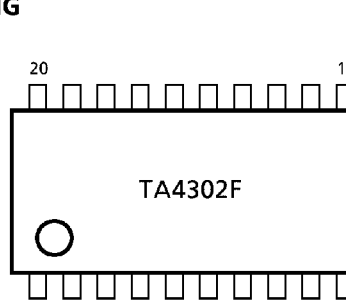
**TENTATIVE** TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

# TA4302F

## DOWN CONVERTER FOR CATV

### DESCRIPTION

The TA4302F is a monolithic IC to down-convert the L-band signal for the CATV 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.



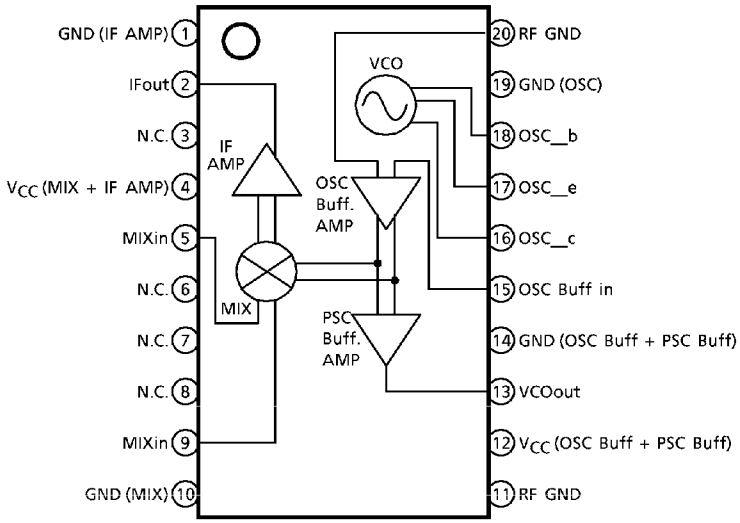
SSOP20-P-225-1.00

Weight : 0.17 g (Typ.)

### FEATURES

- Single 5 V power supply operation
- Local oscillator output circuit for PLL
- Low Phase Noise local oscillator

### PIN CONNECTION / FUNCTION BLOCK DIAGRAM

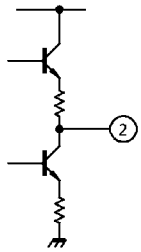
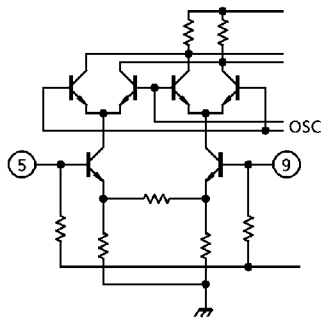
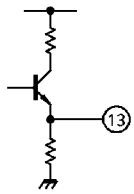


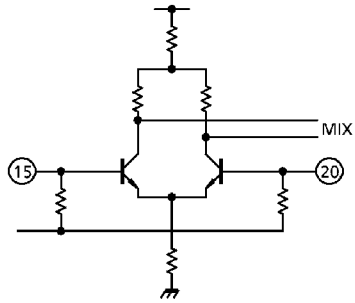
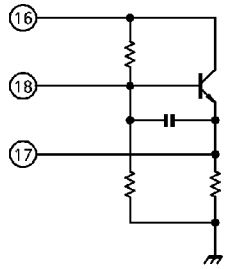

### MARKING




980910EBA1

**PIN DESCRIPTION**

| PIN No. | PIN SYMBOL | PIN VOLTAGE | DESCRIPTION | EQUIVALENT CIRCUIT |
|---|---|---|---|---|
| 1 | GND | 0 | IF amp GND pin | — |
| 2 | IFout | 2.2 | IF output pin |   |
| 3 | NC | — | — | — |
| 4 | $V_{CC}$ (Amp) | 5.0 | MIX IF amp power pin | — |
| 5 | MIXin-1 | 1.6 | RF input pin |   |
| 6 | NC | — | — | — |
| 7 | NC | — | — | — |
| 8 | NC | — | — | — |
| 9 | MIXin-2 | 1.6 | RF GND pin | See the equivalent circuit for pin 5. |
| 10 | GND | 0 | MIX GND pin | — |
| 11 | GND | 0 | GND pin for OSC buffer amp and PSC buffer amp | — |
| 12 | $V_{CC}$ (Buff) | 5.0 | Power pin for OSC buffer amp and PSC buffer amp | — |
| 13 | VCOout | 1.4 | Output pin for local oscillator signal from PSC buffer amp |   |
| 14 | GND (Buff) | 0 | GND pin for OSC buffer amp and PSC buffer amp | — |

| PIN No. | PIN SYMBOL | PIN VOLTAGE | DESCRIPTION | EQUIVALENT CIRCUIT |
|---|---|---|---|---|
| 15 | OSC Buff in | 1.4 | Input pin for local oscillator signal from OSC buffer amp |  |
| 16 | OSC-c | 5.0 | OSC collector pin, power pin, or local oscillator signal output pin |  |
| 17 | OSC-e | 1.6 | OSC emitter pin | |
| 18 | OSC-b | 2.4 | OSC base pin | |
| 19 | GND (OSC) | 0 | OSC GND pin | — |
| 20 | RF GND | 1.4 | RF GND pin | See the equivalent circuit for pin 5. |

**MAXIMAM RATINGS** (Ta = 25°C)

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

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

**RECOMMENDED OPERATING RANGE**

| CHARACTERISTIC | SYMBOL | VALUE | UNIT |
|---|---|---|---|
| Supply Voltage | $V_{CC}$ (Amp, OSC) | 4.5~5.5 | V |

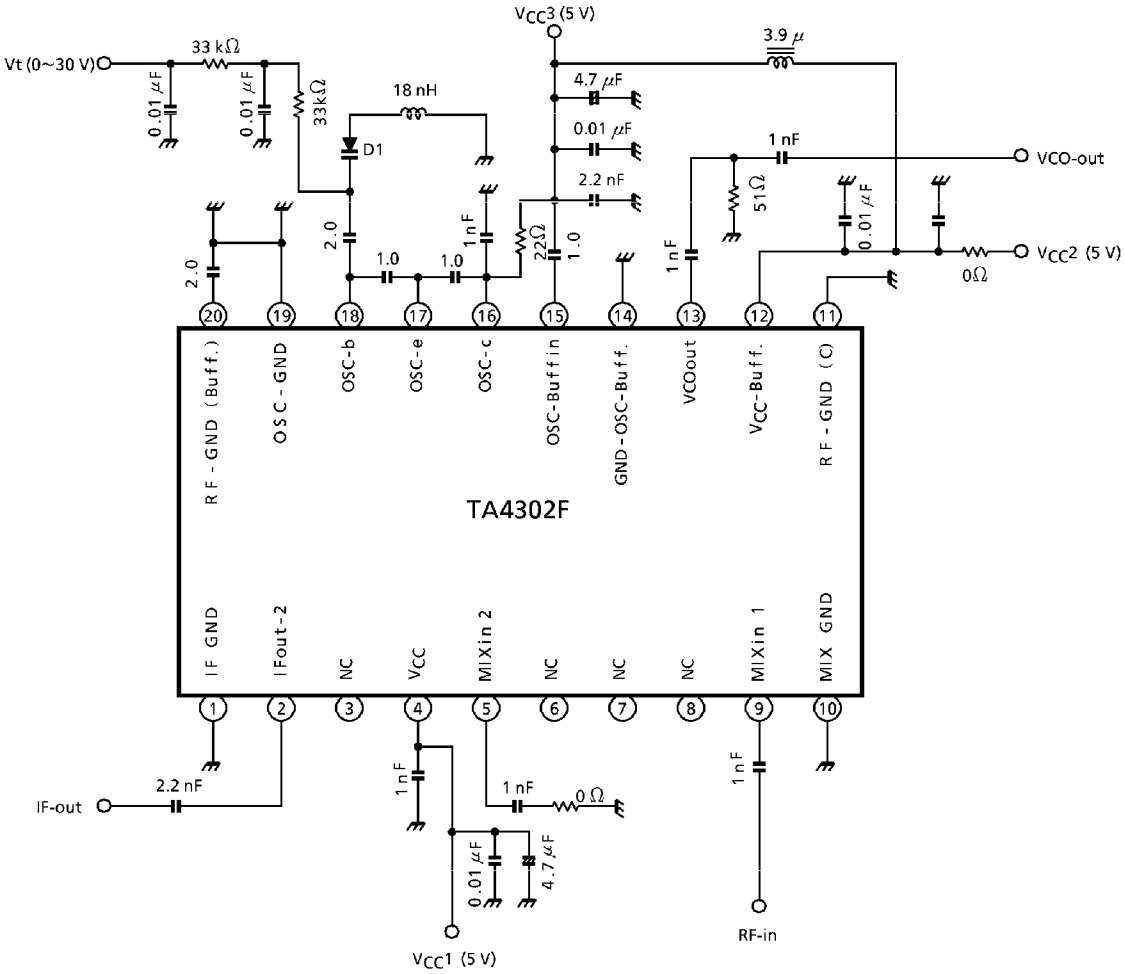
**ELECTRIC CHARACTERISTICS** (Reference) (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CIR-CUIT | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Supply Current | $I_{CC}$ (Amp) | 1 | $V_{CC}$ = 5.0 V, No RF input | 34 | 42 | 50 | mA |
| Supply Current | $I_{CC}$ (OSC) | 1 | $V_{CC}$ = 5.0 V, No RF input | 27 | 32 | 40 | mA |
| Conversion Gain | Gc | 1 | fin = 955 MHz, fIF = 45 MHz | — | 18 | 23 | dB |
| Noise Figure | NF | 1 | fin = 955 MHz (SSB), fIF = 45 MHz | — | 17.0 | — | dB |
| Saturation Output | Po (sat) | 1 | fin = 955 MHz, fIF = 45 MHz | — | (*) +9 | — | dBmW |
| Third-order Intercept | IP3 | 1 | fin = 949, 955 MHz fIF = 39, 45 MHz | — | +15 | — | dBmW |
| Phase Noise | P / N | 1 | fosc = 910 MHz, 10 kHz offset | — | −85 | −80 | dBc / Hz |
| Oscillator Output Power | VCOout | 1 | fosc = 910 MHz | — | −5 | — | dBmW |

(*) IP3 : Pin = −25 dBmW

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

**TEST CIRCUIT 1**

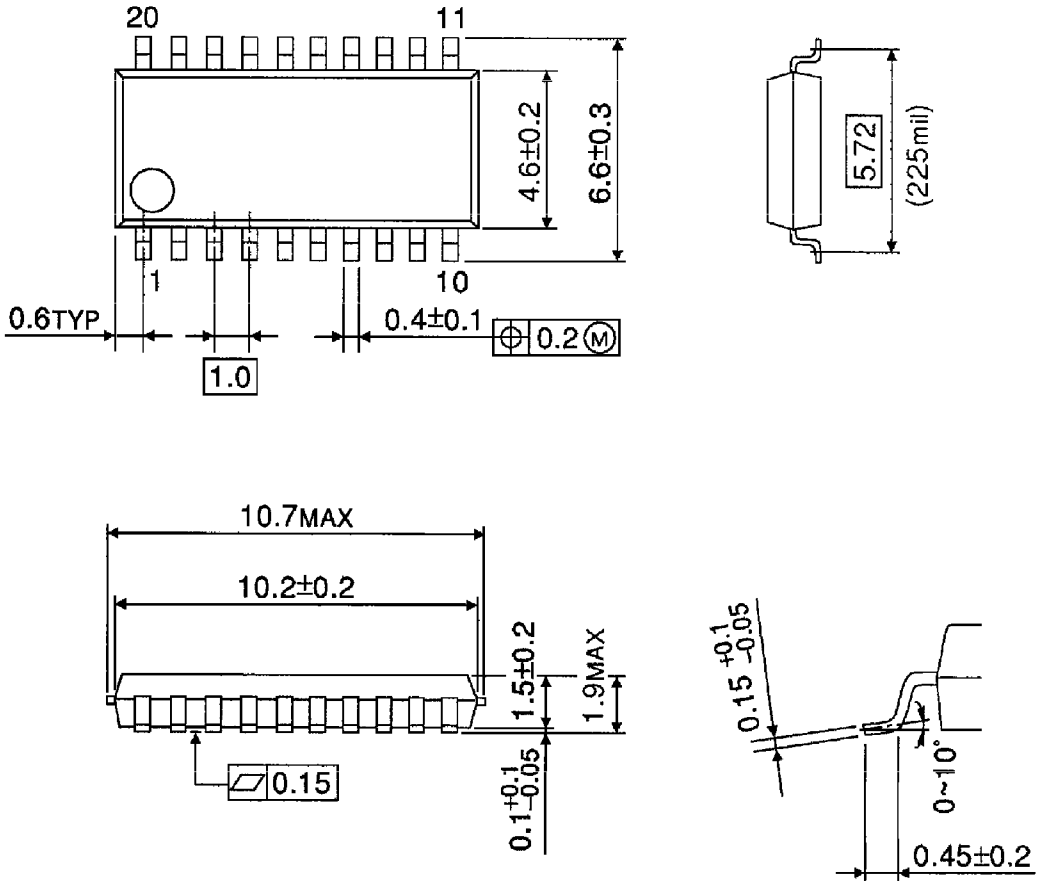



Diode 1SV245

**OUTLINE DRAWING**

SSOP20-P-225-1.00

Unit : mm




Weight : 0.17 g (Typ.)