

3rd. Over Tone Quartz Crystal Oscillator for 166MHz

■GENERAL DESCRIPTION

The NJU6396 is a C-MOS IC for XO's, and can oscillate up to 166MHz maximum at very low operating voltage.

High Fan-out is gained from low operating voltage with 3-state output buffer and the oscillation amplifier that is realized very low stand-by current using NAND circuit.

Furthermore, not using PLL, the electrical character shows a very low jitter.

The NJU6396 is suitable for mobile, optical communications (included WDM system) and not to mention previous applications; Computer & Peripherals, telecommunications, LAN/WAN, Wireless and so on.

■PACKAGE OUTLINE

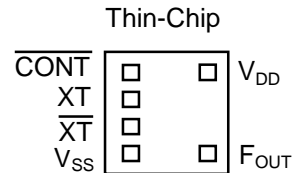


NJU6396C-D

■FEATURES

- Operating Voltage 2.7 to 3.6V
- Maximum Oscillation Frequency 166MHz
- High Fan-out $I_{OH}/I_{OL}=8mA @3.3V$
- 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 LACATION

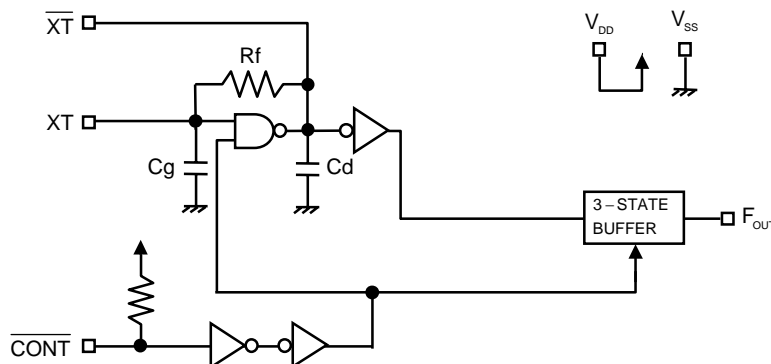


■PAD CONFIGURATION

No	Pad Name	X	Y
1	\overline{CONT}	-178	231
2	XT	-178	77
3	\overline{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
$\overline{\text{XT}}$	Quartz Crystal Connecting Terminals	
V_{SS}	$V_{\text{SS}}=0\text{V}$	
F_{OUT}	Frequency Output	
V_{DD}	$V_{\text{DD}}=3.3\text{V}$	

■ABSOLUTE MAXIMUM RATINGS

(Ta=25°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	Topr	-40 to +85	°C
Storage Temperature Range	Tstg	-55 to +125	°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}		2.7		3.6	V

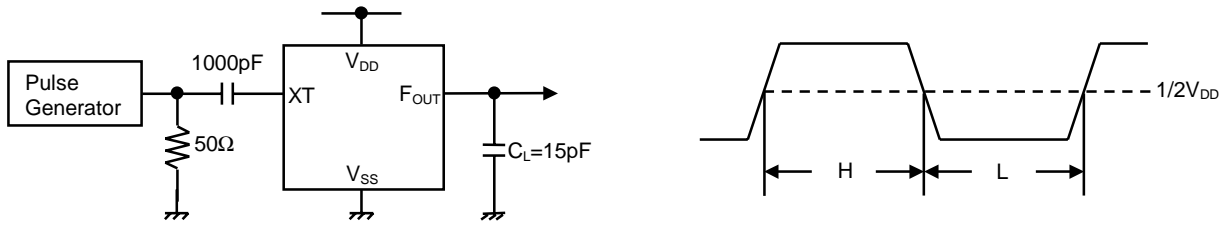
 (V_{DD}=3.3V, Ta=25°C)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Current	I _{DD1}	fosc=166MHz, C _L =15pF		27	40	mA
Oscillation Stopping Current	I _{DD2}	$\overline{\text{CONT}} = V_{SS}$, No load			10	uA
Stand-by Current	I _{st}	$\overline{\text{CONT}} = \text{XT} = V_{SS}$, No load Note3)			1	uA
Input Voltage	V _{IH}		2.31		3.3	V
	V _{IL}		0		0.99	V
Output Current	I _{OH}	V _{OH} =2.97V	8			mA
	I _{OL}	V _{OL} =0.33V	8			mA
Input Current	I _{IN}	$\overline{\text{CONT}} = 0.8V_{DD}$		10.0	15.0	uA
		$\overline{\text{CONT}} = 0.2V_{DD}$		1.8	3.0	uA
3-state Off Leakage Current	I _{OZ}	$\overline{\text{CONT}} = V_{SS}$, F _{OUT} = V _{DD} or V _{SS}			±0.1	uA
Internal Capacitor	Cg/Cd	fosc=166MHz		9/10		pF
Maximum Oscillation Frequency	F _{MAX}		166			MHz
Output Signal Symmetry	SYM	C _L =15pF, @V _{DD} /2	45	50	55	%
Output Signal Rise Time	tr	C _L =15pF, 10% to 90%		2	3	ns
Output Signal Fall Time	tf	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

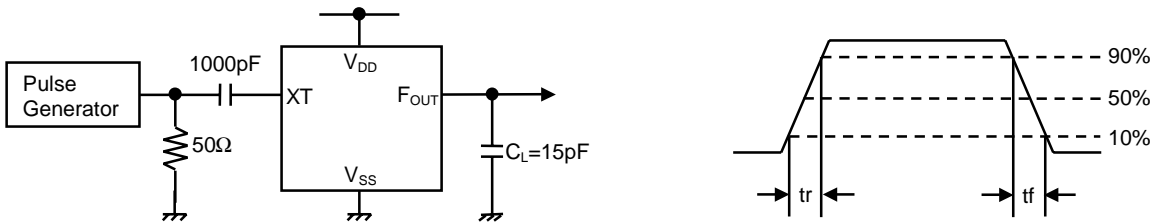
 Note3) Excluding input current on $\overline{\text{CONT}}$ Terminal.

MEASUREMENT CIRCUITS

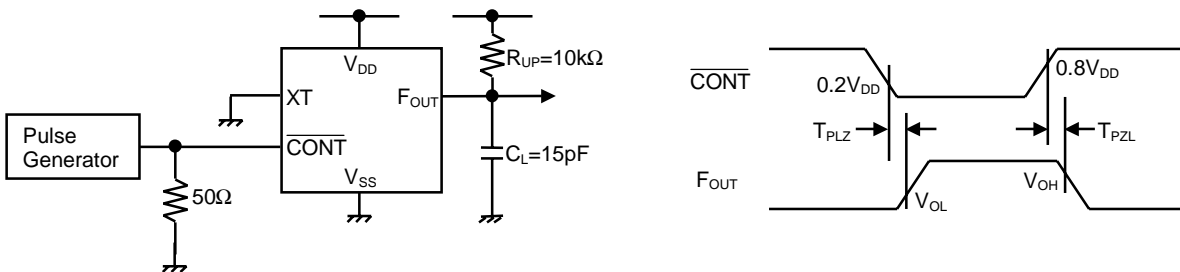
(1) Output Signal Symmetry ($C_L=15\text{pF}$)



(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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