# MGFC42V4450A

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

## 4.4~5.0GHz BAND 16W INTERNALLY MATCHED GaAs FET

## DESCRIPTION

The MGFC42V4450A is an internally impedance-matched GaAs power FET especially designed for use in 4.4~5.0 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) @4.4~5.0GHz
- High power gain
  $G_{LP}$ = 9 dB (TYP) @4.4~5.0GHz
- High power added efficiency
  $\eta_{add}$ = 33%(TYP) @4.4~5.0GHz, $P_{1dB}$
- Hermetically sealed metal-ceramic package
- Low distortion [Item: -51]
  IM3= -45dBc (TYP) @Po=31(dBm) S.C.L.
- Low thermal resistance $R_{th(ch-c)} \leqq 1.6$ (°C/W)

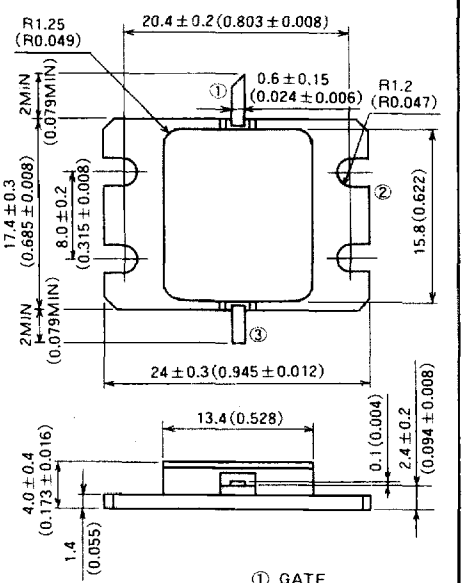
## APPLICATION

Item-01: 4.4~5.0 GHz band power amplifiers.
Item-51: Digital radio communication

## QUALITY GRADE

- IG

## OUTLINE DRAWING Unit: millimeters (inches)




GF-18

## 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 | 12 | A |
| $I_{GR}$ | Reverse gate current | −40 | mA |
| $I_{GF}$ | Forward gate current | +84 | mA |
| $P_T$ | Total power dissipation *1 | 93.7 | 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
- $I_D$=4.5A
- Rg=25Ω
- 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 | — | 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=3.7~4.2GHz | 41.5 | 42.5 | — | dBm |
| $G_{LP}$ | Linear power gain | | 8 | 9 | — | dB |
| $I_D$ | Drain current | | — | 4.5 | — | A |
| $\eta_{add}$ | Power added efficiency | | — | 33 | — | % |
| $IM_3$ | 3rd order IM distortion *1 | | −42 | −45 | — | dBc |
| $R_{th(ch-c)}$ | Thermal resistance *2 | $\Delta V_f$ method | — | — | 1.6 | °C/W |

*1: Item-51, 2-tone test Po=31dBm Single Carrier Level f=5.0 Δf=10MHz. *2: Channel to case

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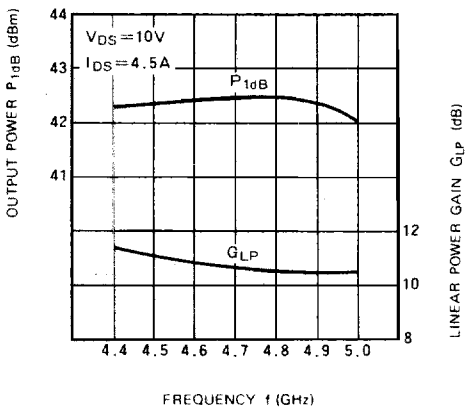
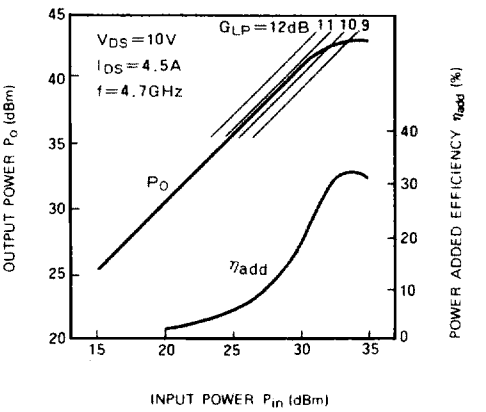
### TYPICAL CHARACTERISTICS (Ta=25°C)

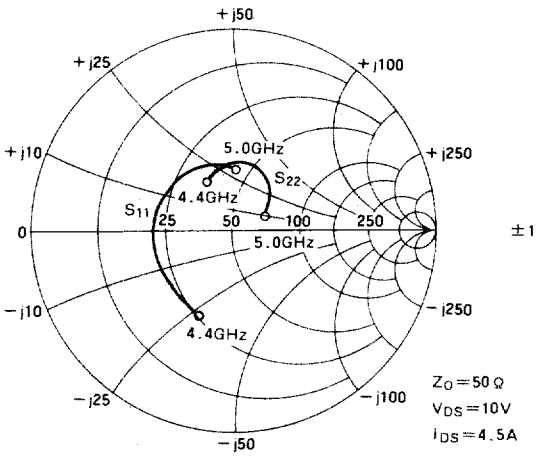
$P_{1dB}$, $G_{LP}$ vs. f



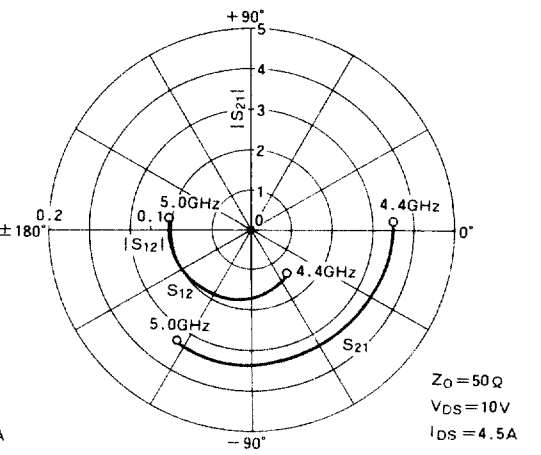

$P_o$, $\eta_{add}$ vs. $P_{in}$




$S_{11}$, $S_{22}$ vs. f




$S_{21}$, $S_{12}$ vs.f




### S PARAMETERS (Ta=25°C, VDS=10V, IDS=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.) |
| 4.4 | 0.46 | −113 | 3.63 | 3 | 0.054 | − 49 | 0.31 | 121 |
| 4.5 | 0.41 | −156 | 3.50 | − 20 | 0.063 | − 78 | 0.33 | 101 |
| 4.6 | 0.40 | −179 | 3.45 | − 38 | 0.068 | − 93 | 0.33 | 90 |
| 4.7 | 0.38 | 154 | 3.42 | − 61 | 0.072 | −123 | 0.33 | 79 |
| 4.8 | 0.37 | 135 | 3.38 | − 77 | 0.075 | −140 | 0.31 | 71 |
| 4.9 | 0.33 | 109 | 3.34 | −101 | 0.078 | −167 | 0.25 | 51 |
| 5.0 | 0.29 | 89 | 3.27 | −122 | 0.079 | 172 | 0.17 | 22 |



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