# MGFC39V4450A

PRELIMINARY

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

## 4.4~5.0GHz BAND 8W INTERNALLY MATCHED GaAs FET

## DESCRIPTION

The MGFC39V4450A is an internally impedance-matched GaAs power FET especially designed for use in 4.4 ~ 5.0 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) @ 4.4 ~ 5.0 GHz
- High power gain
  $G_{LP}$ = 9 dB (TYP) @ 4.4 ~ 5.0 GHz
- High power added efficiency
  $\eta_{add}$ = 30% (TYP) @ 4.4 ~ 5.0 GHz, $P_{1dB}$
- Hermetically sealed metal-ceramic package
- Low distortion [Item: -51]
  $IM_3$ = -45 dBc (TYP) @ $P_o$ = 28 (dBm) S.C.L.

## APPLICATION

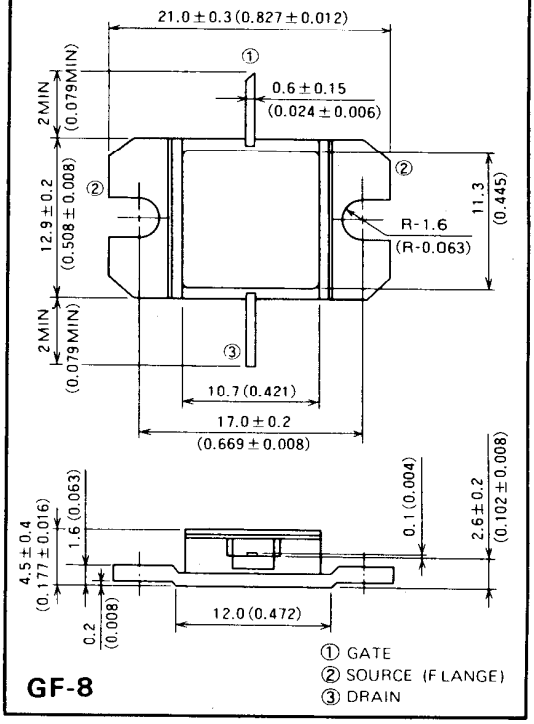
Item -01: 4.4 ~ 5.0 GHz band power amplifier
Item -51: Digital radio communication

## 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 |
| $T_{ch}$ | Channel temperature | 175 | °C |
| $T_{stg}$ | 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 | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | |
| $I_{DSS}$ | 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=4.4~5.0GHz | 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 |
| $R_{th(ch-c)}$ | 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 = 5.0 GHz Δf = 10 MHz *2: Channel to case



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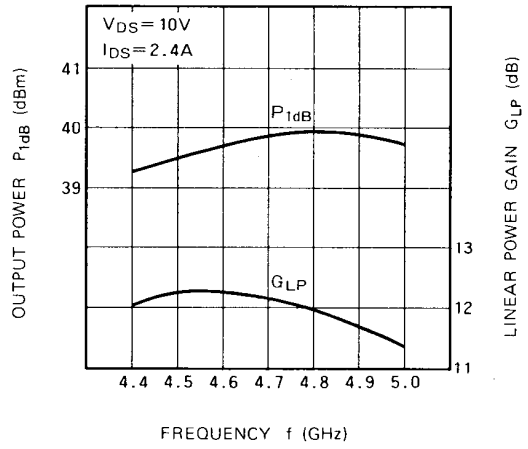
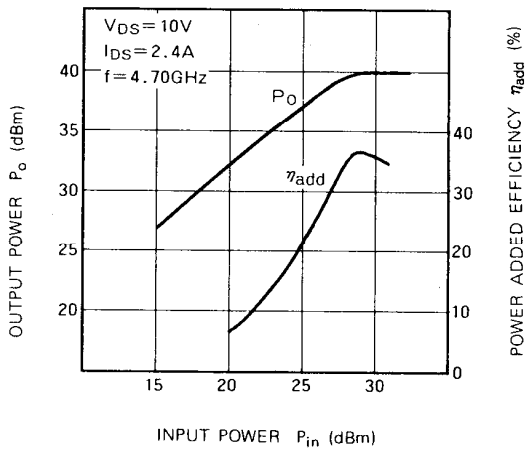
## TYPICAL CHARACTERISTICS ($T_a$=25°C)

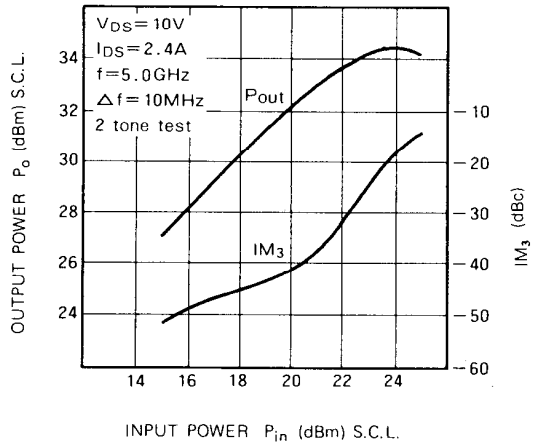
$P_{1dB}$, $G_{LP}$ vs. f




$P_o$, $\eta_{add}$ vs. $P_{in}$




$P_o$, $IM_3$ vs. $P_{in}$




## S PARAMETERS ($T_a$=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.) |
| 4.4 | 0.48 | −176 | 4.140 | 21 | 0.084 | − 38 | 0.13 | −115 |
| 4.5 | 0.48 | 157 | 4.202 | 1 | 0.089 | − 59 | 0.14 | −158 |
| 4.6 | 0.46 | 131 | 4.173 | − 21 | 0.093 | − 80 | 0.16 | 175 |
| 4.7 | 0.43 | 104 | 4.088 | − 42 | 0.094 | − 99 | 0.18 | 155 |
| 4.8 | 0.37 | 72 | 3.976 | − 64 | 0.096 | −120 | 0.18 | 139 |
| 4.9 | 0.32 | 31 | 3.824 | − 86 | 0.098 | −141 | 0.15 | 122 |
| 5.0 | 0.34 | − 16 | 3.673 | −109 | 0.096 | −163 | 0.09 | 97 |



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