

TENTATIVE TOSHIBA FIELD EFFECT TRANSISTOR GaAs N-CHANNEL DUAL GATE MES TYPE

3SK320

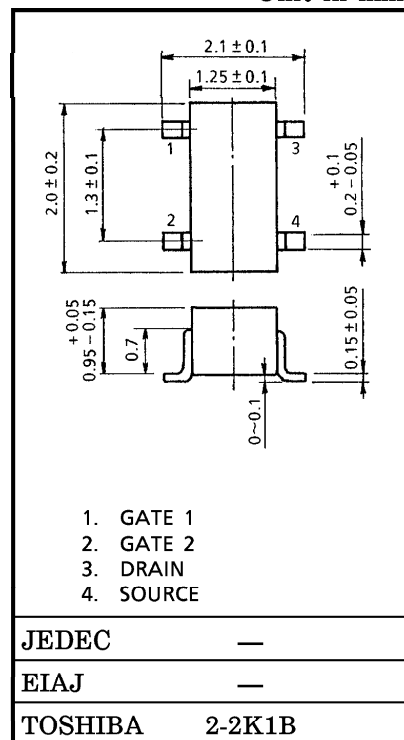
UHF BAND LOW NOISE AMP

UHF BAND MIX

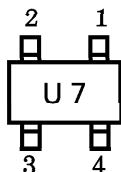
Unit in mm

MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|---------------------------|-------------------|---------|------|
| Gate 1-Drain Voltage | V _{G1DO} | -6 | V |
| Gate 2-Drain Voltage | V _{G2DO} | -6 | V |
| Gate 1-Source Voltage | V _{G1S} | -4 | V |
| Gate 2-Source Voltage | V _{G2S} | -4 | V |
| Gate 1 Current | I _{G1} | 1 | mA |
| Gate 2 Current | I _{G2} | 1 | mA |
| Power Dissipation | P _D | 100 | mW |
| Channel Temperature | T _{ch} | 125 | °C |
| Storage Temperature Range | T _{stg} | -55~125 | °C |



Marking



961001EAC1

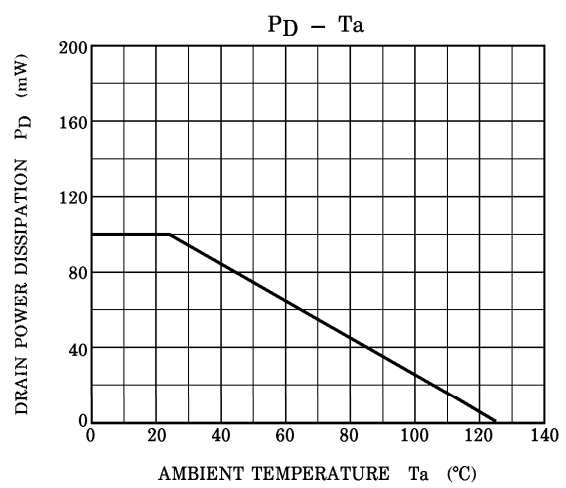
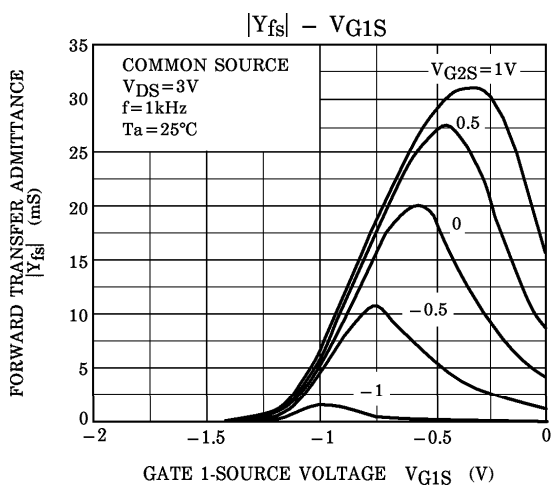
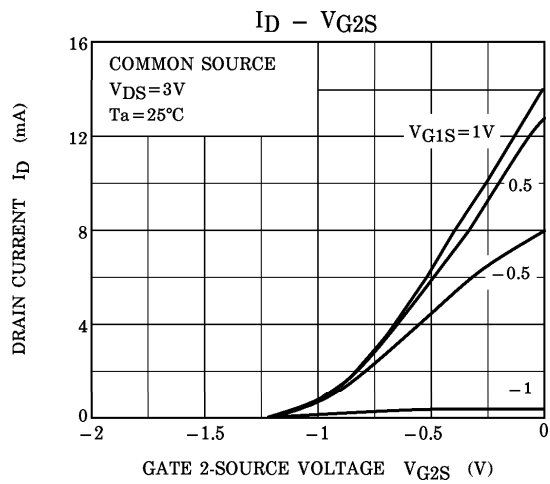
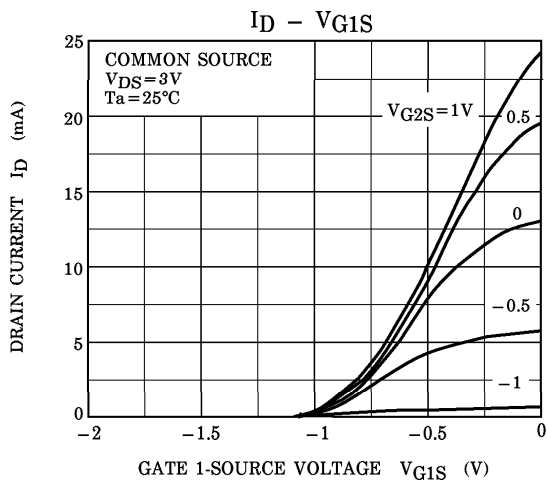
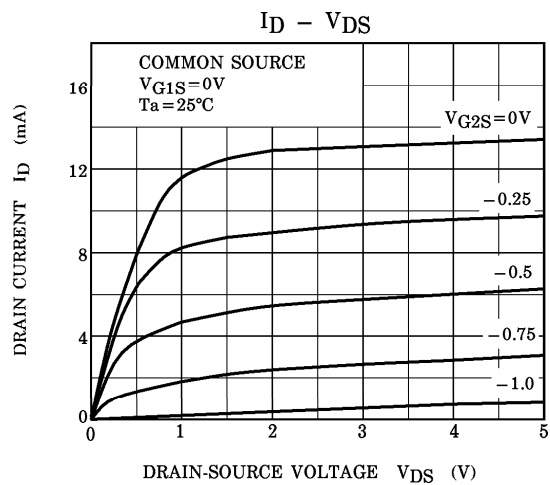
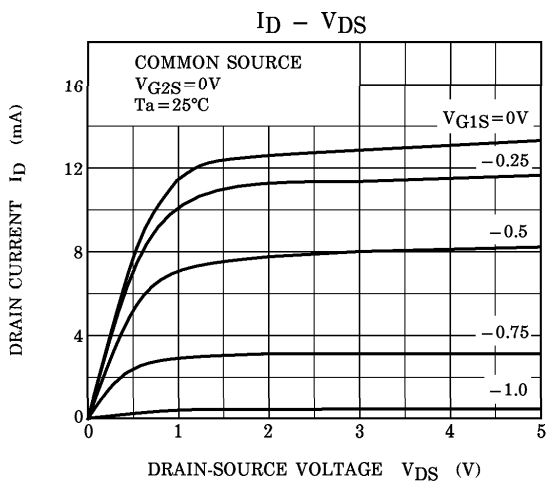
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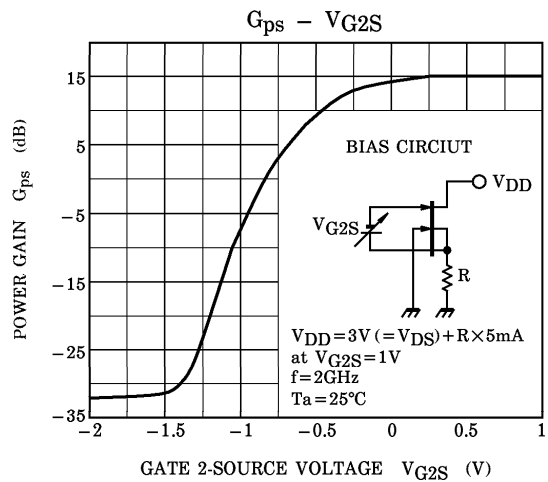
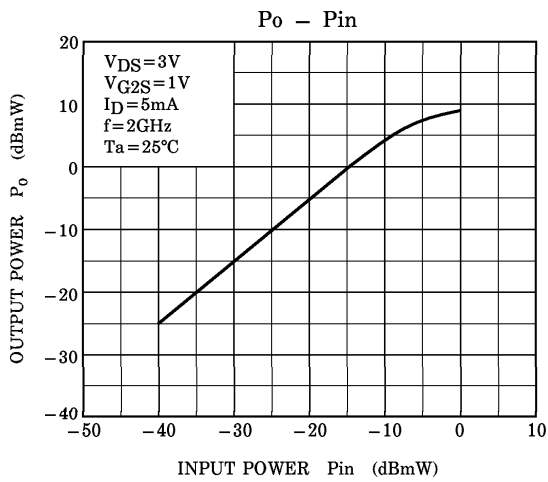
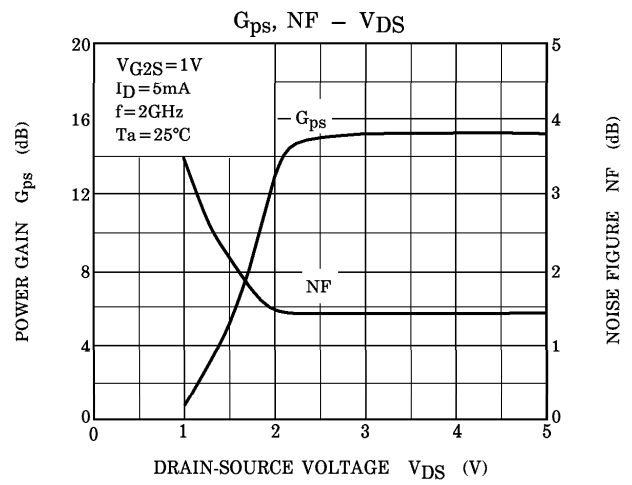
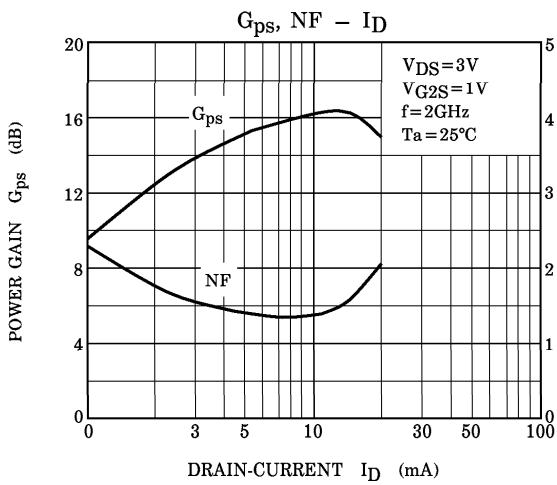
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|-------------------------------|------------------------|--------------------------------------------------------------------------|------|-------|------|------|
| Gate 1 Leakage Current | IG1SS | V _{DS} =0, V _{G1S} =-3V, V _{G2S} =0 | — | — | -4 | μA |
| Gate 2 Leakage Current | IG2SS | V _{DS} =0, V _{G1S} =0, V _{G2S} =-3V | — | — | -4 | μA |
| Drain Current | IDSS | V _{DS} =3V, V _{G1S} =0, V _{G2S} =0 | 9 | — | 18 | mA |
| Gate 1-Source Cut-off Voltage | V _{G1S} (OFF) | V _{DS} =3V, V _{G2S} =0, I _D =100μA | -0.8 | — | -1.4 | V |
| Gate 2-Source Cut-off Voltage | V _{G2S} (OFF) | V _{DS} =3V, V _{G1S} =0, I _D =100μA | -0.8 | — | -1.4 | V |
| Forward Transfer Admittance | Y _{fs} | V _{DS} =3V, V _{G2S} =1V, I _D =5mA, f=1kHz | — | 22 | — | mS |
| Input Capacitance | C _{iss} | V _{DS} =3V, V _{G2S} =1V, I _D =5mA, f=1MHz | — | 0.6 | 1.4 | pF |
| Reverse Transfer Capacitance | C _{rss} | V _{DS} =3V, V _{G2S} =1V, I _D =5mA, f=1MHz | — | 0.012 | 0.03 | pF |
| Power Gain (1) | G _{ps} (1) | V _{DS} =3V, V _{G2S} =1V, I _D =5mA, f=800MHz | — | 20.5 | — | dB |
| Noise Figure (1) | NF (1) | V _{DS} =3V, V _{G2S} =1V, I _D =5mA, f=800MHz | — | 0.9 | — | dB |
| Power Gain (2) | G _{ps} (2) | V _{DS} =3V, V _{G2S} =1V, I _D =5mA, f=2GHz | 12 | 15 | — | dB |
| Noise Figure (2) | NF (2) | V _{DS} =3V, V _{G2S} =1V, I _D =5mA, f=2GHz | — | 1.4 | 2.2 | dB |

CAUTION

This device electrostatic sensitivity. Please handle with caution.





S-PARAMETER

(V_{DS}=2V, I_D=2mA, V_{G2S}=0.5V, T_a=25°C, Z_L=Z_S=50Ω)

| FREQ. (MHz) | S11 | | S21 | | S12 | | S22 | |
|----------------|-------|-------|-------|-------|--------|------|-------|-------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 100 | 0.998 | -3.5 | 1.196 | 174.7 | 0.0019 | 59.4 | 0.968 | -2.1 |
| 200 | 0.996 | -4.9 | 1.195 | 172.8 | 0.0026 | 63.7 | 0.967 | -2.9 |
| 300 | 0.992 | -6.9 | 1.194 | 170.4 | 0.0034 | 66.0 | 0.966 | -3.9 |
| 400 | 0.990 | -9.3 | 1.195 | 167.2 | 0.0044 | 69.9 | 0.964 | -5.2 |
| 500 | 0.984 | -11.6 | 1.193 | 164.1 | 0.0051 | 79.0 | 0.963 | -6.6 |
| 600 | 0.979 | -14.0 | 1.195 | 161.0 | 0.0064 | 79.3 | 0.962 | -7.8 |
| 700 | 0.971 | -16.3 | 1.197 | 158.1 | 0.0070 | 77.2 | 0.960 | -9.2 |
| 800 | 0.963 | -18.6 | 1.202 | 155.0 | 0.0075 | 80.3 | 0.959 | -10.5 |
| 900 | 0.953 | -20.8 | 1.202 | 152.1 | 0.0083 | 79.3 | 0.958 | -11.8 |
| 1000 | 0.945 | -23.1 | 1.209 | 148.9 | 0.0087 | 77.5 | 0.956 | -13.1 |
| 1100 | 0.935 | -25.2 | 1.208 | 145.9 | 0.0087 | 74.9 | 0.954 | -14.5 |
| 1200 | 0.926 | -27.5 | 1.214 | 142.5 | 0.0093 | 78.1 | 0.951 | -15.8 |
| 1300 | 0.918 | -29.7 | 1.217 | 139.4 | 0.0098 | 79.5 | 0.948 | -17.1 |
| 1400 | 0.906 | -32.1 | 1.223 | 136.0 | 0.0102 | 78.9 | 0.946 | -18.4 |
| 1500 | 0.895 | -34.4 | 1.226 | 132.9 | 0.0107 | 75.9 | 0.944 | -19.8 |
| 1600 | 0.882 | -36.7 | 1.231 | 129.5 | 0.0107 | 74.8 | 0.943 | -21.1 |
| 1700 | 0.867 | -39.0 | 1.229 | 126.2 | 0.0106 | 75.7 | 0.941 | -22.4 |
| 1800 | 0.854 | -41.2 | 1.229 | 122.6 | 0.0108 | 71.6 | 0.939 | -23.8 |
| 1900 | 0.839 | -43.4 | 1.229 | 119.5 | 0.0109 | 68.6 | 0.936 | -25.2 |
| 2000 | 0.824 | -45.5 | 1.232 | 115.8 | 0.0106 | 71.8 | 0.933 | -26.5 |
| 2100 | 0.810 | -47.7 | 1.227 | 112.6 | 0.0116 | 70.2 | 0.929 | -27.9 |
| 2200 | 0.796 | -50.0 | 1.227 | 108.8 | 0.0119 | 67.2 | 0.927 | -29.2 |
| 2300 | 0.778 | -52.2 | 1.226 | 105.6 | 0.0116 | 65.5 | 0.924 | -30.6 |
| 2400 | 0.761 | -54.2 | 1.225 | 101.7 | 0.0118 | 66.2 | 0.923 | -31.9 |
| 2500 | 0.746 | -55.9 | 1.221 | 98.6 | 0.0125 | 63.0 | 0.921 | -33.0 |
| 2600 | 0.735 | -57.1 | 1.228 | 96.1 | 0.0123 | 63.5 | 0.921 | -33.8 |

S-PARAMETER

(V_{DS}=2V, I_D=5mA, V_{G2S}=0.5V, T_a=25°C, Z_L=Z_S=50Ω)

| FREQ. (MHz) | S11 | | S21 | | S12 | | S22 | |
|----------------|-------|-------|-------|-------|--------|-------|-------|-------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 100 | 0.997 | -4.3 | 1.913 | 174.3 | 0.0017 | 113.5 | 0.953 | -2.1 |
| 200 | 0.995 | -5.8 | 1.909 | 172.3 | 0.0021 | 103.9 | 0.953 | -2.9 |
| 300 | 0.990 | -7.8 | 1.904 | 169.8 | 0.0029 | 95.8 | 0.952 | -4.0 |
| 400 | 0.984 | -10.4 | 1.900 | 166.4 | 0.0035 | 87.2 | 0.951 | -5.3 |
| 500 | 0.977 | -12.9 | 1.897 | 163.1 | 0.0036 | 82.1 | 0.950 | -6.6 |
| 600 | 0.969 | -15.3 | 1.896 | 159.9 | 0.0045 | 81.8 | 0.948 | -7.9 |
| 700 | 0.959 | -17.8 | 1.894 | 156.6 | 0.0051 | 84.0 | 0.946 | -9.3 |
| 800 | 0.950 | -20.4 | 1.896 | 153.3 | 0.0057 | 81.4 | 0.944 | -10.6 |
| 900 | 0.938 | -22.9 | 1.892 | 150.2 | 0.0069 | 81.1 | 0.941 | -11.9 |
| 1000 | 0.925 | -25.4 | 1.895 | 146.9 | 0.0077 | 83.9 | 0.940 | -13.2 |
| 1100 | 0.912 | -28.0 | 1.892 | 143.8 | 0.0088 | 84.4 | 0.938 | -14.5 |
| 1200 | 0.899 | -30.6 | 1.897 | 140.3 | 0.0093 | 81.3 | 0.936 | -15.8 |
| 1300 | 0.884 | -32.9 | 1.893 | 137.0 | 0.0092 | 82.1 | 0.935 | -17.1 |
| 1400 | 0.870 | -35.3 | 1.896 | 133.5 | 0.0090 | 84.4 | 0.933 | -18.4 |
| 1500 | 0.855 | -37.7 | 1.893 | 130.1 | 0.0099 | 79.8 | 0.931 | -19.8 |
| 1600 | 0.837 | -39.9 | 1.892 | 126.6 | 0.0097 | 79.2 | 0.929 | -21.2 |
| 1700 | 0.818 | -42.1 | 1.881 | 123.1 | 0.0100 | 76.7 | 0.925 | -22.6 |
| 1800 | 0.799 | -44.2 | 1.874 | 119.4 | 0.0108 | 75.4 | 0.923 | -24.0 |
| 1900 | 0.780 | -46.4 | 1.865 | 116.1 | 0.0115 | 73.4 | 0.919 | -25.4 |
| 2000 | 0.761 | -48.5 | 1.857 | 112.4 | 0.0115 | 72.8 | 0.916 | -26.8 |
| 2100 | 0.744 | -50.7 | 1.843 | 109.0 | 0.0120 | 69.6 | 0.915 | -28.1 |
| 2200 | 0.725 | -52.6 | 1.831 | 105.3 | 0.0120 | 73.8 | 0.913 | -29.6 |
| 2300 | 0.708 | -54.5 | 1.820 | 102.0 | 0.0113 | 71.6 | 0.913 | -30.9 |
| 2400 | 0.688 | -56.3 | 1.810 | 98.1 | 0.0119 | 72.2 | 0.913 | -32.2 |
| 2500 | 0.672 | -57.8 | 1.801 | 95.1 | 0.0127 | 75.0 | 0.913 | -33.4 |
| 2600 | 0.659 | -58.8 | 1.805 | 92.5 | 0.0136 | 77.8 | 0.913 | -34.2 |

S-PARAMETER

(V_{DS}=2V, I_D=10mA, V_{G2S}=0.5V, T_a=25°C, Z_L=Z_S=50Ω)

| FREQ. (MHz) | S11 | | S21 | | S12 | | S22 | |
|----------------|-------|-------|-------|-------|--------|------|-------|-------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 100 | 0.993 | -4.6 | 2.468 | 173.8 | 0.0006 | 61.7 | 0.936 | -2.1 |
| 200 | 0.991 | -6.2 | 2.464 | 171.6 | 0.0018 | 81.6 | 0.936 | -2.9 |
| 300 | 0.987 | -8.5 | 2.455 | 168.7 | 0.0028 | 91.9 | 0.935 | -3.9 |
| 400 | 0.981 | -11.4 | 2.450 | 165.0 | 0.0044 | 91.0 | 0.934 | -5.3 |
| 500 | 0.973 | -14.1 | 2.443 | 161.4 | 0.0050 | 88.7 | 0.933 | -6.6 |
| 600 | 0.962 | -16.9 | 2.436 | 157.8 | 0.0058 | 89.1 | 0.932 | -7.9 |
| 700 | 0.951 | -19.7 | 2.425 | 154.3 | 0.0063 | 86.0 | 0.930 | -9.2 |
| 800 | 0.937 | -22.4 | 2.424 | 150.6 | 0.0072 | 79.9 | 0.928 | -10.5 |
| 900 | 0.921 | -25.0 | 2.411 | 147.2 | 0.0079 | 75.4 | 0.927 | -11.8 |
| 1000 | 0.905 | -27.7 | 2.406 | 143.7 | 0.0084 | 73.9 | 0.925 | -13.1 |
| 1100 | 0.887 | -30.3 | 2.393 | 140.2 | 0.0087 | 77.3 | 0.922 | -14.4 |
| 1200 | 0.869 | -32.8 | 2.393 | 136.5 | 0.0092 | 80.0 | 0.920 | -15.7 |
| 1300 | 0.853 | -35.3 | 2.380 | 133.0 | 0.0095 | 79.5 | 0.919 | -17.0 |
| 1400 | 0.835 | -37.7 | 2.378 | 129.3 | 0.0091 | 80.8 | 0.917 | -18.4 |
| 1500 | 0.818 | -40.0 | 2.366 | 125.8 | 0.0095 | 79.8 | 0.915 | -19.7 |
| 1600 | 0.799 | -42.3 | 2.359 | 122.1 | 0.0101 | 78.2 | 0.914 | -21.1 |
| 1700 | 0.778 | -44.5 | 2.339 | 118.5 | 0.0105 | 78.1 | 0.912 | -22.6 |
| 1800 | 0.757 | -46.7 | 2.319 | 114.6 | 0.0105 | 78.1 | 0.910 | -23.9 |
| 1900 | 0.735 | -48.8 | 2.299 | 111.1 | 0.0114 | 78.4 | 0.908 | -25.3 |
| 2000 | 0.712 | -51.0 | 2.281 | 107.1 | 0.0119 | 79.5 | 0.907 | -26.8 |
| 2100 | 0.692 | -53.1 | 2.256 | 103.5 | 0.0122 | 78.9 | 0.904 | -28.2 |
| 2200 | 0.672 | -55.1 | 2.230 | 99.5 | 0.0124 | 77.5 | 0.904 | -29.6 |
| 2300 | 0.652 | -56.9 | 2.212 | 96.2 | 0.0126 | 74.9 | 0.904 | -31.0 |
| 2400 | 0.633 | -58.5 | 2.191 | 92.1 | 0.0122 | 72.9 | 0.904 | -32.4 |
| 2500 | 0.617 | -59.6 | 2.171 | 89.0 | 0.0119 | 71.5 | 0.904 | -33.6 |
| 2600 | 0.603 | -60.4 | 2.171 | 86.3 | 0.0114 | 68.9 | 0.905 | -34.5 |

(V_{DS}=3V, I_D=2mA, V_{G2S}=1V, T_a=25°C, Z_L=Z_S=50Ω)

| FREQ. (MHz) | S11 | | S21 | | S12 | | S22 | |
|----------------|-------|-------|-------|-------|--------|------|-------|-------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 100 | 0.997 | -3.7 | 1.220 | 175.0 | 0.0027 | 58.3 | 0.973 | -2.0 |
| 200 | 0.996 | -5.0 | 1.218 | 173.1 | 0.0031 | 68.8 | 0.973 | -2.7 |
| 300 | 0.994 | -6.8 | 1.218 | 170.7 | 0.0034 | 76.3 | 0.972 | -3.7 |
| 400 | 0.990 | -9.1 | 1.217 | 167.6 | 0.0040 | 81.2 | 0.970 | -4.9 |
| 500 | 0.985 | -11.4 | 1.216 | 164.6 | 0.0043 | 83.2 | 0.970 | -6.1 |
| 600 | 0.980 | -13.7 | 1.217 | 161.6 | 0.0048 | 87.8 | 0.968 | -7.3 |
| 700 | 0.973 | -16.0 | 1.217 | 158.8 | 0.0050 | 83.1 | 0.966 | -8.6 |
| 800 | 0.963 | -18.2 | 1.219 | 155.7 | 0.0054 | 76.7 | 0.964 | -9.9 |
| 900 | 0.956 | -20.4 | 1.219 | 152.9 | 0.0063 | 75.7 | 0.961 | -11.1 |
| 1000 | 0.947 | -22.6 | 1.225 | 149.9 | 0.0074 | 75.1 | 0.958 | -12.3 |
| 1100 | 0.937 | -24.9 | 1.227 | 146.9 | 0.0077 | 75.6 | 0.956 | -13.6 |
| 1200 | 0.926 | -27.2 | 1.237 | 143.6 | 0.0086 | 75.9 | 0.955 | -14.8 |
| 1300 | 0.917 | -29.3 | 1.240 | 140.6 | 0.0093 | 78.2 | 0.953 | -16.0 |
| 1400 | 0.905 | -31.6 | 1.246 | 137.3 | 0.0093 | 76.0 | 0.951 | -17.3 |
| 1500 | 0.893 | -33.8 | 1.249 | 134.2 | 0.0095 | 71.5 | 0.950 | -18.5 |
| 1600 | 0.883 | -36.1 | 1.253 | 131.0 | 0.0099 | 68.8 | 0.948 | -19.8 |
| 1700 | 0.870 | -38.3 | 1.252 | 127.7 | 0.0101 | 71.0 | 0.945 | -21.1 |
| 1800 | 0.856 | -40.5 | 1.251 | 124.1 | 0.0097 | 70.5 | 0.942 | -22.4 |
| 1900 | 0.842 | -42.6 | 1.252 | 121.0 | 0.0095 | 72.2 | 0.940 | -23.6 |
| 2000 | 0.828 | -44.8 | 1.254 | 117.5 | 0.0096 | 75.1 | 0.939 | -24.9 |
| 2100 | 0.811 | -47.1 | 1.252 | 114.3 | 0.0100 | 73.8 | 0.936 | -26.1 |
| 2200 | 0.795 | -49.1 | 1.249 | 110.6 | 0.0091 | 70.5 | 0.935 | -27.4 |
| 2300 | 0.781 | -51.2 | 1.248 | 107.8 | 0.0095 | 68.1 | 0.934 | -28.6 |
| 2400 | 0.765 | -53.4 | 1.247 | 104.0 | 0.0092 | 69.3 | 0.933 | -29.9 |
| 2500 | 0.753 | -54.9 | 1.243 | 101.1 | 0.0084 | 71.2 | 0.932 | -30.9 |
| 2600 | 0.744 | -56.0 | 1.248 | 98.5 | 0.0077 | 77.0 | 0.933 | -31.7 |

S-PARAMETER

(V_{DS}=3V, I_D=5mA, V_{G2S}=1V, T_a=25°C, Z_L=Z_S=50Ω)

| FREQ. (MHz) | S11 | | S21 | | S12 | | S22 | |
|----------------|-------|-------|-------|-------|--------|-------|-------|-------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 100 | 0.995 | -4.2 | 1.923 | 174.6 | 0.0012 | 133.1 | 0.963 | -2.0 |
| 200 | 0.992 | -5.6 | 1.919 | 172.6 | 0.0020 | 112.8 | 0.963 | -2.7 |
| 300 | 0.989 | -7.6 | 1.914 | 170.0 | 0.0027 | 104.4 | 0.961 | -3.7 |
| 400 | 0.984 | -10.1 | 1.912 | 166.7 | 0.0035 | 93.7 | 0.959 | -4.9 |
| 500 | 0.978 | -12.5 | 1.910 | 163.5 | 0.0039 | 90.3 | 0.958 | -6.2 |
| 600 | 0.971 | -15.0 | 1.909 | 160.3 | 0.0050 | 81.0 | 0.956 | -7.4 |
| 700 | 0.964 | -17.5 | 1.907 | 157.3 | 0.0054 | 78.4 | 0.954 | -8.6 |
| 800 | 0.952 | -20.0 | 1.909 | 154.0 | 0.0065 | 74.9 | 0.952 | -9.8 |
| 900 | 0.941 | -22.4 | 1.903 | 150.9 | 0.0075 | 76.3 | 0.950 | -11.1 |
| 1000 | 0.927 | -25.0 | 1.906 | 147.6 | 0.0078 | 78.6 | 0.949 | -12.3 |
| 1100 | 0.913 | -27.5 | 1.901 | 144.5 | 0.0084 | 80.3 | 0.947 | -13.5 |
| 1200 | 0.897 | -29.9 | 1.905 | 141.1 | 0.0088 | 77.5 | 0.945 | -14.7 |
| 1300 | 0.884 | -32.3 | 1.901 | 138.0 | 0.0082 | 77.8 | 0.944 | -16.0 |
| 1400 | 0.870 | -34.7 | 1.902 | 134.5 | 0.0082 | 70.5 | 0.942 | -17.2 |
| 1500 | 0.854 | -36.8 | 1.899 | 131.4 | 0.0092 | 68.5 | 0.940 | -18.3 |
| 1600 | 0.837 | -39.0 | 1.901 | 128.0 | 0.0096 | 71.0 | 0.939 | -19.6 |
| 1700 | 0.820 | -41.3 | 1.891 | 124.7 | 0.0101 | 72.4 | 0.936 | -20.8 |
| 1800 | 0.803 | -43.5 | 1.882 | 121.0 | 0.0102 | 72.3 | 0.933 | -22.0 |
| 1900 | 0.784 | -45.5 | 1.873 | 117.8 | 0.0107 | 79.0 | 0.930 | -23.3 |
| 2000 | 0.765 | -47.5 | 1.864 | 114.0 | 0.0104 | 79.9 | 0.928 | -24.5 |
| 2100 | 0.747 | -49.5 | 1.849 | 110.8 | 0.0099 | 76.7 | 0.925 | -25.8 |
| 2200 | 0.726 | -51.5 | 1.833 | 107.0 | 0.0090 | 75.2 | 0.923 | -27.1 |
| 2300 | 0.705 | -53.4 | 1.824 | 104.0 | 0.0094 | 76.1 | 0.923 | -28.3 |
| 2400 | 0.686 | -55.5 | 1.812 | 100.2 | 0.0087 | 73.4 | 0.922 | -29.5 |
| 2500 | 0.672 | -57.1 | 1.801 | 97.4 | 0.0087 | 75.1 | 0.921 | -30.5 |
| 2600 | 0.660 | -58.3 | 1.807 | 94.8 | 0.0086 | 77.6 | 0.921 | -31.2 |

(V_{DS}=3V, I_D=10mA, V_{G2S}=1V, T_a=25°C, Z_L=Z_S=50Ω)

| FREQ. (MHz) | S11 | | S21 | | S12 | | S22 | |
|----------------|-------|-------|-------|-------|--------|------|-------|-------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 100 | 0.989 | -4.4 | 2.577 | 174.0 | 0.0019 | 85.2 | 0.954 | -1.9 |
| 200 | 0.987 | -6.1 | 2.569 | 171.8 | 0.0023 | 80.5 | 0.953 | -2.6 |
| 300 | 0.984 | -8.4 | 2.559 | 169.0 | 0.0026 | 89.3 | 0.952 | -3.6 |
| 400 | 0.980 | -11.2 | 2.550 | 165.3 | 0.0033 | 78.1 | 0.951 | -4.8 |
| 500 | 0.972 | -13.9 | 2.543 | 161.8 | 0.0037 | 76.2 | 0.949 | -6.1 |
| 600 | 0.964 | -16.6 | 2.534 | 158.2 | 0.0042 | 74.8 | 0.948 | -7.2 |
| 700 | 0.954 | -19.1 | 2.524 | 154.8 | 0.0049 | 75.7 | 0.946 | -8.5 |
| 800 | 0.939 | -21.7 | 2.520 | 151.3 | 0.0057 | 75.3 | 0.944 | -9.7 |
| 900 | 0.924 | -24.3 | 2.505 | 148.0 | 0.0062 | 76.7 | 0.942 | -10.9 |
| 1000 | 0.906 | -26.8 | 2.501 | 144.5 | 0.0068 | 79.4 | 0.939 | -12.1 |
| 1100 | 0.888 | -29.3 | 2.484 | 141.2 | 0.0077 | 84.4 | 0.938 | -13.3 |
| 1200 | 0.870 | -31.8 | 2.479 | 137.6 | 0.0079 | 84.6 | 0.935 | -14.5 |
| 1300 | 0.853 | -34.2 | 2.462 | 134.2 | 0.0086 | 83.4 | 0.933 | -15.6 |
| 1400 | 0.834 | -36.7 | 2.457 | 130.5 | 0.0089 | 84.4 | 0.932 | -16.9 |
| 1500 | 0.818 | -39.0 | 2.439 | 127.1 | 0.0092 | 78.2 | 0.930 | -18.1 |
| 1600 | 0.799 | -41.3 | 2.427 | 123.5 | 0.0090 | 72.0 | 0.928 | -19.3 |
| 1700 | 0.780 | -43.4 | 2.404 | 120.0 | 0.0090 | 74.7 | 0.926 | -20.6 |
| 1800 | 0.757 | -45.4 | 2.381 | 116.1 | 0.0089 | 69.7 | 0.925 | -21.8 |
| 1900 | 0.735 | -47.3 | 2.354 | 112.9 | 0.0089 | 69.8 | 0.922 | -23.0 |
| 2000 | 0.713 | -49.5 | 2.334 | 109.1 | 0.0086 | 75.4 | 0.919 | -24.2 |
| 2100 | 0.692 | -51.3 | 2.304 | 105.7 | 0.0091 | 78.6 | 0.917 | -25.5 |
| 2200 | 0.668 | -53.0 | 2.275 | 101.9 | 0.0088 | 81.3 | 0.915 | -26.7 |
| 2300 | 0.650 | -54.8 | 2.251 | 98.8 | 0.0087 | 85.5 | 0.915 | -27.9 |
| 2400 | 0.627 | -56.3 | 2.227 | 95.0 | 0.0087 | 91.2 | 0.915 | -29.1 |
| 2500 | 0.609 | -57.2 | 2.204 | 92.1 | 0.0092 | 94.2 | 0.916 | -30.0 |
| 2600 | 0.593 | -58.1 | 2.200 | 89.7 | 0.0091 | 99.3 | 0.917 | -30.7 |

S-PARAMETER

($V_{DS}=5V$, $I_D=2mA$, $V_{G2S}=1.5V$, $T_a=25^{\circ}C$, $Z_L=Z_S=50\Omega$)

| FREQ. (MHz) | S11 | | S21 | | S12 | | S22 | |
|----------------|-------|-------|-------|-------|--------|-------|-------|-------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 100 | 0.993 | -3.7 | 1.184 | 174.9 | 0.0009 | 116.0 | 0.977 | -1.7 |
| 200 | 0.992 | -5.0 | 1.182 | 173.0 | 0.0015 | 106.6 | 0.977 | -2.4 |
| 300 | 0.991 | -6.8 | 1.179 | 170.6 | 0.0020 | 92.3 | 0.975 | -3.4 |
| 400 | 0.987 | -8.9 | 1.178 | 167.5 | 0.0025 | 88.4 | 0.975 | -4.6 |
| 500 | 0.983 | -11.2 | 1.180 | 164.5 | 0.0033 | 83.3 | 0.973 | -5.7 |
| 600 | 0.979 | -13.4 | 1.181 | 161.5 | 0.0043 | 78.3 | 0.972 | -6.9 |
| 700 | 0.974 | -15.6 | 1.181 | 158.6 | 0.0048 | 74.1 | 0.970 | -8.1 |
| 800 | 0.966 | -17.8 | 1.188 | 155.6 | 0.0055 | 78.5 | 0.969 | -9.2 |
| 900 | 0.962 | -20.1 | 1.189 | 152.8 | 0.0068 | 72.9 | 0.967 | -10.3 |
| 1000 | 0.954 | -22.3 | 1.195 | 149.9 | 0.0071 | 77.0 | 0.965 | -11.4 |
| 1100 | 0.942 | -24.5 | 1.194 | 147.1 | 0.0074 | 79.2 | 0.963 | -12.5 |
| 1200 | 0.931 | -26.8 | 1.202 | 144.0 | 0.0085 | 78.1 | 0.961 | -13.6 |
| 1300 | 0.923 | -28.9 | 1.202 | 140.9 | 0.0090 | 73.5 | 0.960 | -14.7 |
| 1400 | 0.911 | -31.1 | 1.208 | 137.7 | 0.0093 | 75.9 | 0.958 | -15.8 |
| 1500 | 0.899 | -33.3 | 1.210 | 134.7 | 0.0098 | 71.6 | 0.956 | -17.0 |
| 1600 | 0.889 | -35.6 | 1.217 | 131.4 | 0.0094 | 69.5 | 0.954 | -18.2 |
| 1700 | 0.876 | -37.7 | 1.218 | 128.2 | 0.0087 | 68.8 | 0.952 | -19.3 |
| 1800 | 0.862 | -39.9 | 1.218 | 124.8 | 0.0083 | 73.6 | 0.950 | -20.5 |
| 1900 | 0.848 | -42.1 | 1.217 | 121.9 | 0.0084 | 77.1 | 0.947 | -21.7 |
| 2000 | 0.833 | -44.3 | 1.220 | 118.2 | 0.0084 | 75.2 | 0.945 | -22.8 |
| 2100 | 0.818 | -46.5 | 1.218 | 115.1 | 0.0098 | 73.1 | 0.943 | -23.9 |
| 2200 | 0.803 | -48.7 | 1.216 | 111.4 | 0.0096 | 69.2 | 0.941 | -25.0 |
| 2300 | 0.786 | -50.9 | 1.219 | 108.4 | 0.0096 | 66.4 | 0.940 | -26.2 |
| 2400 | 0.769 | -52.9 | 1.218 | 104.5 | 0.0089 | 63.0 | 0.940 | -27.2 |
| 2500 | 0.754 | -54.4 | 1.214 | 101.6 | 0.0085 | 65.7 | 0.940 | -28.1 |
| 2600 | 0.742 | -55.6 | 1.220 | 99.0 | 0.0075 | 69.7 | 0.940 | -28.8 |

($V_{DS}=5V$, $I_D=5mA$, $V_{G2S}=1.5V$, $T_a=25^{\circ}C$, $Z_L=Z_S=50\Omega$)

| FREQ. (MHz) | S11 | | S21 | | S12 | | S22 | |
|----------------|-------|-------|-------|-------|--------|------|-------|-------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 100 | 0.994 | -4.1 | 1.887 | 174.4 | 0.0014 | 89.2 | 0.968 | -1.9 |
| 200 | 0.992 | -5.6 | 1.887 | 172.4 | 0.0019 | 74.4 | 0.967 | -2.5 |
| 300 | 0.989 | -7.5 | 1.883 | 169.9 | 0.0026 | 74.8 | 0.966 | -3.4 |
| 400 | 0.985 | -10.0 | 1.881 | 166.6 | 0.0029 | 74.8 | 0.965 | -4.5 |
| 500 | 0.980 | -12.4 | 1.879 | 163.3 | 0.0034 | 79.7 | 0.964 | -5.7 |
| 600 | 0.972 | -14.9 | 1.880 | 160.1 | 0.0043 | 85.2 | 0.963 | -6.8 |
| 700 | 0.965 | -17.3 | 1.873 | 157.0 | 0.0049 | 94.7 | 0.961 | -7.9 |
| 800 | 0.955 | -19.8 | 1.877 | 153.8 | 0.0055 | 92.0 | 0.959 | -9.0 |
| 900 | 0.944 | -22.2 | 1.871 | 150.7 | 0.0067 | 89.0 | 0.958 | -10.2 |
| 1000 | 0.931 | -24.5 | 1.874 | 147.5 | 0.0069 | 83.6 | 0.956 | -11.3 |
| 1100 | 0.919 | -27.0 | 1.867 | 144.4 | 0.0070 | 83.8 | 0.954 | -12.4 |
| 1200 | 0.903 | -29.4 | 1.872 | 141.0 | 0.0077 | 77.5 | 0.951 | -13.5 |
| 1300 | 0.888 | -31.7 | 1.867 | 137.8 | 0.0076 | 77.0 | 0.950 | -14.6 |
| 1400 | 0.872 | -34.1 | 1.869 | 134.4 | 0.0076 | 77.9 | 0.948 | -15.7 |
| 1500 | 0.856 | -36.4 | 1.865 | 131.2 | 0.0081 | 77.6 | 0.946 | -16.8 |
| 1600 | 0.837 | -38.6 | 1.863 | 127.7 | 0.0085 | 74.5 | 0.944 | -18.0 |
| 1700 | 0.820 | -40.9 | 1.854 | 124.3 | 0.0083 | 77.3 | 0.942 | -19.1 |
| 1800 | 0.802 | -43.3 | 1.846 | 120.6 | 0.0093 | 76.3 | 0.941 | -20.2 |
| 1900 | 0.784 | -45.5 | 1.837 | 117.4 | 0.0095 | 75.0 | 0.938 | -21.3 |
| 2000 | 0.766 | -47.6 | 1.830 | 113.6 | 0.0100 | 77.4 | 0.936 | -22.4 |
| 2100 | 0.748 | -49.7 | 1.818 | 110.6 | 0.0104 | 80.9 | 0.934 | -23.5 |
| 2200 | 0.728 | -51.8 | 1.808 | 106.9 | 0.0103 | 80.8 | 0.933 | -24.6 |
| 2300 | 0.708 | -53.5 | 1.793 | 104.0 | 0.0095 | 84.6 | 0.931 | -25.6 |
| 2400 | 0.686 | -55.4 | 1.783 | 100.3 | 0.0090 | 89.5 | 0.931 | -26.6 |
| 2500 | 0.668 | -57.1 | 1.771 | 97.5 | 0.0082 | 94.5 | 0.931 | -27.5 |
| 2600 | 0.655 | -58.4 | 1.776 | 95.0 | 0.0076 | 98.5 | 0.931 | -28.1 |

S-PARAMETER

(V_{DS}=5V, I_D=10mA, V_{G2S}=1.5V, T_a=25°C, Z_L=Z_S=50Ω)

| FREQ. (MHz) | S11 | | S21 | | S12 | | S22 | |
|----------------|-------|-------|-------|-------|--------|------|-------|-------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 100 | 0.994 | -4.1 | 2.507 | 173.8 | 0.0007 | 63.5 | 0.963 | -1.7 |
| 200 | 0.990 | -5.8 | 2.502 | 171.6 | 0.0011 | 70.8 | 0.963 | -2.4 |
| 300 | 0.986 | -8.1 | 2.495 | 168.8 | 0.0016 | 79.4 | 0.962 | -3.3 |
| 400 | 0.980 | -10.9 | 2.493 | 165.2 | 0.0024 | 84.0 | 0.960 | -4.4 |
| 500 | 0.972 | -13.8 | 2.483 | 161.6 | 0.0029 | 81.4 | 0.960 | -5.6 |
| 600 | 0.964 | -16.5 | 2.476 | 158.0 | 0.0038 | 88.5 | 0.958 | -6.7 |
| 700 | 0.954 | -19.1 | 2.463 | 154.6 | 0.0044 | 88.4 | 0.956 | -7.9 |
| 800 | 0.939 | -21.8 | 2.461 | 151.1 | 0.0048 | 79.9 | 0.954 | -8.9 |
| 900 | 0.925 | -24.3 | 2.445 | 147.7 | 0.0059 | 79.7 | 0.952 | -10.0 |
| 1000 | 0.908 | -26.8 | 2.437 | 144.2 | 0.0059 | 77.8 | 0.949 | -11.1 |
| 1100 | 0.889 | -29.4 | 2.420 | 140.8 | 0.0061 | 78.9 | 0.947 | -12.2 |
| 1200 | 0.869 | -31.9 | 2.421 | 137.2 | 0.0063 | 78.9 | 0.944 | -13.2 |
| 1300 | 0.851 | -34.3 | 2.404 | 133.7 | 0.0070 | 85.4 | 0.942 | -14.3 |
| 1400 | 0.833 | -36.8 | 2.395 | 130.1 | 0.0072 | 87.7 | 0.941 | -15.4 |
| 1500 | 0.814 | -39.3 | 2.383 | 126.7 | 0.0075 | 86.6 | 0.939 | -16.5 |
| 1600 | 0.795 | -41.5 | 2.368 | 123.1 | 0.0077 | 85.2 | 0.937 | -17.6 |
| 1700 | 0.775 | -43.7 | 2.342 | 119.6 | 0.0083 | 89.1 | 0.935 | -18.7 |
| 1800 | 0.754 | -45.8 | 2.317 | 115.8 | 0.0077 | 88.7 | 0.933 | -19.8 |
| 1900 | 0.730 | -47.8 | 2.292 | 112.5 | 0.0070 | 91.7 | 0.931 | -20.9 |
| 2000 | 0.706 | -49.7 | 2.271 | 108.6 | 0.0084 | 98.5 | 0.928 | -21.9 |
| 2100 | 0.684 | -51.6 | 2.243 | 105.3 | 0.0089 | 95.4 | 0.928 | -22.9 |
| 2200 | 0.662 | -53.3 | 2.215 | 101.5 | 0.0084 | 93.7 | 0.927 | -24.0 |
| 2300 | 0.641 | -55.0 | 2.191 | 98.4 | 0.0085 | 94.6 | 0.927 | -25.0 |
| 2400 | 0.619 | -56.5 | 2.168 | 94.5 | 0.0088 | 91.9 | 0.927 | -26.1 |
| 2500 | 0.601 | -57.5 | 2.144 | 91.5 | 0.0084 | 89.0 | 0.928 | -27.0 |
| 2600 | 0.586 | -58.4 | 2.144 | 88.9 | 0.0080 | 92.0 | 0.928 | -27.7 |