

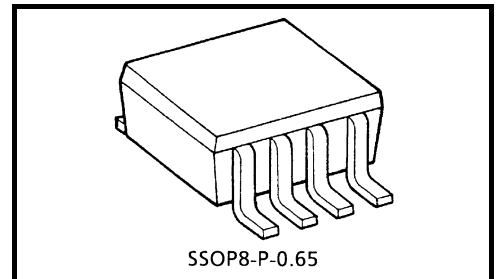
TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

# TA4023F

VHF-UHF Wide Band Amplifier Applications

## Features

- High gain:  $|S_{21}|^2 = 28\text{dB}$  (@45 MHz)
- Low distortion:  $IM_3 = 51\text{dBc}$  (@45 MHz)
- Operating supply voltage:  $V_{CC} = 4.75\text{ V to } 5.25\text{ V}$



Weight: 0.02 g (typ.)

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

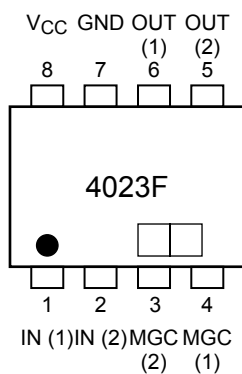
Characteristics	Symbol	Rating	Unit
Supply voltage	$V_{CC}$	5.5	V
Total power dissipation	$P_D$ (Note 1)	550	mW
Operating temperature	$T_{opr}$	-40 to 85	°C
Storage temperature	$T_{stg}$	-55 to 150	°C

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 × 30 × 0.4 t mm).

## Pin Assignment



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

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Circuit current	Icc	Fig1	Non carrier	22	28	36	mA
Insertion gain (1)	$ S21 ^2(1)$		f=45MHz, MGC=Short	25	28	31	dB
Insertion gain (2)	$ S21 ^2(2)$	Fig2	f=45MHz, MGC=Open	—	9	—	dB
Noise figure	NF	Fig3	f = 45MHz	—	8	11	dB
Band width	BW	Fig4	(Note 2)	—	500	—	MHz
Input return loss	$ S11 ^2$		f = 45MHz	—	-0.3	—	dB
Isolation	$ S12 ^2$		f = 45MHz	—	-51	—	dB
Output return loss	$ S22 ^2$		f = 45MHz	—	-5	—	dB
3 <sup>rd</sup> order inter modulation	IM3	Fig1	f1 = 45 MHz, f2 = 44 MHz, Pin = -33dBmW, ZL=50Ω	42	51	—	dBc

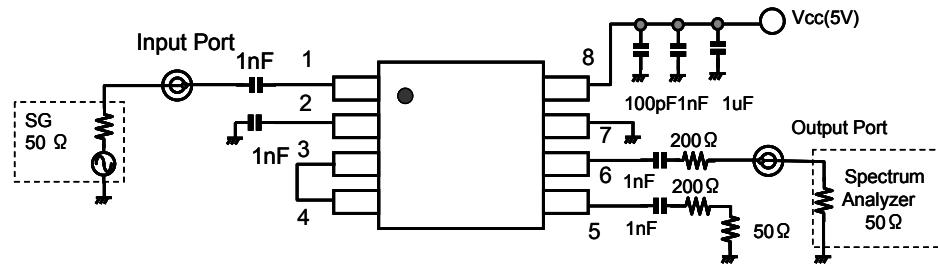
Note 2: BW is 3dB lower than  $|S21|^2$  at 45 MHz.

### CAUTION:

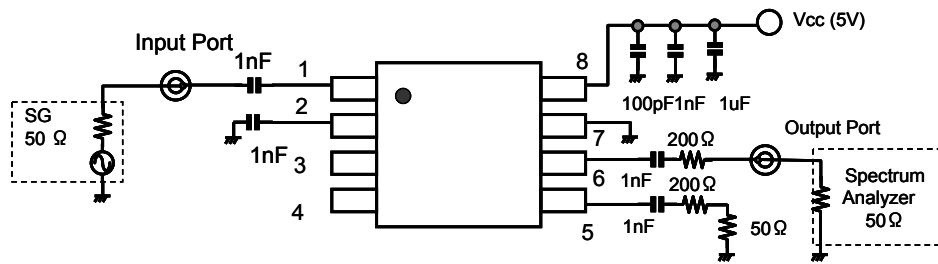
This device is sensitive to electrostatic discharge.

Please ensure equipment and tools are adequately earthed when handling.

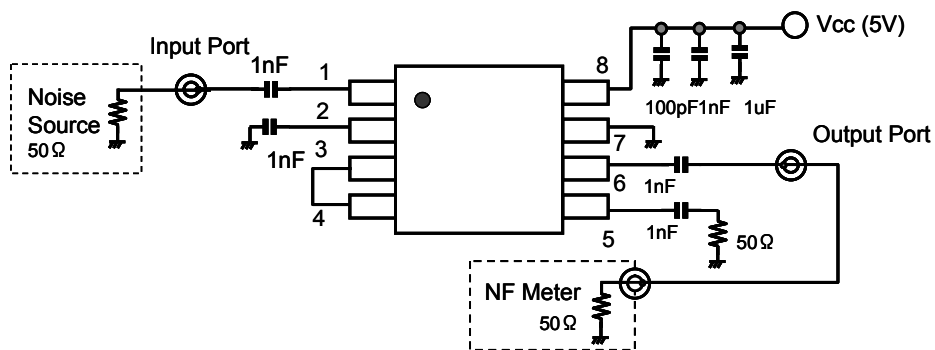
**Test Circuit**



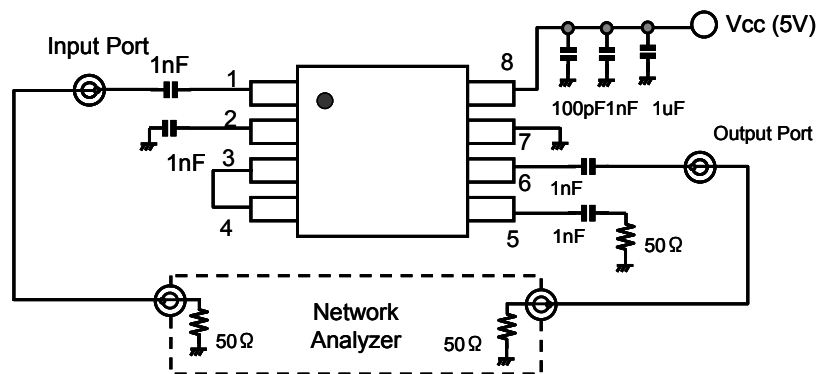
**Figure 1 Measurement circuit (MGC:Short)**



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



**Figure 3 Measurement circuit**



**Figure 4 Measurement circuit**

Equivalent Circuit

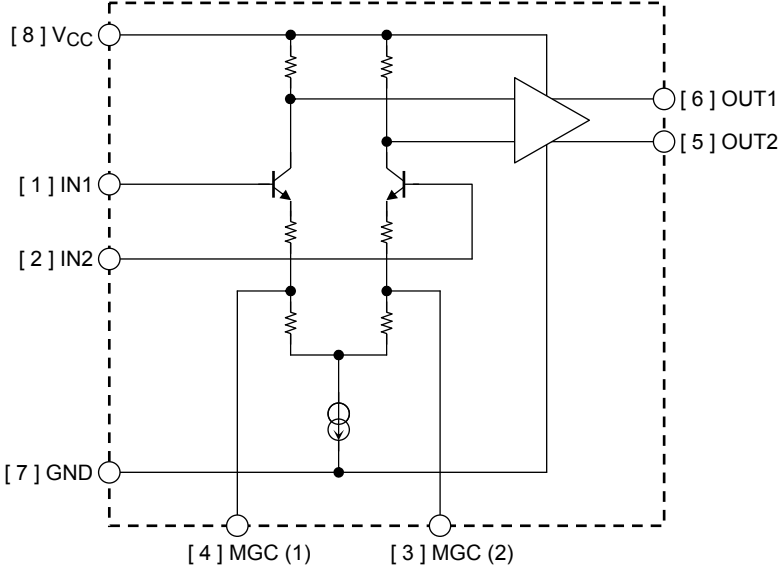


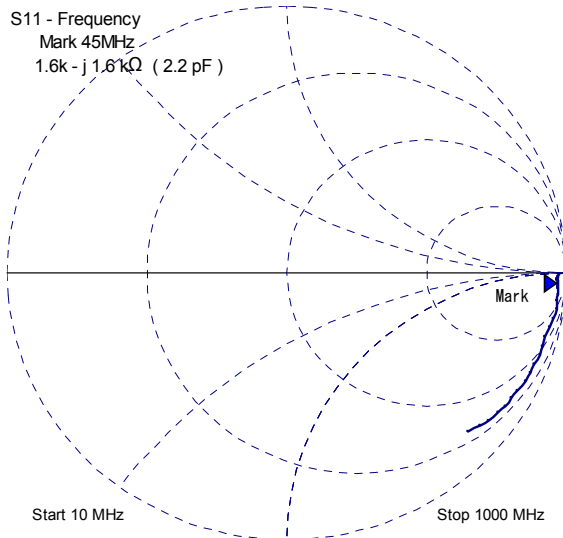
Figure 5 Equivalent circuit

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

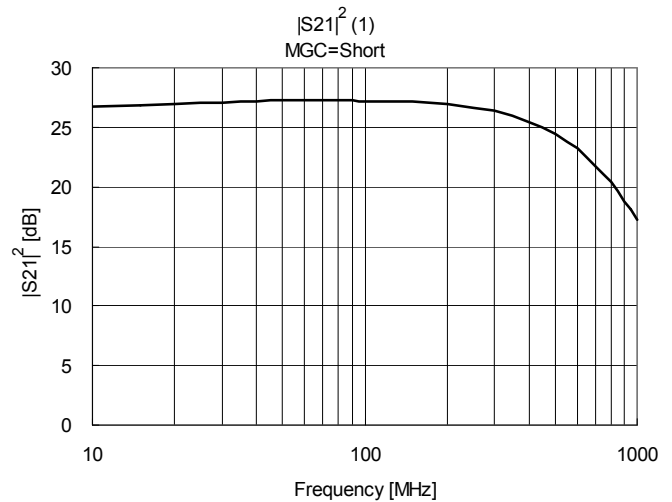
Characteristics	Symbol	Test Circuit	Test Condition	Typ.	Unit
Input Impedance	Z <sub>in</sub>	Fig 4	f = 45MHz	1.6k - j 1.6k	Ω
Output Impedance	Z <sub>out</sub>	Fig 4	f = 45MHz	15.2 - j 1.4	Ω

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

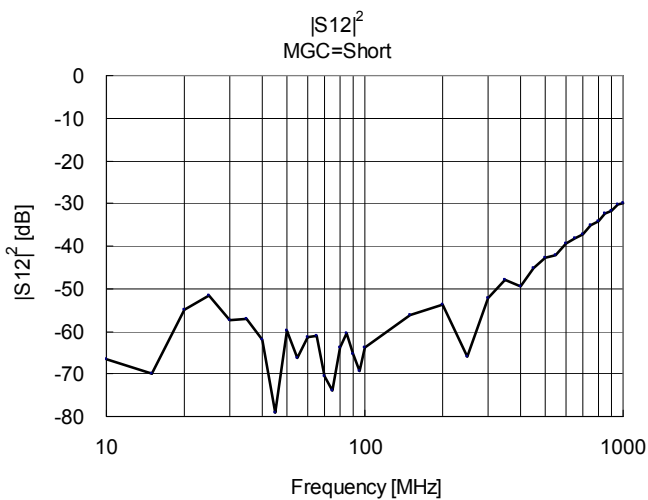
S11



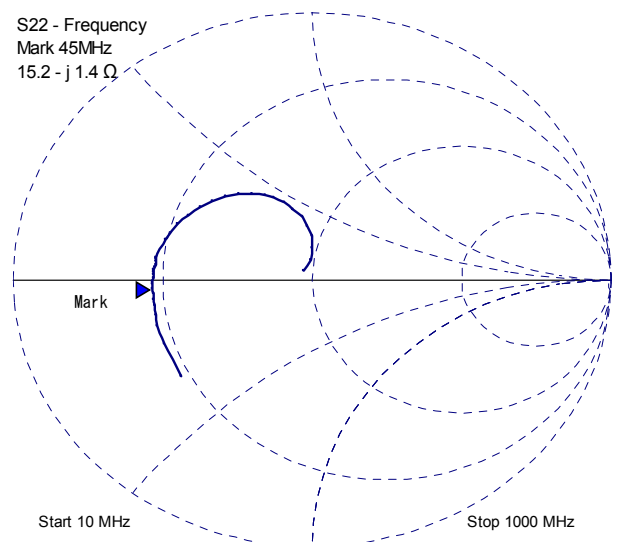
|S21|<sup>2</sup>



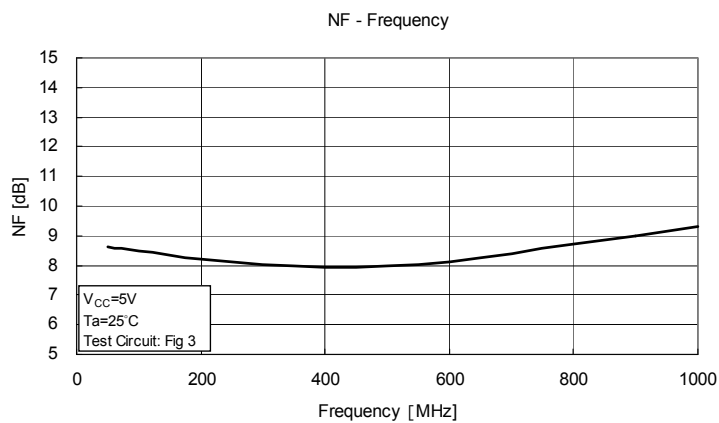
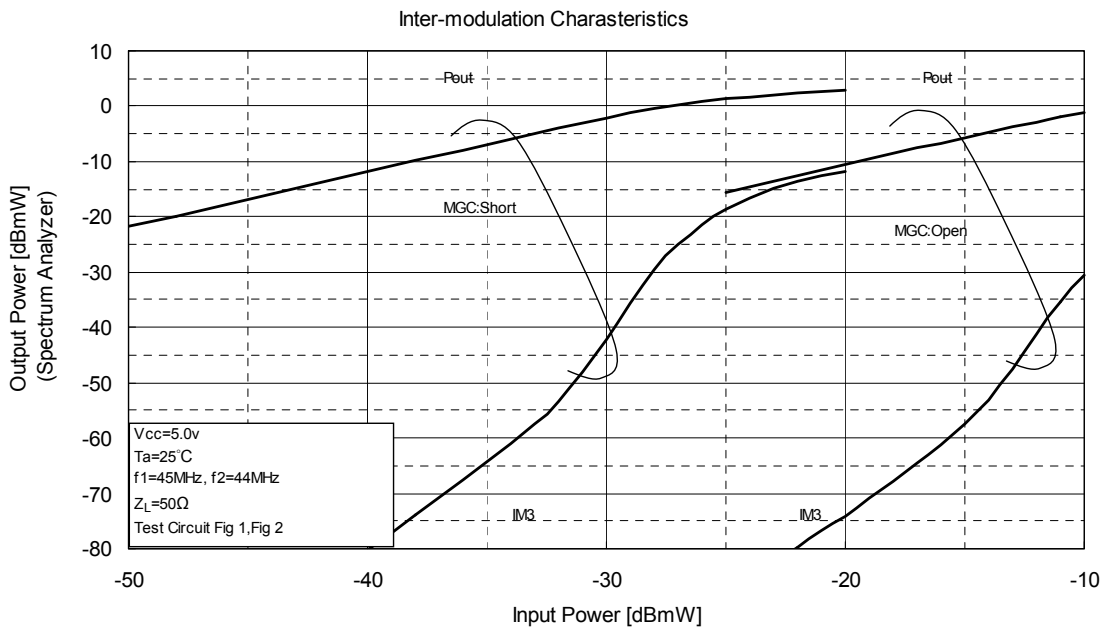
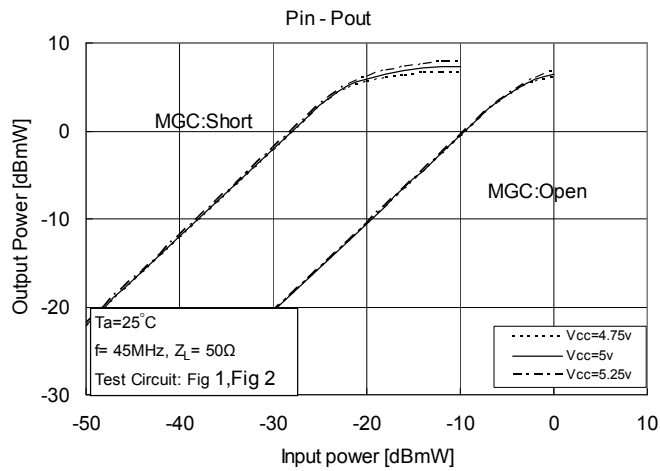
|S12|<sup>2</sup>



S22



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 RF 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.

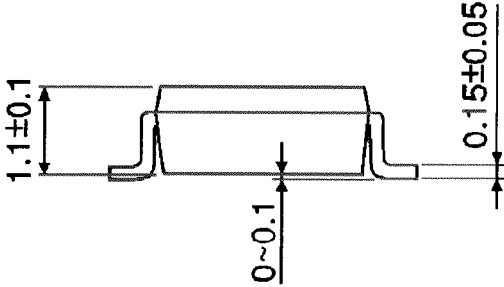
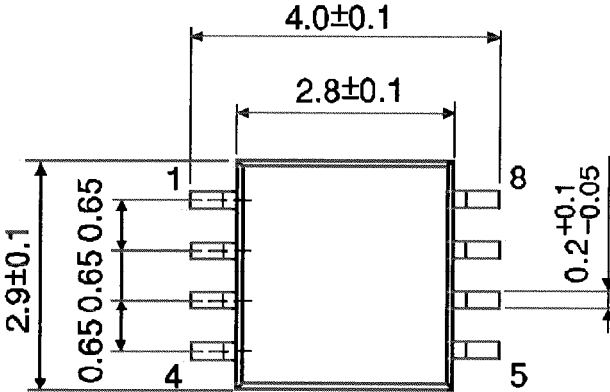
It is the responsibility of the customer to design external circuits which correctly implement the intended application, and to check the characteristics of the design.

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

Package Dimensions

SSOP8-P-0.65

Unit : mm



Weight: 0.02 g (typ.)

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