

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.

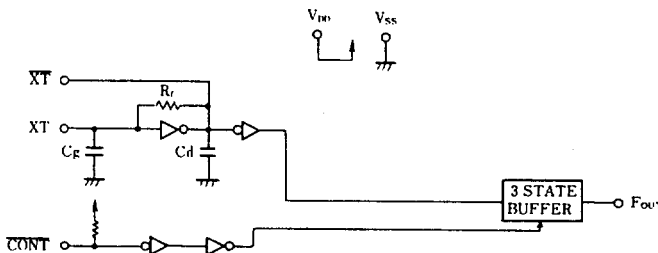
Drivability of the 3-state output buffer is 24mA in A, B and C versions, 16mA in H, J and K versions, thus it can drive both of TTL and C-MOS load.

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	20~35MHz	f_o	28pF
6375B	30~50MHz		20pF
6375C	45~75MHz		17pF
NJU6375H	20~35MHz	f_o	28pF
6375J	30~50MHz		20pF
6375K	45~75MHz		17pF

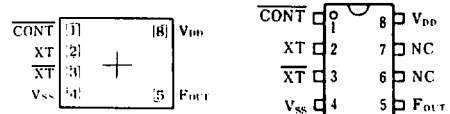
BLOCK DIAGRAM

PACKAGE OUTLINE


NJU6375XC



NJU6375XE

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PAD LOCATION/PIN CONFIGURATION

COORDINATES

 Unit: μm

No.	PAD	X	Y
1	CONT	-408	248
2	XT	-408	81
3	XT	-408	-86
4	VSS	-408	-248
5	F _{OUT}	464	-248
8	V _{DD}	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_{OUT})
		H Output Frequency f_0
		L Output High Impedance
2	XT	Quartz Crystal Connecting Terminals
3	$\overline{\text{XT}}$	
4	V_{SS}	GND
5	F_{OUT}	Output frequency f_0
8	V_{DD}	+ 5V

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■ 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_{DD}	-0.5 ~ +7.0	V
Input Voltage	V_{IN}	$V_{\text{SS}}-0.5 \sim V_{\text{DD}}+0.5$	V
Output Voltage	V_{O}	-0.5 ~ $V_{\text{DD}}+0.5$	V
Input Current	I_{IN}	± 10	mA
Output Current	I_{O}	± 25	mA
Power Dissipation	P_{D}	200 (EMP)	mW
Operating Temperature Range	T_{opr}	-40 ~ +85	$^\circ\text{C}$
Storage Temperature Range	T_{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	μA
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	μA
3-St Off-leakage Current	I_{oz}	$\overline{\text{CONT}}=V_{SS}$, $F_{OUT}=V_{SS}$ or V_{DD}			± 0.1	μA
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

 (Ta=25°C, V_{DD}=5V)

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

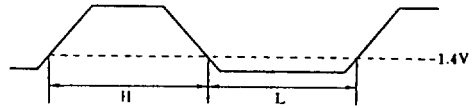
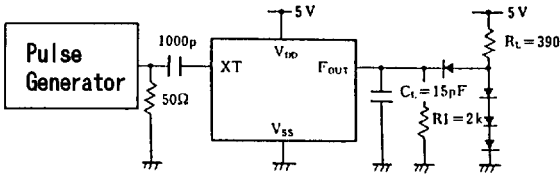
(Note 2) Excluding input current on CONT terminal.



■ MEASUREMENT CIRCUITS 1 (NJU6375A/B/C)

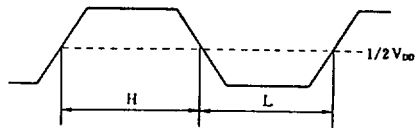
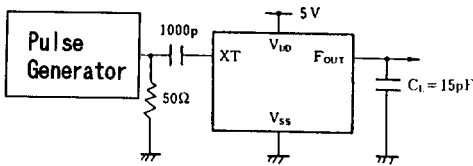
(1-1) Output Signal Symmetry

•TTL



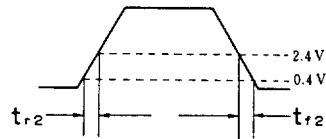
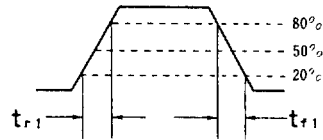
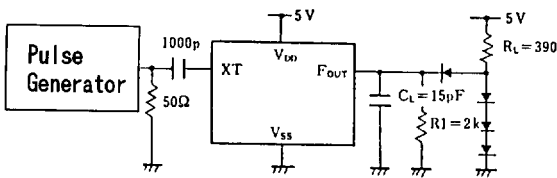
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•C-MOS

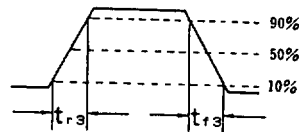
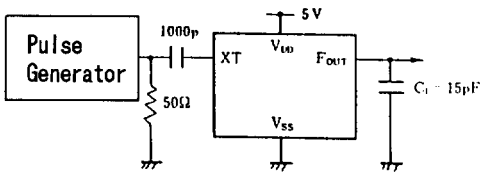


(1-2) Output Signal Rise / Fall Time

•TTL



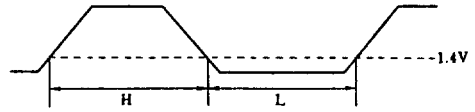
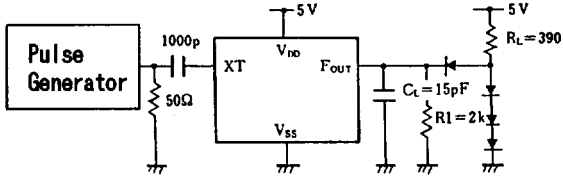
•C-MOS



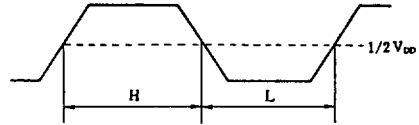
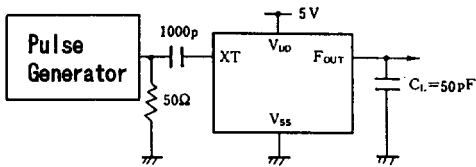

MEASUREMENT CIRCUITS 2 (NJU6375H/J/K)

(2-1) Output Signal Symmetry

•TTL

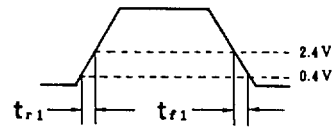
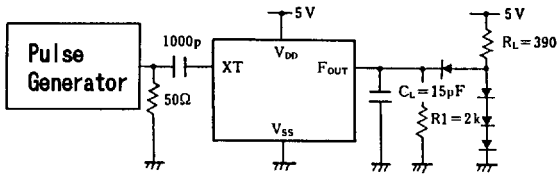


•C-MOS



(2-2) Output Signal Rise / Fall Time

•TTL



•C-MOS

