Drawing No.	TKY1D-H2-18321-00 [13]

1. Purpose and scope
This document contains specification related to CRYSTAL OSCILLATOR model KT2016K60000ZAY33TAW

2. Nominal condition

	Item	MIN.	TYP.	MAX	Unit	Conditions
1	Operating temperature range	-40	---	+105	deg.C	
2	Storage temperature range	-40	—	+105	deg.C	
3	Nominal frequency	---	60.0	—	MHz	
4	Supply voltage	3.135	3.3	3.465	V	3.3V+/-5%
5	Absolute maximaum rating voltage (Supply voltage)	-0.6	---	+4.6	V	
6	Load impedance	9	10	11	kohm	
		9	10	11	pF	
7	Output signal condition	---	Clipped sine	---	—	

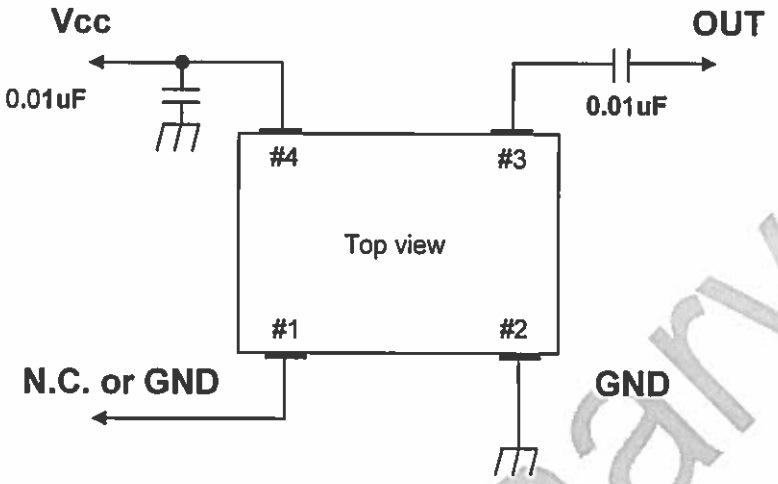
3. Electrical characteristics (T.B.D)
Ta=-40 to +105deg.C, Vcc=3.3 V , Load=10kohm//10pF

	Item	MIN.	TYP.	MAX	Unit	Conditions	Remarks
1	Temp characteristics	-10.0	---	+10.0	$x10^{-6}$	On the basis of 25degC fequency	
2	Voltage characteristics				$x10^{-6}$	3.3V+/-5%	
3	Load characteristics				$x10^{-6}$	10kohm+/-10%, 10pF+/-10%	
4	Aging characteristics				$x10^{-6}$/Y	1year	at 25+/-2 deg.C
5	Frequency tolerance				$x10^{-6}$	After 2 times reflow soldering	at 25+/-2 deg.C
6	Current	---	---	2.5	mA		
7	Output voltage	0.7	---	—	Vp-p		
8	Harmonics	---	---	-8.0	dBc		
9	Duty	45	---	55	%	@GND	
10	Phase noise	---	---	-54	dBc/Hz	@1Hz offset	at 25+/-2 deg.C
		---	---	-82	dBc/Hz	@10Hz offset	
		---	—	-106	dBc/Hz	@100Hz offset	
		—	---	-128	dBc/Hz	@1kHz offset	
		---	---	-142	dBc/Hz	@10kHz offset	
		---	—	-150	dBc/Hz	@100kHz offset	
		---	—	-150	dBc/Hz	@1MHz offset	

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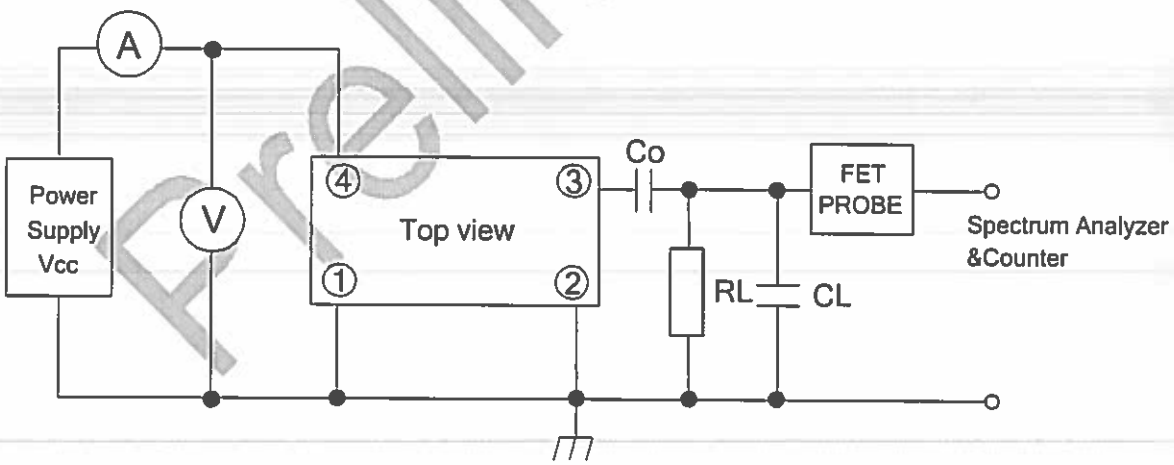
4. Circuit

Bypass Capacitor and DC- Blocking Capacitor do not build in this TCXO.
So, Bypass Capacitor and DC- Blocking Capacitor are attached outside and please use it.
And these Capacitor should be placed as close as possible to the pin(No.3 and No.4).



5. Test circuit

*Load 10kohm//10pF contains the internal impedance of FET probe.



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6. Environment mechanical characteristics

No	Items	Conditions	Number	Judge
1	Low Temperature Storage	-40deg.C, 1000hrs, Unpowered. (Reference: MIL-STD-202 Method 108)	77pcs*1Lot	+/-3.0ppm max. (Before and After)
2	High Temperature Storage	+85deg.C, 1000hrs, Unpowered. (Reference: MIL-STD-202 Method 108)	77pcs*1Lot	+/-3.0ppm max. (Before and After)
3	Temperature Cycling(Air)	-40 to +85deg.C, each30min, 1000cycles, Unpowered. (Reference: JESD22 Method JA-104)	77pcs*1Lot	+/-3.0ppm max. (Before and After)
4	Vibration	10 to 50Hz/+/-0.75mm, 55 to 2000Hz/10G, 1oct./min, 24h, 3axis (Reference: MIL-STD-202 Method 204)	30pcs*1Lot	+/-2.0ppm max. (Before and After)
5	Mechanical shock	half sign, 100G, 6msec, 3times, each 6axis (Total 18) (Reference: MIL-STD-202 Method 213)	30pcs*1Lot	+/-2.0ppm max. (Before and After)
6	Drop test	1.2 m, Concrete floor, 20times	30pcs*1Lot	+/-2.0ppm max. (Before and After)
7	Board Flex	2mm, 60sec min, 1time (Reference: AEC Q200-005)	30pcs*1Lot	+/-2.0ppm max. (Before and After)
8	Shear stress	17.7N, 60sec.-0+1 (Reference: AEC Q200-006)	30pcs*1Lot	+/-2.0ppm max. (Before and After)
9	Humidity tests	+85deg.C, 85%, Vcc=3.465V, 1000hrs (Reference: MIL-STD-202 Method 103)	77pcs*1Lot	+/-3.0ppm max. (Before and After)
10	Operation life tests	+85deg.C, Vcc=3.465V, 1000hrs (Reference: MIL-STD-202 Method 108)	77pcs*1Lot	+/-3.0ppm max. (Before and After)
11	ESD test (Human body model	+/-2000V, 100pF, 1.5kohm, 2pulses	15pcs*1Lot	+/-2.0ppm max. (Before and After)
12	Solvent resistance	3min dip, 10times Brushing, 3cycles (Reference: MIL-STD-202 Method 215)	30pcs*1Lot	+/-2.0ppm max. (Before and After)
13	Refow Soldering	260deg.Cpeak, 10secMAX, 3times	15pcs*1Lot	+/-2.0ppm max. (Before and After)
14	Solderability	Reference: J-STD-002	30pcs*1Lot	Dipped potion : 95% Coverage

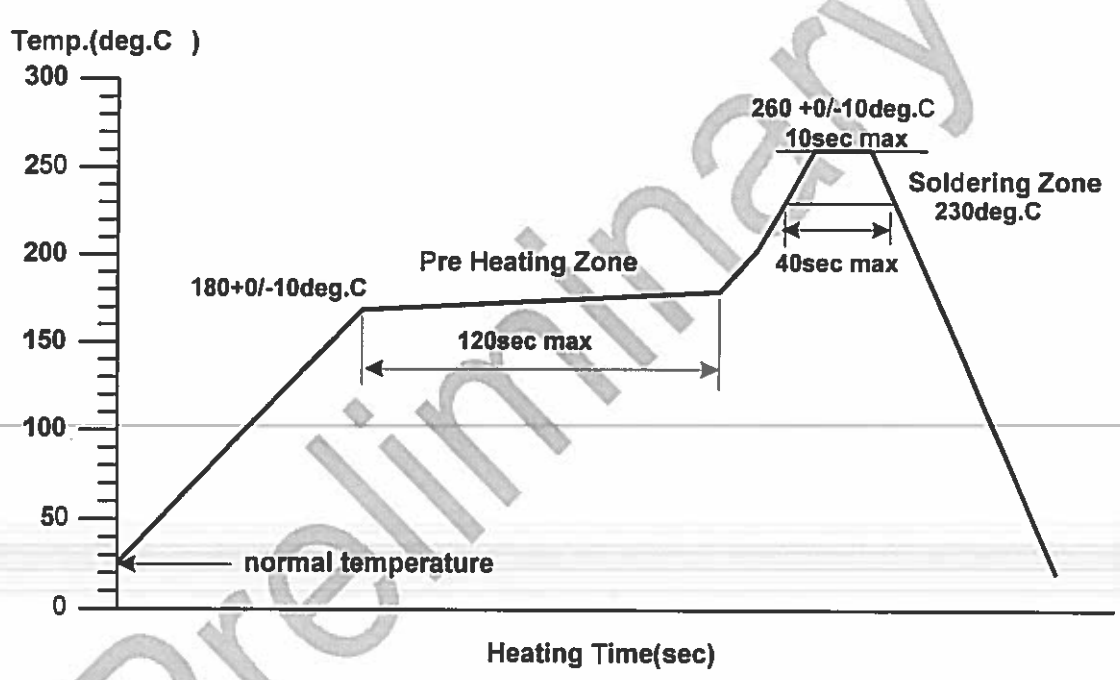
Normal Condition : Temperature 25 deg.C+/-2deg.C , Humidity 30 % to 70 %

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7. Reflow profile

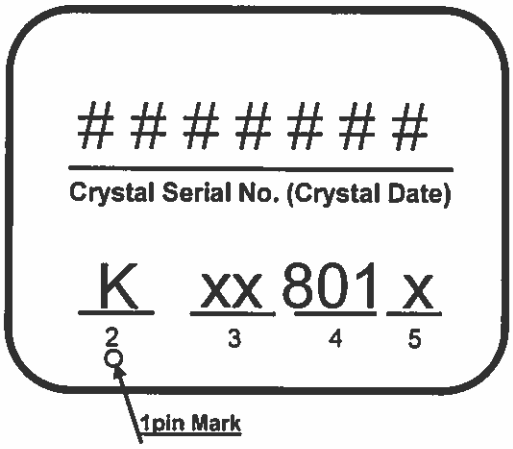
7-1. Preheat: 180+0/-10deg.C, 120sec (max)
7-2. Peak Temperature: 260+0/-10deg.C, 10sec (max)
7-3. PC-Board
Material : FR-4
Size : 140mm*110mm
Thickness : t=0.8mm
7-4. Condition of Measurement Temperature: Surface of PC-BOARD

Reflow Soldering Condition



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8. Marking contents



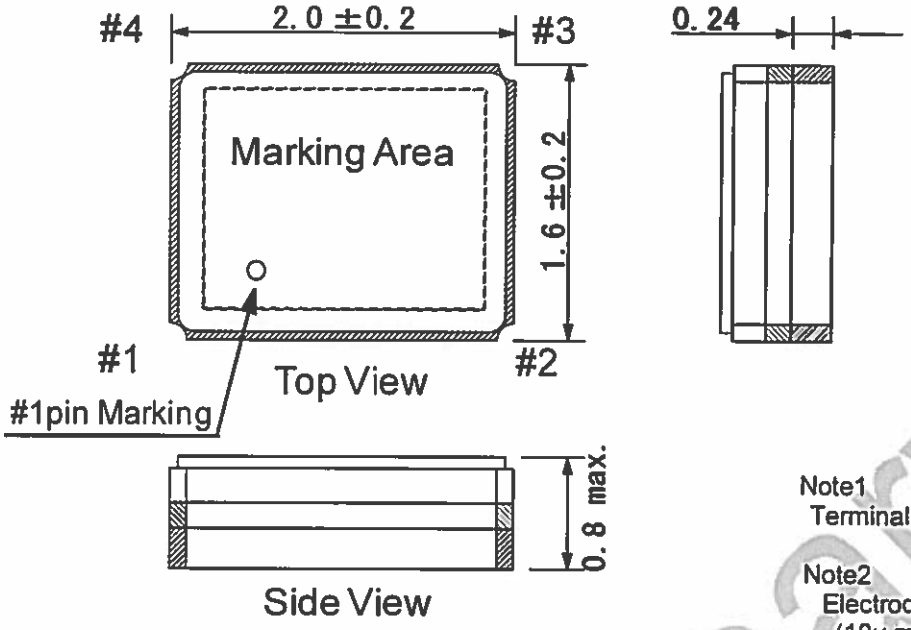
*Laser Marking

	Contents	Example
1	1Pin identifier	O
2	Control Code1	K
3	Control Code2	xx
4	Weekly Code.	801 *The 2018 1st week 802 *The 2018 2nd week
5	Control Code3	x *Specification Code (Alphanumeric characters or nothing)

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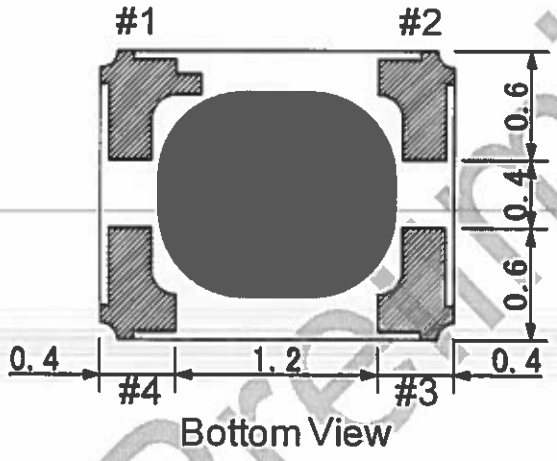
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9. Dimensions



Note1
Terminal Coplanarity:80um max

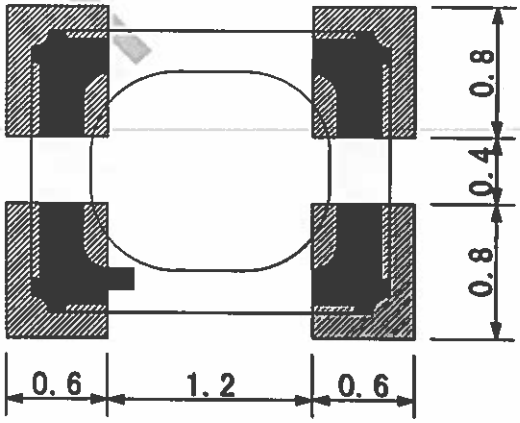
Note2
Electrode : Cu + Ni + Au
(10μ min+3μ min+0.03μ min)



	Pin Connection
# 1 pin	N.C. or GND
# 2 pin	GND
# 3 pin	Output
# 4 pin	Vcc

Unit: mm

Recommended Land Pattern

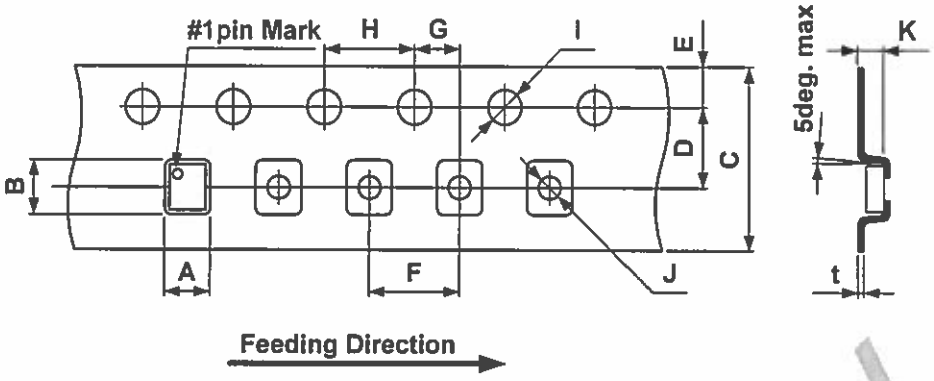


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10.Tape & Reel

10-1. Tape specification



10-1-1. Carrier Tape material : PS Included Carbon

10-1-2. 1pin Mark is positioned on right side against the direction of feed.

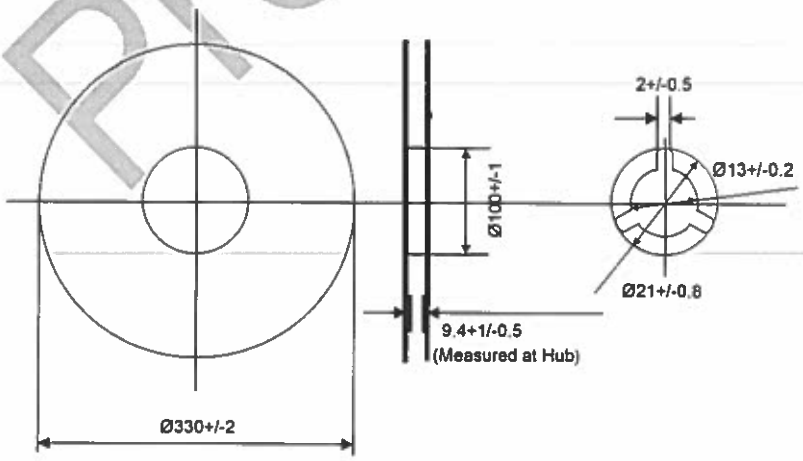
Unit: mm

Symbol	A	B	C	D	E
Dimension	2.0+/-0.05	2.4+/-0.05	8.0+/-0.2	3.5+/-0.05	1.75+/-0.1

Symbol	F	G	H	I	J
Dimension	4.0+/-0.1	2.0+/-0.05	4.0+/-0.1	Φ1.5+0.1/-0	Φ1.0+0.1/-0

Symbol	K	t
Dimension	0.9+/-0.05	0.25+/-0.05

10-2.Reel specification



Unit:mm

10-2-1. Reel material: PS Included Carbon

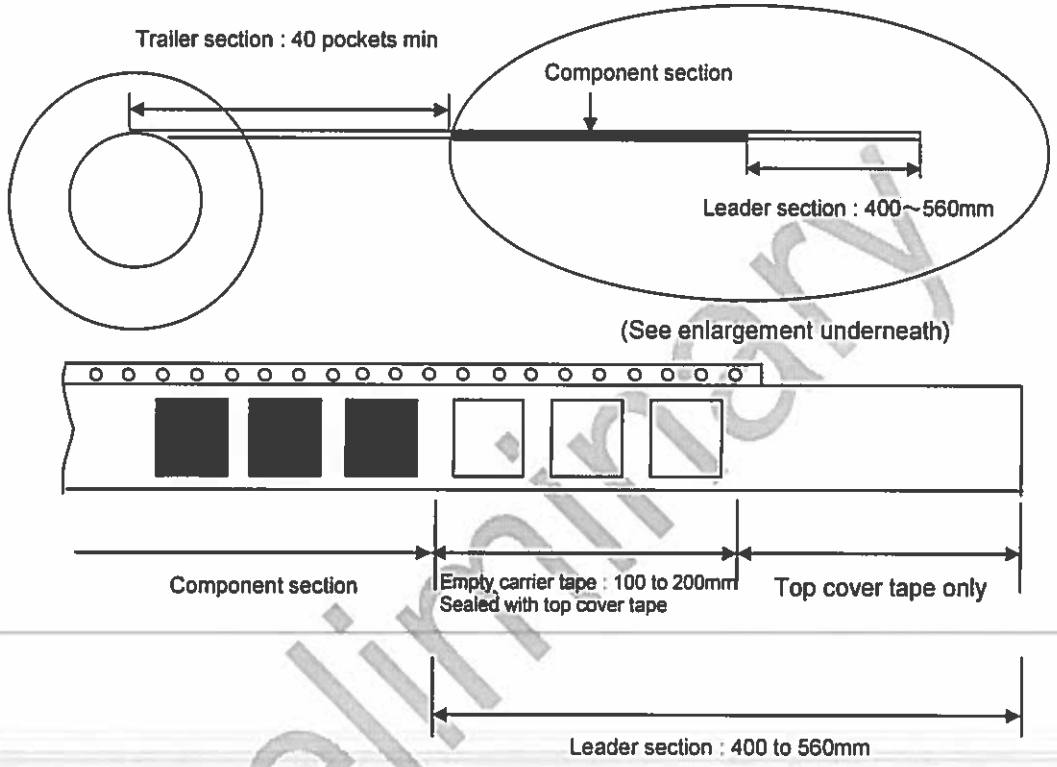
10-2-2. Reel unit: 15,000pcs max. /1Reel

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10-3.Packing

10-3-1.Trailer & Leader

As for the trailer and leader of taping, there are empty pockets as following drawing.
Sprocket hole is positioned on upper side against the direction of feed.
No missing components, excluding empty place.



10-4. Shipping label

Following item shall be listed on reel, bag and box.
"Customer's name", "Parts No", "Lot No", "Quantity", "Order No", "Date of manufacture"
The form of the label conforms to JEITA standard pattern C-3.

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11. Top Cover breaking and peeling force

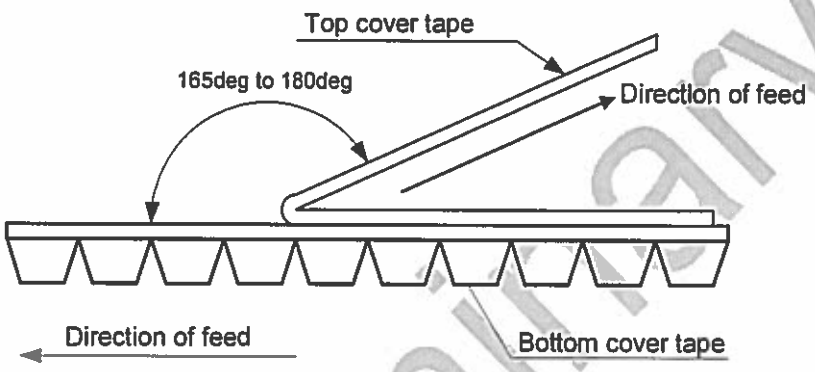
11-1. Reel Angle: 165 to 180deg

11-2. Tape Break Force: 10N min

11-3. Top Cover Tape Strength: 10N min

11-4. Top Cover Tape Peel Force: 0.1 to 1.0N

11-5. Top Cover Tape Peel Speed: 300+/-10mm / minute



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12. Notice

12-1. Please use soldering iron and the spot heater within the range of a solder heat test condition.
Temp.:350+/-5deg.C, Time:3+/-1sec.

12-2. Units should be stored in a dry environment keeping away from the sun.

12-3. Don't leave units in High-temperature and High-humidity environment due to terminal solderability.
(Please keep 0 to 40deg.C and 30 to 70%RH for recommendable storage condition)

12-4. The term of a guarantee of taping packing is 6 months. (0 deg.C to 40 deg.C,RH30% to 70%)

12-5. Disapprove of washing.

12-6. Unless we receive request for modification within 1 month from the issue date of this KC specification sheet, we will supply products according to this specification.
Also, if you'd like to modify specification of order, which has been placed with delivery within 1 month from the issue data of this specification sheet, we would like to discuss with you separately.

12-7. This product is intended to be used for general electronic equipment (information equipment, communication equipment, audio visual equipment, measuring equipment, home electric appliances, etc.). Devices and systems that are required for special quality and reliability, and whose failure or malfunction directly threatens human lives or that may cause harm to the human body (traffic equipment, safety equipment, aircraft and space, nuclear power control, life support equipment Please contact us in advance in case of using it for medical equipment including medical equipment etc.).

12-8. In no event shall the company be liable for any product failure resulting from an inappropriate handling or operation of the product beyond the scope of its guarantee.

12-9. Information contained in this specification must not be quoted, reproduced or used for other purposes including processing either in part or in full without obtaining prior approval from the company.

12-10. Please keep it at the place that was the ESD protective.
Human model 1.5kohm 100pF : +/-2000V
Machine model 0kohm 200pF : +/-200V

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13. Production place

13-1 Manufacturer

KYOCERA Corporation.

13-2 The site of the Factory

1)5850 Higasine-Koh, Higasine-shi, Yamagata, 999-3701, Japan

2) 3-11-1 Osachi Kohagi, Okaya-shi, Nagano, 394-8550 Japan

14. Parts Numbering Guide

KT2016K 60000 Z A Y 33 T AW

A B C D E F G H

A. Series (2.0x1.6 SMD KT2016K)
B. Frequency (60.0MHz)
C. Frequency temperature accuracy (Z: Special specification)
D. Minimum temperature range (A: -40deg.C)
E. Maximum temperature range (Y: +105deg.C)
F. Supply voltage (33: 3.3V)
G. Control voltage stability (T: TCXO)
H. Customer special model Suffix

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