

# MGFC42V5258

## 5.2~5.8GHz BAND 16W INTERNALLY MATCHED GaAs FET

### DESCRIPTION

The MGFC42V5258 is an internally impedance-matched GaAs power FET especially designed for use in 5.2~5.8 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) @ 5.2~5.8 GHz
- High power gain  
 $G_{LP} = 9$  dB (TYP) @ 5.2~5.8 GHz
- High power added efficiency  
 $\eta_{add} = 31%$  (TYP) @ 5.2~5.8 GHz,  $P_{1dB}$
- Hermetically sealed metal-ceramic package

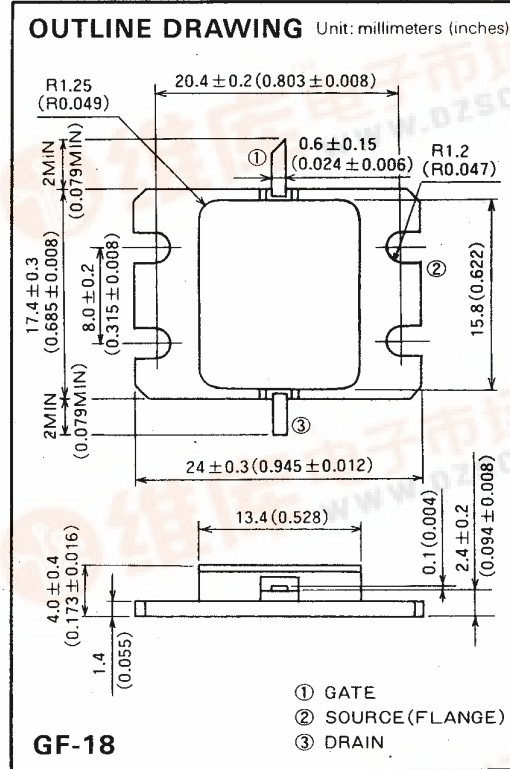
### APPLICATION

5.2~5.8GHz band power amplifier

### QUALITY GRADE

- IG

### OUTLINE DRAWING Unit: millimeters (inches)



GF-18

### RECOMMENDED BIAS CONDITIONS

- $V_{DS} = 10V$
- $I_D = 4.5A$
- $R_g = 25\Omega$
- Refer to Bias Procedure

### ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ C$ )

| 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 | 78.9       | W    |
| $T_{ch}$  | Channel temperature        | 175        | °C   |
| $T_{stg}$ | Storage temperature        | -65 ~ +175 | °C   |

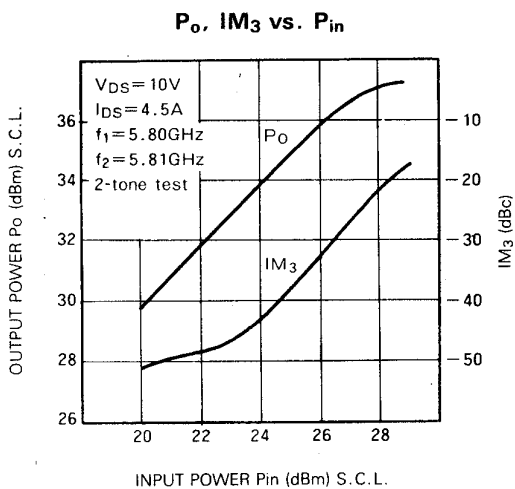
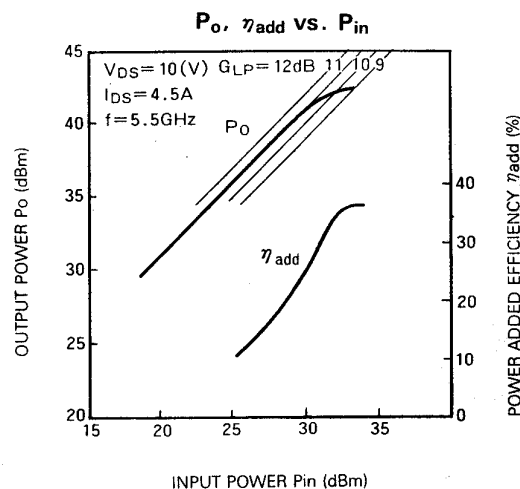
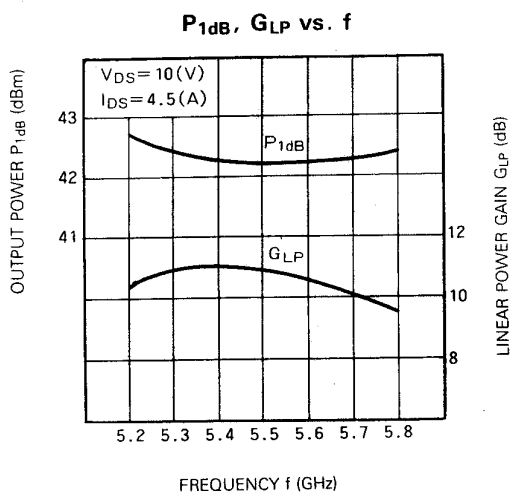
\*1:  $T_c = 25^\circ C$

### ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ C$ )

| 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 | $V_{DS} = 10V, I_D = 4.5A, f = 5.2 \sim 5.8GHz$ | 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               |   | —      | 31   | —   | %    |
| $\theta_{th(ch-c)}$ | Thermal resistance *1                | $\Delta V_f$ method                             | —      | —    | 1.9 | °C/W |

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**TYPICAL CHARACTERISTICS**



**S PARAMETERS** ( $T_a=25^\circ C$ ,  $V_{DS}=10V$ ,  $I_{DS}=4.5A$ )

| f<br>(GHz) | S Parameters (TYP.) |              |          |              |          |              |          |              |
|------------|---------------------|--------------|----------|--------------|----------|--------------|----------|--------------|
|            | $S_{11}$            |              | $S_{21}$ |              | $S_{12}$ |              | $S_{22}$ |              |
|            | Magn.               | Angle (deg.) | Magn.    | Angle (deg.) | Magn.    | Angle (deg.) | Magn.    | Angle (deg.) |
| 5.2        | 0.55                | - 87         | 3.27     | 43           | 0.032    | - 4          | 0.20     | -109         |
| 5.3        | 0.46                | -114         | 3.47     | 22           | 0.035    | - 30         | 0.17     | -152         |
| 5.4        | 0.37                | -146         | 3.53     | 0            | 0.052    | - 55         | 0.18     | 166          |
| 5.5        | 0.32                | 176          | 3.48     | -21          | 0.058    | - 78         | 0.22     | 133          |
| 5.6        | 0.30                | 138          | 3.24     | -42          | 0.065    | - 98         | 0.25     | 111          |
| 5.7        | 0.32                | 105          | 3.18     | -59          | 0.068    | -117         | 0.28     | 94           |
| 5.8        | 0.35                | 80           | 3.06     | -76          | 0.069    | -136         | 0.29     | 82           |