

PRELIMINARY

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

MITSUBISHI SEMICONDUCTOR <GaAs FET>

MGFC40V6472A

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 $R_{th(ch-c)} \leq 2.8$ °C/W

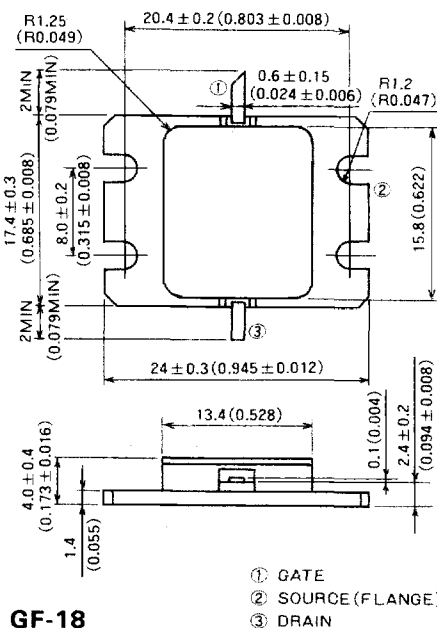
APPLICATION

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

QUALITY GRADE

- IG

OUTLINE DRAWING Unit: millimeters (inches)



GF-18

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

| Symbol | Parameter | Rating | Unit |
|-----------|----------------------------|------------|------|
| V_{GD0} | Gate to drain voltage | -15 | V |
| V_{GS0} | 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

- $V_{DS} = 10V$
- $I_D = 2.4A$
- $R_g = 50 \Omega$
- 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 | $V_{DS} = 10V, I_D = 2.4A, f = 6.4 \sim 7.2GHz$ | 39.5 | 40.5 | — | dBm | |
| G_{LP} | Linear power gain | | 7 | 8 | — | dB | |
| I_D | Drain current | | — | 3.0 | — | A | |
| η_{add} | Power added efficiency | | — | 30 | — | % | |
| IM_3 | 3rd order IM distortion *1 | | -42 | -45 | — | dBc | |
| $R_{th(ch-c)}$ | Thermal resistance *2 | | ΔV_1 method | — | — | 2.8 | °C/W |

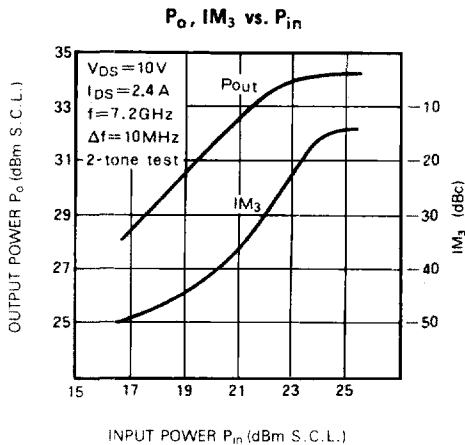
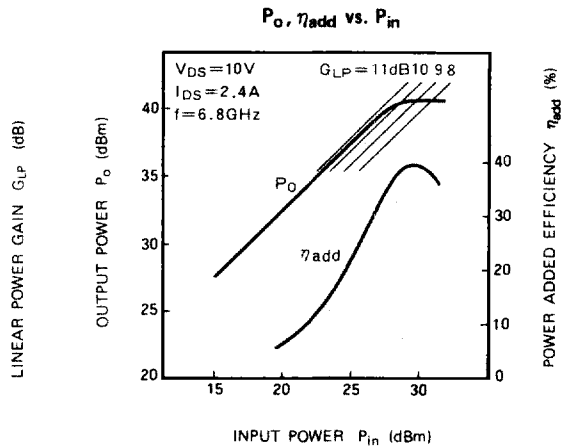
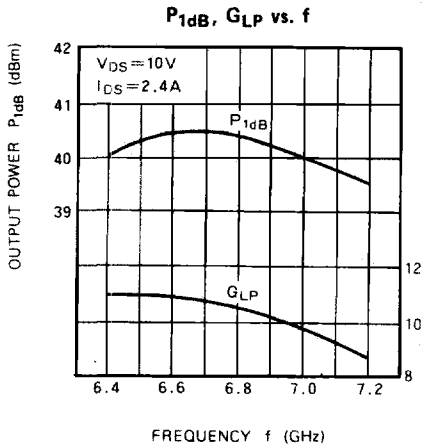
*1: Item-51, 2-tone test $P_o = 29$ dBm Single Carrier Level $f = 7.2GHz$ $\Delta f = 10$ MHz. *2: Channel to case

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TYPICAL CHARACTERISTICS (Ta=25°C)



S PARAMETERS (Ta=25°C, 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 |