# QUARTZ CRYSTAL OSCILLATOR



## ■ GENERAL DESCRIPTION

The NJU6318 series is a C-MOS quartz crystal oscillator which consists of an oscillation amplifier, 3-stage divider and 3-state output buffer.

The oscillation frequency is as wide as up to 50MHz and the symmetry of 45-55% is realized over full oscillation frequency range.

The oscillation amplifier incorporates feed-back resistance and oscillation capacitors(Cg, Cd), therefore, it requires no external component except quartz crystal.

The 3-stage divider generates $f_O$, $f_O/2$, $f_O/4$ and $f_O/8$ and only one frequency selected by internal circuits is output.

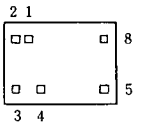
The 3-state output buffer is TTL compatible and capable of 10 TTL driving. And the input level of $\overline{CONT}$ terminal is also TTL compatible.

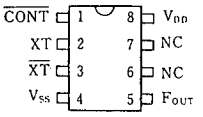
## ■ PACKAGE OUTLINE

NJU6318XC

NJU6318XE

## ■ PIN CONFIGURATION/PAD LOCATION




## ■ FEATURES

- Operating Voltage -- 3.0~6.0V
- Maximum Oscillation Frequency -- 50MHz
- Low Operating Current
- High Fan-out -- TTL 10
- 3-state Output Buffer
- Selected Frequency Output (mask option)
  Only one frequency out of $f_O$, $f_O/2$, $f_O/4$ and $f_O/8$ output
- Oscillation Capacitors Cg and Cd on-chip
- Oscillation and/or Output Stand-by Function
- Package Outline -- CHIP/EMP 8
- C-MOS Technology

## ■ LINE-UP TABLE

| Type No. | Output Frequency | Cg | Cd |
|---|---|---|---|
| NJU6318A | $f_O$ | 23pF | 23pF |
| NJU6318B | $f_O/2$ | 23pF | 23pF |
| NJU6318C | $f_O/4$ | 23pF | 23pF |
| NJU6318D | $f_O/8$ | 23pF | 23pF |
| NJU6318W | $f_O$ | 12.5pF | 12.5pF |
| NJU6318P | $f_O$ | NO | NO |

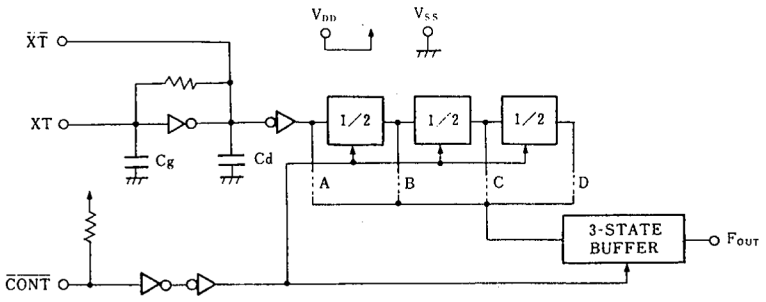
## ■ COORDINATES

Unit: $\mu$m

| No. | PAD | X | Y |
|---|---|---|---|
| 1 | $\overline{CONT}$ | 350 | 655 |
| 2 | XT | 130 | 630 |
| 3 | $\overline{XT}$ | 140 | 175 |
| 4 | $V_{SS}$ | 300 | 130 |
| 5 | $F_{OUT}$ | 1185 | 145 |
| 6 | NC | - | - |
| 7 | NC | - | - |
| 8 | $V_{DD}$ | 1185 | 650 |

Chip Size : 1.33 X 0.8mm
Chip Thickness : 400$\mu$m±30$\mu$m
(Note) No. 6 and 7 terminals are only for package type information. There are no PAD on the chip.

## ■ BLOCK DIAGRAM




## ■ TERMINAL DESCRIPTION

| NO. | SYMBOL | FUNCTION |
|---|---|---|
| 1 | $\overline{CONT}$ | 3-State Output Control and Divider Reset<br>$\overline{CONT}$ = H: Output either one frequency from $f_O$, $f_O/2$, $f_O/4$ and $f_O/8$<br>$\overline{CONT}$ = L: Output High Impedance and Divider Reset |
| 2<br>3 | XT<br>$\overline{XT}$ | Quartz Crystal Connecting terminals |
| 5 | $F_{OUT}$ | Output either one frequency from $f_O$, $f_O/2$, $f_O/4$ and $f_O/8$ |
| 8 | $V_{DD}$ | + 5V |
| 4 | $V_{SS}$ | GND |

## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25℃)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---|---|---|---|
| Supply Voltage | $V_{DD}$ | -0.5 ~ +7.0 | V |
| Input Voltage | $V_{IN}$ | -0.5 ~ $V_{DD}$+0.5 | V |
| Output Voltage | $V_O$ | -0.5 ~ $V_{DD}$+0.5 | V |
| Input Current | $I_{IN}$ | ±10 | mA |
| Output Current | $I_O$ | ±25 | mA |
| Power Dissipation (EMP) | $P_D$ | 200 | mW |
| Operating Temperature Range | Topr | -40 ~ + 85 | ℃ |
| Storage Temperature Range | Tstg | -65 ~ +150 | ℃ |

Note) Decoupling capacitor should be connected between $V_{DD}$ and $V_{SS}$ due to the stabilized operation for the circuit.

## ■ ELECTRICAL CHARACTERISTICS

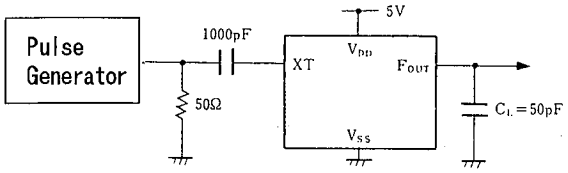
( Ta=25℃, $V_{DD}$=5V )

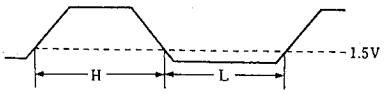
| PARAMETER | SYMBOL | CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| Operating Voltage | $V_{DD}$ | | | 3 | | 6 | V |
| Operating Current | $I_{DD}$ | fosc=16MHz, No load | | | | 15 | mA |
| Stand-by Current | Ist | $\overline{CONT}$,XT=$V_{SS}$, No load (Note1) | | | | 1 | μA |
| Input Voltage | $V_{IH}$ | | | 2.0 | | | V |
| | $V_{IL}$ | | | | | 0.8 | |
| Output Current | $I_{OH}$ | $V_{DD}$=5V, $V_{OH}$=4.5V | | 4 | | | mA |
| | $I_{OL}$ | $V_{DD}$=5V, $V_{OL}$=0.5V | | 16 | | | |
| Input Current | $I_{IN}$ | $\overline{CONT}$ Terminal, $\overline{CONT}$=$V_{SS}$ | | | | 400 | μA |
| Internal Capacitor | Cg | | | | Note 2 | | pF |
| | Cd | | | | Note 2 | | |
| Max. Oscillation Freq. | $f_{MAX}$ | $V_{DD}$=5V | | 50 | | | MHz |
| Output Signal Symmetry | SYM | $C_L$=50pF at 1.5V | | 45 | 50 | 55 | % |
| Output Signal Rise Time | $t_{r1}$ | $V_{DD}$=5V, | 20% - 80% | | | 8 | ns |
| | $t_{r2}$ | $C_L$=15pF | $R_L$=390Ω,0.4V-2.4V | | | 6 | |
| Output Signal Fall Time | $t_{f1}$ | $V_{DD}$=5V, | 80% - 20% | | | 6 | ns |
| | $t_{f2}$ | $C_L$=15pF | $R_L$=390Ω,2.4V-0.4V | | | 4 | |

Note 1) Excluding input current on $\overline{CONT}$ terminal.
Note 2) Refer to Line-Up Table.

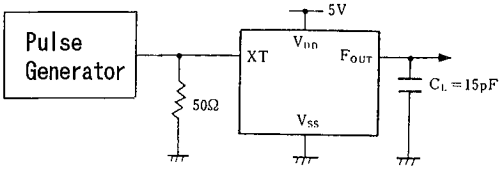
## ■ MEASUREMENT CIRCUITS

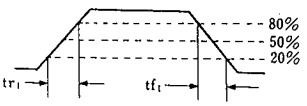
(1) Output Signal Symmetry ($C_L$=50pF)



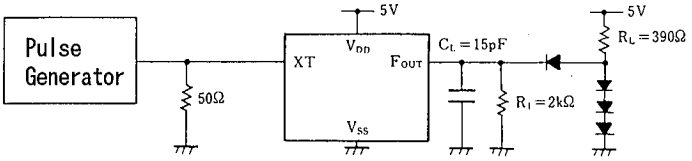



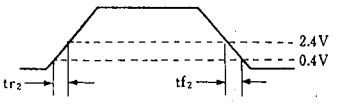

(2) Output Signal Rise/Fall Time ($C_L$=15pF)




(3) Output Signal Rise/Fall Time ($C_L$=15pF, $R_L$=390Ω)



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