

QUARTZ CRYSTAL OSCILLATOR

4

■ 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.

■ 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/ IEMP8V/ MSOP8(VSP8): MEET JEDEC M0-187-DA
- C-MOS Technology

■ LINE-UP TABLE

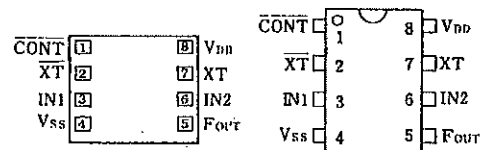
Type No.	Cg	Cd	Osc. Stop (Tr)
NJU6321A	21pF	23pF	Yes
NJU6321P	NO	NO	NO

■ PACKAGE OUTLINE



NJU6321XC NJU6321XE NJU6321XR

■ PIN CONFIGURATION/PAD LOCATION

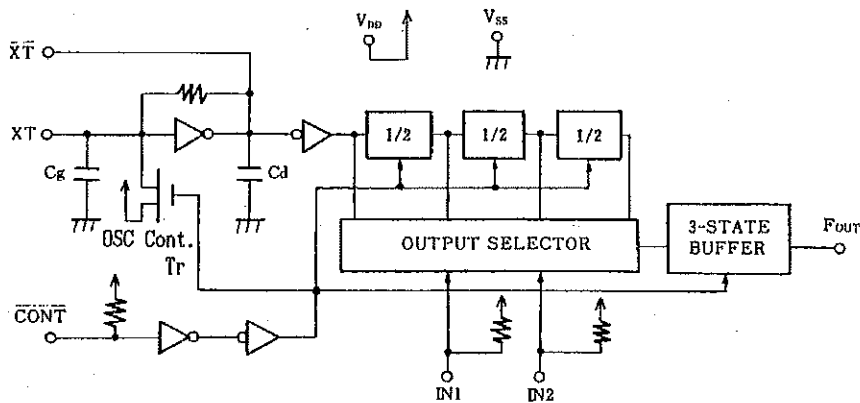


NJU6321XC NJU6321XE  
NJU6321XR

■ 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 $\mu\text{m}$ ±30 $\mu\text{m}$

**■ 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"> <tr> <td><math>\overline{\text{CONT}}</math></td> <td><math>F_{\text{OUT}}</math></td> </tr> <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> </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	$\overline{\text{XT}}$ XT	Quartz Crystal Connecting Terminals															
8	$V_{\text{DD}}$	+ 5V															
3 6	IN1 IN2	3-State Divider Outputs selected by IN1 and IN2															
		<table border="1"> <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	T <sub>opr</sub>	-40 ~ + 85	°C
Storage Temperature Range	T <sub>stg</sub>	-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**

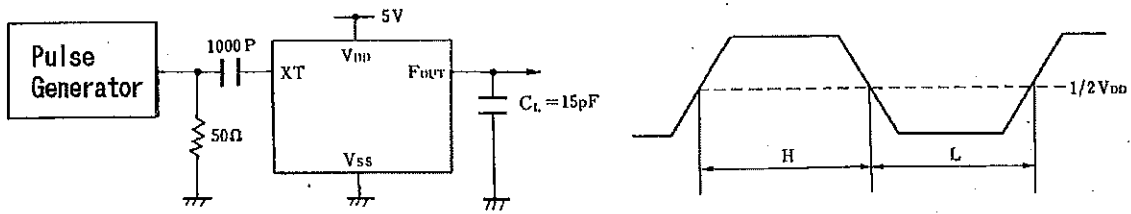
 ( Ta=25°C, V<sub>DD</sub>=5V )

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.

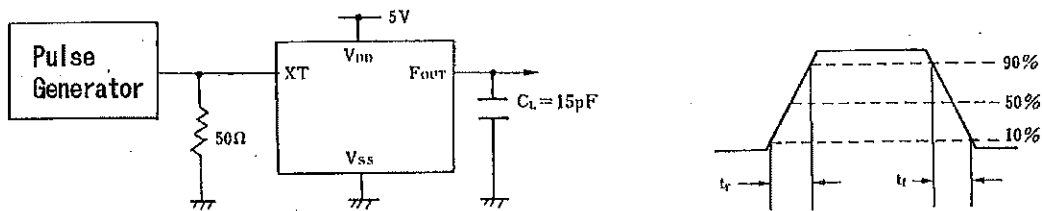
MEASUREMENT CIRCUITS

(1) Output Signal Symmetry ( $C_L=15pF$ )



4

(2) Output Signal Rise/Fall Time ( $C_L=15pF$ )



# NJU6321 Series

---

MEMO

**[CAUTION]**

The specifications on this databook are only given for information, without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.