

## 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  $f_0$ ,  $f_0/2$ ,  $f_0/4$  and  $f_0/8$  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.

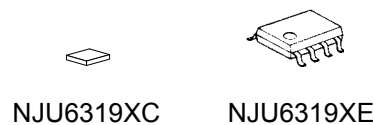
### ■FEATURES

- Operating Voltage ----- 2.7 to 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  $f_0$ ,  $f_0/2$ ,  $f_0/4$  and  $f_0/8$  output
- Oscillation Capacitors Cg and Cd on-Die
- Oscillation Output Stand-by Functuin
- Package Outline ----- Die/EMP-8
- C-MOS Technology

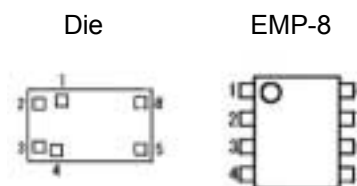
### ■LINE-UP TABLE

Type No.	F <sub>OUT</sub>	Internal Connect	Cg/Cd
NJU6319	A	Connected A Line	23/23pF
	B	Connected B Line	23/23pF
	C	Connected C Line	23/23pF
	D	Connected D Line	23/23pF
	P	Connected A Line	No

### ■PACKAGE OUTLINE



### ■PAD LOCATION

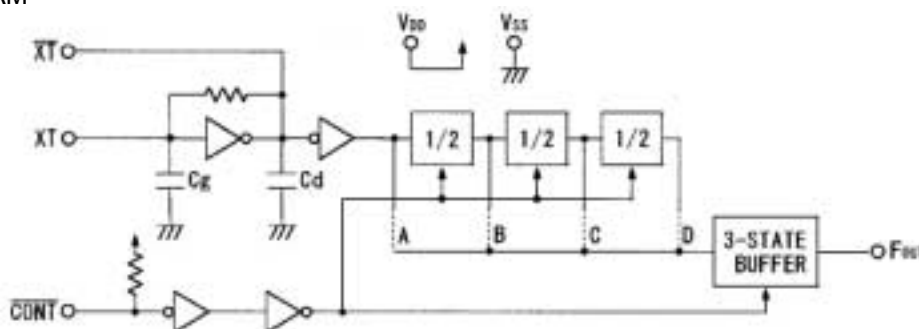


### ■COORDINATES

No	Pad Name	X	Y
1	$\overline{\text{CONT}}$	350	655
2	XT	130	630
3	$\overline{\text{XT}}$	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

Starting Point: Lower Left Corner Unit[um]  
 Chip Size: 1.33x0.8mm  
 Die Thickness: 400±30um  
 Note1) No.6 and 7 terminals are only for package type information. There no Pad on the Die

### ■BLOCK DIAGRAM



## ■ TERMINAL DESCRIPTION

SYMBOL	FUNCTION	
CONT	3-state Output Control and Divider Reset	
	CONT	F <sub>OUT</sub>
	H or OPEN	Output either one frequency from of f <sub>0</sub> , f <sub>0</sub> /2, f <sub>0</sub> /4 and f <sub>0</sub> /8 (Note2)
	L	Output High Impedance and Divider Reset
XT	Quartz Crystal Connecting Terminals	
$\overline{\text{XT}}$		
V <sub>SS</sub>	GND	
F <sub>OUT</sub>	Frequency Output	
V <sub>DD</sub>	V <sub>DD</sub> =3V/5V	

Note2) Refer to the line-up table.

## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V <sub>DD</sub>	-0.5 to +7.0	V
Input Voltage	V <sub>IN</sub>	V <sub>SS</sub> -0.5 to V <sub>DD</sub> +0.5	V
Output Voltage	V <sub>O</sub>	-0.5 to 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 to +85	°C
Storage Temperature Range	T <sub>stg</sub>	-65 to +150	°C

Note3) Decoupling capacitor should be connected between V<sub>DD</sub> and V<sub>SS</sub> 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 Note4)			8	mA
Stand-by Current	I <sub>st</sub>	CONT=XT=V <sub>SS</sub> , No load Note5)			1	uA
Input Voltage	V <sub>IH</sub>		2.7		3.0	V
	V <sub>IL</sub>		0		0.3	V
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			mA
Input Current	I <sub>IN</sub>	CONT=V <sub>SS</sub>			400	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	Cg/Cd	Note6)		23/23		pF
Maximum Oscillation Frequency	F <sub>MAX</sub>	Note4)	50			MHz
Output Signal Symmetry	SYM	C <sub>L</sub> =15pF, @V <sub>DD</sub> /2	45	50	55	%
Output Signal Rise Time	tr	C <sub>L</sub> =15pF, 20% to 80%			8	ns
Output Signal Fall Time	tf	C <sub>L</sub> =15pF, 80% to 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 Note4)			15	mA
Stand-by Current	I <sub>st</sub>	CONT=XT=V <sub>SS</sub> , No load Note5)			1	uA
Input Voltage	V <sub>IH</sub>		2.0		5.0	V
	V <sub>IL</sub>		0		0.8	V
Output Current	I <sub>OH</sub>	V <sub>OH</sub> =4.5V	5			mA
	I <sub>OL</sub>	V <sub>OL</sub> =0.5V	5			mA
Input Current	I <sub>IN</sub>	CONT=V <sub>SS</sub>			400	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	Cg/Cd	Note6)		23/23		pF
Maximum Oscillation Frequency	F <sub>MAX</sub>	Note4)	50			MHz
Output Signal Symmetry	SYM	C <sub>L</sub> =15pF, @V <sub>DD</sub> /2	45	50	55	%
Output Signal Rise Time	tr	C <sub>L</sub> =15pF, 20% to 80%			8	ns
Output Signal Fall Time	tf	C <sub>L</sub> =15pF, 80% to 20%			8	ns

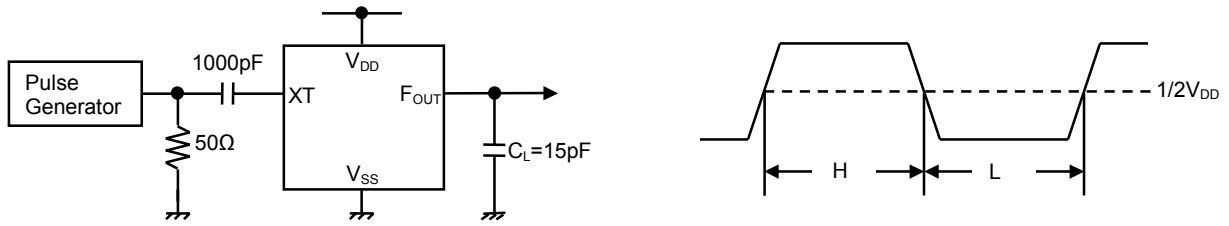
Note4) Only P version is measured with external capacitors contained 18pF for Cg and 16pF for Cd.

Note5) Excluding input current on CONT Terminal.

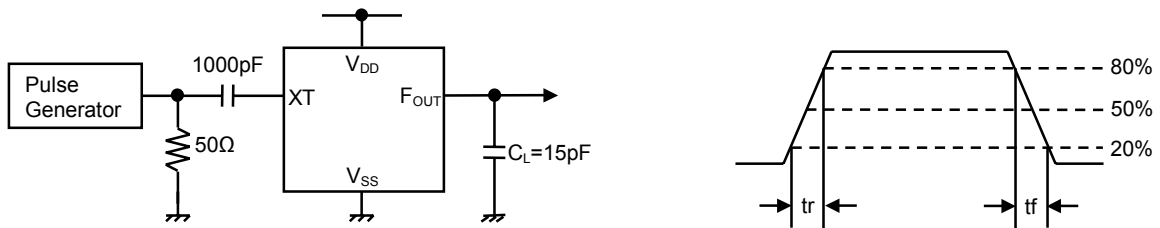
Note6) P version is not mentioned due to internal oscillation capacitors Cg and Cd separated.

MEASUREMENT CIRCUITS

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



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



[CAUTION]  
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