3rd. Over Tone Quartz Crystal Oscillator for 166MHz

■GENERAL DESCRIPTION

The NJU6396 is a C-MOS IC for XOs, 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

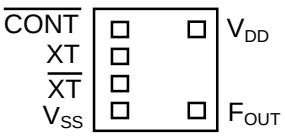
NJU6396C-D

■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 Cg and Cg on-chip
- ●Package Outline
- ●C-MOS Technology Thin-Chip

■PAD LACATION

Thin-Chip

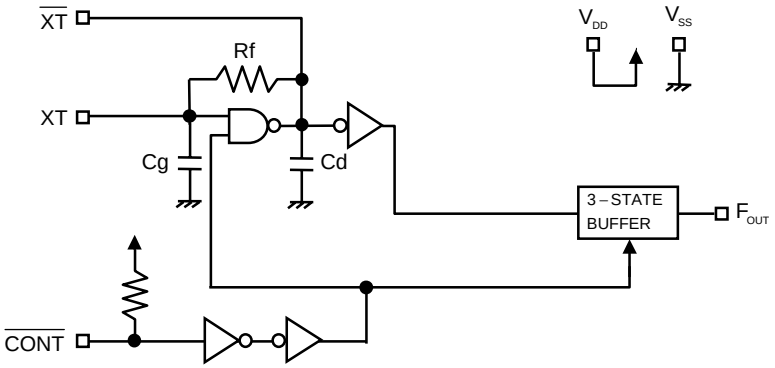


■PAD CONFIGURATION

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



■TREMINAL DESCRIPTION

SYMBOL	FUNCTION	
$\overline{CONT}$	Oscillation and 3-state Output Buffer Control	
	$\overline{CONT}$	F_{OUT}
	H or OPEN	Output frequency f_0
	L	Oscillation Stop and High impedance Output
XT	Quartz Crystal Connecting Terminals	
$\overline{XT}$		
V_{SS}	V_{SS}=0V	
F_{OUT}	Frequency Output	
V_{DD}	V_{DD}=3.3V	

■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_{SS}-0.5 to V_{DD}+0.5	V
Output Voltage	V_O	-0.5 to V_{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) Decupling 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

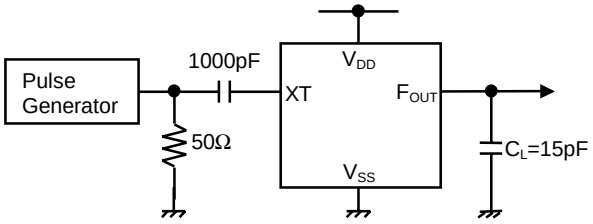
(V_{DD}=3.3V,Ta=25°C)

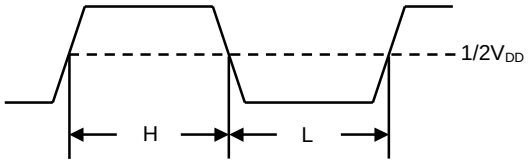
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Current	I_{DD1}	fosc=166MHz, C_L=15pF		27	40	mA
Oscillation Stopping Current	I_{DD2}	$\overline{CONT}$ =V_{SS}, No load			10	uA
Stand-by Current	Ist	$\overline{CONT}$ =XT=V_{SS}, No load Note3)			1	uA
Input Voltage	V_{IH}		2.31		3.3	V
	V_{IL}		0		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}	$\overline{CONT}$ =0.8V_{DD}		10.0	15.0	uA
		$\overline{CONT}$ =0.2V_{DD}		1.8	3.0	uA
3-state Off Leakage Current	I_{OZ}	$\overline{CONT}$ =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 $\overline{CONT}$ Terminal.

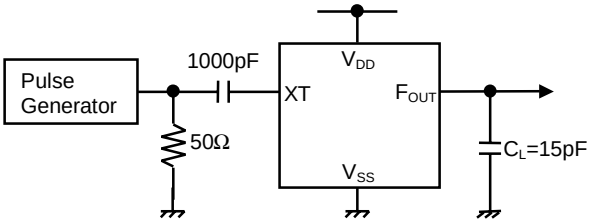
■MEASURMENT CIRCUITS

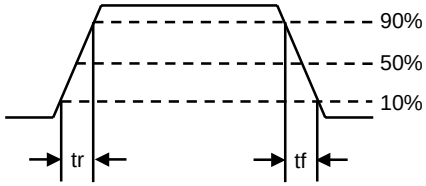
(1)Output Signal Symmetry(C_L=15pF)





(2)Output Signal Rise/Fall Time(C_L=15pF)





(3)Output Disable/Enable Time(C_L=15pF,R_{UP}=10kΩ)