

**DESCRIPTION**

The MGF1801B, medium-power GaAs FET with an N-channel Schottky gate, is designed for use in S to X band amplifiers and oscillators. The hermetically sealed metalceramic package assures minimum parasitic losses, and has a configuration suitable for microstrip circuits.

**FEATURES**

- High output power at 1dB gain compression  
 $P_{1dB}=23dBm(TYP.)$  @f=8GHz
- High linear power gain  
 $GLP=9dB(TYP.)$  @f=8GHz
- High reliability and stability

**APPLICATION**

S to X band medium-power amplifiers and oscillators.

**QUALITY GRADE**

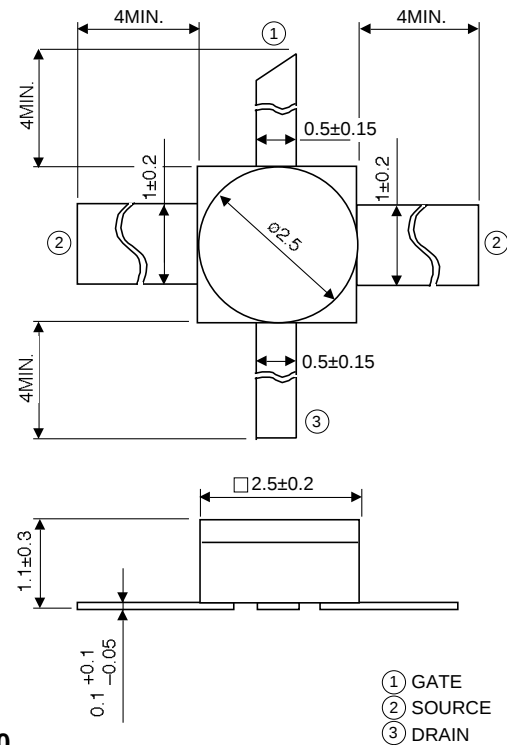
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**RECOMMENDED BIAS CONDITIONS**

- $V_{DS}=6V$
- $I_D=100mA$
- Refer to Bias Procedure

**OUTLINE DRAWING**

Unit: millimeters

**GD-10****ABSOLUTE MAXIMUM RATINGS** ( $T_a=25^\circ C$ )

| Symbol    | Parameter                  | Ratings     | Unit       |
|-----------|----------------------------|-------------|------------|
| $V_{GDO}$ | Gate to drain voltage      | -8          | V          |
| $V_{GSO}$ | Gate to source voltage     | -8          | V          |
| $I_D$     | Drain current              | 250         | mA         |
| $I_{GR}$  | Reverse gate current       | -0.6        | mA         |
| $I_{GF}$  | Forward gate current       | 1.5         | mA         |
| $P_T$     | Total power dissipation *1 | 1.2         | W          |
| $T_{ch}$  | Channel temperature        | 175         | $^\circ C$ |
| $T_{stg}$ | Storage temperature        | -65 to +175 | $^\circ C$ |

\*1:  $T_C=25^\circ C$ **ELECTRICAL CHARACTERISTICS** ( $T_a=25^\circ C$ )

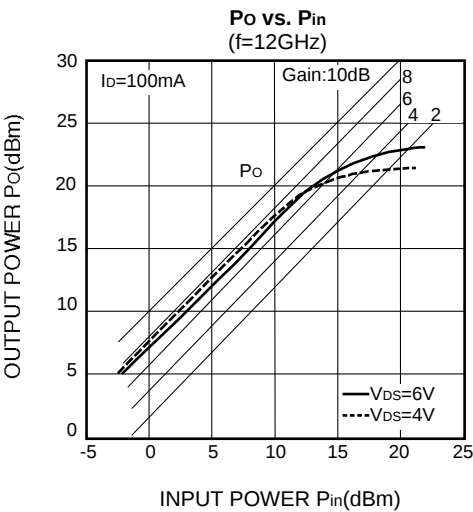
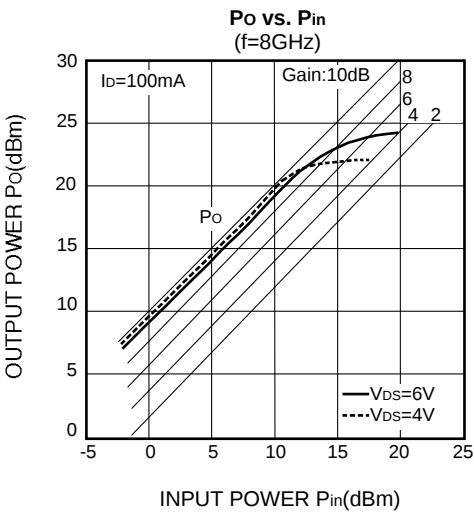
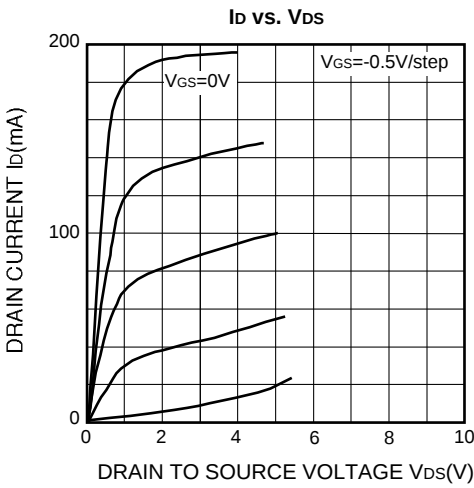
| Symbol         | Parameter                            | Test conditions                | Limits |      |      | Unit         |
|----------------|--------------------------------------|--------------------------------|--------|------|------|--------------|
|                |                                      |                                | Min    | Typ  | Max  |              |
| $V_{(BR)GDO}$  | Gate to drain breakdown voltage      | $I_G=-200\mu A$                | -8     | —    | —    | V            |
| $V_{(BR)GSO}$  | Gate to source breakdown voltage     | $I_G=-200\mu A$                | -8     | —    | —    | V            |
| $I_{GSS}$      | Gate to source leakage current       | $V_{GS}=-3V, V_{DS}=0V$        | —      | —    | 20   | $\mu A$      |
| $I_{DSS}$      | Saturated drain current              | $V_{GS}=0V, V_{DS}=3V$         | 150    | 200  | 250  | mA           |
| $V_{GS(off)}$  | Gate source cut-off voltage          | $V_{DS}=3V, I_D=100\mu A$      | -1.5   | —    | -4.5 | V            |
| $g_m$          | Transconductance                     | $V_{DS}=3V, I_D=100mA$         | 70     | 90   | —    | mS           |
| $GLP$          | Linear power gain                    | $V_{DS}=6V, I_D=100mA, f=8GHz$ | 7      | 9    | —    | dB           |
| $P_{1dB}$      | Output power at 1dB gain compression | $V_{DS}=6V, I_D=100mA, f=8GHz$ | 21.8   | 23.0 | —    | dBm          |
| $R_{th(ch-c)}$ | Thermal resistance *1                | DVf method                     | —      | —    | 125  | $^\circ C/W$ |

\*1: Channel to ambient

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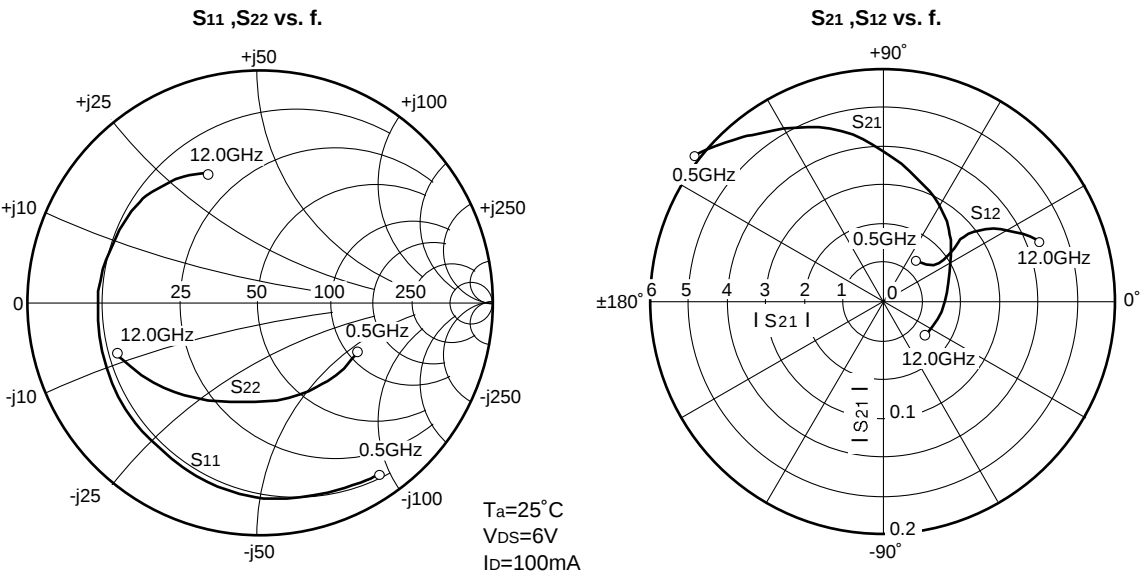
MICROWAVE POWER GaAs FET

TYPICAL CHARACTERISTICS (Ta=25°C)



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MICROWAVE POWER GaAs FET



S PARAMETERS (T<sub>a</sub>=25°C, V<sub>DS</sub>=6V, I<sub>D</sub>=100mA)

| Freq.<br>(GHz) | S <sub>11</sub> |             | S <sub>21</sub> |             | S <sub>12</sub> |             | S <sub>22</sub> |             | K     | MSG/MAG<br>(dB) |
|----------------|-----------------|-------------|-----------------|-------------|-----------------|-------------|-----------------|-------------|-------|-----------------|
|                | Magn.           | Angle(deg.) | Magn.           | Angle(deg.) | Magn.           | Angle(deg.) | Magn.           | Angle(deg.) |       |                 |
| 0.5            | 0.899           | -56.8       | 6.115           | 140.3       | 0.047           | 52.1        | 0.471           | -25.2       | 0.371 | 21.2            |
| 1.0            | 0.874           | -69.4       | 5.682           | 130.4       | 0.049           | 49.3        | 0.462           | -32.7       | 0.394 | 20.7            |
| 1.5            | 0.848           | -82.1       | 5.248           | 120.5       | 0.050           | 46.4        | 0.452           | -40.1       | 0.431 | 20.2            |
| 2.0            | 0.822           | -94.7       | 4.815           | 110.6       | 0.052           | 43.6        | 0.442           | -47.5       | 0.485 | 19.7            |
| 2.5            | 0.796           | -107.4      | 4.382           | 100.6       | 0.054           | 40.8        | 0.432           | -54.9       | 0.558 | 19.1            |
| 3.0            | 0.771           | -120.0      | 3.949           | 90.8        | 0.056           | 38.0        | 0.422           | -62.4       | 0.657 | 18.5            |
| 3.5            | 0.745           | -132.7      | 3.515           | 80.9        | 0.057           | 35.1        | 0.413           | -69.8       | 0.789 | 17.9            |
| 4.0            | 0.719           | -145.3      | 3.082           | 71.0        | 0.059           | 32.3        | 0.403           | -77.2       | 0.964 | 17.2            |
| 4.5            | 0.713           | -153.3      | 2.863           | 63.3        | 0.060           | 33.3        | 0.412           | -84.2       | 1.006 | 16.3            |
| 5.0            | 0.706           | -161.3      | 2.645           | 55.6        | 0.062           | 34.3        | 0.421           | -91.1       | 1.064 | 14.8            |
| 5.5            | 0.700           | -169.3      | 2.426           | 47.9        | 0.063           | 35.2        | 0.431           | -98.1       | 1.142 | 13.6            |
| 6.0            | 0.694           | -177.3      | 2.207           | 40.2        | 0.064           | 36.2        | 0.440           | -105.0      | 1.245 | 12.4            |
| 6.5            | 0.691           | 176.9       | 2.090           | 33.9        | 0.068           | 37.6        | 0.458           | -110.3      | 1.202 | 12.1            |
| 7.0            | 0.689           | 171.1       | 1.973           | 27.5        | 0.073           | 39.0        | 0.476           | -115.5      | 1.172 | 11.8            |
| 7.5            | 0.686           | 165.2       | 1.856           | 21.2        | 0.077           | 40.4        | 0.494           | -120.8      | 1.153 | 11.5            |
| 8.0            | 0.683           | 159.4       | 1.739           | 14.8        | 0.081           | 41.8        | 0.512           | -126.0      | 1.146 | 11.0            |
| 8.5            | 0.677           | 153.1       | 1.671           | 8.5         | 0.089           | 40.5        | 0.530           | -130.8      | 1.072 | 11.1            |
| 9.0            | 0.670           | 146.9       | 1.602           | 2.1         | 0.096           | 39.3        | 0.549           | -135.5      | 1.011 | 11.6            |
| 9.5            | 0.664           | 140.6       | 1.534           | -4.3        | 0.104           | 38.0        | 0.567           | -140.3      | 0.962 | 11.7            |
| 10.0           | 0.657           | 134.3       | 1.466           | -10.6       | 0.111           | 36.7        | 0.585           | -145.0      | 0.922 | 11.2            |
| 10.5           | 0.645           | 127.8       | 1.413           | -17.0       | 0.118           | 33.2        | 0.601           | -149.4      | 0.893 | 10.8            |
| 11.0           | 0.632           | 121.3       | 1.360           | -23.4       | 0.126           | 29.8        | 0.618           | -153.9      | 0.867 | 10.4            |
| 11.5           | 0.620           | 114.8       | 1.308           | -29.7       | 0.133           | 26.3        | 0.635           | -158.3      | 0.844 | 9.9             |
| 12.0           | 0.608           | 108.3       | 1.255           | -36.1       | 0.140           | 22.8        | 0.651           | -162.7      | 0.823 | 9.5             |

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