Specification

Drawing No.	TKY1T-H1-23351-00[42]
Issued Date.	November 24, 2023

TO: Digi-key

Note：Part numbers may be revised in the event of any specifications change.

Product Name	Crystal Oscillator
Product Model	KC5032Z
Frequency	Refer toTKY1T-H1-23351-00[42] 10/10 Output Frequency
Customer Part Number	————————
Customer Specification Number	————————
KYOCERA Part Number	Refer toTKY1T-H1-23351-00[42] 10/10 Output Frequency
Remarks RoHS Compliant / MSL 1	

Customer Acceptance

Accept Signature	Accept Date	
	Department	
	Person in charge	

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Design Department	Quality Assurance	Approved by	Examined by	Written by
Application Engineering Section2 Electronic Devices Division	A.Ito	K.Jikihara	R.Satake	T.Sakuma

Drawing No.	TKY1T-H1-23351-00[42]

Revision History

Rev.No.	Description of revise	Date	Approved by	Examined by	Written by
00	First Edition	Nov. 24, 23	K.Jikuhara	R.Satake	T.Sakuma

Drawing No.	TKY1T-H1-23351-00[42]

1. Scope

This specification shall be defined of the Clock Oscillator for the integrated circuits (ICs).

2. Customer Part Number

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3. KYOCERA Part Number

KC5032Zxx.xxxxC1JX00

4. Electrical Characteristics

4-1. Absolute Maximum Rating

Item	Symbol	Rated Value	Units
Power Supply Voltage	V_{CC}	-0.3 to +4.5	V
Input Voltage	V_{IN}	-0.3 to V_{CC} +0.3	V
Storage Temperature	T_{STG}	-55 to +150	°C

Note:
If the part is used beyond absolute maximum ratings, it may cause internal destruction. The part should be used under the recommended operating conditions the reliability of this part may be damaged if those conditions are exceeded.

4-2. Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Units	Remarks
Power Supply Voltage	V_{CC}	1.71	3.3	3.63	V	
Input Voltage	V_{IN}	0	---	V_{CC}	V	
Operating Temperature	T_{OPR}	-40	+25	+85	°C	

4-3. Electrical Characteristics

Item	Symbol	Min	Typ	Max	Units	Remarks
Output Frequency	F_O		**※1**		MHz	
Frequency Tolerance*	F_{tol}	-25	---	+25	ppm	
Current Consumption (No Load/ 1.71≤V_{CC}≤2.25V)	I_{CC}	---	---	5.2	mA	0.5≤ f_O <5MHz
		---	---	5.8		5≤ f_O <15MHz
		---	---	6.2		15≤ f_O <30MHz
		---	---	6.8		30≤ f_O <50MHz
		---	---	6.8		50≤ f_O ≤60MHz
		---	---	9.0		60< f_O <75MHz
		---	---	10.0		75≤ f_O <105MHz
		---	---	10.5		105≤ f_O <130MHz
		---	---	11.5		130≤ f_O <160MHz
		---	---	12.5		160≤ f_O ≤170MHz
Current Consumption (No Load/ 2.25<V_{CC}≤2.8V)		---	---	5.5		0.5≤ f_O <5MHz
		---	---	6.0		5≤ f_O <15MHz
		---	---	6.5		15≤ f_O <30MHz
		---	---	7.2		30≤ f_O <50MHz
		---	---	7.4		50≤ f_O ≤60MHz
		---	---	10.0		60< f_O <75MHz
		---	---	11.5		75≤ f_O <105MHz
		---	---	12.5		105≤ f_O <130MHz
		---	---	14.0		130≤ f_O <160MHz
		---	---	15.0		160≤ f_O ≤170MHz
Current Consumption (No Load/ 2.8<V_{CC}≤3.63V)		---	---	5.8		0.5≤ f_O <5MHz
		---	---	6.5		5≤ f_O <15MHz
		---	---	7.3		15≤ f_O <30MHz
		---	---	8.0		30≤ f_O <50MHz
		---	---	8.5		50≤ f_O ≤60MHz
		---	---	12.5		60< f_O <75MHz
		---	---	14.5		75≤ f_O <105MHz
		---	---	15.5		105≤ f_O <130MHz
		---	---	18.0		130≤ f_O <160MHz
		---	---	19.5		160≤ f_O ≤170MHz
Standby Current	I_{ST}	---	---	5	μA	
Symmetry (Duty Ratio)	SYM	45	50	55	%	@ 50% V_{CC}

※1 Refer to TKY1T-H1-23351-00[42] 10/10 Output Frequency

Item	Symbol	Min	Typ	Max	Units	Remarks	
Rise Time/ Fall Time (20% V_{CC} to 80% V_{CC}) Loaded	Tr/ Tf	---	---	4.0	ns	0.5≤ f_O ≤60MHz	1.71≤V_{CC}≤2.25V
		---	---	3.0			2.25<V_{CC}≤2.8V
		---	---	2.5			2.8<V_{CC}≤3.63V
		---	---	1.5		60< f_O ≤170MHz	1.71≤V_{CC}≤2.25V
		---	---	1.3			2.25<V_{CC}≤2.8V
		---	---	1.0			2.8<V_{CC}≤3.63V
Output Voltage-“L”	V_{OL}	---	---	10% V_{CC}	V	I_{OL}= 5mA	
Output Voltage-“H”	V_{OH}	90% V_{CC}	---	---		I_{OH}=-5mA	
Output Load	CL	---	---	15	pF	CMOS	
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	$t_{\_ena}$	---	---	5	ms		
Start-up Time	$t_{\_sta}$	---	---	5	ms	@Minimum operating voltage to be 0sec	
1 Sigma Jitter**	J_{Sigma}	---	---	14	ps	10≤ f0 <25MHz	
		---	---	12		25≤ f0 <50MHz	
		---	---	10		50≤ f0 <75MHz	
		---	---	14		75≤ f0 <125MHz	
		---	---	18		125≤ f0 ≤170MHz	
Peak to Peak Jitter**	J_{PK-PK}	---	---	110		10≤ f0 <25MHz	
		---	---	95		25≤ f0 <50MHz	
		---	---	80		50≤ f0 <75MHz	
		---	---	75		75≤ f0 <125MHz	
		---	---	100		125≤ f0 ≤170MHz	
Phase Jitter (BW:12kHz to 20MHz)	---	---	---	33	ps	10≤ f0 <25MHz	V_{CC}=1.8V
		---	---	36		25≤ f0 <50MHz	
		---	---	45		50≤ f0 <75MHz	
		---	---	55		75≤ f0 <125MHz	
		---	---	60		125≤ f0 <150MHz	
		---	---	48		150≤ f0 ≤170MHz	
		---	---	33		10≤ f0 <25MHz	V_{CC}=2.5V
		---	---	36		25≤ f0 <50MHz	
		---	---	45		50≤ f0 <75MHz	
		---	---	53		75≤ f0 <125MHz	
		---	---	57		125≤ f0 <150MHz	
		---	---	48		150≤ f0 ≤170MHz	
		---	---	33		10≤ f0 <25MHz	V_{CC}=3.3V
		---	---	36		25≤ f0 <50MHz	
		---	---	43		50≤ f0 <75MHz	
		---	---	49		75≤ f0 <125MHz	
		---	---	52		125≤ f0 <150MHz	
		---	---	44		150≤ f0 ≤170MHz	

Note: All electrical characteristics have defined on the maximum loaded and recommended operating conditions.

* Over All Conditions:

Include initial tolerance, operating temperature range, rated power supply voltage change, load change,aging (1year @+25°C), shock and vibration

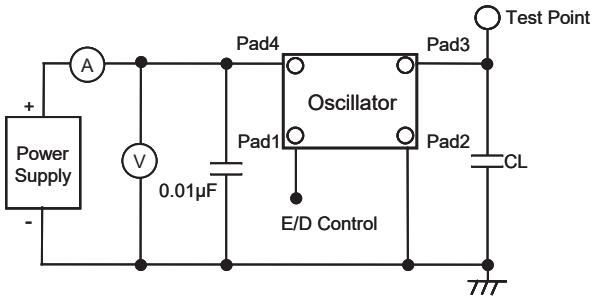
**Based on Time Interval Analyzer "Wavecrest SIA-3000”.

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 electrical characteristics shall be measured by test circuit "Fig. 1". Also jitter shall be measured by test circuit "Fig. 3".

4-6. Clock Timing Chart
The clock timing chart is "Fig. 2".



Note: CL includes probe and test fixture capacitance

Fig.1 Test Circuits

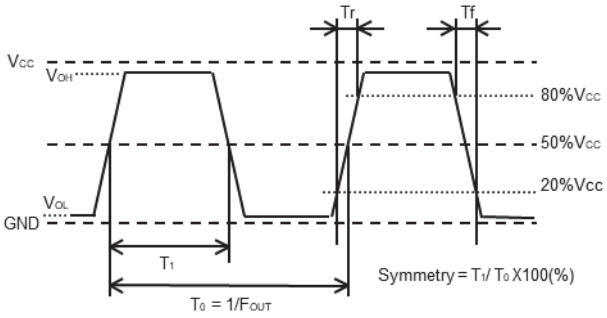
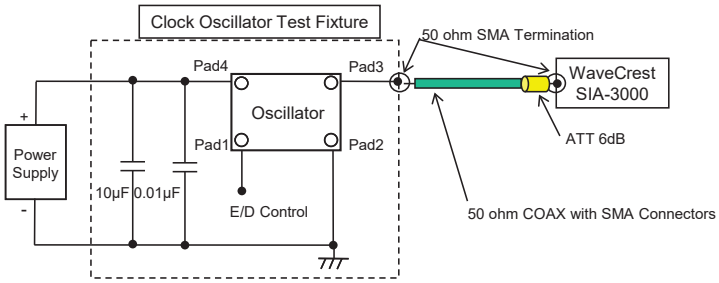


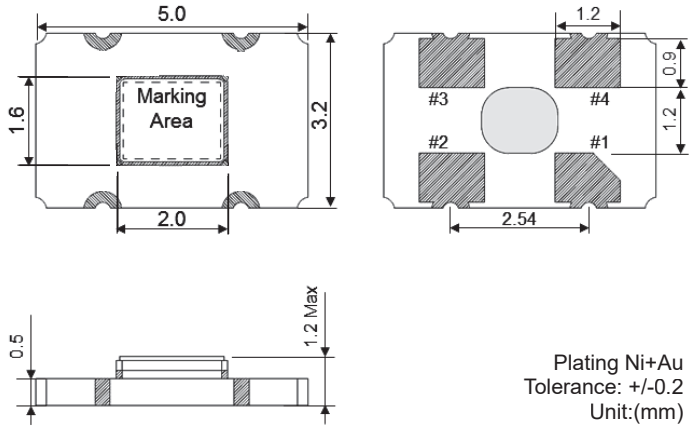
Fig.2 Clock Timing Chart (C-MOS Output)



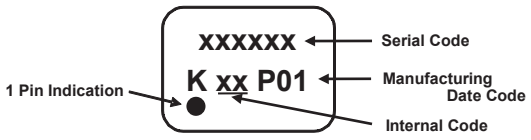
<Measurement Conditions>
- Time Interval Analyzer
  - WaveCrest SIA-3000
- DTS timer calibration
  - Over 30 minutes warm-up
  - Extend 30 minutes calibration
- Jitter histogram conditions (Tail-fit)
  - More than 50,000cyc Hits
  - Bit Error Ratio (BER) –12 (14sigma)

Fig.3 Jitter Test Circuits

5. Dimensions and Marking



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



Manufacturing Date Code

1) Year Code (2020: "W", 2021:"A", 2022: "B" ....)
2) Weekly Code

Year	Code	Year	Code
2020	W	2031	L
2021	A	2032	M
2022	B	2033	N
2023	C	2034	P
2024	D	2035	Q
2025	E	2036	R
2026	F	2037	S
2027	G	2038	T
2028	H	2039	V
2029	J	2040	W
2030	K	2041	A
It repeats from A in 2041 and after wards.			

Table 2

Pad arrangement	
1	Stand-by Function
2	Case GND
3	Output
4	V_{CC}

Stand-by Function	
Pad1	Pad3 (Output)
OPEN	Active
"H" Level	Active
"L" Level	High Z (No-Oscillation)

6. Parts Numbering Guide

KC5032Z xx.xxxx C 1 J X 00
A B C D E F G

A. Series (SMD Oscillator)
B. Output Frequency
C. Output
C: C-MOS
D. Supply Voltage
1: 1.8V/ 2.5V/ 3.3V Compatible
E. Frequency Tolerance*
J:±25ppm
F. Symmetry (Duty Ratio) and Stand-by Function
X: Symmetry: 45% to 55% with Stand-by Function
G. Suffix for Individual Requirements
(STD Specification is "00")

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

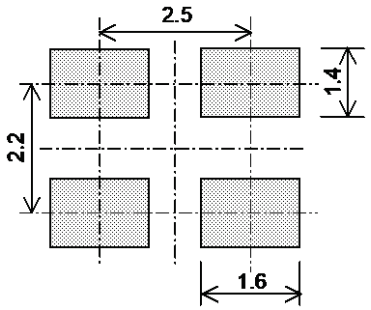
7. Environmental Characteristics

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	Without looseness or crack etc.
7-3. Temperature Cycle	10 cycles: -55°C to +125°C (30minuts each/ cycle)	Clause 7-10 shall be satisfied.
7-4. Mechanical Shock (Pulse)	5 times 14,750m/sec^2 (1,500G), Duration of pulse 0.5msec (MIL-STD-883D-2002.3 Condition B)	
7-5. Vibration	4 times each axis X, Y, Z: 20 to 2,000Hz and 2,000Hz 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 Equipment (MIL-STD-883D-1014.10 Condition A1)	5x10^{-9} Pa m^3/sec max

After each testing, the parts shall be subjected to standard atmospheric conditions more than 2 hours. After that, the electrical characteristics shall be measured. The result of the test shall be satisfied **Table 1.**

Table 3

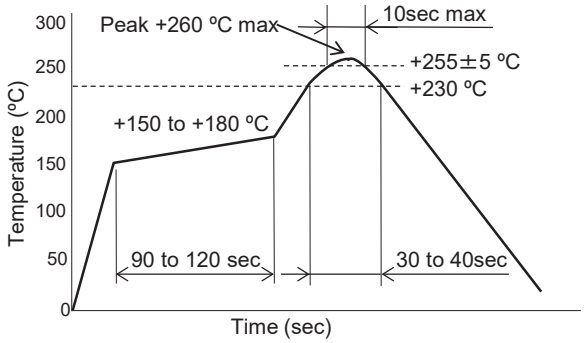
8. Recommended Land pattern and Soldering Guide



Unit: (mm)

Note:
Since the part doesn't have Bypass Capacitor between V_{cc} and GND, Please mount high frequency type capacitor 0.01μF to the nearest position of oscillator.

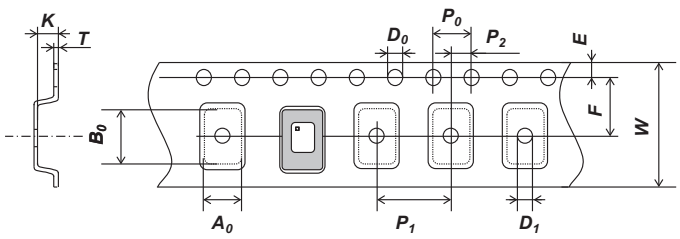
Fig.4 Land pattern



- Available Reflow times: Maximum 2 times

Fig.5 Reflow profile (Lead Free Available)

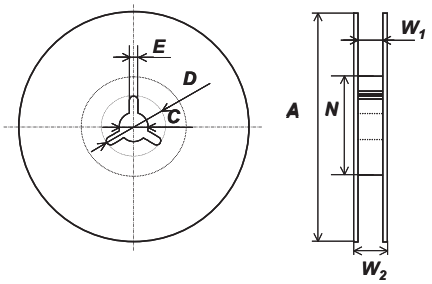
9. Taping Specifications



Unit: (mm)

Symbol	A_0	B_0	W	F	E
Dimensions	3.7±0.1	5.5±0.1	12.0±0.3	5.5±0.05	1.75±0.1
Symbol	P_1	P_2	P_0	D_0	T
Dimensions	8.0±0.1	2.0±0.05	4.0±0.1	1.5+0.1/-0	0.3±0.05
Symbol	K	D_1			
Dimensions	1.4±0.1	1.5+0.1/-0			

Fig.6 Emboss Carrier Tape



Std. Max 1,000pcs/Reel Unit: (mm)

Symbol	A	N	W_1
Dimensions	180 +0/-3	60+1/–0	13.0±0.3
Symbol	W_2	C	D
Dimensions	17.0±1.4	13.0±0.2	21.0±0.8
Symbol	E		
Dimensions	2.0±0.5		

Option Max 2,000pcs/Reel Unit: (mm)

Symbol	A	N	W_1
Dimensions	330 +2/-2	100+1/–1	13.4±1.0
Symbol	W_2	C	D
Dimensions	17.4±1.0	13.0±0.2	21.0±0.8
Symbol	E		
Dimensions	2.0±0.5		

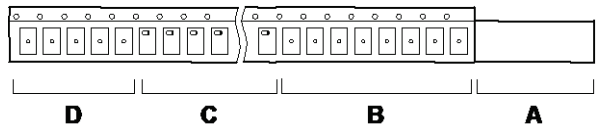
Fig.7 Reel

9-1. Taping Quantities

- The taping of per reel shall be packed 1,000 pcs.
- The parts shall be contained continuously in the pocket.

9-2. Leader and Blank Pockets

- The package shall be consisted of leader, blank pockets and loaded pocket as follows “Fig. 8”.
- The power of peeling strength between top tape and carrier tape shall be 0.1N(10gf) to 1.0N(100gf) as follows “Fig. 9”.



A) Leader
B) Blank Pocket (40mm to 320mm)
A+B: 400mm to 560mm
C) Load Pocket
D) Blank Pocket (160mm minimum)

Fig.8 Packing Method

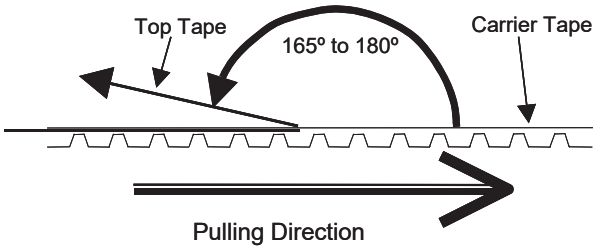


Fig.9 Peeling Strength

9-3. Reel Label

The reel label shall be consisted as below. (Based on EIAJ C-3 format)

A) Customer Part Number
B) Lot No.
C) Quantities
D) Shipping Date
E) Vender Name

9-4. Exterior Package Label

The oscillator shall be packed properly to avoid defect in transportation. The exterior package label shall be consisted as below.

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

10. The agreement of this specifications

In case there is any obscure point or doubt concerning the contents of the specification, it shall be settled through consultation of both parties.

11. Remarks on Usages

A) Storage Conditions

The parts shall be stored in temperature range of -5 to +40°C, humidity 40 to 60% RH, and avoid direct sunlight. Then the parts shall be used within 6 months.

B) Handling Conditions

Although the part has protection circuit against static electricity, when excess static electricity is applied, the inside IC may get damaged.
Before mounting on the PCB, please make sure the direction of the part is correct. Otherwise the part of temperature will increase. And also the part will have some damages.
Please do not use the parts under the unfavorable condition such as beyond specified range in this specification.
Please do not use the parts under the condition, in the water or in the salt water also environment of dew or harmful gas.
Frequency drift may occur as a result of application of light such as direct sunlight or LED light etc when operating this oscillator.
Please use in a design and environment that consider light shielding.
Note the frequency drift will not occur if used in a light-shielded environment.

Please make sure the condition of pick and place following pick up nozzle guideline.

Picking Method: Case of Head Unit 1.6 x 1.2mm (Inside Diameter)

The proper condition of pick and place will be different each equipment. Therefore, please check before testing.

This product can be used for general electronic equipment (information equipment, communication equipment, audiovisual equipment, measuring equipment, home appliances, etc.)Intended to be used. Equipment and systems (traffic equipment, safety equipment, aviation / space control, nuclear power control, life support equipment) that require special quality and reliability and whose failure or malfunction may endanger human life or harm the human body. (Including medical devices, etc.), basic driving functions (running, turning, stopping) and collision safety in traffic equipment, applications related directly or indirectly to collision safety, and applications that are expected to have a significant impact on property, etc. It is not intended to be used.In the unlikely event that this product is used for any of these purposes, we will not be liable for any damages resulting from such use.

C) Rework Condition
Please do not pick up Head Unit. We can't guaranty electrical performance and reliability.

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

E) Soldering in Mounting
In case of Solder paste and conductive glue contact product lid or product side face exception for product terminal it's possible to influence product characteristics.
Please be careful above contents.

F) Washing Conditions
Ultra sonic cleaning is available. However there is a possibility that Crystal in the part may cause damaged under certain condition. Therefore please test before using.
After washing, please dry the parts completely. Otherwise water drops between the parts and PCB may cause migration.

In case of using this part without above precaution, Kyocera is unable to guarantee the specific characteristics

12. Quality guarantee

In case when Kyocera Corporation rooted failure occurred within 1year after its delivery, substitute product will be arranged based on discussion. Quality guarantee of product after 1year of its delivery is waivered.

13. Others

In case of any questions or opinions regarding the Specification, please have it in written manner within 45 days after issued date.

Appendix

No	Output Frequency (MHz)	Customer Part Number	KYOCERA Part Number	Remarks
1	1.8432	---	KC5032Z1.84320C1JX00	
2	4	---	KC5032Z4.00000C1JX00	
3	7.3728	---	KC5032Z7.37280C1JX00	
4	8	---	KC5032Z8.00000C1JX00	
5	8.192	---	KC5032Z8.1920C1JX00	
6	10	---	KC5032Z10.0000C1JX00	
7	12	---	KC5032Z12.0000C1JX00	
8	16	---	KC5032Z16.0000C1JX00	
9	20	---	KC5032Z20.0000C1JX00	
10	22.5792	---	KC5032Z22.5792C1JX00	
11	24	---	KC5032Z24.0000C1JX00	
12	24.576	---	KC5032Z24.5760C1JX00	
13	25	---	KC5032Z25.0000C1JX00	
14	26	---	KC5032Z26.0000C1JX00	
15	27	---	KC5032Z27.0000C1JX00	
16	30	---	KC5032Z30.0000C1JX00	
17	40	---	KC5032Z40.0000C1JX00	
18	48	---	KC5032Z48.0000C1JX00	
19	50	---	KC5032Z50.0000C1JX00	
20	100	---	KC5032Z100.000C1JX00	
21	125	---	KC5032Z125.000C1JX00	