

< Low Noise GaAs HEMT >

# MGF4964BL

Micro-X type plastic package

## DESCRIPTION

The MGF4964BL super-low noise InGaAs HEMT (High Electron Mobility Transistor) is designed for use in K band amplifiers.

## FEATURES

Low noise figure @ f=20GHz  
NFmin. = 0.65dB (Typ.)

High associated gain @ f=20GHz  
Gs = 13.5dB (Typ.)

## APPLICATION

C to K band low noise amplifiers

## QUALITY GRADE

GG

## RECOMMENDED BIAS CONDITIONS

$V_{DS}=2V, I_D=10mA$

## ORDERING INFORMATION

Tape & reel 4000pcs./reel

## RoHS COMPLIANT

MGF4964BL is a RoHS compliant product. RoHS compliance is indicated by the letter "G" after the Lot Marking.

## ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

| Symbol | Parameter               | Ratings     | Unit |
|--------|-------------------------|-------------|------|
| VGDO   | Gate to drain voltage   | -3          | V    |
| VGSO   | Gate to source voltage  | -3          | V    |
| ID     | Drain current           | IDSS        | mA   |
| PT     | Total power dissipation | 50          | mW   |
| Tch    | Channel temperature     | 125         | °C   |
| Tstg   | Storage temperature     | -55 to +125 | °C   |

## ELECTRICAL CHARACTERISTICS (Ta=25°C)

| Symbol        | Parameter                       | Test conditions                     | Limits |      |      | Unit    |
|---------------|---------------------------------|-------------------------------------|--------|------|------|---------|
|               |                                 |                                     | MIN.   | TYP. | MAX. |         |
| $V_{(BR)GDO}$ | Gate to drain breakdown voltage | $I_G=-10\mu A$                      | -3     | --   | --   | V       |
| $I_{GSS}$     | Gate to source leakage current  | $V_{GS}=-2V, V_{DS}=0V$             | --     | --   | 50   | $\mu A$ |
| $I_{DSS}$     | Saturated drain current         | $V_{GS}=0V, V_{DS}=2V$              | 15     | --   | 60   | mA      |
| $V_{GS(off)}$ | Gate to source cut-off voltage  | $V_{DS}=2V, I_D=500\mu A$           | -0.1   | --   | -1.5 | V       |
| Gs            | Associated gain                 | $V_{DS}=2V,$<br>$I_D=10mA, f=20GHz$ | 11.5   | 13.5 | --   | dB      |
| NFmin.        | Minimum noise figure            |                                     | --     | 0.65 | 0.90 | dB      |

Note: Gs and NFmin. are tested with sampling inspection.

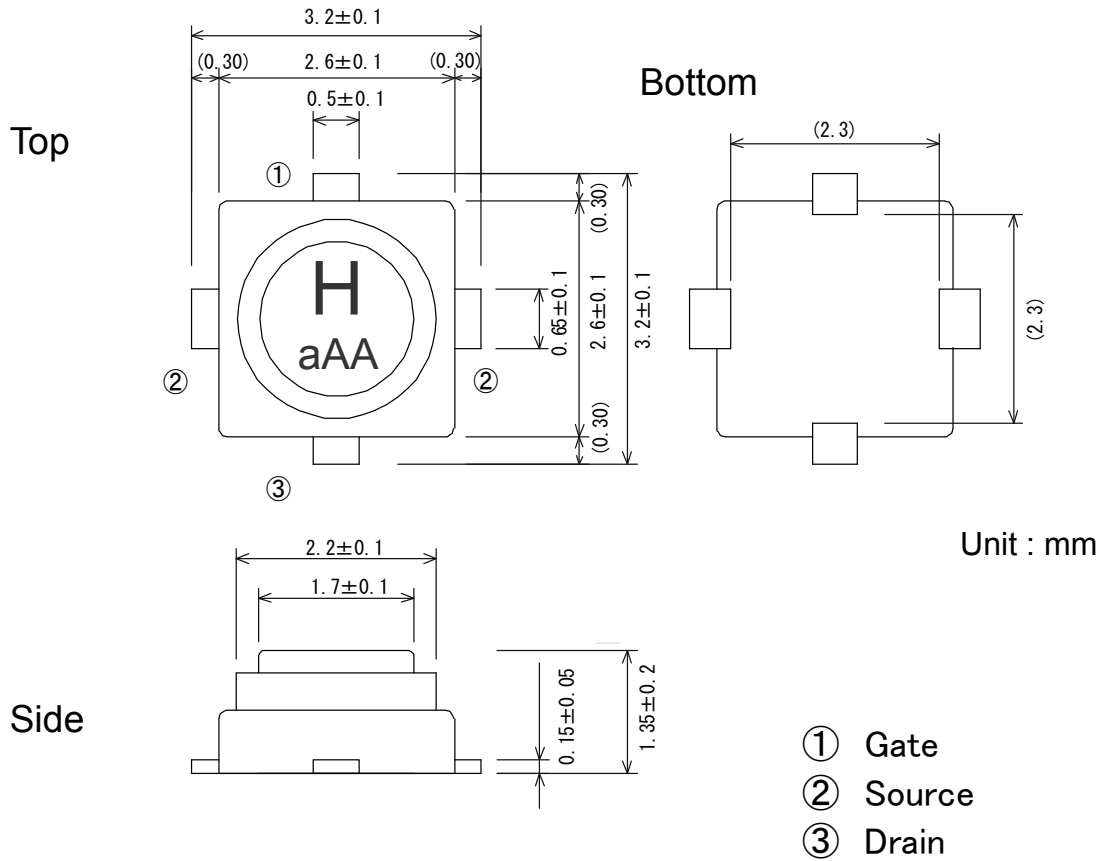
Outline Drawing

Fig.1

## MITSUBISHI Proprietary

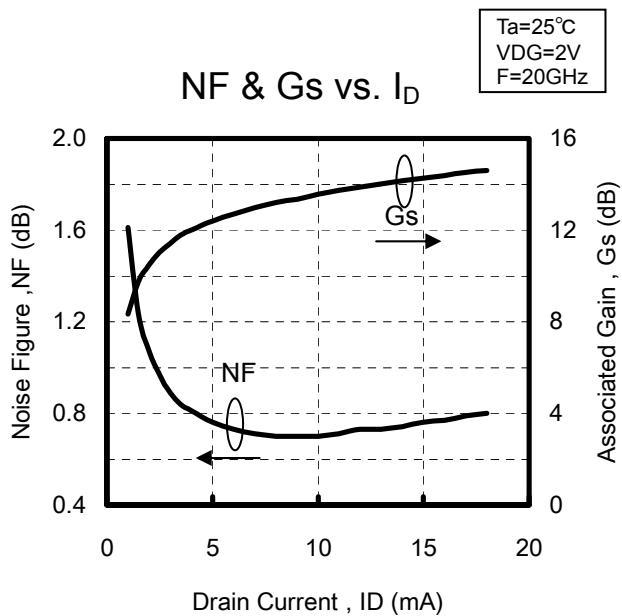
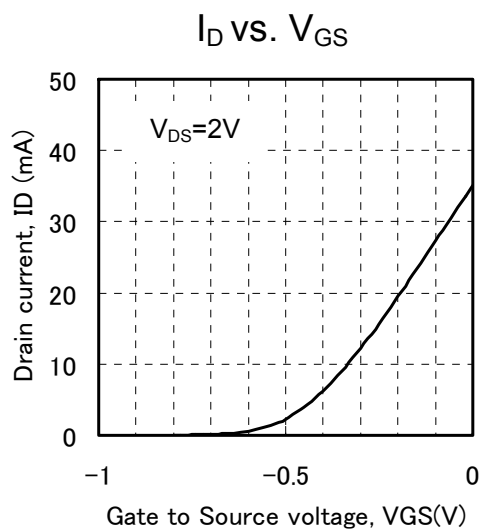
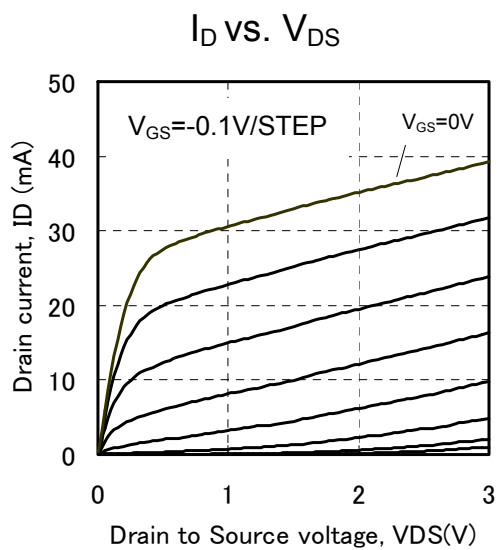
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Fig.1



(GD-32)

TYPICAL CHARACTERISTICS (Ta=25°C)

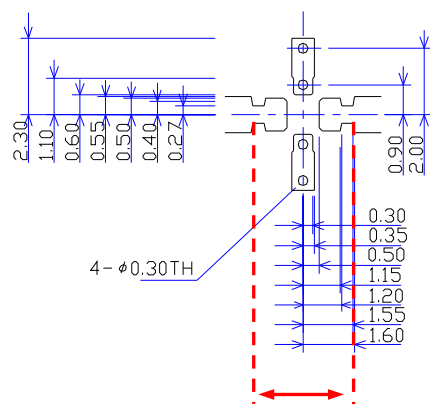


**S PARAMETERS** (Ta=25°C, VDS=2V, ID=10mA)

| Freq.<br>(GHz) | S11   |        | S21   |        | S12   |        | S22   |        |
|----------------|-------|--------|-------|--------|-------|--------|-------|--------|
|                | (mag) | (ang)  | (mag) | (ang)  | (mag) | (ang)  | (mag) | (ang)  |
| 2              | 0.977 | -31.7  | 4.626 | 146.7  | 0.024 | 65.5   | 0.592 | -26.1  |
| 3              | 0.952 | -47.5  | 4.519 | 130.5  | 0.034 | 53.4   | 0.576 | -39.3  |
| 4              | 0.918 | -63.5  | 4.528 | 114.1  | 0.044 | 41.5   | 0.553 | -51.9  |
| 5              | 0.877 | -79.7  | 4.467 | 98.0   | 0.052 | 29.7   | 0.526 | -65.0  |
| 6              | 0.831 | -96.3  | 4.400 | 81.8   | 0.060 | 18.4   | 0.497 | -77.9  |
| 7              | 0.781 | -113.7 | 4.353 | 65.5   | 0.066 | 6.6    | 0.464 | -91.4  |
| 8              | 0.724 | -132.0 | 4.221 | 49.2   | 0.071 | -6.6   | 0.422 | -105.5 |
| 9              | 0.659 | -149.5 | 4.063 | 33.7   | 0.071 | -19.3  | 0.379 | -118.0 |
| 10             | 0.606 | -167.7 | 3.928 | 18.4   | 0.070 | -31.3  | 0.340 | -131.5 |
| 11             | 0.568 | 175.1  | 3.829 | 4.1    | 0.069 | -41.6  | 0.310 | -143.9 |
| 12             | 0.516 | 158.1  | 3.706 | -9.4   | 0.060 | -55.1  | 0.271 | -153.2 |
| 13             | 0.524 | 139.7  | 3.731 | -24.6  | 0.063 | -60.3  | 0.270 | -171.2 |
| 14             | 0.520 | 124.1  | 3.821 | -38.7  | 0.050 | -65.4  | 0.277 | -179.1 |
| 15             | 0.541 | 105.9  | 3.870 | -55.1  | 0.044 | -67.7  | 0.292 | 165.4  |
| 16             | 0.559 | 85.8   | 3.818 | -72.6  | 0.049 | -70.7  | 0.311 | 143.4  |
| 17             | 0.588 | 68.0   | 3.828 | -90.8  | 0.052 | -76.2  | 0.356 | 123.9  |
| 18             | 0.614 | 47.4   | 3.571 | -109.2 | 0.060 | -92.2  | 0.371 | 97.6   |
| 19             | 0.630 | 30.5   | 3.404 | -124.6 | 0.057 | -108.3 | 0.384 | 78.9   |
| 20             | 0.641 | 13.1   | 3.335 | -142.0 | 0.055 | -123.9 | 0.408 | 62.7   |
| 21             | 0.666 | -3.8   | 3.280 | -157.7 | 0.053 | -137.5 | 0.425 | 44.4   |
| 22             | 0.669 | -20.0  | 3.218 | -174.6 | 0.055 | -160.0 | 0.457 | 29.9   |
| 23             | 0.656 | -37.0  | 3.141 | 166.5  | 0.056 | -178.4 | 0.474 | 16.2   |
| 24             | 0.646 | -54.3  | 3.138 | 148.2  | 0.055 | 147.5  | 0.482 | 1.1    |
| 25             | 0.611 | -69.1  | 3.143 | 129.0  | 0.059 | 124.6  | 0.537 | -8.4   |
| 26             | 0.572 | -88.1  | 3.038 | 106.4  | 0.057 | 98.0   | 0.552 | -25.0  |

**NOISE PARAMETERS** (Ta=25°C, VDS=2V, ID=10mA)

| Freq.<br>(GHz) | Γopt  |        | Rn   | NF min<br>(dB) |
|----------------|-------|--------|------|----------------|
|                | (mag) | (ang)  |      |                |
| 6              | 0.73  | 64.1   | 0.20 | 0.23           |
| 7              | 0.67  | 78.7   | 0.16 | 0.24           |
| 8              | 0.61  | 94.4   | 0.12 | 0.25           |
| 9              | 0.56  | 111.0  | 0.09 | 0.27           |
| 10             | 0.51  | 128.5  | 0.06 | 0.28           |
| 11             | 0.47  | 146.9  | 0.04 | 0.30           |
| 12             | 0.43  | 166.1  | 0.03 | 0.33           |
| 13             | 0.40  | -174.1 | 0.04 | 0.35           |
| 14             | 0.38  | -153.8 | 0.05 | 0.39           |
| 15             | 0.37  | -133.1 | 0.07 | 0.43           |
| 16             | 0.37  | -112.1 | 0.10 | 0.47           |
| 17             | 0.38  | -91.1  | 0.13 | 0.52           |
| 18             | 0.40  | -69.8  | 0.17 | 0.57           |
| 19             | 0.44  | -48.4  | 0.21 | 0.62           |
| 20             | 0.49  | -26.5  | 0.26 | 0.67           |
| 21             | 0.56  | -4.4   | 0.30 | 0.72           |



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