

QUARTZ CRYSTAL OSCILLATOR

■ GENERAL DESCRIPTION

The NJU6391 series is a 3V operation C-MOS quartz crystal oscillator which consists of an oscillation amplifier and a 3-state output buffer.

This series are classed into three versions A, B and C according to their oscillation frequency range mentioned in the line-up table.

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

Driverbility of the 3-state output buffer is 8mA (sink/source), thus it can drive C-MOS load.

■ PACKAGE OUTLINE



NJU6391XC



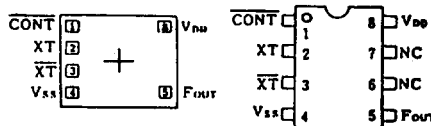
NJU6391XE

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■ FEATURES

- Low Operating Voltage. -- 2.4~3.6V
- Maximum Oscillation Frequency (See Line-Up Table)
- Low Operating Current
- High Fan-out -- $I_{OL}/I_{OH}=8mA$
- 3-state Output Buffer
- Oscillation Capacitors C_g and C_d on-chip
- NAND Type Oscillation Amplifier (not Inverter)
- Oscillation Stand-by Function
(Non Pull-up Resistance)
- Package Outline -- CHIP / EMP 8
- C-MOS Technology

■ PAD LOCATION/PIN CONFIGURATION



■ LINE-UP TABLE

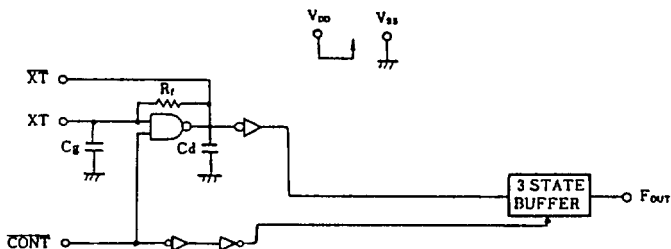
Type No.	Recommended Osc. Freq.	Output Freq.	C_g/C_d
NJU6391A	20~35MHz	f_0	27pF
6391B	35~50MHz		19pF
6391C	45~75MHz		12/14pF

■ COORDINATES

Unit: μm

No.	PAD	X	Y
1	CONT	-408	248
2	XT	-408	81
3	XT	-408	-86
4	VSS	-408	-248
5	FOUT	464	-248
8	VDD	464	248

■ BLOCK DIAGRAM



Chip Size : 1.29 X 0.8mm
 Chip Center : $X=0\mu m, Y=0\mu m$
 Chip Thickness : $400\mu m \pm 30\mu m$
 (Note) No.6 and 7 terminals are only for package type information. There are no PAD on the chip.



■ TERMINAL DESCRIPTION

NO.	SYMBOL	F U N C T I O N
1	$\overline{\text{CONT}}$	3-State Output Control
		$\overline{\text{CONT}}$ Output (F_{OUT})
		H Output Frequency f_0
		L Output High Impedance
2	$\overline{\text{XT}}$	Quartz Crystal Connecting Terminals
3	$\overline{\text{XT}}$	
4	V_{SS}	GND
5	F_{OUT}	Output frequency f_0
8	V_{DD}	+ 3V

(Note) It isn't the pull-up resistance on $\overline{\text{CONT}}$ terminal.

■ ABSOLUTE MAXIMUM RATINGS

($T_a=25^\circ\text{C}$)

P A R A M E T E R	SYMBOL	R A T I N G S	UNIT
Supply Voltage	V_{DD}	-0.5 ~ +7.0	V
Input Voltage	V_{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_{IN}	± 10	mA
Output Current	I_o	± 25	mA
Power Dissipation	P_D	200 (EMP)	mW
Operating Temperature Range	T_{opr}	-40 ~ +85	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55 ~ +125	$^\circ\text{C}$

■ ELECTRICAL CHARACTERISTICS

($T_a=25^\circ\text{C}$, $V_{\text{DD}}=3\text{V}$)

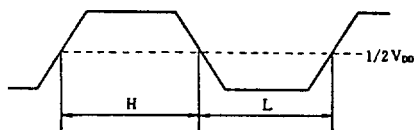
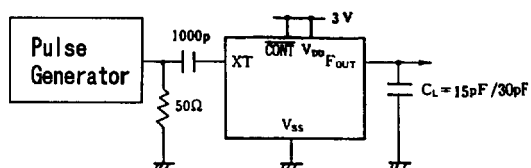
P A R A M E T E R	SYMBOL	C O N D I T I O N S	MIN	TYP	MAX	UNIT
Operating Voltage	V_{DD}		2.4		3.6	V
Operating Current	I_{DD1}	A Version $f_{\text{osc}}=24\text{MHz}$, No Load		6	15	mA
	I_{DD2}	B Version $f_{\text{osc}}=48\text{MHz}$, No Load		9	20	
	I_{DD3}	C Version $f_{\text{osc}}=48\text{MHz}$, No Load		9	25	
Stand-by Current	I_{st}	$\overline{\text{CONT}}, \overline{\text{XT}}=V_{\text{SS}}$, No Load (Note)			1	μA
Input Voltage	V_{IH}		2.4		3.0	V
	V_{IL}		0		0.6	
Output Current	I_{OH}	$V_{\text{DD}}=5\text{V}$, $V_{\text{OH}}=4.5\text{V}$	8			mA
	I_{OL}	$V_{\text{DD}}=5\text{V}$, $V_{\text{OL}}=0.5\text{V}$	8			
Input Current	I_{IN}	$\overline{\text{CONT}}$ Terminal, $\overline{\text{CONT}}=V_{\text{SS}}$			1	μA
3-St Off-leakage Current	I_{oz}	$\overline{\text{CONT}}=V_{\text{SS}}$, $F_{\text{OUT}}=V_{\text{SS}}$ or V_{DD}			± 0.1	μA
Internal Capacitor	C_g/C_d	A Version		27		pF
		B Version		19		
		C Version		12/14		
Max. Oscillation Freq.	f_{MAX}	A Version	35			MHz
		B Version	50			
		C Version	75			
Output Signal Symmetry	SYM	$C_L=15\text{pF}$ at 1.5V	45	50	55	%
		$C_L=30\text{pF}$ at 1.5V				
Output Signal Rise Time	t_{r1}	$C_L=15\text{pF}$, 10~90%		2	4	ns
	t_{r2}	$C_L=30\text{pF}$, 10~90%			6	
Output Signal Fall Time	t_{f1}	$C_L=15\text{pF}$, 90~10%		2	4	ns
	t_{f2}	$C_L=30\text{pF}$, 90~10%			6	

(Note) Excluding input current on $\overline{\text{CONT}}$ terminal.



■ MEASUREMENT CIRCUITS

(1) Output Signal Symmetry



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(2) Output Signal Rise / Fall Time

