

## QUARTZ CRYSTAL OSCILLATOR

**GENERAL DESCRIPTION**

The NJU6375 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 six versions A, B, C and H, J, K 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.

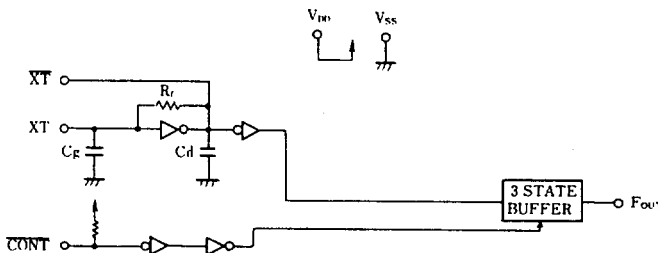
Drivability of the 3-state output buffer is 24mA in A, B and C versions, 16mA in H, J and K versions, thus it can drive both of TTL and C-MOS load.

**FEATURES**

- Operating Voltage. -- 4.0~6.0V
- Maximum Oscillation Frequency (See Line-Up Table)
- Low Operating Current
- High Fan-out --  $I_{OL}/I_{OH}=24\text{mA}$  (A, B and C versions)  
--  $I_{OL}/I_{OH}=16\text{mA}$  (H, J and K versions)
- 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

**LINE-UP TABLE**

Type No.	Recommended Osc. Freq.	Output Freq.	$C_g, C_d$
NJU6375A 6375B 6375C	20~35MHz 30~50MHz 45~75MHz	$f_o$	28pF 20pF 17pF
NJU6375H 6375J 6375K	20~35MHz 30~50MHz 45~75MHz		28pF 20pF 17pF

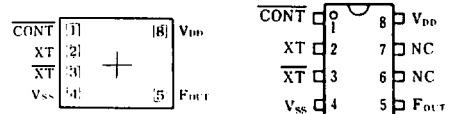
**BLOCK DIAGRAM**

**PACKAGE OUTLINE**


NJU6375XC



NJU6375XE

4

**PAD LOCATION/PIN CONFIGURATION**

**COORDINATES**

 Unit:  $\mu\text{m}$ 

No.	PAD	X	Y
1	CONT	-408	248
2	XT	-408	81
3	XT	-408	-86
4	VSS	-408	-248
5	F <sub>OUT</sub>	464	-248
8	V <sub>DD</sub>	464	248

Chip Size : 1.29 X 0.8mm  
 Chip Center :  $X=0\mu\text{m}, Y=0\mu\text{m}$   
 Chip Thickness :  $400\mu\text{m} \pm 30\mu\text{m}$   
 (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 $f_0$
		L Output High Impedance
2	$\overline{\text{XT}}$	Quartz Crystal Connecting Terminals
3	$\overline{\text{XT}}$	
4	$V_{\text{SS}}$	GND
5	$F_{\text{OUT}}$	Output frequency $f_0$
8	$V_{\text{DD}}$	+ 5V

4

## ■ 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	$V_{\text{O}}$	-0.5 ~ $V_{\text{DD}}+0.5$	V
Input Current	$I_{\text{IN}}$	$\pm 10$	mA
Output Current	$I_{\text{O}}$	$\pm 25$	mA
Power Dissipation	$P_{\text{D}}$	200 (EMP)	mW
Operating Temperature Range	$T_{\text{opr}}$	-40 ~ +85	$^\circ\text{C}$
Storage Temperature Range	$T_{\text{stg}}$	-55 ~ +125	$^\circ\text{C}$


**ELECTRICAL CHARACTERISTICS**

• NJU6375A/B/C

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

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	$V_{DD}$		4		6	V
Operating Current	$I_{DD1}$	A Version $f_{osc}=24\text{MHz}$ , No Load			25	mA
	$I_{DD2}$	B Version $f_{osc}=48\text{MHz}$ , No Load			30	
	$I_{DD3}$	C Version $f_{osc}=48\text{MHz}$ , No Load			35	
Stand-by Current	$I_{st}$	$\overline{\text{CONT}}$ , $X_T=V_{SS}$ , No Load (Note 1)			1	$\mu\text{A}$
Input Voltage	$V_{IH}$		2.0		5.0	V
	$V_{IL}$		0		0.8	
Output Current	$I_{OH}$	$V_{DD}=5\text{V}$ , $V_{OH}=4.5\text{V}$	24			mA
	$I_{OL}$	$V_{DD}=5\text{V}$ , $V_{OL}=0.5\text{V}$	24			
Input Current	$I_{IN}$	$\overline{\text{CONT}}$ Terminal, $\overline{\text{CONT}}=V_{SS}$	125	250	500	$\mu\text{A}$
3-St Off-leakage Current	$I_{oz}$	$\overline{\text{CONT}}=V_{SS}$ , $F_{OUT}=V_{SS}$ or $V_{DD}$			$\pm 0.1$	$\mu\text{A}$
Internal Capacitor	$C_g, C_d$	A Version		28		pF
		B Version		20		
		C Version		17		
Max. Oscillation Freq.	$f_{MAX}$	A Version	35			MHz
		B Version	50			
		C Version	75			
Output Signal Symmetry	SYM	$C_L=15\text{pF}$ at 1.4V	45	50	55	%
		$C_L=15\text{pF}$ at 2.5V				
Output Signal Rise Time	$t_{r1}$	$C_L=15\text{pF}$ , $R_L=390\Omega$ , 20%~80%		2		ns
	$t_{r2}$	$C_L=15\text{pF}$ , $R_L=390\Omega$ , 0.4~2.4V		2		
	$t_{r3}$	$C_L=15\text{pF}$ , 10~90%		3		
Output Signal Fall Time	$t_{f1}$	$C_L=15\text{pF}$ , $R_L=390\Omega$ , 80%~20%		2		ns
	$t_{f2}$	$C_L=15\text{pF}$ , $R_L=390\Omega$ , 2.4~0.4V		2		
	$t_{f3}$	$C_L=15\text{pF}$ , 90~10%		3		

 (Note 1) Excluding input current on  $\overline{\text{CONT}}$  terminal.

4



• NJU6375H/J/K

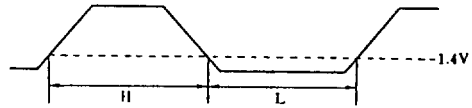
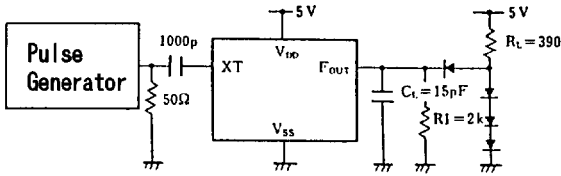
 ( Ta=25°C, V<sub>DD</sub>=5V )

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	V <sub>DD</sub>		4		6	V
Operating Current	I <sub>DD1</sub>	H Version f <sub>OSC</sub> =24MHz, No Load			25	mA
	I <sub>DD2</sub>	J Version f <sub>OSC</sub> =48MHz, No Load			30	
	I <sub>DD3</sub>	K Version f <sub>OSC</sub> =48MHz, No Load			35	
Stand-by Current	I <sub>st</sub>	CONT, XT=V <sub>SS</sub> , No Load(Note 2)			1	μA
Input Voltage	V <sub>IH</sub>		2.0		5.0	V
	V <sub>IL</sub>		0		0.8	
Output Current	I <sub>OH</sub>	V <sub>DD</sub> =5V, V <sub>OH</sub> =4.5V	16			mA
	I <sub>OL</sub>	V <sub>DD</sub> =5V, V <sub>OL</sub> =0.5V	16			
Input Current	I <sub>IN</sub>	CONT Terminal, CONT=V <sub>SS</sub>	125	250	500	μA
3-St Off-leakage Current	I <sub>oz</sub>	CONT=V <sub>SS</sub> , F <sub>OUT</sub> =V <sub>SS</sub> or V <sub>DD</sub>			±0.1	μA
Internal Capacitor	C <sub>g</sub> , Cd	H Version		28		pF
		J Version		20		
		K Version		17		
Max. Oscillation Freq.	f <sub>MAX</sub>	H Version	35			MHz
		J Version	50			
		K Version	75			
Output Signal Symmetry	SYM	C <sub>L</sub> =15pF at 1.4V	40	50	60	%
		C <sub>L</sub> =15pF at 2.5V	45	50	55	
Output Signal Rise Time	t <sub>r1</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =390Ω, 0.4~2.4V		4	7	ns
	t <sub>r2</sub>	C <sub>L</sub> =50pF, 10~90%		5	7	
Output Signal Fall Time	t <sub>f1</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =390Ω, 2.4~0.4V		4	7	ns
	t <sub>f2</sub>	C <sub>L</sub> =50pF, 90~10%		5	7	

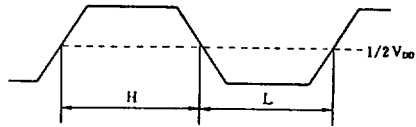
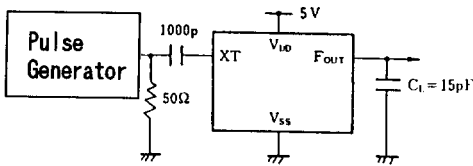
(Note 2) Excluding input current on CONT terminal.


**MEASUREMENT CIRCUITS 1 (NJU6375A/B/C)**
**(1-1) Output Signal Symmetry**

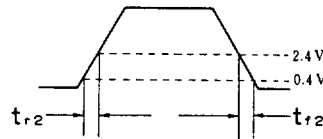
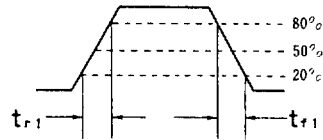
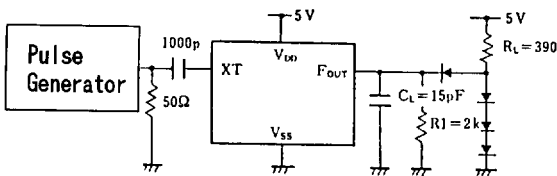
•TTL



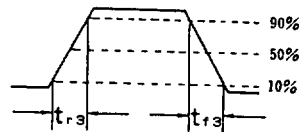
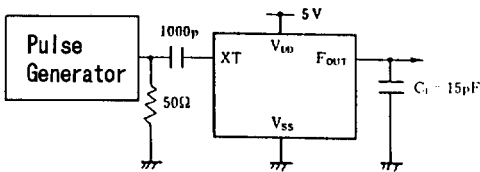
•C-MOS


**(1-2) Output Signal Rise / Fall Time**

•TTL



•C-MOS

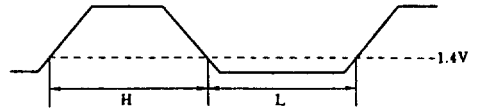
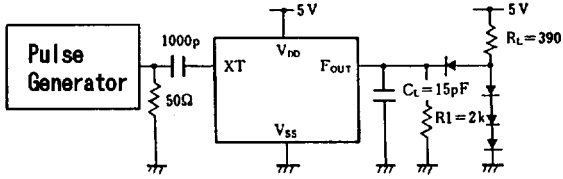


4

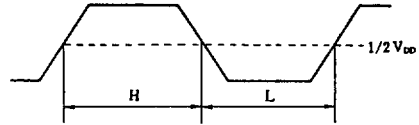
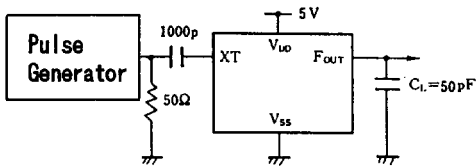

**MEASUREMENT CIRCUITS 2 (NJU6375H/J/K)**

## (2-1) Output Signal Symmetry

•TTL

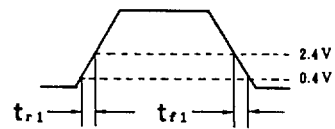
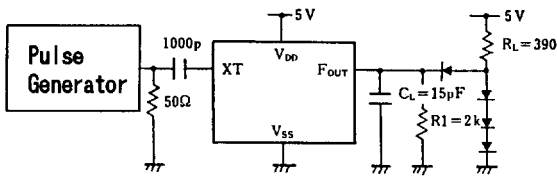


•C-MOS



## (2-2) Output Signal Rise / Fall Time

•TTL



•C-MOS

