

3rd. Over Tone Quartz Crystal Oscillator for 135MHz

■GENERAL DESCRIPTION

The NJU6397 series that is a C-MOS IC for quartz crystal oscillator consists of an oscillation amplifier and 3-state output buffer.

This series has three types of A, B and C. The frequency range of the A type is from 75 to 90MHz, and the B type is from 90 to 110MHz, and the C type is from 110 to 135MHz.

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

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

■PACKAGE OUTLINE

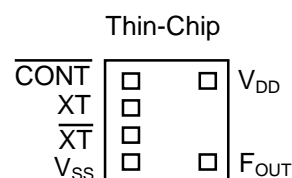


NJU6397XC-D

■FEATURES

- Operating Voltage 2.3 to 3.6V
- Maximum Oscillation Frequency (See Line-up Table)
- High Fan-out $I_{OH}/I_{OL} = 6mA @ V_{DD}=2.5V$
 $I_{OH}/I_{OL} = 8mA @ V_{DD}=3.3V$
- Oscillation Stop and Output Stand-by Function
- 3-State Output Buffer
- Oscillation Capacitors C_g and C_d on-chip
- Package Outline Thin-Chip
- C-MOS Technology

■PAD LOCATION



■LINE-UP TABLE

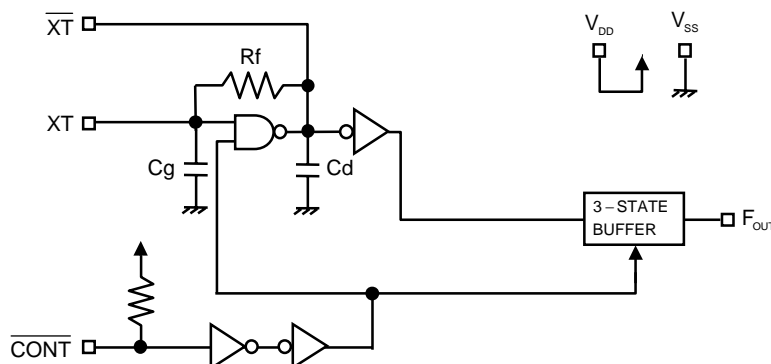
Type No.	Recommended Oscillation Frequency	Output Frequency	C_g/C_d
NJU6397	A 75 to 90MHz	f_0	11/12pF
	B 90 to 110MHz		9/10pF
	C 110 to 135MHz		8/9pF

■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
8	V_{DD}	206	231

Starting Point: Chip Center Unit[um]
 Chip Size: 0.7x0.75mm
 Thin-Chip Thickness: 200±20um
 Pad Size: 90x90um

■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
XT	Quartz Crystal Connecting Terminals	
$\overline{\text{XT}}$		
V_{SS}	$V_{\text{SS}}=0\text{V}$	
F_{OUT}	Frequency Output	
V_{DD}	$V_{\text{DD}}=2.5\text{V}/3.3\text{V}$	

■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 do not over the V_{DD} level.

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}		2.3		3.6	V

(V_{DD}=2.5V, Ta=25°C)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Current	I _{DD1}	A type, fosc=90MHz, C _L =15pF		10	20	mA
		B type, fosc=110MHz, C _L =15pF		10	20	
		C type, fosc=135MHz, C _L =15pF		15	30	
Oscillation Stopping Current	I _{DD2}	CONT=V _{SS} , No load		2	5	uA
Stand-by Current	I _{st}	CONT=XT=V _{SS} , No load Note3)			1	uA
Input Voltage	V _{IH}		2.0		3.5	V
	V _{IL}		0		0.5	V
Output Current	I _{OH}	V _{OH} =2.2V	6			mA
	I _{OL}	V _{OL} =0.3V	6			mA
Input Current	I _{IN}	CONT=0.8V _{DD}		7.5	12.0	uA
		CONT=0.2V _{DD}		1.2	2.0	uA
3-state Off Leakage Current	I _{OZ}	CONT=V _{SS} , F _{OUT} = V _{DD} or V _{SS}			±0.1	uA
Feedback Resistance	R _f	A type		3.8		kΩ
		B type		3.8		
		C type		2.9		
Internal Capacitor	C _g /C _d	A type, fosc=90MHz		11/12		pF
		B type, fosc=110MHz		9/10		
		C type, fosc=135MHz		8/9		
Maximum Oscillation Frequency	F _{MAX}	A type	90			MHz
		B type	110			
		C type	135			
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%		3	4	ns
Output Signal Fall Time	t _f	C _L =15pF, 90% to 10%		3	4	ns
Output Disable time	T _{PLZ}	C _L =15pF, R _{UP} =10kΩ			200	ns
Output Enable Time	T _{PZL}	C _L =15pF, R _{UP} =10kΩ			200	ns

Note3) Excluding input current on CONT Terminal.

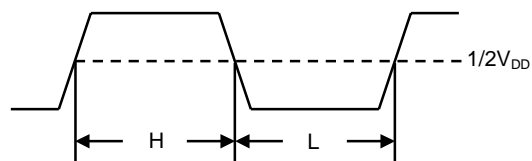
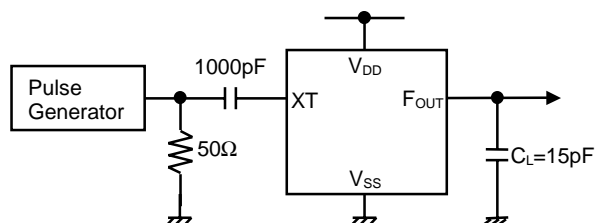
(V_{DD}=3.3V, Ta=25°C)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Current	I _{DD1}	A type, fosc=90MHz, C _L =15pF		13	25	mA
		B type, fosc=110MHz, C _L =15pF		13	25	
		C type, fosc=135MHz, C _L =15pF		18	35	
Oscillation Stopping Current	I _{DD2}	CONT=V _{SS} , No load			10	uA
Stand-by Current	I _{st}	CONT=XT=V _{SS} , No load Note3)			1	uA
Input Voltage	V _{IH}		2.3		3.3	V
	V _{IL}		0		1.0	V
Output Current	I _{OH}	V _{OH} =2.97V	8			mA
	I _{OL}	V _{OL} =0.33V	8			mA
Input Current	I _{IN}	CONT=0.8V _{DD}		10.0	15.0	uA
		CONT=0.2V _{DD}		1.8	3.0	uA
3-state Off Leakage Current	I _{OZ}	CONT=V _{SS} , F _{OUT} = V _{DD} or V _{SS}			±0.1	uA
Feedback Resistance	R _f	A type		3.8		kΩ
		B type		3.8		
		C type		2.9		
Internal Capacitor	C _g /C _d	A type, fosc=90MHz		11/12		pF
		B type, fosc=110MHz		9/10		
		C type, fosc=135MHz		8/9		
Maximum Oscillation Frequency	F _{MAX}	A type	90			MHz
		B type	110			
		C type	135			
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	3	ns
Output Signal Fall Time	t _f	C _L =15pF, 90% to 10%		2	3	ns
Output Disable time	T _{PLZ}	C _L =15pF, R _{UP} =10kΩ			150	ns
Output Enable Time	T _{PZL}	C _L =15pF, R _{UP} =10kΩ			150	ns

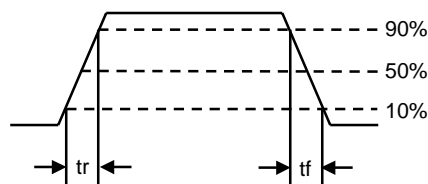
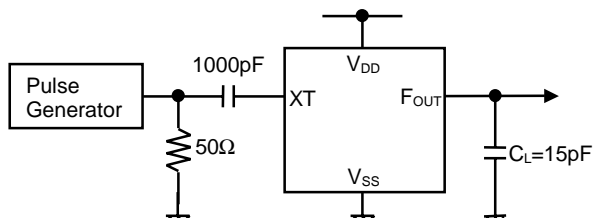
Note3) Excluding input current on CONT Terminal.

MEASUREMENT CIRCUITS

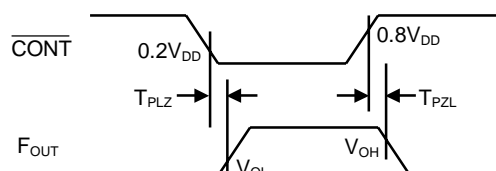
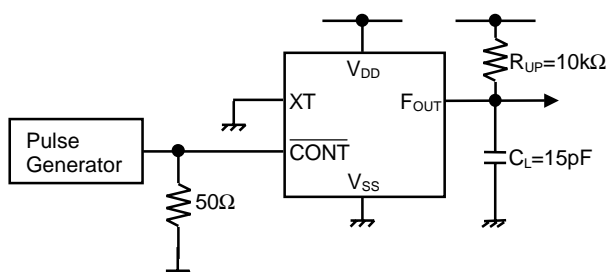
(1) Output Signal Symmetry ($C_L=15\text{pF}$)



(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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