

## QUARTZ CRYSTAL OSCILLATOR

### GENERAL DESCRIPTION

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

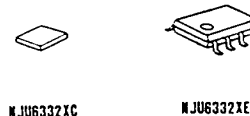
This series are classed into three groups A to D, H to L and Q to T according to their oscillation frequency range mentioned in the line-up table.

The feed-back resistor and oscillation load capacitors ( $C_g$ ,  $C_d$ ) incorporated on oscillation amplifier enables oscillation by connecting quartz crystal only.

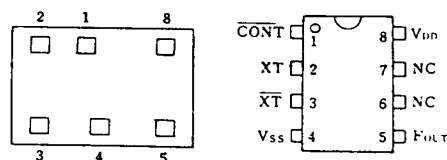
Only one frequency is selected from  $f_0$ ,  $f_0/2$ ,  $f_0/4$  and  $f_0/8$  by internal connection.

The 3-state output buffer is C-MOS compatible and capable of 10 LSTTL driving.

### PACKAGE OUTLINE



### PIN CONFIGURATION/PAD LOCATION



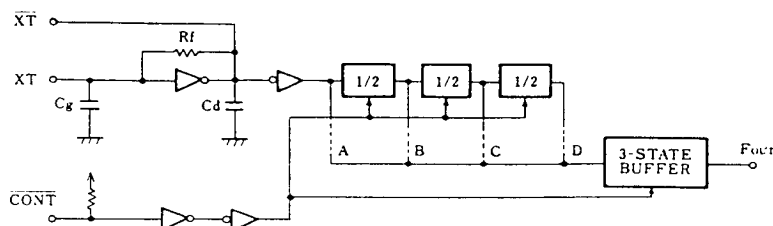
### FEATURES

- Operating Voltage. -- 4.0~6.0V
- Maximum Oscillation Frequency. -- See Line-up Table.
- Low Operating Current.
- High Fanout -- LSTTL 10
- 3-state Output Buffer
- Output Frequency Selectable by mask option.  
One frequency out of  $f_0$ ,  $f_0/2$ ,  $f_0/4$  and  $f_0/8$  outputs.
- Oscillation Capacitors  $C_g$  and  $C_d$  On-chip
- Output Stand-by Function
- Package Outline -- CHIP/EMP 8
- C-MOS Technology

### LINE-UP TABLE

| TYPE NO.                            | Recommended Osc. Freq. | Output Freq.                           | $C_g, C_d$ |
|-------------------------------------|------------------------|----------------------------------------|------------|
| NJU6332A<br>6332B<br>6332C<br>6332D | From 20<br>to 35MHz    | $f_0$<br>$f_0/2$<br>$f_0/4$<br>$f_0/8$ | 28pF       |
| NJU6332H<br>6332J<br>6332K<br>6332L | From 30<br>to 50MHz    | $f_0$<br>$f_0/2$<br>$f_0/4$<br>$f_0/8$ | 20pF       |
| NJU6332Q<br>6332R<br>6332S<br>6332T | From 45<br>to 75MHz    | $f_0$<br>$f_0/2$<br>$f_0/4$<br>$f_0/8$ | 17pF       |

### BLOCK DIAGRAM



### COORDINATES

Unit :  $\mu m$

| No. | PAD  | X    | Y   |
|-----|------|------|-----|
| 1   | CONT | 515  | 648 |
| 2   | XT   | 231  | 648 |
| 3   | XT   | 231  | 168 |
| 4   | Vss  | 734  | 152 |
| 5   | FOUT | 1091 | 172 |
| 6   | NC   | —    | —   |
| 7   | NC   | —    | —   |
| 8   | VDD  | 1091 | 628 |

CHIP SIZE : 1.29 x 0.8mm  
CHIP THICKNESS : 400 $\mu m$   $\pm$  30 $\mu m$

# 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 ~ +10                   | mA   |
| Output Current              | I <sub>O</sub>  | -25 ~ +25                   | mA   |
| Power Dissipation (EMP)     | P <sub>D</sub>  | 200                         | mW   |
| Operating Temperature Range | Topr            | -30 ~ + 75                  | °C   |
| Storage Temperature Range   | Tstg            | -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   | 5   | 6    | V    |
| Operating Current       | I <sub>DD1</sub> | A,B,C,D f <sub>osc</sub> =24MHz, No Load                       |     |     | 15   | mA   |
|                         | I <sub>DD2</sub> | H,J,K,L f <sub>osc</sub> =48MHz, No Load                       |     |     | 25   |      |
|                         | I <sub>DD3</sub> | Q,R,S,T f <sub>osc</sub> =48MHz, No Load                       |     |     | 25   |      |
| Stand-by Current        | I <sub>st</sub>  | CONT=V <sub>SS</sub> , No Load (Note)                          |     |     | 1    | uA   |
| Input Voltage           | V <sub>IH</sub>  |                                                                | 3.5 |     | 5.0  | V    |
|                         | V <sub>IL</sub>  |                                                                | 0   |     | 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=V <sub>SS</sub>                                           | 125 | 250 | 500  | uA   |
| Off-leakage Current     | I <sub>OZ</sub>  | CONT=V <sub>SS</sub> , OUT=V <sub>SS</sub> and V <sub>DD</sub> |     |     | ±0.1 | uA   |
| Output Signal Symmetry  | SYM              | C <sub>L</sub> =15pF, at 1/2V <sub>DD</sub>                    | 45  | 50  | 55   | %    |
| Output Signal Rise Time | Tr1              | C <sub>L</sub> =15pF, 10% - 90%                                |     | 4   | 6    | ns   |
| Output Signal Fall Time | Tf1              | C <sub>L</sub> =15pF, 90% - 10%                                |     | 4   | 6    | ns   |
| Internal Capacitor      | Cg,Cd            | A,B,C,D                                                        |     | 28  |      | pF   |
|                         |                  | H,J,K,L                                                        |     | 20  |      |      |
|                         |                  | Q,R,S,T                                                        |     | 17  |      |      |

Note ) Excluding input current on CONT terminal.