

## QUARTZ CRYSTAL OSCILLATOR

**GENERAL DESCRIPTION**

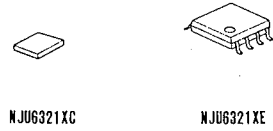
The NJU6321 series is a C-MOS quartz crystal oscillator which consists of an oscillation amplifier, 3-stage divider, output frequency selector and 3-state output buffer.

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.

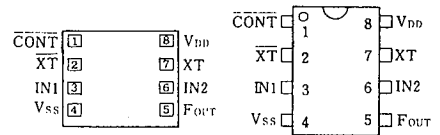
The 3-stage divider outputs  $f_0$ ,  $f_0/2$ ,  $f_0/4$  and  $f_0/8$  to the output frequency selector and it determined one output frequency according to the combination of two input-signal.

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

**PACKAGE OUTLINE**


NJU6321XC

NJU6321XE

**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  $f_0$ ,  $f_0/2$ ,  $f_0/4$  and  $f_0/8$  output
- Oscillation Capacitors Cg and Cd on-chip
- Oscillation and/or Output Stand-by Function
- Package Outline -- CHIP/EMP 8
- C-MOS Technology

**COORDINATES**

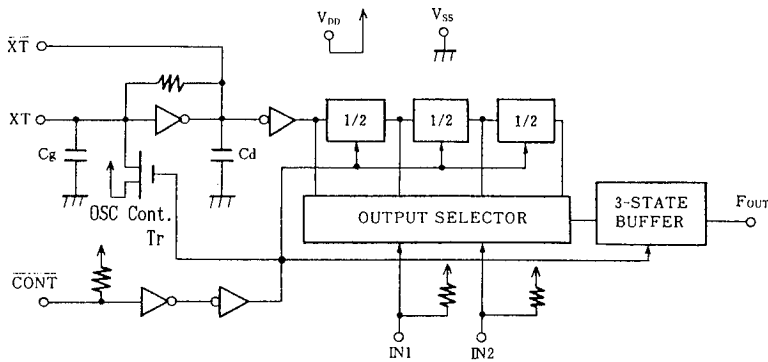
 Unit:  $\mu\text{m}$ 

No.	PAD	X	Y
1	CONT	165	651
2	XT	165	484
3	IN1	165	317
4	VSS	165	149
5	FOUT	1113	149
6	IN2	1113	317
7	XT	1113	484
8	VDD	1113	651

Chip Size : 1.28 X 0.8mm  
 Chip Thickness : 400  $\mu\text{m}$   $\pm$  30  $\mu\text{m}$

**LINE-UP TABLE**

Type No.	Cg	Cd	Osc. Stop (Tr)
NJU6321A	21pF	23pF	Yes
NJU6321P	NO	NO	NO

**■ BLOCK DIAGRAM**


(Note) Oscillation Stop Function is available only for NJU6321A.  
 NJU6321P has only output stand-by function.

**■ TERMINAL DESCRIPTION**

NO.	SYMBOL	F U N C T I O N															
1	$\overline{\text{CONT}}$	Oscillation Stop Control and Divider Reset															
		<table border="1"> <thead> <tr> <th><math>\overline{\text{CONT}}</math></th> <th><math>F_{\text{OUT}}</math></th> </tr> </thead> <tbody> <tr> <td>H</td> <td>Output either one frequency from <math>f_0</math>, <math>f_0/2</math>, <math>f_0/4</math>, and <math>f_0/8</math></td> </tr> <tr> <td>L</td> <td>Output High Impedance and Divider Reset In the NJU6321A also oscillation stop</td> </tr> </tbody> </table>	$\overline{\text{CONT}}$	$F_{\text{OUT}}$	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 In the NJU6321A also oscillation stop									
		$\overline{\text{CONT}}$	$F_{\text{OUT}}$														
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 In the NJU6321A also oscillation stop																
2 7	$\overline{\text{XT}}$ $\text{XT}$	Quartz Crystal Connecting Terminals															
8	$V_{\text{DD}}$	+ 5V															
3 6	$\text{IN1}$ $\text{IN2}$	3-State Divider Outputs selected by $\text{IN1}$ and $\text{IN2}$ <table border="1"> <thead> <tr> <th><math>\text{IN1}</math></th> <th><math>\text{IN2}</math></th> <th><math>F_{\text{OUT}}</math></th> </tr> </thead> <tbody> <tr> <td>H</td> <td>H</td> <td><math>f_0</math></td> </tr> <tr> <td>L</td> <td>H</td> <td><math>f_0/2</math></td> </tr> <tr> <td>H</td> <td>L</td> <td><math>f_0/4</math></td> </tr> <tr> <td>L</td> <td>L</td> <td><math>f_0/8</math></td> </tr> </tbody> </table>	$\text{IN1}$	$\text{IN2}$	$F_{\text{OUT}}$	H	H	$f_0$	L	H	$f_0/2$	H	L	$f_0/4$	L	L	$f_0/8$
$\text{IN1}$	$\text{IN2}$	$F_{\text{OUT}}$															
H	H	$f_0$															
L	H	$f_0/2$															
H	L	$f_0/4$															
L	L	$f_0/8$															
5	$F_{\text{OUT}}$	Output either one frequency from $f_0$ , $f_0/2$ , $f_0/4$ , and $f_0/8$															
4	$V_{\text{SS}}$	GND															

## ■ ABSOLUTE MAXIMUM RATINGS

( Ta=25°C )

PARAMETER	SYMBOL	RATINGS	UNIT
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

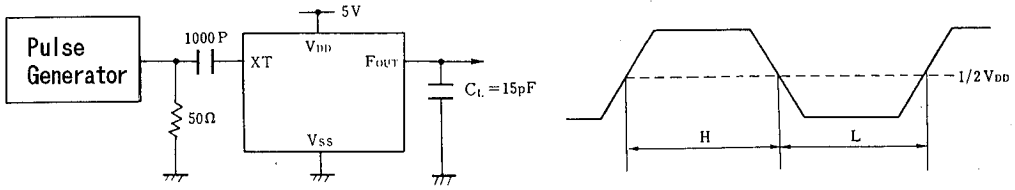
 ( Ta=25°C, V<sub>DD</sub>=5V )

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	V <sub>DD</sub>		3		6	V
Operating Current	I <sub>DD</sub>	fosc=16MHz, No load			10	mA
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		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, IN1, IN2 Terminals CONT, IN1, IN2=V <sub>SS</sub>			400	μA
Internal Capacitor	C <sub>g</sub>	A Version		21		pF
	C <sub>d</sub>	A Version		23		
	C <sub>g</sub> , C <sub>d</sub>	P Version		-		
Max. Oscillation Freq.	f <sub>MAX</sub>	V <sub>DD</sub> =5V, C <sub>L</sub> =15pF	50			MHz
Output Signal Symmetry	SYM	V <sub>DD</sub> =5V, C <sub>L</sub> =15pF at 1/2V <sub>DD</sub>	45	50	55	%
Output Signal Rise Time	t <sub>r</sub>	V <sub>DD</sub> =5V, C <sub>L</sub> =15pF, 10% - 90%			8	ns
Output Signal Fall Time	t <sub>f</sub>	V <sub>DD</sub> =5V, C <sub>L</sub> =15pF, 90% - 10%			8	ns

Note ) Excluding input current on CONT terminal.

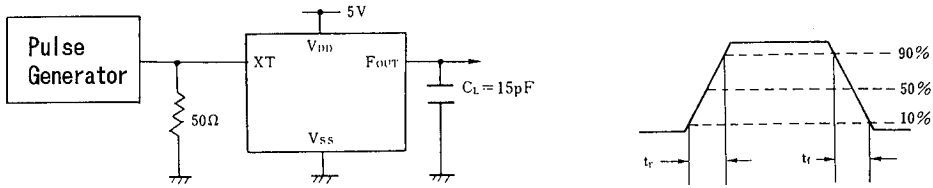
■ MEASUREMENT CIRCUITS

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



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



# NJU6321 Series

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MEMO

**[CAUTION]**

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