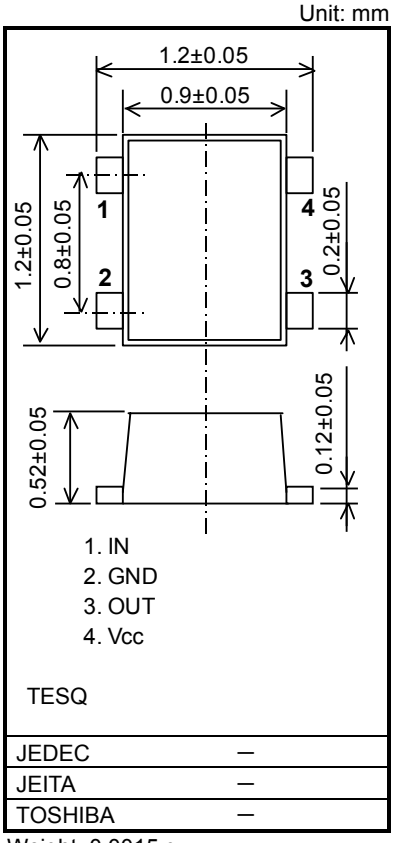
TOSHIBA Linear Integrated Circuit Silicon-Germanium Monolithic

# TA4020FT

○ UHF LOW NOISE AMPLIFIER APPLICATION

・Thin Extreme Super mini Quad Package (4pin) :TESQ

Unit: mm




TESQ

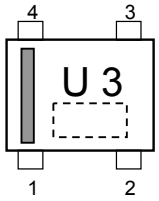
| | |
|---|---|
| JEDEC | ― |
| JEITA | ― |
| TOSHIBA | ― |

Weight: 0.0015 g

## FEATURES

- Low Noise Figure: NF=0.95dB (@ f=1.5GHz)
- High Gain: $|S21e|^2$=15.0dB (@ f=1.5GHz)
- Lead free article

## Marking(Tentative)




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

| Characteristics | Symbol | Rating | Unit |
|---|---|---|---|
| Voltage at pin Vcc | $V_{CC}$ | 3.7 | V |
| Current into pin Vcc | $I_{CC}$ | 10 | mA |
| RF input power | $P_{in}$ | 10 | dBmW |
| Total Power dissipation | $P_D$ | 37 | mW |
| Junction temperature | $T_j$ | 150 | °C |
| Operate temperature Range | $T_{opr}$ | −40～85 | °C |
| Storage temperature Range | $T_{stg}$ | −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).

## Recommend Operation range

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Voltage supply | $V_{CC}$ | — | 2.3 | 3.0 | 3.3 | V |

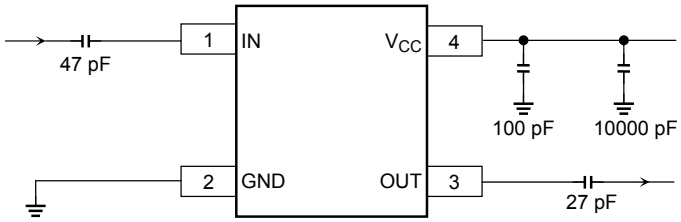
## Electrical Characteristics (Vcc = 3V, Ta = 25°C)

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Circuit Current | $I_{CC}$ | Vcc = 3V | 3.5 | 5 | 7 | mA |
| Insertion Gain | $\|S21e\|^2$(1) | Vcc = 3V, f = 1.5GHz | 13 | 15 | — | dB |
| | $\|S21e\|^2$(2) | Vcc = 3V, f = 2.6GHz | 8.5 | 10.5 | — | dB |
| Noise Figure | NF(1) | Vcc = 3V, f = 1.5GHz, Zs = Zsopt | — | 0.95 | 1.25 | dB |
| | NF(2) | Vcc = 3V, f = 2.6GHz, Zs = Zsopt | — | 1.25 | — | dB |
| Input Third order Intercept Point | IIP3(1) | Vcc = 3V, f = 1.5GHz | — | -9.5 | — | dBmW |
| | IIP3(2) | Vcc = 3V, f = 2.6GHz | — | -4 | — | dBmW |

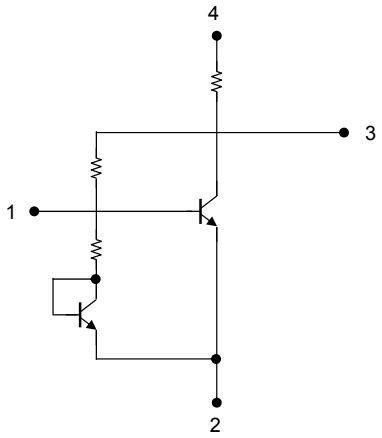
**Caution:**

This device is sensitive to electrostatic discharge due to applied the high frequency transistor process of fT=60GHz class is used for this product.

Please make enough tool and equipment earthed when you handle.

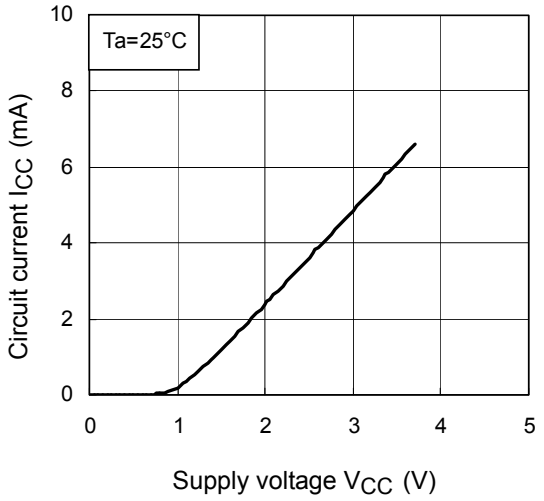



**RF Test Circuit (Top View)**

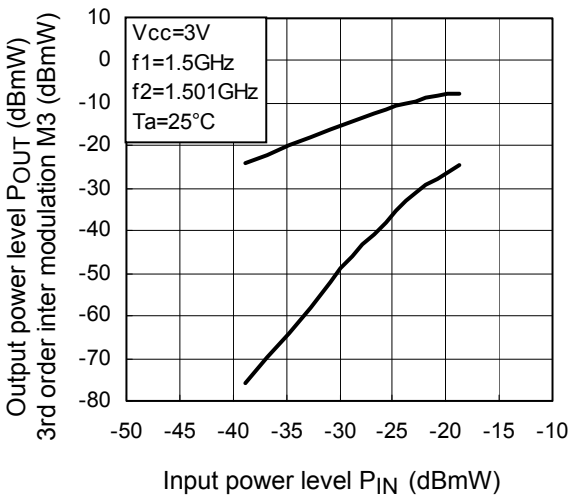



**Equivalent Circuit**

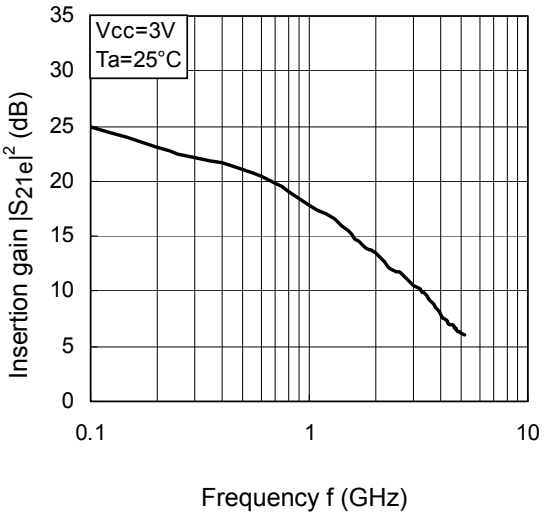
$I_{CC}$ - $V_{CC}$



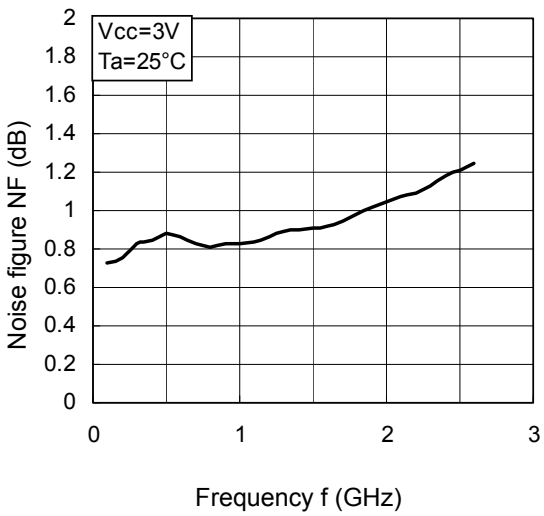

$P_{IN}$ -$P_{OUT}$, IM3




$|S_{21e}|^2$ - f




NF - f




## Notice

The circuits and measurements contained in this document are given only in the context of 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.

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20070701-EN GENERAL

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