## High Efficiency and Low Distortion Internally Matched Power GaAs FETs (C-Band)

### Features

- Low intermodulation distortion
  - $IM_3$ = -45 dBc at Po = 28.5 dBm, Single Carrier Level
- High power
  - $P_{1dB}$ = 39.5 dBm at 5.9 GHz to 6.4 GHz
- High gain
  - $G_{1dB}$ = 8.5 dB at 5.9 GHz to 6.4 GHz
- Broadband internally matched
- Hermetically sealed package

### RF Performance Specifications ($T_a$ = 25°C)

| Characteristic | Symbol | Condition | Unit | Min. | Typ. | Max. |
|---|---|---|---|---|---|---|
| Output Power at 1dB Compression Point | $P_{1dB}$ | $V_{DS}$ = 10V<br>f = 5.9 ~ 6.4 GHz | dBm | 38.5 | 39.5 | – |
| Power Gain at 1dB Compression Point | $G_{1dB}$ | | dB | 7.5 | 8.5 | – |
| Drain Current | $I_{DS}$ | | A | – | 2.2 | 2.6 |
| Gain Flatness | $\Delta G$ | | dB | – | – | ±0.6 |
| Power Added Efficiency | $\eta_{add}$ | | % | – | 35 | – |
| 3rd Order Intermodulation Distortion | $IM_3$ | Note 1 | dBc | -42 | -45 | – |
| Channel-Temperature Rise | $\Delta T_{ch}$ | $V_{DS}$ x $I_{DS}$ x $R_{th\ (c-c)}$ | °C | – | – | 80 |

### Electrical Characteristics ($T_a$ = 25°C)

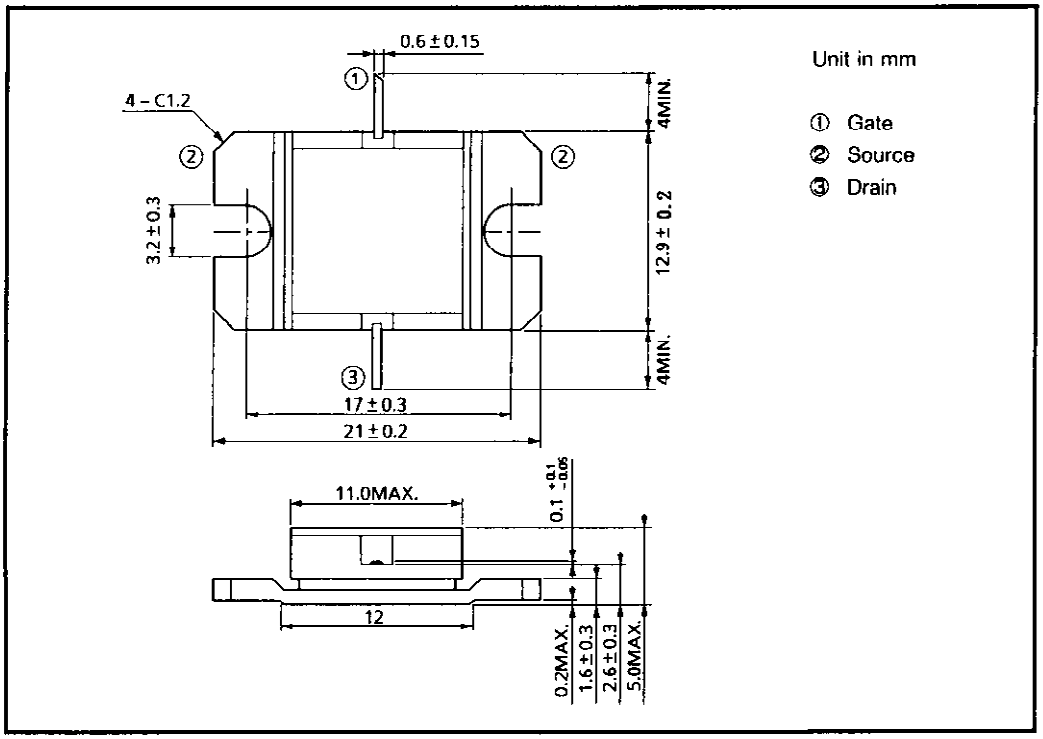
| Characteristic | Symbol | Condition | Unit | Min. | Typ. | Max. |
|---|---|---|---|---|---|---|
| Transconductance | gm | $V_{DS}$ = 3V<br>$I_{DS}$ = 3.0A | mS | – | 1800 | – |
| Pinch-off Voltage | $V_{GSoff}$ | $V_{DS}$ = 3V<br>$I_{DS}$ = 30 mA | V | -1 | -2.5 | -4.0 |
| Saturated Drain Current | $I_{DSS}$ | $V_{DS}$ = 3V<br>$V_{GS}$ = 0V | A | – | 5.2 | 7.0 |
| Gate-Source Breakdown Voltage | $V_{GSO}$ | $I_{GS}$ = -100 μA | V | -5 | – | – |
| Thermal Resistance | $R_{th\ (c-c)}$ | Channel to Case | °C/W | – | 2.5 | 3.8 |

Note 1: 2-tone Test Pout = 28.5 dBm Single Carrier Level.

### Absolute Maximum Ratings ($T_a$ = 25°C)

| Characteristic | Symbol | Unit | Rating |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | V | 15 |
| Gate-Source Voltage | $V_{GS}$ | V | -5 |
| Drain Current | $I_D$ | A | 7.0 |
| Total Power Dissipation ($T_c$ = 25°C) | $P_T$ | W | 37.5 |
| Channel Temperature | $T_{ch}$ | °C | 175 |
| Storage Temperature | $T_{stg}$ | °C | -65 ~ 175 |

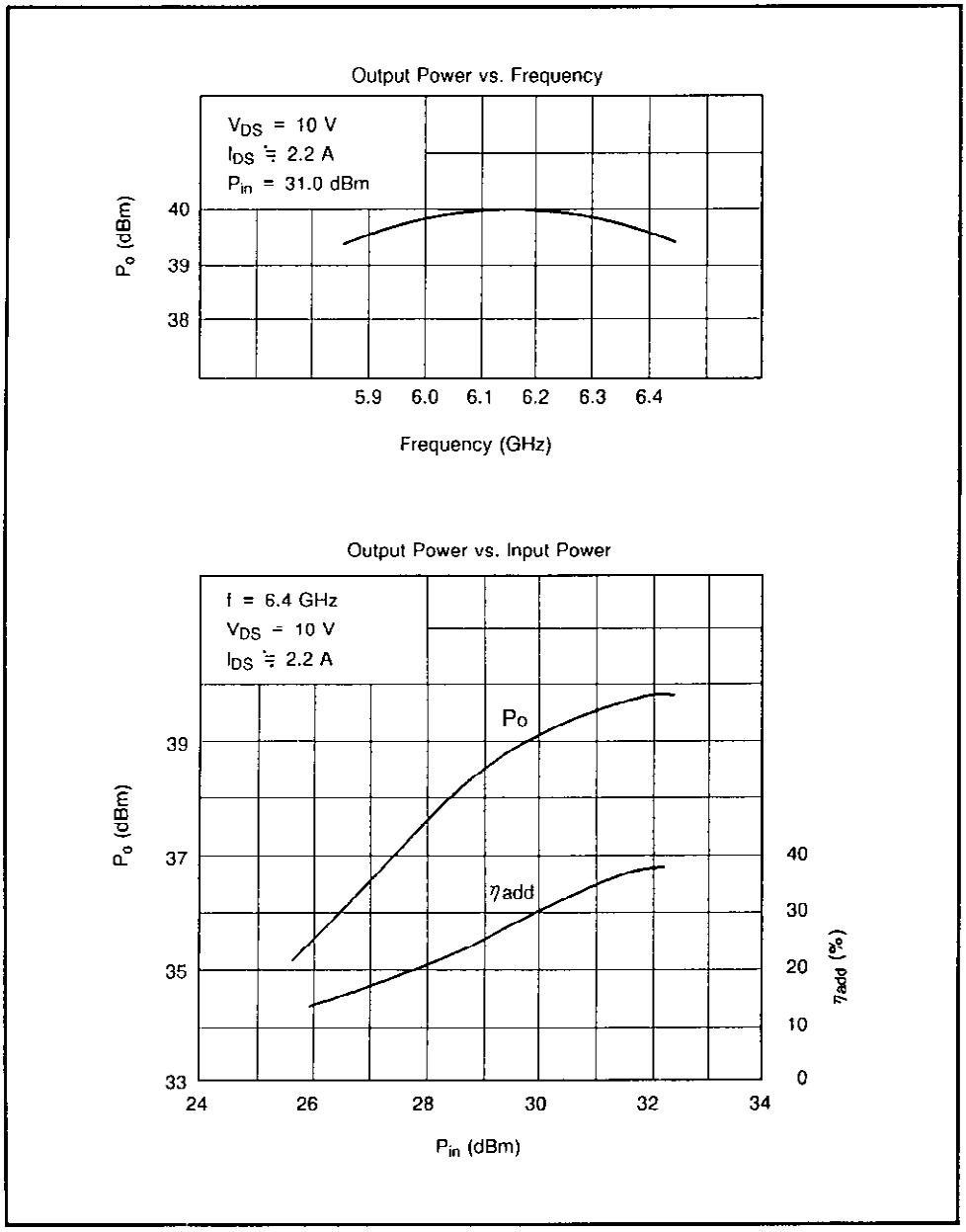
### Package Outline (2-11D1B)



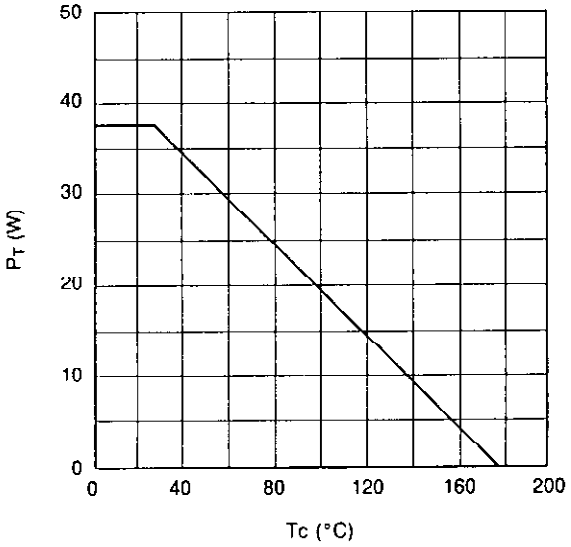

### Handling Precautions for Packaged Type

Soldering iron should be grounded and the operating time should not exceed 10 seconds at 260°C.

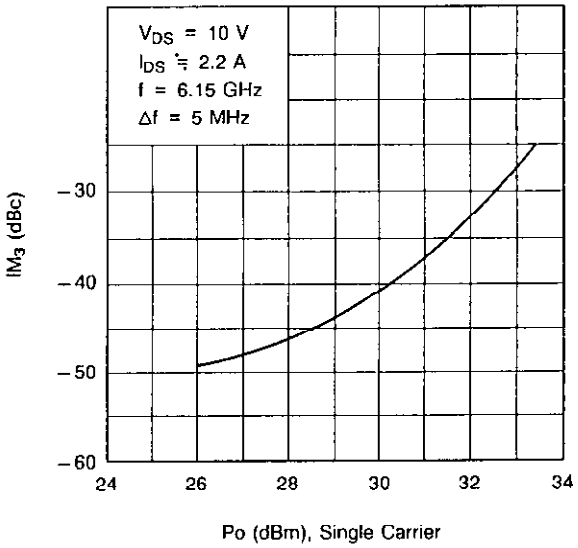
## RF Performances



**Power Dissipation vs. Case Temperature**

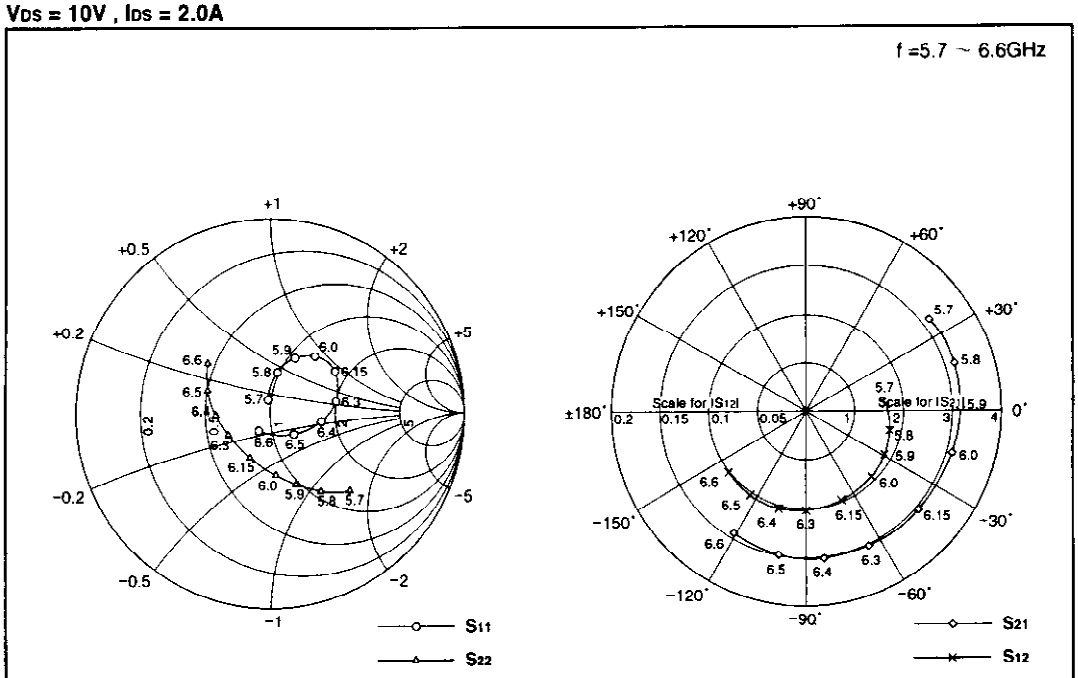



**$IM_3$ vs. Output Power Chacteristics**



## TIM5964-8SL S-Parameters (Magn. and Angles)

**$V_{DS}$ = 10V , $I_{DS}$ = 2.0A**




| FREQUENCY (GHz) | $S_{11}$ MAG | $S_{11}$ ANG | $S_{21}$ MAG | $S_{21}$ ANG | $S_{12}$ MAG | $S_{12}$ ANG | $S_{22}$ MAG | $S_{22}$ ANG |
|---|---|---|---|---|---|---|---|---|
| 5.70 | 0.077 | 99 | 3.162 | 37 | 0.082 | 5 | 0.569 | -44 |
| 5.80 | 0.214 | 80 | 3.194 | 18 | 0.088 | -13 | 0.475 | -57 |
| 5.90 | 0.313 | 66 | 3.164 | 1 | 0.092 | -29 | 0.387 | -70 |
| 6.00 | 0.373 | 52 | 3.113 | -16 | 0.095 | -45 | 0.317 | -85 |
| 6.15 | 0.397 | 33 | 3.058 | -41 | 0.098 | -68 | 0.248 | -115 |
| 6.30 | 0.344 | 10 | 3.036 | -65 | 0.101 | -90 | 0.242 | -153 |
| 6.40 | 0.267 | -9 | 3.026 | -83 | 0.103 | -106 | 0.280 | -178 |
| 6.50 | 0.162 | -41 | 2.984 | -101 | 0.103 | -124 | 0.342 | 160 |
| 6.60 | 0.106 | -124 | 2.884 | -121 | 0.101 | -142 | 0.413 | 141 |