

# MGFC44V4450

4.4 ~ 5.0GHz BAND 24W INTERNALLY MATCHED GaAs FET

## DESCRIPTION

The MGFC44V4450 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

- Internally matched to 50Ω system
- High output power  
P1dB = 25W (TYP.) @ f=4.4 ~ 5.0 GHz
- High power gain  
GLP = 10.0 dB (TYP.) @ f=4.4 ~ 5.0 GHz
- High power added efficiency  
η<sub>add</sub> = 35 % (TYP.) @ f=4.4 ~ 5.0 GHz
- Low Distortion[Item-51]  
IM3=-45 dBc(TYP.)@P<sub>o</sub>-33.5dBm S.C.L.

## APPLICATION

4.4 ~ 5.0GHz band amplifiers

## QUALITY GRADE

IG

## RECOMMENDED BIAS CONDITIONS

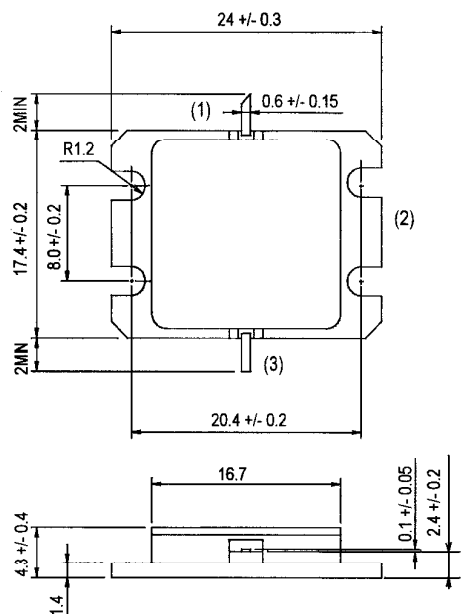
- V<sub>DS</sub> = 10V
- I<sub>D</sub> = 6.4 A
- R<sub>g</sub>=25(Ω) Refer to Bias Procedure

## ABSOLUTE MAXIMUM RATINGS

| Symbol           | Parameter                  | Ratings    | Unit |
|------------------|----------------------------|------------|------|
| V <sub>GDO</sub> | Gate to drain voltage      | -15        | V    |
| V <sub>GSO</sub> | Gate to source voltage     | -15        | V    |
| I <sub>D</sub>   | Drain current              | 20         | A    |
| I <sub>GR</sub>  | Reverse gate current       | -60        | mA   |
| I <sub>GF</sub>  | Forward gate current       | 126        | mA   |
| P <sub>T</sub>   | Total power dissipation *1 | 93         | 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

OUTLINE DRAWING Unit:millimeters



GF-38

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

< Keep safety first in your circuit designs! >

Mitsubishi Electric Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as ( i )placement of substitutive, auxiliary circuits, ( ii )use of non-flammable material or ( iii )prevention against any malfunction or mishap.

## ABSOLUTE MAXIMUM RATINGS

| 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                       | -      | 18  | -   | A    |
| G <sub>m</sub>        | Transconductance                     | V <sub>DS</sub> = 3V , I <sub>D</sub> = 6.4A                      | -      | 6.5 | -   | S    |
| V <sub>GS(off)</sub>  | Gate to source cut-off volt.         | V <sub>DS</sub> = 3V , I <sub>D</sub> = 120mA                     | -2     | -   | -5  | V    |
| P <sub>1dB</sub>      | Output power at 1dB gain compression | V <sub>DS</sub> = 10V , I <sub>D</sub> = 6.4A , f = 4.4 ~ 5.0 GHz | 43     | 44  | -   | dBm  |
| G <sub>LP</sub>       | Linear power gain                    |   | 10     | 11  | -   | dB   |
| η <sub>add</sub>      | Power added efficiency               |   | -      | 35  | -   | %    |
| IM3 *2                | 3rd order IM distortion              |   | -42    | -45 | -   | dBc  |
| R <sub>th(ch-c)</sub> | Thermal resistance *1                | Δ Vf method   | -      | -   | 1.6 | °C/W |

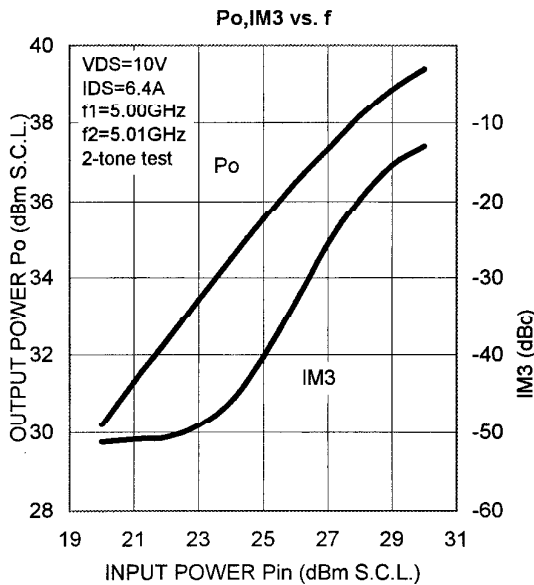
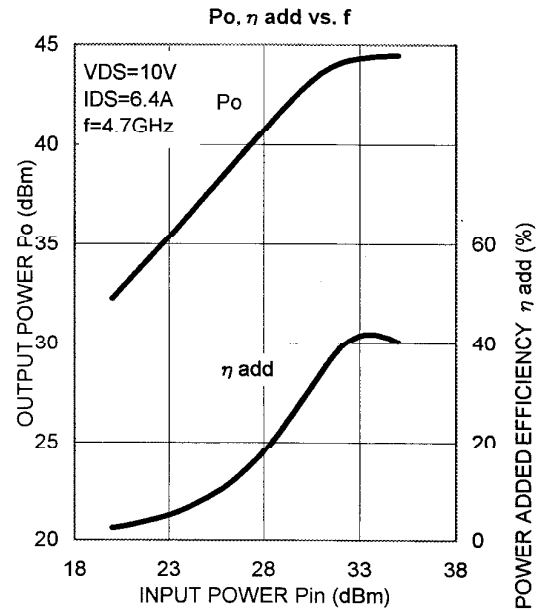
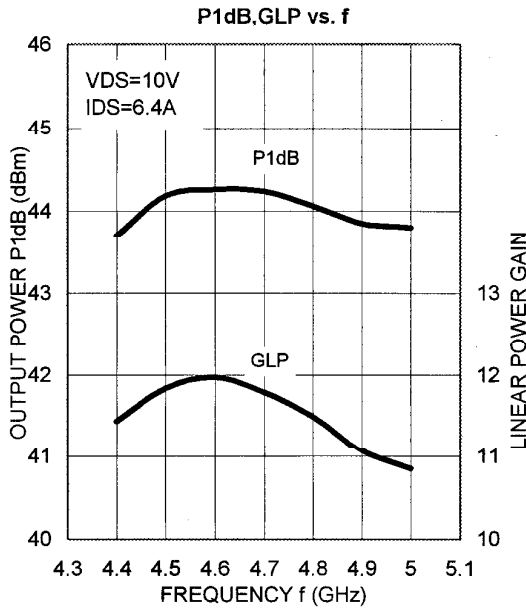
\*1 : Channel to case

\*2 : Item-51, 2tone test, P<sub>o</sub>=33.5dBm Single Carrier Level, f=5.0GHz, Δ f=10MHz

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### TYPICAL CHARACTERISTICS (Ta=25°C)



### S PARAMETERS (Ta=25°C, VDS=10V, IDS=6.4A)

| f<br>(GHz) | S Parameters (TYP.) |             |       |             |       |             |       |             |
|------------|---------------------|-------------|-------|-------------|-------|-------------|-------|-------------|
|            | S11                 |             | S21   |             | S12   |             | S22   |             |
|            | Magn.               | Angle(deg.) | Magn. | Angle(deg.) | Magn. | Angle(deg.) | Magn. | Angle(deg.) |
| 4.4        | 0.45                | -147        | 3.55  | 38          | 0.033 | -20         | 0.33  | -56         |
| 4.5        | 0.40                | 179         | 3.69  | 13          | 0.047 | -46         | 0.26  | -85         |
| 4.6        | 0.37                | 147         | 3.74  | -11         | 0.046 | -72         | 0.23  | -117        |
| 4.7        | 0.31                | 116         | 3.70  | -34         | 0.053 | -100        | 0.23  | -152        |
| 4.8        | 0.26                | 79          | 3.66  | -57         | 0.064 | -121        | 0.23  | -179        |
| 4.9        | 0.18                | 30          | 3.55  | -81         | 0.070 | -143        | 0.24  | 157         |
| 5.0        | 0.20                | -32         | 3.40  | -105        | 0.072 | -164        | 0.21  | 140         |