Preliminary Specification

Note: This is a draft specification and may change.

Drawing No.	TKY1D-H2-23035-00 [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	KT2016K26000ZAW28NAN
Remarks RoHS Compliant, MSL=1	

Customer Acceptance

Accept Signature	Accept Date	
	Department	
	Person in charge	

Seller
KYOCERA Corporation
Corporate Electronic Components Group
Electronic Components Sales Division

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612-8501 Japan

TEL. No. 075-604-3500
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Manufacturer
KYOCERA Corporation
Corporate Electronic Components Group
RF Devices Division
Yamagata higashine Plant
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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

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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-H2-23035-00 [13]

1. Purpose and scope

This document contains specification related to CRYSTAL OSCILLATOR model KT2016K26000ZAW28NAN 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)	-0.3	---	+4.5	V	
	Absolute maximaum rating voltage (Control voltage)	-0.3	---	Vcc+0.3	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 deg.C to +85 deg.C, Vcc=2.8V,
1pin =Enable/Disable Control , Load=10kohm//10pF

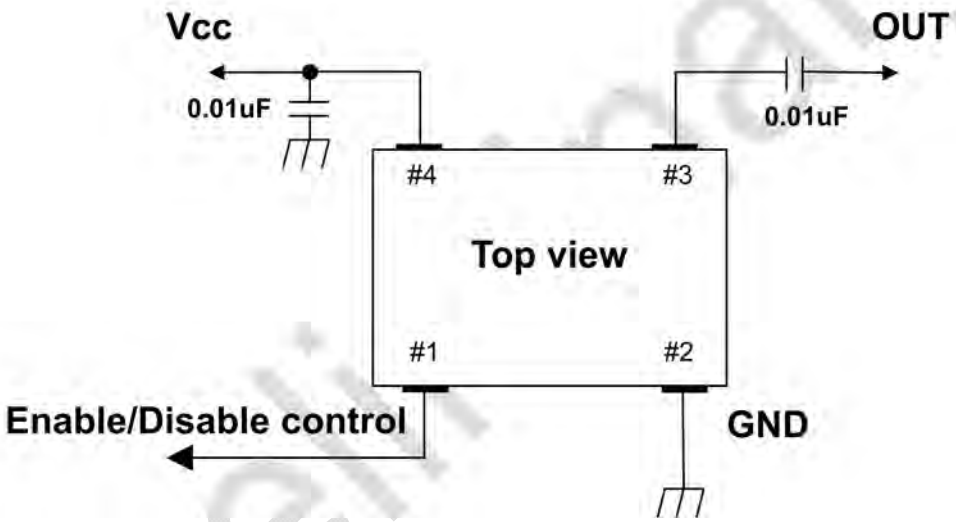
	Item	MIN.	TYP.	MAX	Unit	Conditions	Remarks
1	Temp characteristics	-0.5	---	+0.5	$x10^{-6}$	Ta= -30 to +85 deg.C	Referenced to the mid point between minimum and maximum frequency value over the specified temperature range
		-3.0	---	+3.0	$x10^{-6}$	Ta= -40 to -30 deg.C	
2	Frequency Slope	-0.15	---	+0.15	$\times10^{-6}$/deg.C	-10 to+60 deg.C	
		-0.3	---	+0.3	$\times10^{-6}$/deg.C	-30 to +85 deg.C	
3	Voltage characteristics	-0.2	---	+0.2	$x10^{-6}$	2.8V+/-5%	.
4	Load characteristics	-0.2	---	+0.2	$x10^{-6}$	10kohm+/-10%, 10pF+/-10%	
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	Temperature hysteresis	-0.6	---	+0.6	$x10^{-6}$		
12	Frequency drift rate	---	---	10.0	ppb/sec	Temperature rate change of 0.3deg.C/sec	Ta=-30to+85deg.C
13	Duty	45	---	55	%	@GND	
14	Enable / Disable	80%Vcc	---	Vcc	V	Enable Active Hi	
		0V	---	20%Vcc	V	Disable Active Low	

15	Current of Disable	---	---	4.0	uA		
16	Phase noise	---	-62	---	dBc/Hz	@1Hz offset	at 25+/-2 deg.C
		---	-91	---	dBc/Hz	@10Hz offset	
		---	-117	---	dBc/Hz	@100Hz offset	
		---	-137	---	dBc/Hz	@1kHz offset	
		---	-151	---	dBc/Hz	@10kHz offset	
		---	-157	---	dBc/Hz	@100kHz offset	
		---	-159	---	dBc/Hz	@1MHz offset	

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

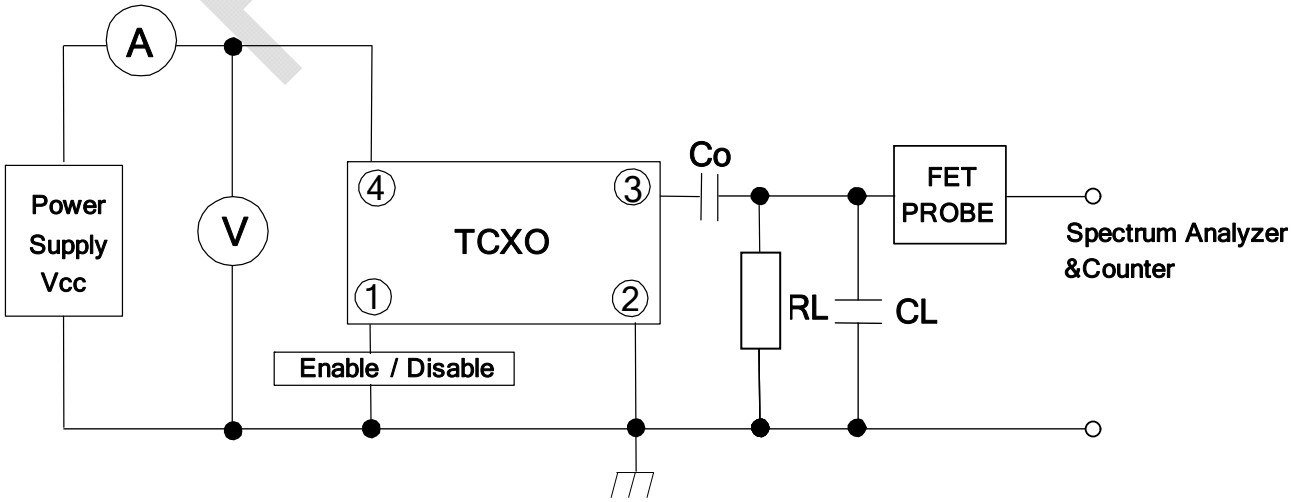
4. Circuit

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

	Item	Conditions	Remark
1	High temperature storage	Ta=+85deg.C, judge on 240H storage	It must be met to the characteristics Judging criterion. Measurement shall be taken at room ambient within 2 to 24hours after each test.
2	Low temperature storage	Ta=-40deg.C, judge on 240H storage	
3	High temperature and high humidity storage	Ta=+85deg.C, RH=85%RH, judge on 240H storage	
4	Temperature cycle test	Ta=-40 to +85deg.C 30min. each 10cycles	
5	Drop test	A test piece (100g) made of Teflon is dropped 3cycles (1cycle: 6 directions) from the height of 150cm on hard board	
6	Vibration test	10 to 55 to 10Hz 1.5mm constant amplitude 1min. period X, Y, Z direction each 2H total 6H.	
7	Solder heat test	All terminal electrode shall be soldered at temperature of 350+/-5deg.C for 3+/-1sec. using a soldering iron.	
8	Solderability	Dip each of terminal electrode into 230+/-5deg.C solder pod for 5+/-0.5sec. after close , the test area of loads surfaces must be covered loads 90% by solder.	
9	Reflow soldering	Reflow soldering at 2 times.	

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

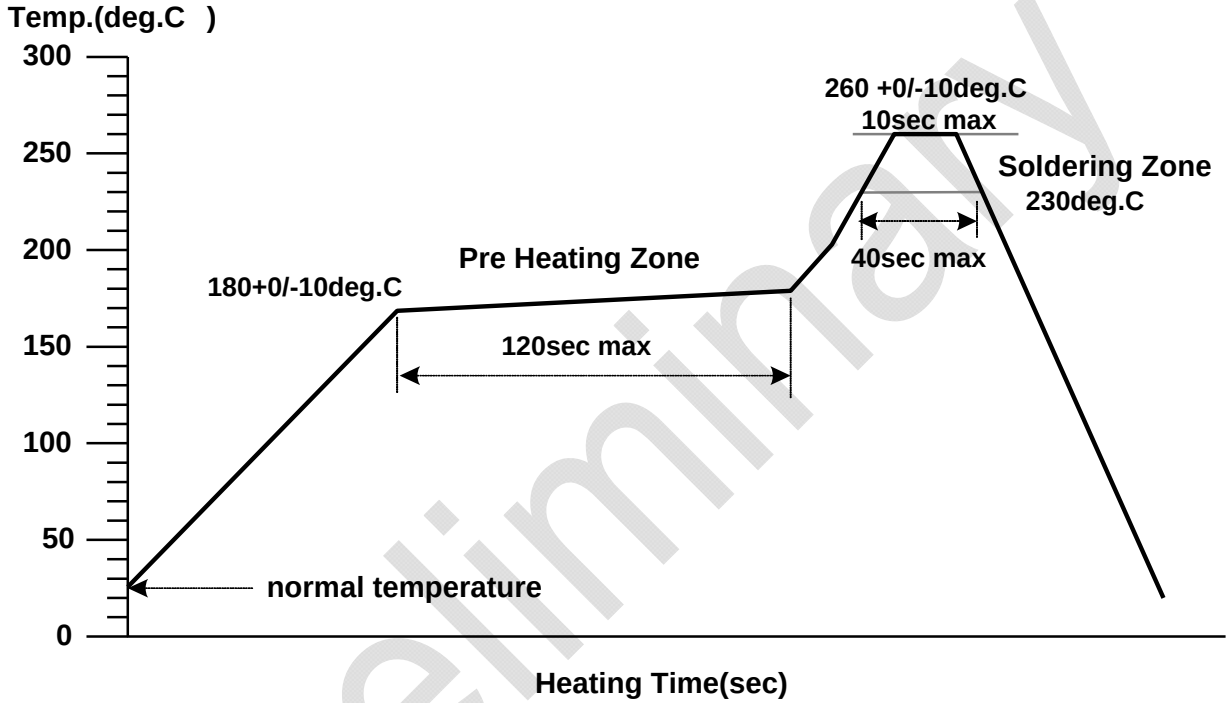
Judge

Item	Specification
At 25deg.C frequency	+/-2.0ppm max(Before and After)

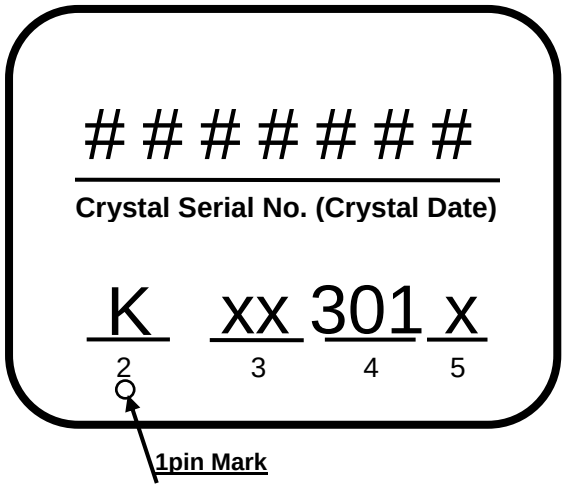
7. Reflow profile

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)

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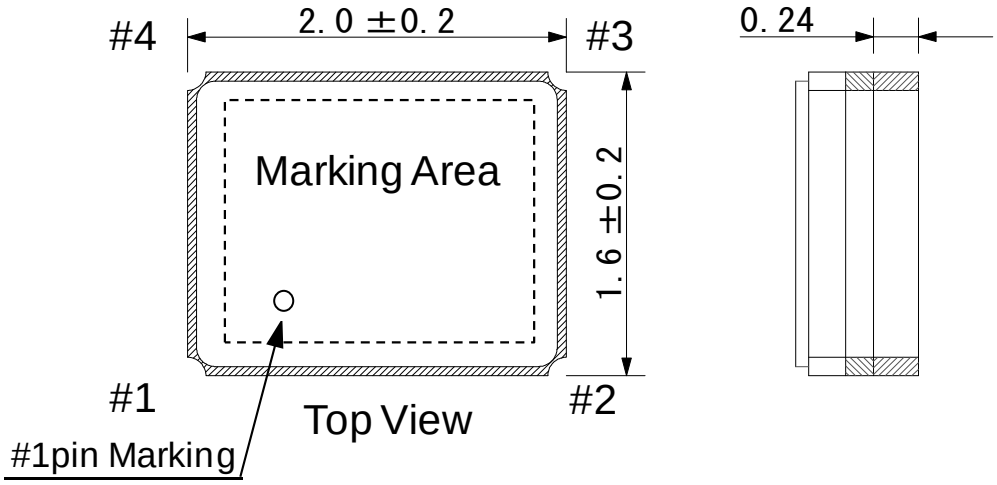
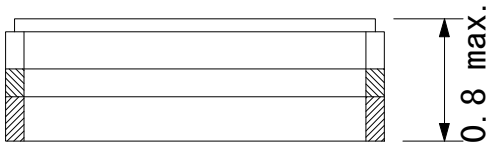
9. Dimensions

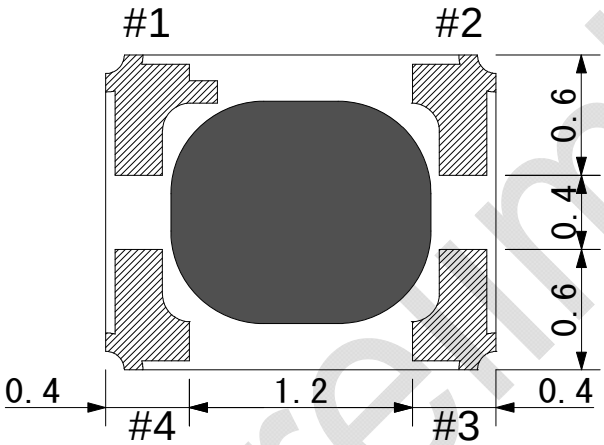




Side View

Note1
Terminal Coplanarity:80um max

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



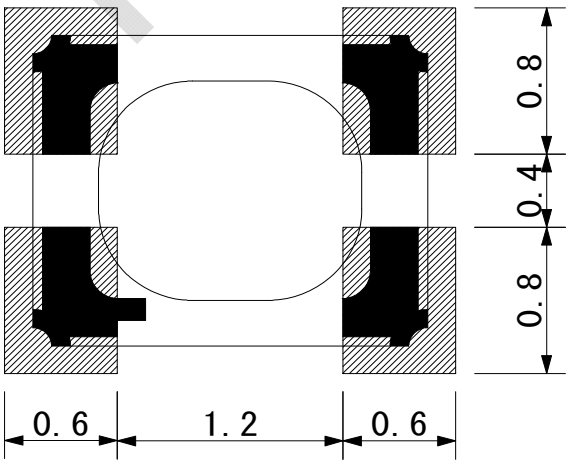
Bottom View

Enable/Disable Function	
#1 Input	#3 Output
Open	Oscillation
"H" Level	Oscillation
"L" Level	High Z

	Pin Connection
# 1 pin	Enable / Disable
# 2 pin	GND
# 3 pin	Output
# 4 pin	Vcc

Recommended Land Pattern

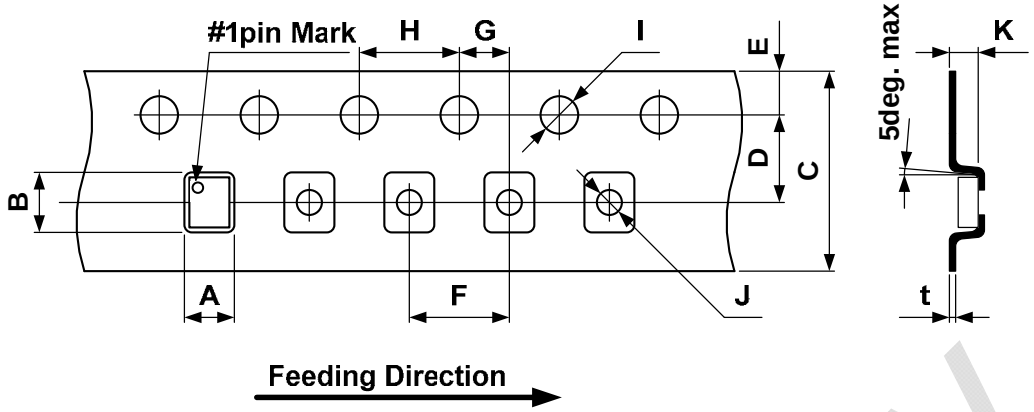
Unit: mm



Drawing No.	TKY1D-H2-23035-00 [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.

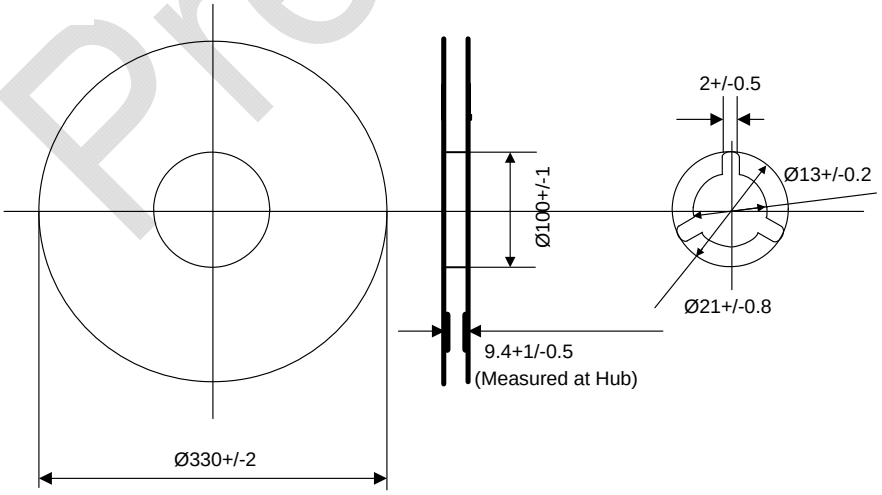
Unit: mm

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

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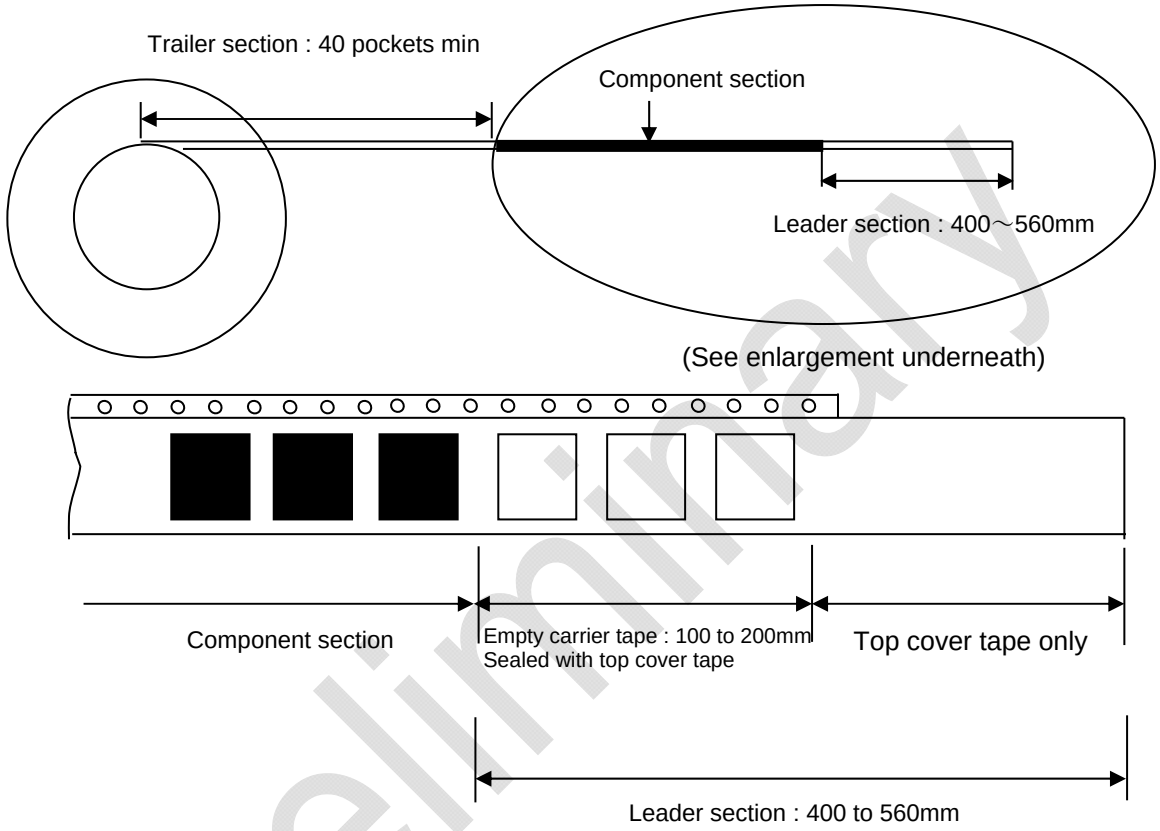
10-3.Packing

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.

11. Top Cover breaking and peeling force

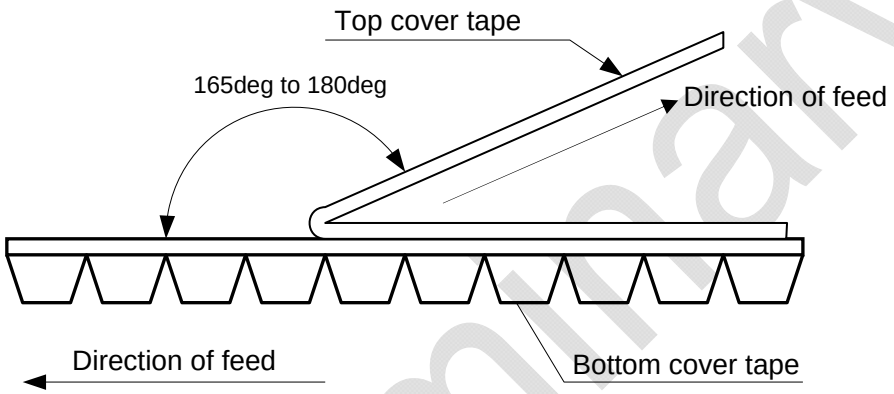
11-1. Reel Angle: 165 to 180deg

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.

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 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.).
It is not intended for use in applications directly related to basic driving functions (run, turn, or stop), collision safety, or driving safety in traffic equipment. In the unlikely event that this product is used for any of these purposes, our company shall 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 : +/-1000V
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 N AN
A B C D E F G H

A. Series (2.0x1.6 SMD KT2016K)
B. Frequency (26.0MHz)
C. Frequency temperature accuracy (Z: Special specification)
D. Minimum temperature range (A: -40degC)
E. Maximum temperature range (W: +85deg.C)
F. Supply voltage (28: 2.8V)
G. Control voltage stability (N: Enable/Disable)
H. Customer special model Suffix