

Preliminary

MITSUBISHI SEMICONDUCTOR<GaAs FET>

**MGF0916A**

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

## DESCRIPTION

The MGF0916A GaAs FET with an N-channel schottky Gate, is designed for use UHF band amplifiers.

## FEATURES

- High output power  
 $P_o=23\text{dBm(TYP.)}$  @ $f=1.9\text{GHz}$ ,  $P_{in}=5\text{dBm}$
- High power gain  
 $G_p=19\text{dB(TYP.)}$  @ $f=1.9\text{GHz}$
- High power added efficiency  
 $\eta_{add}=30\%(\text{TYP.})$  @ $f=1.9\text{GHz}$ ,  $P_{in}=5\text{dBm}$
- Hermetic Package

## APPLICATION

- For UHF Band power amplifiers

## QUALITY

- GG

## RECOMMENDED BIAS CONDITIONS

- $V_{ds}=6\text{V}$  •  $I_{ds}=100\text{mA}$  •  $R_g=1\text{k}\Omega$

**Delivery** Tape & Reel

## Absolute maximum ratings (Ta=25°C)

| Symbol | Parameter                        | Ratings     | Unit |
|--------|----------------------------------|-------------|------|
| VGSO   | Gate to source breakdown voltage | -8          | V    |
| VGDO   | Gate to drain breakdown voltage  | -8          | V    |
| ID     | Drain current                    | 250         | mA   |
| IGR    | Reverse gate current             | -0.6        | mA   |
| IGF    | Forward gate current             | 1.5         | mA   |
| PT     | Total power dissipation          | 1.5         | W    |
| Tch    | Cannel temperature               | 175         | °C   |
| Tstg   | Storage temperature              | -65 to +175 | °C   |

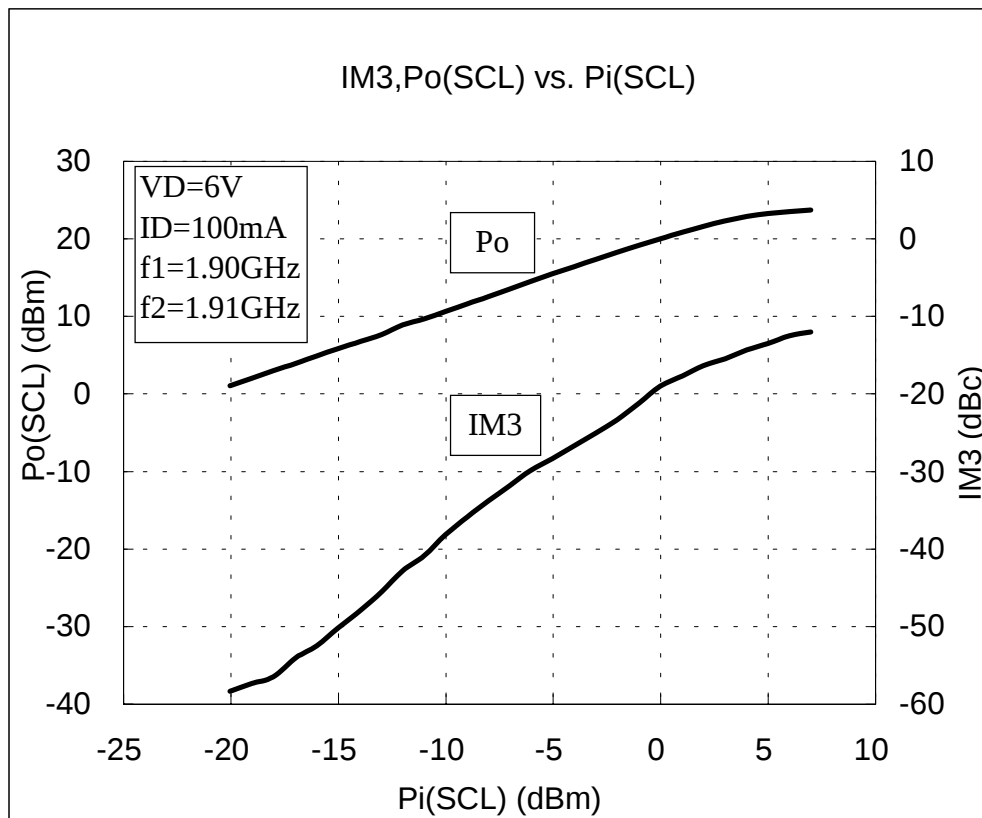
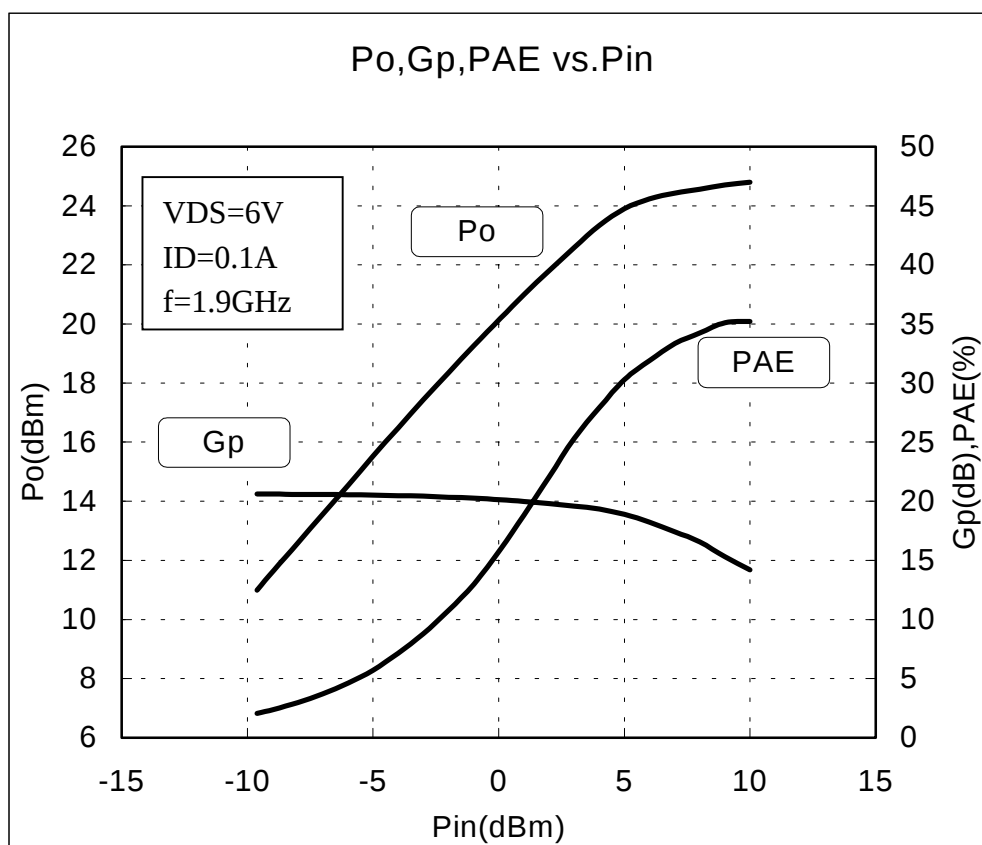
**Fig.1**

## Electrical characteristics (Ta=25°C)

| Symbol       | Parameter                      | Test conditions                                                               | Limits |      |      | Unit |
|--------------|--------------------------------|-------------------------------------------------------------------------------|--------|------|------|------|
|              |                                |                                                                               | Min.   | Typ. | Max. |      |
| IDSS         | Saturated drain current        | $V_{DS}=3\text{V}, V_{GS}=0\text{V}$                                          | 150    | 200  | 250  | mA   |
| VGS(off)     | Gate to source cut-off voltage | $V_{DS}=3\text{V}, I_D=0.1\text{mA}$                                          | -1.5   | -    | -4.5 | V    |
| gm           | Transconductance               | $V_{DS}=3\text{V}, I_D=100\text{mA}$                                          | -      | 90   | -    | mS   |
| Po           | Output power                   | $V_{DS}=6\text{V}, I_D=100\text{mA}, f=1.9\text{GHz}$<br>$P_{in}=5\text{dBm}$ | -      | 23   | -    | dBm  |
| $\eta_{add}$ | Power added Efficiency         |                                                                               | -      | 30   | -    | %    |
| GLP          | Linear Power Gain              |                                                                               | -      | 19   | -    | dB   |
| NF           | Noise figure                   | $V_{DS}=6\text{V}, I_D=100\text{mA}, f=1.9\text{GHz}$                         | -      | 1.0  | -    | dB   |
| Rth(ch-c)    | Thermal Resistance *1          | $\Delta V_f$ Method                                                           | -      | 70   | 100  | °C/W |

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

# MGF0916A TYPICAL CHARACTERISTICS



**MGF0916A S PARAMETERS** (Ta=25°C, VDS=6V, ID=100mA, Reference Plane see Fig.1)

| freq. | S11   |          | S21   |          | S12   |          | S22   |          | K    | MSG/MAG |
|-------|-------|----------|-------|----------|-------|----------|-------|----------|------|---------|
| (GHz) | Mag   | Ang(deg) | Mag   | Ang(deg) | Mag   | Ang(deg) | Mag   | Ang(deg) |      | (dB)    |
| 0.4   | 0.979 | -52.18   | 7.080 | 134.08   | 0.013 | 37.44    | 0.508 | -53.57   | 0.15 | 27.23   |
| 0.6   | 0.955 | -72.24   | 5.903 | 115.68   | 0.015 | 27.67    | 0.569 | -71.98   | 0.21 | 25.88   |
| 0.8   | 0.943 | -88.04   | 4.885 | 100.43   | 0.015 | 18.92    | 0.626 | -86.03   | 0.26 | 25.10   |
| 1.0   | 0.937 | -100.40  | 4.054 | 87.73    | 0.015 | 11.04    | 0.677 | -96.90   | 0.30 | 24.37   |
| 1.2   | 0.935 | -110.19  | 3.388 | 77.05    | 0.014 | 3.93     | 0.720 | -105.58  | 0.36 | 23.84   |
| 1.4   | 0.936 | -117.99  | 2.855 | 67.91    | 0.014 | -2.53    | 0.758 | -112.56  | 0.38 | 23.15   |
| 1.6   | 0.938 | -124.41  | 2.428 | 60.03    | 0.013 | -8.32    | 0.789 | -118.45  | 0.45 | 22.81   |
| 1.8   | 0.939 | -129.65  | 2.082 | 53.09    | 0.012 | -13.52   | 0.816 | -123.36  | 0.49 | 22.30   |
| 2.0   | 0.942 | -134.07  | 1.800 | 46.96    | 0.011 | -18.05   | 0.839 | -127.61  | 0.55 | 21.97   |
| 2.2   | 0.944 | -137.67  | 1.571 | 41.50    | 0.011 | -21.84   | 0.858 | -131.21  | 0.59 | 21.58   |
| 2.4   | 0.945 | -140.93  | 1.375 | 36.44    | 0.011 | -25.23   | 0.875 | -134.46  | 0.63 | 21.17   |
| 2.6   | 0.947 | -143.65  | 1.216 | 31.86    | 0.010 | -27.88   | 0.890 | -137.31  | 0.68 | 20.87   |
| 2.8   | 0.948 | -146.01  | 1.083 | 27.62    | 0.009 | -29.94   | 0.902 | -139.85  | 0.72 | 20.58   |
| 3.0   | 0.949 | -148.06  | 0.971 | 23.66    | 0.009 | -31.46   | 0.913 | -142.13  | 0.76 | 20.31   |
| 3.2   | 0.950 | -149.86  | 0.879 | 19.90    | 0.009 | -32.53   | 0.922 | -144.19  | 0.79 | 20.06   |
| 3.4   | 0.951 | -151.46  | 0.800 | 16.36    | 0.008 | -33.14   | 0.930 | -146.07  | 0.81 | 19.83   |
| 3.6   | 0.951 | -152.88  | 0.734 | 12.94    | 0.008 | -33.45   | 0.937 | -147.79  | 0.83 | 19.61   |
| 3.8   | 0.952 | -154.16  | 0.678 | 9.65     | 0.008 | -33.49   | 0.943 | -149.36  | 0.85 | 19.42   |
| 4.0   | 0.952 | -155.32  | 0.631 | 6.43     | 0.008 | -33.41   | 0.948 | -150.81  | 0.86 | 19.24   |
| 4.2   | 0.951 | -156.40  | 0.591 | 3.29     | 0.007 | -33.23   | 0.953 | -152.15  | 0.87 | 19.09   |
| 4.4   | 0.951 | -157.40  | 0.558 | 0.13     | 0.007 | -33.14   | 0.957 | -153.39  | 0.89 | 18.95   |
| 4.6   | 0.950 | -158.33  | 0.529 | -3.00    | 0.007 | -33.16   | 0.961 | -154.54  | 0.90 | 18.82   |
| 4.8   | 0.949 | -159.22  | 0.505 | -6.17    | 0.007 | -33.38   | 0.965 | -155.60  | 0.92 | 18.70   |
| 5.0   | 0.947 | -160.07  | 0.484 | -9.36    | 0.007 | -33.85   | 0.968 | -156.59  | 0.95 | 18.59   |
| 5.2   | 0.945 | -160.89  | 0.467 | -12.67   | 0.007 | -34.66   | 0.971 | -157.50  | 0.99 | 18.48   |
| 5.4   | 0.942 | -161.69  | 0.452 | -16.04   | 0.007 | -35.79   | 0.973 | -158.36  | 1.03 | 17.35   |
| 5.6   | 0.939 | -162.47  | 0.439 | -19.56   | 0.007 | -37.30   | 0.976 | -159.16  | 1.08 | 16.59   |
| 5.8   | 0.935 | -163.24  | 0.429 | -23.21   | 0.007 | -39.09   | 0.978 | -159.91  | 1.13 | 16.00   |
| 6.0   | 0.930 | -163.98  | 0.421 | -27.10   | 0.007 | -41.21   | 0.980 | -160.62  | 1.19 | 15.47   |
| 6.2   | 0.924 | -164.69  | 0.416 | -31.31   | 0.007 | -43.61   | 0.982 | -161.29  | 1.26 | 14.95   |
| 6.4   | 0.917 | -165.38  | 0.413 | -35.71   | 0.007 | -45.99   | 0.984 | -161.95  | 1.30 | 14.60   |
| 6.6   | 0.909 | -165.99  | 0.413 | -40.48   | 0.007 | -48.34   | 0.986 | -162.59  | 1.34 | 14.38   |
| 6.8   | 0.898 | -166.51  | 0.416 | -45.66   | 0.007 | -50.41   | 0.988 | -163.23  | 1.34 | 14.31   |
| 7.0   | 0.887 | -166.90  | 0.424 | -51.25   | 0.007 | -51.91   | 0.990 | -163.88  | 1.31 | 14.46   |

