

1.8V Operating Voltage 3rd Over Tone Quartz Crystal Oscillator

GENERAL DESCRIPTION

The NJU6394 series is a C-MOS, 1.8V, 75MHz to 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.

FEATURES

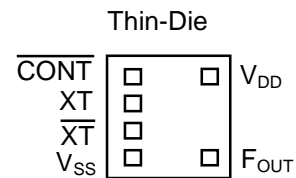
- Operating Voltage 1.6 to 3.0V
- Maximum Oscillation Frequency (See Line-up Table)
- Oscillation Stop and Output Stand-by Function
- 3-State Output Buffer
- Oscillation Capacitors Cg and Cd on-Die
- Package Outline Thin-Die/Wafer
- C-MOS Technology

PACKAGE OUTLINE



NJU6394XC-X

PAD LOCATION



LINE-UP TABLE

Type No.	Recommended Oscillation Frequency	Output Frequency	Rf	Cg/Cd
NJU6394	A	75 to 90MHz	2.2 kΩ	8/12pF
	B	90 to 105MHz		7/10pF
	C	105 to 125MHz		6/7pF

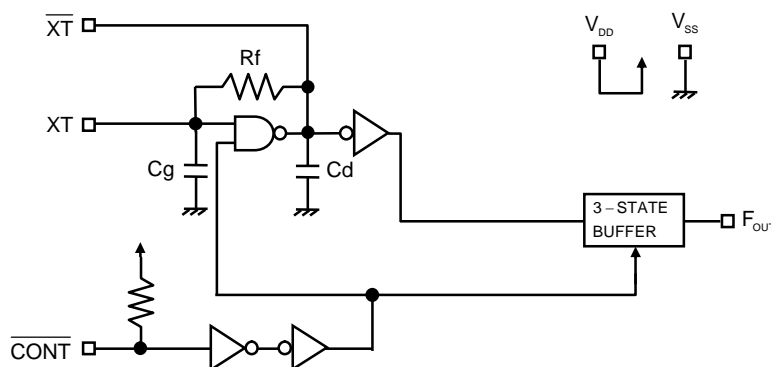
COORDINATES

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

Note1) NJR's standard crystal is used for measurement of the oscillation frequency range and it does not guaranteed.

Die Size: 0.7x0.75mm
 Thin-Die Thickness(C-D): 200±20um
 Thin-Die Thickness(C-L): 140±10um
 Wafer Thickness(W-H): 200±20um
 Wafer Thickness(W-L): 140±10um
 Pad Size: 90x90um
 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	
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	$^\circ\text{C}$

Note2) 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.

Note3) 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

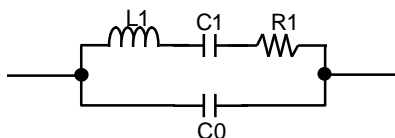
(V_{DD}=1.8V, Ta=25°C)

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 Note4)			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 Note5)	90			MHz
		B type Note5)	105			
		C type Note5)	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

Note4) Excluding input current on CONT Terminal.

Note5) NJR's standard crystal is used for measurement of the oscillation frequency range and it does not guaranteed. (Refer to EXAMPLE OF CRYSTAL PARAMETERS FOR MEASUREMENT CIRCUITS)

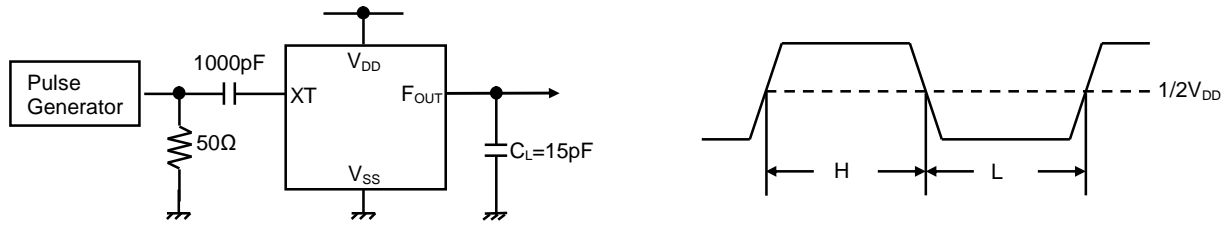
STANDARD CRYSTAL PARAMETERS FOR MEASUREMENT CIRCUITS



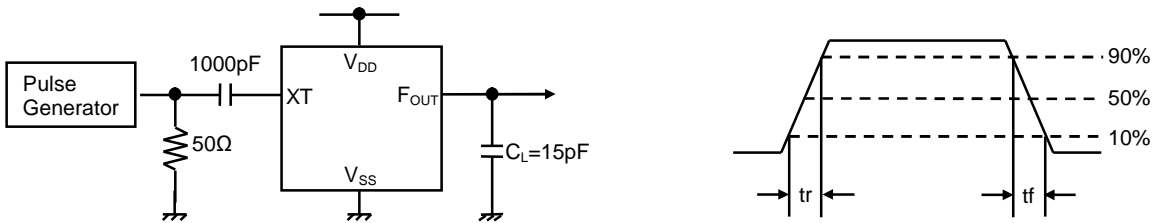
f[MHz]	R1[Ω]	L1[mH]	C1[fF]	C0[pF]
90	27.6	3.12	1.00	3.29
105	17.1	1.99	1.16	3.27
125	14.9	1.20	1.36	4.83

MEASUREMENT CIRCUITS

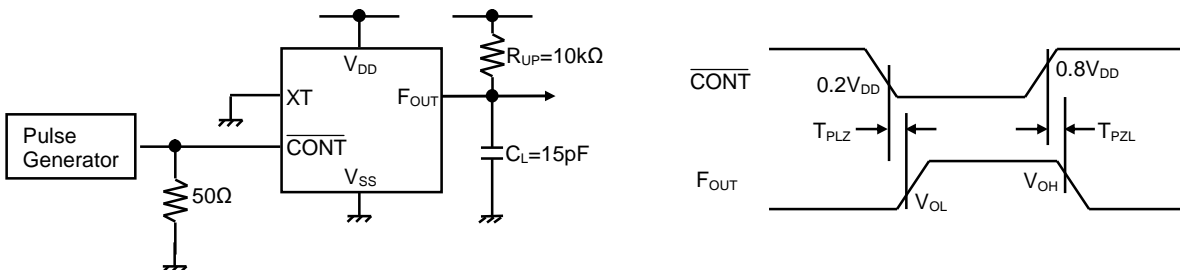
(1) Output Signal Symmetry ($C_L=15\text{pF}$)



(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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