

# TA4303F

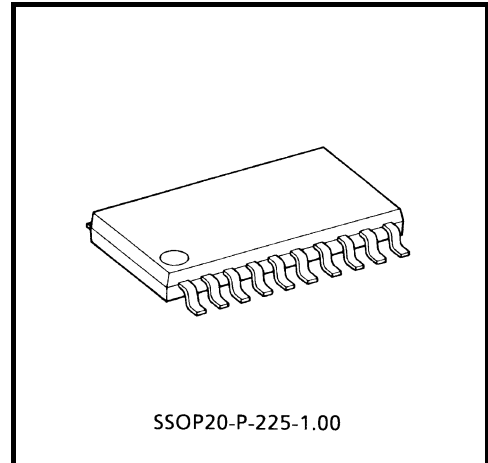
Down Converter for BS/CS Tuner IC

## Description

The TA4303F is a monolithic IC to down-convert the L-band (900~2150 MHz) signal for the satellite tuners. It's integrated circuits that perform the mixer/oscillator function. They have double-balanced mixer, local oscillator, IF amplifier, OSC buffer amplifier and prescaler buffer amplifier circuits.

## Features

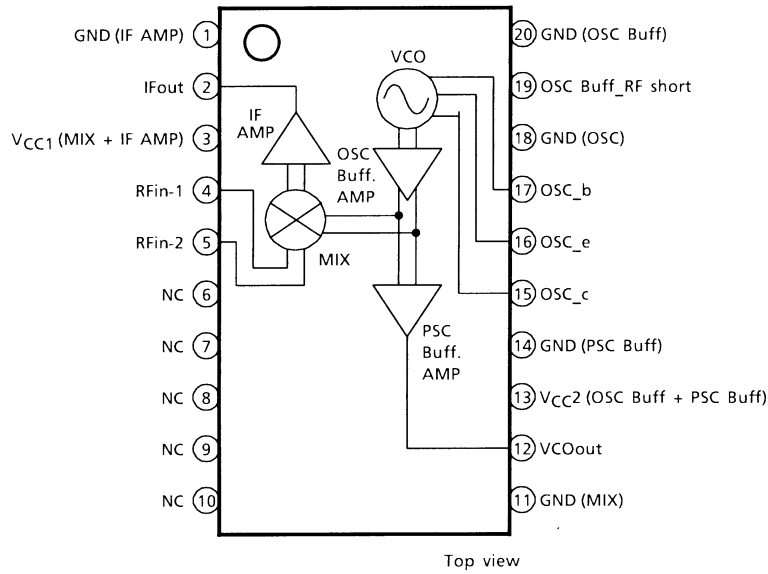
- Single chip full band solution, compatible with digital and analog transmissions.
- Single 5 V power supply operation
- Full band constant conversion Gain and Noise Figure
- Local oscillator output circuit for PLL
- Low Phase Noise local oscillator



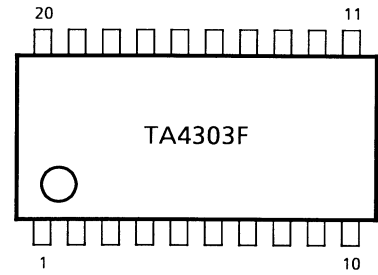
Weight: 0.17 g (typ.)

## Pin Connection Function Block Diagram

## Marking



Package : SSOP20-P-225, 1.0mm pitch



## Caution

This device is electrostatic sensitive.

## Explanation

Pin No.	Pin Name	Pin Voltage	Explanation	Equivalent Circuit
1	GND (IF Amp)	0	GND pin for IF Amp.	—
2	IF out	2.2	IF output pin.	
3	VCC1 (MIX + IF Amp)	5.0	Supply voltage for MIX + IF Amp.	—
4	RFin-1	1.7	RF input pin.	
5	RFin-2	1.7	RF input pin.	
6	NC	—	—	—
7	NC	—	—	—
8	NC	—	—	—
9	NC	—	—	—
10	NC	—	—	—
11	GND (MIX)	0	GND pin for MIX.	—
12	VCOout	2.0	OSC output pin.	
13	VCC2 (OSC Buff + PSC Buff)	5.0	Supply voltage pin for OSC Buff + PSC Buff.	—
14	GND (PSC Buff)	0	GND pin for PSC Buff.	—
15	OSC-c	5.0	OSC collector pin, supply voltage pin.	
16	OSC-e	1.8	Emitter pin for OSC.	
17	OSC-b	2.6	Base pin for OSC.	

Pin No.	Pin Name	Pin Voltage	Explanation	Equivalent Circuit
18	GND (OSC)	0	GND pin for OSC.	—
19	RF GND (OSC Buff)	1.4	RF GND pin.	<p>The diagram shows a differential pair of transistors. The base of the left transistor is connected to a biasing network consisting of a resistor to ground and a resistor to a common-mode input. The base of the right transistor is connected to a similar biasing network. The emitters are connected to a common emitter resistor to ground. The collectors are connected to a common-mode output and a differential output labeled 'MIX'. The pin number '19' is circled next to the MIX output.</p>
20	GND (OSC Buff)	0	GND pin for OSC Buff.	—

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

Characteristic	Symbol	Rating	Unit
Supply voltage	V <sub>CC</sub>	6	V
Total power dissipation	P <sub>D</sub> (Note 1)	1100	mW
Operating temperature	T <sub>opr</sub>	-20~85	°C
Storage temperature	T <sub>stg</sub>	-45~150	°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: 100 cm<sup>2</sup> × 1.6 t (Cu layer area: 36%) on glass epoxy resins.

## Operating Ranges

Characteristic	Symbol	Rating	Unit
Supply voltage	V <sub>CC</sub> (Amp)	4.75~5.25	V
Supply voltage	V <sub>CC</sub> (OSC)	4.75~5.25	V
Input frequency range	f <sub>in</sub>	900~2150	MHz
IF Input frequency range	f <sub>IF</sub>	350~550	MHz

## Electrical Characteristics (Ta = 25°C) (Note 2)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Supply current	I <sub>CC</sub> (Total)	1	V <sub>CC</sub> = 5 V, No RF input	61	74	87	mA
Conversion gain	G <sub>c</sub>	1	f <sub>in</sub> = 1.6 GHz, f <sub>IF</sub> = 400 MHz	14	18	25	dB
Noise figure	NF	1	f <sub>in</sub> = 1.6 GHz, f <sub>IF</sub> = 400 MHz	—	15	22	dB
Saturation output	P <sub>O</sub> (sat)	1	f <sub>in</sub> = 1.6 GHz, f <sub>IF</sub> = 400 MHz	5	10	—	dBmW
Third-order intercept	IP <sub>3</sub>	1	f <sub>in</sub> = 1.596 GHz, 1.6 GHz f <sub>IF</sub> = 400 MHz, 404 MHz	12	17	24	dBmW
Posc	POSC	1	f <sub>LO</sub> = 2.0 GHz	-14	-8	—	dBmW

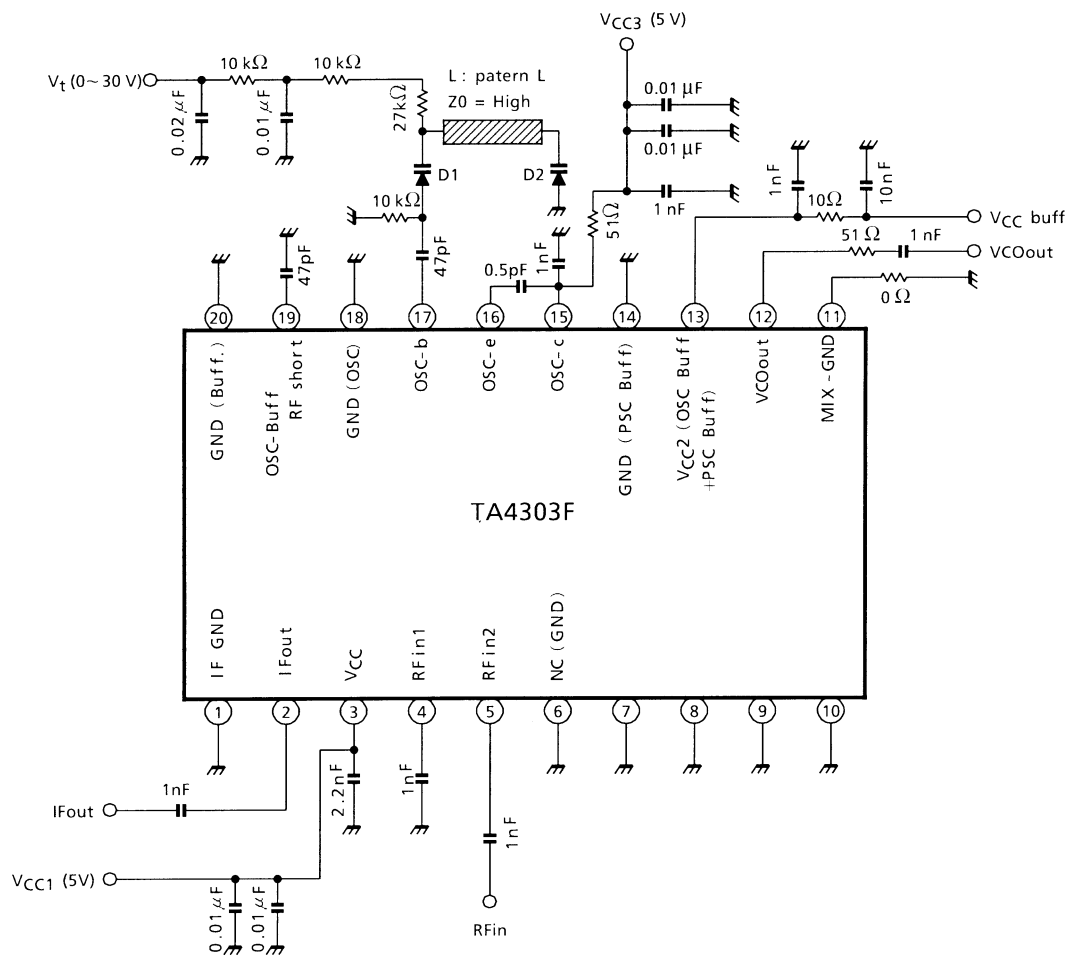
Note 2: All electrical characteristics measured in Supply Voltage 5.0 V (Amp, OSC, OSC Buffer)

## Reference Characteristic (Note 3)

Characteristics	Symbol	Test Circuit	Test Condition	Typ.	Unit
Supply current	I <sub>CC</sub> (Amp)	1	V <sub>CC</sub> = 5 V, No RF input	36	mA
Supply current	I <sub>CC</sub> (OSC)	1	V <sub>CC</sub> = 5 V, No RF input	38	mA

Note 3: All electrical characteristics measured in Supply Voltage 5.0 V (Amp, OSC, OSC Buffer)

Test Circuit



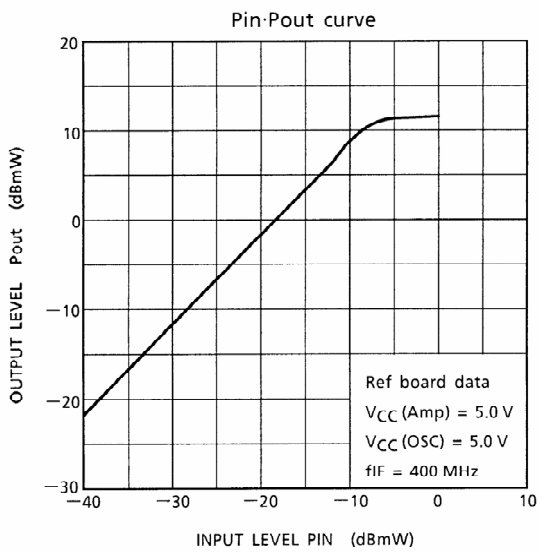
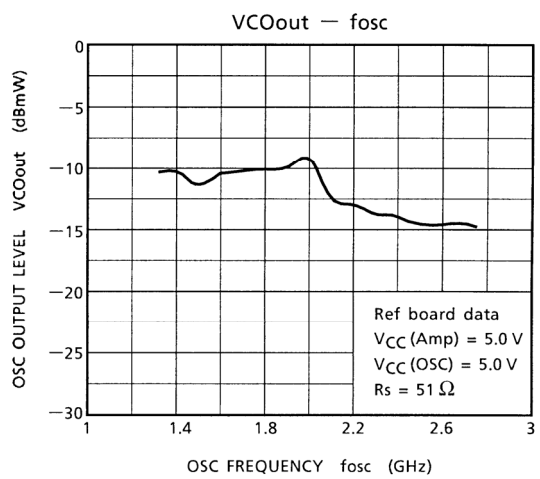
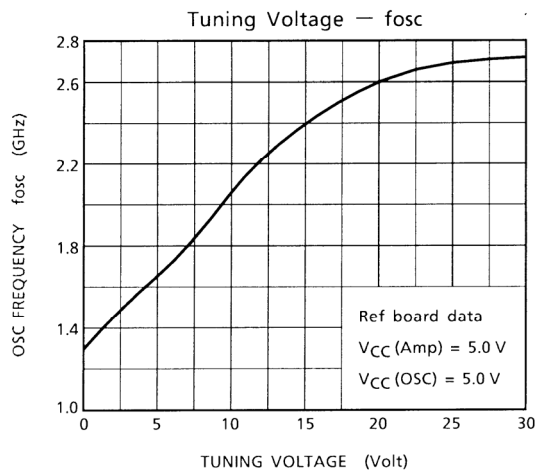
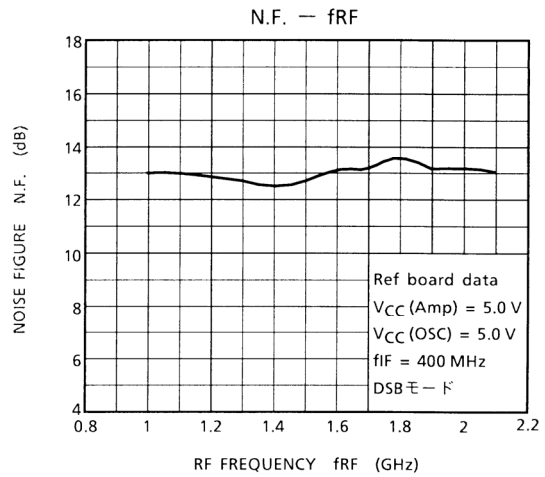
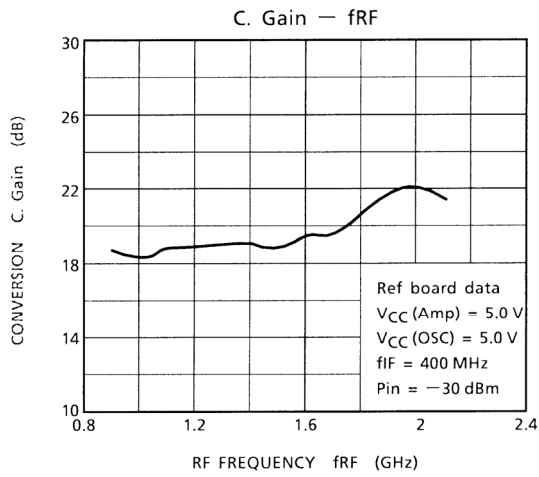
Notice

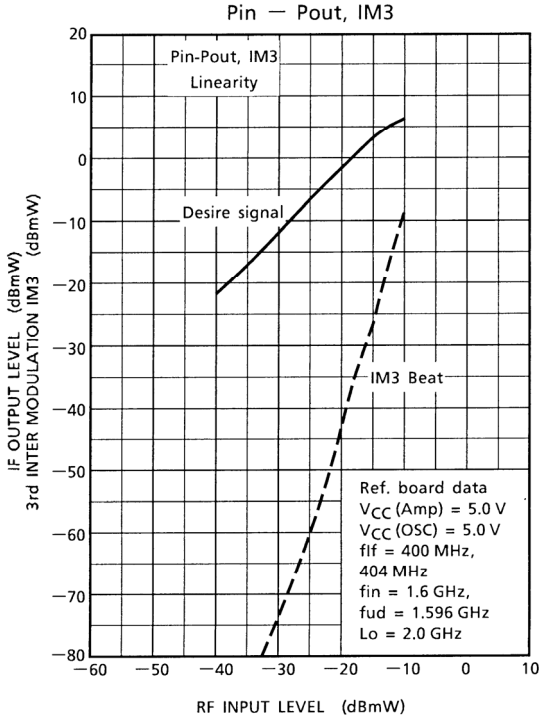
The circuits and measurements contained in this document are given only in the context of as examples of applications for these products.

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.



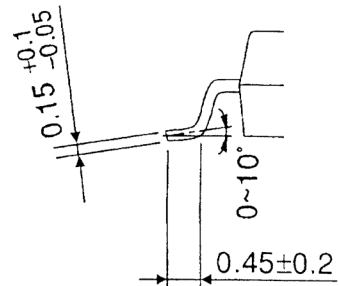
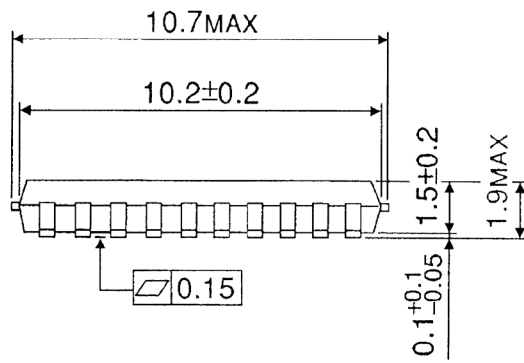
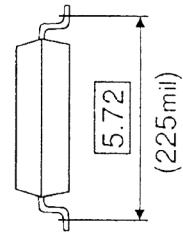
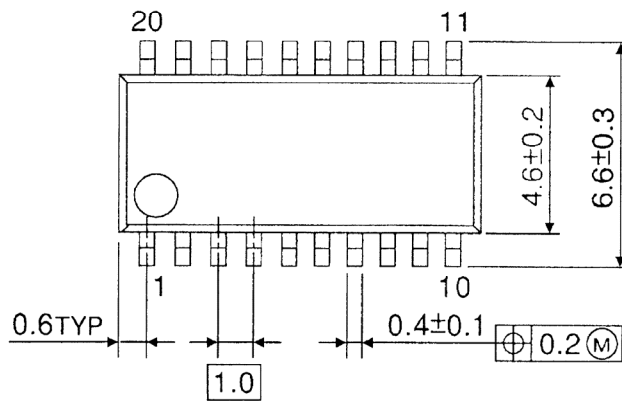




**Package Dimensions**

SSOP20-P-225-1.00

Unit : mm



Weight : 0.17 g (Typ.)

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20070701-EN GENERAL

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