

# MPF102

Preferred Devices

## JFET VHF Amplifier

### N-Channel – Depletion

#### Features

- Pb-Free Package is Available\*

#### MAXIMUM RATINGS

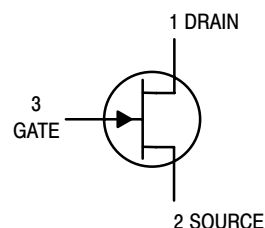
| Rating  | Symbol    | Value       | Unit                       |
|---|-----------|-------------|----------------------------|
| Drain–Source Voltage  | $V_{DS}$  | 25          | Vdc                        |
| Drain–Gate Voltage  | $V_{DG}$  | 25          | Vdc                        |
| Gate–Source Voltage   | $V_{GS}$  | –25         | Vdc                        |
| Gate Current  | $I_G$     | 10          | mAdc                       |
| Total Device Dissipation<br>@ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$     | 350<br>2.8  | mW<br>mW/ $^\circ\text{C}$ |
| Junction Temperature Range  | $T_J$     | 125         | $^\circ\text{C}$           |
| Storage Temperature Range   | $T_{stg}$ | –65 to +150 | $^\circ\text{C}$           |

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.



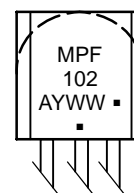
**ON Semiconductor®**

<http://onsemi.com>



TO-92 (TO-226AA)  
CASE 29-11  
STYLE 5

#### MARKING DIAGRAM



MPF102 = Device Code  
A = Assembly Location  
Y = Year  
WW = Work Week  
■ = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

| Device  | Package            | Shipping        |
|---------|--------------------|-----------------|
| MPF102  | TO-92              | 1000 Units/Bulk |
| MPF102G | TO-92<br>(Pb-Free) | 1000 Units/Bulk |

**Preferred** devices are recommended choices for future use and best overall value.

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

# MPF102

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

### OFF CHARACTERISTICS

|  |               |        |              |                         |
|--|---------------|--------|--------------|-------------------------|
| Gate–Source Breakdown Voltage<br>( $I_G = -10\ \mu\text{Adc}$ , $V_{DS} = 0$ )   | $V_{(BR)GSS}$ | -25    | –            | Vdc                     |
| Gate Reverse Current<br>( $V_{GS} = -15\ \text{Vdc}$ , $V_{DS} = 0$ )<br>( $V_{GS} = -15\ \text{Vdc}$ , $V_{DS} = 0$ , $T_A = 100^\circ\text{C}$ ) | $I_{GSS}$     | –<br>– | -2.0<br>-2.0 | nAdc<br>$\mu\text{Adc}$ |
| Gate–Source Cutoff Voltage<br>( $V_{DS} = 15\ \text{Vdc}$ , $I_D = 2.0\ \text{nAdc}$ )   | $V_{GS(off)}$ | –      | -8.0         | Vdc                     |
| Gate–Source Voltage<br>( $V_{DS} = 15\ \text{Vdc}$ , $I_D = 0.2\ \text{mAdc}$ )  | $V_{GS}$      | -0.5   | -7.5         | Vdc                     |

### ON CHARACTERISTICS

|  |           |     |    |      |
|--|-----------|-----|----|------|
| Zero–Gate–Voltage Drain Current (Note 1)<br>( $V_{DS} = 15\ \text{Vdc}$ , $V_{GS} = 0\ \text{Vdc}$ ) | $I_{DSS}$ | 2.0 | 20 | mAdc |
|--|-----------|-----|----|------|

### SMALL–SIGNAL CHARACTERISTICS

|  |                     |              |           |                  |
|--|---------------------|--------------|-----------|------------------|
| Forward Transfer Admittance (Note 1)<br>( $V_{DS} = 15\ \text{Vdc}$ , $V_{GS} = 0$ , $f = 1.0\ \text{kHz}$ )<br>( $V_{DS} = 15\ \text{Vdc}$ , $V_{GS} = 0$ , $f = 100\ \text{MHz}$ ) | $ y_{fs} $          | 2000<br>1600 | 7500<br>– | $\mu\text{mhos}$ |
| Input Admittance<br>( $V_{DS} = 15\ \text{Vdc}$ , $V_{GS} = 0$ , $f = 100\ \text{MHz}$ )   | $\text{Re}(y_{is})$ | –            | 800       | $\mu\text{mhos}$ |
| Output Conductance<br>( $V_{DS} = 15\ \text{Vdc}$ , $V_{GS} = 0$ , $f = 100\ \text{MHz}$ )   | $\text{Re}(y_{os})$ | –            | 200       | $\mu\text{mhos}$ |
| Input Capacitance<br>( $V_{DS} = 15\ \text{Vdc}$ , $V_{GS} = 0$ , $f = 1.0\ \text{MHz}$ )  | $C_{iss}$           | –            | 7.0       | pF               |
| Reverse Transfer Capacitance<br>( $V_{DS} = 15\ \text{Vdc}$ , $V_{GS} = 0$ , $f = 1.0\ \text{MHz}$ )   | $C_{rss}$           | –            | 3.0       | pF               |

1. Pulse Test; Pulse Width  $\leq 630\ \text{ms}$ , Duty Cycle  $\leq 10\%$ .

# COMMON SOURCE CHARACTERISTICS

## ADMITTANCE PARAMETERS

( $V_{DS} = 15 \text{ Vdc}$ ,  $T_{\text{channel}} = 25^{\circ}\text{C}$ )

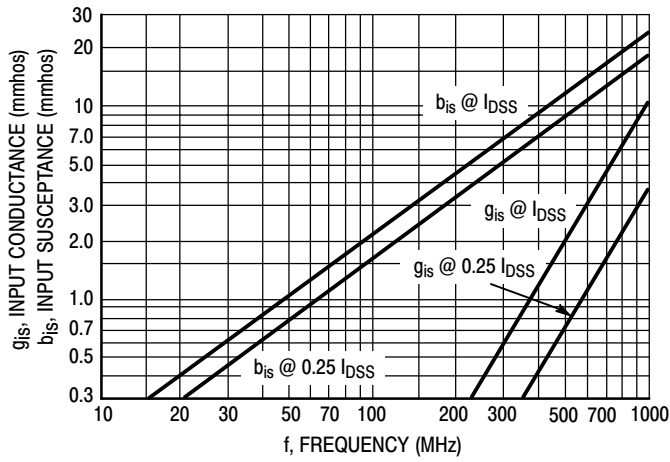


Figure 1. Input Admittance ( $y_{is}$ )

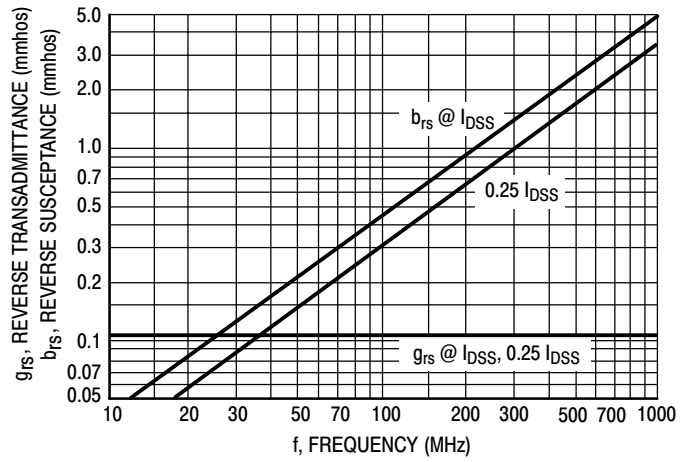


Figure 2. Reverse Transfer Admittance ( $y_{rs}$ )

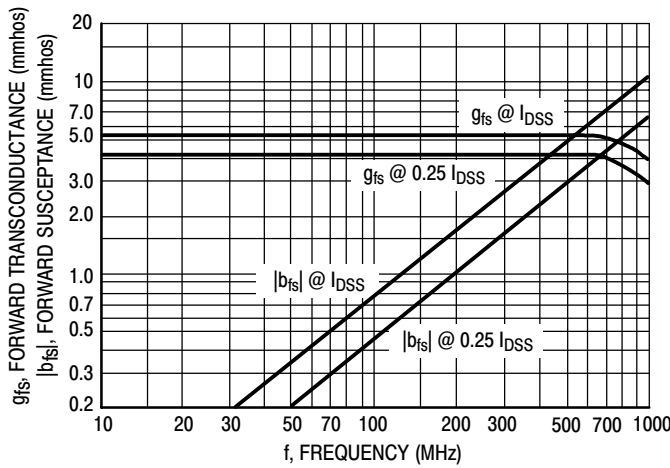


Figure 3. Forward Transfer Admittance ( $y_{fs}$ )

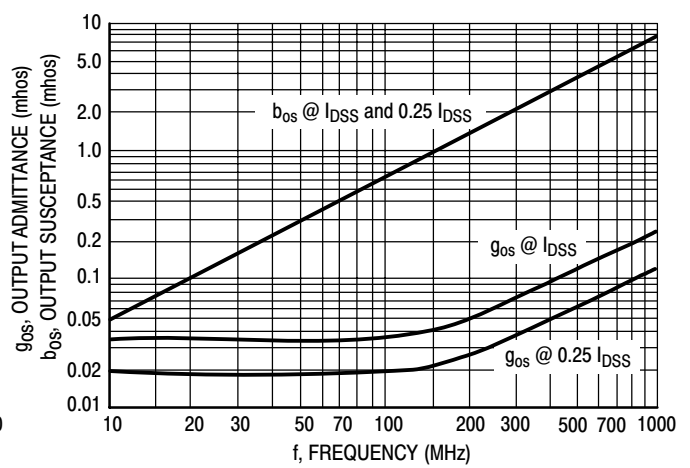


Figure 4. Output Admittance ( $y_{os}$ )

**COMMON SOURCE CHARACTERISTICS  
S-PARAMETERS**

( $V_{DS} = 15$  Vdc,  $T_{channel} = 25^{\circ}\text{C}$ , Data Points in MHz)

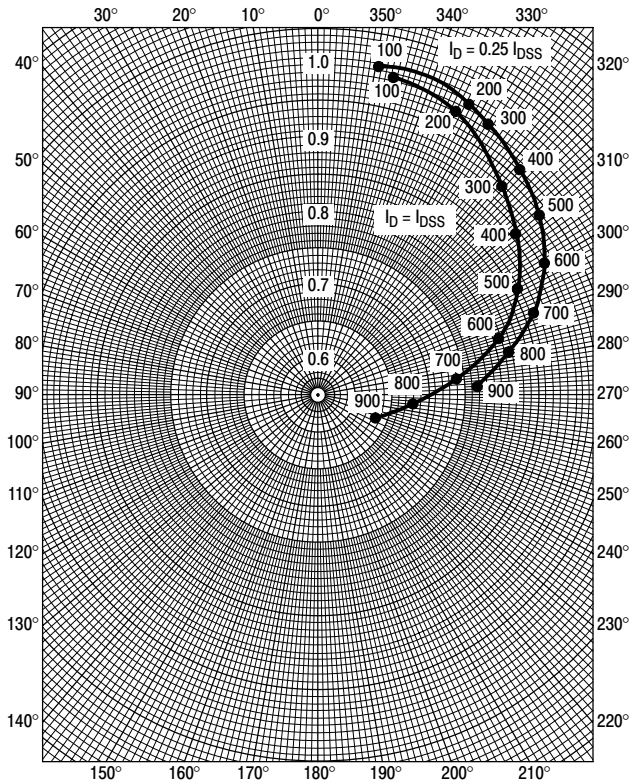


Figure 5.  $S_{11s}$

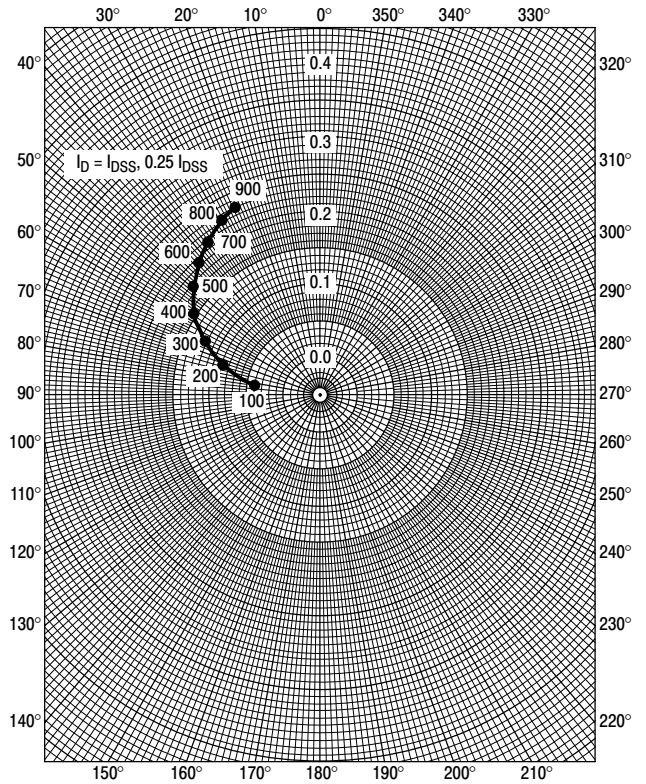


Figure 6.  $S_{12s}$

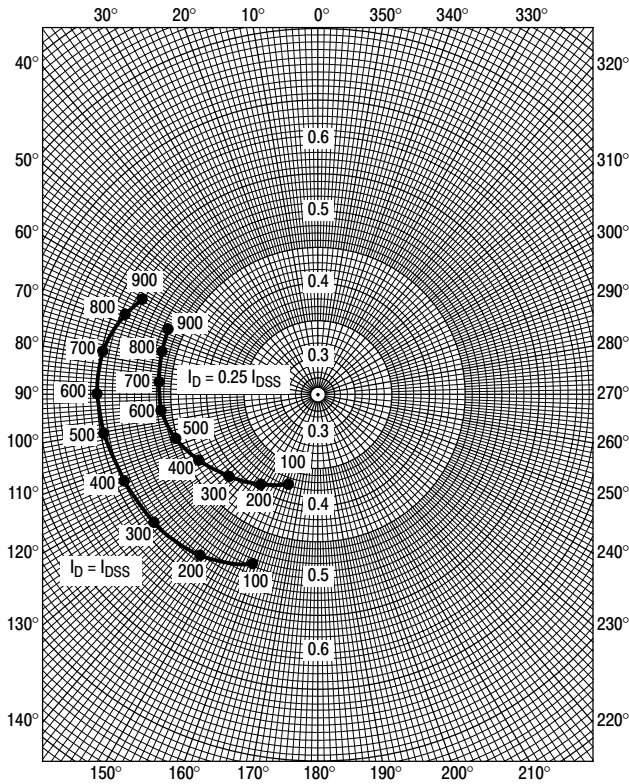


Figure 7.  $S_{21s}$

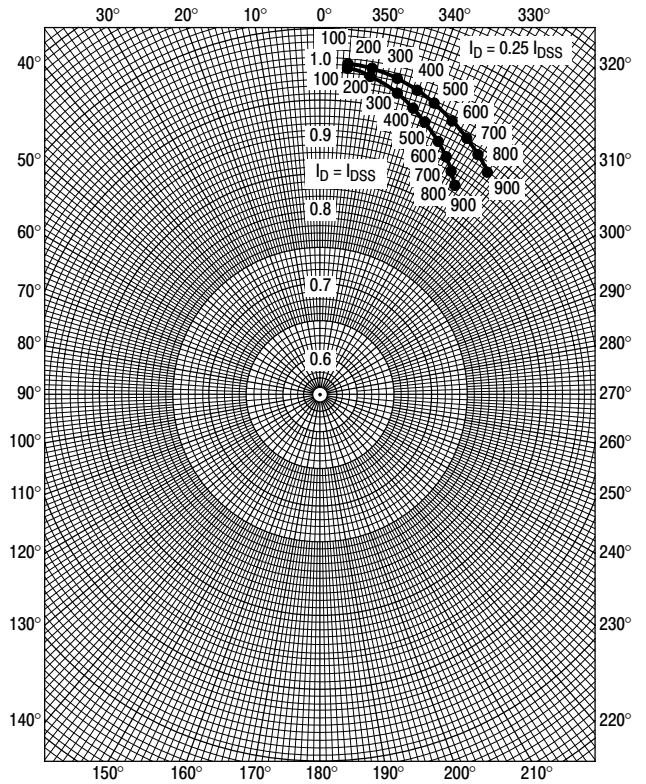
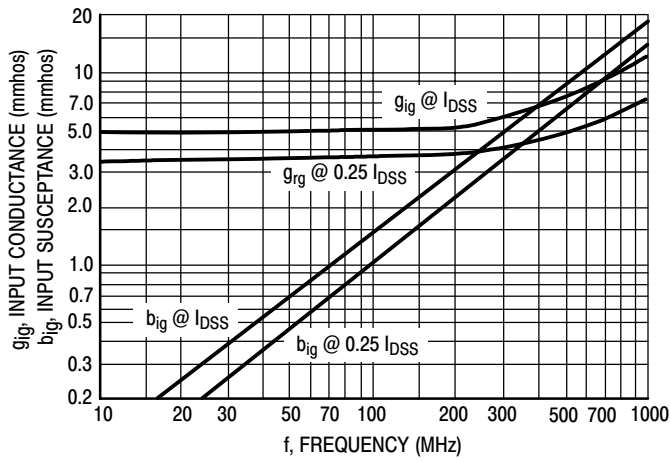
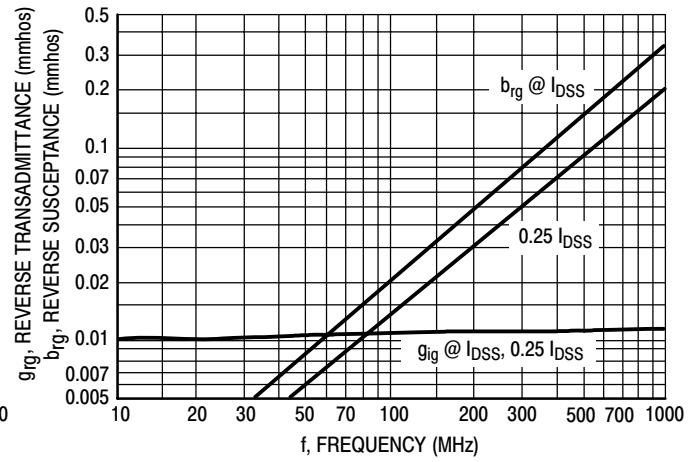
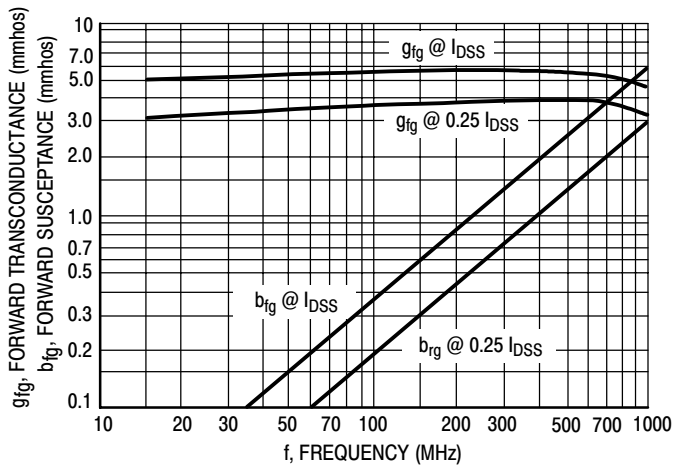
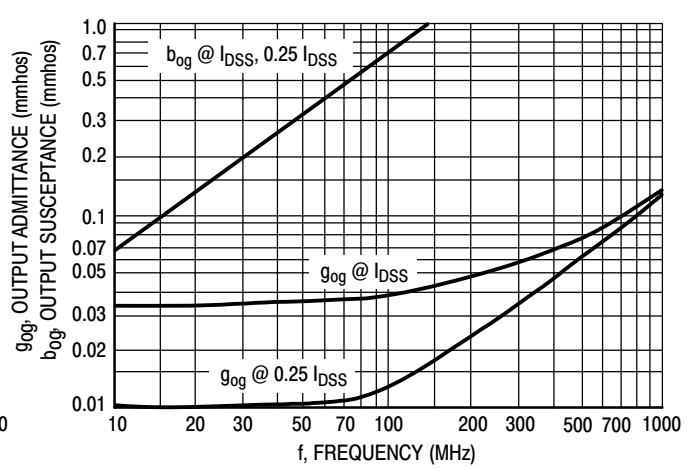


Figure 8.  $S_{22s}$

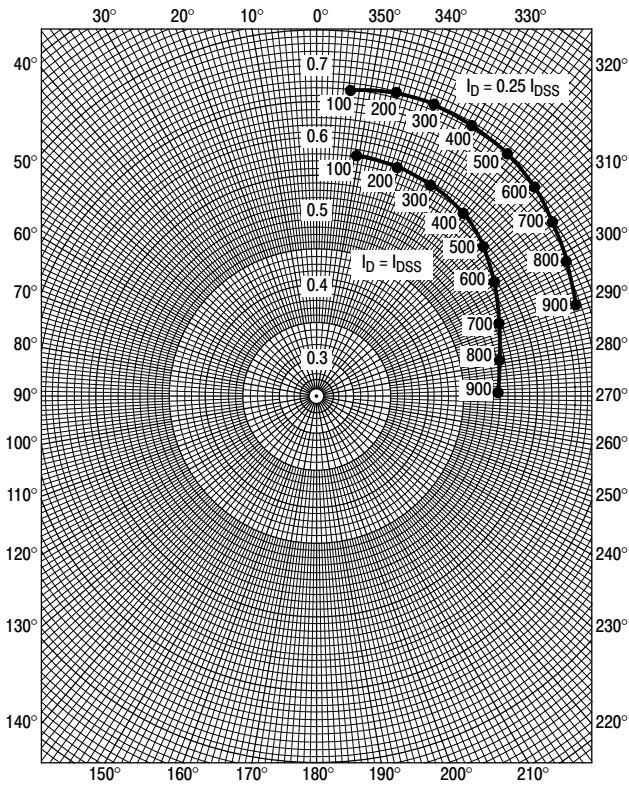
## COMMON GATE CHARACTERISTICS

## ADMITTANCE PARAMETERS

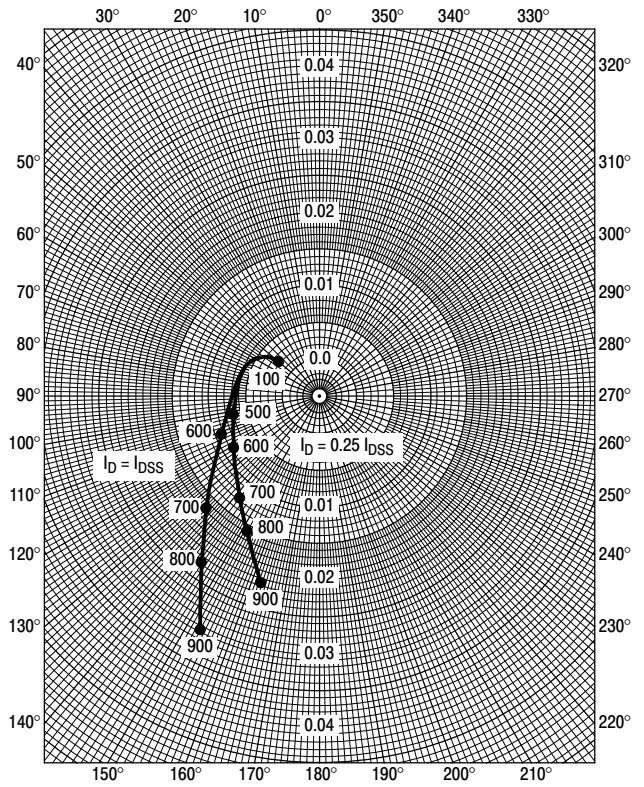
(V<sub>DG</sub> = 15 Vdc, T<sub>channel</sub> = 25°C)Figure 9. Input Admittance ( $y_{ig}$ )Figure 10. Reverse Transfer Admittance ( $y_{rg}$ )Figure 11. Forward Transfer Admittance ( $y_{fg}$ )Figure 12. Output Admittance ( $y_{og}$ )

**COMMON GATE CHARACTERISTICS**  
**S-PARAMETERS**

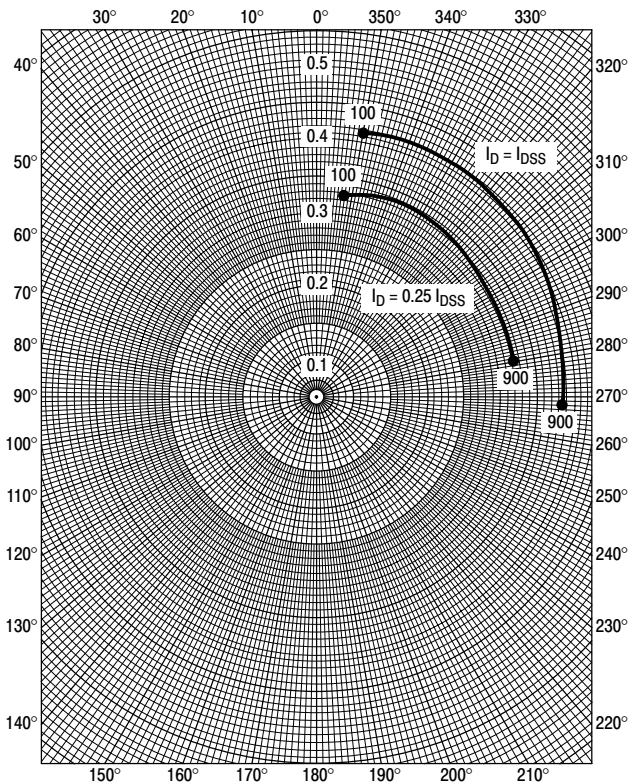
( $V_{DS} = 15$  Vdc,  $T_{channel} = 25^{\circ}\text{C}$ , Data Points in MHz)



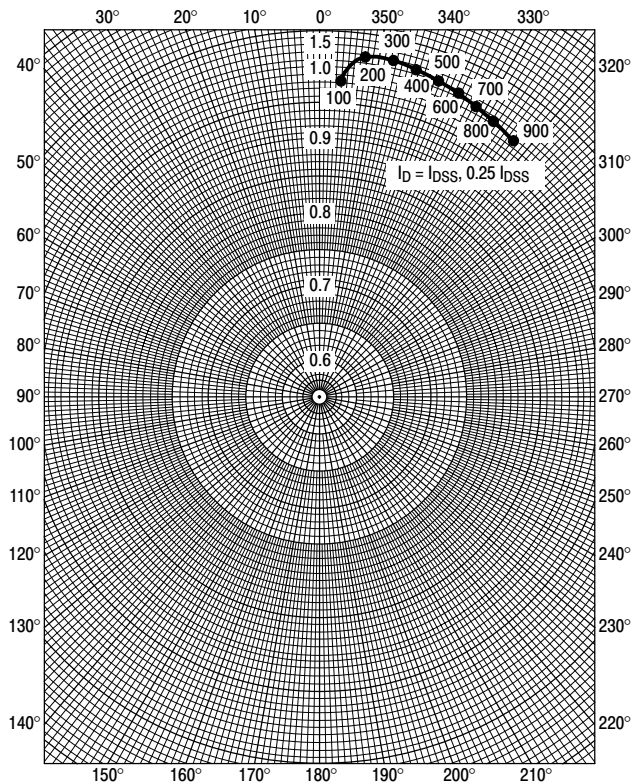
**Figure 13.  $S_{11g}$**



**Figure 14.  $S_{12g}$**



**Figure 15.  $S_{21a}$**

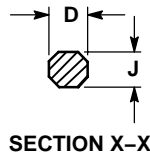
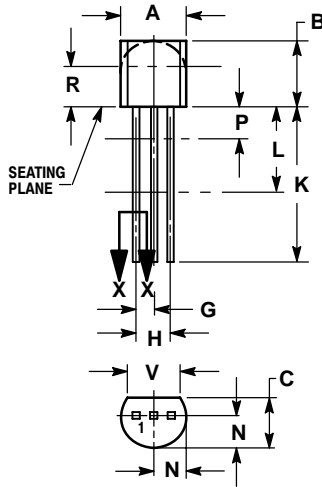


**Figure 16.  $S_{22a}$**

# MPF102

## PACKAGE DIMENSIONS

TO-92 (TO-226)  
CASE 29-11  
ISSUE AL




### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| DIM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 0.175  | 0.205 | 4.45        | 5.20  |
| B   | 0.170  | 0.210 | 4.32        | 5.33  |
| C   | 0.125  | 0.165 | 3.18        | 4.19  |
| D   | 0.016  | 0.021 | 0.407       | 0.533 |
| G   | 0.045  | 0.055 | 1.15        | 1.39  |
| H   | 0.095  | 0.105 | 2.42        | 2.66  |
| J   | 0.015  | 0.020 | 0.39        | 0.50  |
| K   | 0.500  | ---   | 12.70       | ---   |
| L   | 0.250  | ---   | 6.35        | ---   |
| N   | 0.080  | 0.105 | 2.04        | 2.66  |
| P   | ---    | 0.100 | ---         | 2.54  |
| R   | 0.115  | ---   | 2.93        | ---   |
| V   | 0.135  | ---   | 3.43        | ---   |

### STYLE 5:

1. DRAIN
2. SOURCE
3. GATE

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