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(Cg, Cd), 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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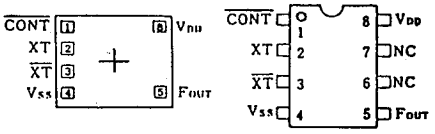
■ FEATURES

- 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 Cg and Cd 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.	Cg/Cd
NJU6391A	20~35MHz	f_O	27pF
6391B	35~50MHz		19pF
6391C	45~75MHz		12/14pF

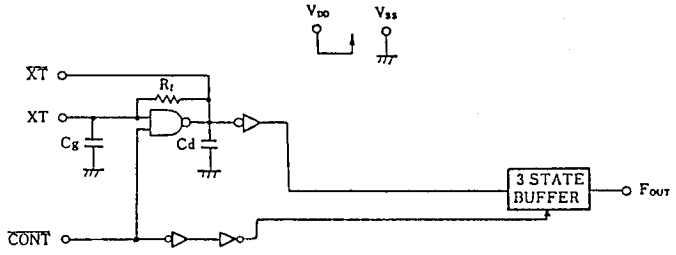
■ COORDINATES

Unit: μm

No.	PAD	X	Y
1	$\overline{CONT}$	-408	248
2	XT	-408	81
3	$\overline{XT}$	-408	- 86
4	V_{SS}	-408	-248
5	F_{OUT}	464	-248
8	V_{DD}	464	248

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

■ BLOCK DIAGRAM



■ TERMINAL DESCRIPTION

NO.	SYMBOL	FUNCTION
1	$\overline{CONT}$	3-State Output Control $\overline{CONT}$ = H: Output (F_{OUT}) = Output Frequency f_O $\overline{CONT}$ = L: Output (F_{OUT}) = Output High Impedance
2	XT	Quartz Crystal Connecting Terminals
3	$\overline{XT}$	
4	V_{SS}	GND
5	F_{OUT}	Output frequency f_O
8	V_{DD}	+ 3V

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

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25℃)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{DD}	-0.5 ~ +7.0	V
Input Voltage	V_{IN}	V_{SS}-0.5 ~ V_{DD}+0.5	V
Output Voltage	V_O	-0.5 ~ V_{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	Topr	-40 ~ +85	℃
Storage Temperature Range	Tstg	-55 ~ +125	℃

(Note) Decoupling capacitor should be connected between V_{DD} and V_{SS} due to the stabilized operation for the circuit.

■ ELECTRICAL CHARACTERISTICS

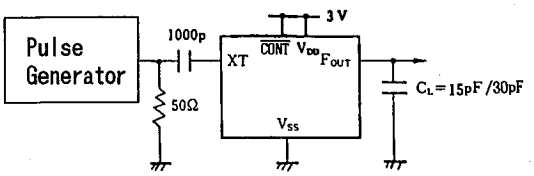
(Ta=25℃, V_{DD}=3V)

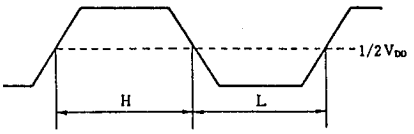
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	V_{DD}		2.4		3.6	V
Operating Current	I_{DD1}	A Version f_{OSC}=24MHz, No Load		6	15	mA
	I_{DD2}	B Version f_{OSC}=48MHz, No Load		9	20	
	I_{DD3}	C Version f_{OSC}=48MHz, No Load		9	25	
Stand-by Current	Ist	$\overline{CONT}$, XT=V_{SS}, No Load (Note)			1	μA
Input Voltage	V_{IH}		2.4		3.0	V
	V_{IL}		0		0.6	
Output Current	I_{OH}	V_{DD}=5V, V_{OH}=4.5V	8			mA
	I_{OL}	V_{DD}=5V, V_{OL}=0.5V	8			
Input Current	I_{IN}	$\overline{CONT}$ Terminal, $\overline{CONT}$=V_{SS}			1	μA
3-St Off-leakage Current	I_{OZ}	$\overline{CONT}$=V_{SS}, F_{OUT}=V_{SS} or V_{DD}			±0.1	μA
Internal Capacitor	Cg/Cd	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=15pF at 1.5V	45	50	55	%
		C_L=30pF at 1.5V				
Output Signal Rise Time	t_{r1}	C_L=15pF, 10~90%		2	4	ns
	t_{r2}	C_L=30pF, 10~90%			6	
Output Signal Fall Time	t_{f1}	C_L=15pF, 90~10%		2	4	ns
	t_{f2}	C_L=30pF, 90~10%			6	

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

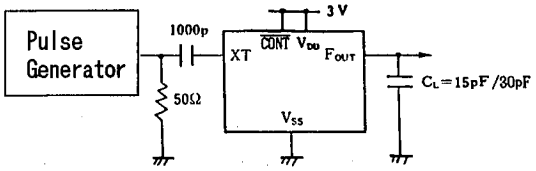
■ MEASUREMENT CIRCUITS

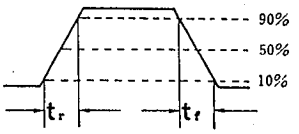
(1) Output Signal Symmetry





(2) Output Signal Rise / Fall Time





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