

## QUARTZ CRYSTAL OSCILLATOR

## GENERAL DESCRIPTION

The NJU6392 series is a 3V operation C-MOS quartz crystal oscillator which consists of an oscillation amplifier and a 3-state output buffer.

This series is classed into four versions A, B, C and P 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.

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

## PACKAGE OUTLINE



NJU6392XC



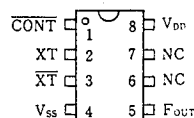
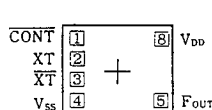
NJU6392XE

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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
- Oscillation Output Stand-by Function
- Package Outline — CHIP / EMP 8
- C-MOS Technology

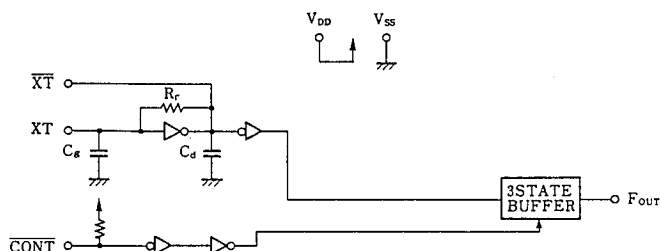
## PAD LOCATION/PIN CONFIGURATION



## LINE-UP TABLE

Type No.	Recommended Osc. Freq.	Output Freq.	$C_g/C_d$
NJU6392A	20~35MHz	$f_o$	27pF
6392B	30~50MHz		19pF
6392C	45~75MHz		12/14pF
6392P	~75MHz		No

## BLOCK DIAGRAM



## COORDINATES

Unit:  $\mu m$ 

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

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	CONT	3-State Output Control
		CONT
		Output ( F <sub>OUT</sub> )
		H or OPEN
2	XT	Quartz Crystal Connecting Terminals
		XT
4	V <sub>SS</sub>	GND
5	F <sub>OUT</sub>	Output frequency f <sub>o</sub>
8	V <sub>DD</sub>	+ 3 V

# ABSOLUTE MAXIMUM RATINGS

(T<sub>a</sub>=25°C)

P A R A M E T E R	SYMBOL	R A T I N G S	UNIT
Supply Voltage	V <sub>DD</sub>	-0.5 ~ +7.0	V
Input Voltage	V <sub>IN</sub>	V <sub>SS</sub> -0.5 ~ V <sub>DD</sub> +0.5	V
Output Voltage	V <sub>o</sub>	-0.5 ~ V <sub>DD</sub> +0.5	V
Input Current	I <sub>IN</sub>	±10	mA
Output Current	I <sub>o</sub>	±25	mA
Power Dissipation	P <sub>D</sub>	200 (EMP)	mW
Operating Temperature Range	T <sub>opr</sub>	-40 ~ +85	°C
Storage Temperature Range	T <sub>stg</sub>	-55 ~ +125	°C

(Note) Decoupling capacitor should be connected between V<sub>DD</sub>-V<sub>SS</sub> due to the stabilized operation for the circuit.

# ELECTRICAL CHARACTERISTICS

(T<sub>a</sub>=25°C, V<sub>DD</sub>=3V)

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 <sub>DD</sub>		2.4		3.6	V
Operating Current	I <sub>DD1</sub>	A Version f <sub>osc</sub> =24MHz, No Load		6	15	mA
	I <sub>DD2</sub>	B Version f <sub>osc</sub> =48MHz, No Load		9	20	
	I <sub>DD3</sub>	C Version f <sub>osc</sub> =48MHz, No Load (Note 1)		9	25	
Stand-by Current	I <sub>st</sub>	CONT, XT=V <sub>SS</sub> , No Load (Note 2)			1	μA
Input Voltage	V <sub>IH</sub>		2.4		3.0	V
	V <sub>IL</sub>		0		0.6	
Output Current	I <sub>OH</sub>	V <sub>OH</sub> =2.7V	8			mA
	I <sub>OL</sub>	V <sub>OL</sub> =0.3V	8			
Input Current	I <sub>IN</sub>	CONT Terminal, CONT=V <sub>SS</sub>	75	150	300	μA
3-St Off-leakage Current	I <sub>oz</sub>	CONT=V <sub>SS</sub> , F <sub>OUT</sub> =V <sub>SS</sub> or V <sub>DD</sub>			±0.1	μA
Internal Capacitor (Note 3)	C <sub>g</sub> /C <sub>d</sub>	A Version f <sub>osc</sub> =24MHz, No Load		27		pF
		B Version f <sub>osc</sub> =48MHz, No Load		19		
		C Version f <sub>osc</sub> =48MHz, No Load		12/14		
Max. Oscillation Freq.	f <sub>MAX</sub>	A Version	35			MHz
		B Version	50			
		C/P Version (Note 1)	75			
Output Signal Symmetry	SYM	C <sub>L</sub> =15pF at 1.5V C <sub>L</sub> =30pF at 1.5V	45	50	55	%
Output Signal Rise Time	t <sub>r1</sub>	C <sub>L</sub> =15pF, 10~90%		2	4	ns
	t <sub>r2</sub>	C <sub>L</sub> =30pF, 10~90%			6	
Output Signal Fall Time	t <sub>f1</sub>	C <sub>L</sub> =15pF, 90~10%		2	4	ns
	t <sub>f2</sub>	C <sub>L</sub> =30pF, 90~10%			6	

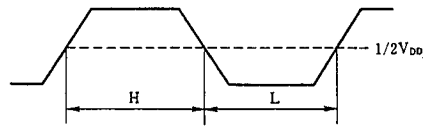
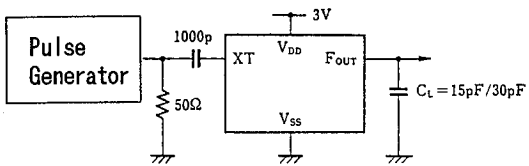
(Note 1) Only P Version is measured with external capacitors contained 3pF for C<sub>g</sub> and 3pF for C<sub>d</sub>.

(Note 2) Excluding input current on CONT terminal.

(Note 3) P Version is not mentioned due to internal oscillation capacitors C<sub>g</sub> and C<sub>d</sub> separated.

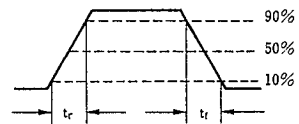
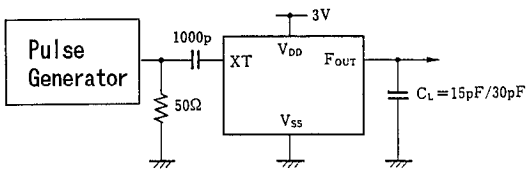
## MEASUREMENT CIRCUITS

### (1) Output Signal Symmetry



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### (2) Output Signal Rise / Fall Time



# NJU6392 Series

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MEMO

**[CAUTION]**

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