

## QUARTZ CRYSTAL OSCILLATOR

### ■ GENERAL DESCRIPTION

The NJU6324 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( $C_g$ ,  $C_d$ ), 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 C-MOS compatible and capable of 10 LSTTL driving.

### ■ PACKAGE OUTLINE

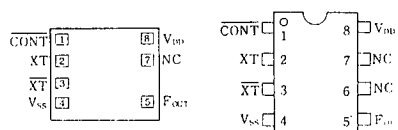


NJU6324XC



NJU6324XE

### ■ PIN CONFIGURATION/PAD LOCATION



### ■ FEATURES

- Operating Voltage                    -- 3.0~6.0V
- Maximum Oscillation Frequency -- 50MHz
- Low Operating Current
- High Fan-out                         -- LSTTL 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  $C_g$  and  $C_d$  on-chip
- Oscillation and/or Output Stand-by Function
- Package Outline                    -- CHIP/EMP 8
- C-MOS Technology

### ■ COORDINATES

Unit:  $\mu\text{m}$

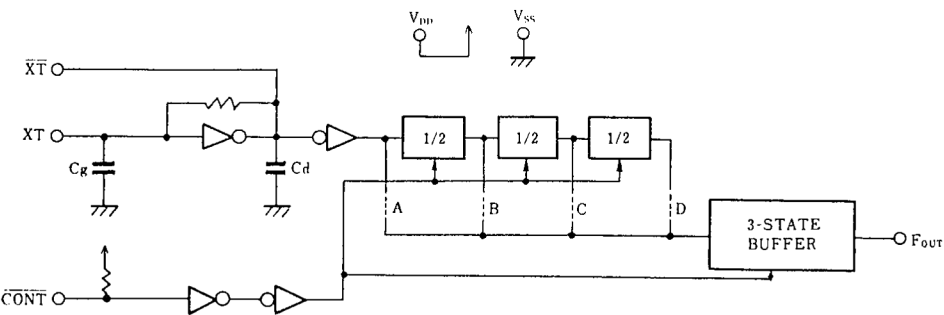
| No. | PAD              | X    | Y   |
|-----|------------------|------|-----|
| 1   | CONT             | 170  | 649 |
| 2   | XT               | 170  | 483 |
| 3   | XT               | 170  | 316 |
| 4   | V <sub>SS</sub>  | 170  | 143 |
| 5   | F <sub>OUT</sub> | 1094 | 143 |
| 6   | NC               | -    | -   |
| 7   | NC               | 1094 | 462 |
| 8   | V <sub>DD</sub>  | 1094 | 649 |

Chip Size : 1.24 X 0.8mm  
 Chip Thickness :  $400\mu\text{m} \pm 30\mu\text{m}$   
 (Note) No. 6 and 7 terminals are only for package type information. There is No.7 PAD on the chip but no No.6.

### ■ LINE-UP TABLE

| Type No. | Output Frequency | $C_g$ | $C_d$ |
|----------|------------------|-------|-------|
| NJU6324L | $f_o$            | 23pF  | 23pF  |
| NJU6324M | $f_o/2$          | 23pF  | 23pF  |
| NJU6324N | $f_o/4$          | 23pF  | 23pF  |
| NJU6324U | $f_o/8$          | 23pF  | 23pF  |

■ BLOCK DIAGRAM



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■ TERMINAL DESCRIPTION

| NO. | SYMBOL           | F U N C T I O N                                                                                                |
|-----|------------------|----------------------------------------------------------------------------------------------------------------|
| 1   | CONT             | 3-State Output Control and Divider Reset                                                                       |
|     |                  | Output ( F <sub>OUT</sub> )                                                                                    |
|     |                  | H Output either one frequency from f <sub>0</sub> , f <sub>0</sub> /2, f <sub>0</sub> /4 and f <sub>0</sub> /8 |
|     |                  | L Output High Impedance and Divider Reset                                                                      |
| 2   | XT               | Quartz Crystal Connecting Terminals                                                                            |
| 3   | XT               |                                                                                                                |
| 5   | F <sub>OUT</sub> | Output either one frequency from f <sub>0</sub> , f <sub>0</sub> /2, f <sub>0</sub> /4 and f <sub>0</sub> /8   |
| 8   | V <sub>DD</sub>  | + 5V                                                                                                           |
| 4   | V <sub>SS</sub>  | GND                                                                                                            |

■ ABSOLUTE MAXIMUM RATINGS

( Ta=25°C )

| P A R A M E T E R           | S Y M B O L     | R A T I N G S               | U N I T |
|-----------------------------|-----------------|-----------------------------|---------|
| Supply Voltage              | V <sub>DD</sub> | -0.5 ~ 7.0                  | V       |
| Input Voltage               | V <sub>IN</sub> | -0.5 ~ V <sub>DD</sub> +0.5 | V       |
| Output Voltage              | V <sub>O</sub>  | -0.5 ~ V <sub>DD</sub> +0.5 | V       |
| Input Current               | I <sub>IN</sub> | ±10                         | mA      |
| Output Current              | I <sub>O</sub>  | ±25                         | mA      |
| Power Dissipation (EMP)     | P <sub>D</sub>  | 200                         | mW      |
| Operating Temperature Range | Topr            | -40 ~ + 85                  | °C      |
| Storage Temperature Range   | Tstg            | -65 ~ +150                  | °C      |

(Note) Decoupling capacitor should be connected between V<sub>DD</sub> and V<sub>SS</sub> due to the stabilized operation for the circuit.

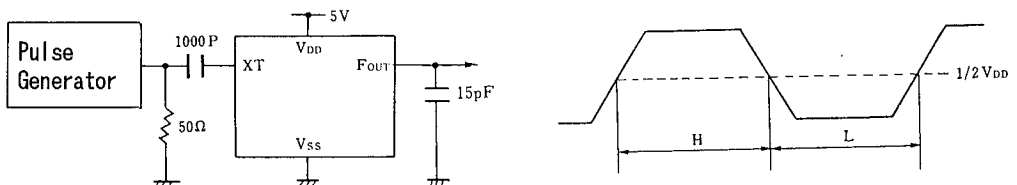
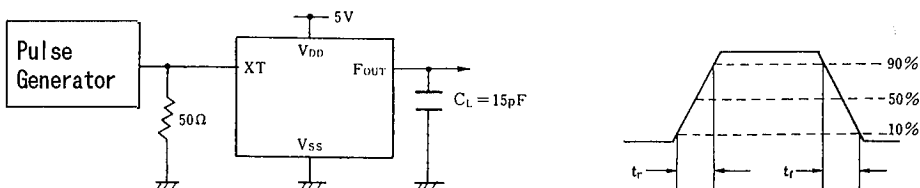
**■ ELECTRICAL CHARACTERISTICS**

 (  $T_a=25^{\circ}\text{C}$ ,  $V_{DD}=5\text{V}$  )

| PARAMETER               | SYMBOL     | CONDITIONS                                                         | MIN | TYP | MAX | UNIT          |
|-------------------------|------------|--------------------------------------------------------------------|-----|-----|-----|---------------|
| Operating Voltage       | $V_{DD}$   |                                                                    | 3   |     | 6   | V             |
| Operating Current       | $I_{DD}$   | $f_{osc}=16\text{MHz}$ , No load                                   |     |     | 10  | mA            |
| Stand-by Current        | $I_{st}$   | $\overline{\text{CONT}}, \text{XT}=V_{SS}$ , No load (Note)        |     |     | 1   | $\mu\text{A}$ |
| Input Voltage           | $V_{IH}$   |                                                                    | 3.5 |     | 5.0 | V             |
|                         | $V_{IL}$   |                                                                    | 0   |     | 1.5 |               |
| Output Current          | $I_{OH}$   | $V_{DD}=5\text{V}$ , $V_{OH}=4.5\text{V}$                          | 4   |     |     | mA            |
|                         | $I_{OL}$   | $V_{DD}=5\text{V}$ , $V_{OL}=0.5\text{V}$                          | 4   |     |     |               |
| Input Current           | $I_{IN}$   | $\overline{\text{CONT}}$ Terminal, $\overline{\text{CONT}}=V_{SS}$ |     |     | 400 | $\mu\text{A}$ |
| Internal Capacitor      | $C_g, C_d$ |                                                                    |     | 23  |     | pF            |
| Max. Oscillation Freq.  | $f_{MAX}$  | $V_{DD}=5\text{V}$ , $C_L=15\text{pF}$                             | 50  |     |     | MHz           |
| Output Signal Symmetry  | SYM        | $V_{DD}=5\text{V}$ , $C_L=15\text{pF}$ at $1/2V_{DD}$              | 45  | 50  | 55  | %             |
| Output Signal Rise Time | $t_r$      | $V_{DD}=5\text{V}$ , $C_L=15\text{pF}$ , 10% - 90%                 |     |     | 8   | ns            |
| Output Signal Fall Time | $t_f$      | $V_{DD}=5\text{V}$ , $C_L=15\text{pF}$ , 90% - 10%                 |     |     | 8   | ns            |

 Note ) Excluding input current on  $\overline{\text{CONT}}$  terminal.

**■ MEASUREMENT CIRCUITS**

 (1) Output Signal Symmetry ( $C_L=15\text{pF}$ )

 (2) Output Signal Rise / Fall Time ( $C_L=15\text{pF}$ )


# NJU6324 Series

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MEMO

**[CAUTION]**

The specifications on this databook are only given for information , without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.