

# RQA0004LXAQS

## Silicon N-Channel MOS FET

REJ03G1567-0100

Rev.1.00

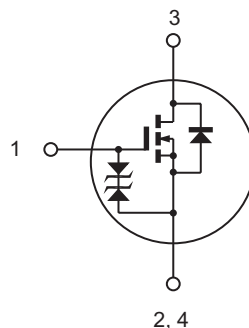
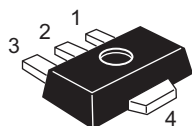
Jul 04, 2007

### Features

- High Output Power, High Gain, High Efficiency  
Pout = +29 dBm, Linear Gain = 21 dB, PAE = 68% (f = 520 MHz)
- Compact package capable of surface mounting

### Outline

RENESAS Package code: PLZZ0004CA-A  
(Package Name : UPAK<sup>®</sup>)



1. Gate
2. Source
3. Drain
4. Source

Note: Marking is "LX".

\*UPAK is a trademark of Renesas Technology Corp.

### Absolute Maximum Ratings

(Ta = 25°C)

| Item                    | Symbol                          | Ratings     | Unit |
|-------------------------|---------------------------------|-------------|------|
| Drain to source voltage | V <sub>DSS</sub>                | 16          | V    |
| Gate to source voltage  | V <sub>GSS</sub>                | ±5          | V    |
| Drain current           | I <sub>D</sub>                  | 0.3         | A    |
| Channel dissipation     | P <sub>ch</sub> <sup>note</sup> | 3           | W    |
| Channel temperature     | T <sub>ch</sub>                 | 150         | °C   |
| Storage temperature     | T <sub>stg</sub>                | -50 to +150 | °C   |

Note: Value at Tc = 25°C

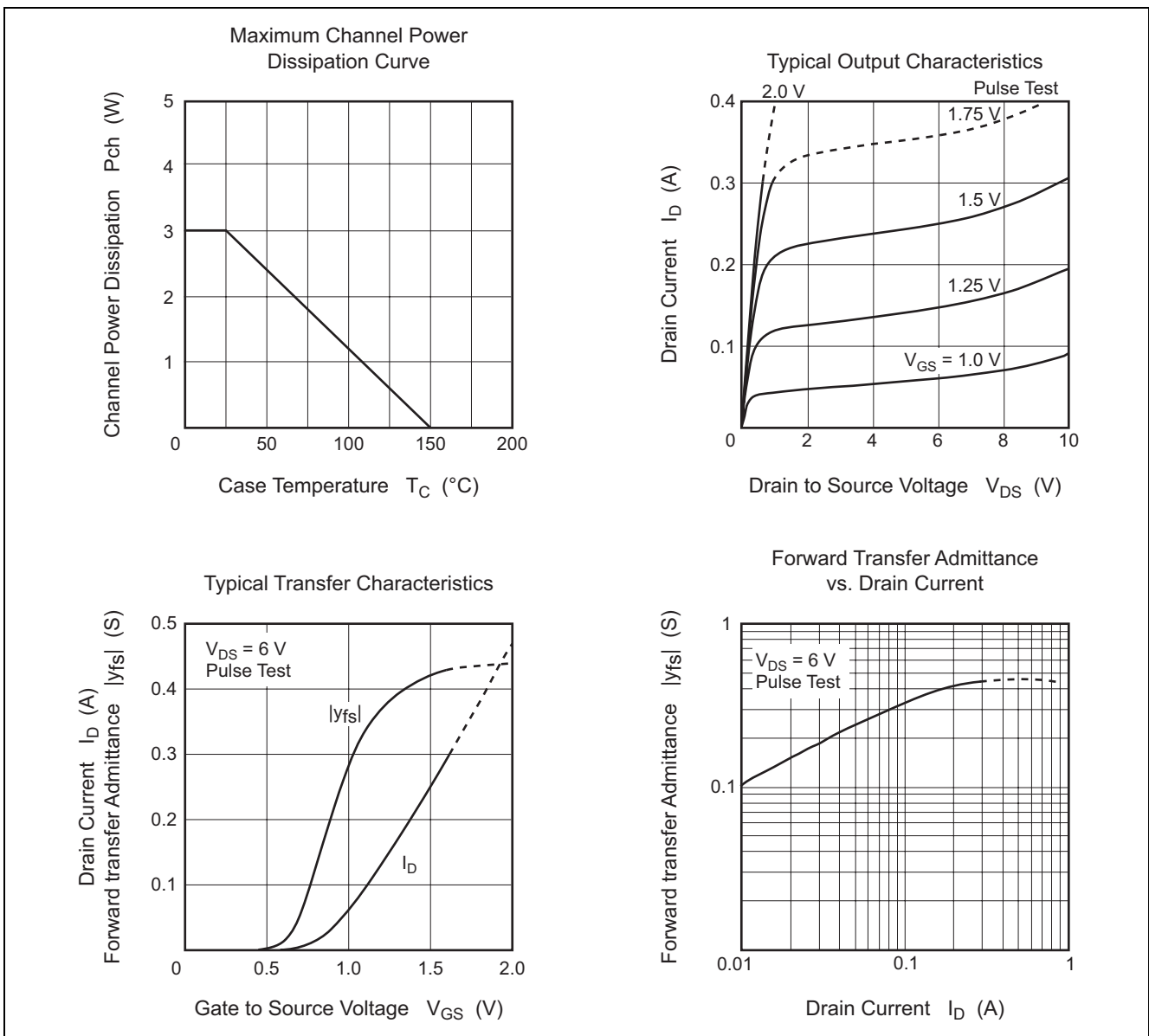
This device is sensitive to electro static discharge. An adequate careful handling procedure is requested.

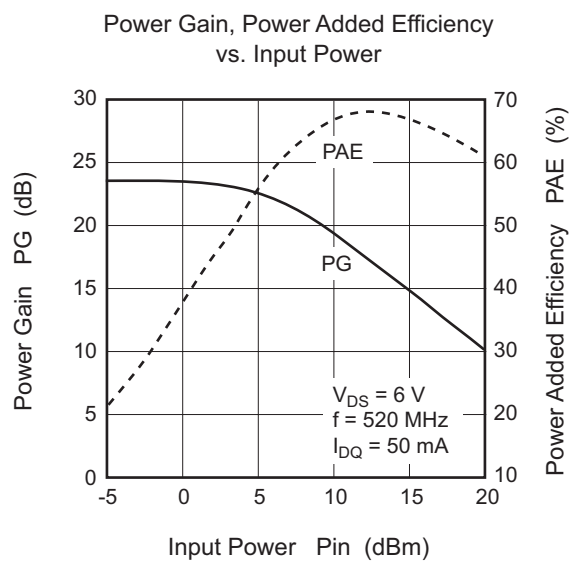
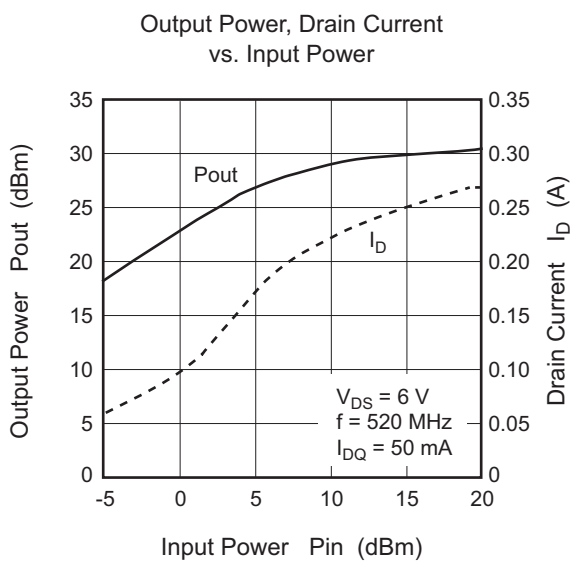
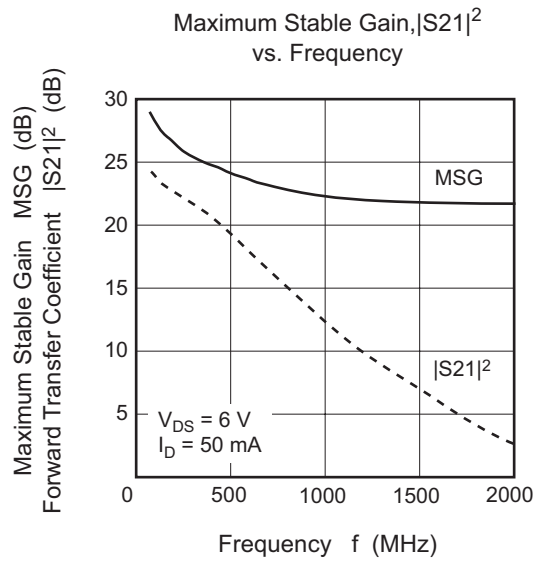
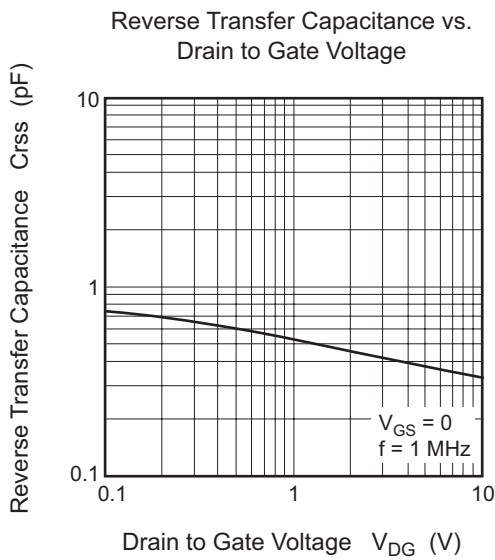
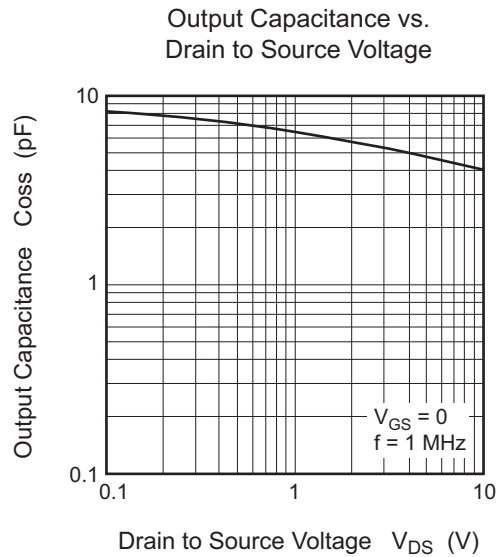
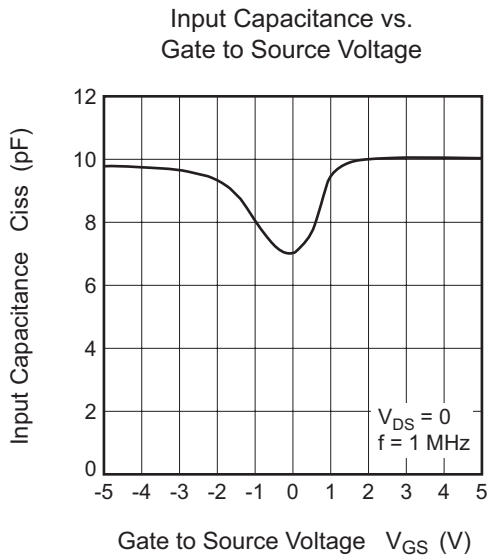
### Electrical Characteristics

(Ta = 25°C)

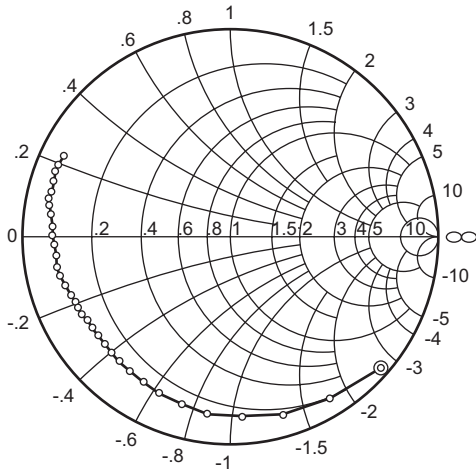
| Item                            | Symbol        | Min. | Typ  | Max.    | Unit    | Test Conditions                       |
|---------------------------------|---------------|------|------|---------|---------|---------------------------------------|
| Zero gate voltage drain current | $I_{DSS}$     | —    | —    | 2       | $\mu A$ | $V_{DS} = 16 V, V_{GS} = 0$           |
| Gate to source leak current     | $I_{GSS}$     | —    | —    | $\pm 2$ | $\mu A$ | $V_{GS} = \pm 5 V, V_{DS} = 0$        |
| Gate to source cutoff voltage   | $V_{GS(off)}$ | 0.3  | 0.6  | 0.9     | V       | $V_{DS} = 6 V, I_D = 1 mA$            |
| Forward Transfer Admittance     | $ y_{fs} $    | —    | 0.43 | —       | S       | $V_{DS} = 6 V, I_D = 0.3 A$           |
| Input capacitance               | $C_{iss}$     | —    | 10   | —       | pF      | $V_{GS} = 5 V, V_{DS} = 0, f = 1 MHz$ |
| Output capacitance              | $C_{oss}$     | —    | 5    | —       | pF      | $V_{DS} = 6 V, V_{GS} = 0, f = 1 MHz$ |
| Reverse transfer capacitance    | $C_{rss}$     | —    | 0.4  | —       | pF      | $V_{DG} = 6 V, V_{GS} = 0, f = 1 MHz$ |
| Output Power                    | Pout          | —    | 29.7 | —       | dBm     | $V_{DS} = 6 V, I_{DQ} = 50 mA$        |
|                                 |               | —    | 0.93 | —       | W       | $f = 520 MHz$                         |
| Power Added Efficiency          | PAE           | —    | 68   | —       | %       | Pin = +13 dBm (20 mW)                 |

### Main Characteristics



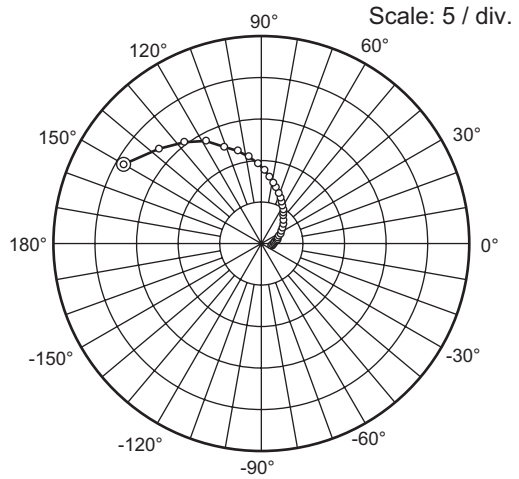


S11 Parameter vs. Frequency



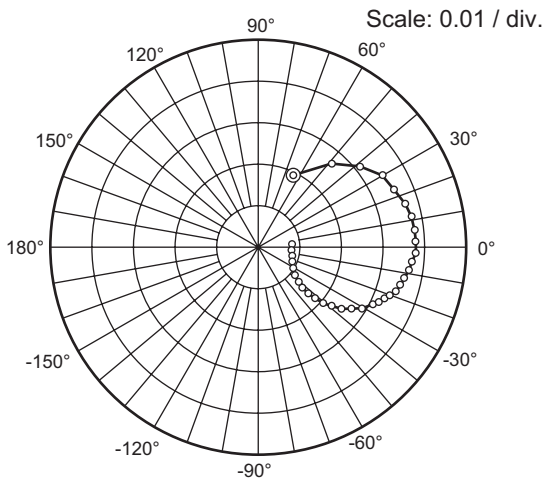
Test condition:  $V_{DS} = 6\text{ V}$ ,  $I_{DQ} = 50\text{ mA}$ ,  $Z_O = 50\ \Omega$   
 100 to 1000 MHz (50 MHz step)  
 1000 to 2500 MHz (100 MHz step)

S21 Parameter vs. Frequency



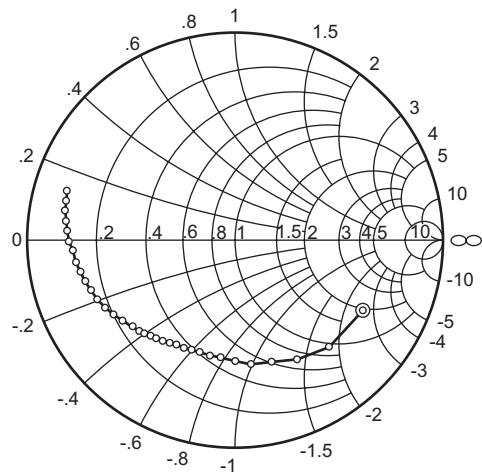
Test condition:  $V_{DS} = 6\text{ V}$ ,  $I_{DQ} = 50\text{ mA}$ ,  $Z_O = 50\ \Omega$   
 100 to 1000 MHz (50 MHz step)  
 1000 to 2500 MHz (100 MHz step)

S12 Parameter vs. Frequency



Test condition:  $V_{DS} = 6\text{ V}$ ,  $I_{DQ} = 50\text{ mA}$ ,  $Z_O = 50\ \Omega$   
 100 to 1000 MHz (50 MHz step)  
 1000 to 2500 MHz (100 MHz step)

S22 Parameter vs. Frequency



Test condition:  $V_{DS} = 6\text{ V}$ ,  $I_{DQ} = 50\text{ mA}$ ,  $Z_O = 50\ \Omega$   
 100 to 1000 MHz (50 MHz step)  
 1000 to 2500 MHz (100 MHz step)

## S Parameter

(V<sub>DS</sub> = 3.6 V, I<sub>DQ</sub> = 50 mA, Z<sub>o</sub> = 50 Ω)

| f (MHz) | S11   |            | S21   |            | S12   |            | S22   |            |
|---------|-------|------------|-------|------------|-------|------------|-------|------------|
|         | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) |
| 100     | 0.946 | -40.3      | 15.41 | 148.7      | 0.021 | 69.4       | 0.784 | -30.2      |
| 150     | 0.931 | -58.4      | 12.58 | 136.4      | 0.029 | 46.8       | 0.744 | -51.2      |
| 200     | 0.898 | -74.0      | 11.57 | 126.4      | 0.034 | 36.1       | 0.700 | -66.0      |
| 250     | 0.865 | -87.5      | 11.08 | 117.4      | 0.037 | 27.8       | 0.657 | -77.8      |
| 300     | 0.856 | -99.2      | 10.15 | 109.2      | 0.038 | 20.8       | 0.640 | -86.9      |
| 350     | 0.827 | -108.7     | 9.91  | 102.2      | 0.039 | 14.1       | 0.615 | -94.4      |
| 400     | 0.812 | -116.8     | 9.44  | 95.7       | 0.040 | 8.9        | 0.601 | -100.8     |
| 450     | 0.804 | -122.6     | 8.78  | 90.2       | 0.040 | 4.0        | 0.595 | -106.1     |
| 500     | 0.792 | -128.2     | 8.15  | 84.9       | 0.040 | -0.9       | 0.595 | -110.9     |
| 550     | 0.791 | -132.4     | 7.55  | 80.5       | 0.040 | -4.6       | 0.596 | -115.2     |
| 600     | 0.790 | -136.4     | 7.00  | 76.4       | 0.039 | -8.2       | 0.602 | -119.1     |
| 650     | 0.787 | -140.2     | 6.48  | 72.3       | 0.038 | -11.5      | 0.608 | -122.7     |
| 700     | 0.787 | -143.7     | 6.03  | 68.5       | 0.038 | -14.5      | 0.616 | -125.9     |
| 750     | 0.788 | -147.1     | 5.59  | 64.9       | 0.037 | -17.6      | 0.626 | -129.2     |
| 800     | 0.792 | -150.0     | 5.22  | 61.3       | 0.036 | -20.5      | 0.634 | -132.1     |
| 850     | 0.797 | -152.7     | 4.86  | 58.0       | 0.035 | -23.1      | 0.643 | -134.9     |
| 900     | 0.801 | -155.2     | 4.54  | 54.7       | 0.034 | -25.1      | 0.654 | -137.6     |
| 950     | 0.807 | -157.3     | 4.29  | 51.4       | 0.033 | -27.5      | 0.664 | -140.2     |
| 1000    | 0.812 | -159.4     | 4.06  | 48.8       | 0.032 | -29.7      | 0.675 | -142.8     |
| 1050    | 0.817 | -161.7     | 3.83  | 46.1       | 0.031 | -31.6      | 0.686 | -145.3     |
| 1100    | 0.827 | -163.5     | 3.62  | 43.7       | 0.030 | -33.7      | 0.695 | -147.5     |
| 1150    | 0.834 | -165.6     | 3.42  | 41.0       | 0.028 | -35.1      | 0.704 | -149.8     |
| 1200    | 0.840 | -167.1     | 3.24  | 38.6       | 0.027 | -36.6      | 0.714 | -152.0     |
| 1250    | 0.846 | -168.4     | 3.06  | 36.3       | 0.026 | -38.2      | 0.723 | -154.0     |
| 1300    | 0.845 | -170.1     | 2.89  | 33.7       | 0.025 | -39.6      | 0.733 | -156.0     |
| 1350    | 0.839 | -171.7     | 2.73  | 31.2       | 0.024 | -40.9      | 0.740 | -158.1     |
| 1400    | 0.843 | -173.8     | 2.59  | 28.6       | 0.023 | -41.9      | 0.749 | -160.2     |
| 1450    | 0.847 | -175.4     | 2.47  | 26.3       | 0.022 | -43.0      | 0.755 | -161.9     |
| 1500    | 0.850 | -177.1     | 2.34  | 24.0       | 0.020 | -43.9      | 0.760 | -164.0     |
| 1550    | 0.852 | -179.0     | 2.24  | 21.8       | 0.019 | -44.6      | 0.768 | -166.0     |
| 1600    | 0.858 | 179.6      | 2.13  | 19.7       | 0.018 | -44.7      | 0.774 | -167.8     |
| 1650    | 0.861 | 178.3      | 2.05  | 17.6       | 0.017 | -45.2      | 0.777 | -169.6     |
| 1700    | 0.863 | 176.8      | 1.96  | 15.4       | 0.016 | -45.3      | 0.784 | -171.7     |
| 1750    | 0.863 | 174.8      | 1.88  | 13.1       | 0.015 | -44.9      | 0.792 | -173.6     |
| 1800    | 0.873 | 173.0      | 1.81  | 10.9       | 0.014 | -44.9      | 0.798 | -175.3     |
| 1850    | 0.878 | 171.4      | 1.75  | 9.0        | 0.013 | -43.7      | 0.800 | -177.3     |
| 1900    | 0.886 | 170.2      | 1.68  | 7.3        | 0.012 | -42.9      | 0.807 | -179.3     |
| 1950    | 0.895 | 168.9      | 1.61  | 5.5        | 0.012 | -41.0      | 0.816 | 179.1      |
| 2000    | 0.894 | 168.2      | 1.55  | 4.2        | 0.011 | -38.6      | 0.818 | 177.6      |
| 2050    | 0.895 | 167.3      | 1.48  | 2.7        | 0.010 | -35.6      | 0.822 | 175.6      |
| 2100    | 0.890 | 165.8      | 1.42  | 0.9        | 0.010 | -33.6      | 0.830 | 173.8      |
| 2150    | 0.890 | 164.0      | 1.37  | -1.1       | 0.009 | -29.1      | 0.837 | 172.3      |
| 2200    | 0.896 | 162.6      | 1.32  | -3.1       | 0.009 | -24.1      | 0.838 | 170.7      |
| 2250    | 0.898 | 161.1      | 1.27  | -5.2       | 0.008 | -19.0      | 0.842 | 168.9      |
| 2300    | 0.902 | 159.8      | 1.22  | -7.1       | 0.008 | -12.8      | 0.848 | 167.1      |
| 2350    | 0.903 | 158.4      | 1.19  | -9.0       | 0.008 | -8.3       | 0.851 | 165.8      |
| 2400    | 0.901 | 157.4      | 1.15  | -11.0      | 0.008 | -3.0       | 0.852 | 164.1      |
| 2450    | 0.895 | 155.9      | 1.11  | -12.6      | 0.008 | 2.0        | 0.855 | 162.4      |
| 2500    | 0.894 | 154.0      | 1.07  | -14.4      | 0.008 | 6.9        | 0.861 | 160.9      |

## S Parameter

(V<sub>DS</sub> = 6 V, I<sub>DQ</sub> = 10 mA, Z<sub>o</sub> = 50 Ω)

| f (MHz) | S11   |            | S21   |            | S12   |            | S22   |            |
|---------|-------|------------|-------|------------|-------|------------|-------|------------|
|         | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) |
| 100     | 0.973 | -34.4      | 12.25 | 150.2      | 0.022 | 69.9       | 0.869 | -20.3      |
| 150     | 0.931 | -49.5      | 11.13 | 138.3      | 0.031 | 54.5       | 0.858 | -35.1      |
| 200     | 0.913 | -63.2      | 10.12 | 128.8      | 0.038 | 43.4       | 0.823 | -45.4      |
| 250     | 0.896 | -74.6      | 9.10  | 120.5      | 0.043 | 34.8       | 0.801 | -54.6      |
| 300     | 0.892 | -85.3      | 8.08  | 113.3      | 0.046 | 26.8       | 0.788 | -62.5      |
| 350     | 0.878 | -93.6      | 7.27  | 107.0      | 0.048 | 19.3       | 0.773 | -70.0      |
| 400     | 0.870 | -101.5     | 6.56  | 100.5      | 0.050 | 12.6       | 0.759 | -77.0      |
| 450     | 0.861 | -108.4     | 5.95  | 94.8       | 0.051 | 6.6        | 0.754 | -83.0      |
| 500     | 0.853 | -114.4     | 5.40  | 89.2       | 0.051 | 0.9        | 0.749 | -88.6      |
| 550     | 0.853 | -119.5     | 4.91  | 84.0       | 0.051 | -3.9       | 0.747 | -93.9      |
| 600     | 0.851 | -124.3     | 4.50  | 79.0       | 0.050 | -8.5       | 0.750 | -98.8      |
| 650     | 0.845 | -128.6     | 4.15  | 74.4       | 0.050 | -12.8      | 0.752 | -103.3     |
| 700     | 0.844 | -132.8     | 3.79  | 70.0       | 0.048 | -16.7      | 0.755 | -107.5     |
| 750     | 0.846 | -136.7     | 3.48  | 65.6       | 0.047 | -20.3      | 0.761 | -111.6     |
| 800     | 0.849 | -140.2     | 3.22  | 61.6       | 0.046 | -23.9      | 0.767 | -115.4     |
| 850     | 0.853 | -143.5     | 2.99  | 57.7       | 0.045 | -27.1      | 0.772 | -119.2     |
| 900     | 0.857 | -146.4     | 2.78  | 53.9       | 0.043 | -29.8      | 0.778 | -122.7     |
| 950     | 0.860 | -149.0     | 2.59  | 50.1       | 0.042 | -32.9      | 0.785 | -126.1     |
| 1000    | 0.867 | -151.5     | 2.44  | 47.2       | 0.041 | -35.5      | 0.792 | -129.4     |
| 1050    | 0.870 | -154.0     | 2.30  | 44.3       | 0.039 | -38.2      | 0.798 | -132.5     |
| 1100    | 0.875 | -156.5     | 2.15  | 41.4       | 0.037 | -40.8      | 0.805 | -135.5     |
| 1150    | 0.883 | -158.7     | 2.03  | 38.5       | 0.036 | -43.1      | 0.811 | -138.4     |
| 1200    | 0.888 | -161.0     | 1.92  | 35.9       | 0.034 | -45.2      | 0.818 | -141.1     |
| 1250    | 0.890 | -162.5     | 1.79  | 33.4       | 0.033 | -47.4      | 0.823 | -143.7     |
| 1300    | 0.890 | -164.5     | 1.69  | 30.7       | 0.031 | -49.1      | 0.830 | -146.2     |
| 1350    | 0.886 | -166.6     | 1.59  | 27.7       | 0.030 | -51.1      | 0.834 | -148.7     |
| 1400    | 0.886 | -168.7     | 1.51  | 25.2       | 0.028 | -52.6      | 0.840 | -151.2     |
| 1450    | 0.886 | -170.8     | 1.43  | 22.9       | 0.027 | -54.4      | 0.843 | -153.3     |
| 1500    | 0.889 | -172.6     | 1.36  | 20.3       | 0.025 | -56.0      | 0.846 | -155.9     |
| 1550    | 0.891 | -174.5     | 1.29  | 18.1       | 0.024 | -57.4      | 0.851 | -158.2     |
| 1600    | 0.895 | -176.1     | 1.23  | 15.9       | 0.022 | -58.5      | 0.855 | -160.3     |
| 1650    | 0.898 | -177.6     | 1.18  | 13.7       | 0.021 | -59.9      | 0.855 | -162.4     |
| 1700    | 0.896 | -179.5     | 1.12  | 11.4       | 0.020 | -60.8      | 0.859 | -164.7     |
| 1750    | 0.897 | 178.5      | 1.08  | 9.3        | 0.019 | -61.8      | 0.866 | -166.9     |
| 1800    | 0.903 | 176.4      | 1.03  | 7.0        | 0.017 | -62.7      | 0.869 | -168.8     |
| 1850    | 0.911 | 174.8      | 0.99  | 4.9        | 0.016 | -62.8      | 0.869 | -171.0     |
| 1900    | 0.917 | 173.4      | 0.95  | 3.2        | 0.015 | -63.2      | 0.874 | -173.3     |
| 1950    | 0.926 | 172.0      | 0.91  | 1.5        | 0.014 | -63.2      | 0.881 | -175.1     |
| 2000    | 0.928 | 171.1      | 0.87  | 0.2        | 0.012 | -63.1      | 0.879 | -176.8     |
| 2050    | 0.925 | 170.1      | 0.83  | -1.5       | 0.011 | -61.7      | 0.883 | -179.1     |
| 2100    | 0.918 | 168.7      | 0.80  | -3.3       | 0.010 | -60.9      | 0.888 | 179.0      |
| 2150    | 0.916 | 166.8      | 0.76  | -5.3       | 0.009 | -59.1      | 0.894 | 177.4      |
| 2200    | 0.918 | 165.3      | 0.73  | -7.4       | 0.008 | -55.0      | 0.894 | 175.6      |
| 2250    | 0.922 | 163.6      | 0.71  | -9.4       | 0.007 | -52.5      | 0.895 | 173.6      |
| 2300    | 0.921 | 162.2      | 0.68  | -11.4      | 0.007 | -46.3      | 0.900 | 171.8      |
| 2350    | 0.923 | 160.6      | 0.65  | -13.3      | 0.006 | -40.6      | 0.902 | 170.3      |
| 2400    | 0.920 | 159.7      | 0.63  | -15.2      | 0.006 | -33.7      | 0.902 | 168.5      |
| 2450    | 0.913 | 158.0      | 0.61  | -16.8      | 0.005 | -24.3      | 0.902 | 166.6      |
| 2500    | 0.911 | 156.0      | 0.59  | -18.6      | 0.005 | -14.3      | 0.907 | 164.9      |

## S Parameter

(V<sub>DS</sub> = 6 V, I<sub>DQ</sub> = 25 mA, Z<sub>o</sub> = 50 Ω)

| f (MHz) | S11   |            | S21   |            | S12   |            | S22   |            |
|---------|-------|------------|-------|------------|-------|------------|-------|------------|
|         | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) |
| 100     | 0.959 | -37.1      | 15.64 | 150.5      | 0.021 | 68.6       | 0.793 | -24.9      |
| 150     | 0.921 | -53.7      | 13.98 | 137.6      | 0.030 | 51.0       | 0.772 | -42.1      |
| 200     | 0.900 | -68.0      | 12.68 | 128.1      | 0.034 | 40.6       | 0.732 | -54.4      |
| 250     | 0.880 | -80.1      | 11.49 | 119.6      | 0.038 | 31.7       | 0.701 | -64.6      |
| 300     | 0.875 | -90.8      | 10.21 | 112.2      | 0.040 | 24.1       | 0.685 | -73.2      |
| 350     | 0.857 | -99.6      | 9.32  | 105.9      | 0.042 | 17.3       | 0.663 | -80.8      |
| 400     | 0.844 | -107.8     | 8.53  | 99.4       | 0.043 | 11.5       | 0.649 | -87.5      |
| 450     | 0.836 | -114.7     | 7.76  | 93.6       | 0.044 | 6.1        | 0.642 | -93.1      |
| 500     | 0.827 | -120.7     | 7.12  | 88.2       | 0.044 | 1.3        | 0.639 | -98.3      |
| 550     | 0.824 | -125.9     | 6.56  | 83.3       | 0.043 | -3.1       | 0.637 | -103.0     |
| 600     | 0.821 | -130.4     | 6.06  | 78.7       | 0.043 | -7.0       | 0.641 | -107.4     |
| 650     | 0.818 | -134.3     | 5.63  | 74.4       | 0.042 | -10.7      | 0.645 | -111.3     |
| 700     | 0.813 | -138.3     | 5.20  | 70.4       | 0.041 | -14.2      | 0.651 | -115.1     |
| 750     | 0.816 | -142.1     | 4.83  | 66.5       | 0.040 | -17.5      | 0.659 | -118.7     |
| 800     | 0.817 | -145.5     | 4.50  | 62.6       | 0.040 | -20.5      | 0.667 | -122.0     |
| 850     | 0.820 | -148.4     | 4.19  | 59.2       | 0.039 | -23.3      | 0.674 | -125.3     |
| 900     | 0.826 | -150.9     | 3.93  | 55.7       | 0.037 | -25.8      | 0.684 | -128.3     |
| 950     | 0.830 | -153.2     | 3.70  | 52.4       | 0.036 | -28.5      | 0.693 | -131.4     |
| 1000    | 0.834 | -155.8     | 3.50  | 49.4       | 0.035 | -30.8      | 0.703 | -134.3     |
| 1050    | 0.841 | -158.3     | 3.31  | 46.4       | 0.034 | -33.1      | 0.713 | -137.1     |
| 1100    | 0.847 | -160.3     | 3.12  | 44.0       | 0.033 | -35.4      | 0.722 | -139.6     |
| 1150    | 0.852 | -162.3     | 2.96  | 41.3       | 0.031 | -37.3      | 0.730 | -142.2     |
| 1200    | 0.856 | -164.4     | 2.80  | 38.8       | 0.030 | -39.1      | 0.739 | -144.7     |
| 1250    | 0.865 | -165.9     | 2.63  | 36.5       | 0.029 | -41.0      | 0.747 | -147.0     |
| 1300    | 0.862 | -167.5     | 2.49  | 33.8       | 0.028 | -42.5      | 0.756 | -149.3     |
| 1350    | 0.860 | -169.6     | 2.35  | 30.9       | 0.026 | -43.9      | 0.762 | -151.6     |
| 1400    | 0.860 | -171.5     | 2.24  | 28.5       | 0.025 | -45.5      | 0.771 | -153.8     |
| 1450    | 0.862 | -173.2     | 2.12  | 26.1       | 0.024 | -46.8      | 0.777 | -155.8     |
| 1500    | 0.863 | -175.2     | 2.02  | 23.6       | 0.023 | -48.1      | 0.781 | -158.1     |
| 1550    | 0.866 | -176.9     | 1.93  | 21.6       | 0.022 | -49.2      | 0.788 | -160.3     |
| 1600    | 0.871 | -178.4     | 1.84  | 19.3       | 0.020 | -49.9      | 0.793 | -162.4     |
| 1650    | 0.875 | -179.8     | 1.76  | 17.2       | 0.019 | -50.8      | 0.796 | -164.3     |
| 1700    | 0.873 | 178.5      | 1.68  | 14.8       | 0.018 | -51.4      | 0.802 | -166.5     |
| 1750    | 0.876 | 176.5      | 1.61  | 12.7       | 0.017 | -51.4      | 0.810 | -168.5     |
| 1800    | 0.883 | 174.5      | 1.56  | 10.4       | 0.016 | -51.6      | 0.815 | -170.3     |
| 1850    | 0.889 | 173.0      | 1.50  | 8.5        | 0.015 | -51.7      | 0.816 | -172.5     |
| 1900    | 0.897 | 171.7      | 1.44  | 6.7        | 0.014 | -50.9      | 0.823 | -174.6     |
| 1950    | 0.905 | 170.4      | 1.38  | 5.1        | 0.013 | -50.1      | 0.832 | -176.4     |
| 2000    | 0.909 | 169.7      | 1.33  | 3.6        | 0.012 | -49.2      | 0.833 | -178.0     |
| 2050    | 0.905 | 168.7      | 1.27  | 2.1        | 0.011 | -47.0      | 0.837 | 179.9      |
| 2100    | 0.899 | 167.3      | 1.21  | 0.1        | 0.010 | -45.2      | 0.843 | 177.9      |
| 2150    | 0.898 | 165.3      | 1.17  | -1.8       | 0.009 | -42.2      | 0.850 | 176.5      |
| 2200    | 0.902 | 163.9      | 1.12  | -3.8       | 0.008 | -37.3      | 0.851 | 174.7      |
| 2250    | 0.906 | 162.2      | 1.09  | -6.0       | 0.008 | -33.6      | 0.854 | 172.8      |
| 2300    | 0.908 | 160.9      | 1.05  | -7.9       | 0.007 | -28.1      | 0.860 | 171.0      |
| 2350    | 0.908 | 159.5      | 1.02  | -9.8       | 0.007 | -22.0      | 0.863 | 169.5      |
| 2400    | 0.907 | 158.5      | 0.98  | -11.5      | 0.007 | -16.1      | 0.863 | 167.8      |
| 2450    | 0.898 | 157.1      | 0.95  | -13.3      | 0.007 | -9.5       | 0.866 | 166.0      |
| 2500    | 0.898 | 154.9      | 0.92  | -15.0      | 0.007 | -2.6       | 0.872 | 164.4      |

## S Parameter

(V<sub>DS</sub> = 6 V, I<sub>DQ</sub> = 50 mA, Z<sub>o</sub> = 50 Ω)

| f (MHz) | S11   |            | S21   |            | S12   |            | S22   |            |
|---------|-------|------------|-------|------------|-------|------------|-------|------------|
|         | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) |
| 100     | 0.960 | -41.0      | 19.06 | 150.1      | 0.019 | 63.9       | 0.702 | -28.7      |
| 150     | 0.916 | -58.4      | 16.77 | 137.1      | 0.027 | 48.6       | 0.688 | -48.7      |
| 200     | 0.892 | -73.5      | 15.28 | 127.1      | 0.031 | 38.3       | 0.646 | -62.4      |
| 250     | 0.868 | -86.2      | 14.02 | 118.4      | 0.035 | 30.0       | 0.613 | -73.4      |
| 300     | 0.860 | -97.3      | 12.48 | 110.8      | 0.036 | 22.9       | 0.602 | -82.6      |
| 350     | 0.840 | -106.3     | 11.51 | 104.4      | 0.037 | 16.3       | 0.582 | -90.1      |
| 400     | 0.825 | -114.5     | 10.57 | 98.0       | 0.038 | 11.5       | 0.571 | -96.7      |
| 450     | 0.816 | -121.2     | 9.62  | 92.7       | 0.038 | 6.3        | 0.567 | -102.2     |
| 500     | 0.810 | -126.8     | 8.80  | 87.6       | 0.038 | 2.0        | 0.567 | -107.1     |
| 550     | 0.806 | -131.6     | 8.12  | 83.0       | 0.038 | -2.0       | 0.569 | -111.4     |
| 600     | 0.802 | -135.9     | 7.49  | 78.8       | 0.037 | -5.4       | 0.573 | -115.4     |
| 650     | 0.797 | -139.6     | 6.94  | 74.9       | 0.037 | -8.7       | 0.578 | -119.0     |
| 700     | 0.795 | -143.4     | 6.44  | 71.2       | 0.036 | -11.8      | 0.586 | -122.3     |
| 750     | 0.797 | -146.7     | 5.97  | 67.5       | 0.035 | -14.7      | 0.596 | -125.5     |
| 800     | 0.798 | -149.7     | 5.57  | 64.0       | 0.035 | -17.6      | 0.604 | -128.4     |
| 850     | 0.806 | -152.4     | 5.20  | 60.7       | 0.034 | -19.9      | 0.612 | -131.3     |
| 900     | 0.807 | -155.0     | 4.89  | 57.4       | 0.033 | -21.9      | 0.623 | -134.0     |
| 950     | 0.811 | -157.3     | 4.59  | 54.3       | 0.032 | -24.5      | 0.632 | -136.6     |
| 1000    | 0.817 | -159.5     | 4.35  | 51.4       | 0.031 | -26.4      | 0.645 | -139.2     |
| 1050    | 0.822 | -161.6     | 4.11  | 48.7       | 0.030 | -28.4      | 0.655 | -141.7     |
| 1100    | 0.831 | -163.6     | 3.90  | 46.3       | 0.029 | -30.5      | 0.666 | -144.0     |
| 1150    | 0.834 | -165.7     | 3.69  | 43.7       | 0.028 | -32.1      | 0.674 | -146.3     |
| 1200    | 0.842 | -167.2     | 3.50  | 41.3       | 0.027 | -33.4      | 0.685 | -148.5     |
| 1250    | 0.846 | -168.7     | 3.30  | 39.0       | 0.026 | -35.1      | 0.695 | -150.5     |
| 1300    | 0.848 | -170.2     | 3.13  | 36.4       | 0.025 | -36.5      | 0.703 | -152.6     |
| 1350    | 0.842 | -171.9     | 2.97  | 33.7       | 0.024 | -37.5      | 0.711 | -154.7     |
| 1400    | 0.843 | -173.9     | 2.82  | 31.4       | 0.023 | -38.5      | 0.721 | -156.7     |
| 1450    | 0.844 | -175.6     | 2.69  | 29.0       | 0.022 | -40.1      | 0.727 | -158.5     |
| 1500    | 0.849 | -177.3     | 2.56  | 26.7       | 0.021 | -40.5      | 0.733 | -160.7     |
| 1550    | 0.849 | -178.8     | 2.45  | 24.5       | 0.020 | -41.3      | 0.740 | -162.7     |
| 1600    | 0.857 | -179.6     | 2.33  | 22.4       | 0.018 | -41.5      | 0.748 | -164.6     |
| 1650    | 0.860 | -178.2     | 2.24  | 20.1       | 0.017 | -42.1      | 0.752 | -166.3     |
| 1700    | 0.860 | -176.8     | 2.15  | 17.9       | 0.017 | -42.2      | 0.758 | -168.4     |
| 1750    | 0.861 | -174.8     | 2.06  | 15.9       | 0.016 | -42.1      | 0.767 | -170.3     |
| 1800    | 0.870 | -172.9     | 1.99  | 13.6       | 0.015 | -41.9      | 0.774 | -172.1     |
| 1850    | 0.878 | -171.4     | 1.92  | 11.5       | 0.014 | -40.8      | 0.776 | -174.0     |
| 1900    | 0.884 | -170.1     | 1.84  | 9.8        | 0.013 | -39.7      | 0.784 | -176.1     |
| 1950    | 0.889 | -169.0     | 1.77  | 8.3        | 0.012 | -38.1      | 0.793 | -177.7     |
| 2000    | 0.895 | -168.3     | 1.71  | 6.7        | 0.011 | -36.3      | 0.796 | -179.3     |
| 2050    | 0.890 | -167.5     | 1.63  | 5.3        | 0.011 | -33.9      | 0.799 | -178.7     |
| 2100    | 0.886 | -165.9     | 1.57  | 3.3        | 0.010 | -31.3      | 0.808 | -176.8     |
| 2150    | 0.887 | -164.1     | 1.51  | 1.3        | 0.009 | -27.8      | 0.816 | -175.3     |
| 2200    | 0.891 | -162.6     | 1.46  | -0.7       | 0.009 | -23.0      | 0.818 | -173.6     |
| 2250    | 0.895 | -161.2     | 1.40  | -2.7       | 0.009 | -19.0      | 0.822 | -171.8     |
| 2300    | 0.897 | -159.7     | 1.36  | -4.8       | 0.008 | -14.5      | 0.828 | -170.1     |
| 2350    | 0.898 | -158.5     | 1.31  | -6.6       | 0.008 | -9.8       | 0.833 | -168.6     |
| 2400    | 0.896 | -157.4     | 1.27  | -8.5       | 0.008 | -5.1       | 0.835 | -167.0     |
| 2450    | 0.890 | -155.8     | 1.23  | -10.4      | 0.008 | -0.3       | 0.836 | -165.2     |
| 2500    | 0.890 | -154.0     | 1.19  | -12.1      | 0.008 | 5.2        | 0.843 | -163.6     |



## S Parameter

 $(V_{DS} = 6\text{ V}, I_{DQ} = 100\text{ mA}, Z_o = 50\ \Omega)$ 

| f (MHz) | S11   |            | S21   |            | S12   |            | S22   |            |
|---------|-------|------------|-------|------------|-------|------------|-------|------------|
|         | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) |
| 100     | 0.972 | -45.9      | 22.91 | 149.6      | 0.019 | 65.4       | 0.615 | -34.3      |
| 150     | 0.920 | -64.3      | 19.70 | 136.4      | 0.024 | 48.3       | 0.597 | -55.7      |
| 200     | 0.888 | -80.4      | 17.99 | 125.8      | 0.028 | 37.6       | 0.560 | -70.8      |
| 250     | 0.860 | -93.9      | 16.78 | 116.9      | 0.031 | 29.8       | 0.534 | -82.5      |
| 300     | 0.847 | -104.9     | 14.91 | 109.3      | 0.032 | 23.1       | 0.517 | -91.7      |
| 350     | 0.827 | -113.3     | 13.65 | 103.1      | 0.033 | 16.8       | 0.517 | -99.6      |
| 400     | 0.816 | -120.8     | 12.39 | 97.3       | 0.033 | 11.9       | 0.511 | -106.1     |
| 450     | 0.809 | -126.9     | 11.24 | 92.4       | 0.033 | 7.4        | 0.512 | -111.3     |
| 500     | 0.799 | -132.3     | 10.23 | 87.7       | 0.033 | 3.3        | 0.513 | -115.9     |
| 550     | 0.800 | -136.7     | 9.38  | 83.4       | 0.033 | -0.3       | 0.518 | -120.0     |
| 600     | 0.801 | -140.6     | 8.68  | 79.5       | 0.033 | -3.5       | 0.524 | -123.5     |
| 650     | 0.792 | -144.0     | 8.00  | 75.9       | 0.032 | -6.6       | 0.531 | -126.7     |
| 700     | 0.788 | -147.5     | 7.41  | 72.3       | 0.032 | -9.3       | 0.540 | -129.7     |
| 750     | 0.790 | -150.6     | 6.89  | 68.9       | 0.031 | -11.7      | 0.550 | -132.5     |
| 800     | 0.793 | -153.5     | 6.42  | 65.6       | 0.031 | -14.3      | 0.558 | -135.0     |
| 850     | 0.798 | -156.1     | 5.99  | 62.3       | 0.030 | -16.5      | 0.567 | -137.5     |
| 900     | 0.801 | -158.5     | 5.62  | 59.1       | 0.029 | -18.3      | 0.578 | -139.8     |
| 950     | 0.805 | -160.5     | 5.31  | 56.1       | 0.028 | -20.2      | 0.588 | -142.2     |
| 1000    | 0.809 | -162.7     | 5.03  | 53.5       | 0.027 | -21.9      | 0.601 | -144.5     |
| 1050    | 0.814 | -164.5     | 4.77  | 51.1       | 0.027 | -23.6      | 0.612 | -146.5     |
| 1100    | 0.823 | -166.3     | 4.51  | 48.5       | 0.026 | -25.4      | 0.622 | -148.5     |
| 1150    | 0.829 | -168.2     | 4.29  | 45.9       | 0.025 | -26.6      | 0.632 | -150.6     |
| 1200    | 0.835 | -169.7     | 4.08  | 43.7       | 0.024 | -27.9      | 0.643 | -152.6     |
| 1250    | 0.837 | -171.0     | 3.85  | 41.5       | 0.023 | -28.9      | 0.653 | -154.3     |
| 1300    | 0.836 | -172.5     | 3.65  | 39.0       | 0.022 | -30.3      | 0.662 | -156.1     |
| 1350    | 0.834 | -174.2     | 3.47  | 36.4       | 0.021 | -30.8      | 0.670 | -158.1     |
| 1400    | 0.835 | -176.1     | 3.31  | 33.9       | 0.021 | -31.5      | 0.681 | -159.9     |
| 1450    | 0.837 | -177.8     | 3.15  | 31.6       | 0.020 | -32.5      | 0.688 | -161.4     |
| 1500    | 0.839 | -179.4     | 3.00  | 29.4       | 0.019 | -33.0      | 0.694 | -163.4     |
| 1550    | 0.844 | 179.0      | 2.88  | 27.2       | 0.018 | -33.2      | 0.702 | -165.3     |
| 1600    | 0.849 | 177.7      | 2.75  | 25.1       | 0.017 | -32.9      | 0.711 | -167.0     |
| 1650    | 0.850 | 176.5      | 2.64  | 23.1       | 0.016 | -32.8      | 0.715 | -168.7     |
| 1700    | 0.850 | 174.9      | 2.53  | 20.8       | 0.015 | -32.6      | 0.722 | -170.6     |
| 1750    | 0.854 | 173.0      | 2.44  | 18.5       | 0.015 | -31.9      | 0.731 | -172.5     |
| 1800    | 0.861 | 171.4      | 2.36  | 16.4       | 0.014 | -31.0      | 0.738 | -174.1     |
| 1850    | 0.868 | 170.0      | 2.27  | 14.4       | 0.013 | -29.7      | 0.741 | -175.9     |
| 1900    | 0.875 | 168.7      | 2.19  | 12.6       | 0.012 | -28.0      | 0.749 | -177.9     |
| 1950    | 0.881 | 167.5      | 2.11  | 11.0       | 0.012 | -26.0      | 0.759 | -179.4     |
| 2000    | 0.886 | 166.8      | 2.03  | 9.6        | 0.011 | -24.3      | 0.763 | 179.0      |
| 2050    | 0.882 | 166.0      | 1.95  | 8.0        | 0.011 | -21.0      | 0.768 | 177.1      |
| 2100    | 0.878 | 164.6      | 1.87  | 6.2        | 0.010 | -18.4      | 0.776 | 175.3      |
| 2150    | 0.877 | 163.1      | 1.80  | 4.2        | 0.010 | -15.2      | 0.785 | 174.0      |
| 2200    | 0.883 | 161.5      | 1.74  | 2.2        | 0.010 | -10.2      | 0.787 | 172.3      |
| 2250    | 0.891 | 159.9      | 1.68  | 0.1        | 0.009 | -6.5       | 0.792 | 170.6      |
| 2300    | 0.892 | 158.6      | 1.63  | -1.9       | 0.010 | -2.2       | 0.799 | 168.9      |
| 2350    | 0.896 | 157.7      | 1.58  | -3.8       | 0.009 | 1.0        | 0.804 | 167.5      |
| 2400    | 0.892 | 156.4      | 1.53  | -5.7       | 0.009 | 4.1        | 0.806 | 166.0      |
| 2450    | 0.885 | 155.1      | 1.47  | -7.5       | 0.010 | 7.7        | 0.810 | 164.3      |
| 2500    | 0.884 | 153.0      | 1.43  | -9.4       | 0.010 | 11.4       | 0.816 | 162.7      |

## S Parameter

(V<sub>DS</sub> = 7.2 V, I<sub>DQ</sub> = 50 mA, Z<sub>o</sub> = 50 Ω)

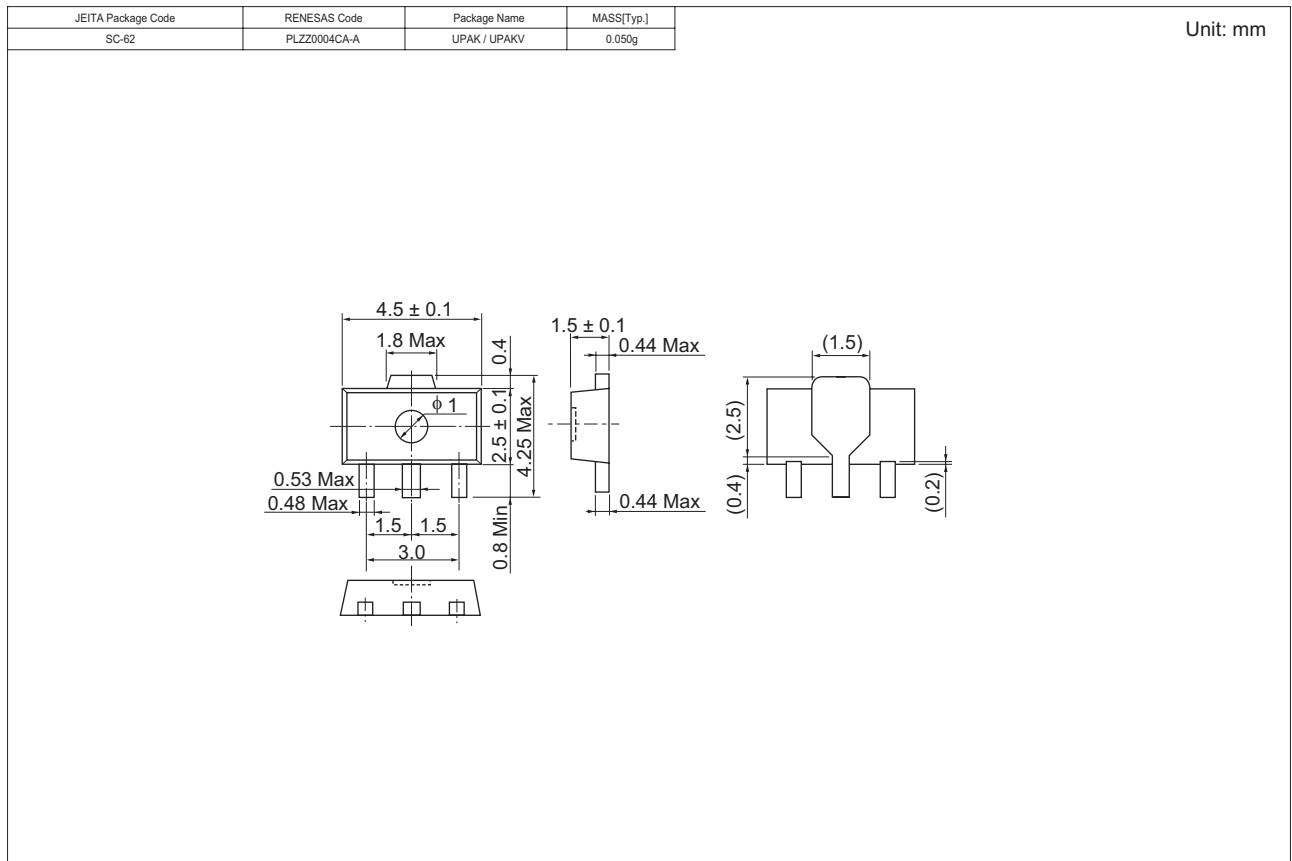
| f (MHz) | S11   |            | S21   |            | S12   |            | S22   |            |
|---------|-------|------------|-------|------------|-------|------------|-------|------------|
|         | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) |
| 100     | 0.978 | -39.6      | 19.82 | 151.1      | 0.017 | 73.5       | 0.701 | -27.0      |
| 150     | 0.927 | -56.8      | 17.53 | 138.2      | 0.024 | 50.7       | 0.654 | -46.3      |
| 200     | 0.899 | -71.6      | 15.97 | 128.4      | 0.029 | 39.5       | 0.619 | -59.5      |
| 250     | 0.877 | -84.2      | 14.52 | 120.0      | 0.032 | 31.8       | 0.591 | -70.5      |
| 300     | 0.869 | -95.5      | 12.92 | 112.1      | 0.033 | 24.7       | 0.569 | -79.3      |
| 350     | 0.850 | -104.7     | 11.88 | 105.7      | 0.034 | 18.1       | 0.565 | -87.1      |
| 400     | 0.834 | -112.9     | 10.89 | 99.4       | 0.035 | 13.0       | 0.554 | -93.7      |
| 450     | 0.828 | -119.5     | 9.93  | 94.0       | 0.035 | 8.3        | 0.551 | -99.2      |
| 500     | 0.815 | -125.4     | 9.13  | 88.7       | 0.036 | 3.8        | 0.551 | -104.1     |
| 550     | 0.816 | -130.4     | 8.40  | 84.3       | 0.035 | -0.2       | 0.553 | -108.6     |
| 600     | 0.812 | -134.5     | 7.77  | 80.1       | 0.035 | -3.7       | 0.558 | -112.6     |
| 650     | 0.807 | -138.5     | 7.21  | 76.2       | 0.034 | -7.1       | 0.564 | -116.1     |
| 700     | 0.805 | -142.2     | 6.69  | 72.5       | 0.034 | -10.0      | 0.571 | -119.6     |
| 750     | 0.807 | -145.8     | 6.21  | 69.0       | 0.033 | -13.0      | 0.581 | -122.9     |
| 800     | 0.808 | -149.0     | 5.79  | 65.3       | 0.033 | -15.8      | 0.591 | -125.8     |
| 850     | 0.814 | -151.7     | 5.41  | 62.0       | 0.032 | -18.2      | 0.599 | -128.7     |
| 900     | 0.816 | -154.2     | 5.07  | 58.7       | 0.031 | -20.1      | 0.609 | -131.5     |
| 950     | 0.820 | -156.5     | 4.79  | 55.5       | 0.030 | -22.6      | 0.619 | -134.2     |
| 1000    | 0.823 | -158.8     | 4.54  | 52.7       | 0.029 | -24.6      | 0.631 | -136.8     |
| 1050    | 0.829 | -161.1     | 4.30  | 50.0       | 0.028 | -26.4      | 0.642 | -139.3     |
| 1100    | 0.837 | -163.0     | 4.07  | 47.5       | 0.027 | -28.5      | 0.653 | -141.6     |
| 1150    | 0.843 | -164.8     | 3.86  | 44.8       | 0.026 | -29.9      | 0.661 | -144.0     |
| 1200    | 0.848 | -166.7     | 3.66  | 42.5       | 0.025 | -31.4      | 0.672 | -146.3     |
| 1250    | 0.850 | -168.3     | 3.45  | 40.0       | 0.024 | -32.9      | 0.682 | -148.3     |
| 1300    | 0.851 | -169.6     | 3.27  | 37.7       | 0.023 | -34.0      | 0.691 | -150.4     |
| 1350    | 0.848 | -171.6     | 3.11  | 34.9       | 0.022 | -35.0      | 0.700 | -152.5     |
| 1400    | 0.849 | -173.5     | 2.96  | 32.5       | 0.021 | -36.0      | 0.710 | -154.6     |
| 1450    | 0.851 | -175.3     | 2.82  | 30.1       | 0.020 | -37.1      | 0.717 | -156.4     |
| 1500    | 0.854 | -176.9     | 2.69  | 28.1       | 0.019 | -37.7      | 0.722 | -158.6     |
| 1550    | 0.857 | -178.7     | 2.57  | 25.5       | 0.018 | -38.4      | 0.731 | -160.7     |
| 1600    | 0.861 | -179.9     | 2.45  | 23.6       | 0.017 | -38.4      | 0.738 | -162.5     |
| 1650    | 0.864 | -178.7     | 2.35  | 21.4       | 0.016 | -38.5      | 0.742 | -164.3     |
| 1700    | 0.865 | -177.1     | 2.26  | 19.1       | 0.015 | -38.3      | 0.749 | -166.5     |
| 1750    | 0.865 | -175.2     | 2.17  | 16.9       | 0.014 | -37.9      | 0.757 | -168.4     |
| 1800    | 0.874 | -173.3     | 2.09  | 14.5       | 0.013 | -37.6      | 0.764 | -170.2     |
| 1850    | 0.880 | -171.7     | 2.02  | 12.6       | 0.013 | -36.4      | 0.767 | -172.2     |
| 1900    | 0.888 | -170.5     | 1.94  | 10.8       | 0.012 | -34.9      | 0.775 | -174.3     |
| 1950    | 0.895 | -169.3     | 1.87  | 9.1        | 0.011 | -32.4      | 0.785 | -176.0     |
| 2000    | 0.898 | -168.4     | 1.79  | 7.8        | 0.010 | -30.7      | 0.786 | -177.5     |
| 2050    | 0.893 | -167.4     | 1.72  | 6.1        | 0.010 | -26.5      | 0.791 | -179.6     |
| 2100    | 0.891 | -166.1     | 1.65  | 4.3        | 0.009 | -24.2      | 0.799 | 178.6      |
| 2150    | 0.891 | -164.5     | 1.59  | 2.3        | 0.009 | -19.9      | 0.808 | 177.1      |
| 2200    | 0.896 | -162.8     | 1.53  | 0.3        | 0.009 | -14.9      | 0.809 | 175.3      |
| 2250    | 0.901 | -161.4     | 1.48  | -1.7       | 0.008 | -10.2      | 0.813 | 173.5      |
| 2300    | 0.902 | -160.0     | 1.43  | -3.9       | 0.008 | -5.4       | 0.821 | 171.8      |
| 2350    | 0.903 | -158.8     | 1.39  | -5.7       | 0.008 | -0.3       | 0.824 | 170.4      |
| 2400    | 0.901 | -157.6     | 1.35  | -7.6       | 0.008 | 4.0        | 0.826 | 168.7      |
| 2450    | 0.894 | -156.2     | 1.30  | -9.4       | 0.009 | 8.7        | 0.830 | 166.8      |
| 2500    | 0.895 | -154.2     | 1.26  | -11.3      | 0.009 | 12.7       | 0.835 | 165.3      |

## S Parameter

(V<sub>DS</sub> = 7.5 V, I<sub>DQ</sub> = 50 mA, Z<sub>o</sub> = 50 Ω)

| f (MHz) | S11   |            | S21   |            | S12   |            | S22   |            |
|---------|-------|------------|-------|------------|-------|------------|-------|------------|
|         | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) |
| 100     | 0.986 | -38.8      | 20.01 | 150.8      | 0.016 | 71.9       | 0.689 | -26.5      |
| 150     | 0.929 | -56.2      | 17.57 | 138.8      | 0.023 | 51.6       | 0.647 | -46.0      |
| 200     | 0.901 | -71.3      | 16.07 | 128.8      | 0.028 | 40.1       | 0.612 | -59.1      |
| 250     | 0.879 | -84.0      | 14.61 | 120.1      | 0.031 | 31.9       | 0.585 | -69.9      |
| 300     | 0.872 | -95.1      | 13.00 | 112.6      | 0.032 | 25.2       | 0.564 | -78.7      |
| 350     | 0.851 | -104.4     | 11.95 | 106.0      | 0.034 | 19.0       | 0.560 | -86.6      |
| 400     | 0.838 | -112.5     | 10.97 | 99.7       | 0.035 | 13.5       | 0.550 | -93.1      |
| 450     | 0.831 | -119.1     | 10.01 | 94.3       | 0.035 | 8.7        | 0.547 | -98.7      |
| 500     | 0.821 | -125.2     | 9.19  | 89.3       | 0.035 | 4.2        | 0.547 | -103.5     |
| 550     | 0.817 | -130.0     | 8.47  | 84.7       | 0.035 | 0.3        | 0.549 | -108.0     |
| 600     | 0.817 | -134.4     | 7.84  | 80.4       | 0.034 | -3.3       | 0.554 | -112.0     |
| 650     | 0.807 | -138.3     | 7.27  | 76.4       | 0.034 | -6.7       | 0.560 | -115.7     |
| 700     | 0.808 | -142.2     | 6.74  | 72.9       | 0.033 | -9.5       | 0.568 | -119.0     |
| 750     | 0.807 | -145.7     | 6.25  | 69.1       | 0.033 | -12.4      | 0.577 | -122.3     |
| 800     | 0.809 | -148.8     | 5.85  | 65.6       | 0.032 | -15.3      | 0.587 | -125.3     |
| 850     | 0.816 | -151.6     | 5.46  | 62.3       | 0.031 | -17.8      | 0.596 | -128.2     |
| 900     | 0.820 | -154.3     | 5.14  | 59.1       | 0.030 | -19.5      | 0.605 | -131.0     |
| 950     | 0.820 | -156.5     | 4.84  | 55.8       | 0.029 | -22.1      | 0.615 | -133.7     |
| 1000    | 0.826 | -158.6     | 4.58  | 53.1       | 0.029 | -24.0      | 0.628 | -136.3     |
| 1050    | 0.832 | -161.0     | 4.34  | 50.3       | 0.028 | -26.0      | 0.639 | -138.9     |
| 1100    | 0.835 | -162.8     | 4.11  | 47.8       | 0.027 | -27.9      | 0.649 | -141.2     |
| 1150    | 0.842 | -165.0     | 3.90  | 45.3       | 0.026 | -29.5      | 0.658 | -143.5     |
| 1200    | 0.850 | -166.6     | 3.70  | 42.9       | 0.025 | -30.9      | 0.669 | -145.8     |
| 1250    | 0.854 | -167.9     | 3.50  | 40.6       | 0.024 | -32.1      | 0.679 | -147.8     |
| 1300    | 0.853 | -169.6     | 3.31  | 37.9       | 0.023 | -33.4      | 0.688 | -149.9     |
| 1350    | 0.848 | -171.4     | 3.14  | 35.3       | 0.022 | -34.3      | 0.696 | -152.0     |
| 1400    | 0.850 | -173.4     | 3.00  | 32.8       | 0.021 | -35.3      | 0.707 | -154.2     |
| 1450    | 0.851 | -175.2     | 2.85  | 30.6       | 0.020 | -36.1      | 0.713 | -155.9     |
| 1500    | 0.853 | -176.7     | 2.72  | 28.1       | 0.019 | -36.8      | 0.719 | -158.1     |
| 1550    | 0.857 | -178.3     | 2.60  | 25.9       | 0.018 | -37.3      | 0.727 | -160.2     |
| 1600    | 0.862 | -179.9     | 2.48  | 23.6       | 0.017 | -37.2      | 0.735 | -162.1     |
| 1650    | 0.866 | -178.8     | 2.38  | 21.7       | 0.016 | -37.3      | 0.739 | -163.9     |
| 1700    | 0.865 | -177.1     | 2.28  | 19.3       | 0.015 | -37.7      | 0.745 | -166.0     |
| 1750    | 0.869 | -175.1     | 2.20  | 17.0       | 0.014 | -36.7      | 0.754 | -168.0     |
| 1800    | 0.874 | -173.4     | 2.12  | 14.9       | 0.013 | -36.4      | 0.761 | -169.7     |
| 1850    | 0.882 | -171.9     | 2.05  | 12.9       | 0.012 | -34.5      | 0.765 | -171.8     |
| 1900    | 0.889 | -170.6     | 1.97  | 11.1       | 0.012 | -33.5      | 0.772 | -173.9     |
| 1950    | 0.895 | -169.4     | 1.89  | 9.5        | 0.011 | -31.0      | 0.782 | -175.5     |
| 2000    | 0.897 | -168.5     | 1.82  | 8.0        | 0.010 | -29.2      | 0.784 | -177.2     |
| 2050    | 0.896 | -167.7     | 1.74  | 6.4        | 0.010 | -25.2      | 0.789 | -179.2     |
| 2100    | 0.892 | -166.1     | 1.67  | 4.7        | 0.009 | -22.6      | 0.797 | -179.0     |
| 2150    | 0.892 | -164.4     | 1.61  | 2.5        | 0.009 | -18.1      | 0.805 | -177.5     |
| 2200    | 0.897 | -162.9     | 1.56  | 0.4        | 0.009 | -12.7      | 0.807 | -175.8     |
| 2250    | 0.899 | -161.6     | 1.50  | -1.6       | 0.008 | -8.6       | 0.811 | -173.9     |
| 2300    | 0.902 | -160.0     | 1.46  | -3.8       | 0.008 | -2.5       | 0.819 | -172.1     |
| 2350    | 0.905 | -158.7     | 1.41  | -5.7       | 0.008 | 2.0        | 0.822 | -170.8     |
| 2400    | 0.901 | -157.7     | 1.37  | -7.3       | 0.008 | 6.0        | 0.824 | -169.0     |
| 2450    | 0.896 | -156.0     | 1.32  | -9.2       | 0.009 | 10.1       | 0.828 | -167.2     |
| 2500    | 0.895 | -154.3     | 1.27  | -10.9      | 0.009 | 14.5       | 0.834 | -165.6     |

## Package Dimensions



## Ordering Information

| Part Name     | Quantity | Shipping Container                      |
|---------------|----------|---|
| RQA0004LXTL-E | 1000 pcs | $\phi 178$ mm reel, 12 mm emboss taping |

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

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