MITSUBISHI SEMICONDUCTOR <GaAs FET>

# MGFC40V6472A

PRELIMINARY

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

## 6.4~7.2GHz BAND 10W INTERNALLY MATCHED GaAs FET

## DESCRIPTION

The MGFC40V6472A is an internally impedance-matched GaAs power FET especially designed for use in 6.4~7.2 GHz band amplifiers. The hermetically sealed metal-ceramic package guarantees high reliability.

## FEATURES

- Class A operation
- Internally matched to 50Ω system
- High output power
  $P_{1dB}$ = 10W (TYP) @ 6.4~7.2GHz
- High power gain
  $G_{LP}$ = 8 dB (TYP) @ 6.4~7.2GHz
- High power added efficiency
  $\eta_{add}$ = 30% (TYP) @ 6.4~7.2GHz, $P_{1dB}$
- Hermetically sealed metal-ceramic package
- Low distortion [Item: -51]
  $IM_3$ = -45 dBc (TYP) @ $P_o$ = 29 (dBm) S.C.L.
- Low thermal resistance $R_{th(ch-c)} \leqq 2.8°C/W$

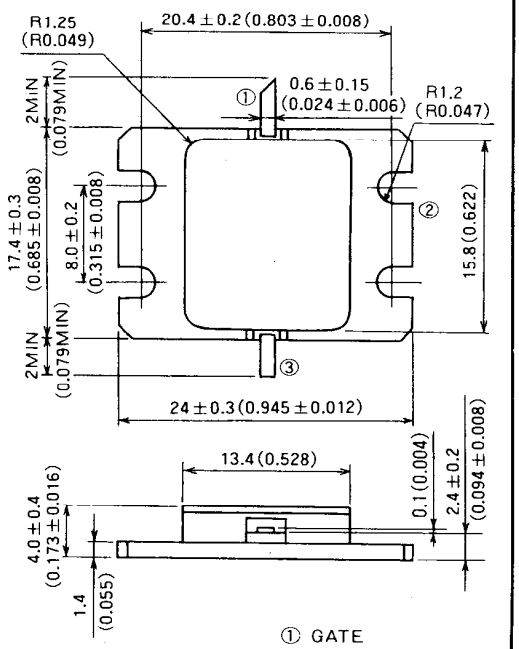
## APPLICATION

Item-01: 6.4~7.2GHz band power amplifier
Item-51: Digital radio communication

## QUALITY GRADE

- IG

## OUTLINE DRAWING Unit: millimeters (inches)

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## 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 | 6 | A |
| $I_{GR}$ | Reverse gate current | −20 | mA |
| $I_{GF}$ | Forward gate current | 42 | mA |
| $P_T$ | Total power dissipation *1 | 53.5 | 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 | — | 4.5 | 6 | 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, $I_D$=40mA | −2 | −3 | −4 | V |
| $P_{1dB}$ | Output power at 1dB gain compression | $V_{DS}$=10V, $I_D$=2.4A, f=6.4~7.2GHz | 39.5 | 40.5 | — | dBm |
| $G_{LP}$ | Linear power gain | | 7 | 8 | — | 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 | $\triangle V_f$ method | — | — | 2.8 | °C/W |

*1: Item-51, 2-tone test $P_o$ = 29 dBm Single Carrier Level f=7.2GHz Δf = 10 MHz. *2: Channel to case



MITSUBISHI ELECTRIC

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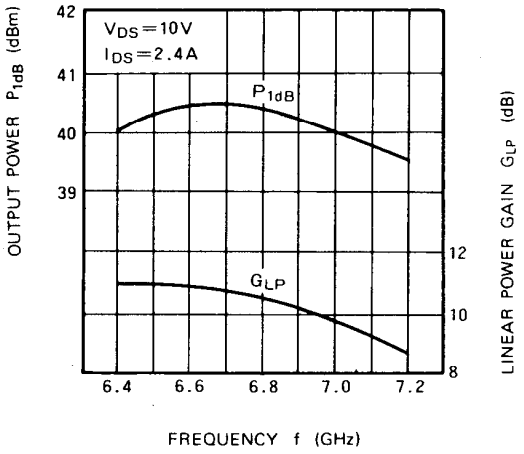
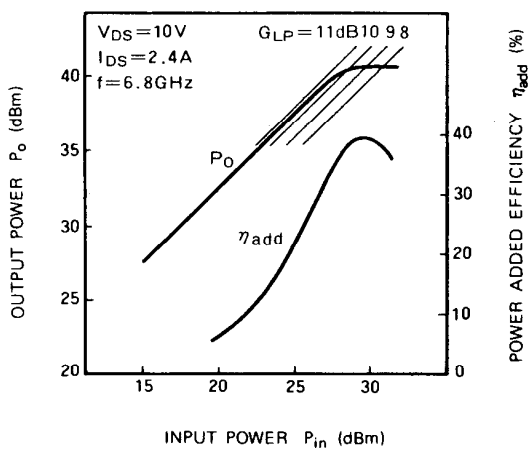
## TYPICAL CHARACTERISTICS (Ta=25℃)

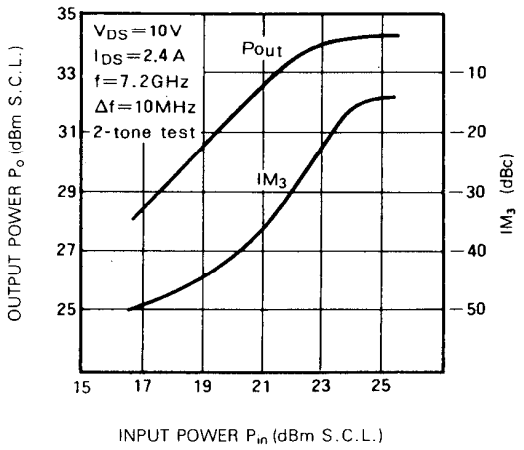
$P_{1dB}$, $G_{LP}$ vs. f




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




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




## S PARAMETERS (Ta=25℃, VDS=10V, IDS=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.) |
| 6.4 | 0.40 | −170.9 | 3.51 | 34.3 | 0.071 | − 24.8 | 0.32 | −134.4 |
| 6.5 | 0.41 | 140.3 | 3.51 | − 6.5 | 0.072 | − 65.4 | 0.31 | −171.2 |
| 6.6 | 0.40 | 92.6 | 3.47 | − 47.4 | 0.073 | −106.6 | 0.29 | −155.1 |
| 6.7 | 0.39 | 41.3 | 3.43 | − 88.0 | 0.073 | −147.2 | 0.26 | 123.6 |
| 6.8 | 0.40 | − 15.1 | 3.39 | −129.5 | 0.073 | 171.2 | 0.21 | 95.4 |
| 6.9 | 0.44 | − 76.5 | 3.27 | −173.5 | 0.071 | 127.6 | 0.14 | 77.0 |
| 7.0 | 0.45 | − 90.0 | 3.05 | 175.0 | 0.071 | 100.0 | 0.13 | 60.0 |
| 7.1 | 0.47 | −110.0 | 2.92 | 165.0 | 0.070 | 80.0 | 0.15 | 50.0 |
| 7.2 | 0.49 | −130.0 | 2.75 | 155.0 | 0.070 | 60.0 | 0.19 | 40.0 |