Preliminary Specification

This is a draft specification and may change.

Drawing No.	TKY1D-H2-23037-00 [13]
Issued Date.	January 26, 2023

TO: Digi-Key

Note：In case of specification change, KYOCERA Part Number also will be changed.

Product Name	Temperature Compensated Crystal Oscillator
Product Model	KT2016K
Frequency	26.0MHz
Customer Part Number	————————
Customer Specification Number	————————
KYOCERA Part Number	KT2016K26000ZAW28QAP
Remarks	RoHS Compliant, MSL=1 AEC-Q200(Grade3) Compliance

Customer Acceptance

Accept Signature	Accept Date	
	Department	
	Person in charge	

Seller
KYOCERA Corporation
Corporate Electronic Components Group
Electronic Components Sales Division

6 Takeda Tobadono-cho, Fushimi-ku, Kyoto
612-8501 Japan

TEL. No. 075-604-3500
FAX. No. 075-604-3501

Manufacturer
KYOCERA Corporation
Corporate Electronic Components Group
RF Devices Division
Yamagata higashine Plant
5850, Higashine-koh, Higashine-shi, Yamagata
999-3701 Japan
TEL. No. 0237-43-5611
FAX. No. 0237-43-5615

Design Department	Quality Assurance	Approved by	Examined by	Examined by	Written by
RF Devices Engineering Department Crystal Components Application Engineering Section	Y.Kakuta	W.Muraoka.	Y.Hosoya	F.Horie	C.Nitoube

Drawing No.	TKY1D-H2-23037-00 [13]

Revision History

Rev.No.	Description of revise	Date	Approved by	Examined by	Examined by	Written by
00	First Edition	January 26, 2023	W.Muraoka.	Y.Hosoya	F.Horie	C.Nitoube

Drawing No.	TKY1D-H2-23037-00 [13]

1. Purpose and scope

This document contains specification related to CRYSTAL OSCILLATOR model KT2016K26000ZAW28QAP for Digi-Key.

2. Nominal condition

	Item	MIN.	TYP.	MAX	Unit	Conditions
1	Operating temperature range	-40	---	+85	deg.C	
2	Storage temperature range	-40	---	+85	deg.C	
3	Nominal frequency	---	26.0	---	MHz	
4	Supply voltage	2.66	2.8	2.94	V	2.8V+/-5%
5	Absolute maximaum rating voltage (Supply voltage)	-0.6	---	+4.6	V	
	Absolute maximaum rating voltage (Control voltage)	-0.6	---	Vcc+0.6	V	
6	Load impedance	9.5	10	10.5	kohm	
		9.5	10	10.5	pF	
7	Output signal condition	---	Clipped sine	---		
8	Control voltage range	0.4	1.4	2.4	V	1.4V+/-1.0V

3. Electrical characteristics (T.B.D)

Ta= -40 deg.C to +85 deg.C, Vcc=2.8V, Vcon=1.4V, Load 10kohm//10pF

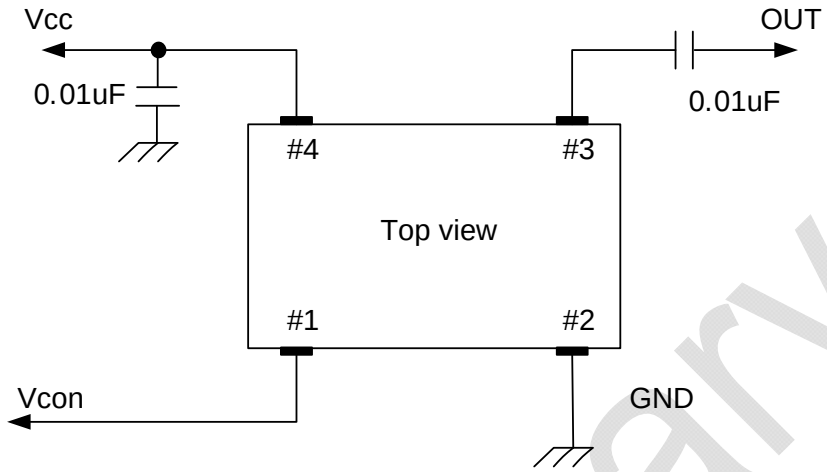
	Item	MIN.	TYP.	MAX.	Unit	Conditions	Remarks
1	Temp characteristics	-0.5	---	+0.5	$x10^{-6}$	-30 to +85deg.C	Referenced to the mid point between minimum and maximum frequency value over the specified temperature range
		-3.0	---	+3.0	$x10^{-6}$	-40 to -30deg.C	
2	Frequency Slope	-0.1	---	+0.1	$\times 10^{-6}$/deg.C	-30 to +85 deg.C	Every 2deg.C
		-0.35	---	+0.35	$\times 10^{-6}$/deg.C	-40 to -30 deg.C	
3	Voltage characteristics	-0.1	---	+0.1	$x10^{-6}$	2.8V+/-5%	
4	Load characteristics	-0.1	---	+0.1	$x10^{-6}$	10kohm//10pF+/-5%	
5	Aging characteristics	-1.0	---	+1.0	$x10^{-6}$/Y	1year	at 25+/-2 deg.C
6	Frequency tolerance	-2.0	---	+2.0	$x10^{-6}$	After 2 times reflow soldering	at 25+/-2 deg.C
7	Current	---	---	2.0	mA		
8	Output voltage	0.8	---	---	Vp-p		
9	Harmonics	---	---	-8.0	dBc		
10	Start up time	---	---	2.0	msec	90% of final output amplitude	
		---	---	2.0	msec	Within +/-0.5ppm	
11	Control voltage stability	-15.0	---	-9.0	$x10^{-6}$	Vcon=0.4V	ref:Vcon=1.4V
		+9.0	---	+15.0	$x10^{-6}$	Vcon=2.4V	
12	Phase noise	---	-67	---	dBc/Hz	@1Hz offset	at 25+/-2 deg.C
		---	-95	---	dBc/Hz	@10Hz offset	
		---	-120	---	dBc/Hz	@100Hz offset	
		---	-140	---	dBc/Hz	@1kHz offset	
		---	-153	---	dBc/Hz	@10kHz offset	
		---	-156	---	dBc/Hz	@100kHz offset	
		---	-157	---	dBc/Hz	@1MHz offset	

Note. There is possibility to change standard values of electrical characteristics

Drawing No.	TKY1D-H2-23037-00 [13]

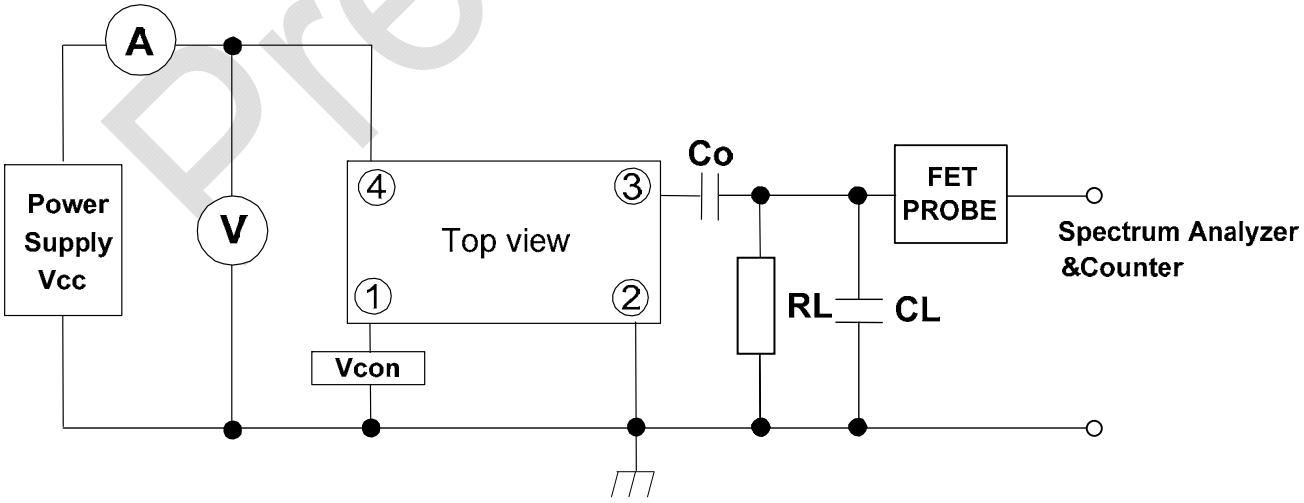
4. Circuit

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.



6. Environment mechanical characteristics

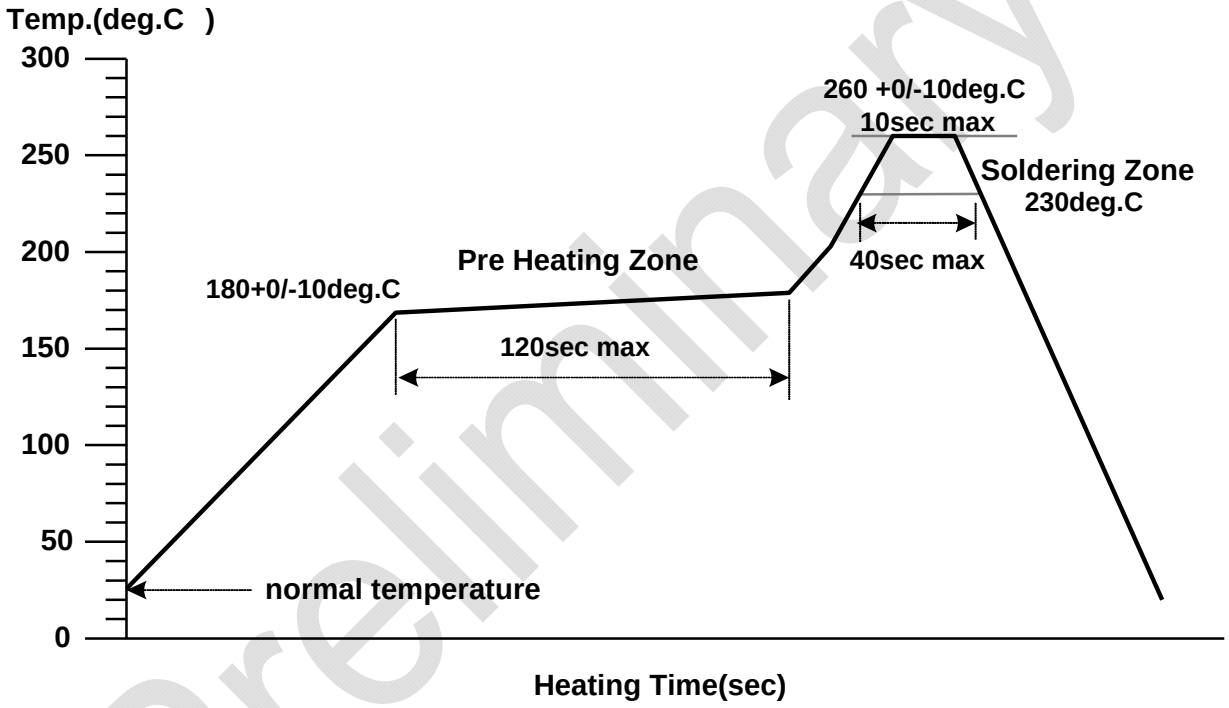
No	Items	Conditions	Number	Judge
1	Low Temperature Storage	-40deg.C, 1000hrs, Unpowered. (Reference: MIL-STD-202 Method 108)	77pcs*1Lot	+/-3.0ppm max. (Before and After)
2	High Temperature Storage	+85deg.C, 1000hrs, Unpowered. (Reference: MIL-STD-202 Method 108)	77pcs*1Lot	+/-3.0ppm max. (Before and 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=2.94V, 1000hrs (Reference: MIL-STD-202 Method 103)	77pcs*1Lot	+/-3.0ppm max. (Before and After)
10	Operation life tests	+85deg.C, Vcc=2.94V, 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 %

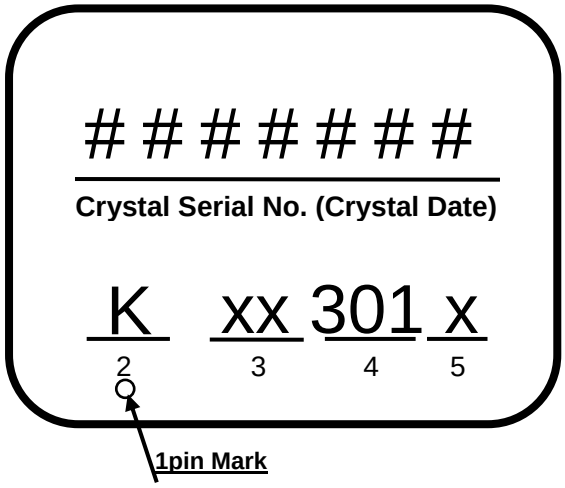
7. Reflow profile

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



8. Marking contents

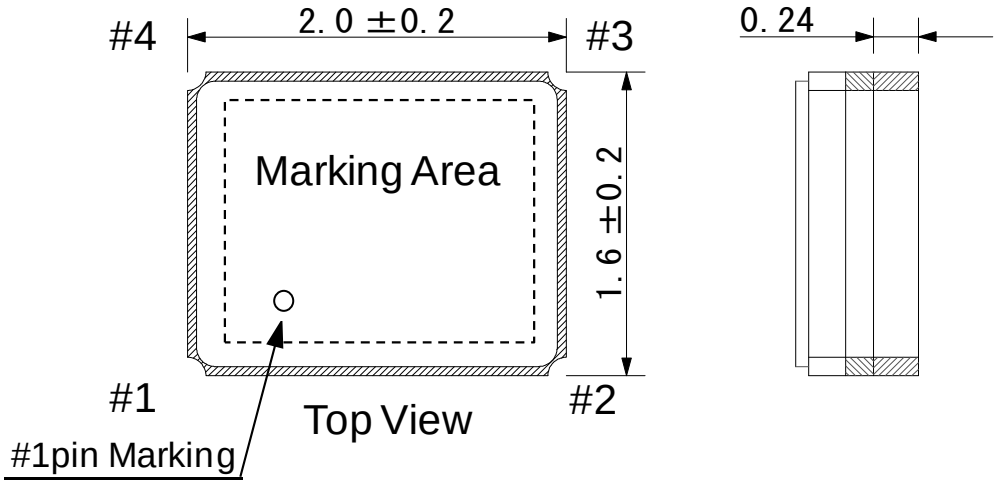


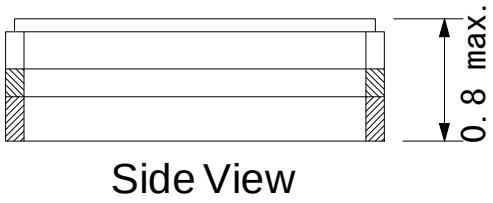
*Laser Marking

	Contents	Example
1	1Pin identifier	○
2	Control Code1	K
3	Control Code2	xx
4	Weekly Code.	301 *The 2023 1st week 302 *The 2023 2nd week
5	Control Code3	x *Specification Code (Alphanumeric characters or nothing)

Drawing No.	TKY1D-H2-23037-00 [13]

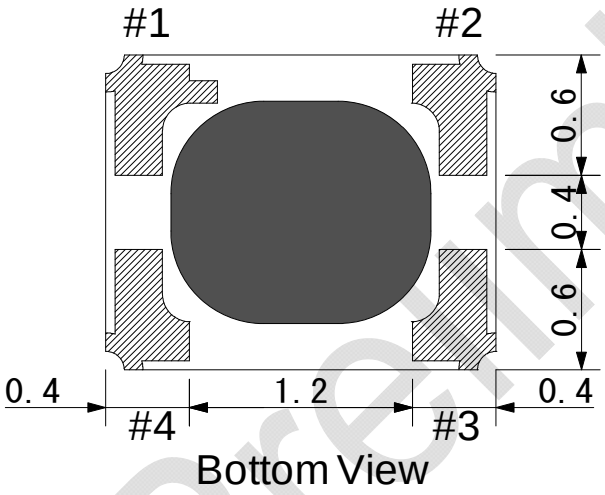
9. Dimensions





Note1
Terminal Coplanarity:80um max

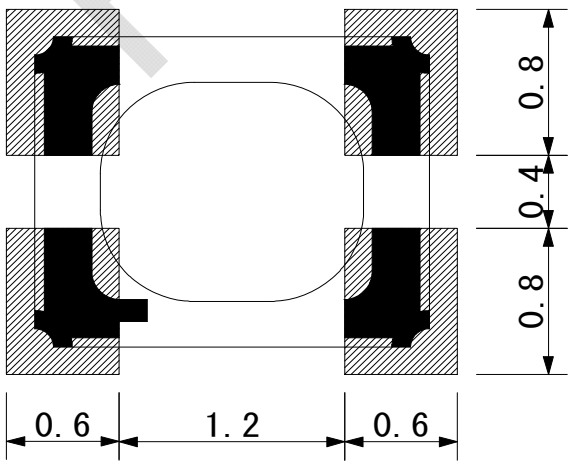
Note2
Electrode : Cu + Ni + Au
(10μ min+3μ min+0.03μ min)



	Pin Connection
# 1 pin	Vcon
# 2 pin	GND
# 3 pin	Output
# 4 pin	Vcc

Unit: mm

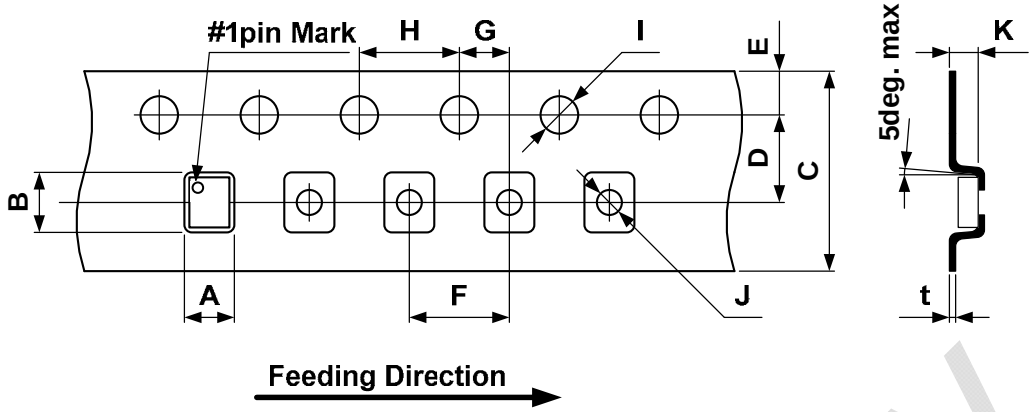
Recommended Land Pattern



Drawing No.	TKY1D-H2-23037-00 [13]

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.

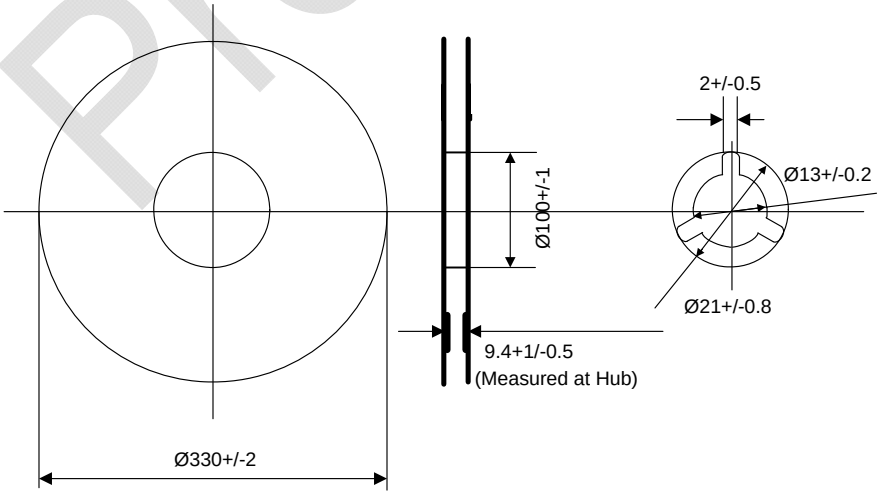
Unit: mm

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

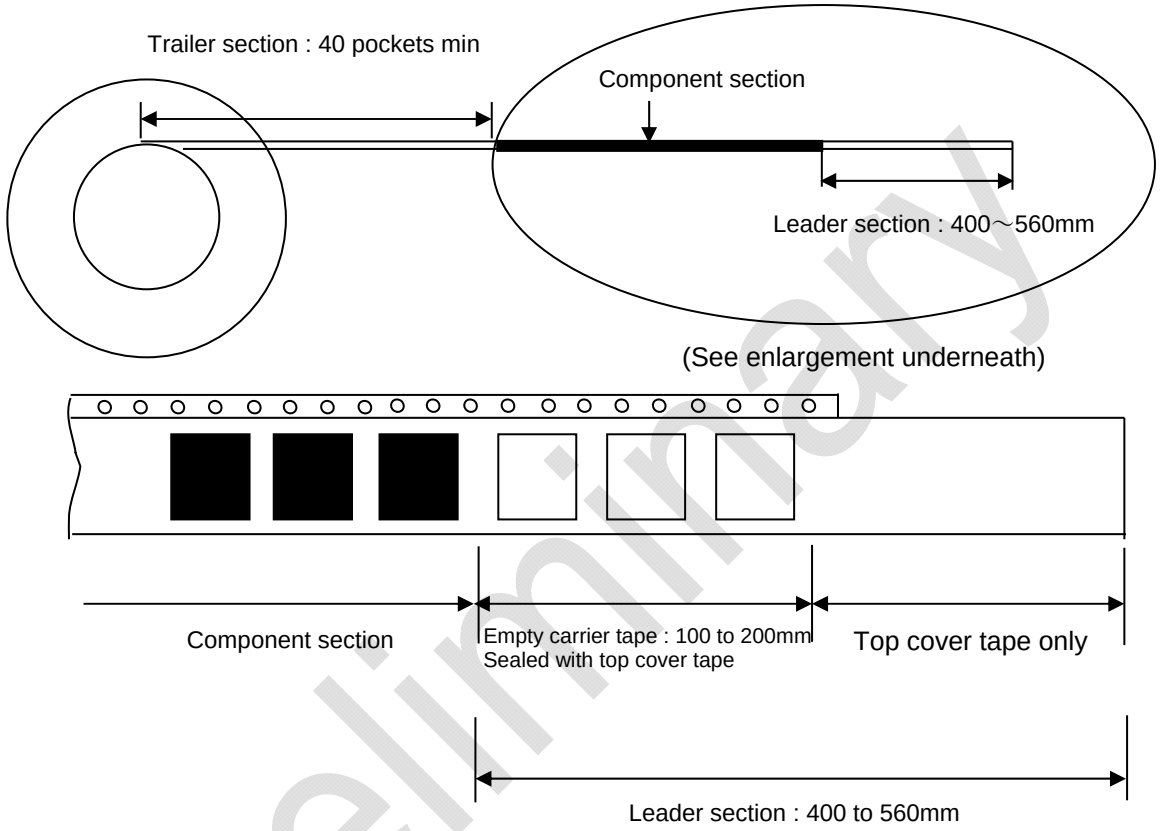
10-2-2. Reel unit: 15,000pcs max. /1Reel

Drawing No.	TKY1D-H2-23037-00 [13]

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.

11. Top Cover breaking and peeling force

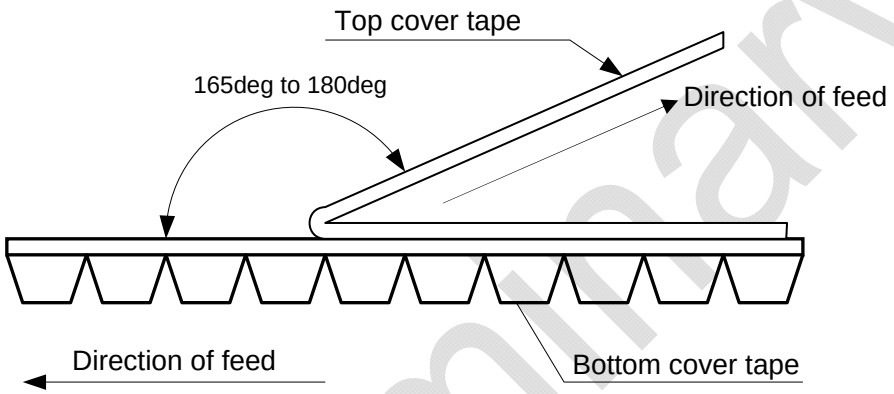
11-1. Reel Angle: 165 to 180deg

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



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. It is not guaranteed to be molded by transfer or compression.

12-7. 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.

12-8. 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, base station) 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.

12-9. 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.

12-10. 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.

12-11. Please keep it at the place that was the ESD protective.
Human model 1.5kohm 100pF : +/-2000V
Machine model 0kohm 200pF : +/-200V

13. Production place

13-1 Manufacturer
KYOCERA Corporation.

13-2 The site of the Factory
5850 Higashine-Koh, Higashine-shi, Yamagata, 999-3701, Japan
158-15 Chuo-kogyo-danchi, Sagae-shi, Yamagata, 991-0061, Japan
115-1 Jinmachi-aza-nishihara, Higashine-shi, Yamagata, 999-3761, Japan

14. 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.

15. Parts Numbering Guide

KT2016K 26000 Z A W 28 Q AP
A B C D E F G H

A. Series (2.0x1.6 SMD KT2016K)
B. Frequency (26.0 MHz)
C. Frequency temperature accuracy (Z: Special specification)
D. Minimum temperature range (A: -40deg.C)
E. Maximum temperature range (W: +85deg.C)
F. Supply voltage (28: 2.8V)
G. Control voltage stability (Q: +/-9.0 $X10^{-6}$ to +/-15.0 $X10^{-6}$ / 1.4V+/-1.0V)
H. Customer special model Suffix