# MGF0911A

## L, S BAND POWER GaAs FET

## DESCRIPTION

The MGF0911A, GaAs FET with an N-channel schottky gate, is designed for use in UHF band amplifiers.

## FEATURES

- Class A operation
- High output power
  $P_{1dB}$=41dBm(TYP) @2.3GHz
- High power gain
  $G_{LP}$=11dB(TYP) @2.3GHz
- High power added efficiency
  $\eta_{add}$=40%(TYP) @2.3GHz,$P_{1dB}$
- Hermetically sealed metal-ceramic package with ceramic lid

## APPLICATION

UHF band power amplifiers

## QUALITY GRADE

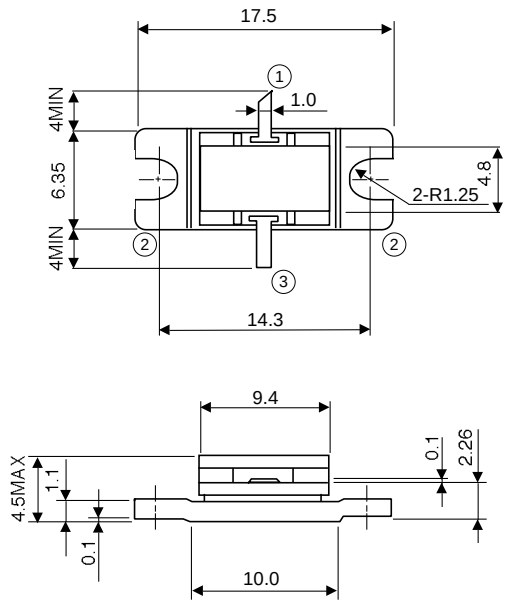
- IG

## RECOMMENDED BIAS CONDITIONS

- $V_{DS}$=10V
- $I_D$=2.6A
- Rg=50Ω
- Refer to Bias Procedure

## OUTLINE DRAWING

Unit:millimeters




① GATE
② SOURCE(FLANGE)
③ DRAIN

**GF-21**

## ABSOLUTE MAXIMUM RATINGS ($T_a$=25˚C)

| Symbol | Parameter | Ratings | Unit |
|---|---|---|---|
| $V_{GDO}$ | Gate to drain voltage | -15 | V |
| $V_{GSO}$ | Gate to source voltage | -15 | V |
| $I_D$ | Drain current | 10 | A |
| $I_{GR}$ | Reverse gate current | 30 | mA |
| $I_{GF}$ | Forward gate current | 63 | mA |
| $P_T$ | Total power dissipation *1 | 37.5 | W |
| $T_{ch}$ | Channel temperature | 175 | ˚C |
| $T_{stg}$ | Storage temperature | -65 to +175 | ˚C |

*1:TC=25˚C

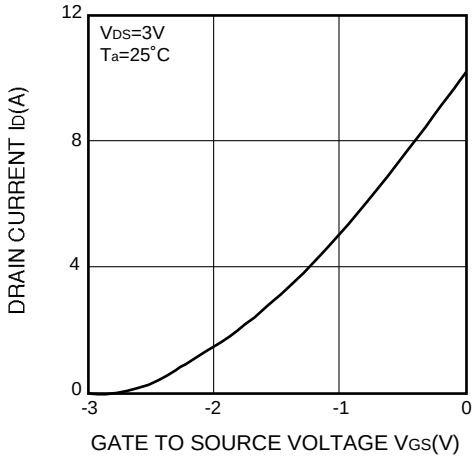
## ELECTRICAL CHARACTERISTICS ($T_a$=25˚C)

| Symbol | Parameter | | Limits | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | |
| $I_{DSS}$ | Saturated drain current | $V_{DS}$=3V,$V_{GS}$=0V | – | – | 10 | A |
| $g_m$ | Transconductance | $V_{DS}$=3V,$I_D$=2.6A | – | 3.0 | – | S |
| $V_{GS(off)}$ | Gate to source cut-off voltage | $V_{DS}$=3V,$I_D$=20mA Test conditions | -2 | – | -5 | V |
| $P_{1dB}$ | Output power at 1dB gain compression | $V_{DS}$=10V,$I_D$≒2.6A,f=2.3GHz | 40 | 41 | – | dBm |
| $G_{LP}$ | Linear power gain *2 | | 10 | 11 | – | dB |
| $\eta_{add}$ | Power added efficiency at $P_{1dB}$ | | – | 40 | – | % |
| $R_{th(ch-c)}$ | Thermal resistance *1 | ΔVf method | – | – | 4.0 | ˚C/W |

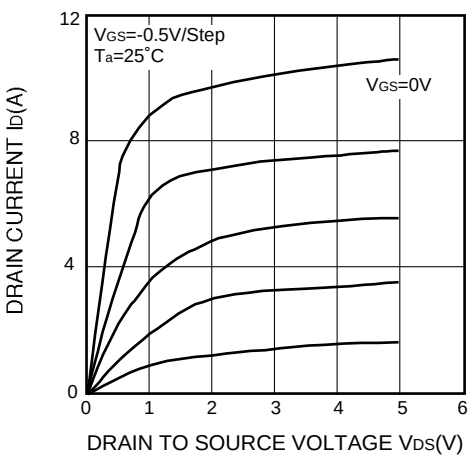
*1:Channel to case *2:Pin=25dBm

## TYPICAL CHARACTERISTICS

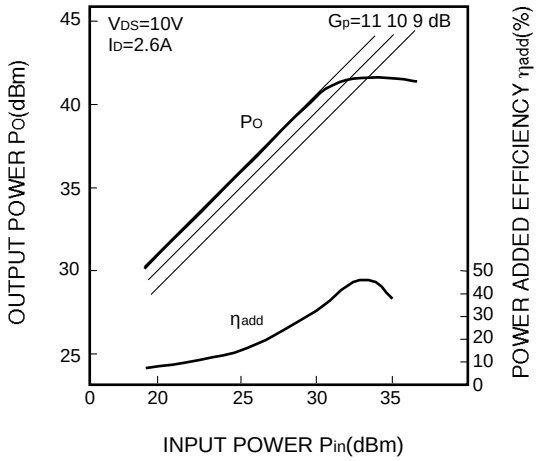
**ID vs. VGS**



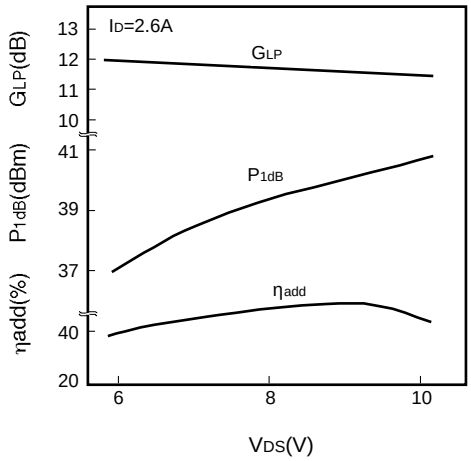

**ID vs. VDS**




**PO & ηadd vs. Pin**
(f=2.3GHz)




**GLP,P1dB, ID and ηadd vs. VDS**
(f=2.3GHz)



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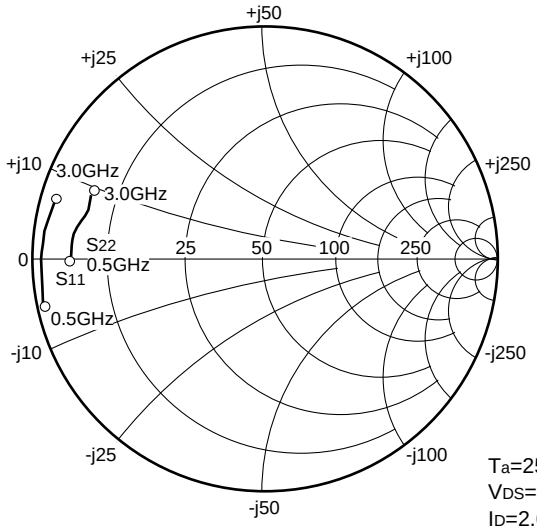
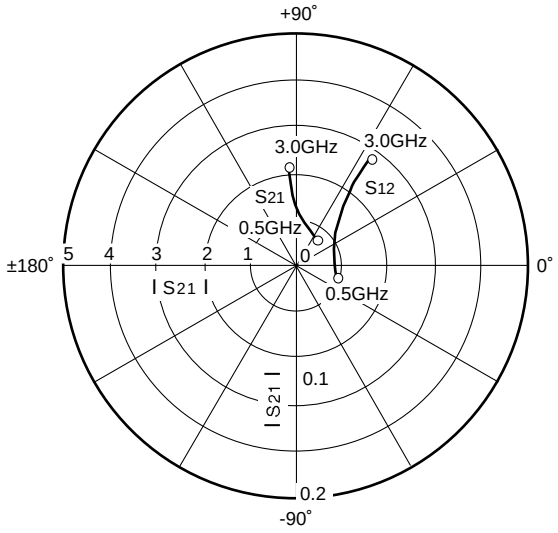
**$S_{11}$ ,$S_{22}$ vs. f.**




$T_a$=25˚C
$V_{DS}$=10V
$I_D$=2.6A

**$S_{21}$ ,$S_{12}$ vs. f.**




**S PARAMETERS** ($T_a$=25˚C,$V_{DS}$=10V,$I_D$=2.6A)

| Freq. (GHz) | $S_{11}$ | | $S_{21}$ | | $S_{12}$ | | $S_{22}$ | | K | MSG/MAG (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Magn. | Angle(deg.) | Magn. | Angle(deg.) | Magn. | Angle(deg.) | Magn. | Angle(deg.) | | |
| 0.50 | 0.986 | -167.3 | 2.046 | 91.2 | 0.008 | 44.1 | 0.913 | -178.6 | 0.515 | 23.1 |
| 0.60 | 0.985 | -171.3 | 1.833 | 87.9 | 0.010 | 44.2 | 0.911 | -179.9 | 0.567 | 22.7 |
| 0.70 | 0.984 | -174.3 | 1.515 | 86.1 | 0.011 | 44.6 | 0.909 | 178.6 | 0.583 | 21.8 |
| 0.80 | 0.983 | -175.5 | 1.356 | 83.6 | 0.012 | 44.9 | 0.907 | 178.2 | 0.675 | 21.2 |
| 0.90 | 0.982 | -172.1 | 1.233 | 84.0 | 0.013 | 45.3 | 0.904 | 177.7 | 0.683 | 20.3 |
| 1.00 | 0.981 | -173.9 | 1.128 | 81.1 | 0.013 | 45.8 | 0.902 | 176.6 | 0.713 | 19.6 |
| 1.10 | 0.980 | -175.3 | 1.033 | 79.7 | 0.015 | 46.4 | 0.898 | 175.7 | 0.736 | 19.3 |
| 1.20 | 0.979 | -176.3 | 0.970 | 77.8 | 0.015 | 46.8 | 0.895 | 176.6 | 0.785 | 18.7 |
| 1.30 | 0.978 | -176.9 | 0.919 | 75.8 | 0.016 | 47.0 | 0.889 | 176.0 | 0.815 | 18.2 |
| 1.40 | 0.976 | -177.9 | 0.878 | 73.6 | 0.017 | 47.3 | 0.883 | 175.6 | 0.835 | 17.5 |
| 1.50 | 0.975 | -178.2 | 0.845 | 71.6 | 0.018 | 47.6 | 0.875 | 175.2 | 0.900 | 17.1 |
| 1.60 | 0.974 | -179.3 | 0.811 | 69.4 | 0.019 | 48.0 | 0.865 | 175.0 | 0.951 | 16.8 |
| 1.70 | 0.973 | -179.8 | 0.788 | 67.8 | 0.020 | 48.4 | 0.858 | 174.6 | 0.989 | 15.8 |
| 1.80 | 0.972 | 179.5 | 0.771 | 65.8 | 0.020 | 48.9 | 0.850 | 173.6 | 1.011 | 14.7 |
| 1.90 | 0.971 | 178.6 | 0.754 | 64.1 | 0.022 | 49.2 | 0.843 | 173.4 | 1.050 | 14.1 |
| 2.00 | 0.970 | 176.7 | 0.653 | 63.1 | 0.023 | 49.6 | 0.837 | 172.6 | 1.149 | 13.9 |
| 2.10 | 0.969 | 175.9 | 0.638 | 60.9 | 0.023 | 49.9 | 0.833 | 174.1 | 1.170 | 13.7 |
| 2.20 | 0.968 | 175.1 | 0.638 | 59.0 | 0.023 | 50.4 | 0.829 | 173.6 | 1.221 | 12.7 |
| 2.30 | 0.967 | 174.1 | 0.635 | 56.3 | 0.024 | 50.7 | 0.826 | 172.9 | 1.242 | 12.3 |
| 2.40 | 0.966 | 173.1 | 0.625 | 54.2 | 0.025 | 51.0 | 0.823 | 171.0 | 1.256 | 11.9 |
| 2.50 | 0.965 | 172.3 | 0.628 | 52.3 | 0.025 | 51.2 | 0.820 | 170.3 | 1.267 | 11.6 |
| 2.60 | 0.965 | 171.2 | 0.634 | 51.3 | 0.027 | 51.6 | 0.818 | 168.8 | 1.292 | 11.4 |
| 2.70 | 0.964 | 170.2 | 0.635 | 48.9 | 0.027 | 51.9 | 0.816 | 167.1 | 1.315 | 11.0 |
| 2.80 | 0.963 | 168.7 | 0.646 | 46.3 | 0.028 | 52.3 | 0.814 | 165.7 | 1.327 | 10.1 |
| 2.90 | 0.962 | 167.6 | 0.642 | 44.0 | 0.029 | 52.5 | 0.812 | 164.6 | 1.366 | 9.8 |
| 3.00 | 0.961 | 166.3 | 0.651 | 41.0 | 0.029 | 52.7 | 0.811 | 162.7 | 1.412 | 9.4 |