

## QUARTZ CRYSTAL OSCILLATOR

**GENERAL DESCRIPTION**

The NJU6330 series is a C-MOS quartz crystal oscillator which consists of an oscillation amplifier and a 3-state output buffer.

This series are classed into three versions A, B and C according to their oscillation frequency range mentioned in the line-up table.

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

Driverbility of the 3-state output buffer is 16mA (sink/source), thus it can drive both of TTL and C-MOS load.

**PACKAGE OUTLINE**


NJU6330XC

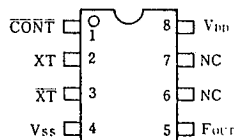
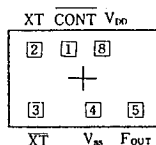


NJU6330XE

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**FEATURES**

- Operating Voltage. -- 4.0~6.0V
- Maximum Oscillation Frequency (See Line-Up Table)
- Low Operating Current
- High Fan-out --  $I_{OL}/I_{OH}=16mA$
- 3-state Output Buffer
- Oscillation Capacitors  $C_g$  and  $C_d$  on-chip
- Oscillation and/or Output Stand-by Function
- Package Outline -- CHIP / EMP 8
- C-MOS Technology

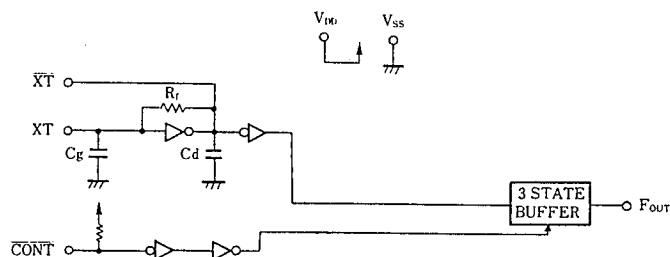
**PAD LOCATION/PIN CONFIGURATION**

**LINE-UP TABLE**

Type No.	Recommended Osc. Freq.	Output Freq.	$C_g, C_d$
NJU6330A	20~35MHz	$f_0$	28pF
6330B	30~50MHz		20pF
6330C	45~75MHz		17pF

**COORDINATES**

 Unit:  $\mu m$ 

No.	PAD	X	Y
1	CONT	-130	248
2	XT	-414	248
3	$\overline{XT}$	-414	-232
4	$V_{SS}$	89	-248
5	$F_{OUT}$	446	-228
8	$V_{DD}$	153	228

**BLOCK DIAGRAM**


Chip Size : 1.29 X 0.8mm  
 Chip Center :  $X=0 \mu m, Y=0 \mu m$   
 Chip Thickness :  $400 \mu m \pm 30 \mu m$   
 (Note) No.6 and 7 terminals are only for package type information. There are no PAD on the chip.

**■ TERMINAL DESCRIPTION**

NO.	SYMBOL	F U N C T I O N
1	$\overline{\text{CONT}}$	3-State Output Control
		$\overline{\text{CONT}}$ Output ( $F_{\text{OUT}}$ )
		H Output Frequency $f_o$
		L Output High Impedance
2	XT	Quartz Crystal Connecting Terminals
3	$\overline{\text{XT}}$	
4	$V_{\text{SS}}$	GND
5	$F_{\text{OUT}}$	Output frequency $f_o$
8	$V_{\text{DD}}$	+ 5V

**■ ABSOLUTE MAXIMUM RATINGS**

 (  $T_a=25^\circ\text{C}$  )

P A R A M E T E R	SYMBOL	R A T I N G S	UNIT
Supply Voltage	$V_{\text{DD}}$	-0.5 ~ +7.0	V
Input Voltage	$V_{\text{IN}}$	$V_{\text{SS}}-0.5 \sim V_{\text{DD}}+0.5$	V
Output Voltage	$V_o$	-0.5 ~ $V_{\text{DD}}+0.5$	V
Input Current	$I_{\text{IN}}$	$\pm 10$	mA
Output Current	$I_o$	$\pm 25$	mA
Power Dissipation	$P_D$	200 (EMP)	mW
Operating Temperature Range	$T_{\text{opr}}$	-40 ~ +85	$^\circ\text{C}$
Storage Temperature Range	$T_{\text{stg}}$	-55 ~ +125	$^\circ\text{C}$

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

**■ ELECTRICAL CHARACTERISTICS**

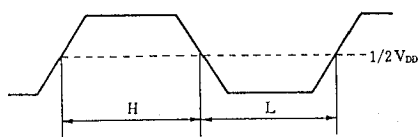
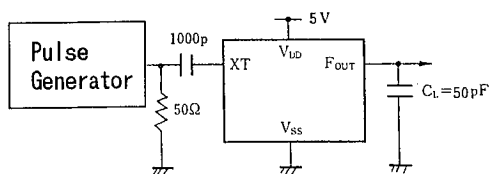
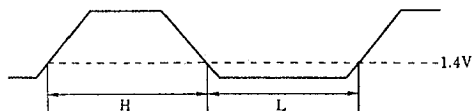
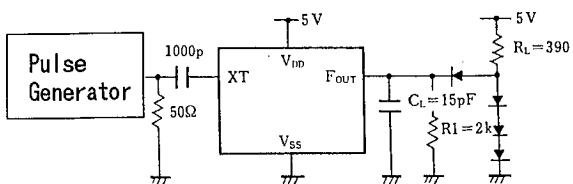
 (  $T_a=25^\circ\text{C}$ ,  $V_{\text{DD}}=5\text{V}$  )

P A R A M E T E R	SYMBOL	C O N D I T I O N S	MIN	TYP	MAX	UNIT
Operating Voltage	$V_{\text{DD}}$		4		6	V
	$I_{\text{DD1}}$	A Version $f_{\text{OSC}}=24\text{MHz}$ , No Load			25	mA
Operating Current	$I_{\text{DD2}}$	B Version $f_{\text{OSC}}=48\text{MHz}$ , No Load			30	
	$I_{\text{DD3}}$	C Version $f_{\text{OSC}}=48\text{MHz}$ , No Load			35	
Stand-by Current	$I_{\text{st}}$	$\overline{\text{CONT}}, \text{XT}=\text{V}_{\text{SS}}$ , No Load (Note)			1	$\mu\text{A}$
Input Voltage	$V_{\text{IH}}$		2.0		5.0	V
	$V_{\text{IL}}$		0		0.8	
Output Current	$I_{\text{OH}}$	$V_{\text{DD}}=5\text{V}$ , $V_{\text{OH}}=4.5\text{V}$	16			mA
	$I_{\text{OL}}$	$V_{\text{DD}}=5\text{V}$ , $V_{\text{OL}}=0.5\text{V}$	16			
Input Current	$I_{\text{IN}}$	$\overline{\text{CONT}}$ Terminal, $\overline{\text{CONT}}=\text{V}_{\text{SS}}$	125	250	500	$\mu\text{A}$
3-St Off-leakage Current	$I_{\text{oz}}$	$\overline{\text{CONT}}=\text{V}_{\text{SS}}$ , $F_{\text{OUT}}=\text{V}_{\text{SS}}$ or $V_{\text{DD}}$			$\pm 0.1$	$\mu\text{A}$
Internal Capacitor	$C_g, C_d$	A Version		28		pF
		B Version		20		
		C Version		17		
Max. Oscillation Freq.	$f_{\text{MAX}}$	A Version	35			MHz
		B Version	50			
		C Version	75			
Output Signal Symmetry	SYM	$C_L=15\text{pF}$ at 1.4V	40	50	60	%
		$C_L=15\text{pF}$ at 2.5V	45	50	55	
Output Signal Rise Time	$t_{r1}$	$C_L=15\text{pF}$ , $R_L=390\Omega$ , 0.4~2.4V		4	7	ns
		$C_L=50\text{pF}$ , 10~90%		5	7	
Output Signal Fall Time	$t_{f1}$	$C_L=15\text{pF}$ , $R_L=390\Omega$ , 2.4~0.4V		4	7	ns
		$C_L=50\text{pF}$ , 90~10%		5	7	

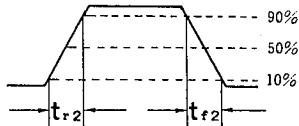
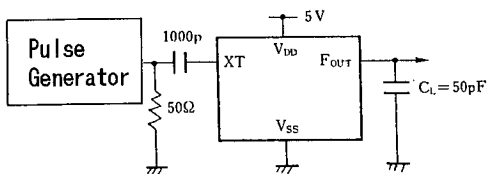
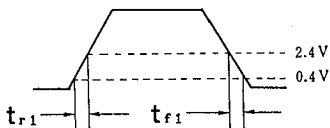
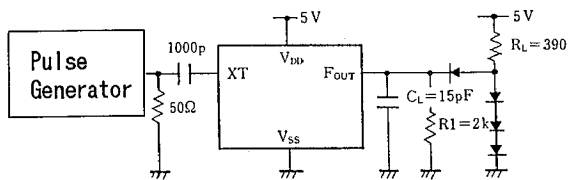
(Note) Excluding input current on  $\overline{\text{CONT}}$  terminal.

MEASUREMENT CIRCUITS

(1) Output Signal Symmetry



(2) Output Signal Rise / Fall Time



# NJU6330 Series

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MEMO

**[CAUTION]**

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