# MGFC39V7785A

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

## 7.7~8.5GHz BAND 8W INTERNALLY MATCHED GaAs FET

## DESCRIPTION

The MGFC39V7785A is an internally impedance-matched GaAs power FET especially designed for use in 7.7~8.5 GHz band amplifiers. The hermetically sealed metal-ceramic package guarantees high reliability.

## FEATURES

- Class A operation
- Internally matched to 50Ω system
- High output power
  $P_{1dB}$ = 8W (TYP) @7.7~8.5 GHz
- High power gain
  $G_{LP}$ = 7 dB (TYP) @7.7~8.5GHz
- High power added efficiency
  $\eta_{add}$ = 27% (TYP) @ 7.7~8.5GHz, $P_{1dB}$
- Hermetically sealed metal-ceramic package
- Low distortion [Item: -51]
  $IM_3$ = -45 dBc (TYP) @ $P_o$ = 28 (dBm) S.C.L.

## APPLICATION

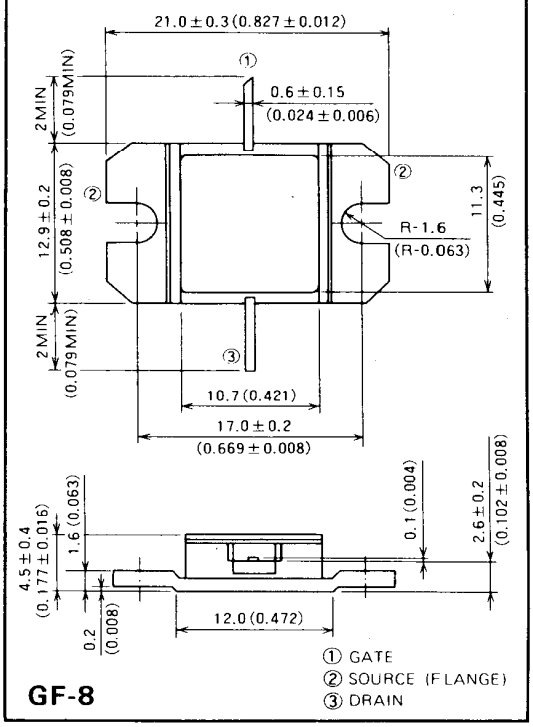
Item-01: 7.7~8.5GHz band power amplifier
Item-51: Digital radio communication

## QUALITY GRADE

- IG

## OUTLINE DRAWING

Unit: millimeters (inches)




GF-8

## 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 | 7.5 | A |
| $I_{GR}$ | Reverse gate current | −20 | mA |
| $I_{GF}$ | Forward gate current | 42 | mA |
| $P_T$ | Total power dissipation *1 | 42.8 | 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 | — | — | 7.5 | 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, $I_D$=20mA | — | — | −4.5 | V |
| $P_{1dB}$ | Output power at 1dB gain compression | $V_{DS}$=10V, $I_D$=2.4A, f=7.7~8.5GHz | 38 | 39 | — | dBm |
| $G_{LP}$ | Linear power gain | | 6 | 7 | — | dB |
| $I_D$ | Drain current | | — | — | 3.0 | A |
| $\eta_{add}$ | Power added efficiency | | — | 27 | — | % |
| $IM_3$ | 3rd order IM distortion *1 | | −42 | −45 | — | dBc |
| $R_{th(ch-c)}$ | Thermal resistance *2 | △$V_f$ method | — | — | 3.5 | °C/W |

*1: Item-51, 2-tone test $P_o$ = 28 dBm Single Carrier Level f = 8.5GHz Δf = 10 MHz. *2: Channel to case



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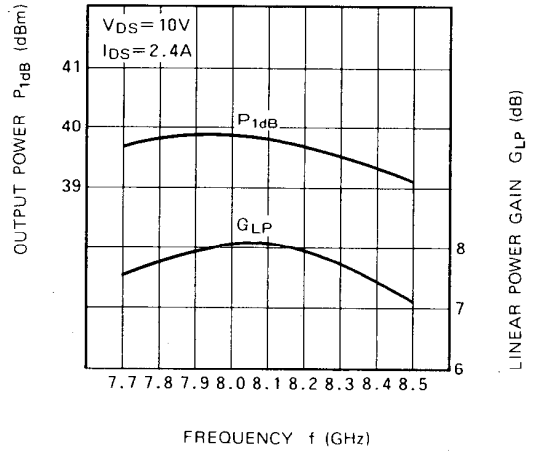
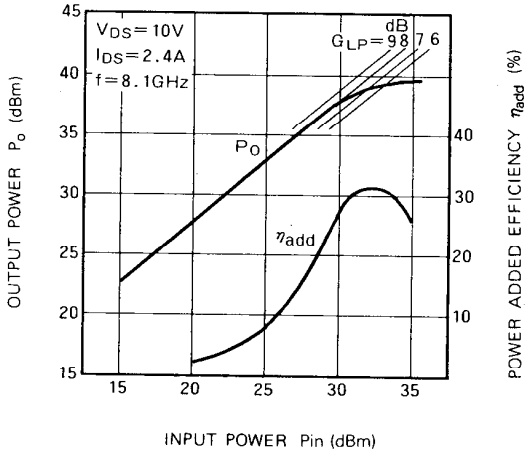
## TYPICAL CHARACTERISTICS (Ta=25℃)

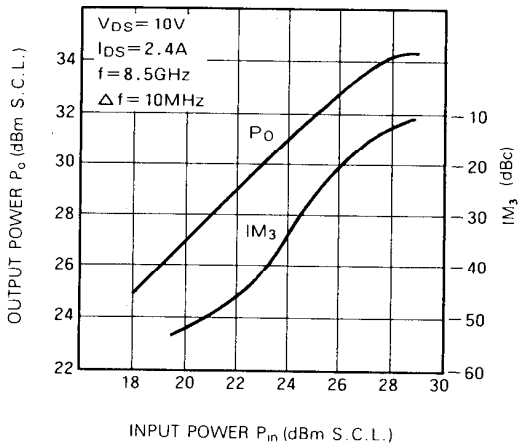
$P_{1dB}$, $G_{LP}$ vs. f




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




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




## S PARAMETERS (Ta=25°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.) |
| 7.7 | 0.45 | 24 | 2.40 | −131 | 0.064 | 178 | 0.23 | 82 |
| 7.8 | 0.39 | 11 | 2.45 | −145 | 0.068 | 167 | 0.21 | 76 |
| 7.9 | 0.35 | − 1 | 2.50 | −161 | 0.072 | 156 | 0.20 | 70 |
| 8.0 | 0.33 | − 8 | 2.52 | 176 | 0.074 | 146 | 0.20 | 56 |
| 8.1 | 0.27 | − 40 | 2.51 | 162 | 0.077 | 131 | 0.19 | 46 |
| 8.2 | 0.24 | −113 | 2.48 | 145 | 0.071 | 114 | 0.17 | 21 |
| 8.3 | 0.26 | −161 | 2.42 | 121 | 0.069 | 91 | 0.15 | 12 |
| 8.4 | 0.31 | 146 | 2.34 | 103 | 0.068 | 77 | 0.15 | − 94 |
| 8.5 | 0.35 | 129 | 2.26 | 82 | 0.068 | 63 | 0.15 | −146 |



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