# MGFC41V3642

## 3.6~4.2GHz BAND 12W INTERNALLY MATCHED GaAs FET

## DESCRIPTION

The MGFC41V3642 is an internally impedance-matched GaAs power FET especially designed for use in 3.6 ~ 4.2 GHz band amplifiers. The hermetically sealed metal-ceramic package guarantees high reliability.

## FEATURES

- Class A operation
- Internally matched to 50Ω system
- High output power
  $P_{1dB}$ = 14W(TYP) @ 3.6~4.2GHz
- High power gain
  $G_{LP}$ = 12.5dB (TYP) @3.6~4.2GHz
- High power added efficiency
  $\eta_{add}$ = 40%(TYP) @ 3.6~4.2 GHz, $P_{1dB}$
- Hermetically sealed metal-ceramic package
- Low distortion [Item: -51]
  $IM_3$ = -45 dBc (TYP) @ $P_o$ = 30 (dBm) S.C.L.

## APPLICATION

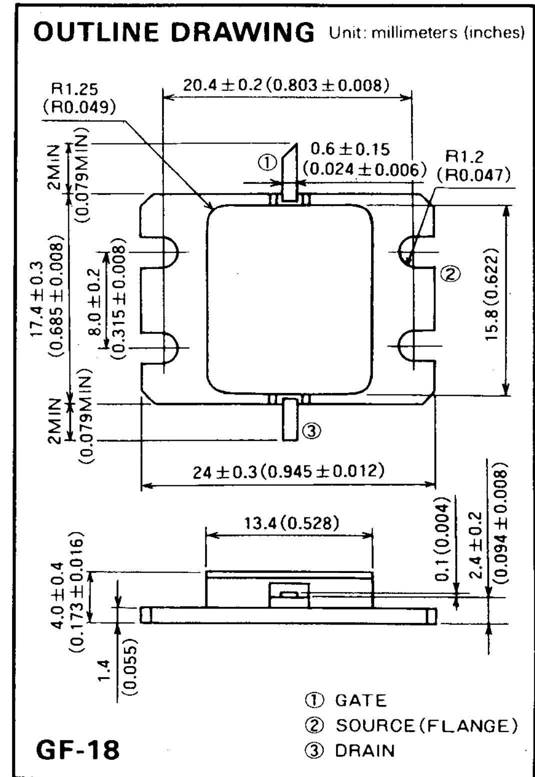
Item-01: 3.6~4.2 GHz band power amplifier
Item-51: Digital radio communication

## 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 | 12 | A |
| $I_{GR}$ | Reverse gate current | −30 | mA |
| $I_{GF}$ | Forward gate current | 63 | mA |
| $P_T$ | Total power dissipation *1 | 57.7 | 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
- $I_D$=3.4A
- Rg=50Ω
- Refer to Bias Procedure

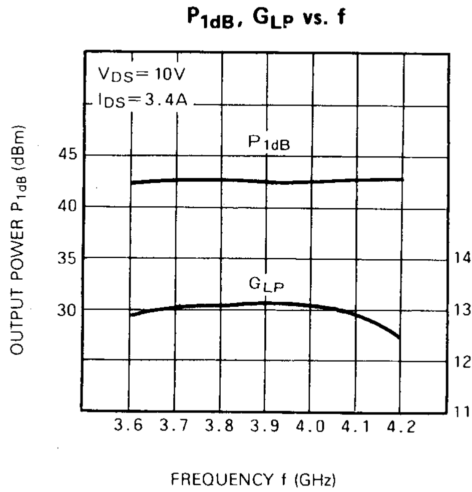
## ELECTRICAL CHARACTERISTICS (Ta=25°C)

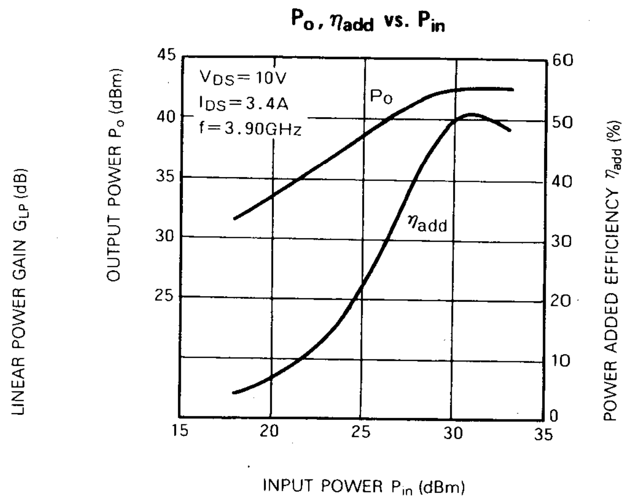
| Symbol | Parameter | Test conditions | Limits | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | |
| $I_{DSS}$ | Saturated drain current | $V_{DS}$=3V, $V_{GS}$=0V | — | — | 12 | A |
| $g_m$ | Transconductance | $V_{DS}$=3V, $I_D$=3.0A | — | 3.0 | — | S |
| $V_{GS(off)}$ | Gate to source cut-off voltage | $V_{DS}$=3V, $I_D$=30mA | — | — | −5 | V |
| $P_{1dB}$ | Output power at 1dB gain compression | $V_{DS}$=10V, $I_D$=3.4A, f=3.6~4.2GHz | 40 | 41.5 | — | dBm |
| $G_{LP}$ | Linear power gain | $V_{DS}$=10V, $I_D$=3.4A, f=3.6~4.2GHz | 11.0 | 12.5 | — | dB |
| $I_D$ | Drain current | $V_{DS}$=10V, $I_D$=3.4A, f=3.6~4.2GHz | — | 3.3 | — | A |
| $\eta_{add}$ | Power added efficiency | $V_{DS}$=10V, $I_D$=3.4A, f=3.6~4.2GHz | — | 40 | — | % |
| $IM_3$ | 3rd order IM distortion *1 | $V_{DS}$=10V, $I_D$=3.4A, f=3.6~4.2GHz | −42 | −45 | — | dBc |
| Rth(ch-c) | Thermal resistance *2 | $\Delta V_f$ method | — | — | 2.6 | °C/W |

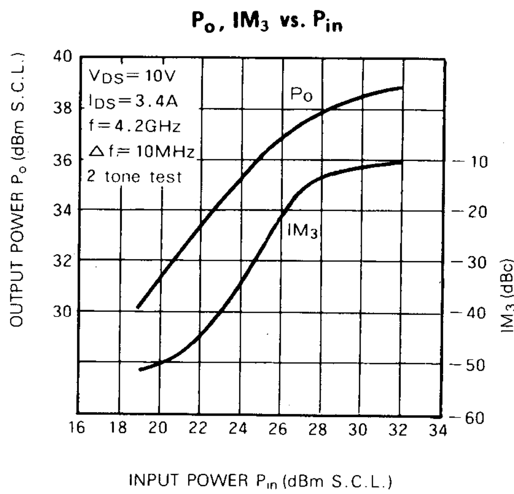
*1: Item-51, 2-tone test $P_o$ = 30 dBm Single Carrier Level f = 4.2 GHz Δf = 10 MHz  *2: Channel to case

## 3.6～4.2GHz BAND 12W INTERNALLY MATCHED GaAs FET

## TYPICAL CHARACTERISTICS (Ta=25℃)




## S PARAMETERS (Ta=25°C, $V_{DS}$=10V, $I_{DS}$=3.4A)

| 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.) |
| 3.6 | 0.48 | −168 | 4.13 | 57 | 0.042 | 10 | 0.45 | −23 |
| 3.7 | 0.47 | 155 | 4.29 | 32 | 0.052 | −21 | 0.34 | −45 |
| 3.8 | 0.44 | 121 | 4.45 | 6 | 0.052 | −45 | 0.26 | −73 |
| 3.9 | 0.40 | 86 | 4.39 | −20 | 0.058 | −75 | 0.23 | −115 |
| 4.0 | 0.35 | 42 | 4.34 | −46 | 0.060 | −101 | 0.22 | −160 |
| 4.1 | 0.31 | −11 | 4.17 | −73 | 0.066 | −123 | 0.28 | 166 |
| 4.2 | 0.34 | −70 | 3.70 | −100 | 0.057 | −150 | 0.29 | 140 |