

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(Cg, Cd), therefore, it requires no external component except quartz crystal.

Driverbility 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.

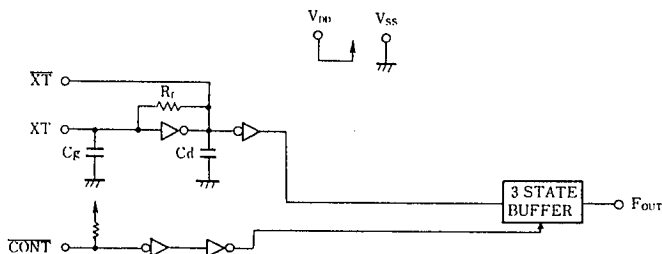
■ FEATURES

- Operating Voltage. -- 4.0~6.0V
- Maximum Oscillation Frequency (See Line-Up Table)
- Low Operating Current
- High Fan-out --  $I_{OL}/I_{OH}=24mA$  (A, B and C versions)  
--  $I_{OL}/I_{OH}=16mA$  (H, J and K versions)
- 3-state Output Buffer
- Oscillation Capacitors Cg and Cd 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.	Cg, Cd
NJU6375A	20~35MHz	$f_o$	28pF
6375B	30~50MHz		20pF
6375C	45~75MHz		17pF
NJU6375H	20~35MHz		28pF
6375J	30~50MHz		20pF
6375K	45~75MHz		17pF

■ BLOCK DIAGRAM



■ PACKAGE OUTLINE

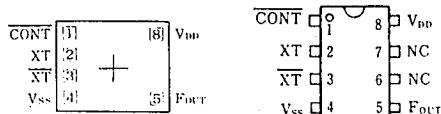


NJU6375XC



NJU6375XE

■ PAD LOCATION/PIN CONFIGURATION



■ COORDINATES

Unit:  $\mu m$

No.	PAD	X	Y
1	CONT	-408	248
2	XT	-408	81
3	XT	-408	-86
4	VSS	-408	-248
5	FOUT	464	-248
8	VDD	464	248

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	
		CONT	Output ( $F_{\text{OUT}}$ )
		H	Output Frequency $f_0$
		L	Output High Impedance
2	XT	Quartz Crystal Connecting Terminals	
3	XT		
4	$V_{\text{SS}}$	GND	
5	$F_{\text{OUT}}$	Output frequency $f_0$	
8	$V_{\text{DD}}$	+ 5V	

**■ ABSOLUTE MAXIMUM RATINGS**

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

P A R A M E T E R	S Y M B O L	R A T I N G S	U N I T
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	$V_0$	-0.5 ~ $V_{\text{DD}}+0.5$	V
Input Current	$I_{\text{IN}}$	$\pm 10$	mA
Output Current	$I_0$	$\pm 25$	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

• 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	$I_{st}$	$\overline{\text{CONT}}, \text{XT}=\overline{V_{SS}}$ , 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, $\overline{\text{CONT}}=\overline{V_{SS}}$	125	250	500	$\mu\text{A}$
3-St Off-leakage Current	$I_{oz}$	$\overline{\text{CONT}}=\overline{V_{SS}}$ , $F_{OUT}=\overline{V_{SS}}$ 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.

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• NJU6375H/J/K

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

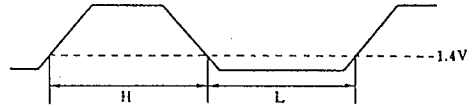
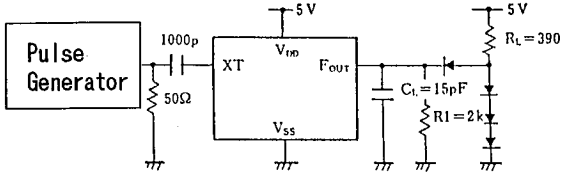
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	$V_{DD}$		4		6	V
Operating Current	$I_{DD1}$	H Version $f_{OSC}=24\text{MHz}$ , No Load			25	mA
	$I_{DD2}$	J Version $f_{OSC}=48\text{MHz}$ , No Load			30	
	$I_{DD3}$	K Version $f_{OSC}=48\text{MHz}$ , No Load			35	
Stand-by Current	$I_{st}$	$\overline{\text{CONT}}, \text{XT}=\overline{V_{SS}}$ , No Load (Note 2)			1	$\mu\text{A}$
Input Voltage	$V_{IH}$		2.0		5.0	V
	$V_{IL}$		0		0.8	
Output Current	$I_{OH}$	$V_{DD}=5\text{V}$ , $V_{OH}=4.5\text{V}$	16			mA
	$I_{OL}$	$V_{DD}=5\text{V}$ , $V_{OL}=0.5\text{V}$	16			
Input Current	$I_{IN}$	$\overline{\text{CONT}}$ Terminal, $\overline{\text{CONT}}=\overline{V_{SS}}$	125	250	500	$\mu\text{A}$
3-St Off-leakage Current	$I_{OZ}$	$\overline{\text{CONT}}=\overline{V_{SS}}$ , $F_{OUT}=\overline{V_{SS}}$ or $V_{DD}$			$\pm 0.1$	$\mu\text{A}$
Internal Capacitor	$C_g, C_d$	H Version		28		pF
		J Version		20		
		K Version		17		
Max. Oscillation Freq.	$f_{MAX}$	H Version	35			MHz
		J Version	50			
		K 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
	$t_{r2}$	$C_L=50\text{pF}$ , 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
	$t_{f2}$	$C_L=50\text{pF}$ , 90~10%		5	7	

 (Note 2) Excluding input current on  $\overline{\text{CONT}}$  terminal.

■ MEASUREMENT CIRCUITS 1 (NJU6375A/B/C)

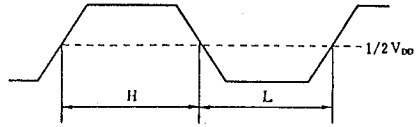
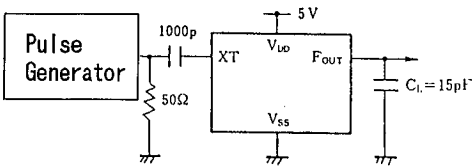
(1-1) Output Signal Symmetry

•TTL



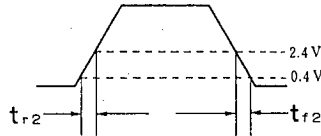
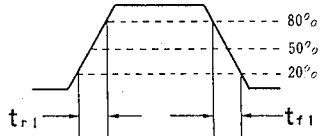
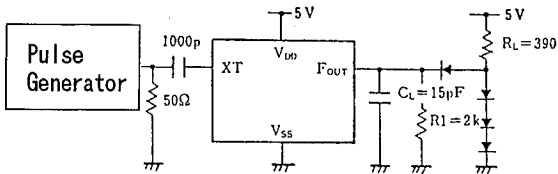
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•C-MOS

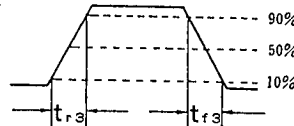
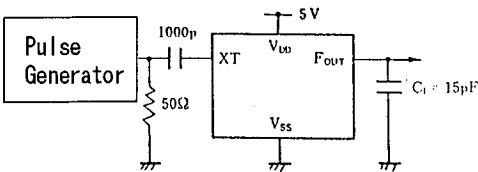


(1-2) Output Signal Rise / Fall Time

•TTL



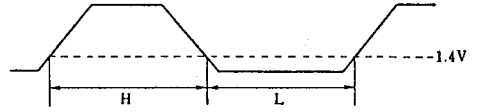
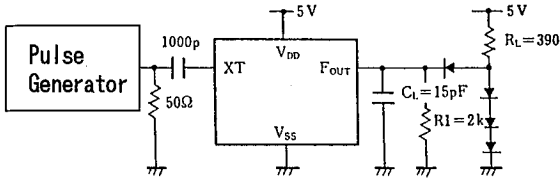
•C-MOS



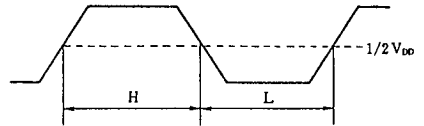
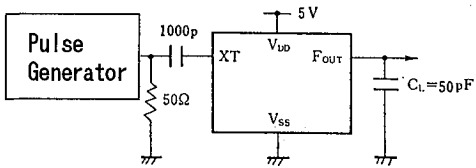
**MEASUREMENT CIRCUITS 2 (NJU6375H/J/K)**

## (2-1) Output Signal Symmetry

•TTL

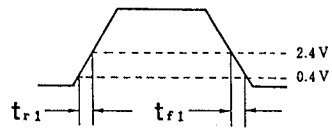
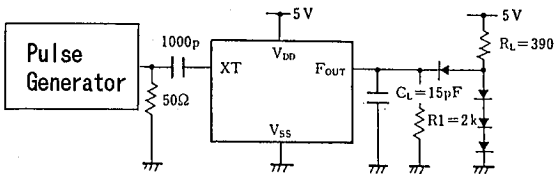


•C-MOS

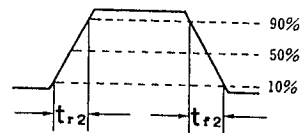
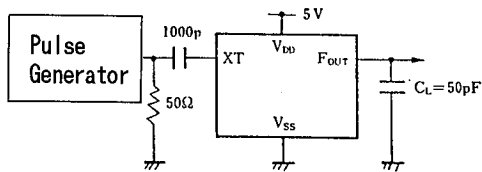


## (2-2) Output Signal Rise / Fall Time

•TTL



•C-MOS



# NJU6375 Series

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MEMO

**[CAUTION]**

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