# MGFC39V5964A

PRELIMINARY

Notice: This is not a final specification. Some parametric limits are subject to change.

## 5.9~6.4GHz BAND 8W INTERNALLY MATCHED GaAs FET

## DESCRIPTION

The MGFC39V5964A is an internally impedance-matched GaAs power FET especially designed for use in 5.9~6.4 GHz band amplifiers. The hermetically sealed metal-ceramic package guarantees high reliability.

## FEATURES

- Class A operation
- Internally matched to 50Ω system
- High output power
  $P_{1dB}$ = 8W (TYP) @ 5.9~6.4GHz
- High power gain
  $G_{LP}$ = 9 dB (TYP) @5.9~6.4GHz
- High power added efficiency
  $\eta_{add}$ = 30% (TYP) @5.9~6.4GHz, $P_{1dB}$
- Hermetically sealed metal-ceramic package
- Low distortion [Item: -51]
  $IM_3$ = -45 dBc (TYP) @ $P_o$ = 28 (dBm) S.C.L.

## APPLICATION

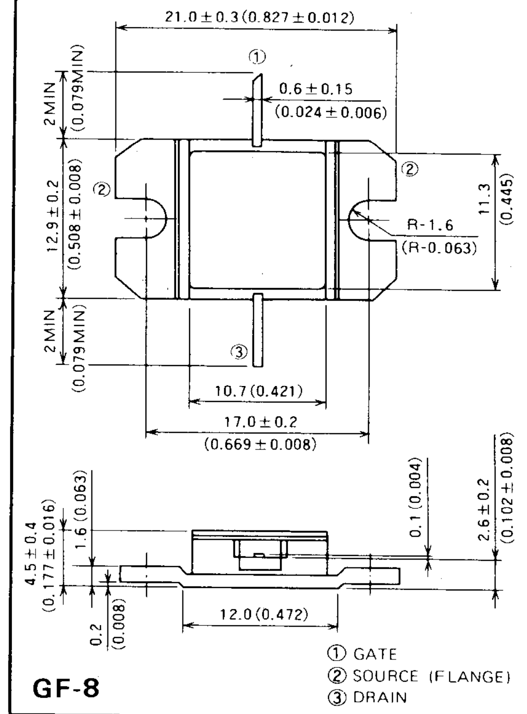
Item-01: 5.9~6.4GHz band power amplifier
Item-51: Digital radio communication

## QUALITY GRADE

- IG

## OUTLINE DRAWING

Unit: millimeters (inches)




## ABSOLUTE MAXIMUM RATINGS (Ta=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 | 7.5 | A |
| $I_{GR}$ | Reverse gate current | −20 | mA |
| $I_{GF}$ | Forward gate current | 42 | mA |
| $P_T$ | Total power dissipation *1 | 42.8 | W |
| Tch | Channel temperature | 175 | °C |
| Tstg | Storage temperature | −65~+175 | °C |

*1: $T_c$ = 25°C

## RECOMMENDED BIAS CONDITIONS

- $V_{DS}$=10V
- $I_D$=2.4A
- Rg=50Ω
- Refer to Bias Procedure

## ELECTRICAL CHARACTERISTICS (Ta=25°C)

| Symbol | Parameter | Test conditions | Limits Min | Limits Typ | Limits Max | Unit |
|---|---|---|---|---|---|---|
| $I_{DSS}$ | Saturated drain current | $V_{DS}$=3V, $V_{GS}$=0V | — | — | 7.5 | A |
| $g_m$ | Transconductance | $V_{DS}$=3V, $I_D$=2.2A | — | 2 | — | S |
| $V_{GS(off)}$ | Gate to source cut-off voltage | $V_{DS}$=3V, $I_D$=20mA | — | — | −4.5 | V |
| $P_{1dB}$ | Output power at 1dB gain compression | $V_{DS}$=10V, $I_D$=2.4A, f=5.9~6.4GHz | 38 | 39 | — | dBm |
| $G_{LP}$ | Linear power gain | | 8 | 9 | — | dB |
| $I_D$ | Drain current | | — | — | 3.0 | A |
| $\eta_{add}$ | Power added efficiency | | — | 30 | — | % |
| $IM_3$ | 3rd order IM distortion *1 | | −42 | −45 | — | dBc |
| Rth(ch-c) | Thermal resistance *2 | $\Delta V_f$ method | — | — | 3.5 | °C/W |

*1: Item-51, 2-tone test $P_o$ = 28 dBm Single Carrier Level f = 6.4GHz Δf = 10 MHz. *2: Channel to case

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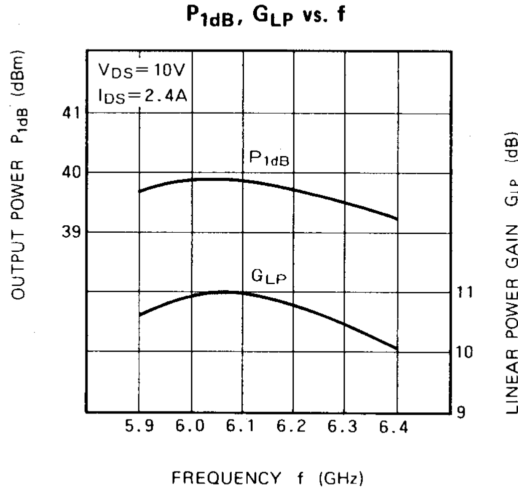
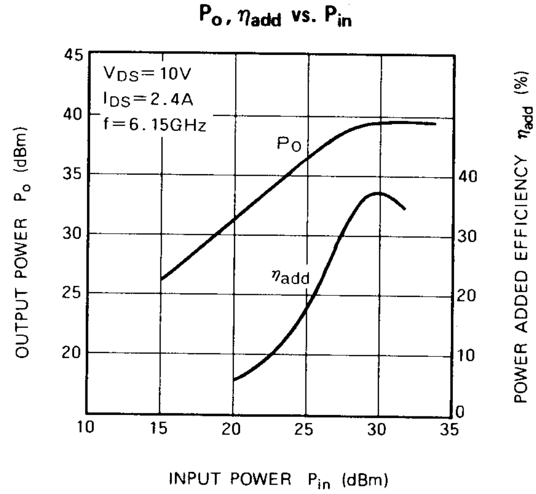
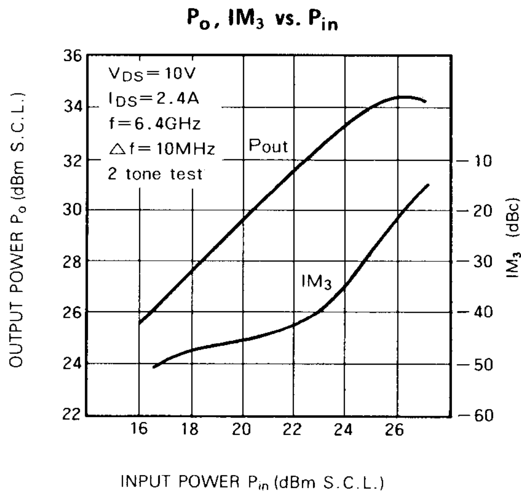
## TYPICAL CHARACTERISTICS (Ta=25℃)




## S PARAMETERS (Ta=25°C, $V_{DS}$=10V, $I_{DS}$=2.4A)

| f (GHz) | S Parameters (TYP.) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | $S_{11}$ | | $S_{21}$ | | $S_{12}$ | | $S_{22}$ | |
| | Magn. | Angle (deg.) | Magn. | Angle (deg.) | Magn. | Angle (deg.) | Magn. | Angle (deg.) |
| 5.9 | 0.32 | −171 | 3.388 | − 23 | 0.079 | − 76 | 0.18 | 168 |
| 6.0 | 0.23 | 156 | 3.516 | − 41 | 0.084 | − 93 | 0.14 | 141 |
| 6.1 | 0.18 | 106 | 3.548 | − 58 | 0.088 | −111 | 0.13 | 109 |
| 6.2 | 0.21 | 56 | 3.479 | − 75 | 0.089 | −128 | 0.13 | 73 |
| 6.3 | 0.29 | 23 | 3.330 | − 92 | 0.087 | −145 | 0.14 | 43 |
| 6.4 | 0.38 | 2 | 3.170 | −108 | 0.086 | −160 | 0.15 | 23 |