

## QUARTZ CRYSTAL OSCILLATOR

### ■ GENERAL DESCRIPTION

The NJU6332 series is a C-MOS quartz crystal oscillator which consists of an oscillation amplifier, 3-stage divider and 3-state output buffer.

This series are classed into three groups A to D, H to L and Q to T according to their oscillation frequency range mentioned in the line-up table.

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 C-MOS compatible and capable of 10 LSTTL driving.

### ■ FEATURES

- Operating Voltage. — 4.0~6.0V
- Maximum Oscillation Frequency (See Line-Up Table)
- 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 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.                            | Recommended Osc. Freq. | Output Freq.                           | Cg, Cd |
|-------------------------------------|------------------------|--|--------|
| NJU6332A<br>6332B<br>6332C<br>6332D | From 20<br>to 35MHz    | $f_o$<br>$f_o/2$<br>$f_o/4$<br>$f_o/8$ | 28pF   |
| NJU6332H<br>6332J<br>6332K<br>6332L | From 30<br>to 50MHz    | $f_o$<br>$f_o/2$<br>$f_o/4$<br>$f_o/8$ | 20pF   |
| NJU6332Q<br>6332R<br>6332S<br>6332T | From 45<br>to 75MHz    | $f_o$<br>$f_o/2$<br>$f_o/4$<br>$f_o/8$ | 17pF   |

### ■ PACKAGE OUTLINE

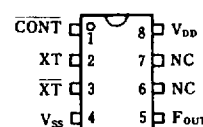
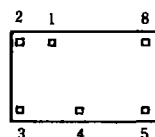


NJU6332XC



NJU6332XE

### ■ PIN CONFIGURATION/PAD LOCATION



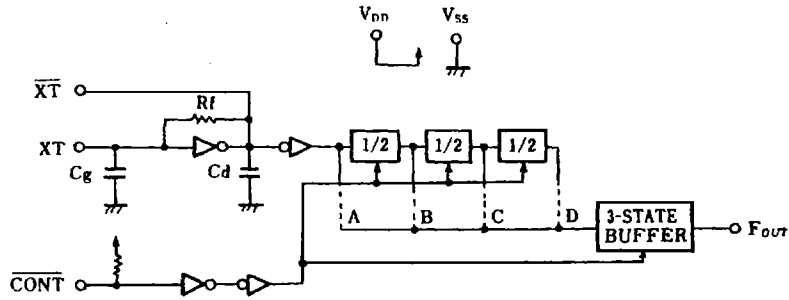
### ■ COORDINATES

 Unit:  $\mu\text{m}$ 

| No. | PAD              | X    | Y   |
|-----|------------------|------|-----|
| 1   | CONT             | 515  | 648 |
| 2   | XT               | 231  | 648 |
| 3   | XT               | 231  | 168 |
| 4   | V <sub>SS</sub>  | 734  | 152 |
| 5   | F <sub>OUT</sub> | 1091 | 172 |
| 6   | NC               | -    | -   |
| 7   | NC               | -    | -   |
| 8   | V <sub>DD</sub>  | 1091 | 628 |

Chip Size : 1.29 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 are no PAD on the chip.

■ BLOCK DIAGRAM



■ TERMINAL DESCRIPTION

| NO. | SYMBOL                                    | F U N C T I O N  |
|-----|---|--|
| 1   | $\overline{\text{CONT}}$                  | 3-State Output Control and Divider Reset                                 |
|     |   | $\overline{\text{CONT}}$ Output ( $F_{\text{OUT}}$ )                     |
|     |   | H Output either one frequency from $f_0$ , $f_0/2$ , $f_0/4$ and $f_0/8$ |
|     | L Output High Impedance and Divider Reset |  |
| 2   | XT  | Quartz Crystal Connecting Terminals                                      |
| 3   | $\overline{\text{XT}}$                    |  |
| 5   | $F_{\text{OUT}}$                          | Output either one frequency from $f_0$ , $f_0/2$ , $f_0/4$ and $f_0/8$   |
| 8   | $V_{\text{DD}}$                           | + 5V   |
| 4   | $V_{\text{SS}}$                           | GND  |

**■ ABSOLUTE MAXIMUM RATINGS**

( Ta=25°C )

| PARAMETER                   | SYMBOL           | RATINGS                     | UNIT |
|-----------------------------|------------------|-----------------------------|------|
| Supply Voltage              | V <sub>DD</sub>  | -0.3 ~ +7.0                 | V    |
| Input Voltage               | V <sub>IN</sub>  | -0.3 ~ V <sub>DD</sub> +0.3 | 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 | T <sub>opr</sub> | -30 ~ + 75                  | °C   |
| Storage Temperature Range   | T <sub>stg</sub> | -40 ~ +125                  | °C   |

**■ ELECTRICAL CHARACTERISTICS**

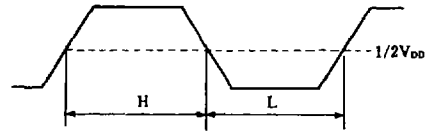
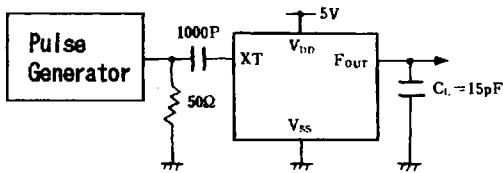
 ( Ta=25°C, V<sub>DD</sub>=5V )

| PARAMETER                | SYMBOL                         | CONDITIONS   | MIN | TYP | MAX  | UNIT |
|--------------------------|--------------------------------|--|-----|-----|------|------|
| Operating Voltage        | V <sub>DD</sub>                |  | 4   |     | 6    | V    |
| Operating Current        | I <sub>DD1</sub>               | A,B,C,D fosc=24MHz, No Load  |     |     | 15   | mA   |
|                          | I <sub>DD2</sub>               | H,J,K,L fosc=48MHz, No Load  |     |     | 25   |      |
|                          | I <sub>DD3</sub>               | Q,R,S,T fosc=48MHz, No Load  |     |     | 25   |      |
| Stand-by Current         | I <sub>st</sub>                | CONT,XT=V <sub>SS</sub> , No Load (Note)                                     |     |     | 1    | μA   |
| Input Voltage            | V <sub>IH</sub>                |  | 3.5 |     |      | V    |
|                          | V <sub>IL</sub>                |  |     |     | 1.5  |      |
| Output Current           | I <sub>OH</sub>                | V <sub>DD</sub> =5V, V <sub>OH</sub> =4.5V                                   | 4   |     |      | mA   |
|                          | I <sub>OL</sub>                | V <sub>DD</sub> =5V, V <sub>OL</sub> =0.5V                                   | 4   |     |      |      |
| Input Current            | I <sub>IN</sub>                | CONT Terminal, CONT=V <sub>SS</sub>  | 125 | 250 | 500  | μA   |
| 3-St Off-leakage Current | I <sub>OZ</sub>                | CONT=V <sub>SS</sub> , F <sub>OUT</sub> =V <sub>SS</sub> and V <sub>DD</sub> |     |     | ±0.1 | μA   |
| Internal Capacitor       | C <sub>g</sub> ,C <sub>d</sub> | A,B,C,D Version  |     | 28  |      | pF   |
|                          |                                | H,J,K,L Version  |     | 20  |      |      |
|                          |                                | Q,R,S,T Version  |     | 17  |      |      |
| Max. Oscillation Freq.   | f <sub>MAX</sub>               | A,B,C,D Version  | 35  |     |      | MHz  |
|                          |                                | H,J,K,L Version  | 50  |     |      |      |
|                          |                                | Q,R,S,T Version  | 75  |     |      |      |
| Output Signal Symmetry   | SYM                            | C <sub>L</sub> =15pF at 1/2V <sub>DD</sub>                                   | 45  | 50  | 55   | %    |
| Output Signal Rise Time  | t <sub>r</sub>                 | C <sub>L</sub> =15pF, 10% - 90%  |     |     | 6    | ns   |
| Output Signal Fall Time  | t <sub>f</sub>                 | C <sub>L</sub> =15pF, 90% - 10%  |     |     | 6    | ns   |

Note ) Excluding input current on CONT terminal.

■ MEASUREMENT CIRCUITS

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



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

