | 0.019 | -104.8 | 0.828 | 58.0 |
| 4.500 | 0.955 | 16.7 | 0.764 | -160.9 | 0.015 | -144.0 | 0.846 | 39.9 |
| 5.000 | 0.862 | -8.2 | 0.965 | 162.4 | 0.020 | -175.3 | 0.819 | 20.8 |
| 5.500 | 0.720 | -42.1 | 1.344 | 120.6 | 0.030 | 120.1 | 0.754 | -0.4 |
| 5.800 | 0.606 | -72.7 | 1.700 | 90.8 | 0.037 | 80.1 | 0.692 | -17.2 |
| 6.000 | 0.532 | -101.1 | 2.010 | 68.4 | 0.047 | 54.0 | 0.631 | -31.4 |
| 6.200 | 0.477 | -137.8 | 2.353 | 43.6 | 0.057 | 22.0 | 0.540 | -48.7 |
| 6.400 | 0.464 | 177.9 | 2.702 | 15.3 | 0.070 | -10.4 | 0.421 | -71.0 |
| 6.500 | 0.472 | 156.9 | 2.837 | 0.8 | 0.076 | -25.8 | 0.352 | -85.5 |
| 6.600 | 0.486 | 136.3 | 2.988 | -14.6 | 0.082 | -43.1 | 0.287 | -103.1 |
| 6.700 | 0.491 | 118.0 | 3.102 | -29.8 | 0.088 | -58.6 | 0.236 | -125.7 |
| 6.800 | 0.488 | 99.4 | 3.150 | -46.3 | 0.093 | -76.0 | 0.196 | -156.8 |
| 6.900 | 0.475 | 82.3 | 3.213 | -62.6 | 0.100 | -91.9 | 0.195 | 168.9 |
| 7.000 | 0.442 | 67.0 | 3.111 | -78.6 | 0.103 | -108.9 | 0.223 | 139.5 |
| 7.100 | 0.420 | 49.1 | 3.135 | -95.5 | 0.105 | -126.6 | 0.262 | 112.6 |
| 7.200 | 0.364 | 33.2 | 3.012 | -110.8 | 0.104 | -141.4 | 0.280 | 94.7 |
| 7.400 | 0.247 | -5.5 | 2.834 | -141.5 | 0.106 | -171.1 | 0.294 | 70.1 |

NEZ7177-8D/8DD

V_{DS} = 10 V, I_{DS} = 1 600 mA

| FREQUENCY GHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|--------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.100 | 0.965 | -134.9 | 10.517 | 108.5 | 0.004 | 11.1 | 0.802 | 178.3 |
| 0.200 | 0.971 | -160.1 | 5.614 | 94.0 | 0.006 | 18.7 | 0.823 | 176.2 |
| 0.500 | 0.976 | 175.6 | 2.333 | 72.4 | 0.007 | 19.2 | 0.832 | 167.3 |
| 1.000 | 0.978 | 155.2 | 1.222 | 46.4 | 0.009 | 18.7 | 0.833 | 154.9 |
| 1.500 | 0.974 | 136.0 | 0.861 | 20.4 | 0.012 | 12.3 | 0.830 | 141.2 |
| 2.000 | 0.970 | 119.2 | 0.692 | -4.1 | 0.013 | -2.3 | 0.841 | 127.0 |
| 2.500 | 0.958 | 102.0 | 0.604 | -28.3 | 0.017 | -18.9 | 0.843 | 112.5 |
| 3.000 | 0.966 | 83.9 | 0.576 | -52.1 | 0.021 | -30.6 | 0.847 | 98.9 |
| 3.500 | 0.979 | 64.2 | 0.580 | -77.3 | 0.021 | -47.0 | 0.858 | 85.3 |
| 4.000 | 0.949 | 45.6 | 0.590 | -106.7 | 0.025 | -64.9 | 0.872 | 72.6 |
| 4.500 | 0.927 | 24.2 | 0.642 | -133.2 | 0.023 | -82.0 | 0.866 | 57.2 |
| 5.000 | 0.865 | -0.2 | 0.757 | -161.6 | 0.034 | -110.7 | 0.853 | 41.6 |
| 5.500 | 0.781 | -28.9 | 0.955 | 165.9 | 0.040 | -156.0 | 0.848 | 24.6 |
| 6.000 | 0.644 | -65.4 | 1.256 | 127.0 | 0.041 | 147.0 | 0.824 | 5.9 |
| 6.500 | 0.456 | -118.8 | 1.686 | 82.5 | 0.040 | 81.4 | 0.779 | -16.8 |
| 6.700 | 0.382 | -149.5 | 1.883 | 62.4 | 0.043 | 56.0 | 0.747 | -26.7 |
| 6.900 | 0.335 | 171.1 | 2.103 | 40.0 | 0.046 | 32.0 | 0.698 | -38.0 |
| 7.100 | 0.331 | 129.4 | 2.268 | 17.0 | 0.049 | 3.6 | 0.651 | -48.8 |
| 7.300 | 0.370 | 90.1 | 2.368 | -7.1 | 0.052 | -22.0 | 0.586 | -61.5 |
| 7.500 | 0.416 | 55.7 | 2.412 | -31.4 | 0.058 | -46.3 | 0.519 | -75.3 |
| 7.700 | 0.452 | 27.0 | 2.440 | -55.1 | 0.064 | -69.1 | 0.440 | -91.6 |
| 7.900 | 0.470 | 0.1 | 2.408 | -79.4 | 0.072 | -95.9 | 0.355 | -112.1 |
| 8.100 | 0.469 | -25.8 | 2.375 | -103.0 | 0.077 | -120.6 | 0.272 | -138.9 |
| 8.300 | 0.451 | -51.7 | 2.307 | -127.7 | 0.082 | -144.7 | 0.199 | -177.0 |
| 8.500 | 0.431 | -77.8 | 2.140 | -152.2 | 0.084 | -169.9 | 0.170 | 132.2 |
| 8.700 | 0.424 | -103.6 | 2.003 | -174.2 | 0.082 | 170.0 | 0.176 | 86.9 |

NEZ7785-8DD

$V_{DS} = 10 \text{ V}$, $I_{DS} = 1 \text{ 600 mA}$, $V_{GS} = -1.349 \text{ V}$, $I_G = 0.0 \text{ mA}$

| FREQUENCY GHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|--------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 1.000 | 0.965 | -134.9 | 10.517 | 108.5 | 0.004 | 11.1 | 0.802 | 178.3 |
| 2.000 | 0.971 | -160.1 | 5.614 | 94.0 | 0.006 | 18.7 | 0.823 | 176.2 |
| 5.000 | 0.976 | 175.6 | 2.333 | 72.4 | 0.007 | 19.2 | 0.832 | 167.3 |
| 1.000 | 0.978 | 155.2 | 1.222 | 46.4 | 0.009 | 18.7 | 0.833 | 154.9 |
| 1.500 | 0.974 | 136.0 | 0.861 | 20.4 | 0.012 | 12.3 | 0.830 | 141.2 |
| 2.000 | 0.970 | 119.2 | 0.692 | -4.1 | 0.013 | -2.3 | 0.841 | 127.0 |
| 2.500 | 0.958 | 102.0 | 0.604 | -28.3 | 0.017 | -18.9 | 0.843 | 112.5 |
| 3.000 | 0.966 | 83.9 | 0.576 | -52.1 | 0.021 | -30.6 | 0.847 | 98.9 |
| 3.500 | 0.979 | 64.2 | 0.580 | -77.3 | 0.021 | -47.0 | 0.858 | 85.3 |
| 4.000 | 0.949 | 45.6 | 0.590 | -106.7 | 0.025 | -64.9 | 0.872 | 72.6 |
| 4.500 | 0.927 | 24.2 | 0.642 | -133.2 | 0.023 | -82.0 | 0.866 | 57.2 |
| 5.000 | 0.865 | -0.2 | 0.757 | -161.6 | 0.034 | -110.7 | 0.853 | 41.6 |
| 5.500 | 0.781 | -28.9 | 0.955 | 165.9 | 0.040 | -156.0 | 0.848 | 24.6 |
| 6.000 | 0.644 | -65.4 | 1.256 | 127.0 | 0.041 | 147.0 | 0.824 | 5.9 |
| 6.500 | 0.456 | -118.8 | 1.686 | 82.5 | 0.040 | 81.4 | 0.779 | -16.8 |
| 6.700 | 0.382 | -149.5 | 1.883 | 62.4 | 0.043 | 56.0 | 0.747 | -26.7 |
| 6.900 | 0.335 | 171.1 | 2.103 | 40.0 | 0.046 | 32.0 | 0.698 | -38.0 |
| 7.100 | 0.331 | 129.4 | 2.268 | 17.0 | 0.049 | 3.6 | 0.651 | -48.8 |
| 7.300 | 0.370 | 90.1 | 2.368 | -7.1 | 0.052 | -22.0 | 0.586 | -61.5 |
| 7.500 | 0.416 | 55.7 | 2.412 | -31.4 | 0.058 | -46.3 | 0.519 | -75.3 |
| 7.700 | 0.452 | 27.0 | 2.440 | -55.1 | 0.064 | -69.1 | 0.440 | -91.6 |
| 7.900 | 0.470 | 0.1 | 2.408 | -79.4 | 0.072 | -95.9 | 0.355 | -112.1 |
| 8.100 | 0.469 | -25.8 | 2.375 | -103.0 | 0.077 | -120.6 | 0.272 | -138.9 |
| 8.300 | 0.451 | -51.7 | 2.307 | -127.7 | 0.082 | -144.7 | 0.199 | -177.0 |
| 8.500 | 0.431 | -77.8 | 2.140 | -152.2 | 0.084 | -169.9 | 0.170 | 132.2 |
| 8.700 | 0.424 | -103.6 | 2.003 | -174.2 | 0.082 | 170.0 | 0.176 | 86.9 |

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