

## QUARTZ CRYSTAL OSCILLATOR

### ■ GENERAL DESCRIPTION

The NJU6395 series is a low voltage operation C-MOS quartz crystal oscillator which is possible to 65MHz. It consists of an oscillation amplifier and a 3-state output buffer.

The oscillation amplifier incorporates feed-back resistance and oscillation capacitors (Cg, Cd), therefore it requires no external component except quartz crystal.

The driverbility of the 3-state output buffer is 6mA, thus it can drive C-MOS load.

### ■ FEATURES

- Low Operating Voltage — 2.2~2.8V
- Recommended Oscillation Frequency — 45 to 65MHz
- High Fan-out —  $I_{OL}/I_{OH}=6mA$  @2.5V
- Oscillation Stop and Output Buffer Stand-by Function
- 3-state Output Buffer
- Oscillation Capacitors Cg and Cd on-chip
- Package Outline — Chip/Thin-Chip
- C-MOS Technology

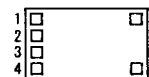
### ■ PACKAGE OUTLINE



NJU6393C/CT

### ■ PAD LOCATION

Chip/Thin-Chip



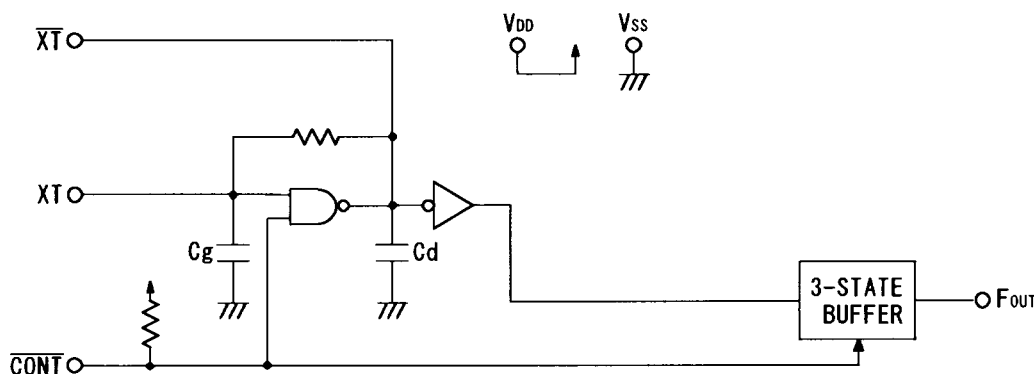
### ■ COORDINATES

UNIT:  $\mu m$

No.	PAD	X	Y
1	$\overline{CONT}$	-428	258
2	XT	-428	86
3	$\overline{XT}$	-428	-86
4	V <sub>SS</sub>	-428	-258
5	F <sub>OUT</sub>	478	-258
8	V <sub>DD</sub>	478	258

Chip Center : X=0 $\mu m$ , Y=0  $\mu m$   
 Chip Size : 1.24x0.8 mm  
 Chip Thickness : 400 $\pm$ 30  $\mu m$   
 Thin-Chip Thickness: 260 $\pm$ 20  $\mu m$   
 Note1) No. 6 and 7 are no pad.

### ■ BLOCK DIAGRAM



**■ TERMINAL DESCRIPTION**

No.	SYMBOL	F U N C T I O N	
1	$\overline{\text{CONT}}$	Oscillation and 3-State Output Buffer Control	
		$\overline{\text{CONT}}$	$F_{\text{OUT}}$
		H or Open	Output Frequency $f_o$
		L	Oscillation Stop and High Impedance Output
2	$\overline{\text{XT}}$	Quartz Crystal Connecting terminals	
3	$\text{XT}$		
4	$V_{\text{SS}}$	GND : $V_{\text{SS}}=0\text{V}$	
5	$F_{\text{OUT}}$	Output Frequency $f_o$	
8	$V_{\text{DD}}$	$V_{\text{DD}}=2.5\text{V}$	

**■ ABSOLUTE MAXIMUM RATINGS**

(Ta=25°C)

P A R A M E T E R	SYMBOL	R A T I N G S	UNIT
Supply Voltage	$V_{\text{DD}}$	-0.5 ~ +7.0	V
Input Voltage	$V_{\text{IN}}$	$V_{\text{SS}}-0.5 \sim V_{\text{DD}}+0.5$	V
Output Voltage	$V_o$	-0.5 ~ $V_{\text{DD}}+0.5$	V
Input Current	$I_{\text{IN}}$	$\pm 10$	mA
Output Current	$I_o$	$\pm 25$	mA
Operating Temperature Range	Topr	-40 ~ + 85	°C
Storage Temperature Range	Tstg	-55 ~ +125	°C

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

**■ ELECTRICAL CHARACTERISTICS**

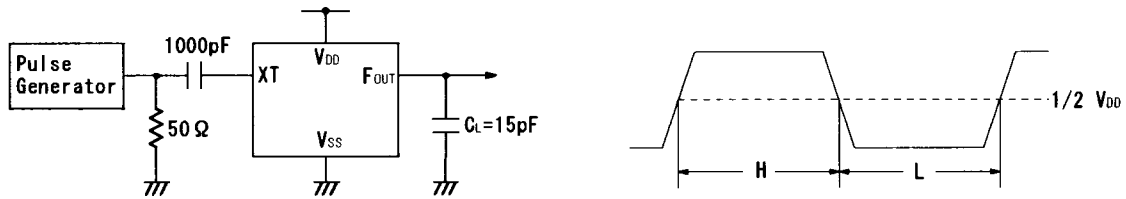
 (V<sub>DD</sub>=3.0V, Ta=25°C)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	V <sub>DD</sub>		2.2		2.8	V
Operating Current	I <sub>DD1</sub>	f <sub>OSC</sub> =48MHz, No Load		8	15	mA
Stand-by Current	I <sub>st</sub>	CONT=XT=V <sub>SS</sub> , No load Note3			1	uA
Input Voltage	V <sub>IH</sub>		2.0		2.5	V
	V <sub>IL</sub>		0		0.5	
Output Current	I <sub>OH</sub>	V <sub>OH</sub> =2.25V	6			mA
	I <sub>OL</sub>	V <sub>OL</sub> =0.25V	6			
Input Current	I <sub>IN</sub>	CONT=V <sub>SS</sub>	62	125	250	uA
3-state Off-leakage Current	I <sub>oz</sub>	CONT=V <sub>SS</sub> , F <sub>OUT</sub> =V <sub>DD</sub> or V <sub>SS</sub>			±0.1	uA
Internal Capacitor	C <sub>s</sub> /C <sub>d</sub>	f <sub>OSC</sub> =48MHz		12/14		pF
Maximum Oscillation Frequency	F <sub>MAX</sub>		65			MHz
Output Signal Symmetry	SYM	C <sub>L</sub> =15pF, @1/2·V <sub>DD</sub>	45	50	55	%
Output Signal Rise Time	t <sub>r</sub>	C <sub>L</sub> =15pF, 10%~90%		2.6	6	ns
Output Signal Fall Time	t <sub>f</sub>	C <sub>L</sub> =15pF, 90%~10%		2.6	6	
Output Disable Time	T <sub>PLZ</sub>	C <sub>L</sub> =15pF, R <sub>UP</sub> =10kΩ			200	ns
Output Enable Time	T <sub>PZL</sub>	C <sub>L</sub> =15pF, R <sub>UP</sub> =10kΩ			200	

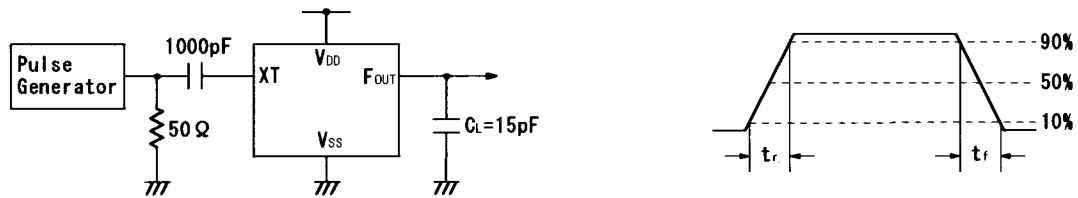
Note3) Excluding input current on CONT terminal.

MEASUREMENT CIRCUITS

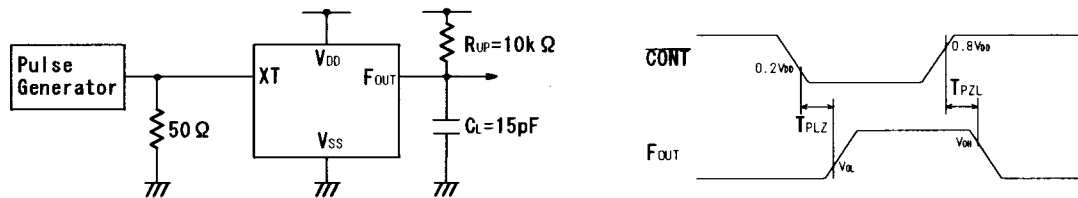
(1) Output Signal Symmetry ( $C_L=15\text{pF}$ )



(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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