

# RQA0001DNS

## Silicon N-Channel MOS FET

REJ03G0582-0300

Rev.3.00

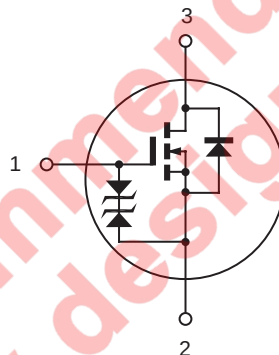
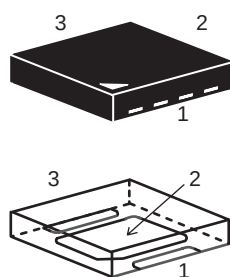
Oct 11, 2006

### Features

- High Output Power, High Gain, High Efficiency  
Pout = +33 dBm, Linear Gain = 21 dB, PAE = 68% (f = 520 MHz)
- Small Outline Package (WSN0303-2: 3.0 × 3.0 × 0.8mm)

### Outline

RENESAS Package code: PWSN0002ZA-A  
(Package name: HWSN-2 <WSN0303-2>)



1. Gate
2. Source
3. Drain

Note: Marking is "A0001".

### Absolute Maximum Ratings

(Ta = 25°C)

| Item                    | Symbol                          | Ratings     | Unit |
|-------------------------|---------------------------------|-------------|------|
| Drain to source voltage | V <sub>bss</sub>                | 16          | V    |
| Gate to source voltage  | V <sub>GSS</sub>                | ±5          | V    |
| Drain current           | I <sub>D</sub>                  | 0.8         | A    |
| Channel dissipation     | P <sub>ch</sub> <sup>note</sup> | 5           | 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

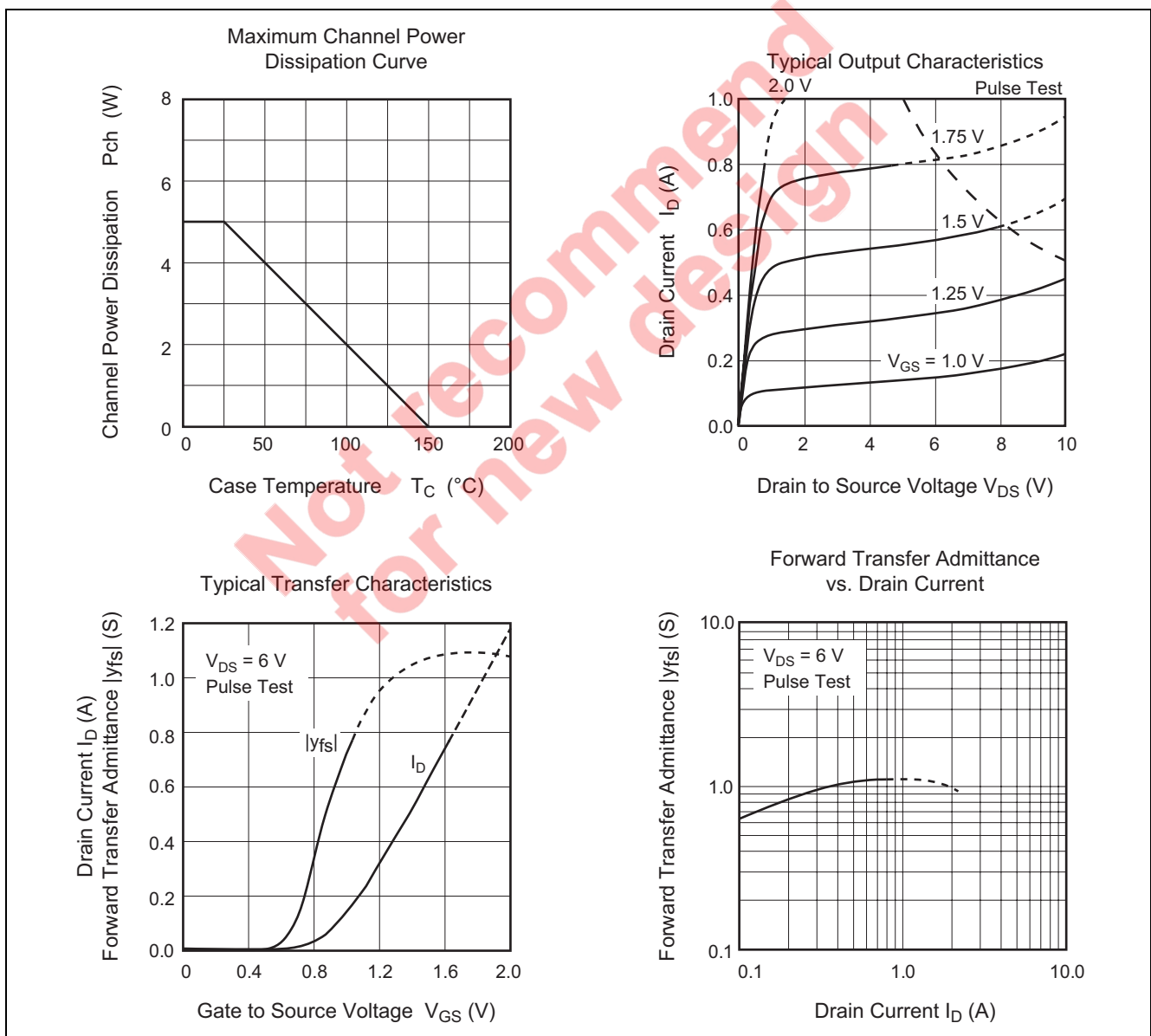
This Device is sensitive to Electro Static Discharge. An Adequate careful handling procedure is requested.

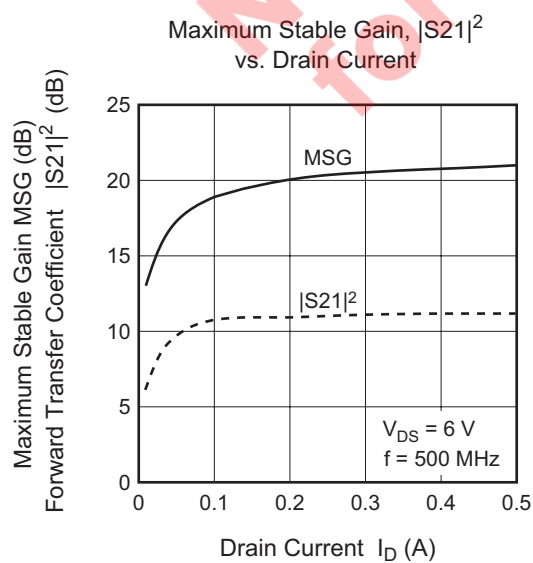
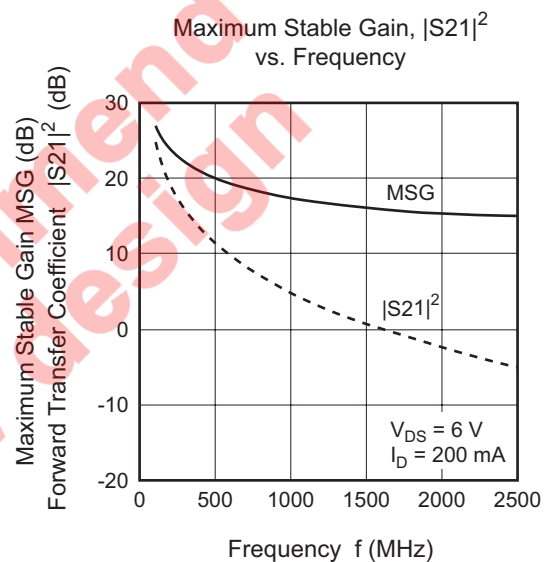
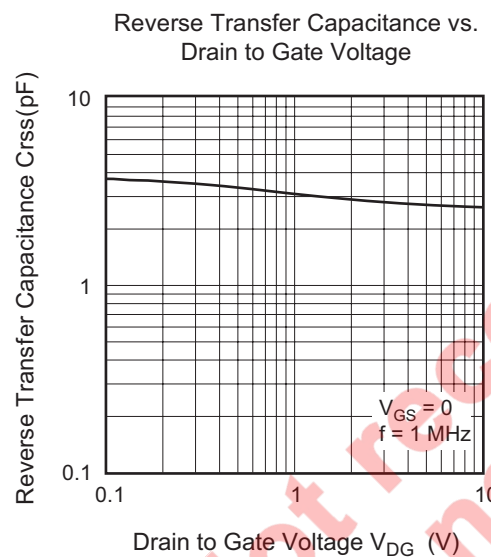
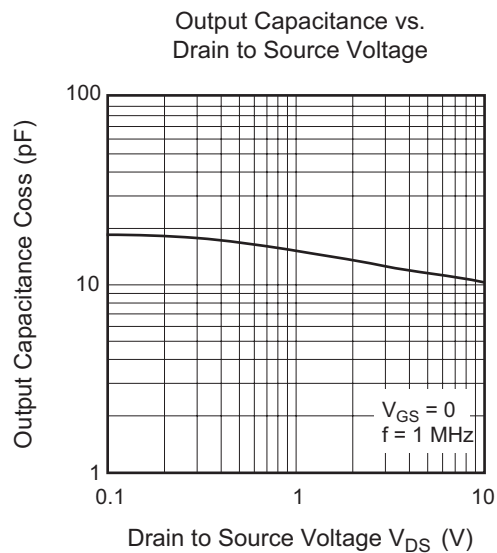
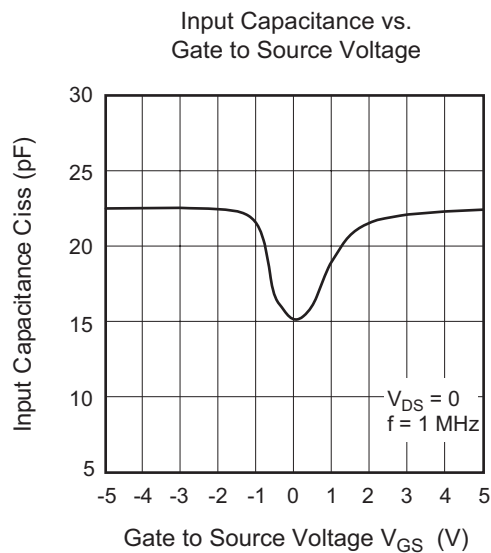
## Electrical Characteristics

(Ta = 25°C)

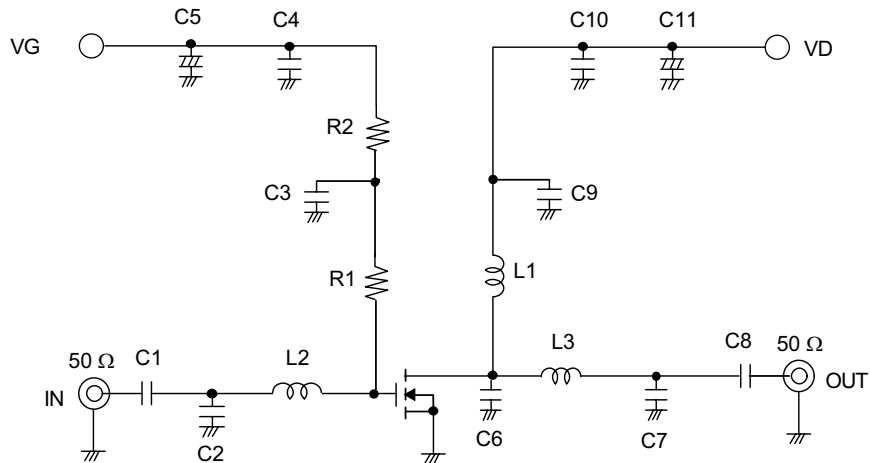
| Item                            | Symbol        | Min. | Typ  | Max.    | Unit    | Test Conditions                       |
|---------------------------------|---------------|------|------|---------|---------|---------------------------------------|
| Zero gate voltage drain current | $I_{DSS}$     | —    | —    | 10      | $\mu A$ | $V_{DS} = 16 V, V_{GS} = 0$           |
| Gate to source leakage current  | $I_{GSS}$     | —    | —    | $\pm 2$ | $\mu A$ | $V_{GS} = \pm 5 V, V_{DS} = 0$        |
| Gate to source cutoff voltage   | $V_{GS(off)}$ | 0.15 | 0.45 | 0.75    | V       | $V_{DS} = 6 V, I_D = 1 mA$            |
| Forward Transfer Admittance     | $ y_{fs} $    | 0.6  | 1.1  | 1.6     | S       | $V_{DS} = 6 V, I_D = 600 mA$          |
| Input capacitance               | $C_{iss}$     | —    | 22   | —       | pF      | $V_{GS} = 5 V, V_{DS} = 0, f = 1 MHz$ |
| Output capacitance              | $C_{oss}$     | —    | 12   | —       | pF      | $V_{DS} = 6 V, V_{GS} = 0, f = 1 MHz$ |
| Reverse transfer capacitance    | $C_{rss}$     | —    | 2.6  | —       | pF      | $V_{DS} = 6 V, V_{GS} = 0, f = 1 MHz$ |
| Output Power                    | $P_{out}$     | 32   | 33   | —       | dBm     | $V_{DS} = 6 V, I_{DQ} = 200 mA$       |
|                                 |               | 1.58 | 2    | —       | W       | $f = 520 MHz,$                        |
| Power Added Efficiency          | PAE           | 55   | 68   | —       | %       | $P_{in} = +20 dBm (100 mW)$           |

## Main Characteristics

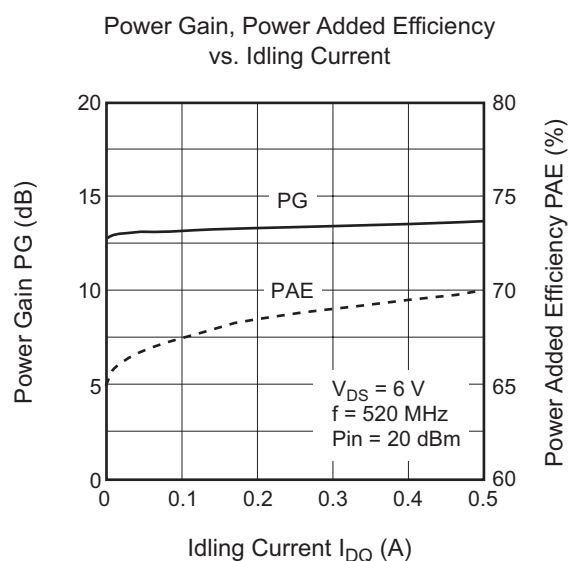
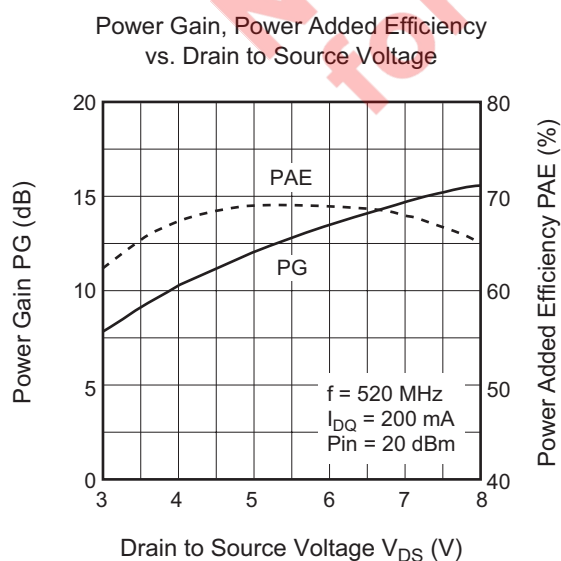
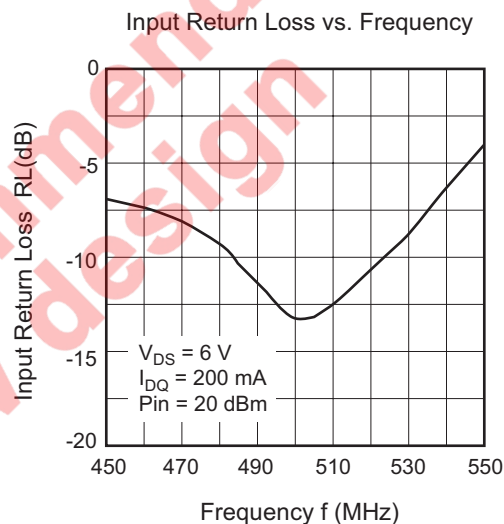
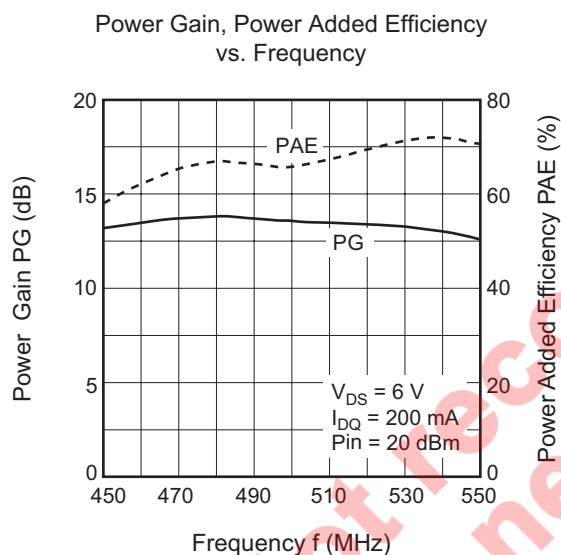
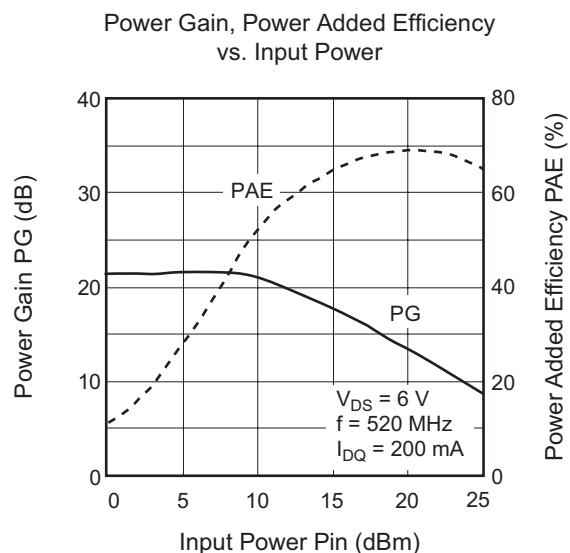
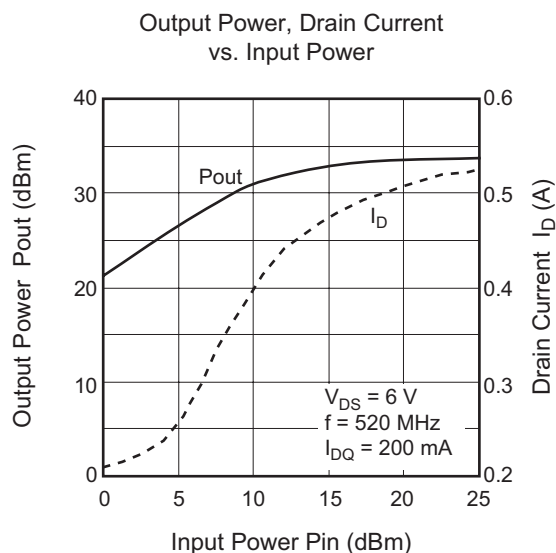


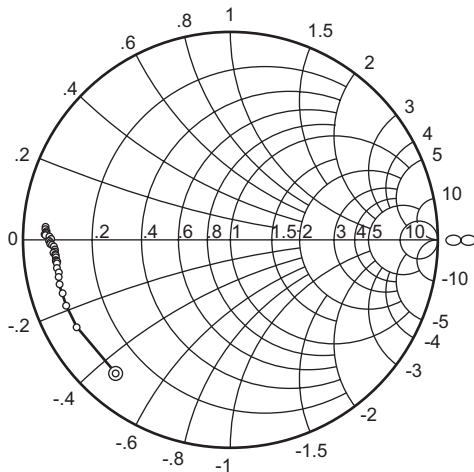


## Evaluation Circuit (f = 520 MHz)

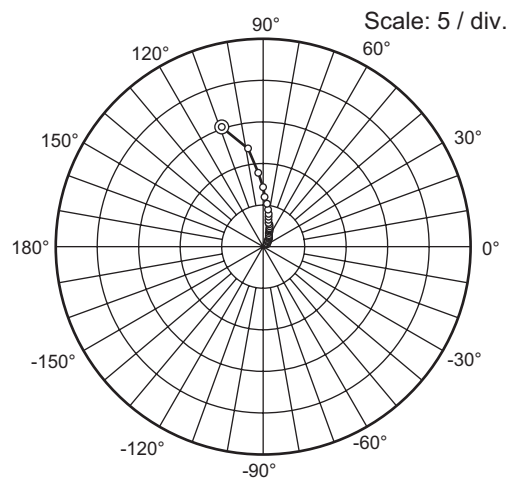


- C1, C8: 68 pF Chip Capacitor  
 C2: 15 pF Chip Capacitor  
 C3, C9: 100 pF Chip Capacitor  
 C4, C10: 1000 pF Chip Capacitor  
 C5, C11: 2.2  $\mu$ F Electrolysis Capacitor  
 C6: 4 pF Chip Capacitor  
 C7: 12 pF Chip Capacitor  
 L1: 8 Turns D: 0.5 mm,  $\phi$  2.4 mm Enamel Wire  
 L2: 4.7 nH Chip Inductor  
 L3: 3.6 nH Chip Inductor  
 R1: 33  $\Omega$  Chip Resistor  
 R2: 2.7 k $\Omega$  Chip Resistor

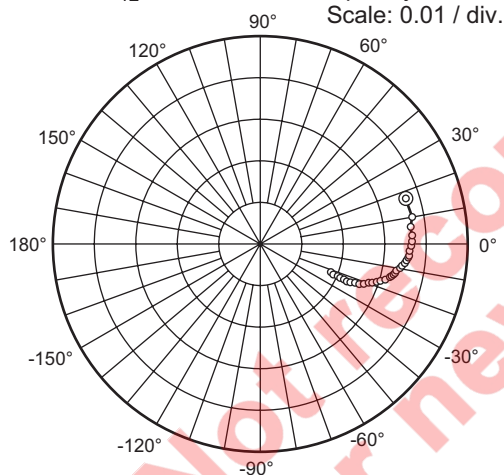


$S_{11}$  Parameter vs. Frequency

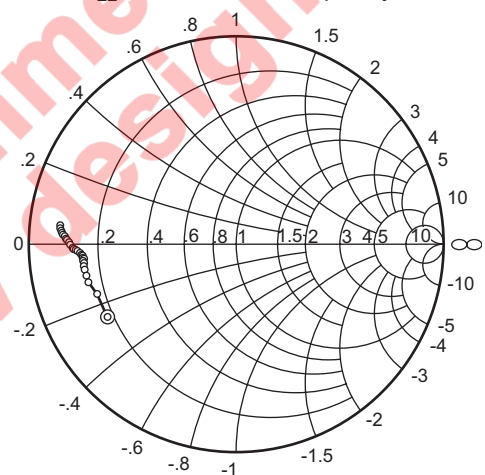
Condition:  $V_{DS} = 6V$ ,  $I_{DQ} = 200\text{ mA}$ ,  $Z_o = 50\ \Omega$   
 100 to 1000 MHz (50 MHz Step)  
 1000 to 2500 MHz (200 MHz Step)

 $S_{21}$  Parameter vs. Frequency

Condition:  $V_{DS} = 6V$ ,  $I_{DQ} = 200\text{ mA}$ ,  $Z_o = 50\ \Omega$   
 100 to 1000 MHz (50 MHz Step)  
 1000 to 2500 MHz (200 MHz Step)

 $S_{12}$  Parameter vs. Frequency

Condition:  $V_{DS} = 6V$ ,  $I_{DQ} = 200\text{ mA}$ ,  $Z_o = 50\ \Omega$   
 100 to 1000 MHz (50 MHz Step)  
 1000 to 2500 MHz (200 MHz Step)

 $S_{22}$  Parameter vs. Frequency

Condition:  $V_{DS} = 6V$ ,  $I_{DQ} = 200\text{ mA}$ ,  $Z_o = 50\ \Omega$   
 100 to 1000 MHz (50 MHz Step)  
 1000 to 2500 MHz (200 MHz Step)

## 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     | 0.823 | -115.4     | 12.90 | 113.1      | 0.056 | 20.6       | 0.664 | -128.9     |
| 150     | 0.809 | -136.7     | 10.15 | 102.5      | 0.058 | 11.1       | 0.648 | -144.3     |
| 200     | 0.805 | -148.3     | 7.75  | 94.5       | 0.058 | 5.8        | 0.662 | -152.3     |
| 250     | 0.798 | -154.5     | 6.30  | 89.3       | 0.058 | 1.2        | 0.665 | -156.8     |
| 300     | 0.797 | -158.5     | 5.28  | 85.2       | 0.058 | -2.0       | 0.666 | -159.8     |
| 350     | 0.796 | -161.4     | 4.51  | 81.6       | 0.058 | -4.9       | 0.668 | -162.1     |
| 400     | 0.795 | -163.5     | 3.93  | 78.6       | 0.057 | -7.6       | 0.671 | -163.7     |
| 450     | 0.797 | -165.0     | 3.47  | 75.7       | 0.057 | -10.0      | 0.676 | -164.8     |
| 500     | 0.800 | -166.5     | 3.11  | 73.0       | 0.056 | -12.3      | 0.678 | -165.7     |
| 550     | 0.803 | -167.5     | 2.79  | 70.6       | 0.055 | -14.3      | 0.682 | -166.5     |
| 600     | 0.808 | -168.3     | 2.53  | 68.2       | 0.054 | -16.1      | 0.688 | -166.9     |
| 650     | 0.809 | -169.0     | 2.31  | 66.0       | 0.053 | -17.8      | 0.691 | -167.5     |
| 700     | 0.813 | -169.6     | 2.11  | 63.8       | 0.053 | -19.4      | 0.694 | -167.9     |
| 750     | 0.815 | -170.1     | 1.94  | 61.7       | 0.052 | -21.0      | 0.702 | -168.1     |
| 800     | 0.817 | -170.5     | 1.80  | 59.8       | 0.051 | -22.5      | 0.707 | -168.4     |
| 850     | 0.822 | -170.9     | 1.67  | 57.8       | 0.050 | -23.7      | 0.713 | -168.6     |
| 900     | 0.826 | -171.5     | 1.56  | 55.8       | 0.049 | -24.9      | 0.720 | -169.0     |
| 950     | 0.828 | -171.8     | 1.46  | 54.1       | 0.048 | -26.3      | 0.727 | -169.2     |
| 1000    | 0.828 | -172.1     | 1.37  | 52.4       | 0.047 | -27.5      | 0.734 | -169.5     |
| 1050    | 0.831 | -172.8     | 1.29  | 50.4       | 0.046 | -28.7      | 0.741 | -169.9     |
| 1100    | 0.834 | -173.4     | 1.22  | 48.9       | 0.045 | -29.9      | 0.750 | -170.2     |
| 1150    | 0.839 | -173.9     | 1.16  | 47.2       | 0.044 | -31.1      | 0.758 | -170.6     |
| 1200    | 0.847 | -174.1     | 1.10  | 45.9       | 0.043 | -32.1      | 0.765 | -171.0     |
| 1250    | 0.856 | -174.2     | 1.05  | 44.5       | 0.042 | -33.1      | 0.773 | -171.4     |
| 1300    | 0.857 | -174.4     | 0.99  | 42.9       | 0.041 | -33.9      | 0.780 | -171.8     |
| 1350    | 0.859 | -174.6     | 0.94  | 41.3       | 0.041 | -35.0      | 0.787 | -172.2     |
| 1400    | 0.859 | -175.0     | 0.90  | 39.9       | 0.039 | -35.9      | 0.793 | -172.6     |
| 1450    | 0.863 | -175.3     | 0.85  | 38.1       | 0.039 | -36.7      | 0.799 | -173.0     |
| 1500    | 0.867 | -175.7     | 0.82  | 36.7       | 0.038 | -37.5      | 0.804 | -173.5     |
| 1550    | 0.868 | -175.8     | 0.78  | 35.3       | 0.037 | -38.3      | 0.809 | -174.0     |
| 1600    | 0.871 | -176.1     | 0.74  | 34.0       | 0.036 | -39.1      | 0.814 | -174.4     |
| 1650    | 0.870 | -176.5     | 0.71  | 32.5       | 0.035 | -39.8      | 0.819 | -175.0     |
| 1700    | 0.868 | -176.9     | 0.68  | 31.1       | 0.034 | -40.6      | 0.823 | -175.5     |
| 1750    | 0.869 | -177.4     | 0.65  | 29.6       | 0.033 | -41.3      | 0.827 | -176.1     |
| 1800    | 0.876 | -178.0     | 0.63  | 28.3       | 0.032 | -41.6      | 0.832 | -176.6     |
| 1850    | 0.884 | -178.5     | 0.60  | 27.1       | 0.032 | -42.2      | 0.836 | -177.0     |
| 1900    | 0.892 | -178.8     | 0.58  | 26.1       | 0.031 | -42.8      | 0.839 | -177.5     |
| 1950    | 0.898 | -178.7     | 0.56  | 25.2       | 0.030 | -43.4      | 0.844 | -178.1     |
| 2000    | 0.903 | -178.7     | 0.54  | 24.1       | 0.029 | -43.7      | 0.850 | -178.5     |
| 2050    | 0.903 | -178.5     | 0.52  | 23.3       | 0.028 | -44.0      | 0.852 | -178.8     |
| 2100    | 0.900 | -178.7     | 0.50  | 22.2       | 0.027 | -44.4      | 0.856 | -179.3     |
| 2150    | 0.899 | -178.9     | 0.48  | 21.3       | 0.027 | -44.7      | 0.862 | -179.7     |
| 2200    | 0.897 | -179.4     | 0.46  | 20.2       | 0.026 | -44.8      | 0.865 | -180.0     |
| 2250    | 0.897 | -179.8     | 0.45  | 19.3       | 0.025 | -45.3      | 0.867 | -179.5     |
| 2300    | 0.897 | 179.7      | 0.43  | 18.4       | 0.024 | -45.3      | 0.871 | 178.9      |
| 2350    | 0.901 | 179.5      | 0.42  | 17.2       | 0.024 | -45.5      | 0.877 | 178.6      |
| 2400    | 0.904 | 179.1      | 0.41  | 16.3       | 0.023 | -45.4      | 0.877 | 178.2      |
| 2450    | 0.903 | 178.9      | 0.39  | 15.5       | 0.022 | -45.6      | 0.878 | 177.7      |
| 2500    | 0.906 | 178.4      | 0.38  | 14.4       | 0.022 | -45.8      | 0.881 | 177.2      |

## S parameter

(V<sub>DS</sub> = 6 V, I<sub>DQ</sub> = 100 mA, Z<sub>0</sub> = 50 Ω)

| f (MHz) | S11   |            | S21   |            | S12   |            | S22   |            |
|---------|-------|------------|-------|------------|-------|------------|-------|------------|
|         | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) |
| 100     | 0.850 | -121.5     | 14.14 | 112.6      | 0.044 | 17.8       | 0.690 | -142.4     |
| 150     | 0.835 | -146.3     | 11.33 | 99.7       | 0.045 | 10.0       | 0.687 | -154.5     |
| 200     | 0.830 | -154.9     | 8.50  | 93.6       | 0.045 | 5.7        | 0.705 | -160.7     |
| 250     | 0.831 | -160.2     | 6.88  | 89.5       | 0.045 | 2.0        | 0.709 | -164.2     |
| 300     | 0.827 | -163.4     | 5.76  | 86.0       | 0.045 | -0.6       | 0.710 | -166.5     |
| 350     | 0.823 | -165.8     | 4.91  | 83.1       | 0.045 | -2.7       | 0.712 | -168.3     |
| 400     | 0.822 | -167.5     | 4.28  | 80.7       | 0.044 | -4.9       | 0.713 | -169.5     |
| 450     | 0.823 | -169.0     | 3.79  | 78.2       | 0.044 | -6.9       | 0.715 | -170.5     |
| 500     | 0.825 | -170.2     | 3.40  | 75.9       | 0.044 | -8.5       | 0.714 | -171.2     |
| 550     | 0.827 | -171.0     | 3.07  | 74.1       | 0.043 | -10.1      | 0.716 | -171.9     |
| 600     | 0.826 | -171.6     | 2.78  | 72.1       | 0.043 | -11.3      | 0.719 | -172.2     |
| 650     | 0.834 | -172.3     | 2.56  | 70.1       | 0.042 | -12.6      | 0.720 | -172.6     |
| 700     | 0.829 | -173.0     | 2.35  | 68.2       | 0.041 | -13.9      | 0.721 | -173.0     |
| 750     | 0.830 | -173.4     | 2.17  | 66.5       | 0.041 | -15.1      | 0.726 | -173.2     |
| 800     | 0.832 | -173.7     | 2.02  | 64.7       | 0.040 | -16.1      | 0.729 | -173.3     |
| 850     | 0.836 | -174.0     | 1.88  | 62.9       | 0.040 | -17.0      | 0.731 | -173.5     |
| 900     | 0.837 | -174.5     | 1.76  | 61.2       | 0.039 | -18.0      | 0.737 | -173.8     |
| 950     | 0.836 | -174.8     | 1.66  | 59.6       | 0.039 | -19.2      | 0.742 | -173.9     |
| 1000    | 0.838 | -175.0     | 1.57  | 58.1       | 0.038 | -20.1      | 0.745 | -174.1     |
| 1050    | 0.839 | -175.5     | 1.48  | 56.3       | 0.038 | -21.0      | 0.750 | -174.4     |
| 1100    | 0.841 | -176.2     | 1.41  | 54.8       | 0.037 | -22.0      | 0.756 | -174.6     |
| 1150    | 0.846 | -176.5     | 1.34  | 53.5       | 0.037 | -22.9      | 0.762 | -174.8     |
| 1200    | 0.851 | -176.6     | 1.27  | 52.1       | 0.036 | -23.6      | 0.766 | -175.1     |
| 1250    | 0.856 | -176.7     | 1.21  | 51.0       | 0.035 | -24.4      | 0.773 | -175.5     |
| 1300    | 0.858 | -176.9     | 1.15  | 49.4       | 0.035 | -25.1      | 0.777 | -175.6     |
| 1350    | 0.859 | -176.8     | 1.10  | 48.1       | 0.034 | -25.9      | 0.782 | -176.0     |
| 1400    | 0.860 | -177.3     | 1.05  | 46.6       | 0.033 | -26.7      | 0.787 | -176.2     |
| 1450    | 0.864 | -177.5     | 1.00  | 45.0       | 0.033 | -27.3      | 0.790 | -176.4     |
| 1500    | 0.866 | -177.8     | 0.96  | 43.7       | 0.032 | -27.9      | 0.795 | -176.8     |
| 1550    | 0.868 | -178.0     | 0.92  | 42.4       | 0.031 | -28.5      | 0.799 | -177.2     |
| 1600    | 0.867 | -178.1     | 0.88  | 41.0       | 0.031 | -29.0      | 0.803 | -177.5     |
| 1650    | 0.867 | -178.5     | 0.84  | 39.7       | 0.030 | -29.7      | 0.808 | -177.9     |
| 1700    | 0.863 | -178.9     | 0.81  | 38.3       | 0.030 | -30.2      | 0.810 | -178.3     |
| 1750    | 0.865 | -179.2     | 0.78  | 37.0       | 0.029 | -30.8      | 0.815 | -178.8     |
| 1800    | 0.871 | -179.9     | 0.75  | 35.6       | 0.028 | -30.8      | 0.818 | -179.2     |
| 1850    | 0.880 | 179.7      | 0.73  | 34.4       | 0.028 | -31.4      | 0.822 | -179.5     |
| 1900    | 0.885 | 179.6      | 0.70  | 33.3       | 0.027 | -31.8      | 0.824 | -180.0     |
| 1950    | 0.893 | 179.6      | 0.68  | 32.4       | 0.026 | -32.2      | 0.829 | 179.6      |
| 2000    | 0.900 | 179.7      | 0.66  | 31.4       | 0.026 | -32.2      | 0.833 | 179.3      |
| 2050    | 0.897 | 179.8      | 0.63  | 30.5       | 0.025 | -32.5      | 0.836 | 179.1      |
| 2100    | 0.893 | 179.7      | 0.61  | 29.5       | 0.024 | -32.8      | 0.839 | 178.7      |
| 2150    | 0.893 | 179.6      | 0.59  | 28.5       | 0.024 | -32.8      | 0.845 | 178.3      |
| 2200    | 0.891 | 179.2      | 0.57  | 27.7       | 0.023 | -32.7      | 0.847 | 178.1      |
| 2250    | 0.890 | 178.9      | 0.55  | 26.6       | 0.023 | -33.1      | 0.851 | 177.7      |
| 2300    | 0.890 | 178.5      | 0.53  | 25.5       | 0.022 | -33.0      | 0.854 | 177.2      |
| 2350    | 0.894 | 178.2      | 0.52  | 24.5       | 0.022 | -33.1      | 0.859 | 176.9      |
| 2400    | 0.895 | 177.8      | 0.50  | 23.4       | 0.021 | -32.7      | 0.860 | 176.5      |
| 2450    | 0.895 | 177.7      | 0.49  | 22.6       | 0.021 | -33.0      | 0.861 | 176.1      |
| 2500    | 0.896 | 177.2      | 0.47  | 21.7       | 0.020 | -32.9      | 0.862 | 175.6      |



## S parameter

(V<sub>DS</sub> = 6 V, I<sub>DQ</sub> = 200 mA, Z<sub>0</sub> = 50 Ω)

| f (MHz) | S11   |            | S21   |            | S12   |            | S22   |            |
|---------|-------|------------|-------|------------|-------|------------|-------|------------|
|         | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) |
| 100     | 0.847 | -130.3     | 15.20 | 108.9      | 0.037 | 17.2       | 0.713 | -150.4     |
| 150     | 0.856 | -150.5     | 11.84 | 98.7       | 0.037 | 10.0       | 0.714 | -160.3     |
| 200     | 0.855 | -158.2     | 8.83  | 93.3       | 0.037 | 6.2        | 0.734 | -165.2     |
| 250     | 0.850 | -162.5     | 7.13  | 89.9       | 0.037 | 3.0        | 0.738 | -168.1     |
| 300     | 0.850 | -165.4     | 5.97  | 86.8       | 0.037 | 0.6        | 0.740 | -170.1     |
| 350     | 0.848 | -167.8     | 5.12  | 84.1       | 0.037 | -1.2       | 0.741 | -171.8     |
| 400     | 0.845 | -169.5     | 4.45  | 82.0       | 0.036 | -3.0       | 0.741 | -172.6     |
| 450     | 0.849 | -170.9     | 3.95  | 79.8       | 0.036 | -4.6       | 0.742 | -173.5     |
| 500     | 0.846 | -172.2     | 3.55  | 77.6       | 0.036 | -5.7       | 0.740 | -174.2     |
| 550     | 0.846 | -172.9     | 3.20  | 76.0       | 0.035 | -6.9       | 0.742 | -174.8     |
| 600     | 0.847 | -173.3     | 2.92  | 74.4       | 0.035 | -7.9       | 0.743 | -175.0     |
| 650     | 0.849 | -174.1     | 2.68  | 72.6       | 0.035 | -9.1       | 0.743 | -175.5     |
| 700     | 0.849 | -174.7     | 2.47  | 70.9       | 0.034 | -10.0      | 0.744 | -175.8     |
| 750     | 0.848 | -175.1     | 2.28  | 69.4       | 0.034 | -11.0      | 0.746 | -175.8     |
| 800     | 0.850 | -175.2     | 2.13  | 68.1       | 0.034 | -11.7      | 0.749 | -176.0     |
| 850     | 0.854 | -175.7     | 2.00  | 66.3       | 0.033 | -12.5      | 0.750 | -176.2     |
| 900     | 0.851 | -176.2     | 1.87  | 64.6       | 0.033 | -13.1      | 0.754 | -176.5     |
| 950     | 0.849 | -176.6     | 1.76  | 63.2       | 0.033 | -13.9      | 0.758 | -176.6     |
| 1000    | 0.851 | -176.7     | 1.67  | 61.7       | 0.032 | -14.7      | 0.761 | -176.8     |
| 1050    | 0.852 | -177.2     | 1.58  | 60.1       | 0.032 | -15.3      | 0.763 | -177.0     |
| 1100    | 0.852 | -177.8     | 1.50  | 58.7       | 0.031 | -16.2      | 0.768 | -177.3     |
| 1150    | 0.860 | -177.9     | 1.44  | 57.6       | 0.031 | -16.9      | 0.772 | -177.5     |
| 1200    | 0.861 | -178.2     | 1.37  | 56.4       | 0.030 | -17.3      | 0.775 | -177.6     |
| 1250    | 0.868 | -178.3     | 1.31  | 55.1       | 0.030 | -18.0      | 0.780 | -178.0     |
| 1300    | 0.867 | -178.5     | 1.25  | 53.8       | 0.030 | -18.4      | 0.783 | -178.1     |
| 1350    | 0.867 | -178.5     | 1.19  | 52.4       | 0.029 | -19.0      | 0.787 | -178.4     |
| 1400    | 0.870 | -178.8     | 1.14  | 50.9       | 0.029 | -19.6      | 0.790 | -178.5     |
| 1450    | 0.868 | -179.1     | 1.09  | 49.4       | 0.028 | -20.1      | 0.793 | -178.7     |
| 1500    | 0.872 | -179.3     | 1.05  | 48.3       | 0.028 | -20.2      | 0.797 | -179.1     |
| 1550    | 0.872 | -179.4     | 1.01  | 46.9       | 0.027 | -20.8      | 0.799 | -179.4     |
| 1600    | 0.873 | -179.5     | 0.97  | 45.8       | 0.027 | -21.2      | 0.803 | -179.7     |
| 1650    | 0.869 | -179.8     | 0.93  | 44.4       | 0.026 | -21.7      | 0.807 | 180.0      |
| 1700    | 0.867 | 179.9      | 0.89  | 43.2       | 0.026 | -22.0      | 0.809 | 179.6      |
| 1750    | 0.869 | 179.4      | 0.86  | 41.8       | 0.025 | -22.4      | 0.812 | 179.2      |
| 1800    | 0.874 | 178.9      | 0.83  | 40.6       | 0.025 | -22.4      | 0.815 | 178.8      |
| 1850    | 0.881 | 178.5      | 0.81  | 39.4       | 0.024 | -22.6      | 0.817 | 178.6      |
| 1900    | 0.887 | 178.3      | 0.78  | 38.5       | 0.024 | -22.8      | 0.819 | 178.3      |
| 1950    | 0.895 | 178.4      | 0.75  | 37.5       | 0.023 | -22.9      | 0.823 | 177.9      |
| 2000    | 0.898 | 178.5      | 0.73  | 36.5       | 0.023 | -23.1      | 0.828 | 177.6      |
| 2050    | 0.897 | 178.5      | 0.70  | 35.4       | 0.022 | -22.8      | 0.830 | 177.4      |
| 2100    | 0.894 | 178.6      | 0.68  | 34.6       | 0.022 | -23.2      | 0.833 | 177.0      |
| 2150    | 0.892 | 178.5      | 0.66  | 33.8       | 0.022 | -23.0      | 0.838 | 176.7      |
| 2200    | 0.894 | 178.2      | 0.64  | 32.9       | 0.021 | -23.1      | 0.840 | 176.6      |
| 2250    | 0.892 | 177.7      | 0.62  | 31.8       | 0.021 | -23.1      | 0.844 | 176.2      |
| 2300    | 0.891 | 177.4      | 0.60  | 30.8       | 0.020 | -22.7      | 0.846 | 175.8      |
| 2350    | 0.892 | 177.1      | 0.58  | 29.7       | 0.020 | -22.7      | 0.851 | 175.5      |
| 2400    | 0.895 | 176.7      | 0.57  | 28.4       | 0.019 | -22.2      | 0.851 | 175.1      |
| 2450    | 0.895 | 176.5      | 0.55  | 27.7       | 0.019 | -22.1      | 0.852 | 174.8      |
| 2500    | 0.895 | 176.2      | 0.54  | 26.8       | 0.019 | -21.9      | 0.854 | 174.3      |

## S parameter

(V<sub>DS</sub> = 6 V, I<sub>DQ</sub> = 300 mA, Z<sub>0</sub> = 50 Ω)

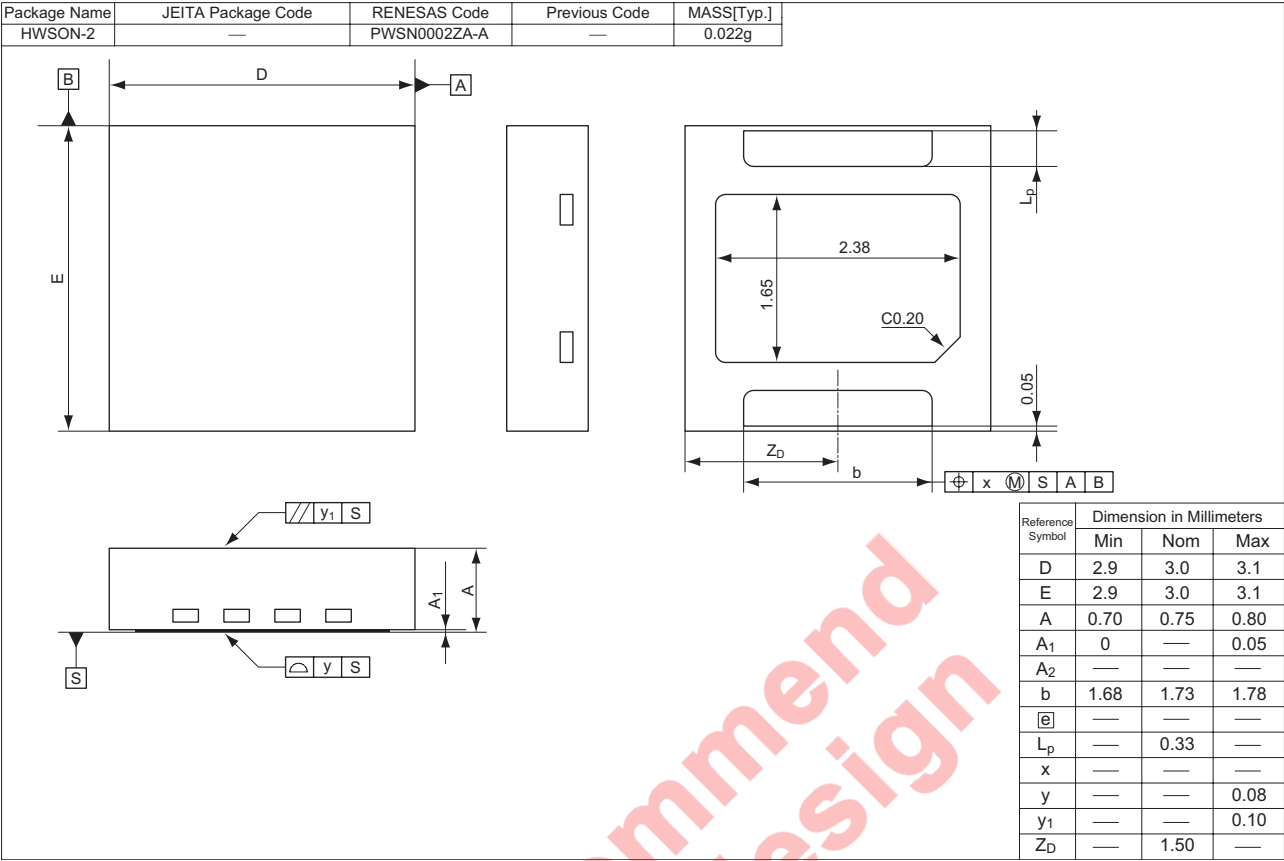
| f (MHz) | S11   |            | S21   |            | S12   |            | S22   |            |
|---------|-------|------------|-------|------------|-------|------------|-------|------------|
|         | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) |
| 100     | 0.864 | -131.1     | 15.08 | 109.1      | 0.034 | 17.0       | 0.720 | -153.1     |
| 150     | 0.869 | -150.3     | 11.79 | 99.0       | 0.034 | 9.4        | 0.723 | -162.2     |
| 200     | 0.868 | -158.2     | 8.84  | 93.9       | 0.034 | 6.6        | 0.745 | -166.8     |
| 250     | 0.865 | -163.1     | 7.16  | 90.1       | 0.034 | 3.1        | 0.751 | -169.3     |
| 300     | 0.862 | -166.0     | 6.00  | 87.2       | 0.034 | 1.6        | 0.750 | -171.1     |
| 350     | 0.857 | -168.3     | 5.13  | 84.8       | 0.034 | -0.9       | 0.749 | -172.7     |
| 400     | 0.853 | -169.7     | 4.47  | 82.6       | 0.034 | -2.1       | 0.751 | -173.6     |
| 450     | 0.854 | -171.3     | 3.98  | 80.6       | 0.033 | -3.7       | 0.751 | -174.4     |
| 500     | 0.855 | -172.4     | 3.58  | 78.5       | 0.033 | -4.9       | 0.749 | -175.1     |
| 550     | 0.853 | -173.5     | 3.24  | 76.8       | 0.033 | -6.1       | 0.748 | -175.6     |
| 600     | 0.854 | -173.9     | 2.95  | 75.3       | 0.033 | -7.0       | 0.751 | -175.8     |
| 650     | 0.857 | -174.3     | 2.73  | 73.8       | 0.032 | -7.8       | 0.750 | -176.1     |
| 700     | 0.855 | -175.1     | 2.51  | 71.9       | 0.032 | -8.3       | 0.752 | -176.5     |
| 750     | 0.853 | -175.3     | 2.32  | 70.4       | 0.032 | -9.6       | 0.754 | -176.6     |
| 800     | 0.856 | -175.7     | 2.17  | 68.8       | 0.031 | -10.1      | 0.756 | -176.8     |
| 850     | 0.857 | -176.2     | 2.03  | 67.3       | 0.031 | -10.7      | 0.758 | -176.9     |
| 900     | 0.858 | -176.6     | 1.91  | 65.7       | 0.031 | -11.1      | 0.760 | -177.2     |
| 950     | 0.856 | -176.7     | 1.80  | 64.5       | 0.030 | -12.2      | 0.764 | -177.4     |
| 1000    | 0.857 | -177.2     | 1.70  | 62.7       | 0.030 | -12.6      | 0.766 | -177.4     |
| 1050    | 0.857 | -177.6     | 1.61  | 61.2       | 0.030 | -13.1      | 0.769 | -177.8     |
| 1100    | 0.858 | -178.4     | 1.53  | 59.8       | 0.029 | -14.1      | 0.773 | -178.0     |
| 1150    | 0.864 | -178.5     | 1.47  | 58.7       | 0.029 | -14.8      | 0.778 | -178.3     |
| 1200    | 0.868 | -178.6     | 1.40  | 57.5       | 0.028 | -14.9      | 0.780 | -178.4     |
| 1250    | 0.871 | -179.0     | 1.34  | 56.2       | 0.028 | -15.6      | 0.784 | -178.8     |
| 1300    | 0.872 | -178.9     | 1.27  | 55.0       | 0.028 | -15.8      | 0.787 | -178.9     |
| 1350    | 0.872 | -179.0     | 1.21  | 53.7       | 0.027 | -16.4      | 0.790 | -179.1     |
| 1400    | 0.872 | -179.2     | 1.16  | 52.2       | 0.027 | -16.8      | 0.793 | -179.3     |
| 1450    | 0.875 | -179.7     | 1.12  | 50.8       | 0.027 | -17.3      | 0.796 | -179.5     |
| 1500    | 0.876 | -179.8     | 1.07  | 49.6       | 0.026 | -17.4      | 0.799 | -179.8     |
| 1550    | 0.876 | -179.8     | 1.03  | 48.4       | 0.026 | -17.9      | 0.802 | 179.9      |
| 1600    | 0.874 | -179.9     | 0.99  | 47.4       | 0.025 | -18.1      | 0.805 | 179.6      |
| 1650    | 0.875 | 179.8      | 0.95  | 45.9       | 0.025 | -18.7      | 0.808 | 179.2      |
| 1700    | 0.872 | 179.4      | 0.91  | 44.5       | 0.025 | -18.9      | 0.810 | 178.9      |
| 1750    | 0.873 | 179.0      | 0.88  | 43.3       | 0.024 | -19.1      | 0.813 | 178.5      |
| 1800    | 0.878 | 178.3      | 0.85  | 42.0       | 0.024 | -19.0      | 0.816 | 178.1      |
| 1850    | 0.884 | 178.1      | 0.83  | 40.9       | 0.023 | -19.2      | 0.818 | 177.9      |
| 1900    | 0.890 | 177.9      | 0.80  | 39.9       | 0.023 | -19.3      | 0.820 | 177.6      |
| 1950    | 0.898 | 178.0      | 0.78  | 38.9       | 0.022 | -19.6      | 0.824 | 177.2      |
| 2000    | 0.903 | 178.0      | 0.75  | 38.0       | 0.022 | -19.6      | 0.827 | 177.0      |
| 2050    | 0.897 | 178.3      | 0.73  | 37.3       | 0.021 | -19.4      | 0.830 | 176.7      |
| 2100    | 0.896 | 178.2      | 0.70  | 36.1       | 0.021 | -19.5      | 0.833 | 176.5      |
| 2150    | 0.894 | 178.0      | 0.68  | 35.3       | 0.021 | -19.2      | 0.838 | 176.1      |
| 2200    | 0.896 | 177.7      | 0.66  | 34.3       | 0.020 | -19.1      | 0.840 | 176.1      |
| 2250    | 0.891 | 177.3      | 0.64  | 33.2       | 0.020 | -19.3      | 0.842 | 175.6      |
| 2300    | 0.892 | 177.0      | 0.62  | 32.3       | 0.020 | -18.8      | 0.845 | 175.1      |
| 2350    | 0.894 | 176.7      | 0.60  | 31.2       | 0.019 | -18.7      | 0.849 | 175.0      |
| 2400    | 0.896 | 176.3      | 0.59  | 30.3       | 0.019 | -17.9      | 0.849 | 174.7      |
| 2450    | 0.897 | 176.4      | 0.57  | 29.2       | 0.018 | -17.9      | 0.850 | 174.3      |
| 2500    | 0.897 | 175.9      | 0.55  | 28.4       | 0.018 | -17.5      | 0.853 | 173.8      |

## S parameter

(V<sub>DS</sub> = 6 V, I<sub>DQ</sub> = 400 mA, Z<sub>0</sub> = 50 Ω)

| f (MHz) | S11   |            | S21   |            | S12   |            | S22   |            |
|---------|-------|------------|-------|------------|-------|------------|-------|------------|
|         | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) | MAG   | ANG (deg.) |
| 100     | 0.899 | -128.3     | 14.60 | 110.0      | 0.033 | 16.5       | 0.721 | -154.3     |
| 150     | 0.877 | -149.7     | 11.59 | 99.4       | 0.033 | 9.7        | 0.726 | -163.0     |
| 200     | 0.874 | -157.9     | 8.76  | 94.3       | 0.033 | 6.7        | 0.749 | -167.2     |
| 250     | 0.867 | -162.7     | 7.11  | 90.4       | 0.033 | 3.7        | 0.753 | -169.7     |
| 300     | 0.866 | -166.0     | 5.97  | 87.4       | 0.033 | 1.4        | 0.754 | -171.5     |
| 350     | 0.860 | -168.2     | 5.11  | 85.0       | 0.032 | -0.2       | 0.754 | -172.9     |
| 400     | 0.859 | -170.0     | 4.47  | 82.8       | 0.032 | -1.9       | 0.755 | -173.7     |
| 450     | 0.857 | -171.3     | 3.97  | 80.8       | 0.032 | -3.1       | 0.756 | -174.4     |
| 500     | 0.861 | -172.6     | 3.58  | 78.9       | 0.032 | -4.3       | 0.754 | -175.0     |
| 550     | 0.860 | -173.4     | 3.24  | 77.2       | 0.032 | -5.3       | 0.757 | -175.4     |
| 600     | 0.860 | -173.8     | 2.96  | 75.6       | 0.031 | -6.2       | 0.757 | -175.8     |
| 650     | 0.861 | -174.5     | 2.72  | 74.1       | 0.031 | -6.9       | 0.758 | -176.1     |
| 700     | 0.862 | -175.1     | 2.51  | 72.3       | 0.031 | -7.7       | 0.761 | -176.4     |
| 750     | 0.860 | -175.5     | 2.33  | 70.7       | 0.031 | -8.6       | 0.761 | -176.6     |
| 800     | 0.860 | -175.7     | 2.17  | 69.2       | 0.030 | -9.3       | 0.764 | -176.8     |
| 850     | 0.861 | -176.2     | 2.03  | 67.6       | 0.030 | -9.9       | 0.767 | -177.1     |
| 900     | 0.862 | -176.7     | 1.92  | 66.0       | 0.030 | -10.4      | 0.769 | -177.3     |
| 950     | 0.861 | -177.2     | 1.80  | 64.5       | 0.029 | -11.3      | 0.772 | -177.5     |
| 1000    | 0.861 | -177.3     | 1.71  | 62.9       | 0.029 | -12.0      | 0.775 | -177.6     |
| 1050    | 0.858 | -177.8     | 1.62  | 61.4       | 0.029 | -12.5      | 0.777 | -178.0     |
| 1100    | 0.862 | -178.4     | 1.54  | 60.0       | 0.028 | -13.2      | 0.780 | -178.4     |
| 1150    | 0.866 | -178.8     | 1.47  | 58.7       | 0.028 | -13.7      | 0.783 | -178.5     |
| 1200    | 0.871 | -178.8     | 1.40  | 57.6       | 0.028 | -14.3      | 0.784 | -178.8     |
| 1250    | 0.876 | -178.9     | 1.34  | 56.5       | 0.027 | -14.7      | 0.789 | -179.1     |
| 1300    | 0.875 | -179.1     | 1.28  | 55.2       | 0.027 | -15.1      | 0.790 | -179.2     |
| 1350    | 0.874 | -179.1     | 1.22  | 53.8       | 0.027 | -15.5      | 0.794 | -179.4     |
| 1400    | 0.876 | -179.5     | 1.17  | 52.5       | 0.026 | -15.9      | 0.796 | -179.6     |
| 1450    | 0.878 | -179.7     | 1.12  | 51.1       | 0.026 | -16.2      | 0.798 | -179.8     |
| 1500    | 0.878 | -180.0     | 1.08  | 49.7       | 0.025 | -16.6      | 0.801 | -179.9     |
| 1550    | 0.880 | -179.9     | 1.03  | 48.6       | 0.025 | -16.7      | 0.803 | -179.6     |
| 1600    | 0.879 | 179.9      | 0.99  | 47.4       | 0.024 | -17.0      | 0.805 | 179.3      |
| 1650    | 0.878 | 179.7      | 0.95  | 46.1       | 0.024 | -17.6      | 0.808 | 179.0      |
| 1700    | 0.873 | 179.2      | 0.91  | 44.9       | 0.024 | -17.6      | 0.810 | 178.7      |
| 1750    | 0.875 | 178.8      | 0.88  | 43.4       | 0.023 | -17.9      | 0.813 | 178.3      |
| 1800    | 0.885 | 178.3      | 0.86  | 42.4       | 0.023 | -17.7      | 0.817 | 177.9      |
| 1850    | 0.888 | 177.8      | 0.83  | 41.1       | 0.022 | -17.9      | 0.818 | 177.7      |
| 1900    | 0.895 | 177.8      | 0.80  | 40.2       | 0.022 | -18.0      | 0.819 | 177.4      |
| 1950    | 0.900 | 177.9      | 0.78  | 39.2       | 0.022 | -18.0      | 0.824 | 177.0      |
| 2000    | 0.901 | 177.8      | 0.75  | 38.2       | 0.021 | -17.9      | 0.828 | 176.8      |
| 2050    | 0.903 | 178.1      | 0.73  | 37.3       | 0.021 | -17.8      | 0.829 | 176.6      |
| 2100    | 0.899 | 178.0      | 0.70  | 36.4       | 0.020 | -17.7      | 0.833 | 176.2      |
| 2150    | 0.896 | 177.7      | 0.68  | 35.5       | 0.020 | -17.4      | 0.838 | 175.9      |
| 2200    | 0.895 | 177.5      | 0.66  | 34.6       | 0.020 | -17.6      | 0.840 | 175.7      |
| 2250    | 0.893 | 177.3      | 0.64  | 33.6       | 0.019 | -17.4      | 0.842 | 175.4      |
| 2300    | 0.893 | 176.7      | 0.62  | 32.4       | 0.019 | -16.9      | 0.845 | 175.0      |
| 2350    | 0.896 | 176.7      | 0.61  | 31.6       | 0.019 | -16.6      | 0.849 | 174.8      |
| 2400    | 0.899 | 176.2      | 0.59  | 30.7       | 0.018 | -15.9      | 0.849 | 174.4      |
| 2450    | 0.899 | 176.2      | 0.57  | 29.7       | 0.018 | -16.0      | 0.850 | 174.1      |
| 2500    | 0.899 | 175.7      | 0.56  | 28.6       | 0.018 | -15.5      | 0.852 | 173.7      |

Package Dimensions



Ordering Information

| Part Name      | Quantity  | Shipping Container                |
|----------------|-----------|-----------------------------------|
| RQA0001DNSTR-E | 2000 pcs. | φ178 mm Reel, 12 mm Emboss Taping |

Notes:

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