APPROVAL SHEET

(KYOCERA KINSEKI Clock Oscillator Specification)

This product is Pb-Free and RoHS compliant.

Moisture Sensitivity Level (MSL): Level1

APPROVED
(Please sign here and send one copy back to us.)

Specification No.	*EQM08-5OC-00AE223-00*		
Type Name	**KC7050P125.000L20E00**		
00	Jul-09-2010		
Approved by		*Checked by*	
M. Morimoto		*R. Mizutani*	
Checked by		*Issued by*	
T. Koyanagi		*T. Asakura*	

DocNo: *EQM08-5OC-00L2A0E-04*

History of Change

Rev. No.	Date	Page	Contents
00	Jul-09-2010	----	**RELEASE**

1. Scope

This specification shall cover the characteristics of the Clock Oscillator for the oscillation circuit of such as microprocessors.

2. Kyocera's Type Name

KC7050P125.000L20E00

3. Customer's Type Name

4. Electrical Characteristics

4-1. Absolute Maximum Rating

Item	Symbol	Rated Value	Unit
Power Supply Voltage	V_{DD}	-0.5 to +5.0	V
Input Voltage	V_{IN}	-0.5 to V_{CC} +0.5	V
Storage Temperature Range	T_{STG}	-55 to +125	°C

<Note>

If KC7050P is used beyond absolute maximum ratings, it may cause internal destruction.
KC7050P should be used under the recommended operating conditions. KC7050P reliability may be damaged if those conditions are exceeded.

4-2. Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Unit	Remarks
Power Supply Voltage	V_{CC}	2.375	2.5	2.625	V	
Input voltage	V_{IN}	0	---	V_{CC}	V	
Operating Temperature Range	T_{OPR}	0	25	+70	°C	

4-3. Electrical Characteristics

Item	Symbol	Min	Typ	Max	Units	Remarks
Frequency Range	F_O	---	125	---	MHz	
Frequency Tolerance	F_{tol}	-50	---	+50	ppm	Over all conditions: initial tolerance, operating temperature range, rated power supply voltage change, load change, aging (1year @25°C), shock and vibration
Current Consumption	I_{CC}	---	---	70	mA	
Standby Current	I_{ST}	---	---	30	µA	
Duty ratio (Symmetry)	SYM	45	50	55	%	100ohm, @ 50% Vopp
Rise Time (20% V_{CC} to 80% V_{CC})	Tr	---	0.4	0.6	nS	100ohm
Fall Time (80% V_{CC} to 20% V_{CC})	Tf	---	0.4	0.6		
Output voltage -"L"	V_{OL}	0.9	1.1	---	V	
Output voltage -"H"	V_{OH}	---	1.43	1.6		
Differential Output Voltage	V_{OD}	247	330	454	mV	
Differential Output Voltage Error	dV_{OD}	---	---	50		$dV_{OD} = \lvert V_{OD1} - V_{OD2} \rvert$
Offset Voltage	V_{OS}	1.125	1.25	1.375	V	
Offset Voltage Error	dV_{OS}	---	---	50	mV	$dV_{OS} = \lvert V_{OS1} - V_{OS2} \rvert$
Output Load	---		100		ohm	LVDS Output
Input Voltage -"L"	V_{IL}	---	---	30% V_{CC}	V	
Input Voltage -"H"	V_{IH}	70% V_{CC}	---	---		
Output Disable Time	t_dis	---	---	200	nS	
Output Enable Time	t_ena	---	---	10	mS	
Start up time	t_{sta}	---	----	10	mS	@Minimum operating voltage to be 0sec
Deterministic Jitter*	DJ	---	0.2	2	pS	DJ pk-pk
1sigma Jitter*	1sigma	---	2	4		
Peak to Peak Jitter*	Pk-Pk	---	25	30		

Note: All Electrical characteristics define Maximum Loaded and operating temperature range.
*The Time Interval Analyzer "Wavecrest DTS-2079" with *VISI 6.3.1* shall measure jitter. (Load=50ohm, @ 50% output swing)

Table 1

4-4. Measurement Condition
The reference temperature shall be 25±2ºC. The measurement shall be performed at the temperature range of 5 ºC to 35 ºC unless otherwise the result is doubtful.

4-5. Measurement Circuit
The test circuit as shown in “Fig. 1” shall measure electric characteristics.

4-6. Clock Timing Chart
The clock timing chart as shown in “Fig. 2” and “Fig. 3”.

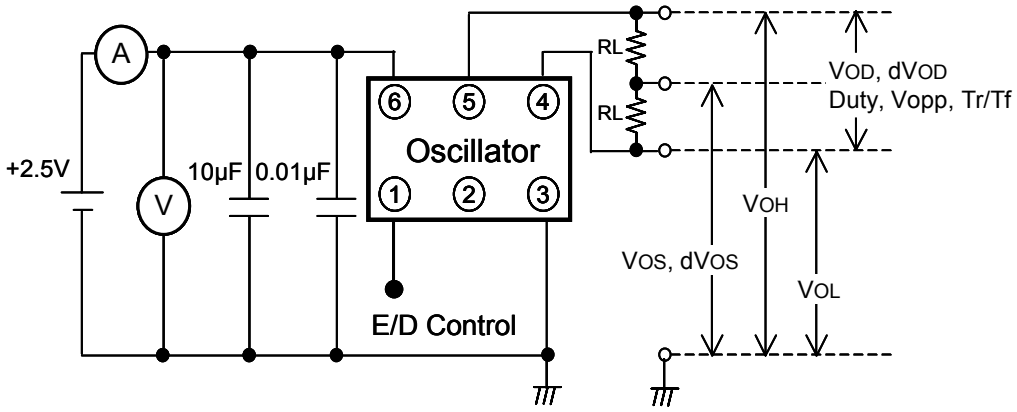


Fig.1 Test Circuits

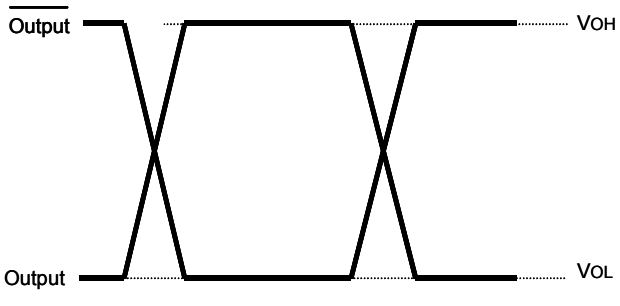


Fig.2 Clock Timing Chart 1

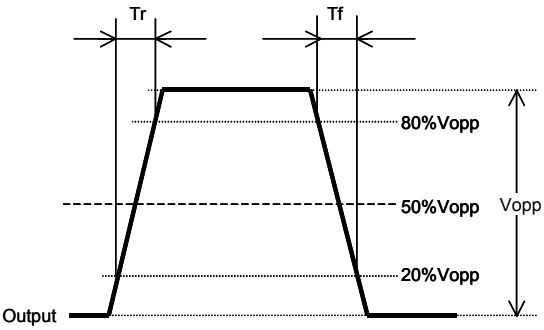
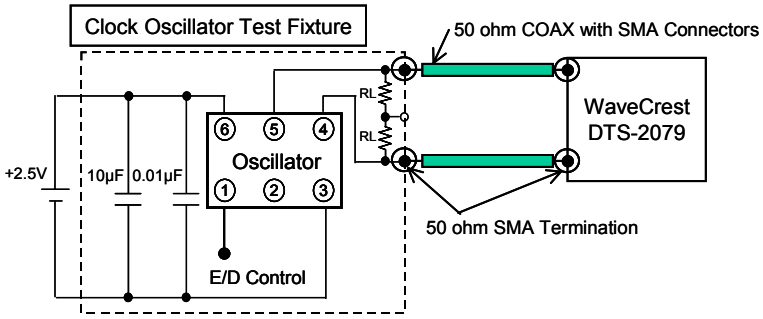


Fig.3 Clock Timing Chart 2

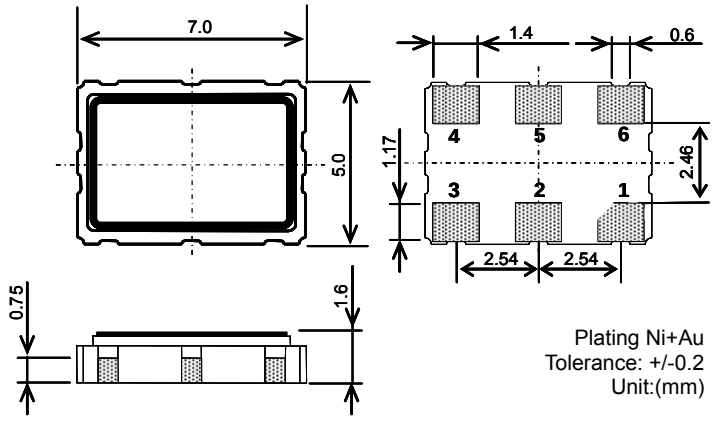


<Measurement Conditions>

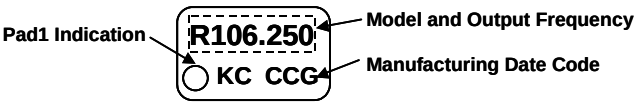
- Time Interval Analyzer
  - WaveCrest DTS-2079
- Jitter Analysis Software
  - VISI 6.3.1
- DTS Timer Calibration
  - Over 30minnites warm-up
  - Extend 30minites Calibration
- Jitter Histogram Parameters (Tail-fit)
  - More than 50,000cyc Hits
  - Bit Error Ratio (BER) –12 (14sigma)

Fig.4 Jitter Test Circuits

5. Dimensions and Marking



Plating Ni+Au
Tolerance: +/-0.2
Unit:(mm)



Output Frequency
7 digits indication inclusive of decimal point, round off the fractions to three decimal places.
Ex.) 133.3333MHz "133.333"

Model
See Table 2

Manufacturing Date Code

Year	Code	Year	Code
2001	A	2011	L
2002	B	2012	M
2003	C	2013	N
2004	D	2014	P
2005	E	2015	Q
2006	F	2016	R
2007	G	2017	S
2008	H	2018	T
2009	J	2019	V
2010	K	2020	W
It repeats from A in 2021 and afterwards.			

Month	Code
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	A
11	B
12	C

Day	Code	Day	Code	Day	Code
1	1	11	B	21	M
2	2	12	C	22	N
3	3	13	D	23	P
4	4	14	E	24	Q
5	5	15	F	25	R
6	6	16	G	26	S
7	7	17	H	27	T
8	8	18	J	28	V
9	9	19	K	29	W
10	A	20	L	30	X
				31	Y

e.g. :"C46" means "Apr-6-2003"

Pad arrangement	
1	Enable/Disable
2	NC
3	Case GND
4	Output
5	Complementary Output
6	V_{CC}

Enable/Disable Function	
Pad1	Pad4/Pad5
OPEN	Active
"H" Level	Active
"L" Level	No-Oscillation

Stability		Model Code
Code	(ppm)	KC7050P125.000L20E00
0	±50	M125P000

Table 2

6. Parts Numbering Guide

KC7050P 125.000 L 2 0 E 00
A B C D E F G

A. Series (6pad SMD Crystal Oscillator)
B. Oscillating Frequency
C. Output
L: LVDS
D. Supply Voltage
2: 2.5V
E. Frequency Stability* (Over All Conditions)
See Table 2
F. Duty Ratio and Enable/Disable Function
E: Duty: 45% to 55% with Stand-by Function
G. Customer special model Suffix
(**STD Specification is "00"**)

Packing (Tape & Reel 1,000pcs/Reel)
*Over all conditions:
initial tolerance, operating temperature range, rated power supply voltage change, load change, aging (1year @25°C), shock and vibration

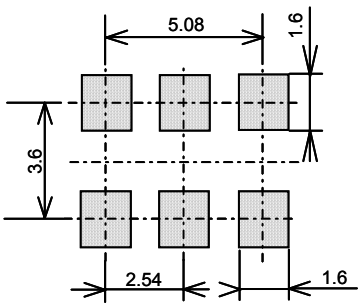
7. Environmental Characteristics

Items	Conditions	Criteria of Acceptance
7-1. Solderability	Soaking: 245±5°C, 5.0±0.5sec	Dipped potion: Minimum 95% coverage
7-2. Soldering Heat Resistance	Reflow Soldering: Peak 260°C max, 10sec, Twice max Soldering iron: 380±5°C, 3+1/-0sec, Twice as one time for four Pads	Without looseness or crack etc.
7-3. Temperature Cycle	10Cycles: -55°C to +125°C (30minuts each)/cycle	Clause 7-10 shall be satisfied.
7-4. Mechanical Shock (Pulse)	5 times 14750m/sec^2 (1500G), Duration of pulse 0.5msec (MIL-STD-883D-2002.3 Condition B)	
7-5. Vibration	4 times each axis X, Y, Z: 20 to 2000Hz and 2000Hz to 20Hz/cycle Peak acceleration 196m/sec^2 (20G) (MIL-STD-883D-2007.2 Condition A)	
7-6. High Temperature	1000 hours: Temperature: 85+5/-3°C	
7-7. Low Temperature	1000 hours: Temperature: -40+5/-3°C	
7-8. Humidity Cycle	10 cycles: Based on 1004 specifications (MIL-STD-883D-1004.7)	Clause 7-1 shall be satisfied.
7-9. Hermeticity 1 (Gross leak)	Soaking: 125°C, 5minutes	No bubbles appeared
7-10. Hermeticity 2 (Fine leak)	Measured by Helium Detector Device (MIL-STD-883D-1014.10 Condition A1)	5x10^{-9} Pa m^3/sec max

After above Test, it shall be subjected to standard atmospheric conditions for 2 hours, after which measurement shall be made. And result of the test shall satisfy **Table 1**

Table 3

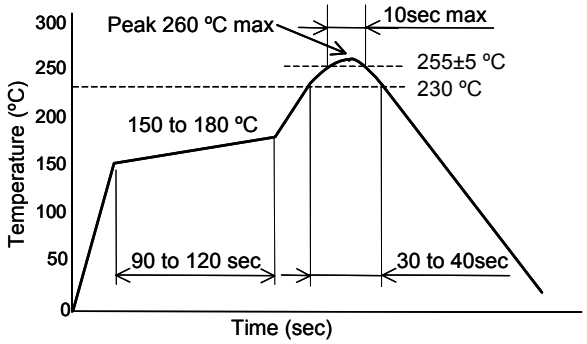
8. Recommended Land pattern and Soldering Guide



Note:

Since KC7050P series has no Bypass Capacitor between V_{CC} and GND, Please mount high frequency type capacitor 0.01µF to the nearest position of oscillator.

Fig.5 Land pattern



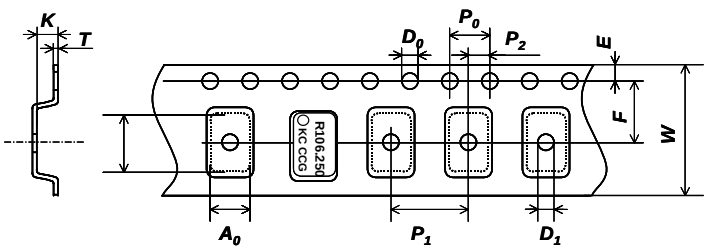
- Available Reflow times: Maximum twice

Fig.6 Reflow profile (Lead Free Available)

8-1.Soldering Iron Condition

- Tip temperature of soldering iron: 380°C±5°C, Soldering Time: 3sec+1/-0sec
- Number of Soldering Iron: maximum twice as one time for 4 pads

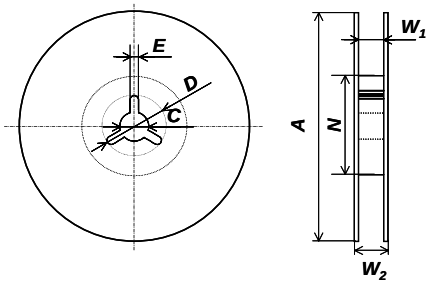
9. **Taping Specifications**



Unit: (mm)

Symbol	A_0	B_0	W	F	E
Dimensions	5.4±0.1	7.4±0.1	16.0±0.2	7.5±0.1	1.75±0.1
Symbol	P_1	P_2	P_0	D_0	T
Dimensions	8.0±0.1	2.0±0.1	4.0±0.1	1.5+0.1/-0	0.3±0.05
Symbol	K	D_1			
Dimensions	2.0±0.1	1.55±0.1			

Fig.7 Emboss Carrier Tape



Unit: (mm)

Symbol	A	N	W_1
Dimensions	180 +0/-3	60+1/–0	17.0±0.2
Symbol	W_2	C	D
Dimensions	19.5±1.0	13.0±0.2	21.0±0.8
Symbol	E		
Dimensions	2.0±0.5		

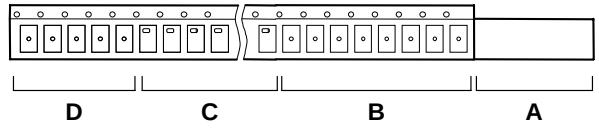
Fig.8 Reel

9-1. Taping Quantities:

- The tape of one reel shall pack 1,000 pcs.(standard)
- KC7050P shall be contained continuously in pocket.

9-2. Leader and Blank Pocket

- Package shall consist of leader, blank pocket and loaded pocket as follows. (Fig.9)
- The power peeling top tape from carrier one shall be 0.1N {10gf} to 0.7N {70gf}. (Fig.10)



A) Leader
B) Blank Pocket (40mm to 320mm)
A+B: 500mm to 560mm
C) Load Pocket
D) Blank Pocket (40mm minimum)

Fig.9 Packing Method

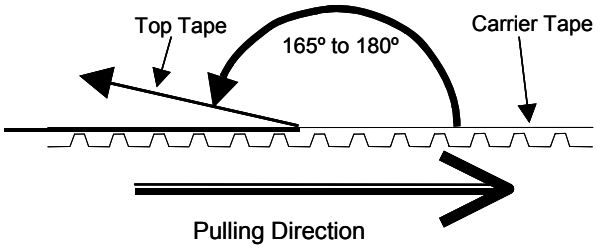


Fig.10 Peeling Strength

9-3. Reel label
A reel label shall consist as below. (Based on EIAJ C-3 format)

A) Customer P/N
B) Lot No.
C) Quantity
D) Shipping date
E) Vender Name

9-4. Exterior Package label
The oscillator shall be packed properly to avoid defect in transportation and the marking of exterior package shall consist as below.

A) Name of Customer
B) P/O No.
C) Customer P/N
D) Lot No.
E) Quantity
F) Shipping Date
G) Vender Name

10. The agreement of this specifications

Should any part of the content of this specification become questionable, it shall be settled by mutual deliberations.

11. Remarks on Usage

A) Storage Condition
Parts should be stored in temperature range of -5 to +40°C, humidity 40 to 60% RH, and avoid direct sunlight. Then use within 6 months.

B) Handling Condition
Although KC7050P has protection circuit against static electricity, when excess static electricity is applied, the inside IC may get damaged.
When mounting on PCB, please make sure the direction of KC7050P is correct, otherwise KC7050P will increase in temperature and may damaged.
Please do not use KC7050P under unfavorable condition such as beyond specified range in catalogue or specification sheet.
Please do not use KC7050P under condition in the water or salt water will drop on KC7050P and under environment of dew or harmful gas.

C) Soldering
This product can respond to the general Pb-free reflow profile. The wave soldering can not be supported.

D) Washing Condition
Ultra sonic cleaning is available. However there is a possibility that Crystal in KC7050P may cause damaged under certain condition. Therefore please test before use.
After washing, please dry KC7050P completely. Otherwise water drops between KC7050P and PCB may cause migration.

In case of using KC7050P without above precaution, Kyocera is unable to guarantee the specified characteristics.