

Preliminary

MITSUBISHI SEMICONDUCTOR<GaAs FET>

**MGF0914A**

L & S BAND GaAs FET [ SMD non - matched ]

## DESCRIPTION

The MGF0914A GaAs FET with an N-channel schottky Gate, is designed for use UHF band amplifiers.

## FEATURES

- High output power  
 $P_o=35.5\text{dBm(TYP.)}$  @ $f=1.9\text{GHz}$ ,  $P_{in}=26\text{dBm}$
- High power gain  
 $G_p=11\text{dB(TYP.)}$  @ $f=1.9\text{GHz}$
- High power added efficiency  
 $\eta_{add}=48\%(\text{TYP.})$  @ $f=1.9\text{GHz}$ ,  $P_{in}=26\text{dBm}$
- Hermetic Package

## APPLICATION

- For UHF Band power amplifiers

## QUALITY

- GG

## RECOMMENDED BIAS CONDITIONS

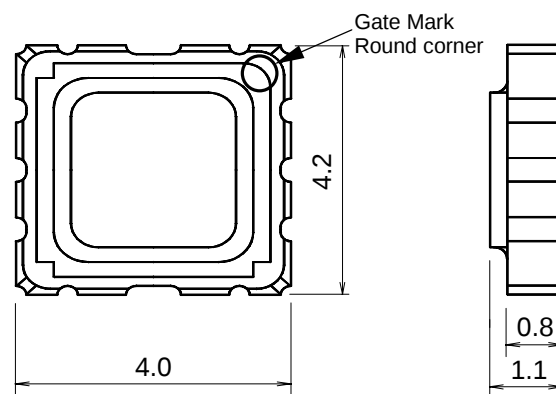
- $V_{ds}=10\text{V}$
- $I_{ds}=800\text{mA}$
- $R_g=100\Omega$

## Absolute maximum ratings

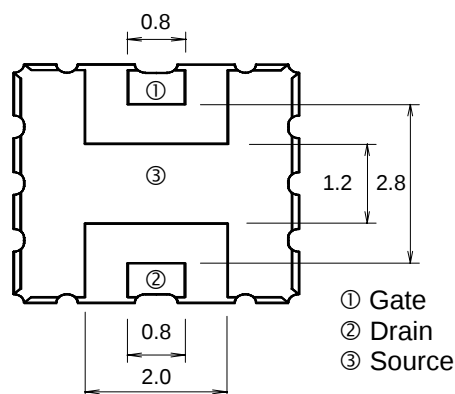
| Symbol | Parameter                        | Ratings     | Unit |
|--------|----------------------------------|-------------|------|
| VGSO   | Gate to source breakdown voltage | -15         | V    |
| VGDO   | Gate to drain breakdown voltage  | -15         | V    |
| ID     | Drain current                    | 3200        | mA   |
| IGR    | Reverse gate current             | -10         | mA   |
| IGF    | Forward gate current             | 21.5        | mA   |
| PT     | Total power dissipation          | 12          | W    |
| Tch    | Channel temperature              | 175         | °C   |
| Tstg   | Storage temperature              | -65 to +175 | °C   |

## OUTLINE DRAWING

(Unit:mm)



## BACK SIDE PATTERN

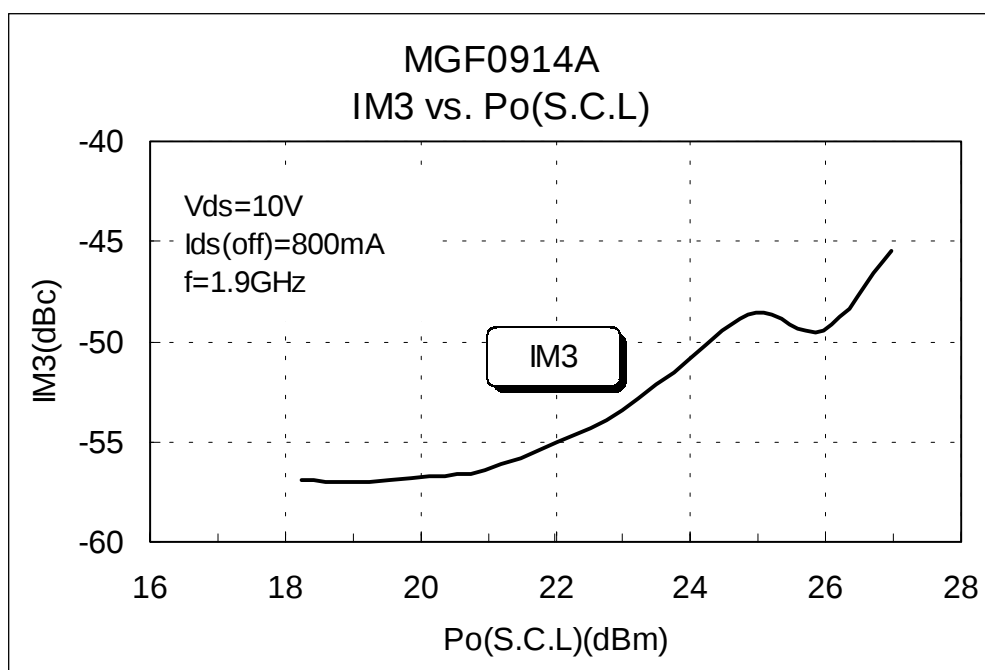
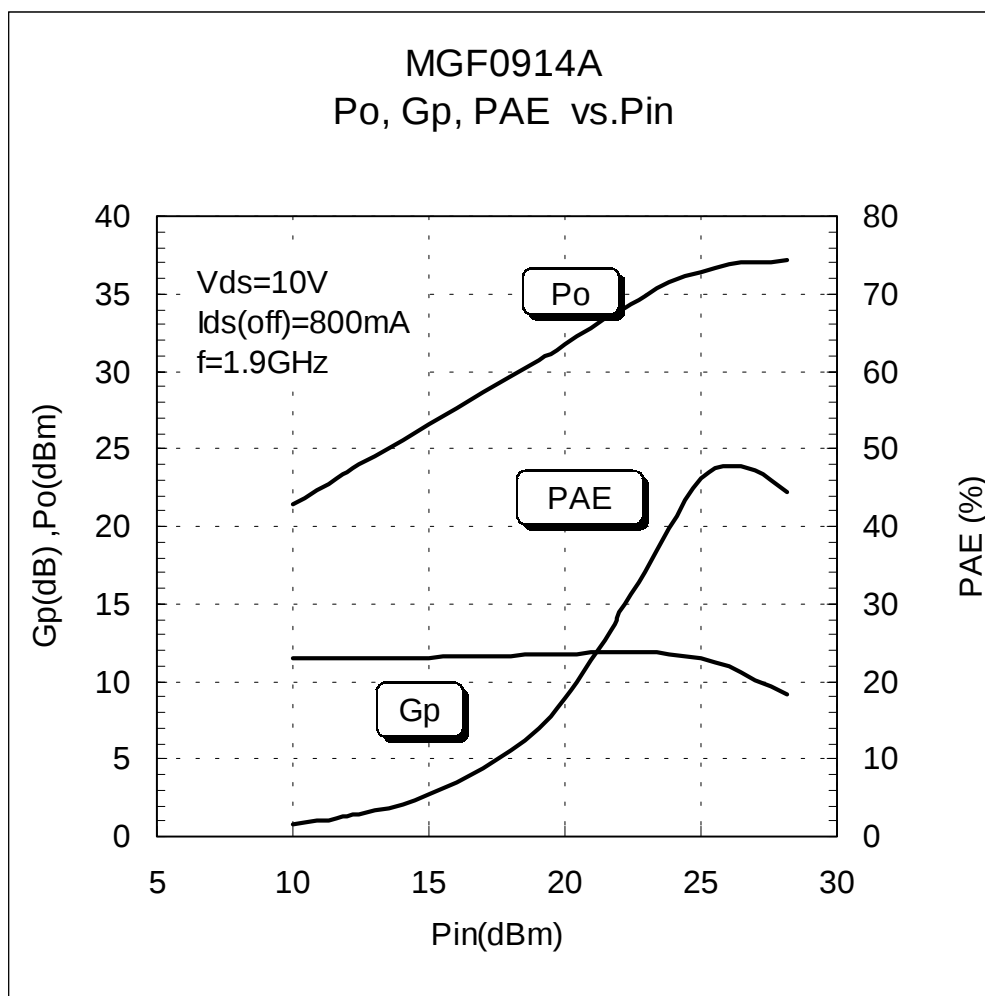


## Electrical characteristics

| Symbol       | Parameter                      | Test conditions                                        | Limits |      |      | Unit |
|--------------|--------------------------------|--------------------------------------------------------|--------|------|------|------|
|              |                                |                                                        | Min.   | Typ. | Max. |      |
| IDSS         | Saturated drain current        | $V_{DS}=3\text{V}, V_{GS}=0\text{V}$                   | 1600   | 2400 | 3200 | mA   |
| VGS(off)     | Gate to source cut-off voltage | $V_{DS}=3\text{V}, I_D=10\text{mA}$                    | -1     | -3   | -5   | V    |
| gm           | Transconductance               | $V_{DS}=3\text{V}, I_D=800\text{mA}$                   | -      | 800  | -    | mS   |
| Po           | Output power                   | $V_{DS}=10\text{V}, I_D=800\text{mA}, f=1.9\text{GHz}$ | 34     | 35.5 | -    | dBm  |
| $\eta_{add}$ | Power added Efficiency         | $P_{in}=26\text{dBm}$                                  | -      | 48   | -    | %    |
| GLP          | Linear Power Gain              | $V_{DS}=10\text{V}, I_D=800\text{mA}, f=1.9\text{GHz}$ | -      | 11   | -    | dB   |
| NF           | Noise figure                   |                                                        | -      | 4    | -    | dB   |
| Rth(ch-c)    | Thermal Resistance *1          | $\Delta V_f$ Method                                    | -      | -    | TBD  | °C/W |

\*1: Channel to case / Above parameters, ratings, limits are subject to change.

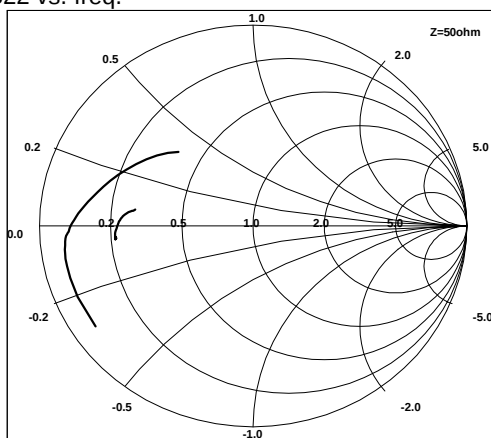
# MGF0914A TYPICAL CHARACTERISTICS



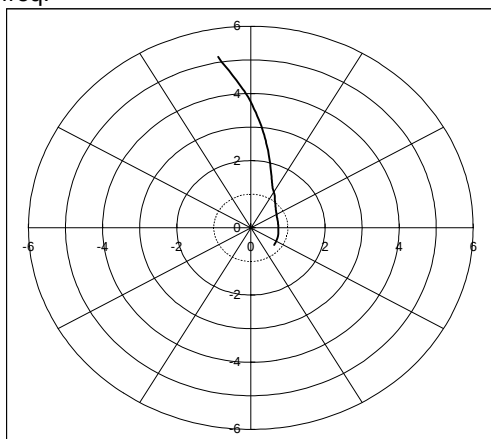
**MGF0914A S PARAMETERS** (Ta=25°C,Vds=10V,Id=800mA)

| f     | S11   |            | S12   |            | S21   |            | S22   |            | K    | MSG/MAG |
|-------|-------|------------|-------|------------|-------|------------|-------|------------|------|---------|
| (GHz) | Magn. | Ang. (deg) | Magn. | Ang. (deg) | Magn. | Ang. (deg) | Magn. | Ang. (deg) |      | (dB)    |
| 0.4   | 0.891 | -145.84    | 0.026 | 27.23      | 5.168 | 99.89      | 0.643 | -174.56    | 0.63 | 23.03   |
| 0.6   | 0.894 | -156.64    | 0.026 | 33.46      | 4.012 | 92.01      | 0.645 | -175.02    | 0.48 | 21.87   |
| 0.8   | 0.894 | -163.15    | 0.027 | 38.43      | 3.135 | 85.46      | 0.646 | -175.22    | 0.43 | 20.60   |
| 1.0   | 0.894 | -167.02    | 0.029 | 42.35      | 2.486 | 79.94      | 0.647 | -175.23    | 0.44 | 19.31   |
| 1.2   | 0.893 | -169.39    | 0.032 | 45.43      | 2.017 | 75.18      | 0.647 | -175.11    | 0.49 | 18.06   |
| 1.4   | 0.891 | -171.05    | 0.034 | 47.81      | 1.690 | 70.98      | 0.647 | -174.92    | 0.55 | 16.92   |
| 1.6   | 0.888 | -172.42    | 0.037 | 49.63      | 1.469 | 67.17      | 0.647 | -174.70    | 0.60 | 15.93   |
| 1.8   | 0.886 | -173.70    | 0.041 | 51.01      | 1.326 | 63.60      | 0.647 | -174.49    | 0.63 | 15.11   |
| 2.0   | 0.883 | -174.91    | 0.045 | 52.03      | 1.238 | 60.18      | 0.647 | -174.32    | 0.63 | 14.44   |
| 2.2   | 0.879 | -175.97    | 0.048 | 52.78      | 1.170 | 56.83      | 0.647 | -174.19    | 0.62 | 13.84   |
| 2.4   | 0.876 | -176.79    | 0.052 | 53.30      | 1.087 | 53.50      | 0.647 | -174.14    | 0.65 | 13.17   |
| 2.6   | 0.872 | -177.33    | 0.057 | 53.63      | 1.018 | 50.15      | 0.648 | -174.18    | 0.67 | 12.55   |
| 2.8   | 0.868 | -177.67    | 0.061 | 53.79      | 0.961 | 46.78      | 0.648 | -174.30    | 0.70 | 11.98   |
| 3.0   | 0.864 | -178.13    | 0.065 | 53.81      | 0.914 | 43.38      | 0.648 | -174.51    | 0.72 | 11.45   |
| 3.2   | 0.859 | -179.27    | 0.070 | 53.68      | 0.876 | 39.95      | 0.649 | -174.81    | 0.74 | 10.96   |
| 3.4   | 0.853 | -179.83    | 0.075 | 53.40      | 0.845 | 36.52      | 0.649 | -175.20    | 0.76 | 10.49   |
| 3.6   | 0.846 | -178.98    | 0.081 | 52.94      | 0.819 | 33.09      | 0.648 | -175.67    | 0.78 | 10.06   |
| 3.8   | 0.839 | -177.99    | 0.087 | 52.30      | 0.798 | 29.67      | 0.648 | -176.21    | 0.80 | 9.64    |
| 4.0   | 0.830 | -176.88    | 0.093 | 51.44      | 0.782 | 26.27      | 0.646 | -176.83    | 0.82 | 9.24    |
| 4.2   | 0.820 | -175.67    | 0.100 | 50.36      | 0.769 | 22.88      | 0.645 | -177.52    | 0.85 | 8.86    |
| 4.4   | 0.809 | -174.32    | 0.107 | 49.01      | 0.758 | 19.48      | 0.642 | -178.27    | 0.87 | 8.49    |
| 4.6   | 0.796 | -172.81    | 0.116 | 47.39      | 0.751 | 16.02      | 0.639 | -179.09    | 0.90 | 8.13    |
| 4.8   | 0.781 | -171.09    | 0.124 | 45.47      | 0.746 | 12.45      | 0.635 | -179.97    | 0.93 | 7.78    |
| 5.0   | 0.765 | -169.14    | 0.134 | 43.24      | 0.743 | 8.67       | 0.630 | -178.51    | 0.96 | 7.43    |
| 5.2   | 0.747 | -166.90    | 0.145 | 40.70      | 0.742 | 4.57       | 0.624 | -177.40    | 0.99 | 7.10    |
| 5.4   | 0.726 | -164.33    | 0.156 | 37.85      | 0.744 | -0.01      | 0.618 | -176.42    | 1.03 | 5.80    |
| 5.6   | 0.704 | -161.42    | 0.169 | 34.71      | 0.747 | -4.96      | 0.611 | -175.51    | 1.06 | 4.96    |
| 5.8   | 0.681 | -158.15    | 0.182 | 31.29      | 0.752 | -9.21      | 0.603 | -174.66    | 1.09 | 4.33    |
| 6.0   | 0.655 | -154.53    | 0.197 | 27.66      | 0.759 | -13.59     | 0.595 | -173.92    | 1.12 | 3.79    |
| 6.2   | 0.628 | -150.59    | 0.212 | 23.86      | 0.768 | -18.33     | 0.587 | -173.32    | 1.14 | 3.29    |
| 6.4   | 0.599 | -146.39    | 0.229 | 19.97      | 0.777 | -23.37     | 0.579 | -172.85    | 1.17 | 2.84    |
| 6.6   | 0.570 | -142.02    | 0.247 | 16.10      | 0.788 | -28.54     | 0.571 | -172.50    | 1.18 | 2.44    |
| 6.8   | 0.539 | -137.62    | 0.266 | 12.35      | 0.798 | -33.75     | 0.564 | -172.16    | 1.20 | 2.09    |
| 7.0   | 0.508 | -133.37    | 0.286 | 8.87       | 0.808 | -39.12     | 0.558 | -171.64    | 1.21 | 1.78    |

S11 &amp; S22 vs. freq.



S21 vs. freq.



S12 vs. freq.

