

MGF0907B

L, S BAND POWER GaAs FET

DESCRIPTION

The MGF0907B, GaAs FET with an N-channel schottky gate, is designed for use in UHF band amplifiers.

FEATURES

- Class A operation
- High output power
 $P_{1dB} = 40\text{dBm}$ (TYP) @2.3 GHz
- High power gain
 $G_{LP} = 10\text{ dB}$ (TYP) @2.3GHz
- High power added efficiency
 $\eta_{add} = 37\%$ (TYP) @2.3GHz, P_{1dB}
- Hermetically sealed metal-ceramic package with ceramic lid

APPLICATION

UHF band power amplifiers.

QUALITY GRADE

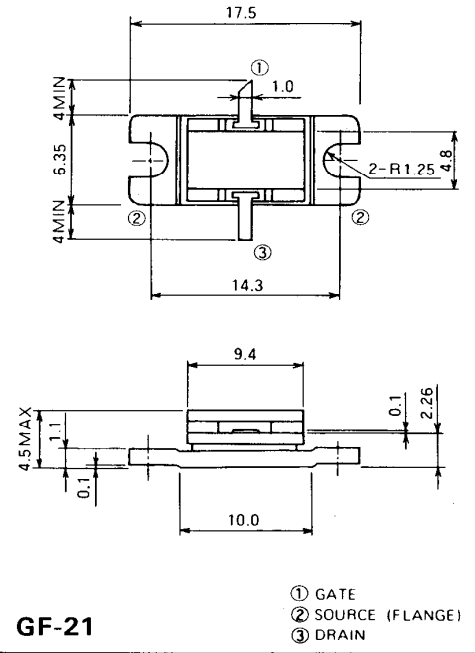
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RECOMMENDED BIAS CONDITIONS

- $V_{DS} = 10\text{V}$
- $I_D = 2.4\text{A}$
- $R_g = 50\ \Omega$
- Refer to Bias Procedure

OUTLINE DRAWING

Unit: millimeters



ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

| Symbol | Parameter | Rated | Unit |
|-----------|----------------------------|--------------|------------------|
| V_{GD0} | Gate to drain voltage | - 15 | V |
| V_{GS0} | Gate to source voltage | - 15 | V |
| I_D | Drain current | 6 | A |
| I_{GR} | Reverse gate current | - 20 | mA |
| I_{GF} | Forward gate current | + 42 | mA |
| P_T | Total power dissipation *1 | 37.5 | W |
| T_{ch} | Channel temperature | 175 | $^\circ\text{C}$ |
| T_{stg} | Storage temperature | - 65 ~ + 175 | $^\circ\text{C}$ |

*1: $T_c = 25^\circ\text{C}$

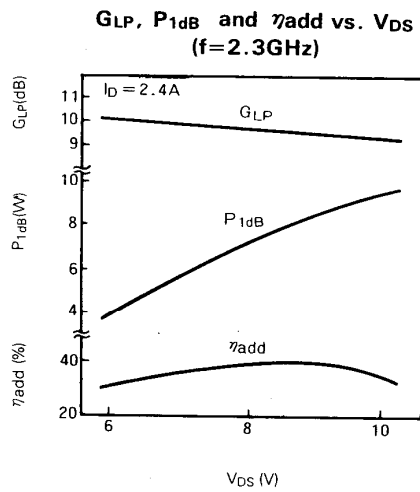
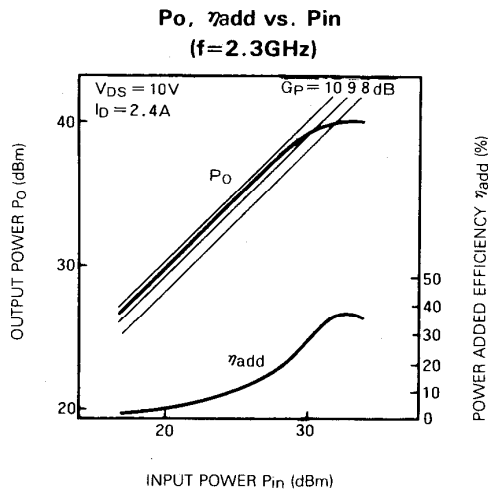
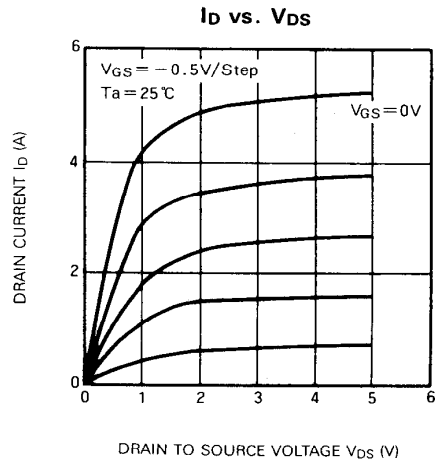
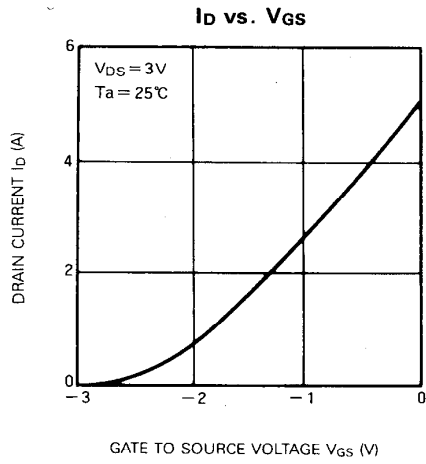
ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

| Symbol | Parameter | Test conditions | Limits | | | Unit |
|----------------|--------------------------------------|---|---------------------|-------|-----|------|
| | | | Min | Typ | Max | |
| I_{DSS} | Saturated drain current | $V_{DS} = 3\text{V}, V_{GS} = 0\text{V}$ | — | 4.0 | 6.0 | A |
| g_m | Transconductance | $V_{DS} = 3\text{V}, I_D = 2.2\text{A}$ | — | 2.0 | — | S |
| $V_{GS(off)}$ | Gate to source cut-off voltage | $V_{DS} = 3\text{V}, I_D = 20\text{mA}$ | - 1 | - 2.5 | - 4 | V |
| P_{1dB} | Output power at 1dB gain compression | $V_{DS} = 10\text{V}, I_D = 2.4\text{A}, f = 2.3\text{GHz}$ | 38.5 | 40 | — | dBm |
| G_{LP} | Linear power gain | | 8 | 10 | — | dB |
| I_D | Drain current | | — | 2.2 | 3.0 | A |
| η_{add} | Power added efficiency at P_{1dB} | | — | 37 | — | % |
| $R_{th(ch-c)}$ | Thermal resistance *1 | | ΔV_f method | — | — | 4.0 |

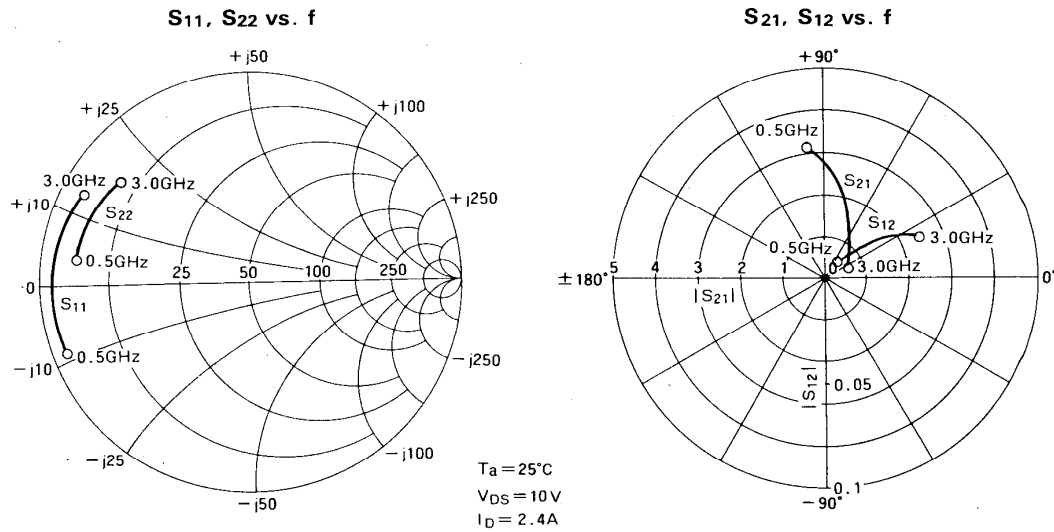
*1. Channel to case

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TYPICAL CHARACTERISTICS



L, S BAND POWER GaAs FET



S PARAMETERS (Ta=25°C, VDS=10V, ID=2.4A)

| f (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | | K | MAG (dB) |
|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-------|-------------|
| | Magn. | Ang. (deg) | Magn. | Ang. (deg) | Magn. | Ang. (deg) | Magn. | Ang. (deg) | | |
| 0.5 | 0.947 | -162.1 | 3.089 | 96.7 | 0.010 | 45.8 | 0.823 | 171.6 | 1.086 | 23.1 |
| 0.6 | 0.943 | -165.6 | 2.793 | 90.8 | 0.012 | 44.1 | 0.822 | 170.1 | 1.055 | 22.2 |
| 0.7 | 0.939 | -168.7 | 2.524 | 85.5 | 0.014 | 42.7 | 0.822 | 168.7 | 1.038 | 21.4 |
| 0.8 | 0.936 | -171.4 | 2.281 | 80.7 | 0.014 | 41.5 | 0.821 | 167.5 | 1.024 | 20.6 |
| 0.9 | 0.934 | -173.8 | 2.092 | 76.4 | 0.017 | 40.5 | 0.821 | 166.4 | 1.043 | 19.6 |
| 1.0 | 0.932 | -175.9 | 1.865 | 72.7 | 0.018 | 39.7 | 0.820 | 165.5 | 1.072 | 18.5 |
| 1.1 | 0.931 | -177.7 | 1.691 | 69.3 | 0.019 | 39.0 | 0.819 | 164.7 | 1.095 | 17.6 |
| 1.2 | 0.930 | -179.3 | 1.537 | 66.4 | 0.020 | 38.4 | 0.818 | 164.0 | 1.124 | 16.7 |
| 1.3 | 0.929 | -179.3 | 1.401 | 63.7 | 0.021 | 37.9 | 0.817 | 163.3 | 1.157 | 15.8 |
| 1.4 | 0.929 | -178.1 | 1.284 | 61.4 | 0.021 | 37.5 | 0.816 | 162.7 | 1.219 | 15.0 |
| 1.5 | 0.928 | -177.0 | 1.183 | 59.3 | 0.022 | 37.2 | 0.815 | 162.1 | 1.257 | 14.3 |
| 1.6 | 0.928 | -176.0 | 1.096 | 57.4 | 0.022 | 36.9 | 0.813 | 161.5 | 1.328 | 13.6 |
| 1.7 | 0.927 | -175.1 | 1.024 | 55.6 | 0.023 | 36.6 | 0.811 | 160.8 | 1.367 | 12.7 |
| 1.8 | 0.927 | -174.2 | 0.964 | 54.0 | 0.023 | 36.3 | 0.810 | 160.2 | 1.430 | 12.3 |
| 1.9 | 0.926 | -173.3 | 0.915 | 52.4 | 0.024 | 35.9 | 0.808 | 159.4 | 1.461 | 11.8 |
| 2.0 | 0.925 | -172.3 | 0.875 | 50.9 | 0.025 | 35.5 | 0.806 | 158.6 | 1.488 | 11.3 |
| 2.1 | 0.923 | -171.2 | 0.844 | 49.3 | 0.026 | 35.0 | 0.803 | 157.7 | 1.527 | 10.8 |
| 2.2 | 0.921 | -170.0 | 0.820 | 47.6 | 0.027 | 34.4 | 0.801 | 156.7 | 1.555 | 10.4 |
| 2.3 | 0.919 | -168.6 | 0.801 | 45.8 | 0.028 | 33.7 | 0.798 | 155.5 | 1.584 | 10.1 |
| 2.4 | 0.916 | -167.1 | 0.787 | 43.9 | 0.030 | 32.8 | 0.769 | 154.1 | 1.574 | 9.7 |
| 2.5 | 0.912 | -165.3 | 0.776 | 41.7 | 0.032 | 31.8 | 0.792 | 152.6 | 1.587 | 9.4 |
| 2.6 | 0.907 | -163.3 | 0.767 | 39.2 | 0.035 | 30.6 | 0.789 | 150.9 | 1.570 | 9.0 |
| 2.7 | 0.902 | -160.9 | 0.757 | 36.5 | 0.037 | 29.1 | 0.786 | 148.9 | 1.594 | 8.6 |
| 2.8 | 0.895 | -158.3 | 0.746 | 33.4 | 0.040 | 27.4 | 0.782 | 146.6 | 1.614 | 8.1 |
| 2.9 | 0.887 | -155.2 | 0.735 | 29.9 | 0.044 | 25.4 | 0.778 | 144.1 | 1.620 | 7.6 |
| 3.0 | 0.879 | -151.7 | 0.719 | 26.0 | 0.048 | 23.1 | 0.774 | 141.4 | 1.636 | 7.1 |

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