

### General Description

HTT4101 series are SPXO (Simple Packaged X'tal Oscillator) IC which is operated with Low voltage and provides very Low phase noise. HTT4101 has 3 styles of SPXO. 1<sup>st</sup>: HTT4101-A provides differential fundamental frequency outputs with clipped sine wave. 2<sup>nd</sup>: HTT4101-B provides differential outputs through CMOS buffers and fundamental frequency is provided. 3<sup>rd</sup>: HTT4101-C provides differential outputs through CMOS buffers and 1/2 fundamental frequency is provided. So, you could choose fundamental frequency output or 1/2 fundamental frequency output to adjust to your systems. Clipped sine wave has lower harmonics rather than square wave. It means very useful for designing of EMC. HTT4101 series provide very low characteristics of temperature and it almost depends on the characteristics of X'tal. HTT4101 series provide very low influence of power supply ( 200ppb ).

Next functions are included in HTT4101.

1. · Chip Enable control (Oscillator will be stopped)
2. · When Oscillator is stopped, HTT4101-B,-C provides Hi-impedance at output of CMOS buffers.

HTT4101 is very useful for various applications, especially for Hi-Reso (High Resolution) audio and high speed data transmission systems.

### Features

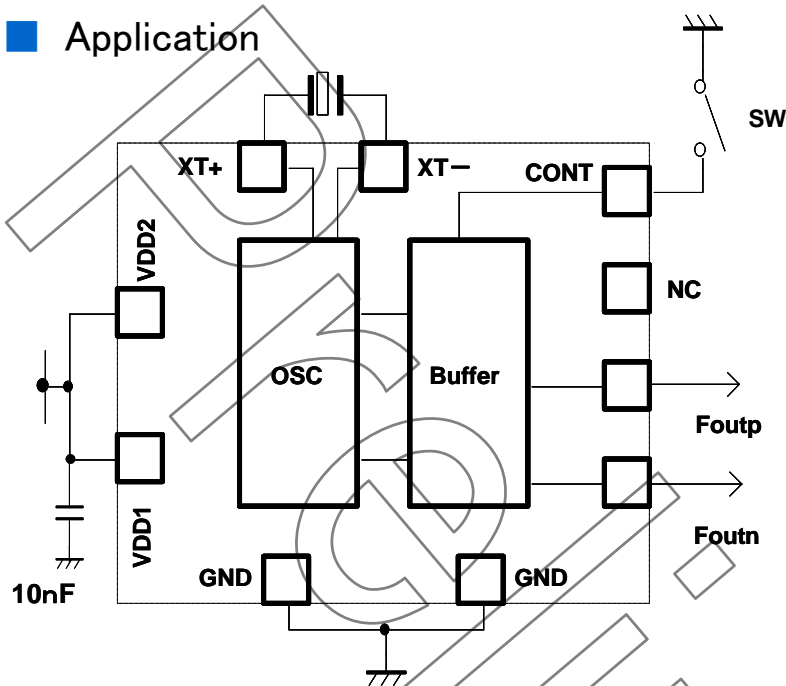
- Frequency Range 10MHz~80MHz ● df/dVdd 200ppb @ 3.3V±10%
- Operational Voltage range 1.8V ~ 3.3V
- CMOS output Level VH : VDD-0.4V, VL : 0.4V
- Phase Noise . . . . . See below
- IDD ( HTT4101-A ) 5.5mA(Typ.) @49.15MHz, VDD=3.3V 3.5mA (Typ.) @49.15MHz, VDD=1.8V
- Tri-State Output ( only for HTT4101-B/C )
- CE(Chip Enable) function ( @ CONT. Pin is " L " ) . . . . . Wating Current : 10uA(Typ.)  
CE: "H" or "Open": Oscillating, CE: "L" or "GND": Oscillating STOP
- Package Bare Chip

### Line-up Table

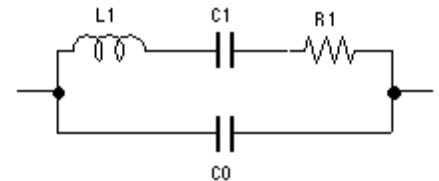
| Name      | Output Pin |       | Function                    |
|-----------|------------|-------|-----------------------------|
|           | Foutp      | Foutn |                             |
| HTT4101-A | Fo         | Fo    | C_sine,Differential         |
| HTT4101-B | Fo         | Fo    | CMOS,Differential, 3-State  |
| HTT4101-C | Fo/2       | Fo/2  | CMOS, Differential, 3-State |

- ※ Fo : Fundamental Frequency
- ※ C\_sine : Clipped sine wave output
- ※ 3-State : Three State Buffer

### Application



- parameters of X'tal  
TZ1865A (TAI-SAW)  
AT-Cut



SW : Open → Oscillation  
 SW : Short to GND → Oscillation stopped  
 C : 10nF → Setting C nearby VDD-Pin as possible

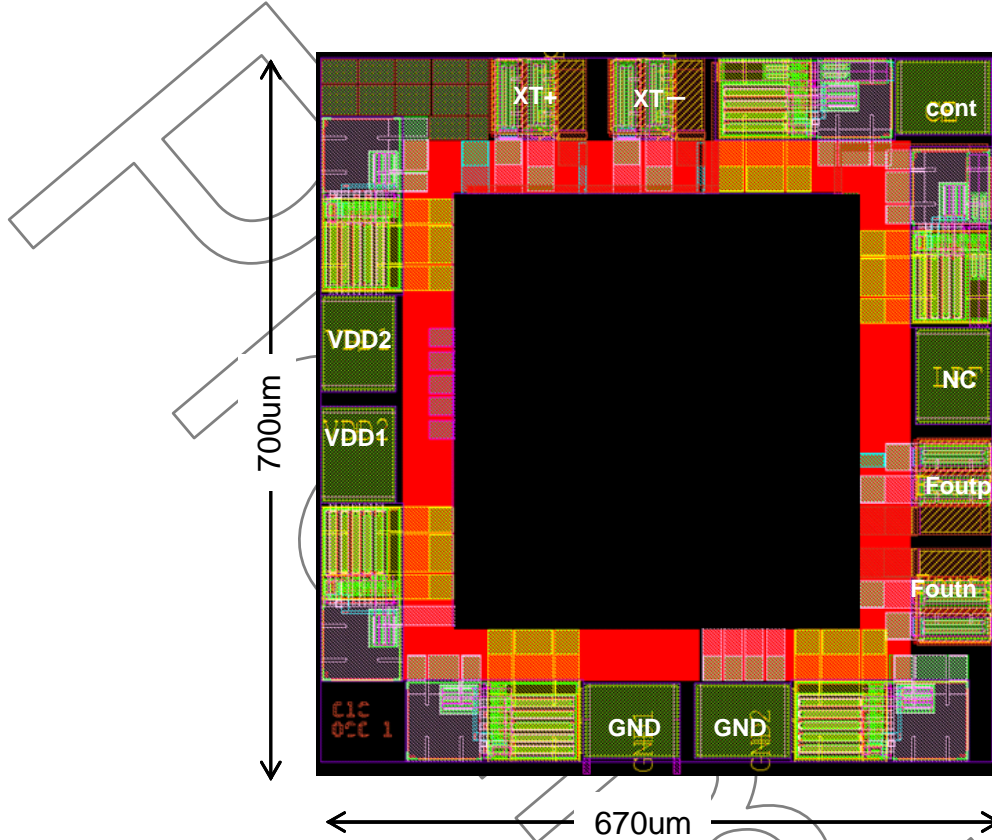
| F0[MHz] | R1[Ω] | L1[nH] | C1[pF] | C0[pF] |
|---------|-------|--------|--------|--------|
| 50.00   | 6.337 | 2.327  | 4.354  | 1.168  |

### Pin Function

| Pin Name | Function                        |                     |
|----------|---------------------------------|---------------------|
| CONT     | H or Open                       | Oscillation         |
|          | L                               | Oscillation Stopped |
| XT+      | X'tal terminals                 |                     |
| XT-      |                                 |                     |
| Foutp    | Output : C_Sine(A), CMOS (B,C), | @CONT=L → Hi-Z(B,C) |
| Foutn    | Output : C_Sine(A), CMOS (B,C), | @CONT=L → Hi-Z(B,C) |
| GND      | GND                             |                     |
| VDD      | VDD                             |                     |

※ A → HTT4101-A, ※ B → HTT4101-B, ※ C → HTT4101-C

### ■ Pad Location (Face Down / Flip Chip bonding)



### ■ Electrical characteristics

※ VDD=3.3V, 1.8V Ta = 25°C

|                          | mark  | condition                            | MIN                                    | TYP    | MAX  | Dim    |
|--------------------------|-------|--------------------------------------|--|--------|------|--------|
| Freq.                    | Fosc  | X'tal                                |  | 24.007 |      |        |
| $\Delta F/\Delta V_{dd}$ | df/dV | Vdd ± 10%                            |  | 200    |      | ppb    |
| $\Delta F/\Delta T$      | df/dT | Ta : -25°C ~ 125°C                   | depend on the characteristics of X'tal |        |      | -      |
| Duty ratio               | SYM   | No Load (HTT4101C)                   | 47.5                                   | 50.0   | 52.5 | %      |
| Phase Noise              | SSB   | See below                            |  |        |      | dBc/Hz |
| Rise-time                | Tr    | Vdd=3.3V, Load:CL=10pF<br>HTT4101B/C | -                                      | 2      | -    | nsec   |
| Fall-time                | Tf    | Vdd=3.3V, Load:CL=10pF<br>HTT4101B/C | -                                      | 2      | -    | nsec   |
| Oscillating time         | tosc  | No Load                              | -                                      | -      | 8    | msec   |

### ■ Phase – Noise characteristics

- Phase noise is affected by Quarts Xtal.

Measured using TZ1682A ( TAI-SAW ). It is AT-Cut X' tal.

Yellow line below is the actual data in case of TAI-SAW X' tal ( Fo=50MHz).  
White dot line is the simulation data in case of the ideal X' tal we considered.

● VDD=1.8V

