

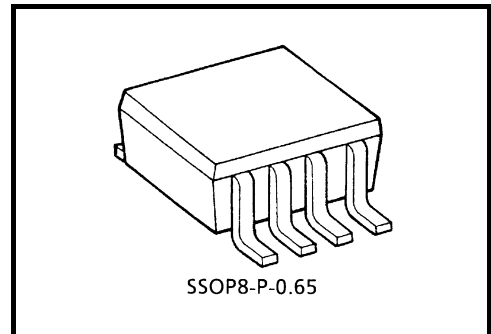
TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

# TA4022F

VHF-UHF Wide Band Amplifier Applications

## Features

- Low distortion: IM3 = 58dBc (@45 MHz)
- Operating supply voltage:  $V_{CC} = 4.75\text{ V} \sim 5.25\text{ V}$



Weight: 0.02g (typ.)

## Absolute Maximum Ratings (Ta = 25°C)

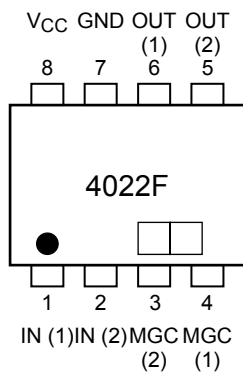
| Characteristics         | Symbol         | Rating  | Unit |
|-------------------------|----------------|---------|------|
| Supply voltage          | $V_{CC}$       | 5.5     | V    |
| Total power dissipation | $P_D$ (Note 1) | 550     | mW   |
| Operating temperature   | $T_{opr}$      | -40~85  | °C   |
| Storage temperature     | $T_{stg}$      | -55~150 | °C   |

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1: When mounted on a glass epoxy PCB (35 x 30 x 0.4 t mm).

## Pin Assignment



## Electrical Characteristics (Ta = 25°C, VCC = 5 V, Zs = 50Ω)

| Characteristics                        | Symbol            | Test Circuit | Test Condition   | Min | Typ. | Max | Unit |
|--|-------------------|--------------|--|-----|------|-----|------|
| Circuit current                        | Icc               | Fig1         | Non carrier  | 26  | 35   | 42  | mA   |
| Gain (1)                               | V Gain(1)         |              | f=45MHz, Z <sub>L</sub> =250Ω, MGC=Short                                     | 16  | 19   | 22  | dB   |
| Gain (2)                               | V Gain(2)         | Fig2         | f=45MHz, Z <sub>L</sub> =250Ω, MGC=Open                                      | —   | 10   | —   | dB   |
| Noise figure                           | NF                | Fig3         | f = 45MHz  | —   | 11   | 14  | dB   |
| Band width                             | BW                | Fig4         | (Note 2)   | —   | 700  | —   | MHz  |
| Input return loss                      | S11  <sup>2</sup> |              | f = 45MHz  | —   | -0.3 | —   | dB   |
| Isolation                              | S12  <sup>2</sup> |              | f = 45MHz  | —   | -51  | —   | dB   |
| Output return loss                     | S22  <sup>2</sup> |              | f = 45MHz  | —   | -4   | —   | dB   |
| 3 <sup>rd</sup> order inter modulation | IM3               | Fig1         | f1 = 45 MHz, f2 = 44 MHz,<br>P <sub>in</sub> = -21dBmW, Z <sub>L</sub> =250Ω | 52  | 58   | —   | dBc  |

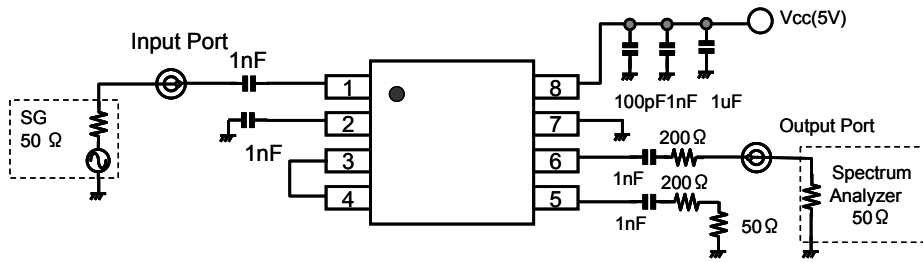
Note 2: BW is 3dB lower than |S21|<sup>2</sup> at 45 MHz.

**CAUTION:**

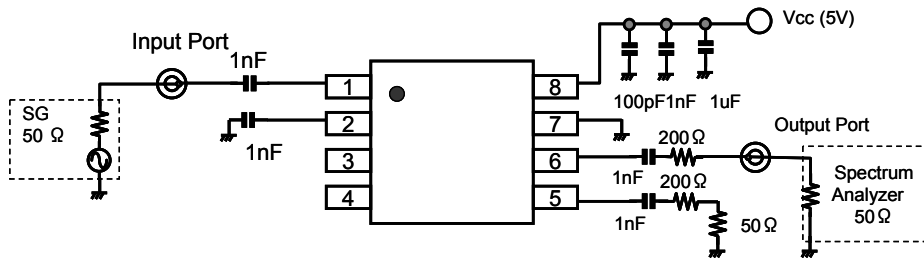
This device is sensitive to electrostatic discharge.

Please ensure equipment and tools are adequately earthed when handling.

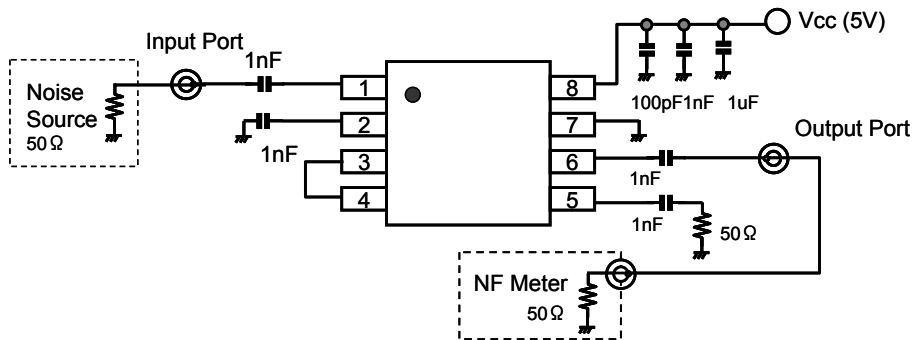
**Test Circuit**



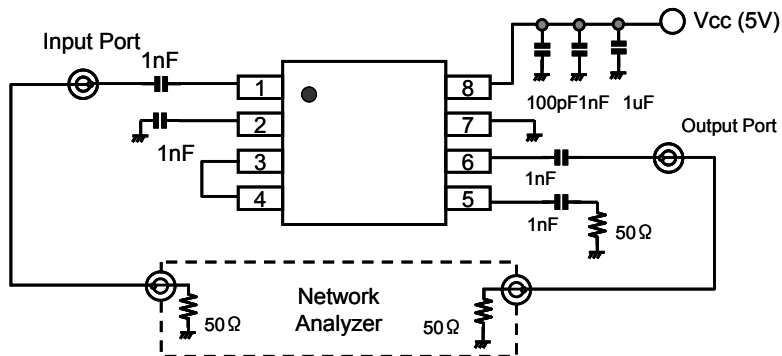
**Figure 1 Measurement circuit (MGC:Short)**



**Figure 2 Measurement circuit (MGC:Open)**

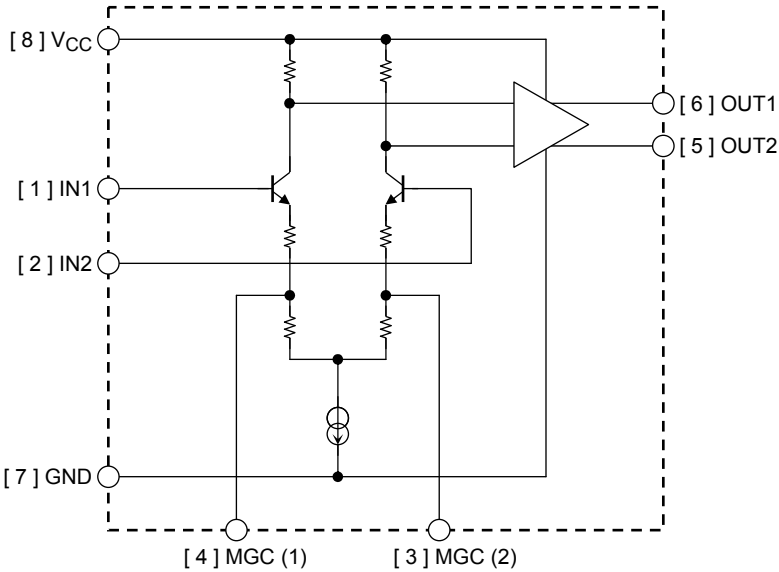


**Figure 3 Measurement circuit**



**Figure 4 Measurement circuit**

**Equivalent Circuit**



**Figure 5 Equivalent circuit**

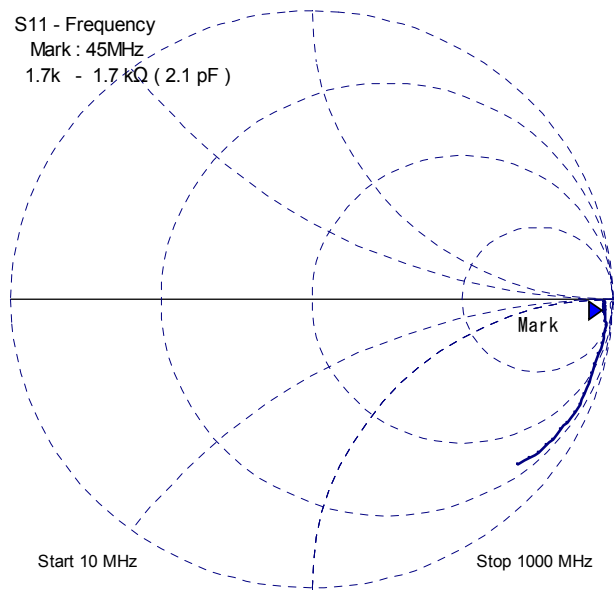
**Input / Output Impedance (Ta= 25°C, V<sub>CC</sub>=5 V, Measurement circuit : Fig 4 )**

| ITEM             | Symbol           | Test circuit | Test Condition | Typ.          | Unit |
|------------------|------------------|--------------|----------------|---------------|------|
| Input Impedance  | Z <sub>in</sub>  | Fig 4        | f = 45MHz      | 1.7k - j 1.7k | Ω    |
| Output Impedance | Z <sub>out</sub> | Fig 4        | f = 45MHz      | 13.2 - j 1.7  | Ω    |

**S Parameter ( Ta=25 °C, V<sub>CC</sub>=5 V, Measurement circuit : Fig 4 )**

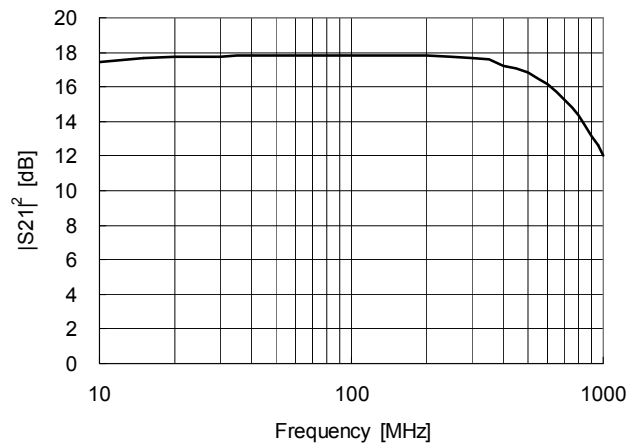
**S11**

S11 - Frequency  
Mark : 45MHz  
1.7k - 1.7kΩ ( 2.1 pF )



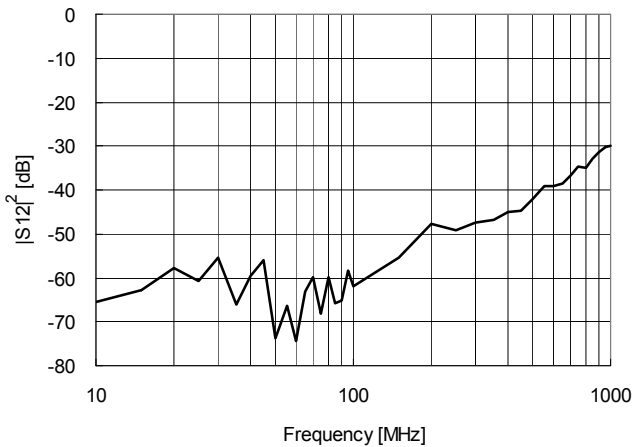
**|S21|<sup>2</sup>**

|S21|<sup>2</sup> (1)  
MGC=Short



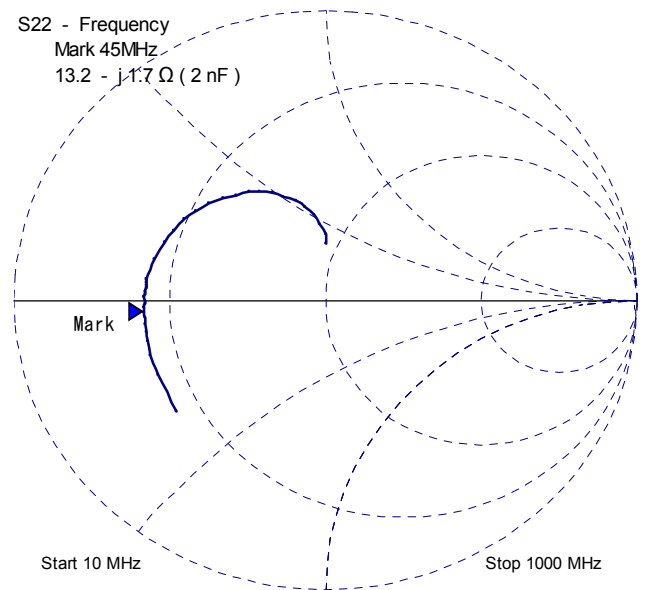
**|S12|<sup>2</sup>**

|S12|<sup>2</sup>  
MGC=Short

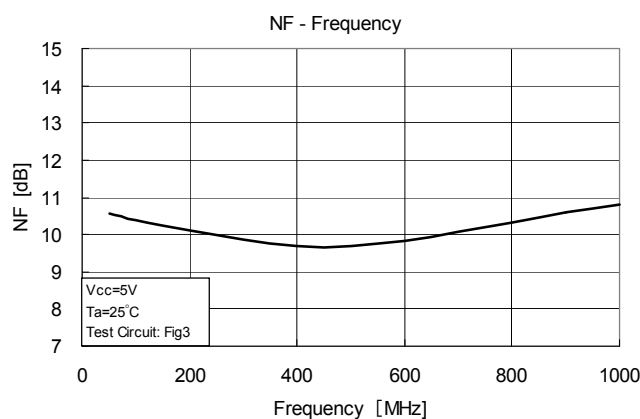
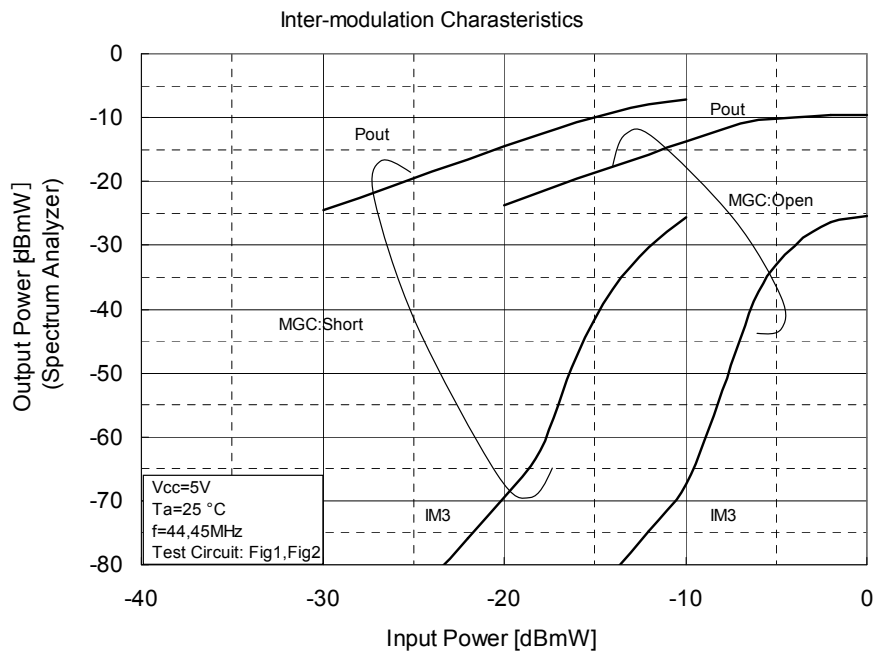
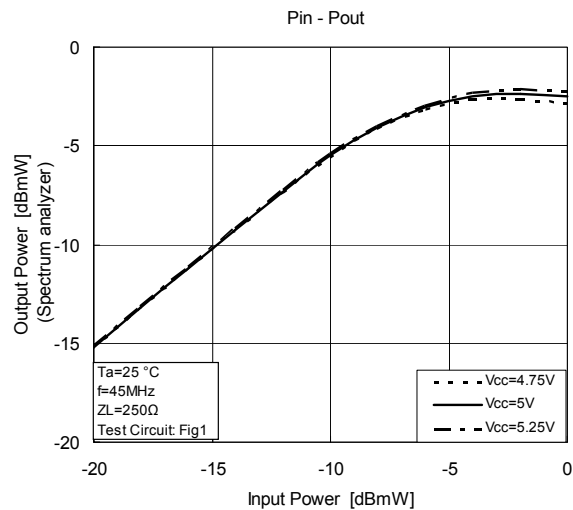


**S22**

S22 - Frequency  
Mark 45MHz  
13.2 - j 1.7 Ω ( 2 nF )



Typical Characteristics



Notice

The circuits and measurements contained in this document are given only as examples of applications for these products.

Moreover, these example application circuits are not intended for mass production, since the high-frequency characteristics (the AC characteristics) of these devices will be affected by the external components which the customer uses, by the design of the circuit and by various other conditions.

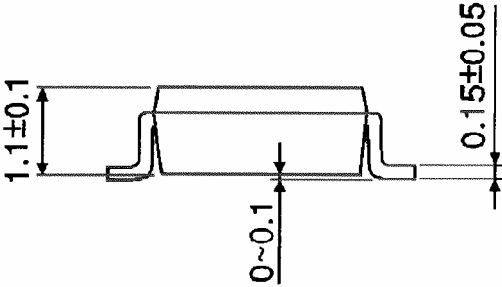
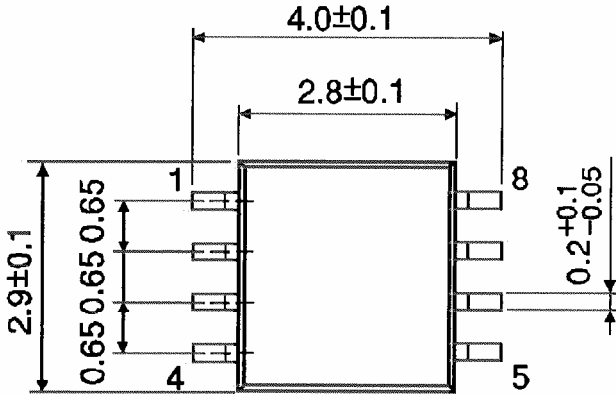
It is the responsibility of the customer to design external circuits which correctly implement the intended application, and to check the characteristics of the design.

TOSHIBA assume no responsibility for the integrity of customer circuit designs or applications.

**Package Dimensions**

SSOP8-P-0.65

Unit : mm



Weight: 0.02g (typ.)

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20070701-EN GENERAL

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