



**For C to X-band Local Oscillator and Amplifier**

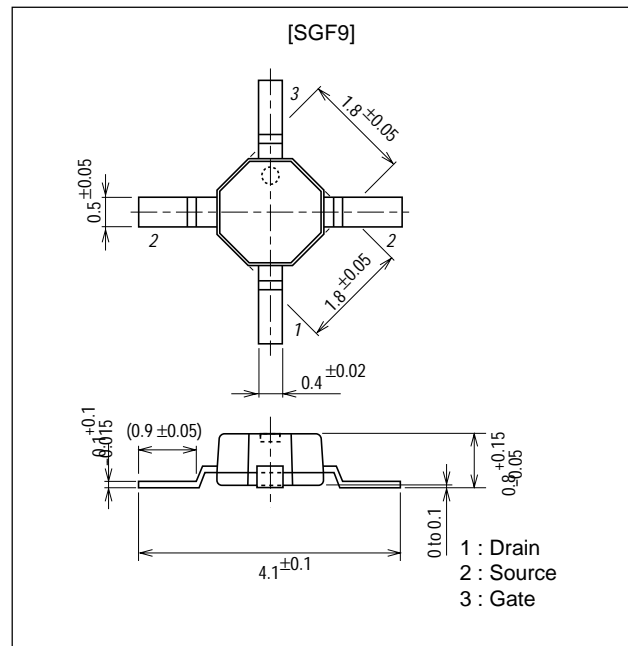
Preliminary

**Features**

- Mold package-owing to the cross-mold technology, this product can maintain the same performance as the ceramic package.
- The chip surface is covered with the highly reliable protection film.
- Automatic surface mounting is available.

**Package Dimensions**

unit : mm  
0000



**Specifications**

**Absolute Maximum Ratings** at Ta=25°C

| Parameter                   | Symbol           | Conditions | Ratings     | Unit |
|-----------------------------|------------------|------------|-------------|------|
| Drain-to-Source Voltage     | V <sub>DS</sub>  |            | 6.0         | V    |
| Gate-to-Source Voltage      | V <sub>GS</sub>  |            | -5.0        | V    |
| Drain Current               | I <sub>D</sub>   |            | 100         | mA   |
| Allowable Power Dissipation | P <sub>D</sub>   |            | 130         | mW   |
| Junction Temperature        | T <sub>J</sub>   |            | 150         | °C   |
| Storage Temperature         | T <sub>stg</sub> |            | -55 to +150 | °C   |

**Electrical Characteristics** at Ta=25°C

| Parameter                     | Symbol               | Conditions                                 | Ratings |     |      | Unit |
|-------------------------------|----------------------|--|---------|-----|------|------|
|                               |                      |  | min     | typ | max  |      |
| Gate-to-Source Leak Current   | V <sub>(BR)GSO</sub> | I <sub>GS</sub> =-10μA                     | -5.0    |     |      | V    |
| Saturated Drain Current       | I <sub>DSS</sub>     | V <sub>DS</sub> =3V, V <sub>GS</sub> =0    | 30      | 40  | 70   | mA   |
| Gate-to-Source Cutoff Voltage | V <sub>GS(off)</sub> | V <sub>DS</sub> =3V, I <sub>D</sub> =100μA | -0.5    |     | -5.0 | V    |
| Forward Transfer Admittance   | y <sub>fs</sub>      | V <sub>DS</sub> =3V, I <sub>D</sub> =10mA  | 20      | 35  |      | mS   |

Continued on next page.

■ Any and all SANYO products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your SANYO representative nearest you before using any SANYO products described or contained herein in such applications.

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# SGF9

Continued from preceding page.

| Parameter              | Symbol | Conditions                     | Ratings |     |     | Unit |
|------------------------|--------|--------------------------------|---------|-----|-----|------|
|                        |        |                                | min     | typ | max |      |
| Minimum Noise Figure   | NF min | $V_{DS}=3V, I_D=10mA, f=12GHz$ |         | 2.5 |     | dB   |
| Associated Gain        | Ga     | $V_{DS}=3V, I_D=10mA, f=12GHz$ |         | 5.0 |     | dB   |
| Maximum Available Gain | MAG    | $V_{DS}=3V, I_D=10mA, f=12GHz$ |         | 7.0 |     | dB   |

## S-Parameter

SGF9

$V_{DS}=3V, I_{DS}=10mA$

| FREQUENCY<br>MHz | S11   |        | S21   |       | S12   |       | S22   |        |
|------------------|-------|--------|-------|-------|-------|-------|-------|--------|
|                  | MAG   | ANG    | MAG   | ANG   | MAG   | ANG   | MAG   | ANG    |
| 1000.0000        | 0.978 | -25.5  | 3.020 | 157.3 | 0.042 | 71.7  | 0.741 | -14.5  |
| 2000.0000        | 0.928 | -50.3  | 2.868 | 136.6 | 0.078 | 56.9  | 0.702 | -28.1  |
| 3000.0000        | 0.872 | -74.4  | 2.696 | 116.9 | 0.107 | 42.4  | 0.649 | -41.4  |
| 4000.0000        | 0.810 | -97.8  | 2.468 | 97.8  | 0.124 | 29.5  | 0.585 | -53.9  |
| 5000.0000        | 0.758 | -119.5 | 2.241 | 80.9  | 0.134 | 18.1  | 0.529 | -66.4  |
| 6000.0000        | 0.729 | -140.1 | 2.046 | 64.5  | 0.138 | 8.1   | 0.480 | -79.5  |
| 7000.0000        | 0.704 | -157.7 | 1.829 | 49.3  | 0.134 | -0.1  | 0.446 | -92.7  |
| 8000.0000        | 0.701 | -172.8 | 1.661 | 36.0  | 0.127 | -5.1  | 0.429 | -106.3 |
| 9000.0000        | 0.701 | 173.2  | 1.509 | 23.1  | 0.121 | -9.2  | 0.423 | -120.2 |
| 10000.0000       | 0.705 | 160.4  | 1.370 | 10.7  | 0.115 | -12.4 | 0.422 | -135.1 |
| 11000.0000       | 0.720 | 149.0  | 1.255 | -0.9  | 0.109 | -12.6 | 0.434 | -150.1 |
| 12000.0000       | 0.733 | 138.5  | 1.134 | -12.8 | 0.102 | -12.4 | 0.458 | -164.3 |
| 13000.0000       | 0.750 | 131.2  | 1.007 | -22.3 | 0.100 | -9.6  | 0.495 | -177.4 |
| 14000.0000       | 0.777 | 122.8  | 0.929 | -32.1 | 0.104 | -7.3  | 0.535 | 170.6  |
| 15000.0000       | 0.785 | 115.3  | 0.836 | -41.2 | 0.109 | -6.5  | 0.577 | 160.0  |
| 16000.0000       | 0.799 | 108.0  | 0.763 | -49.6 | 0.118 | -7.0  | 0.610 | 149.5  |

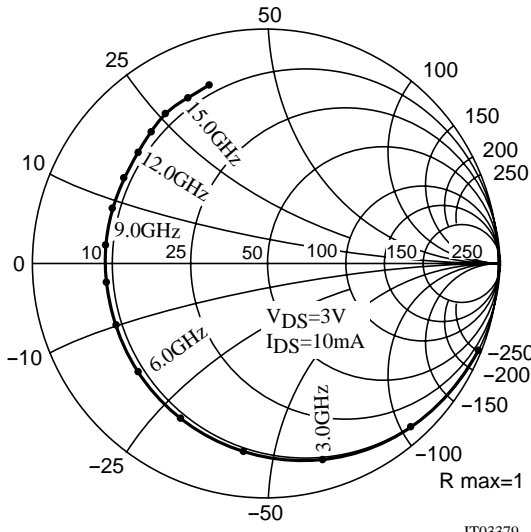
SGF9

$V_{DS}=3V, I_{DS}=10mA$

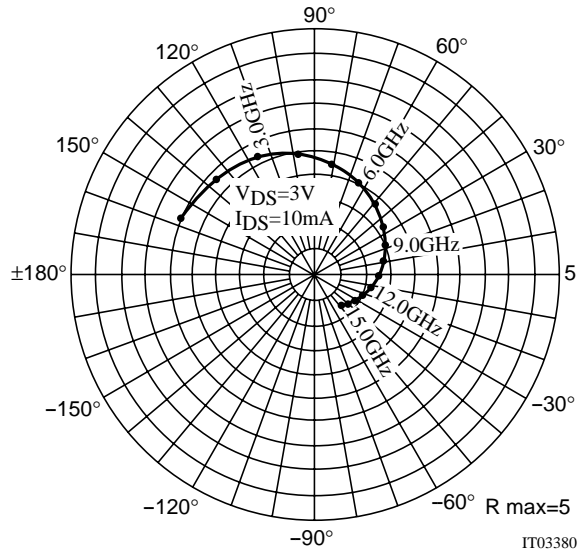
| FREQUENCY<br>MHz | GU max<br>dB | GA max<br>dB | $ S21 ^2$<br>dB | $ S12 ^2$<br>dB | K    | Delay<br>ns | Mason's U<br>dB | G1<br>dB | G2<br>dB |
|------------------|--------------|--------------|-----------------|-----------------|------|-------------|-----------------|----------|----------|
| 1000.0000        | 26.67        |              | 9.60            | -27.54          | 0.15 | 0.060       | 26.521          | 13.61    | 3.46     |
| 2000.0000        | 20.68        |              | 9.15            | -22.16          | 0.25 | 0.058       | 24.262          | 8.58     | 2.95     |
| 3000.0000        | 17.19        |              | 8.61            | -19.41          | 0.33 | 0.055       | 22.599          | 6.20     | 2.37     |
| 4000.0000        | 14.30        |              | 7.85            | -18.13          | 0.45 | 0.052       | 20.846          | 4.64     | 1.82     |
| 5000.0000        | 12.15        |              | 7.01            | -17.46          | 0.56 | 0.046       | 18.943          | 3.71     | 1.43     |
| 6000.0000        | 10.65        |              | 6.22            | -17.20          | 0.65 | 0.046       | 18.621          | 3.29     | 1.14     |
| 7000.0000        | 9.18         |              | 5.24            | -17.46          | 0.79 | 0.041       | 16.467          | 2.97     | 0.96     |
| 8000.0000        | 8.23         |              | 4.41            | -17.92          | 0.90 | 0.037       | 16.145          | 2.94     | 0.88     |
| 9000.0000        | 7.37         | 10.53        | 3.57            | -18.34          | 1.00 | 0.036       | 15.317          | 2.94     | 0.86     |
| 10000.0000       | 6.57         | 8.60         | 2.73            | -18.79          | 1.13 | 0.033       | 13.909          | 2.98     | 0.85     |
| 11000.0000       | 6.05         | 7.96         | 1.97            | -19.25          | 1.19 | 0.033       | 13.557          | 3.17     | 0.91     |
| 12000.0000       | 5.46         | 7.16         | 1.09            | -19.83          | 1.30 | 0.034       | 11.820          | 3.35     | 1.02     |
| 13000.0000       | 4.87         | 6.59         | 0.06            | -20.00          | 1.33 | 0.025       | 10.636          | 3.59     | 1.22     |
| 14000.0000       | 4.84         | 7.22         | -0.64           | -19.66          | 1.14 | 0.027       | 11.879          | 4.02     | 1.46     |
| 15000.0000       | 4.36         | 7.03         | -1.56           | -19.25          | 1.09 | 0.024       | 10.633          | 4.16     | 1.76     |
| 16000.0000       | 4.09         |              | -2.35           | -18.56          | 0.97 | 0.021       | 10.480          | 4.42     | 2.02     |

S-Parameter

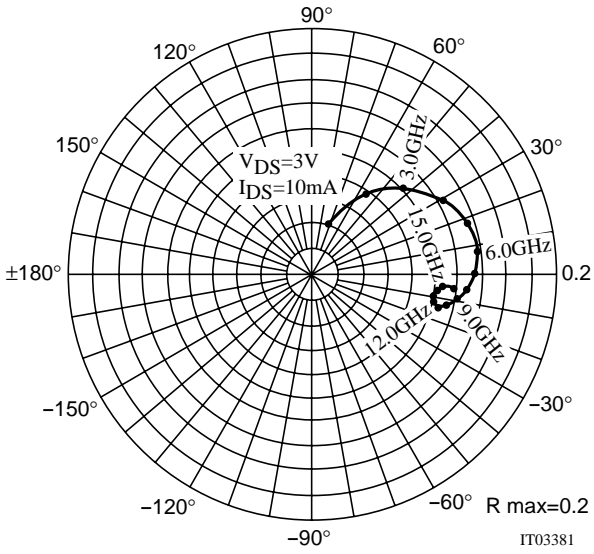
S11



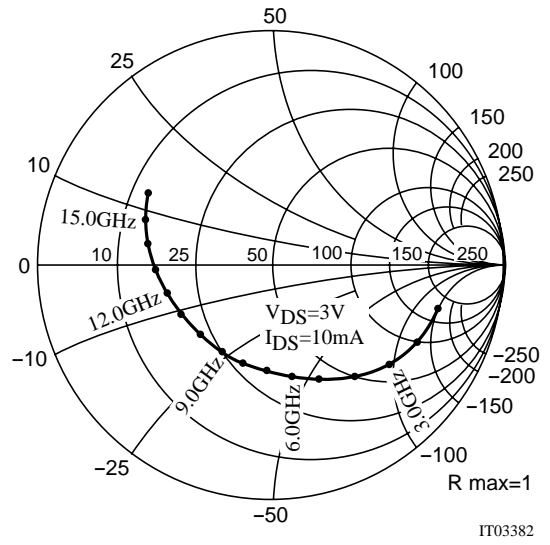
S21



S12



S22



START 1GHz  
STOP 16GHz

# SGF9

## S-Parameter

SGF9

V<sub>DS</sub>=3V, I<sub>DS</sub>=20mA

| FREQUENCY<br>MHz | S11   |        | S21   |       | S12   |      | S22   |        |
|------------------|-------|--------|-------|-------|-------|------|-------|--------|
|                  | MAG   | ANG    | MAG   | ANG   | MAG   | ANG  | MAG   | ANG    |
| 1000.0000        | 0.973 | -27.7  | 3.699 | 156.7 | 0.039 | 70.9 | 0.715 | -15.0  |
| 2000.0000        | 0.915 | -54.4  | 3.454 | 134.6 | 0.071 | 56.0 | 0.670 | -23.7  |
| 3000.0000        | 0.852 | -79.9  | 3.187 | 114.7 | 0.095 | 41.8 | 0.613 | -41.8  |
| 4000.0000        | 0.787 | -104.0 | 2.861 | 95.7  | 0.108 | 29.6 | 0.547 | -53.8  |
| 5000.0000        | 0.737 | -126.0 | 2.559 | 79.2  | 0.116 | 19.4 | 0.491 | -65.8  |
| 6000.0000        | 0.713 | -146.3 | 2.306 | 63.3  | 0.118 | 10.6 | 0.444 | -73.4  |
| 7000.0000        | 0.693 | -163.6 | 2.045 | 48.6  | 0.114 | 4.7  | 0.412 | -91.4  |
| 8000.0000        | 0.693 | -178.1 | 1.846 | 35.8  | 0.110 | 1.7  | 0.397 | -104.7 |
| 9000.0000        | 0.696 | 168.3  | 1.671 | 23.4  | 0.107 | -0.8 | 0.391 | -118.7 |
| 10000.0000       | 0.703 | 156.0  | 1.513 | 11.4  | 0.105 | -2.3 | 0.390 | -133.8 |
| 11000.0000       | 0.720 | 145.1  | 1.383 | 0.1   | 0.103 | -1.7 | 0.405 | -149.0 |
| 12000.0000       | 0.734 | 135.0  | 1.249 | -11.4 | 0.102 | -0.9 | 0.429 | -164.1 |
| 13000.0000       | 0.751 | 128.1  | 1.114 | -20.7 | 0.104 | 0.8  | 0.467 | -176.8 |
| 14000.0000       | 0.779 | 119.9  | 1.026 | -30.4 | 0.111 | 1.5  | 0.507 | 171.2  |
| 15000.0000       | 0.785 | 112.6  | 0.926 | -39.3 | 0.120 | 1.5  | 0.550 | 160.6  |
| 16000.0000       | 0.800 | 105.6  | 0.848 | -47.8 | 0.130 | -1.1 | 0.585 | 150.2  |

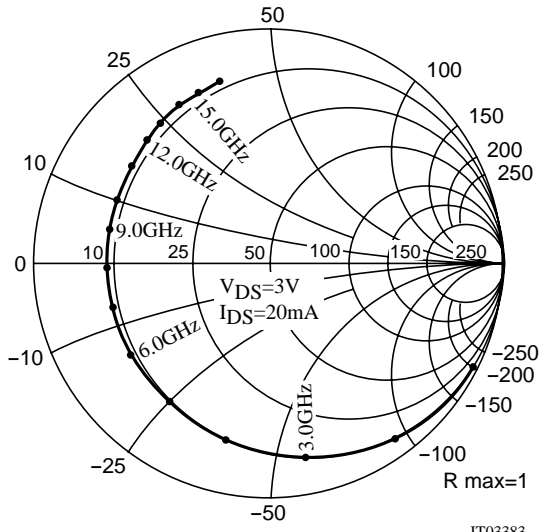
SGF9

V<sub>DS</sub>=3V, I<sub>DS</sub>=20mA

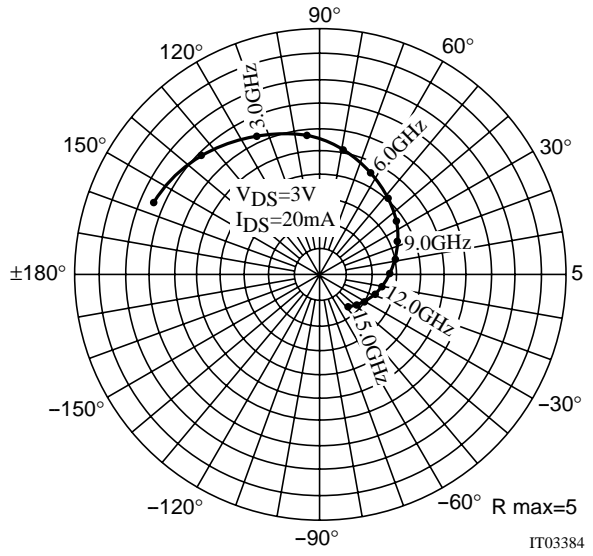
| FREQUENCY<br>MHz | GU max<br>dB | GA max<br>dB | S21 ^2<br>dB | S12 ^2<br>dB | K    | Delay<br>ns | Mason's U<br>dB | G1<br>dB | G2<br>dB |
|------------------|--------------|--------------|--------------|--------------|------|-------------|-----------------|----------|----------|
| 1000.0000        | 27.21        |              | 11.36        | -28.18       | 0.16 | 0.062       | 27.458          | 12.74    | 3.11     |
| 2000.0000        | 21.24        |              | 10.77        | -22.97       | 0.26 | 0.060       | 25.596          | 7.88     | 2.59     |
| 3000.0000        | 17.74        |              | 10.07        | -20.45       | 0.36 | 0.056       | 24.093          | 5.62     | 2.05     |
| 4000.0000        | 14.87        |              | 9.13         | -19.33       | 0.49 | 0.051       | 21.882          | 4.19     | 1.54     |
| 5000.0000        | 12.76        |              | 8.16         | -18.71       | 0.61 | 0.045       | 20.065          | 3.40     | 1.20     |
| 6000.0000        | 11.29        |              | 7.26         | -18.56       | 0.71 | 0.044       | 19.513          | 3.08     | 0.95     |
| 7000.0000        | 9.86         |              | 6.21         | -18.86       | 0.87 | 0.040       | 17.573          | 2.84     | 0.81     |
| 8000.0000        | 8.91         |              | 5.32         | -19.17       | 0.97 | 0.036       | 17.350          | 2.84     | 0.74     |
| 9000.0000        | 8.06         | 10.34        | 4.46         | -19.41       | 1.07 | 0.034       | 16.472          | 2.88     | 0.72     |
| 10000.0000       | 7.27         | 9.15         | 3.60         | -19.58       | 1.16 | 0.032       | 15.167          | 2.96     | 0.72     |
| 11000.0000       | 6.77         | 8.62         | 2.82         | -19.74       | 1.19 | 0.032       | 14.730          | 3.17     | 0.78     |
| 12000.0000       | 6.18         | 7.93         | 1.93         | -19.83       | 1.24 | 0.032       | 13.060          | 3.36     | 0.88     |
| 13000.0000       | 5.61         | 7.46         | 0.94         | -19.66       | 1.22 | 0.025       | 11.860          | 3.61     | 1.07     |
| 14000.0000       | 5.57         | 8.49         | 0.22         | -19.09       | 1.04 | 0.027       | 13.079          | 4.05     | 1.29     |
| 15000.0000       | 5.06         |              | -0.67        | -18.42       | 0.98 | 0.023       | 11.592          | 4.16     | 1.56     |
| 16000.0000       | 4.82         |              | -1.43        | -17.72       | 0.86 | 0.021       | 11.773          | 4.44     | 1.82     |

S-Parameter

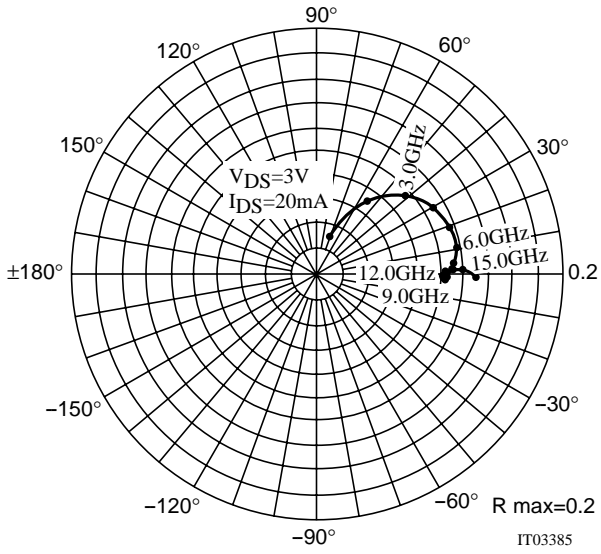
S11



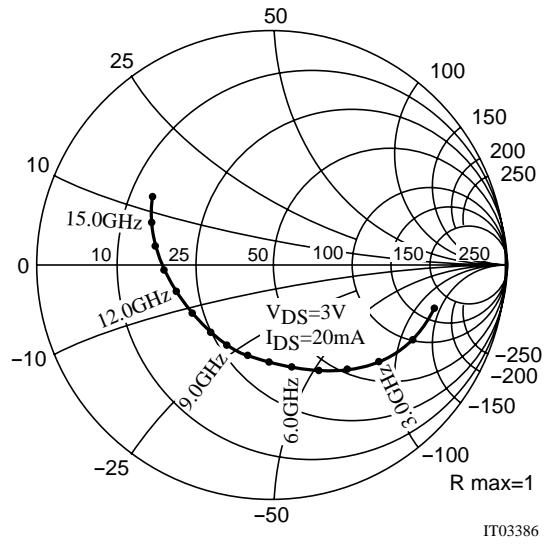
S21



S12



S22



START 1GHz  
STOP 16GHz

# SGF9

## S-Parameter

SGF9

V<sub>DS</sub>=3V, I<sub>DS</sub>=30mA

| FREQUENCY<br>MHz | S11   |        | S21   |       | S12   |      | S22   |        |
|------------------|-------|--------|-------|-------|-------|------|-------|--------|
|                  | MAG   | ANG    | MAG   | ANG   | MAG   | ANG  | MAG   | ANG    |
| 1000.0000        | 0.970 | -29.2  | 4.062 | 155.9 | 0.036 | 70.4 | 0.713 | -15.0  |
| 2000.0000        | 0.908 | -57.0  | 3.764 | 133.4 | 0.066 | 55.7 | 0.666 | -28.4  |
| 3000.0000        | 0.841 | -83.1  | 3.432 | 113.3 | 0.087 | 41.6 | 0.607 | -41.1  |
| 4000.0000        | 0.775 | -107.6 | 3.051 | 94.4  | 0.098 | 29.8 | 0.543 | -52.5  |
| 5000.0000        | 0.728 | -129.5 | 2.709 | 78.0  | 0.104 | 20.6 | 0.488 | -64.0  |
| 6000.0000        | 0.708 | -149.7 | 2.427 | 62.4  | 0.106 | 13.2 | 0.444 | -76.1  |
| 7000.0000        | 0.690 | -166.7 | 2.147 | 48.1  | 0.102 | 8.1  | 0.415 | -88.7  |
| 8000.0000        | 0.693 | 179.0  | 1.935 | 35.4  | 0.099 | 6.3  | 0.400 | -101.9 |
| 9000.0000        | 0.697 | 165.8  | 1.746 | 23.1  | 0.097 | 5.3  | 0.396 | -115.7 |
| 10000.0000       | 0.706 | 153.7  | 1.581 | 11.3  | 0.098 | 4.6  | 0.394 | -130.7 |
| 11000.0000       | 0.724 | 143.1  | 1.443 | 0.1   | 0.099 | 6.3  | 0.408 | -146.0 |
| 12000.0000       | 0.739 | 133.3  | 1.303 | -11.4 | 0.102 | 6.8  | 0.432 | -161.4 |
| 13000.0000       | 0.756 | 126.5  | 1.161 | -20.6 | 0.107 | 8.1  | 0.469 | -174.3 |
| 14000.0000       | 0.785 | 118.5  | 1.070 | -30.4 | 0.116 | 7.7  | 0.511 | 173.4  |
| 15000.0000       | 0.790 | 111.3  | 0.965 | -39.2 | 0.125 | 6.2  | 0.552 | 162.7  |
| 16000.0000       | 0.805 | 104.2  | 0.885 | -47.8 | 0.137 | 3.5  | 0.587 | 152.1  |

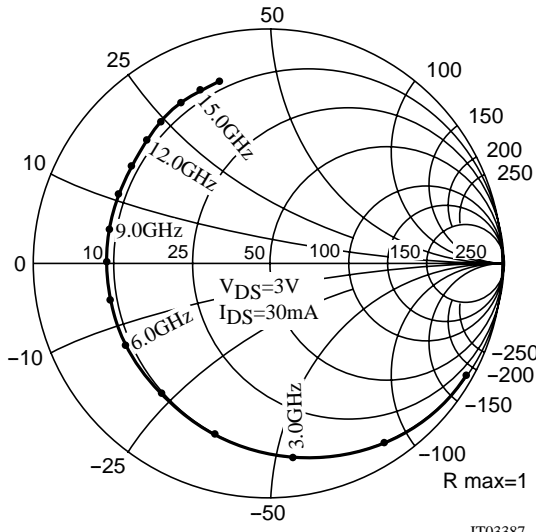
SGF9

V<sub>DS</sub>=3V, I<sub>DS</sub>=30mA

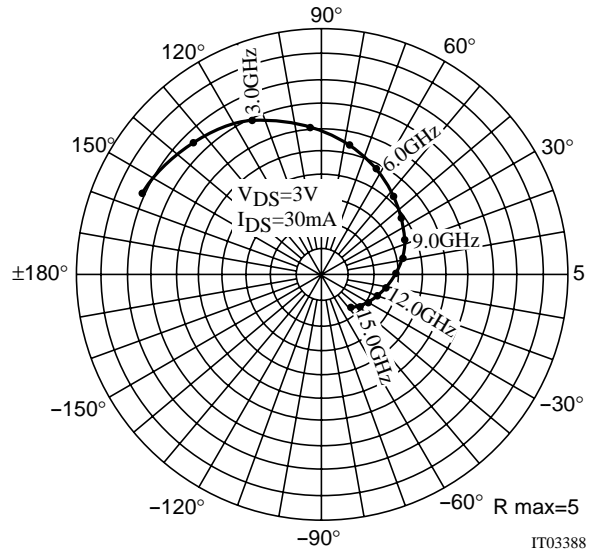
| FREQUENCY<br>MHz | GU max<br>dB | GA max<br>dB | S21 ^2<br>dB | S12 ^2<br>dB | K    | Delay<br>ns | Mason's U<br>dB | G1<br>dB | G2<br>dB |
|------------------|--------------|--------------|--------------|--------------|------|-------------|-----------------|----------|----------|
| 1000.0000        | 27.54        |              | 12.17        | -28.87       | 0.17 | 0.064       | 28.076          | 12.28    | 3.03     |
| 2000.0000        | 21.62        |              | 11.51        | -23.61       | 0.27 | 0.061       | 26.836          | 7.56     | 2.55     |
| 3000.0000        | 18.04        |              | 10.71        | -21.21       | 0.38 | 0.056       | 24.721          | 5.34     | 2.00     |
| 4000.0000        | 15.19        |              | 9.69         | -20.18       | 0.52 | 0.051       | 22.314          | 3.99     | 1.52     |
| 5000.0000        | 13.12        |              | 8.66         | -19.66       | 0.64 | 0.045       | 20.778          | 3.28     | 1.18     |
| 6000.0000        | 11.68        |              | 7.70         | -19.49       | 0.74 | 0.043       | 20.850          | 3.02     | 0.95     |
| 7000.0000        | 10.27        |              | 6.64         | -19.83       | 0.91 | 0.039       | 18.328          | 2.81     | 0.82     |
| 8000.0000        | 9.33         | 12.31        | 5.73         | -20.09       | 1.01 | 0.035       | 18.191          | 2.84     | 0.76     |
| 9000.0000        | 8.47         | 10.55        | 4.84         | -20.26       | 1.11 | 0.034       | 17.137          | 2.89     | 0.74     |
| 10000.0000       | 7.71         | 9.59         | 3.98         | -20.18       | 1.17 | 0.032       | 16.068          | 3.00     | 0.73     |
| 11000.0000       | 7.20         | 9.15         | 3.19         | -20.09       | 1.17 | 0.032       | 15.611          | 3.23     | 0.79     |
| 12000.0000       | 6.63         | 8.62         | 2.30         | -19.83       | 1.16 | 0.032       | 14.114          | 3.43     | 0.90     |
| 13000.0000       | 6.06         | 8.27         | 1.30         | -19.41       | 1.12 | 0.024       | 12.816          | 3.68     | 1.08     |
| 14000.0000       | 6.06         |              | 0.59         | -18.71       | 0.92 | 0.027       | 14.586          | 4.16     | 1.31     |
| 15000.0000       | 5.52         |              | -0.31        | -18.06       | 0.88 | 0.023       | 12.541          | 4.25     | 1.58     |
| 16000.0000       | 5.31         |              | -1.06        | -17.27       | 0.77 | 0.022       | 12.617          | 4.53     | 1.83     |

S-Parameter

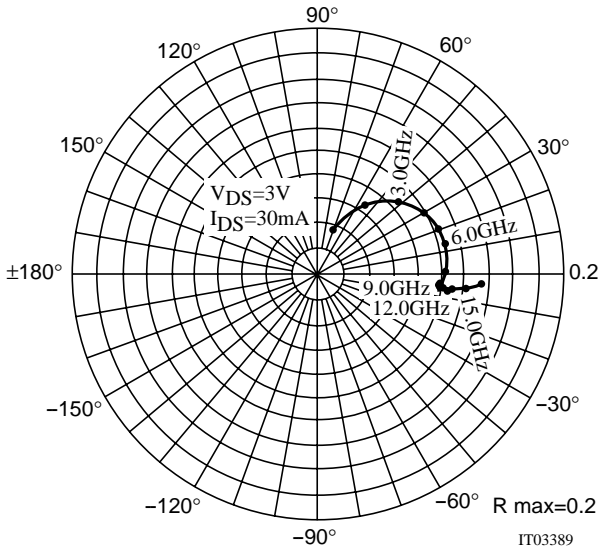
S11



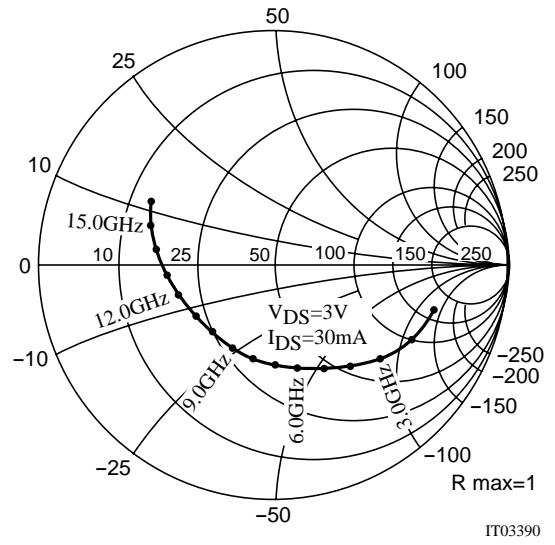
S21



S12



S22



START 1GHz  
STOP 16GHz

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