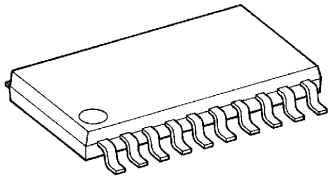
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA4303F

DOWN CONVERTER FOR BS / CS TUNER IC

DESCRIPTION

The TA4303F is a monolithic IC to down-convert the L-band (900~2150MHz) 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.



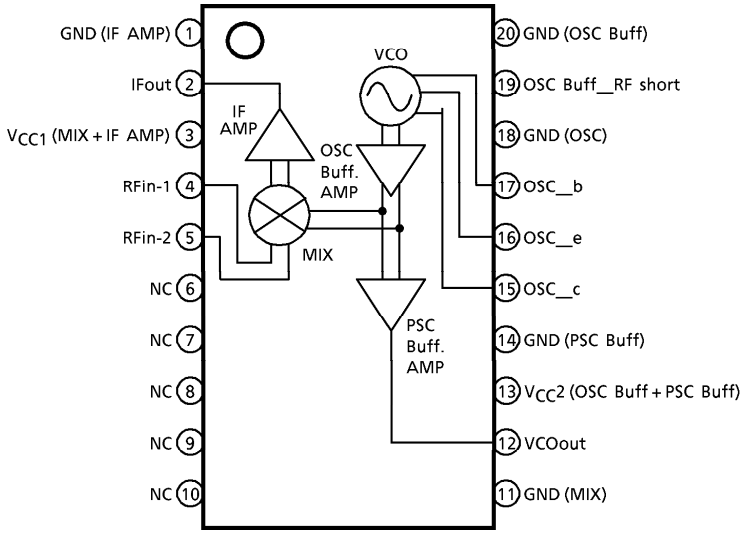
SSOP20-P-225-1.00

Weight : 0.17g (Typ.)

FEATURES

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

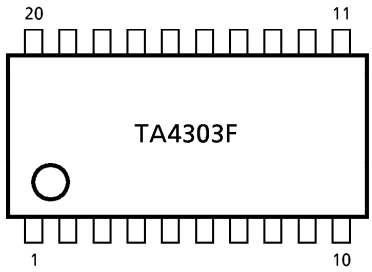
PIN CONNECTION FUNCTION BLOCK DIAGRAM



Top view

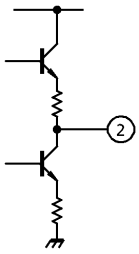
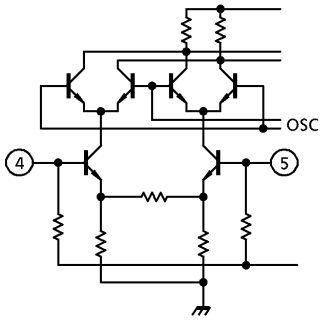
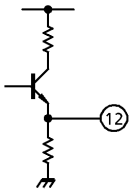
Package : SSOP20-P-225, 1.0mm pitch

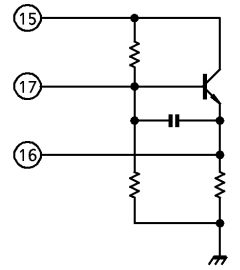
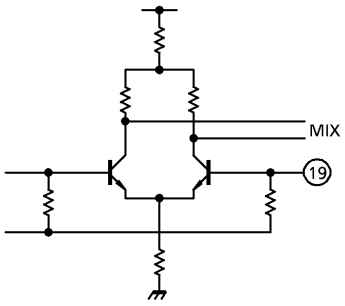
MARKING



(CAUTION) This devices is electrostatic sensitivity

EXPLANATION

PIN No.	PIN NAME	PIN VOLTAGE	EXPLANATION	EQUIVALENT CIRCUIT
1	GND (IF Amp)	0	GND pin for IF Amp.	—
2	IFout	2.2	IF output pin.	
3	V_{CC1} (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	V_{CC2} (OSC Buff + PSC Buff)	5.0	Supply voltage pin for OSC Buff + PSC Buff.	—
14	GND (PSC Buff)	0	GND pin for PSC Buff.	—

PIN No.	PIN NAME	PIN VOLTAGE	EXPLANATION	EQUIVALENT CIRCUIT
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.	
18	GND (OSC)	0	GND pin for OSC.	—
19	RF GND (OSC Buff)	1.4	RF GND pin.	
20	GND (OSC Buff)	0	GND pin for OSC Buff.	—

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	6	V
Total Power Dissipation	P_D (Note)	1100	mW
Operating Temperature	T_{opr}	−20~85	°C
Storage Temperature	T_{stg}	−45~150	°C

(Note) $100cm^2 \times 1.6t$ (Cu layer area : 36%) on glass epoxy resins.

RECOMMENDED OPERATING RANGE

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC} (Amp)	4.75~5.25	V
Supply Voltage	V_{CC} (OSC)	4.75~5.25	V
Input Frequency Range	fin	900~2150	MHz
IF Input Frequency Range	fIF	350~550	MHz

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current	I_{CC} (Total)	1	V_{CC} = 5V, No RF input	61	74	87	mA
Conversion Gain	Gc	1	fin = 1.6GHz, fIF = 400MHz	14	18	25	dB
Noise Figure	NF	1	fin = 1.6GHz, fIF = 400MHz	—	15	22	dB
Saturation Output	Po (sat)	1	fin = 1.6GHz, fIF = 400MHz	5	10	—	dBmW
Third-order Intercept	IP3	1	fin = 1.596GHz, 1.6GHz fIF = 400MHz, 404MHz	12	17	24	dBmW
Posc	Posc	1	fLO = 2.0GHz	−14	−8	—	dBmW

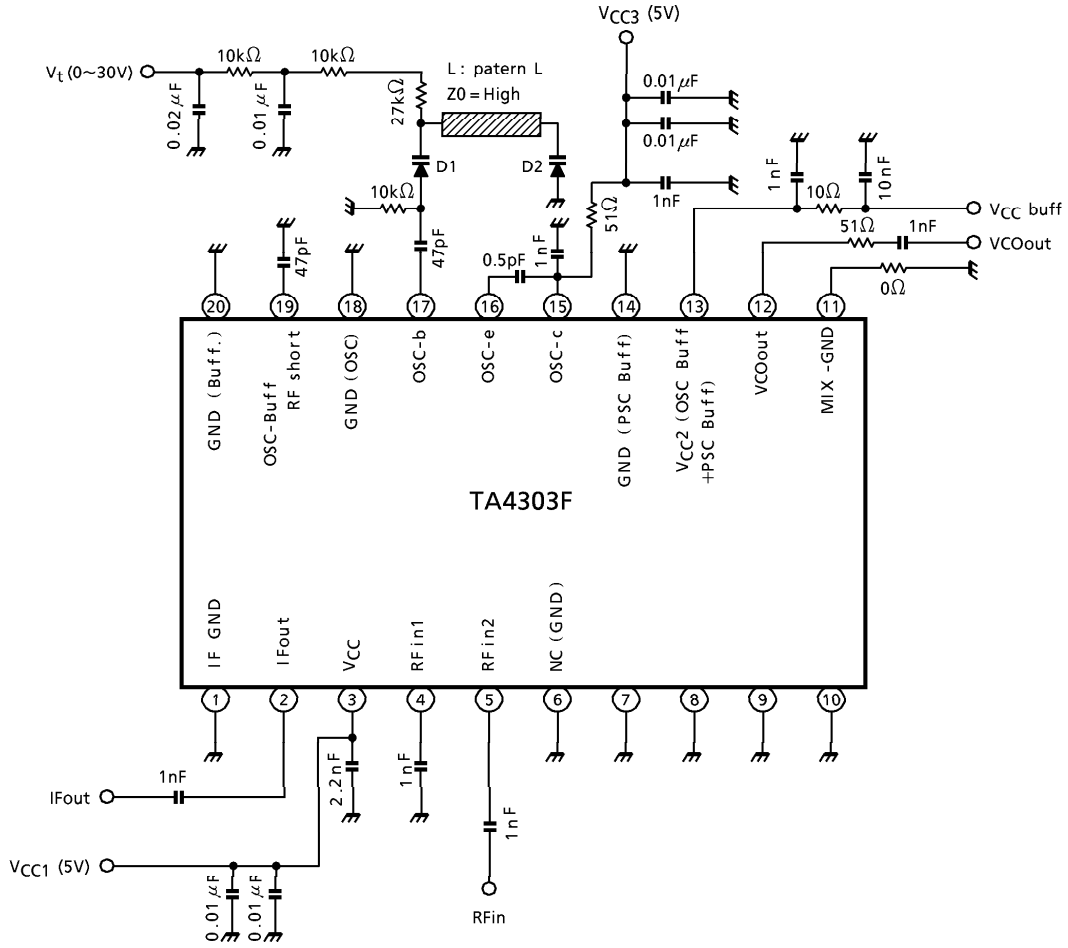
(Note) All electrical characteristics measured in Supply Voltage 5.0V (Amp, OSC, OSC Buffer)

REFERENCE CHARACTERISTIC

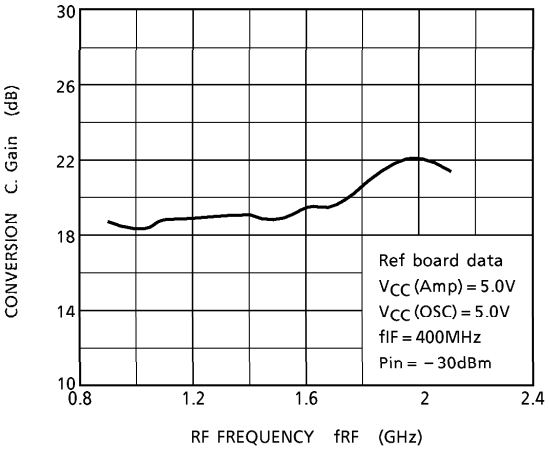
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	TYP.	UNIT
Supply Current	I_{CC} (Amp)	1	V_{CC} = 5V, No RF input	36	mA
Supply Current	I_{CC} (OSC)	1	V_{CC} = 5V, No RF input	38	mA

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

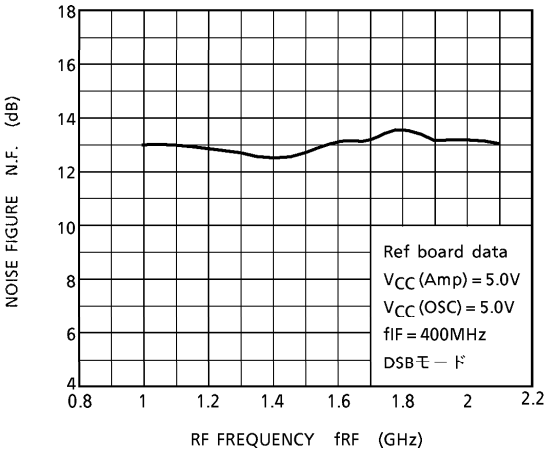
TEST CIRCUIT



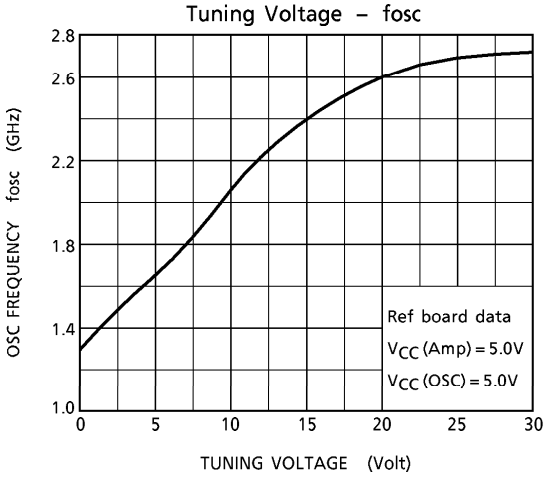
C. Gain – fRF



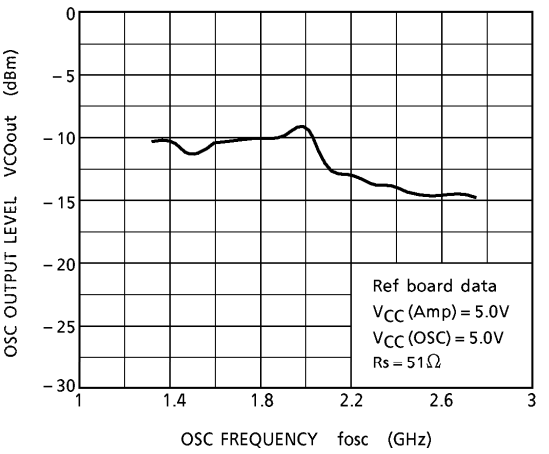
N.F. – fRF



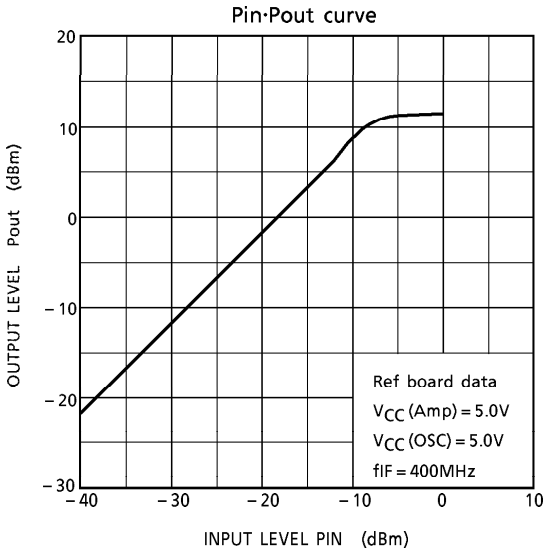
Tuning Voltage – fosc



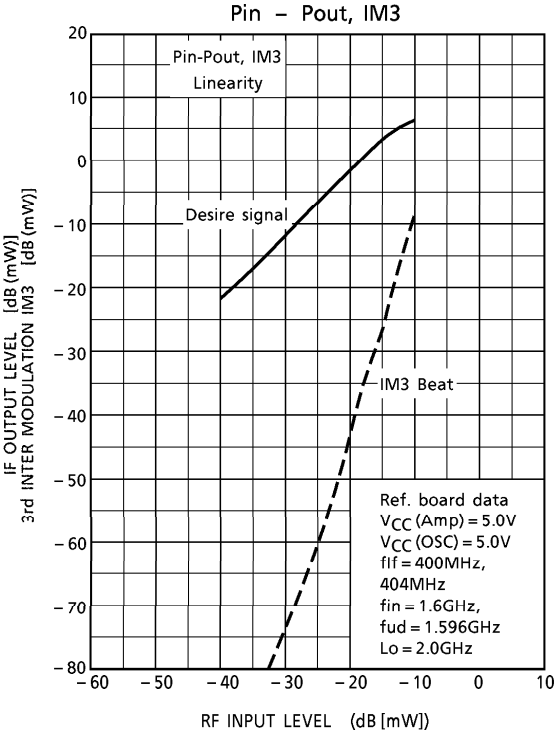
VCOout – fosc



Pin·Pout curve



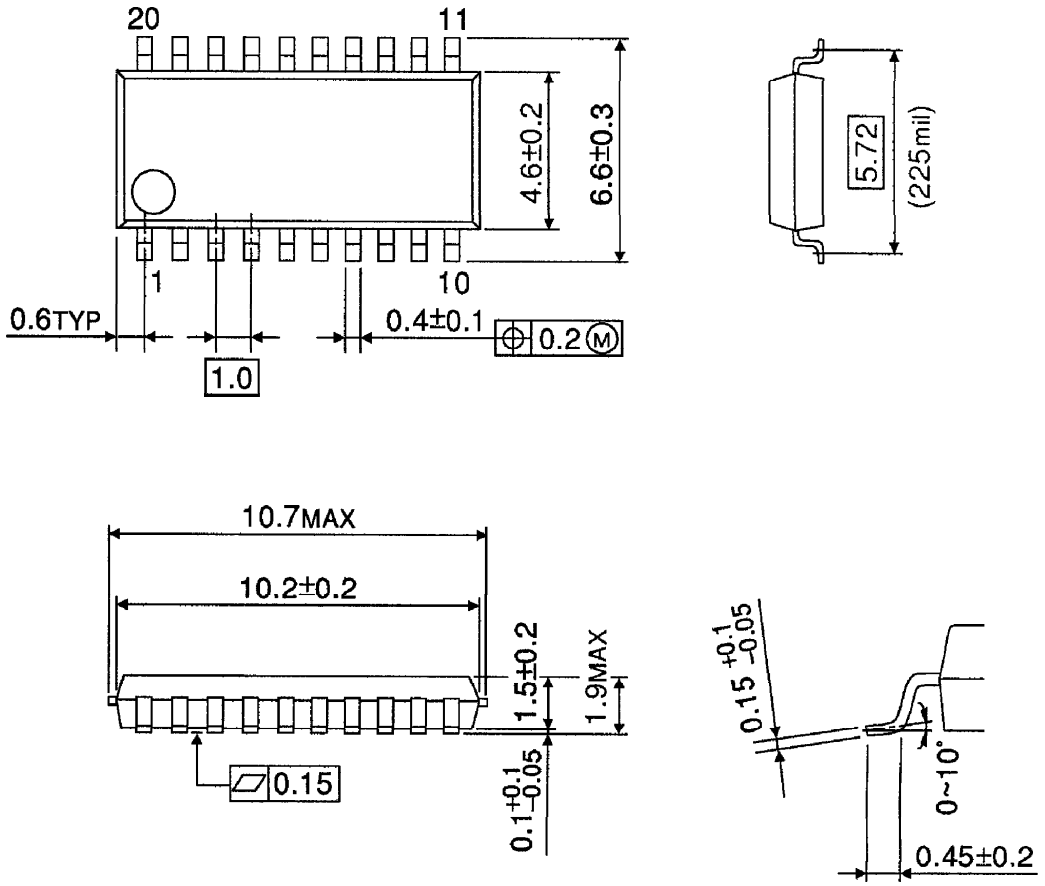
Pin – Pout, IM3


Pin-Pout, IM3
Linearity
Desire signal
IM3 Beat
Ref. board data
VCC (Amp) = 5.0V
VCC (OSC) = 5.0V
fIf = 400MHz,
404MHz
fin = 1.6GHz,
fud = 1.596GHz
Lo = 2.0GHz
IF OUTPUT LEVEL [dB (mW)]
3rd INTER MODULATION IM3 [dB (mW)]
RF INPUT LEVEL (dB [mW])
20
10
0
– 10
– 20
– 30
– 40
– 50
– 60
– 70
– 80
– 60
– 50
– 40
– 30
– 20
– 10
0
10

OUTLINE DRAWING

SSOP20-P-225-1.00

Unit : mm



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