

MGFC40V7177B

PRELIMINARY

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

7.1~7.7GHz BAND 10W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC40V7177B is an internally impedance-matched GaAs power FET especially designed for use in 7.1~7.7 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) @ 7.1~7.7 GHz
- High power gain
 $G_{LP} = 9$ dB (TYP) @ 7.1~7.7GHz
- High power added efficiency
 $\eta_{add} = 28\%$ (TYP) @ 7.1~7.7 GHz, P_{1dB}
- Hermetically sealed metal-ceramic package
- Low distortion [Item: -51]
 $IM_3 = -45$ dBc (TYP) @ $P_o = 28$ (dBm) S.C.L.
- Low thermal resistance $R_{th} \leq 2.8^\circ C/W$

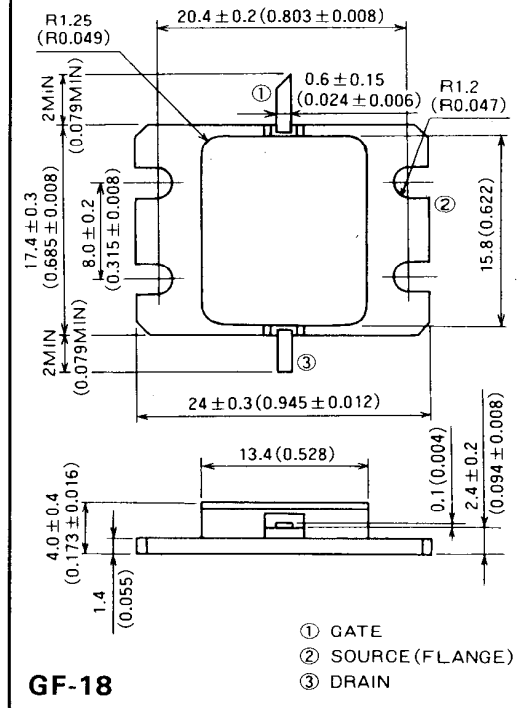
APPLICATION

- Item-01: 7.1~7.7 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 | 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: $T_c = 25^\circ C$

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 | -4.5 | V | |
| P_{1dB} | Output power at 1dB gain compression | $V_{DS} = 10V, I_D = 2.4A, f = 7.1 \sim 7.7GHz$ | 38.0 | 40.0 | — | dBm | |
| G_{LP} | Linear power gain | | 8 | 9 | — | dB | |
| I_D | Drain current | | — | 3.0 | — | A | |
| η_{add} | Power added efficiency | | — | 28 | — | % | |
| IM_3 | 3rd order IM distortion *1 | | -42 | -45 | — | dBc | |
| $R_{th(ch-c)}$ | Thermal resistance *2 | | ΔV_f method | — | — | 2.8 | °C/W |

*1: Item-51, 2-tone test $P_o = 28$ dBm Single Carrier Level $f = 7.7GHz$ $\Delta f = 10$ MHz.

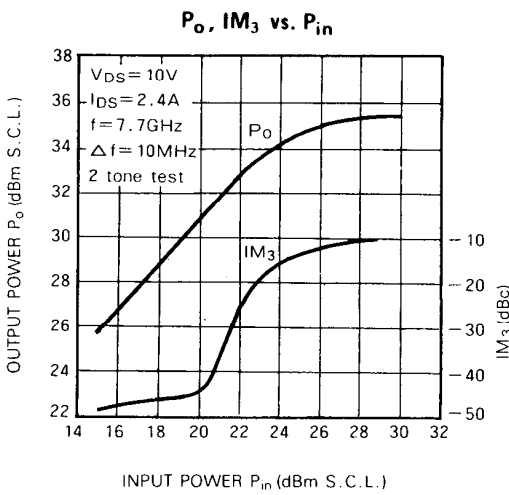
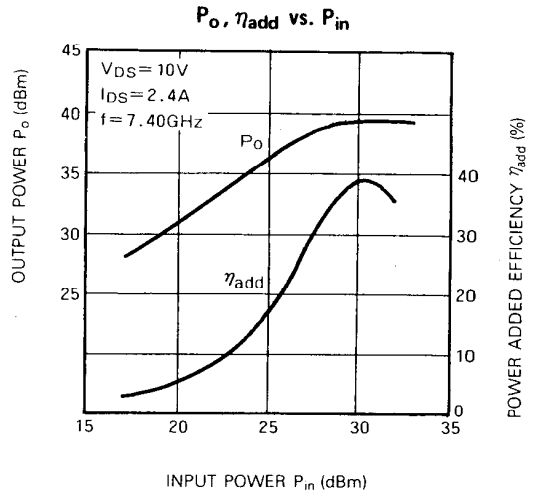
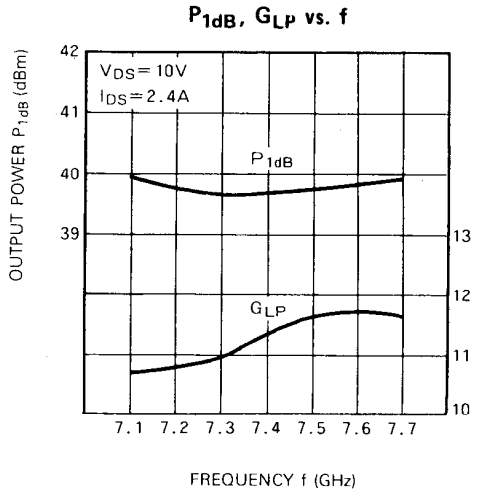
*2: Channel to case

PRELIMINARY

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

7.1~7.7GHz BAND 10W INTERNALLY MATCHED GaAs FET

TYPICAL CHARACTERISTICS (Ta=25°C)



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.) |
| 7.1 | 0.66 | 49 | 2.96 | 131 | 0.094 | 72 | 0.36 | - 86 |
| 7.2 | 0.63 | 32 | 3.04 | 115 | 0.099 | 59 | 0.30 | - 106 |
| 7.3 | 0.63 | 14 | 3.10 | 99 | 0.107 | 39 | 0.23 | - 128 |
| 7.4 | 0.61 | - 4 | 3.13 | 82 | 0.112 | 23 | 0.19 | - 155 |
| 7.5 | 0.55 | - 18 | 3.14 | 66 | 0.107 | 7 | 0.18 | 173 |
| 7.6 | 0.52 | - 36 | 3.16 | 49 | 0.113 | - 7 | 0.19 | 133 |
| 7.7 | 0.45 | - 51 | 3.20 | 31 | 0.114 | - 26 | 0.21 | 98 |