

# Specifications

Drawing No.	USY1M-H1-16428-00 1 / 11
Issued Date.	Apr,20,2016

## Messrs: KED USA

**Note: Part Number will be revised in case of specification change.**

Product Type	Quartz Crystal
Series	CX2520DB
Frequency	Refer to Doc No.USY1M-H1-16428-00 Page 3/11
Customer Part Number	-
Customer Specification Number	-
KYOCERA Part Number	Refer to Doc No.USY1M-H1-16428-00 Page 3/11
Remarks Pb-Free, RoHS Compliant, MSL 1	

### Customer Approval

Approval Signature	Approved Date	
	Department	
	Person in charge	

### Seller

**KYOCERA Crystal Device Corporation**  
 (Sales Division)  
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 612-8501 Japan  
 TEL. No. 075-604-3500  
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### Manufacturer

**KYOCERA Crystal Device Corporation**  
 Crystal Units Division  
 5850, Higashine-Koh, Higashine-Shi, Yamagata  
 999-3701 Japan  
 TEL. No. 0237-43-5611  
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Design Department	Quality Assurance	Approved by	Checked by	Issued by
KYOCERA Crystal Device Corporation Crystal Unit Application Engineering Section Crystal Units Division	S.Itoh	T.Soda	A.Muraoka	Y.Nozaki

### Revision History

Rev.No.	Description of revise	Date	Approved by	Checked by	Issued by
00	First Edition	Apr,20,2016	T.Soda	A.Muraoka	Y.Nozaki

[Parts Number list]

Nominal Frequency (MHz)	KYOCERA Part Number	ESR ( $\Omega$ )	Nominal Frequency Code
12.000	CX2520DB12000D0GPSC1	150	12000
13.560	CX2520DB13560D0GPSC1	150	13560
16.000	CX2520DB16000D0GPSC1	80	16000
19.200	CX2520DB19200D0GPSC1	80	19200
20.000	CX2520DB20000D0GPSC1	80	20000
24.000	CX2520DB24000D0GPSC1	80	24000
24.576	CX2520DB24576D0GPSC1	80	24576
25.000	CX2520DB25000D0GPSC1	80	25000
26.000	CX2520DB26000D0GPSC1	60	26000
27.000	CX2520DB27000D0GPSC1	60	27000
30.000	CX2520DB30000D0GPSC1	50	30000
32.000	CX2520DB32000D0GPSC1	50	32000
38.400	CX2520DB38400D0GPSC1	50	38400
40.000	CX2520DB40000D0GPSC1	50	40000
48.000	CX2520DB48000D0GPSC1	50	48000

## 1. APPLICATION

The purpose of this document is applied to CX2016DB quartz crystal.

## 2. KYOCERA PART NUMBER

Refer to Doc No.USY1M-H1-16428-00 Page 3/11

## 3. RATINGS

Items	SYMB.	Rating	Unit	Remarks
Operating Temperature range	Topr	-40~+85	deg. C	
Storage Temperature range	Tstg	-40~+85	deg. C	

## 4. CHARACTERISTICS

### 4-1 ELECTRICAL CHARACTERISTICS

Items	Electrical Specification					Test Condition	Remarks
	SYMB.	Min	Typ.	Max	Unit		
Mode of Vibration		Fundamental					
Nominal Frequency	F0		(*1)		MHz		
Nominal Temperature	T <sub>NOM</sub>		+25		°C		
Load Capacitance	CL		8.0		pF		
Frequency Tolerance	df/F	-15.0		+15.0	PPM	+25±3°C	
Frequency Temperature characteristics	df/F	-50.0		+50.0		-40°C ~+85°C	
Frequency Ageing Rate		-1.0		+1.0		1 <sup>ST</sup> year	+25±3°C
Equivalent Series Resistance	ESR		(*2)		Ω		
Drive Level	Pd	0.01		100	μW		
Insulation Resistance	IR	500			MΩ	100V(DC)	

### Measurement Condition

Frequency measurement

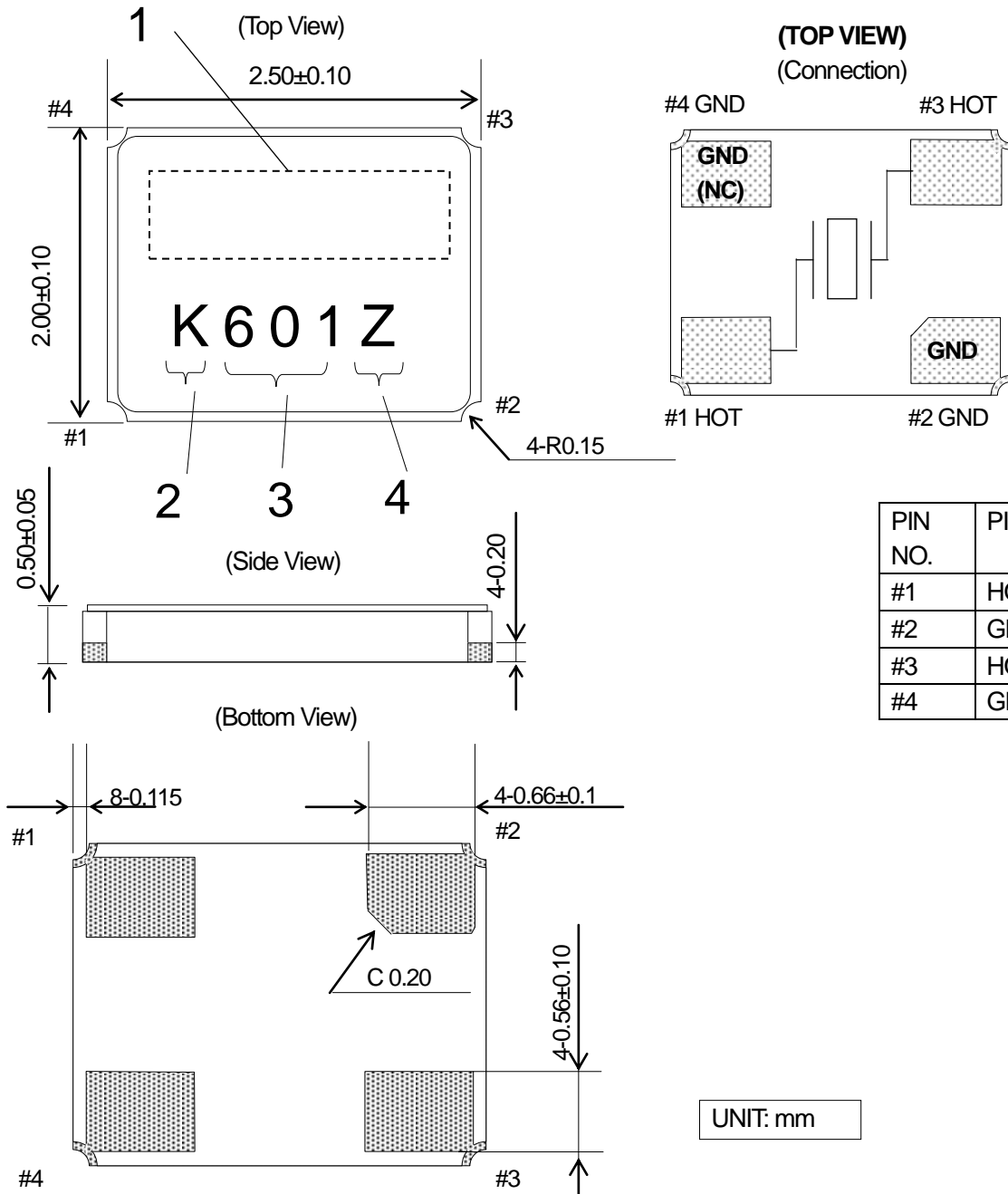
Measuring instrument : IEC PI-Network Test Fixture  
IEC 60444-8 STD (Pi circuit 41901A)

Equivalent series resistance (ESR) measurement

Measuring instrument : IEC PI-Network Test Fixture  
Load Capacitance : Series

\*1 \*2 Refer to Doc No.USY1M-H1-16428-00 Page 3/11

**5. APPEARANCES, PHYSICAL DIMENSION**  
**OUTLINE DIMENSION (not to scale)**



PIN NO.	PIN Layout
#1	HOT
#2	GND
#3	HOT
#4	GND(NC)

UNIT: mm

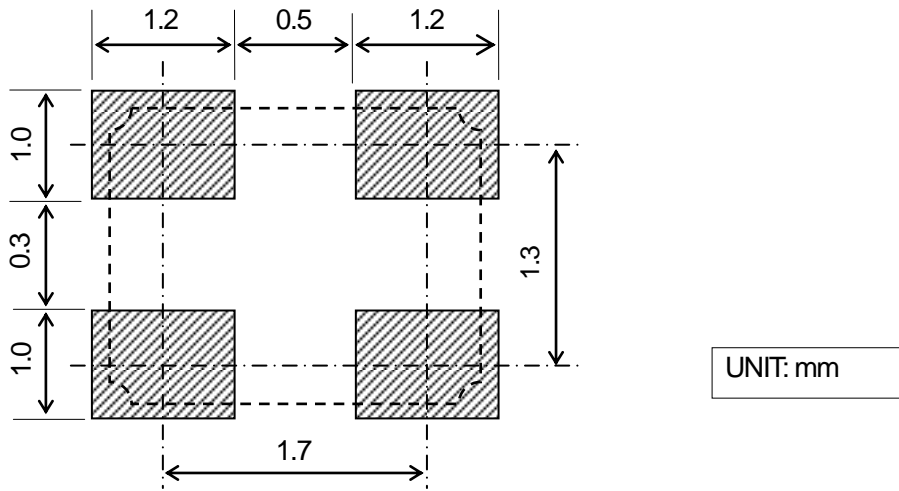
**MARKING**

1	Nominal Frequency	First 5digit of the frequency is indicated. *3
2	Identification	[K] is to indicate 1Pin direction.
3	Date Code	Last 1 Digit of YEAR and WEEK (Ex) 2016,Jan,01 → 601
4	Manufacturing Location	Y→Japan (Yamagata ) Z→Japan (Shiga Yohkaichi ) T→Thailand

\*The font of marking is for reference only.

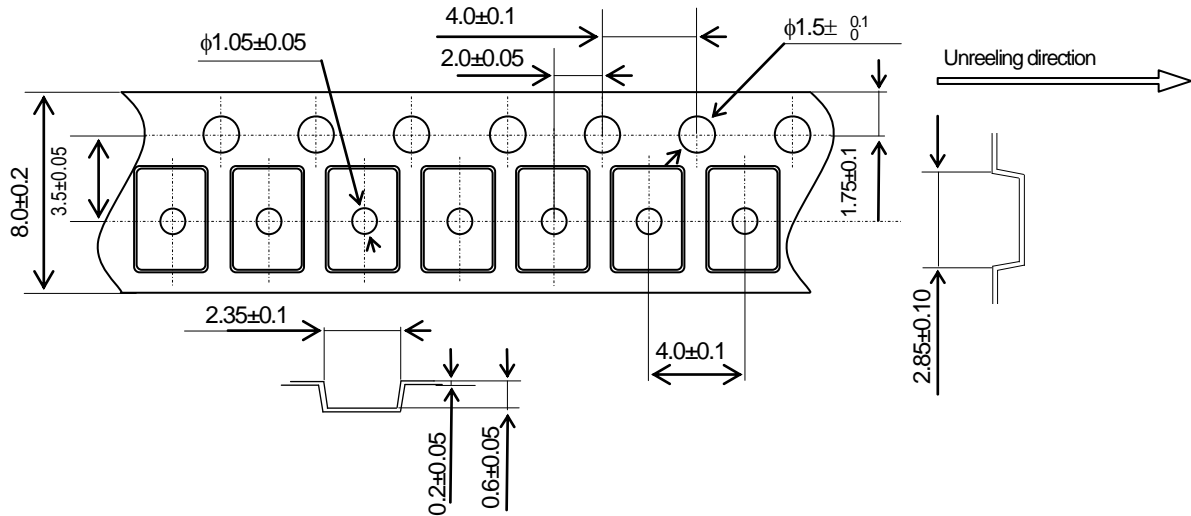
\*3 Refer to Doc No.USY1M-H1-16428-00 Page 3/11

**6. RECOMMENDED LAND PATTERN (not to scale)**

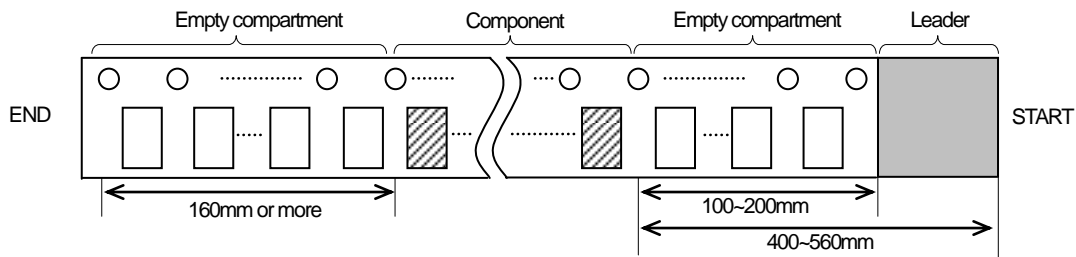


## 7. TAPING&REEL

### 7-1.Dimensions



### 7-2.Leader and trailer tape

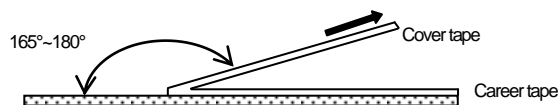


### 7-3.Direction(The direction shall be seen from the top cover tape side)

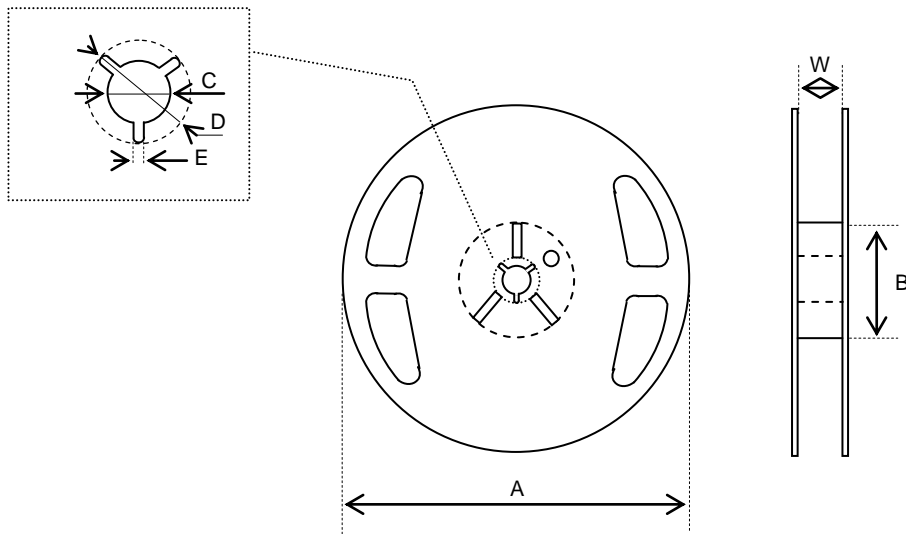


### 7-4.Specification

1. Material of the carrier tape is either polystyrene or A-PET (ESD).
2. Material of the cover tape is polyester (ESD).
3. The seal tape shall not cover the sprocket holes and not protrude from the carrier tape.
4. Tensile strength of carrier tape: 10N or more.
5. The R of the corner of each cavity is  $0.2R_{MAX}$ .
6. The alignment between centers of the cavity and sprocket hole shall be  $0.05\text{mm}$  or less.
7. The orientation shall be checked from the top cover tape side as shown in 8-3.
8. Peeling force of cover tape:  $0.1$  to  $1.0\text{N}$ .
9. The component will fall out naturally when cover tape is removed and set upside down.



7-5.Reel Specification



φ180 Reel (3,000 pcs Max.)

Symbol	A	B	C
Dimension	φ180 +0/-3	φ60 +1/-0	φ13±0.2
Symbol	D	E	W
Dimension	φ21±0.8	2.0±0.5	9±1

(Unit: mm)

φ330 Reel (12,000 pcs Max.)

Symbol	A	B	C
Dimension	φ330±2.0	φ100±1.0	φ13±0.2
Symbol	D	E	W
Dimension	φ21±0.8	2.0±0.5	9.5±0.5

(Unit: mm)



**8. Enviromental requirements**

After conducting the following tests, component needs to meet below conditions.

Frequency: Fluctuation within +/-10 x 10<sup>-6</sup>

CI: Fluctuation within +/-20% or 5Ω whichever is larger

- 8.1 Resistance to Shock      Test condition  
    3 times natural drop from 100cm onto hard wooden board.
  
- 8.2 Resistance to Vibration      Test condition

frequency	: 10 - 55 - 10 Hz
Amplitude	: 1.5mm
Cycle time	: 15 minutes
Direction	: X,Y,Z (3direction),2h each.
  
- 8.3 Resistance to Heat      Test condition

The quartz crystal unit shall be stored at a temperature of +85±2°C for 500h and subjected to room temperature for 1h before measurement.
  
- 8.4 Resistance to Cold      Test condition

The quartz crystal unit shall be stored at a temperature of -40±2°C for 500h and subjected to room temperature for 1h before measurement.
  
- 8.5 Thermal Shock      Test condition

The quartz crystal unit shall be subjected to 500 temperature cycles shown in table below,Then it shall be subjected to room temperature for 1h before mesurement.

Cycle	: -40±2°C (30min.)→ +25±2°C(5min.)
	→ +85±2°C(30min.)→ +25±2°C(5min.)

8.6 Resistance to Moisture      Test condition

The quartz crystal unit shall be stored at a temperature of  $+60\pm 2^{\circ}\text{C}$  with relative humidity of 90% to 95% for 240 h. Then it shall be subjected to room temperature for 1h before measurement.

8.7 Soldering condition      1.) Type of solder

Material       $\rightarrow$  lead free solder paste

Melting point  $\rightarrow +220\pm 5^{\circ}\text{C}$

2.) Reflow temp.profile

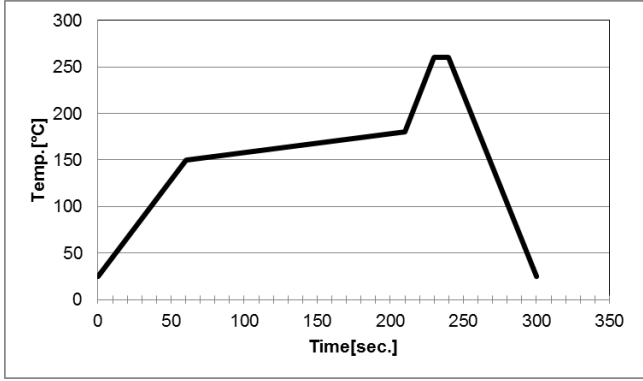
	Temp [ $^{\circ}\text{C}$ ]	Time[sec]
Preheating	+150 to +180	150 (typ.)
Peak	$+260\pm 5$	10 (max.)
Total	---	300 (max.)

Frequency shift :  $\pm 2\text{ppm}$

3.) Hand Soldering       $+350^{\circ}\text{C}$  3 sec max

4.) Reflow Times      2 times in below Reflow temp. profile

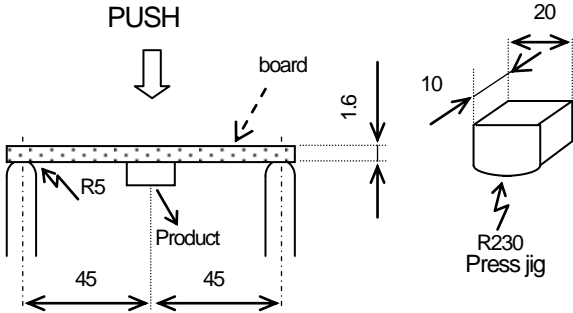
Reflow temp.profile



8.8 Bending Strength

Solder this product in center of the circuit board (40mm X 100mm), and add deflection of 3mm.

Test board :  $t=1.6\text{mm}$



UNIT: mm

## 9. Cautions for use

### (1) Soldering upon mounting

There is a possibility to influence product characteristics when Solder paste or conductive glue comes in contact with product lid or surface.

### (2) When using mounting machine

Please minimize the shock when using mounting machine to avoid any excess stress to the product.

### (3) Conformity of a circuit

We strongly recommend to make sure that Negative resistance (Gain) of IC is designed to be 5 times the ESR (Equivalent Series Resistance) of crystal unit.

## 10. Storage conditions

Please store product in below conditions, and use within 6 months.

Temperature +18 to +30°C, and Humidity of 20 to 70 % in the packaging condition.

## 11. Manufacturing location

Kyocera Crystal Device Corporation Yamagata Plant

Kyocera Crystal Device Corporation Shiga Yohkaichi Plant

Kyocera Crystal Device (Thailand) Co., Ltd

## 12. Quality Assurance

To be guaranteed by Kyocera Crystal Device Quality Assurance Division

## 13. Quality guarantee

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

## 14. Others

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