QUARTZ CRYSTAL OSCILLATOR

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■ GENERAL DESCRIPTION

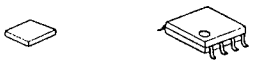
The NJU6333 series is a C-MOS quartz crystal oscillator which consists of an oscillation amplifier and a 3-state output buffer.

This series are classed into three versions A, H and Q according to their oscillation frequency range mentioned in the line-up table.

The oscillation amplifier incorporates feed-back resistance and oscillation capacitors(Cg, Cd), therefore, it requires no external component except quartz crystal.

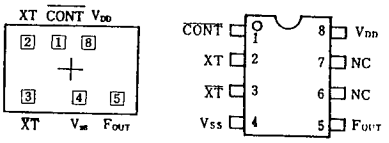
Driverbility of the 3-state output buffer is 24mA (sink/source), thus it can drive both of TTL and C-MOS load.

■ PACKAGE OUTLINE



NJU6333XC NJU6333XE

■ PIN CONFIGURATION/PAD LOCATION



■ FEATURES

- Operating Voltage. -- 4.0~6.0V
- Maximum Oscillation Frequency (See Line-Up Table)
- Low Operating Current
- High Fan-out -- I_{OL}/I_{OH}=24mA
- 3-state Output Buffer
- Oscillation Capacitors Cg and Cd on-chip
- Oscillation and/or Output Stand-by Function
- Package Outline -- CHIP / EMP 8
- C-MOS Technology

■ LINE-UP TABLE

Type No.	Recommended Osc. Freq.	Output Freq.	Cg,Cd
NJU6333A	20~35MHz	f_0	28pF
6333H	30~50MHz		20pF
6333Q	45~75MHz		17pF

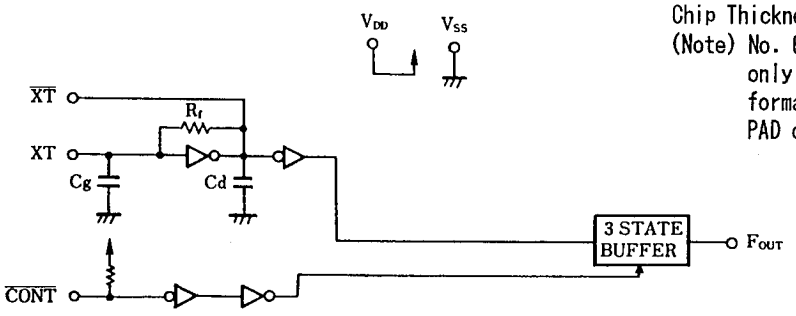
■ COORDINATES

Unit: μm

No.	PAD	X	Y
1	$\overline{CONT}$	-130	248
2	XT	-414	248
3	$\overline{XT}$	-414	-232
4	V_{SS}	89	-248
5	F_{OUT}	446	-228
8	V_{DD}	153	228

Chip Size : 1.29 X 0.8mm
Chip Center : X=0μm, Y=0μm
Chip Thickness : 400μm±30μm
(Note) No. 6 and 7 terminals are only for package type information. There are no PAD on the chip.

■ BLOCK DIAGRAM



■ TERMINAL DESCRIPTION

NO.	SYMBOL	FUNCTION
1	$\overline{CONT}$	3-State Output Control $\overline{CONT}$ H: Output (F_{OUT}) Output Frequency f_O $\overline{CONT}$ L: Output High Impedance
2	XT	Quartz Crystal Connecting Terminals
3	$\overline{XT}$	
4	V_{SS}	GND
5	F_{OUT}	Output frequency f_O
8	V_{DD}	+ 5V

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25℃)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{DD}	-0.5 ～ +7.0	V
Input Voltage	V_{IN}	V_{SS}-0.5 ～ V_{DD}+0.5	V
Output Voltage	V_O	-0.5 ～ V_{DD}+0.5	V
Input Current	I_{IN}	±10	mA
Output Current	I_O	±25	mA
Power Dissipation	P_D	200 (EMP)	mW
Operating Temperature Range	Topr	-40 ～ +85	℃
Storage Temperature Range	Tstg	-55 ～ +125	℃

(Note) Decoupling capacitor should be connected between V_{DD} and V_{SS} due to the stabilized operation for the circuit.

■ ELECTRICAL CHARACTERISTICS

(Ta=25℃, V_{DD}=5V)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	V_{DD}		4		6	V
Operating Current	I_{DD1}	A Version f_{OSC}=24MHz, No Load			25	mA
	I_{DD2}	H Version f_{OSC}=48MHz, No Load			30	
	I_{DD3}	Q Version f_{OSC}=48MHz, No Load			35	
Stand-by Current	Ist	$\overline{CONT}$, XT=V_{SS}, No Load (Note)			1	μA
Input Voltage	V_{IH}		3.5		5.0	V
	V_{IL}		0		1.5	
Output Current	I_{OH}	V_{DD}=5V, V_{OH}=4.5V	24			mA
	I_{OL}	V_{DD}=5V, V_{OL}=0.5V	24			
Input Current	I_{IN}	$\overline{CONT}$ Terminal, $\overline{CONT}$=V_{SS}	125	250	500	μA
3-St Off-leakage Current	I_{OZ}	$\overline{CONT}$=V_{SS}, F_{OUT}=V_{SS} or V_{DD}			±0.1	μA
Internal Capacitor	Cg, Cd	A Version		28		pF
		H Version		20		
		Q Version		17		
Max. Oscillation Freq.	f_{MAX}	A Version	35			MHz
		H Version	50			
		Q Version	75			
Output Signal Symmetry	SYM	C_L=15pF at 1.4V	45	50	55	%
		C_L=15pF at 2.5V				
Output Signal Rise Time	t_{r1}	C_L=15pF, R_L=390Ω, 20%～80%		2		ns
	t_{r2}	C_L=15pF, R_L=390Ω, 0.4～2.4V		2		
	t_{r3}	C_L=15pF, 10～90%		3		
Output Signal Fall Time	t_{f1}	C_L=15pF, R_L=390Ω, 80%～20%		2		ns
	t_{f2}	C_L=15pF, R_L=390Ω, 2.4～0.4V		2		
	t_{f3}	C_L=15pF, 90～10%		3		

(Note) Excluding input current on $\overline{CONT}$ terminal.

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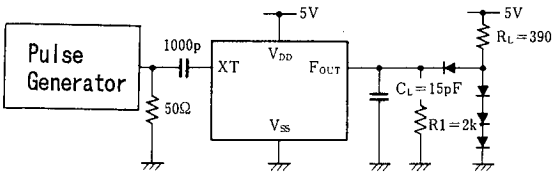
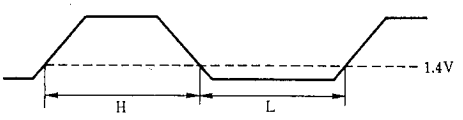
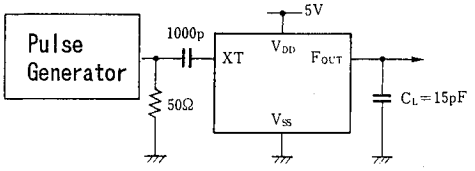
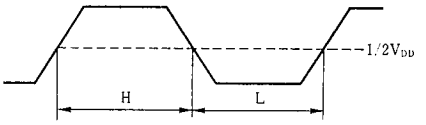
■ MEASUREMENT CIRCUITS

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

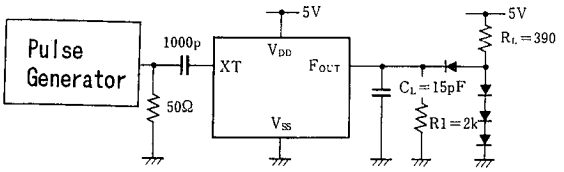


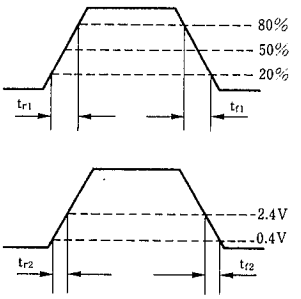


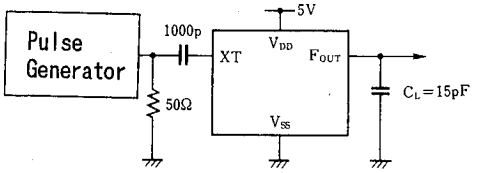


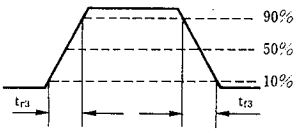


(2) Output Signal Rise / Fall Time (C_L=15pF)









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