

## QUARTZ CRYSTAL OSCILLATOR

### ■GENERAL DESCRIPTION

The NJU6395 series is up to 125MHz low-voltage C-MOS quartz crystal oscillator, the NJU6395A is up to 110MHz and the NJU6395B is up to 125MHz.

The NJU6395 series consists of an oscillation amplifier, internal capacitors (Cg, Cd), feedback resistance (Rf), and 3-state output buffer.

The output is 8mA at 3V and 12mA at 5V operation, which can drive C-MOS load.

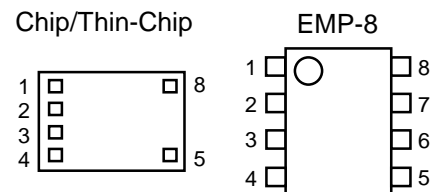
### ■FEATURES

- Low Operating Voltage
- Maximum Oscillation Frequency
  - A: 110MHz
  - B: 125MHz
- High Fan-out
  - $I_{OH}/I_{OL}=8mA$  @3V
  - $I_{OH}/I_{OL}=12mA$  @5V
- 3-State Output Buffer
- Oscillation Stop and Output Buffer Stand-by Function
- Oscillation Capacitors Cg and Cd on-chip
- Package Outline Chip/Thin-Chip/EMP-8
- C-MOS Technology

### ■PACKAGE OUTLINE



### ■PAD LOCATION



### ■LINE-UP TABLE

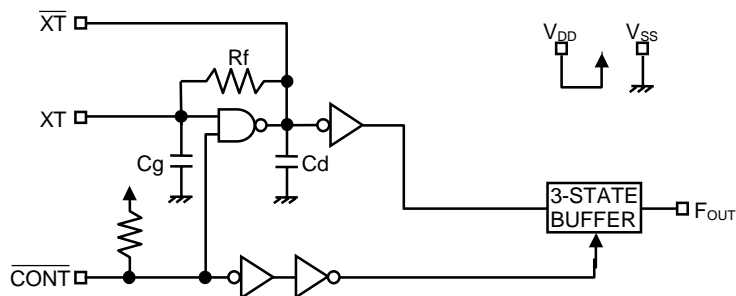
Type No.	Operating Voltage Range[V]	Recommended Oscillation Frequency[MHz]	Package	Cg/Cd [pF]	
NJU6395	A	2.7 to 5.5	80 to 110	C/CT/E	8.5/9.5
	B	2.4 to 3.6	105 to 125	C/CT/E	8.0/9.0

### ■COORDINATES

No	Pad Name	X	Y
1	$\overline{CONT}$	-428	258
2	XT	-428	-86
3	$\overline{XT}$	-428	-86
4	V <sub>SS</sub>	-428	-258
5	F <sub>OUT</sub>	478	-258
8	V <sub>DD</sub>	478	258

Starting Point : Chip Center Unit[um]  
 Chip Size:1.24x0.8mm  
 Thin-Chip Thickness:260±20um  
 Pad Size:100x100um  
 Note1) No.6 and No.7 are no pad.

### ■BLOCK DIAGRAM



## ■TERMINAL DESCRIPTION

SYMBOL	FUNCTION	
$\overline{\text{CONT}}$	Oscillation and 3-state Output Buffer Control	
	$\overline{\text{CONT}}$	$F_{\text{OUT}}$
	H or OPEN	Output frequency $f_0$
	L	Oscillation Stop and High impedance Output
$\overline{\text{XT}}$	Quartz Crystal Connecting Terminals	
$V_{\text{SS}}$	$V_{\text{SS}}=0\text{V}$	
$F_{\text{OUT}}$	Frequency Output	
$V_{\text{DD}}$	$V_{\text{DD}}=3\text{V}/5\text{V}$	

## ■ABSOLUTE MAXIMUM RATINGS

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

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	$V_{\text{DD}}$	-0.5 to +7.0	V
Input Voltage	$V_{\text{IN}}$	$V_{\text{SS}}-0.5$ to $V_{\text{DD}}+0.5$	V
Output Voltage	$V_{\text{O}}$	-0.5 to $V_{\text{DD}}+0.5$	V
Input Current	$I_{\text{IN}}$	$\pm 10$	mA
Output Current	$I_{\text{O}}$	$\pm 25$	mA
Power Dissipation	$P_{\text{D}}$	450(EMP-8)	mW
Operating Temperature Range	$T_{\text{opr}}$	-40 to +85	$^\circ\text{C}$
Storage Temperature Range	$T_{\text{stg}}$	-55 to +125	$^\circ\text{C}$

Note2) If the supply voltage( $V_{\text{DD}}$ ) is less than 7.0V, the input voltage must not over the  $V_{\text{DD}}$  level though 7.0V is limit specified.

Note3) Decoupling capacitor should be connected between  $V_{\text{DD}}$  and  $V_{\text{SS}}$  due to the stabilized operation for the circuit.

Note4) The power dissipation is EMP-8 package without board.

## ■ ELECTRICAL CHARACTERISTICS

(Ta=25°C)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	V <sub>DD</sub>	A version	2.7		5.5	V
		B version	2.4		3.6	

(V<sub>DD</sub>=3.0V, Ta=25°C)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Current	I <sub>DD1</sub>	A: fosc=100MHz, C <sub>L</sub> =15pF		25	33	mA
		B: fosc=125MHz, C <sub>L</sub> =15pF		20	33	
Oscillation Stopping Current	I <sub>DD2</sub>	$\overline{\text{CONT}} = V_{SS}$ , No load			10	uA
Stand-by Current	I <sub>st</sub>	$\overline{\text{CONT}} = \text{XT} = V_{SS}$ , No load Note5)			1	uA
Input Voltage	V <sub>IH</sub>		2.4		3.0	V
	V <sub>IL</sub>		0		0.6	V
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			mA
Input Current	I <sub>IN</sub>	$\overline{\text{CONT}} = 0.8V_{DD}$	15	30	60	uA
		$\overline{\text{CONT}} = 0.2V_{DD}$	5	10	20	uA
3-state Off Leakage Current	I <sub>oz</sub>	$\overline{\text{CONT}} = V_{SS}$ , F <sub>OUT</sub> = V <sub>DD</sub> or V <sub>SS</sub>			±0.1	uA
Internal Capacitor	C <sub>g</sub> /C <sub>d</sub>	A: fosc=100MHz		8.5/9.5		pF
		B: fosc=125MHz		8.0/9.0		
Maximum Oscillation Frequency	F <sub>MAX</sub>	A version	110			MHz
		B version	125			
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, 10% to 90%		2	4	ns
Output Signal Fall Time	tf	C <sub>L</sub> =15pF, 90% to 10%		2	4	ns
Output Disable time	T <sub>PLZ</sub>	C <sub>L</sub> =15pF, R <sub>UP</sub> =10kΩ			100	ns
Output Enable Time	T <sub>PZL</sub>	C <sub>L</sub> =15pF, R <sub>UP</sub> =10kΩ			100	ns

Note5) Excluding input current on  $\overline{\text{CONT}}$  Terminal.

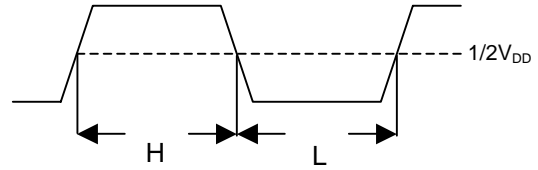
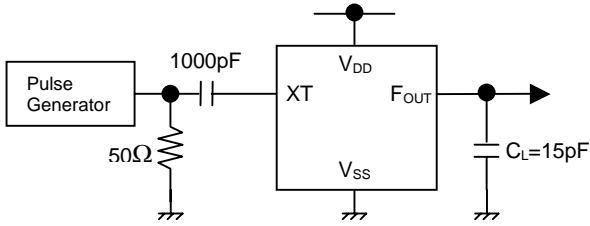
( $V_{DD}=5.0V, T_a=25^{\circ}C$ , Only A version)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Current	$I_{DD1}$	fosc=100MHz, $C_L=15pF$		50	65	mA
Oscillation Stopping Current	$I_{DD2}$	$\overline{CONT}=V_{SS}$ , No load			10	uA
Stand-by Current	$I_{st}$	$\overline{CONT}=\overline{XT}=V_{SS}$ , No load Note5)			1	uA
Input Voltage	$V_{IH}$		4.0		5.0	V
	$V_{IL}$		0		1.0	V
Output Current	$I_{OH}$	$V_{OH}=4.5V$	12			mA
	$I_{OL}$	$V_{OL}=0.5V$	12			mA
Input Current	$I_{IN}$	$\overline{CONT}=0.8V_{DD}$	30	60	120	uA
		$\overline{CONT}=0.2V_{DD}$	10	20	40	uA
3-state Off Leakage Current	$I_{OZ}$	$\overline{CONT}=V_{SS}$ , $F_{OUT}=V_{DD}$ or $V_{SS}$			$\pm 0.1$	uA
Internal Capacitor	Cg/Cd	fosc=100MHz		8.5/9.5		pF
Maximum Oscillation Frequency	$F_{MAX}$		110			MHz
Output Signal Symmetry	SYM	$C_L=15pF$ , @ $V_{DD}/2$	45	50	55	%
Output Signal Rise Time	$t_r$	$C_L=15pF$ , 10% to 90%		2	4	ns
Output Signal Fall Time	$t_f$	$C_L=15pF$ , 90% to 10%		2	4	ns
Output Disable time	$T_{PLZ}$	$C_L=15pF$ , $R_{UP}=10k\Omega$			100	ns
Output Enable Time	$T_{PZL}$	$C_L=15pF$ , $R_{UP}=10k\Omega$			100	ns

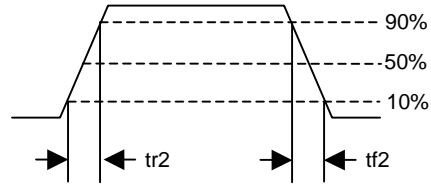
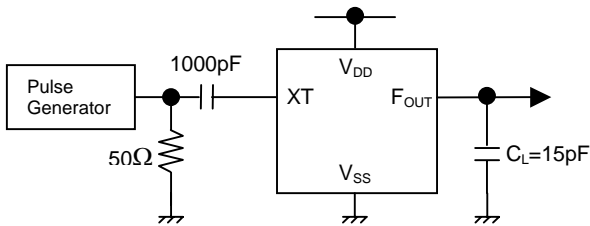
Note5) Excluding input current on  $\overline{CONT}$  Terminal.

MEASUREMENT CIRCUITS

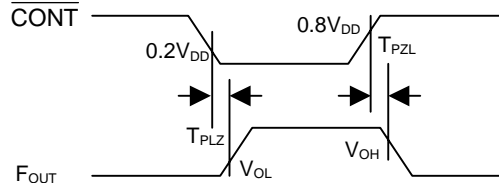
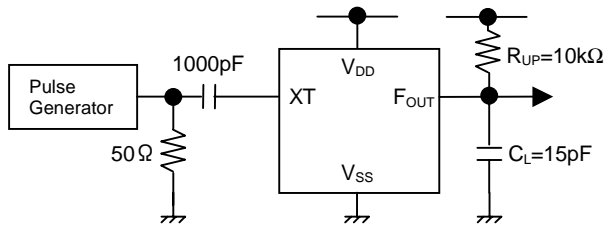
(1) Output Signal Symmetry ( $C_L=15\text{pF}$ )



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



(3) Output Disable/Enable Time ( $C_L=15\text{pF}, R_{UP}=10\text{k}\Omega$ )



[CAUTION]  
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