

## QUARTZ CRYSTAL OSCILLATOR

## ■ GENERAL DESCRIPTION

The NJU6319 series is a C-MOS quartz crystal oscillator which contains of an oscillation amplifier, 3-stage divider and 3-state output buffer.

The oscillation frequency is as wide as up to 50MHz and the symmetry of 45-55% is realized over full oscillation frequency range.

The oscillation amplifier incorporates feed-back resistance and oscillation capacitors (Cg, Cd), therefore, it requires no external component except quartz crystal and operating voltage is correspondence of 3V.

The 3-stage divider generates  $f_o$ ,  $f_o/2$ ,  $f_o/4$  and  $f_o/8$  and only one frequency selected by internal circuits is output.

The 3-state output buffer is C-MOS compatible and capable of 10 LSTTL driving.

## ■ FEATURES

- Operating Voltage — 2.7~6.0V
- Maximum Oscillation Frequency — 50MHz
- Low Operating Current
- High Fan-out — LSTTL 10
- 3-state Output Buffer
- Selected Frequency Output (mask option)  
Only one frequency out of  $f_o$ ,  $f_o/2$ ,  $f_o/4$  and  $f_o/8$  output
- Oscillation Capacitors Cg and Cd on-chip
- Oscillation Output Stand-by Function
- Package Outline — Chip/EMP/VSP 8
- C-MOS Technology

## ■ LINE-UP TABLE

Type No.	Output Frequency	Cg	Cd
NJU6319A	$f_o$	23pF	23pF
NJU6319B	$f_o/2$	23pF	23pF
NJU6319C	$f_o/4$	23pF	23pF
NJU6319D	$f_o/8$	23pF	23pF
NJU6319P	$f_o$	No	No

## ■ PACKAGE OUTLINE



NJU6319XC

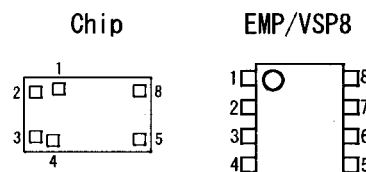


NJU6319XE



NJU6319XR

## ■ PAD LOCATION/PIN CONFIGURATION



## ■ COORDINATES

Unit:um

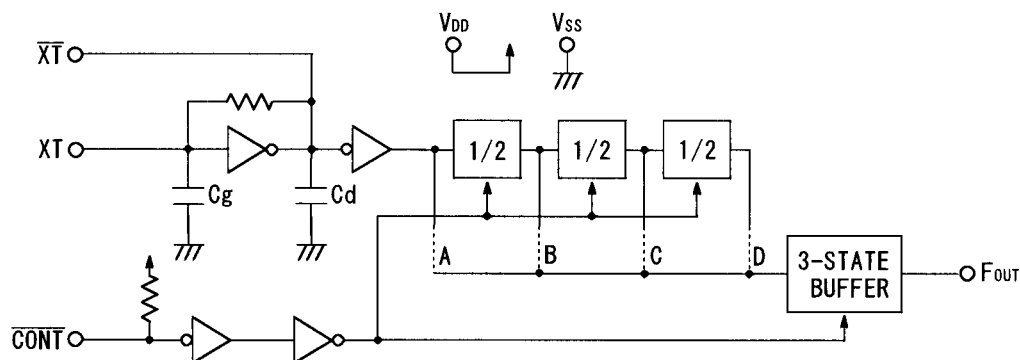
No.	PAD	X	Y
1	CONT	350	655
2	XT	130	630
3	XT	140	175
4	V <sub>SS</sub>	300	130
5	F <sub>OUT</sub>	1185	145
6	NC	—	—
7	NC	—	—
8	V <sub>DD</sub>	1185	650

Chip Size : 1.33 X 0.8mm

Chip Thickness : 400±30um

Note1) No. 6 and 7 terminals are only for package type information. There are no PAD on the chip.

## ■ BLOCK DIAGRAM



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## ■ TERMINAL DESCRIPTION

No.	SYMBOL	F U N C T I O N
1	$\overline{CONT}$	3-State Output Control and Divider Reset
		$\overline{CONT}$ $F_{OUT}$
		H or Open Output either one frequency from $f_o$ , $f_o/2$ , $f_o/4$ and $f_o/8$ (Note2)
		L Output High Impedance and Divider Reset
2	XT	Quartz Crystal Connecting terminals
3	$\overline{XT}$	
4	$V_{SS}$	GND
5	$F_{OUT}$	Output either one frequency from $f_o$ , $f_o/2$ , $f_o/4$ and $f_o/8$
8	$V_{DD}$	+3V/+5V

Note2) Refer to Line-Up Table.

## ■ 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	$V_{IN}$	$V_{SS}-0.5 \sim V_{DD}+0.5$	V
Output Voltage	$V_o$	-0.5 ~ $V_{DD}+0.5$	V
Input Current	$I_{IN}$	$\pm 10$	mA
Output Current	$I_o$	$\pm 25$	mA
Power Dissipation	$P_D$	200 (EMP) 320 (VSP)	mW
Operating Temperature Range	$T_{opr}$	-40 ~ + 85	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-65 ~ +150	$^\circ\text{C}$

Note) Decoupling 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 <sub>DD</sub>		2.7		6.0	V

(V<sub>DD</sub>=3V, Ta=25°C)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Current	I <sub>DD</sub>	fosc=16MHz, No load Note3			8	mA
Stand-by Current	I <sub>st</sub>	CONT, XT=V <sub>SS</sub> , No load Note4			1	uA
Input Voltage	V <sub>IH</sub>		2.7		3.0	V
	V <sub>IL</sub>		0		0.3	
Output Current	I <sub>OH</sub>	V <sub>OH</sub> =2.7V	1			mA
	I <sub>OL</sub>	V <sub>OL</sub> =0.3V	1			
Input Current	I <sub>IN</sub>	CONT=V <sub>SS</sub>			400	uA
3-st. Offleakage 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	Cg, Cd	Note5		23		pF
Max. Oscillation Freq.	f <sub>MAX</sub>	Note3	50			MHz
Output Signal Symmetry	SYM	C <sub>L</sub> =15pF at 1/2V <sub>DD</sub>	45	50	55	%
Output Signal Rise Time	t <sub>r</sub>	C <sub>L</sub> =15pF, 20%–80%			8	ns
Output Signal Fall Time	t <sub>f</sub>	C <sub>L</sub> =15pF, 80%–20%			8	ns

(V<sub>DD</sub>=5V, Ta=25°C)

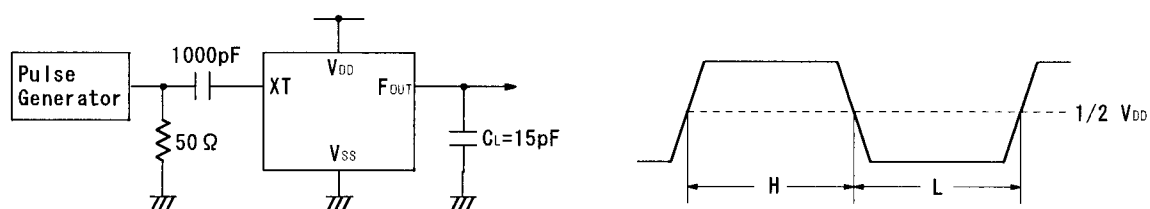
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Current	I <sub>DD</sub>	fosc=16MHz, No load Note3			15	mA
Stand-by Current	I <sub>st</sub>	CONT=XT=V <sub>SS</sub> , No load Note4			1	uA
Input Voltage	V <sub>IH</sub>		2.0		5.0	V
	V <sub>IL</sub>		0		0.8	
Output Current	I <sub>OH</sub>	V <sub>OH</sub> =4.5V	4			mA
	I <sub>OL</sub>	V <sub>OL</sub> =0.5V	4			
Input Current	I <sub>IN</sub>	CONT=V <sub>SS</sub>			400	uA
3-st. Offleakage 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	Cg, Cd	Note5		23		pF
Max. Oscillation Freq.	f <sub>MAX</sub>	Note3	50			MHz
Output Signal Symmetry	SYM	C <sub>L</sub> =15pF at 1/2V <sub>DD</sub>	45	50	55	%
Output Signal Rise Time	t <sub>r</sub>	C <sub>L</sub> =15pF, 20% – 80%			8	ns
Output Signal Fall Time	t <sub>f</sub>	C <sub>L</sub> =15pF, 80% – 20%			8	ns

Note3) Only P version is measured with external capacitors contained 18pF for Cg and 16pF for Cd.

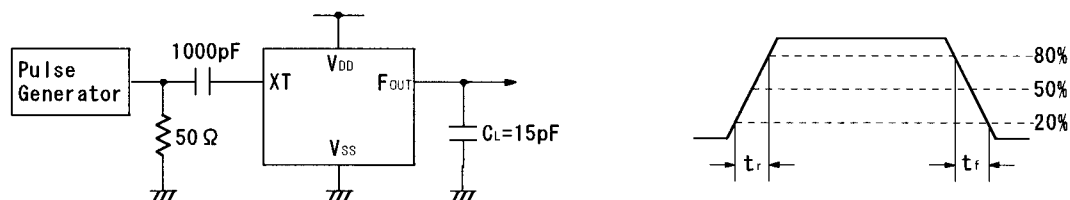
Note4) Excluding input current on CONT terminal.

Note5) P version is not mentioned due to internal oscillation capacitors Cg and Cd separated.

## ■ MEASUREMENT CIRCUITS

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

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(2) Output Signal Rise/Fall Time ( $C_L=15\text{pF}$ )

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# MEMO

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## [CAUTION]

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