

MGFC42V5964

5.9~6.4GHz BAND 16W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC42V5964 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
 $P_{1dB} = 18W$ (TYP) @ 5.9 ~ 6.4 GHz
- High power gain
 $G_{LP} = 9$ dB (TYP) @ 5.9 ~ 6.4 GHz
- High power added efficiency
 $\eta_{add} = 31\%$ (TYP) @ 5.9 ~ 6.4 GHz, P_{1dB}
- Hermetically sealed metal-ceramic package
- Low distortion [Item: -51]
 $IM_3 = -45$ dBc (TYP) @ $P_o = 31$ (dBm) S.C.L.

APPLICATION

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

QUALITY GRADE

- IG

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

| Symbol | Parameter | Ratings | Unit |
|-----------|----------------------------|------------|------|
| V_{GD0} | Gate to drain voltage | -15 | V |
| V_{GS0} | Gate to source voltage | -15 | V |
| I_D | Drain current | 12 | A |
| I_{GR} | Reverse gate current | -40 | mA |
| I_{GF} | Forward gate current | 84 | mA |
| P_T | Total power dissipation *1 | 78.9 | W |
| T_{ch} | Channel temperature | 175 | °C |
| T_{stg} | Storage temperature | -65 ~ +175 | °C |

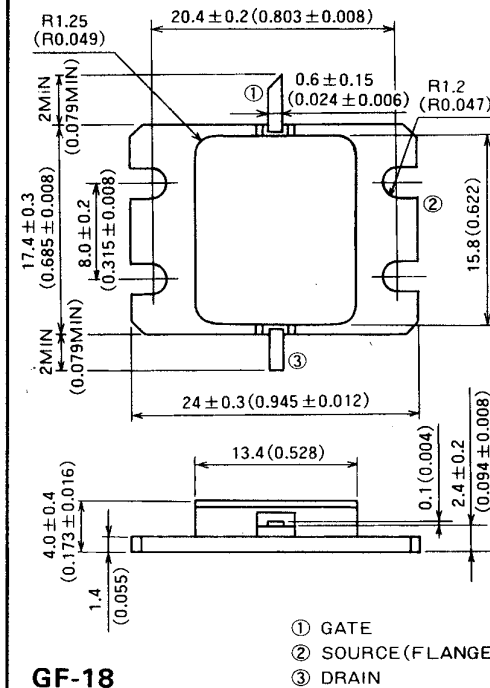
*1: $T_c = 25^\circ C$

ELECTRICAL CHARACTERISTICS (Ta=25°C)

| Symbol | Parameter | Test conditions | Limits | | | Unit | |
|----------------|--------------------------------------|--|---------------------|------|-----|------|------|
| | | | Min | Typ | Max | | |
| I_{DSS} | Saturated drain current | $V_{DS}=3V, V_{GS}=0V$ | — | 9 | 12 | A | |
| g_m | Transconductance | $V_{DS}=3V, I_D=4.4A$ | — | 4 | — | S | |
| $V_{GS(off)}$ | Gate to source cut-off voltage | $V_{DS}=3V, I_D=80mA$ | -2 | -3 | -4 | V | |
| P_{1dB} | Output power at 1dB gain compression | $V_{DS}=10V, I_D=4.5A, f=5.9\sim 6.4GHz$ | 41.5 | 42.5 | — | dBm | |
| G_{LP} | Linear power gain | | 8 | 9 | — | dB | |
| I_D | Drain current | | — | 4.5 | — | A | |
| η_{add} | Power added efficiency | | — | 31 | — | % | |
| IM_3 | 3rd order IM distortion *1 | | -42 | -45 | — | dBc | |
| $R_{th(ch-c)}$ | Thermal resistance *2 | | ΔV_f method | — | — | 1.9 | °C/W |

*1: Item -51, 2-tone test $P_o = 31$ dBm Single Carrier Level $f = 6.4$ GHz $\Delta f = 10$ MHz. *2: Channel to case

OUTLINE DRAWING Unit: millimeters (inches)



GF-18

- ① GATE
- ② SOURCE (FLANGE)
- ③ DRAIN

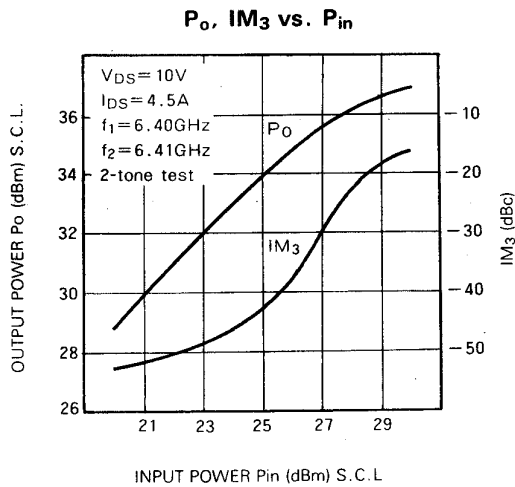
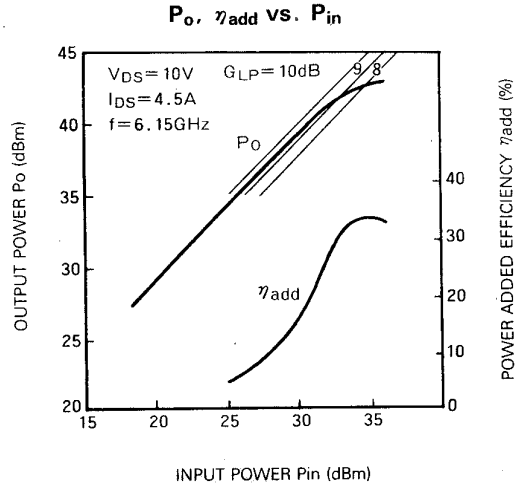
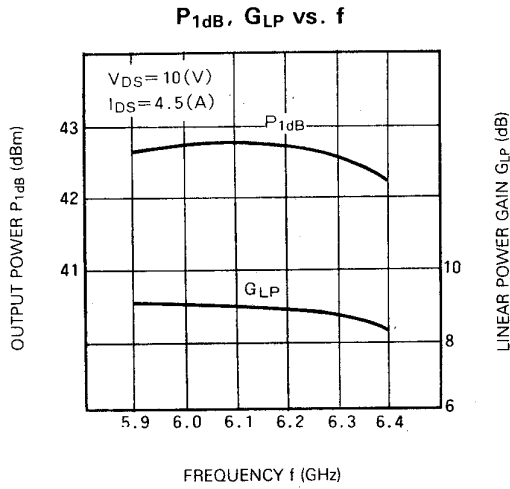
RECOMMENDED BIAS CONDITIONS

- $V_{DS} = 10V$
- $I_D = 4.5A$
- $R_g = 25 \Omega$
- Refer to Bias Procedure

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TYPICAL CHARACTERISTICS



S PARAMETERS ($T_a=25^\circ C$, $V_{DS}=10V$, $I_{DS}=4.5A$)

| 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 | 0.36 | 82 | 2.99 | -74 | 0.071 | -133 | 0.26 | 80 |
| 6.0 | 0.35 | 56 | 2.95 | -91 | 0.071 | -151 | 0.32 | 72 |
| 6.1 | 0.35 | 34 | 2.91 | -108 | 0.072 | -167 | 0.35 | 65 |
| 6.2 | 0.35 | 14 | 2.88 | -124 | 0.078 | 177 | 0.37 | 58 |
| 6.3 | 0.34 | -4 | 2.81 | -140 | 0.079 | 161 | 0.41 | 53 |
| 6.4 | 0.33 | -23 | 2.72 | -157 | 0.079 | 146 | 0.43 | 48 |