

PRELIMINARY

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

MITSUBISHI SEMICONDUCTOR <GaAs FET>

MGFC45V5053

5.05~5.25GHz BAND 30W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC45V5053 is an internally impedance-matched GaAs power FET especially designed for use in 5.05 ~ 5.25 GHz band amplifiers. The hermetically sealed metal-ceramic package guarantees high reliability.

FEATURES

- Class A operation
- Internally matched to 50Ω system
- High output power
 $P_{1dB} = 30W(TYP) @ 5.05 \sim 5.25GHz$
- High power gain
 $G_{LP} = 10 \text{ dB (TYP) } @ 5.05 \sim 5.25GHz$
- High power added efficiency
 $\eta_{add} = 40\%(TYP) @ 5.05 \sim 5.25GHz, P_{1dB}$
- Hermetically sealed metal-ceramic package
- Low distortion (Item: -51)
 $IM3 = -45dBc (TYP) @ P_o = 34.5(dBm) \text{ S.C.L.}$

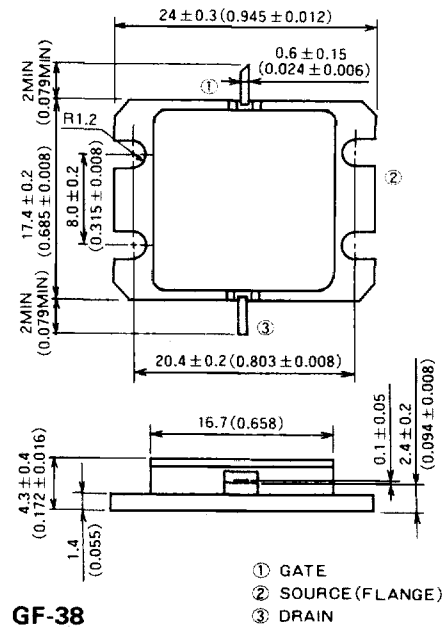
APPLICATION

- Item-01: 5.05~5.25GHz band power amplifiers.
- Item-51: Digital radio communication

QUALITY GRADE

- IG

OUTLINE DRAWING Unit: millimeters (inches)



GF-38

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

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

| Symbol | Parameter | Ratings | Unit |
|------------------|----------------------------|------------|------|
| V _{GD0} | Gate to drain voltage | -15 | V |
| V _{GSO} | Gate to source voltage | -15 | V |
| I _D | Drain current | 20 | A |
| I _{GR} | Reverse gate current | -60 | mA |
| I _{GF} | Forward gate current | 126 | mA |
| P _T | Total power dissipation *1 | 93 | 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 = 6.2A
- R_g = 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 | — | 18 | — | A |
| g _m | Transconductance | V _{DS} = 3V, I _D = 6.2A | — | 6.5 | — | S |
| V _{GS(off)} | Gate to source cut-off voltage | V _{DS} = 3V, I _D = 120mA | -2 | — | -5 | V |
| P _{1dB} | Output power at 1dB gain compression | V _{DS} = 10V, I _D = 6.2A, f = 5.05 ~ 5.25GHz | 44 | 44.7 | — | dBm |
| G _{LP} | Linear power gain | | 9 | 10 | — | dB |
| η _{add} | Power added efficiency | | — | 40 | — | % |
| IM ₃ | 3rd order IM distortion *1 | | -42 | -45 | — | dBc |
| R _{th(ch-c)} | Thermal resistance *2 | | ΔV _f method | — | — | 1.6 |

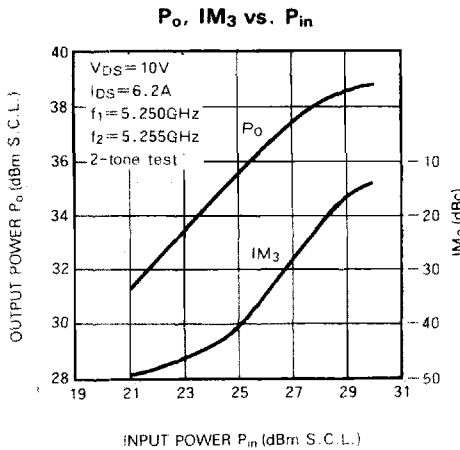
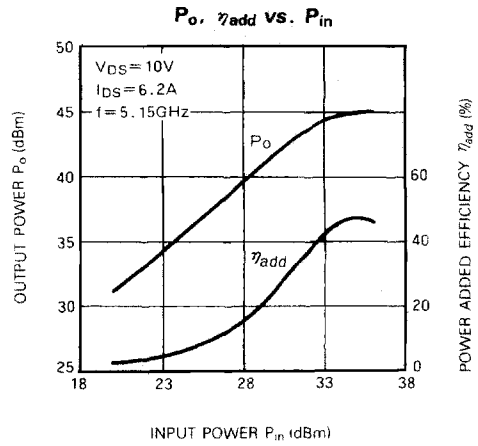
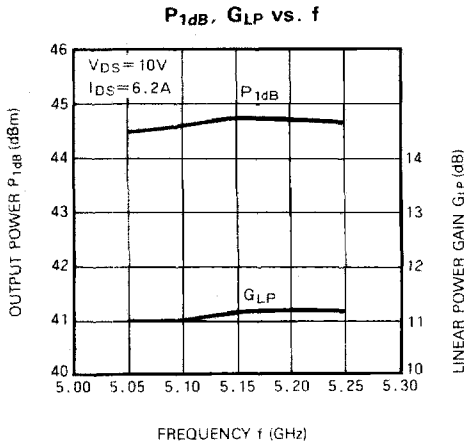
*1: Item-51, 2-tone test P_o = 34.5 dBm Single Carrier Level f = 5.25 Δf = 5MHz. *2: Channel to case

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TYPICAL CHARACTERISTICS (Ta=25°C)



S PARAMETERS (Ta=25°C, VDS=10V, IDS=6.2A)

| f (GHz) | S Parameters (TYP.) | | | | | | | |
|------------|---------------------|--------------|-------|--------------|-------|--------------|-------|--------------|
| | S11 | | S21 | | S12 | | S22 | |
| | Magn. | Angle (deg.) | Magn. | Angle (deg.) | Magn. | Angle (deg.) | Magn. | Angle (deg.) |
| 5.05 | 0.49 | 36 | 3.48 | -72 | 0.054 | -131 | 0.17 | -148 |
| 5.10 | 0.45 | 24 | 3.48 | -83 | 0.056 | -139 | 0.16 | -168 |
| 5.15 | 0.41 | 10 | 3.47 | -94 | 0.061 | -149 | 0.17 | -180 |
| 5.20 | 0.36 | -6 | 3.46 | -105 | 0.063 | -163 | 0.17 | 164 |
| 5.25 | 0.33 | -26 | 3.43 | -116 | 0.061 | -172 | 0.16 | 148 |