

1.8V 125MHz 3rd Over Tone Quartz Crystal Oscillator

■GENERAL DESCRIPTION

The NJU6394 series is a C-MOS, 1.8V, 125MHz, 3rd overtone quartz crystal oscillator that consists of an oscillation amplifier (low oscillation-stop current based on NAND circuit) and 3-state output buffer (C-MOS compatible, 15pF load).

The operating voltage is from 1.6V to 3.0V, and frequency range is from 75MHz to 125MHz divided by 3 version, A-type: 75MHz to 90MHz, B-type: 90MHz to 105MHz, C-type: 105MHz to 125MHz.

The oscillation amplifier realizes very low oscillation stop current with NAND circuit.

The 3-state output buffer is C-MOS compatible.

■PACKAGE OUTLINE

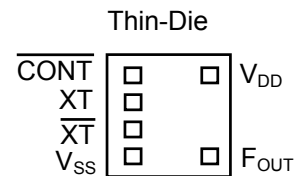


NJU6394XC-X

■FEATURES

- Operating Voltage 1.6 to 3.0V
- Maximum Oscillation Frequency (See Line-up Table)
- Oscillation Stop and Output Stand-by Function
- 3-State Output Buffer
- Oscillation Capacitors C_g and C_d on-Die
- Package Outline Thin-Die/Wafer
- C-MOS Technology

■PAD LOCATION



■LINE-UP TABLE

Type No.	Recommended Oscillation Frequency	Output Frequency	R _f	C _g /C _d
NJU6394	A	75 to 90MHz	2.2 kΩ	8/12pF
	B	90 to 105MHz		7/10pF
	C	105 to 125MHz		6/7pF

■COORDINATES

No	Pad Name	X	Y
1	CONT	-178	231
2	XT	-178	77
3	XT	-178	-77
4	V _{SS}	-178	-231
5	F _{OUT}	206	-231
6	V _{DD}	206	231

Starting Point: Die Center Unit[μm]

Die Size: 0.7x0.75mm

Thin-Die Thickness(C-D): 200±20μm

Thin-Die Thickness(C-L): 140±10μm

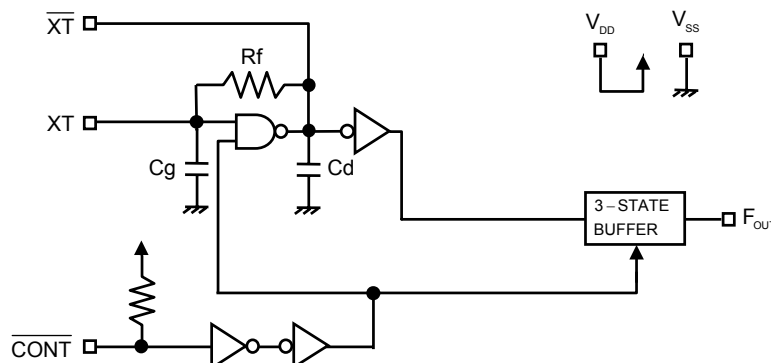
Wafer Thickness(W-H): 200±20μm

Wafer Thickness(W-L): 140±10μm

Pad Size: 90x90μm

Die Substrate: V_{DD} Level

■BLOCK DIAGRAM



■ TERMINAL DESCRIPTION

SYMBOL	FUNCTION	
$\overline{\text{CONT}}$	Oscillation and 3-state Output Buffer Control	
	$\overline{\text{CONT}}$	F_{OUT}
	H or OPEN	Output frequency f_0
	L	Oscillation Stop and High impedance Output
$\overline{\text{XT}}$	Quartz Crystal Connecting Terminals	
$\overline{\text{XT}}$		
V_{SS}	$V_{\text{SS}}=0\text{V}$	
F_{OUT}	Frequency Output	
V_{DD}	$V_{\text{DD}}=1.8\text{V}$	

■ ABSOLUTE MAXIMUM RATINGS

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

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V_{DD}	-0.5 to +7.0	V
Input Voltage	V_{IN}	$V_{\text{SS}}-0.5$ to $V_{\text{DD}}+0.5$	V
Output Voltage	V_{O}	-0.5 to $V_{\text{DD}}+0.5$	V
Input Current	I_{IN}	± 10	mA
Output Current	I_{O}	± 25	mA
Operating Temperature Range	T_{opr}	-40 to +85	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55 to +125	$^\circ\text{C}$

Note1) If the supply voltage(V_{DD}) is less than 7.0V, the input voltage must not over the V_{DD} level though 7.0V is limit specified.

Note2) Decoupling capacitor should be connected between V_{DD} and V_{SS} due to the stabilized operation for the circuit.

■ELECTRICAL CHARACTERISTICS

(Ta=25°C)

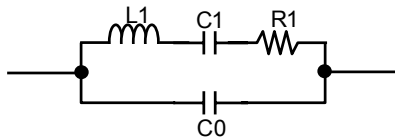
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	V _{DD}		1.6		3.0	V

(V_{DD}=1.8V, Ta=25°C)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Current	I _{DD1}	A type, fosc=90MHz, C _L =15pF		6	10	mA
		B type, fosc=105MHz, C _L =15pF		7	12	
		C type, fosc=125MHz, C _L =15pF		8	12	
Oscillation Stopping Current	I _{DD2}	CONT=V _{SS} , No load		2	6	uA
Stand-by Current	I _{st}	CONT=XT=V _{SS} , No load Note3)			2	uA
Input Voltage	V _{IH}		1.26		1.8	V
	V _{IL}		0		0.54	V
Output Current	I _{OH}	V _{OH} =1.62V	2			mA
	I _{OL}	V _{OL} =0.18V	2			mA
Input Current	I _{IN}	CONT=0.8V _{DD}		3.0	4.5	uA
		CONT=0.2V _{DD}		0.5	0.7	uA
3-state Off Leakage Current	I _{oZ}	CONT=V _{SS} , F _{OUT} = V _{DD} or V _{SS}			±0.2	uA
Feedback Resistance	R _f	A type		2.2		kΩ
Internal Capacitor	C _g /C _d	A type, fosc=90MHz		8/12		pF
		B type, fosc=105MHz		7/10		
		C type, fosc=125MHz		6/7		
Maximum Oscillation Frequency	F _{MAX}	A type	90			MHz
		B type	105			
		C type	125			
Output Signal Symmetry	SYM	C _L =15pF, @V _{DD} /2	45	50	55	%
Output Signal Rise Time	t _r	C _L =15pF, 10% to 90%		2.2	3	ns
Output Signal Fall Time	t _f	C _L =15pF, 90% to 10%		2.2	3	ns
Output Disable time	t _{PLZ}	C _L =15pF, R _{UP} =10kΩ			250	ns
Output Enable Time	t _{PZL}	C _L =15pF, R _{UP} =10kΩ			250	ns

Note3) Excluding input current on CONT Terminal.

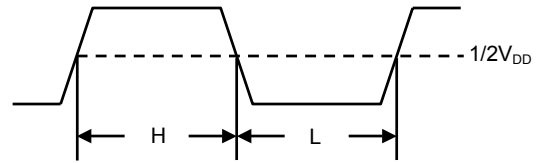
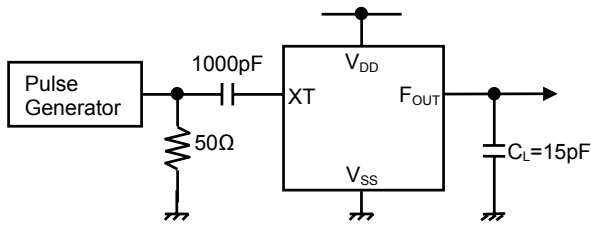
■STANDARD CRYSTAL PARAMETERS FOR MEASUREMENT CIRCUITS



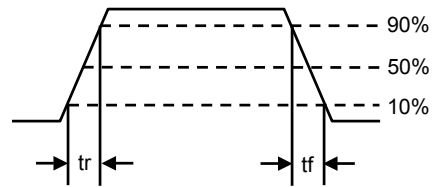
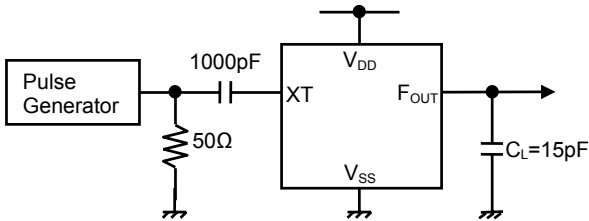
f[MHz]	R1[Ω]	L1[mH]	C1[fF]	C0[pF]
90	27.6	3.12	1.00	3.29
105	17.1	1.99	1.16	3.27
125	14.9	1.20	1.36	4.83

MEASUREMENT CIRCUITS

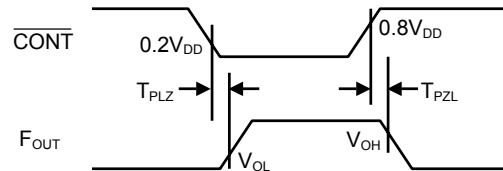
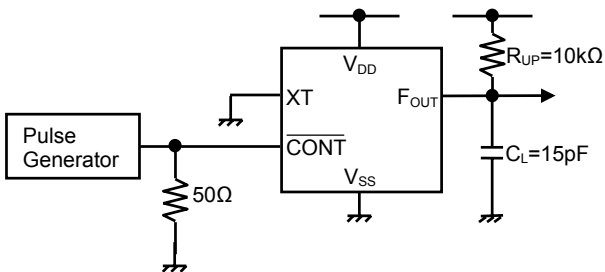
(1) Output Signal Symmetry ($C_L=15\text{pF}$)



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



(3) Output Disable/Enable Time ($C_L=15\text{pF}, R_{UP}=10\text{k}\Omega$)



[CAUTION]
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