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.

■PAKAGE OUTLINE

NJU6395XC/XCT

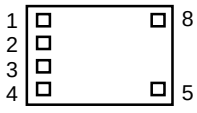
NJU6395XE

■FEATURES

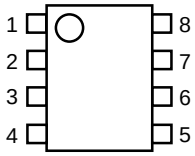
●Low Operating Voltage
●Maximum Oscillation Frequency A: 110MHz
B: 125MHz
●High Fan-out I_{OH}/I_{OL}=8mA @3V
I_{OH}/I_{OL}=12mA @5V
●3-State Output Buffer
●Oscillation Stop and Output Buffer Stand-by Function
●Oscillation Capacitors Cg and Cg on-chip
●Package Outline Chip/Thin-Chip/EMP-8
●C-MOS Technology

■PAD LOCATION

Chip/Thin-Chip



EMP-8



■LINE-UP TABLE

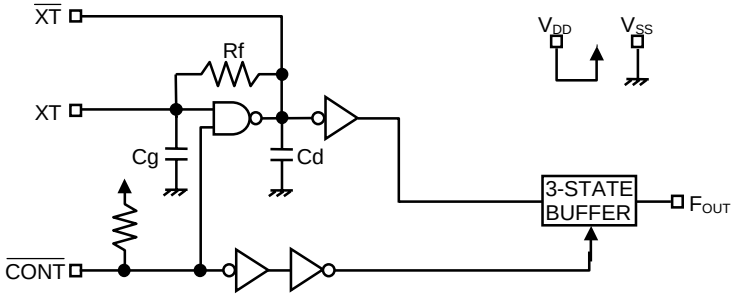
Type No.		Operating Voltage Range[V]	Recommended Oscillation Frequency[MHz]	Package	Cg/Cd [pF]
NJU6395	A	2.7 to 5.5	80 to 110	C/CT/E	8.5/9.5
	B	2.4 to 3.6	105 to 125	C/CT/E	8.0/9.0

■COORDINATES

No	Pad Name	X	Y
1	$\overline{CONT}$	-428	258
2	XT	-428	-86
3	$\overline{XT}$	-428	-86
4	V_{SS}	-428	-258
5	F_{OUT}	478	-258
8	V_{DD}	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



■TREMINAL DESCRIPTION

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

■ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V_{DD}	-0.5 to +7.0	V
Input Voltage	V_{IN}	V_{SS}-0.5 to V_{DD}+0.5	V
Output Voltage	V_O	-0.5 to V_{DD}+0.5	V
Input Current	I_{IN}	±10	mA
Output Current	I_O	±25	mA
Power Dissipation	P_D	450(EMP-8)	mW
Operating Temperature Range	Topr	-40 to +85	°C
Storage Temperature Range	Tstg	-55 to +125	°C

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

Note3) Decupling capacitor should be connected between V_{DD} and V_{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_{DD}	A version	2.7		5.5	V
		B version	2.4		3.6	

(V_{DD}=3.0V,Ta=25°C)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Current	I_{DD1}	A: fosc=100MHz, C_L=15pF		25	33	mA
		B: fosc=125MHz, C_L=15pF		20	33	
Oscillation Stopping Current	I_{DD2}	$\overline{CONT}$ =V_{SS}, No load			10	uA
Stand-by Current	Ist	$\overline{CONT}$ =XT=V_{SS}, No load Note5)			1	uA
Input Voltage	V_{IH}		2.4		3.0	V
	V_{IL}		0		0.6	V
Output Current	I_{OH}	V_{OH}=2.7V	8			mA
	I_{OL}	V_{OL}=0.3V	8			mA
Input Current	I_{IN}	$\overline{CONT}$ =0.8V_{DD}	15	30	60	uA
		$\overline{CONT}$ =0.2V_{DD}	5	10	20	uA
3-state Off Leakage Current	I_{OZ}	$\overline{CONT}$ =V_{SS}, F_{OUT}= V_{DD} or V_{SS}			±0.1	uA
Internal Capacitor	Cg/Cd	A: fosc=100MHz		8.5/9.5		pF
		B: fosc=125MHz		8.0/9.0		
Maximum Oscillation Frequency	F_{MAX}	A version	110			MHz
		B version	125			
Output Signal Symmetry	SYM	C_L=15pF, @V_{DD}/2	45	50	55	%
Output Signal Rise Time	tr	C_L=15pF, 10% to 90%		2	4	ns
Output Signal Fall Time	tf	C_L=15pF, 90% to 10%		2	4	ns
Output Disable time	T_{PLZ}	C_L=15pF, R_{UP}=10kΩ			100	ns
Output Enable Time	T_{PZL}	C_L=15pF, R_{UP}=10kΩ			100	ns

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

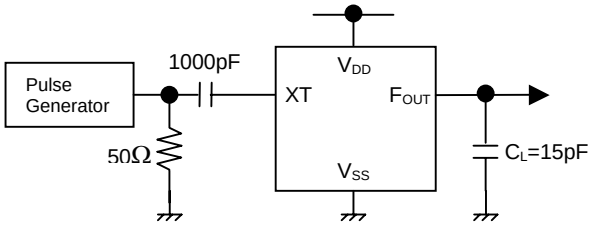
(V_{DD}=5.0V,Ta=25°C, Only A version)

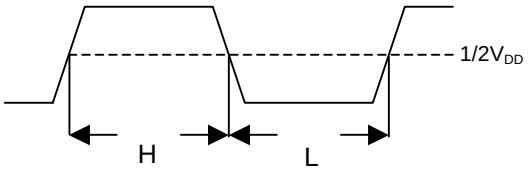
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Current	I_{DD1}	fosc=100MHz, C_L=15pF		50	65	mA
Oscillation Stopping Current	I_{DD2}	$\overline{CONT}$ =V_{SS}, No load			10	uA
Stand-by Current	Ist	$\overline{CONT}$ =XT=V_{SS}, No load Note5)			1	uA
Input Voltage	V_{IH}		4.0		5.0	V
	V_{IL}		0		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}			±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	tr	C_L=15pF, 10% to 90%		2	4	ns
Output Signal Fall Time	tf	C_L=15pF, 90% to 10%		2	4	ns
Output Disable time	T_{PLZ}	C_L=15pF, R_{UP}=10kΩ			100	ns
Output Enable Time	T_{PZL}	C_L=15pF, R_{UP}=10kΩ			100	ns

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

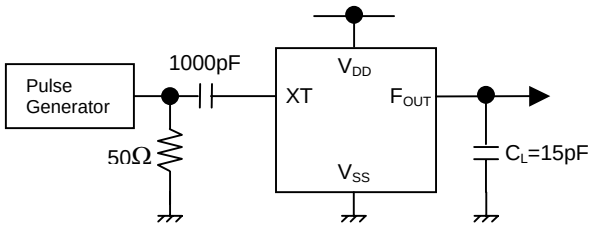
■MEASURMENT CIRCUITS

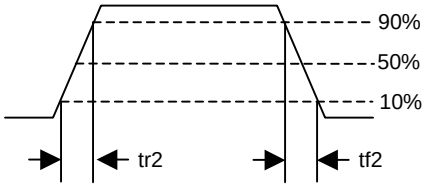
(1)Output Signal Symmetry (C_L=15pF)





(2)Output Signal Rise/Fall Time (C_L=15pF)





(3)Output Disable/Enable Time (C_L=15pF,R_{UP}=10kΩ)