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DATE	2000.9.18
NO.	S-SC0006

Messrs.



## SPECIFICATION

PRODUCT NAME: CRYSTAL CLOCK OSCILLATOR

TYPE: CSX-750FB? (?= B,C,F)

FREQUENCY: 2.500 ~ 32.000 MHz

PARTS NO.:

CITIZEN WATCH CO., LTD.  
 1-12, Honcho 6-chome, Tanashi-shi,  
 Tokyo 188-8511 Japan

Oscillator Technical section  
 Crystal Devices Div.  
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APPROVED	CHECKED	PREPARED
		T.Kuratomi

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## 1. SCOPE

This specification relates to the crystal clock oscillator to be supplied by CITIZEN WATCH CO., LTD. (following as CITIZEN) to .

### NOTICE

- 1.If something that is ambiguously defined or undefined in this specification happened, customer and CITIZEN would discuss and take necessary steps by mutual consent.
- 2.Product test data can't be attached to this specification.
- 3.This product is not authorized for use as critical component in life support devices or systems.

## 2. SPECIFICATION

### 1. ABSOLUTE MAXIMUM RATING

Parameter	Conditions		Unit
Supply Voltage $V_{MAX}$		-0.5 ~ +7.0	V
Storage Temperature $T_{STG}$	See 8.	-55 ~ +125	°C
Output Current $I_{OUT}$		25	mA
Input Voltage $V_{IN\_M}$		-0.5 ~ $V_{DD} + 0.5$	V
Solder Heat Resistance Of The Outer Lead $T_{SOL}$	{ MAX.260°C, MAX.10 seconds , 2times } or { MAX.230°C, MAX.3 minutes }		

### 2. OPERATING RANGE

Parameter	Conditions				Unit
		Min.	Typ.	Max.	
Supply Voltage $V_{DD}$		3.0	3.3	3.6	V
Temperature $T_{OPR}$	FBC,FBB	-20		70	°C
	FBF	-40		85	°C
Input Voltage $V_{IN}$		0		$V_{DD}$	V
Output Load $CL$				30	pF

### 3. FREQUENCY CHARACTERISTICS

Parameter	Conditions		Unit
Frequency $f_0$	See Section 2.	2.500 ~ 32.000	MHz
Frequency Stability $df$	See Section 2. FBB:±50 FBC, FBF:±100		ppm

note) Frequency Stability includes initial tolerance, temperature characteristics, voltage characteristics, load characteristics and aging(25°C , first year).

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#### 4. ELECTRICAL CHARACTERISTICS

(V=3.3V Ta = 25°C load=30pF)

Parameter	Conditions				Unit
		Min.	Typ.	Max.	
Start Up Time $t_{osc}$				10	ms
Power Supply Current $I_{DD}$	No Load			15	mA
Disable Current $I_{INH}$	OE=GND			5	mA
Rise Time $t_r$	CMOS load : 20%V <sub>DD</sub> to 80%V <sub>DD</sub>			8	ns
Fall Time $t_f$	CMOS load : 80%V <sub>DD</sub> to 20%V <sub>DD</sub>			8	ns
Duty Cycle DUTY	CMOS load : 50%V <sub>DD</sub>	45		55	%
Output HIGH Voltage $V_{OH}$	I <sub>OH</sub> = -4mA	2.2			V
Output LOW Voltage $V_{OL}$	I <sub>OL</sub> = 4mA			0.4	V
Input HIGH Voltage $V_{IH}$	OE	2.0			V
Input LOW Voltage $V_{IL}$	OE			0.4	V
Output Disable Time $t_{PXZ}$	See 5.			100	ns
Output Enable Time $t_{PXZ}$	See 5.			100	ns

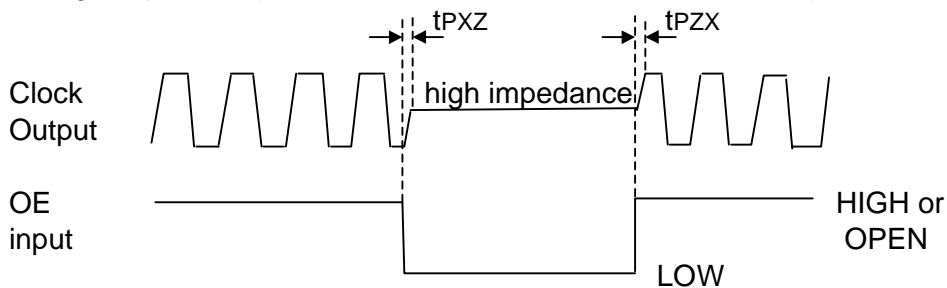
#### 5. THREE STATE OUTPUT OPERATION

OE Input	Clock Output	Internal quartz oscillator
HIGH or OPEN	Active : enable	Active
LOW	High impedance : disable	Active

Propagation delay time between

$t_{PXZ}$  : OE(HIGH to LOW) and  
OUTPUT(active level  
to high impedance)

$t_{PXZ}$  : OE(LOW to HIGH) and  
OUTPUT(high impedance  
to active level)

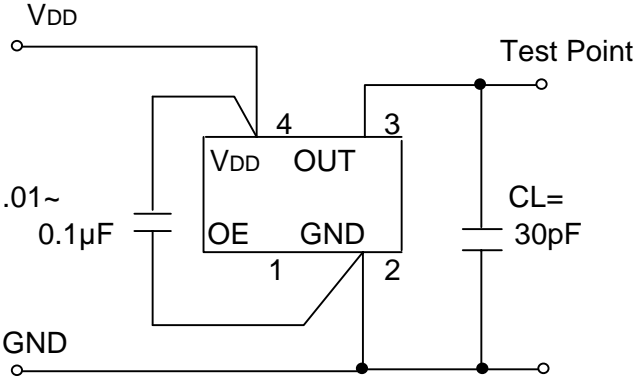


NOTE: The phase of clock output does not synchronize with OE signal edges.

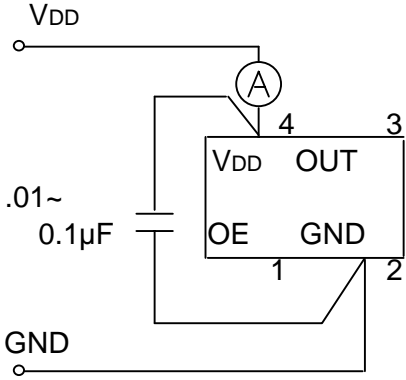
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6. TEST CIRCUIT

[CMOS LOAD] (30pF)



[SUPPLY CURRENT ]

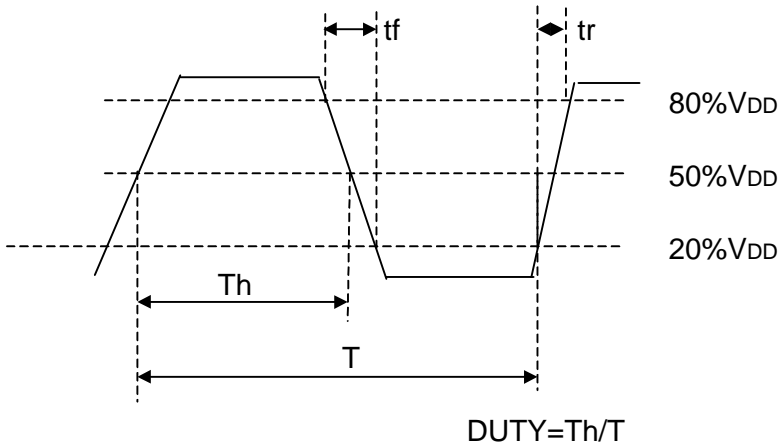


[MEASUREMENT CONDITION]

1. Oscilloscope  
 Impedance: No less than 1M ohm  
 Capacitance: No more than 5pF  
 Band width: No less than 500MHz  
 The length of GND lead of the probe should be as short as possible.
2. The CL includes the probe capacitance.
3. Grounding should be single point grounding.
4. Supply impedance should be as low as possible.  
 0V to 90%VDD rise time is no less than 150µs
5. Use the ammeter that internal impedance is small.

7. OUTPUT WAVEFORM

[CMOS LOAD] (30pF)



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### 8. ENVIRONMENTAL AND MECHANICAL CHARACTERISTICS

The following are our reliability test conditions.

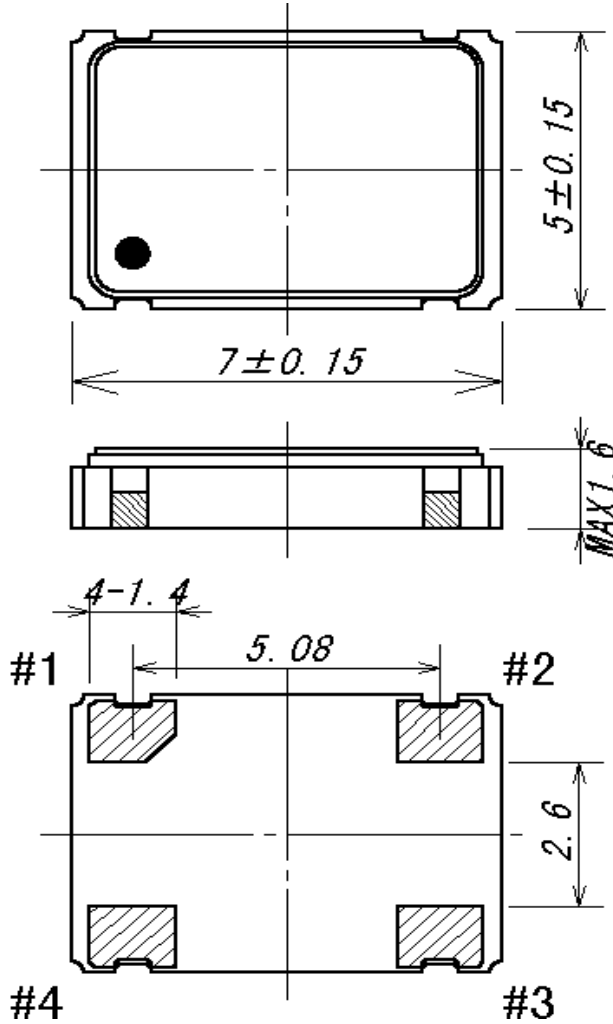
Item	Test Method	Frequency *1 Shift after Test	Electrical
Temperature Cycle	-55 ~ 125°C(NO BIAS) (15min. , 100cycles)	±20 ppm	Electrical Characterristics satisfy the spec.4.
High Temp. Storage	+125°C , NO BIAS , 1000hours	±50 ppm	
Low Temp. Storage	-55°C , NO BIAS , 1000hours	±20 ppm	
Vibration	20Hz ~ 2000Hz, 1.5mm p-p or 196m/s <sup>2</sup> 20Hz ~ 2000Hz ~ 20Hz 4 min./cycle 3 direction , 4 cycles for each direction	±10 ppm	
Drop	Free drop from 75cm height on a hard wooden board for 3 times.	±20 ppm	
Resistance to Soldering Heat	Into solder bath +260°C±5°C for 20 sec.	±10 ppm	
Solderability	Dip into solder bath +230°C for 5 sec.	90% of the dipped terminal is soldered.	
Seal	Helium leak detector	1E-9 Pa m <sup>3</sup> /s max.	

Each test is independtly examined.

\*1 The value of after test is measured after putting in room temperature for 2 ~ 24hours.

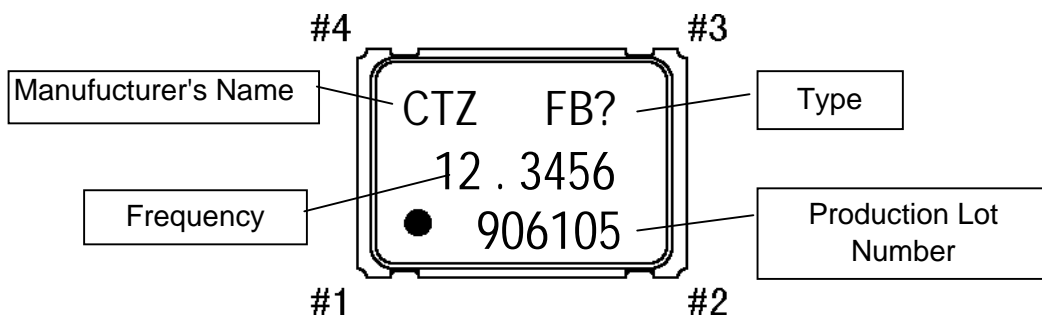
3. DIMENSIONS AND MARKING

[Dimensions] (UNIT mm)



No.	PIN
#1	OE
#2	GND
#3	OUT
#4	VDD

[Marking]



4. TAPE AND REEL PACKAGING

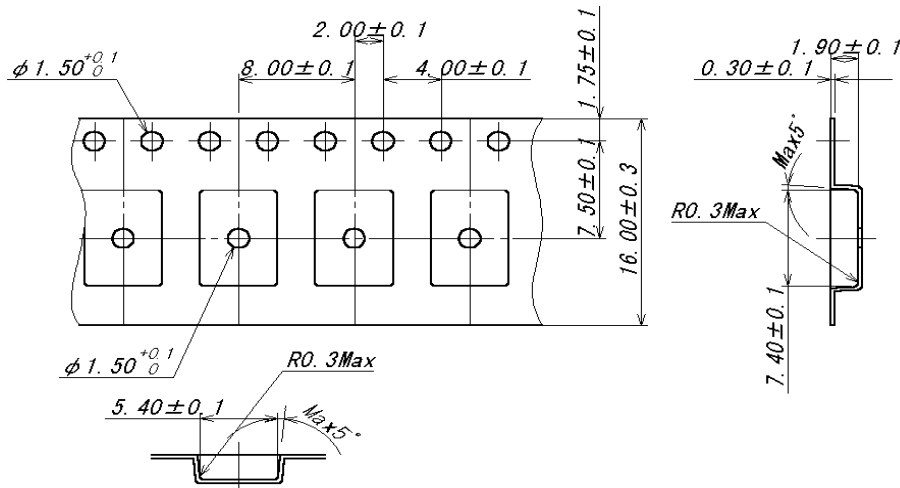
1. TAPING SPECIFICATION

Subject to EIA 481A & JIS C 0806

(1) Tape Dimensions

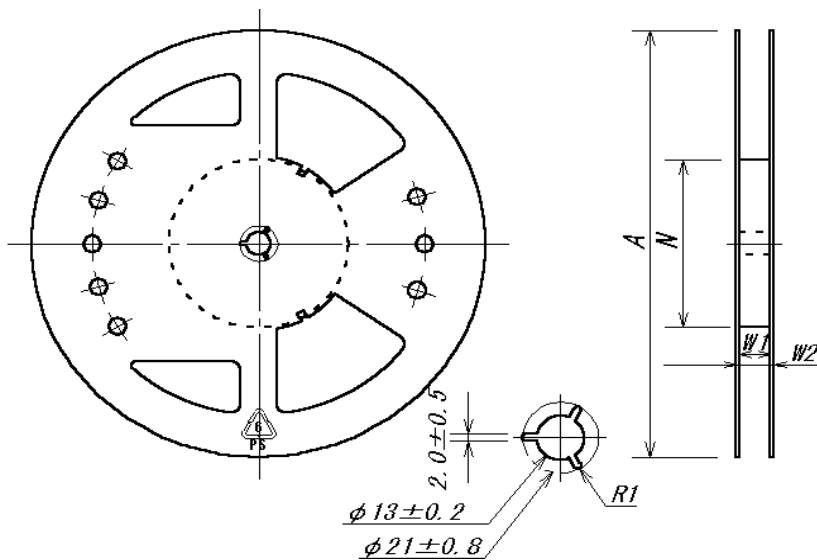
Material of the Carrier Tape : PA-PET conductive coat

Material of the Cover Tape : PE A-PET conductive coat



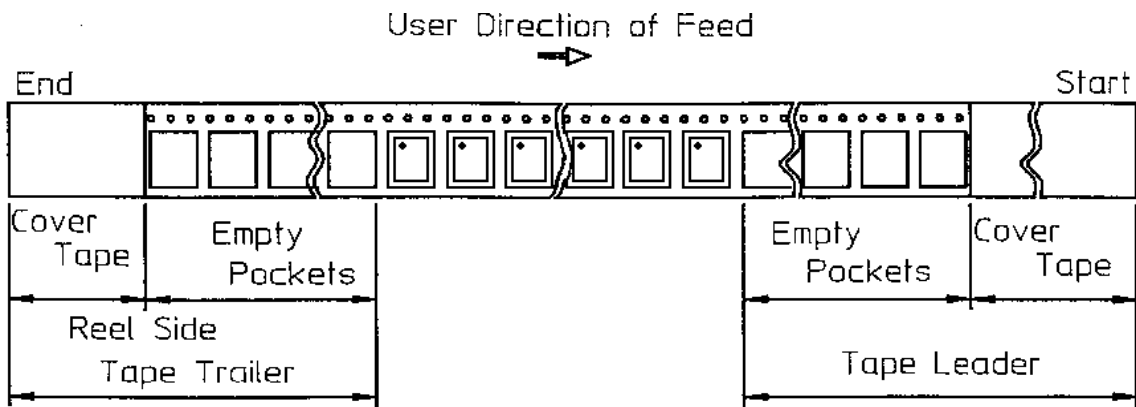
(2) Reel Dimensions

Material of the Reel : PS



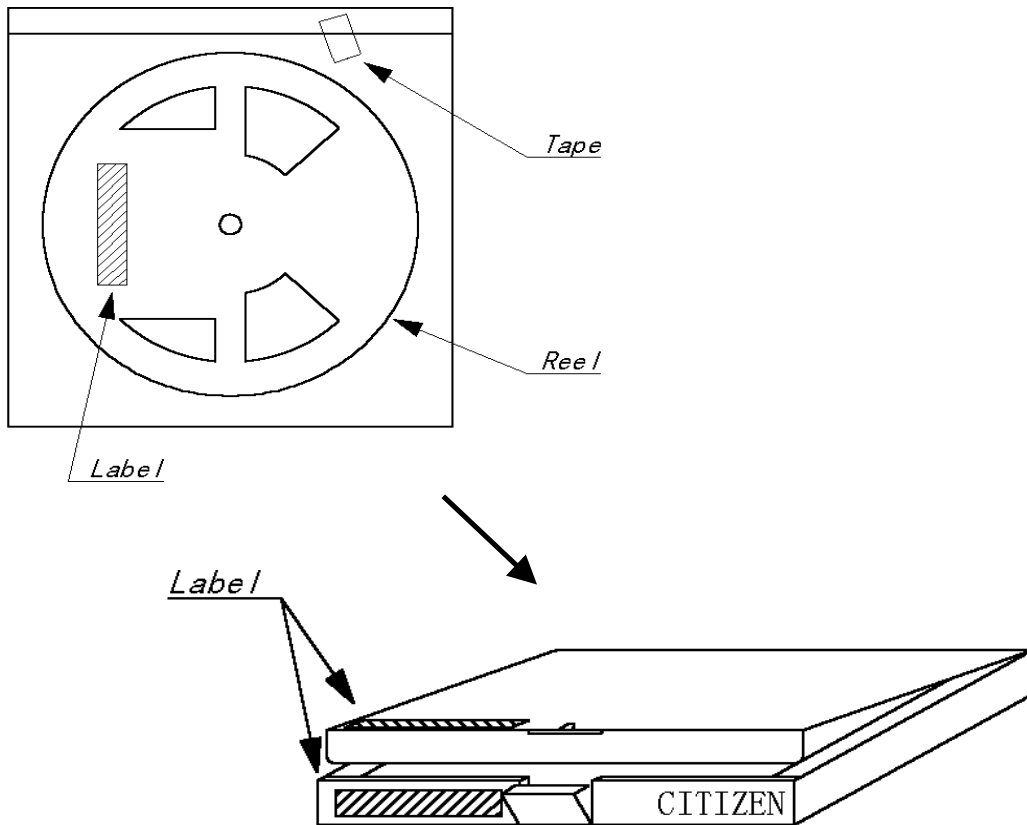
Symbol	A	N	W1	W2
Dimension(mm)	254±2	100±1	17.5±1.0	21.5±1.0

(3) Packing



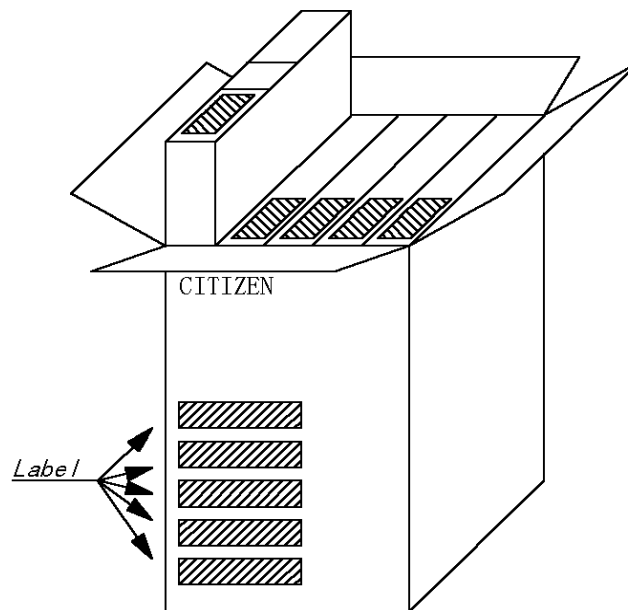
Item		Empty Space
Tape Leader	Cover Tape	Min. 500 mm
	Empty Pockets	Min. 20 Pockets
Tape Trailer	Cover Tape	Min. 0 mm
	Empty Pockets	Min. 40 mm

2. INNER CARTON





### 3. OUTER CARTON



### 4. MARKING

(1) Marking Labels are affixed to reel , inner carton and outer carton.

Reel Marking is consist of:

(2) Each label contains the following information.

- \* Parts name or type
- \* Frequency
- \* Quantity
- \* Manufacturing Date or symbol
- \* Manufacturer's name or symbol
- \* Others(if necessary)

### 5. QUANTITY

2000 pcs/reel

### 6. STORAGE ENVIRONMENT

- \* Storage the reel at normal temperature and humidity
- \* Open the packing just before using.
- \* Do not expose the sun.
- \* Do not storage with some erosive chemicals.
- \* Nothing is allowed to put on the reel or carton to prevent mechanical damage.

### 7. HANDLING

- \* Handle with care to prevent the damage of tape, reel and products.

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<p><b>5. NOTES</b></p> <p><b>1. HANDLING</b>  <b>(ELECTROSTATIC DISCHARGES)</b>  This device is made with CMOS circuitry. Please take precautions to prevent damage due to electrical static discharge.</p> <p><b>(SHOCK RELIABILITY)</b>  This device contains a quartz crystal, so please do not give too much shock or vibration. An automatic inserion is available, however, the internal quartz crystal might be damaged in case that too much shock or vibration is given by machine condition. Be sure to check your machine condition in advance.</p> <p><b>(CLEANING)</b>  Since, depending on the cleaning conditions,there is a possibility of damage being caused to the Crystal Osillator,do not fail to test and confirm the results beforehand,using your company's cleaning conditions.</p> <p><b>(TEMPERATURE AND HUMIDITY)</b>  We recommend to store and use device under normal temperature and humidity. When this device is used in high humidity applications, there is a potential problem with condensation. As with other IC's, please take precautions to prevent condensation.</p> <p><b>2. CIRCUIT DESIGNS</b>  <b>(POWER LINES)</b>  We recommend placing a 0.01 ~ 0.1<math>\mu</math>F capacitor between VDD and GND to obtain stable operation and protect against power line ripple . VDD and GND pattern should be as wide as possible.</p> <p><b>(OE INPUT LINE)</b>  When OE pin is not used, please connect it to VDD.</p> <p><b>(OUTPUT LINE)</b>  As a long output line may cause irregular output, please take care to design that output line is as short as possible, and also keep high level signal source away from this device.</p>			