

## 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  $f_o$ ,  $f_o/2$ ,  $f_o/4$  and  $f_o/8$  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

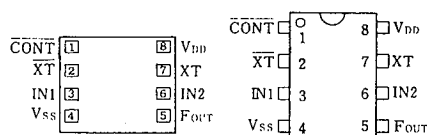


NJU6321XC



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  $f_o$ ,  $f_o/2$ ,  $f_o/4$  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

### ■ 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

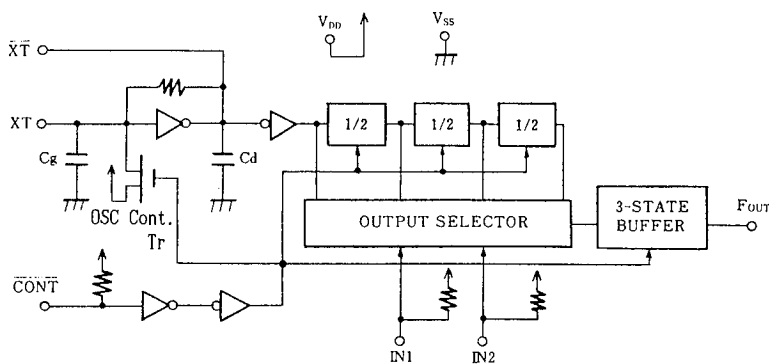
Chip Size : 1.28 X 0.8mm

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																	
		$\overline{\text{CONT}}$	$F_{\text{OUT}}$																
		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	IN1  IN2	3-State Divider Outputs selected by IN1 and IN2																	
		<table><tr><td>IN1</td><td>IN2</td><td><math>F_{\text{OUT}}</math></td></tr><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></table>	IN1	IN2	$F_{\text{OUT}}$	H	H	$f_0$	L	H	$f_0/2$	H	L	$f_0/4$	L	L	$f_0/8$		
IN1	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

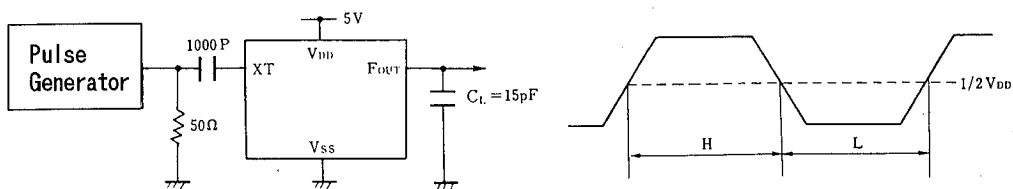
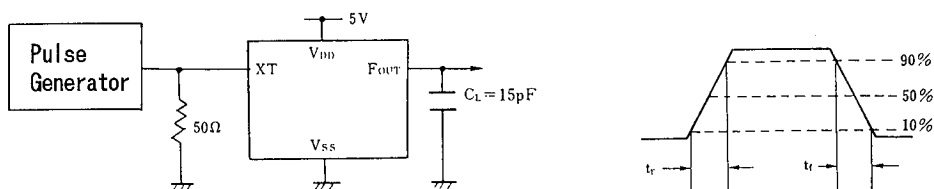
Note ) Decoupling capacitor should be connected between V<sub>DD</sub> and V<sub>SS</sub> due to the stabilized operation for the circuit.

**■ 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 ( $C_L=15\text{pF}$ )**

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


# NJU6321 Series

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MEMO

**[CAUTION]**

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