

# 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  $R_{th} \leq 2.8^\circ C/W$

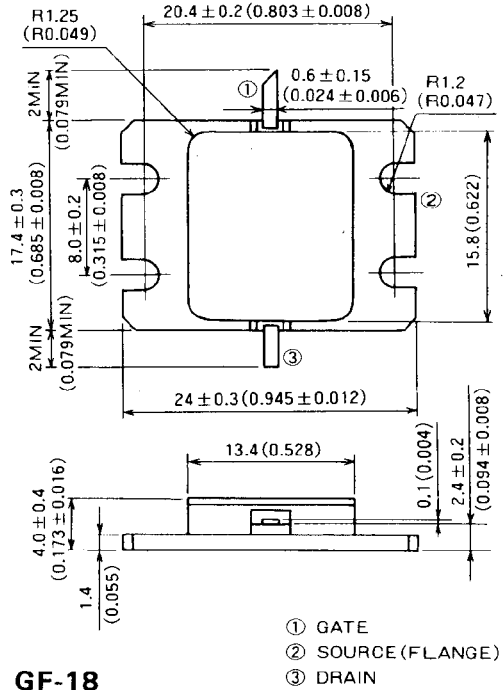
### APPLICATION

- Item-01: 7.1~7.7 GHz band power amplifier
- Item-51: Digital radio communication

### QUALITY GRADE

- IG

### OUTLINE DRAWING Unit: millimeters (inches)



GF-18

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

### ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

| Symbol           | Parameter                  | Ratings    | Unit |
|------------------|----------------------------|------------|------|
| V <sub>GD0</sub> | Gate to drain voltage      | -15        | V    |
| V <sub>GSO</sub> | Gate to source voltage     | -15        | V    |
| I <sub>D</sub>   | Drain current              | 6          | A    |
| I <sub>GR</sub>  | Reverse gate current       | -20        | mA   |
| I <sub>GF</sub>  | Forward gate current       | 42         | mA   |
| P <sub>T</sub>   | Total power dissipation *1 | 53.5       | W    |
| T <sub>ch</sub>  | Channel temperature        | 175        | °C   |
| T <sub>stg</sub> | Storage temperature        | -65 ~ +175 | °C   |

\*1: T<sub>c</sub> = 25°C

### RECOMMENDED BIAS CONDITIONS

- V<sub>DS</sub> = 10V
- I<sub>D</sub> = 2.4A
- R<sub>g</sub> = 50Ω
- Refer to Bias Procedure

### ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| Symbol                | Parameter                            | Test conditions  | Limits                 |      |      | Unit |      |
|-----------------------|--------------------------------------|--|------------------------|------|------|------|------|
|                       |                                      |  | Min                    | Typ  | Max  |      |      |
| I <sub>DSS</sub>      | Saturated drain current              | V <sub>DS</sub> = 3V, V <sub>GS</sub> = 0V                   | —                      | 4.5  | 6    | A    |      |
| g <sub>m</sub>        | Transconductance                     | V <sub>DS</sub> = 3V, I <sub>D</sub> = 2.2A                  | —                      | 2    | —    | S    |      |
| V <sub>GS(off)</sub>  | Gate to source cut-off voltage       | V <sub>DS</sub> = 3V, I <sub>D</sub> = 40mA                  | -2                     | -3   | -4.5 | V    |      |
| P <sub>1dB</sub>      | Output power at 1dB gain compression | V <sub>DS</sub> = 10V, I <sub>D</sub> = 2.4A, f = 7.1~7.7GHz | 38.0                   | 40.0 | —    | dBm  |      |
| G <sub>LP</sub>       | Linear power gain                    |  | 8                      | 9    | —    | dB   |      |
| I <sub>D</sub>        | Drain current                        |  | —                      | 3.0  | —    | A    |      |
| η <sub>add</sub>      | Power added efficiency               |  | —                      | 28   | —    | %    |      |
| IM <sub>3</sub>       | 3rd order IM distortion *1           |  | -42                    | -45  | —    | dBc  |      |
| R <sub>th(ch-c)</sub> | Thermal resistance *2                |  | ΔV <sub>f</sub> method | —    | —    | 2.8  | °C/W |

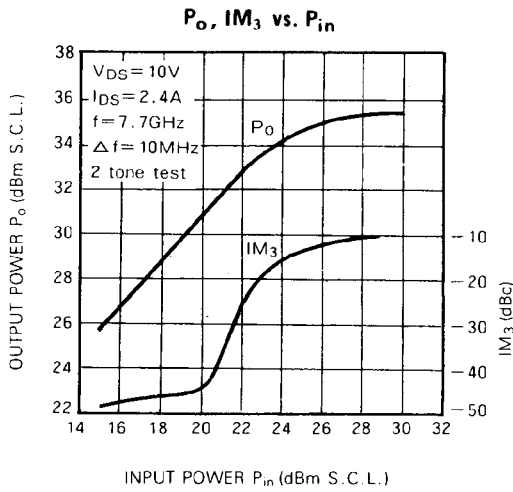
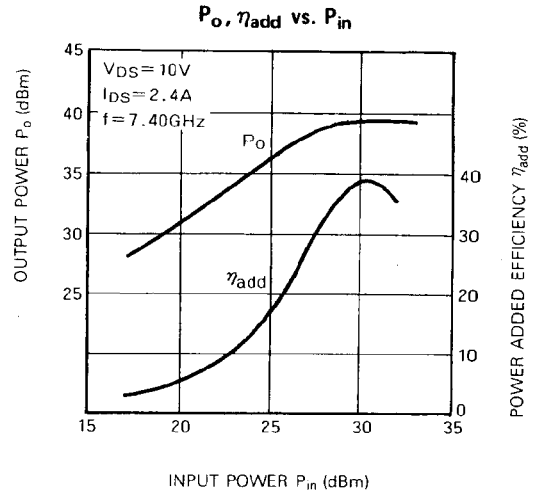
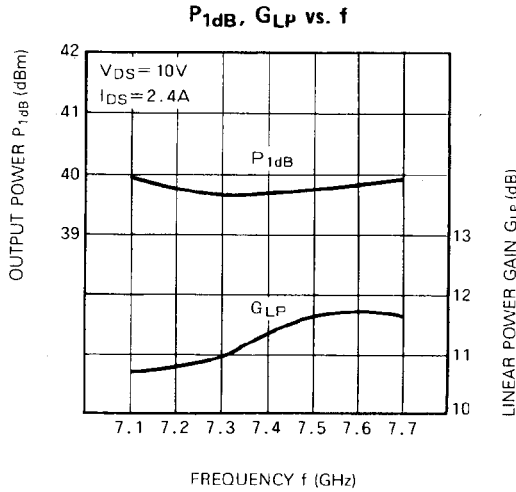
\*1: Item-51, 2-tone test P<sub>o</sub> = 28 dBm Single Carrier Level f = 7.7GHz Δf = 10 MHz.

\*2: Channel to case

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**TYPICAL CHARACTERISTICS (Ta=25°C)**



**S PARAMETERS (Ta=25°C, V<sub>DS</sub>=10V, I<sub>DS</sub>=2.4A)**

| f<br>(GHz) | S Parameters (TYP.) |              |                 |              |                 |              |                 |              |
|------------|---------------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|
|            | S <sub>11</sub>     |              | S <sub>21</sub> |              | S <sub>12</sub> |              | S <sub>22</sub> |              |
|            | 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           |