

Crystal Unit

■ NX1612SD Data Sheet (for Automotive)

Application Automotive

Features

Crystal Unit with built-in Thermistor construction for automotive.

- A crystal element and a temperature sensor (thermistor) are mounted in the same airtight chamber, and the temperature closer to the crystal element can be detected, thereby improving the frequency temperature compensation compared with the conventional crystal unit
- Suitable for applications such as vehicle communication equipment and car navigation systems
- Reflow temperature profile
(Available for lead free soldering)
- Conforms to AEC-Q200.



RoHS Compliant
Directive 2011/65/EU
Directive (EU) 2015/863

Pb free

AEC-Q200

1. Item : Crystal Unit
2. Type : NX1612SD
3. Nominal Frequency : 55.2 MHz
4. NDK Spec. No. : EXS00A-CS14877
5. NDK Parts No. : CS14877-55.2M
6. Electrical Specifications

	Parameters	SYM.	Electrical Spec.				Notes
			min	typ	max	Units	
1	Nominal frequency	f_{nom}	55.2			MHz	
2	Overtone order	-	Fundamental			-	
3	Frequency tolerance	-	-10	-	+10	$\times 10^{-6}$	at +25°C
4	Frequency versus temperature characteristics	-	-29.0	-	+29.0	ppm	at -20~+65°C The reference temperature shall be +25°C
			-32.4	-	+32.4	ppm	at -40~+115°C The reference temperature shall be +25°C
			-2.8	+12.3	+27.6	ppm	at -40°C (Reference Spec.) The reference temperature shall be +25°C
			9.3	+18.3	+27.3	ppm	at -20°C (Reference Spec.) The reference temperature shall be +25°C
			-28.7	-20.9	-13.3	ppm	at +65°C (Reference Spec.) The reference temperature shall be +25°C
			-32.1	-20.3	-8.7	ppm	at +85°C (Reference Spec.) The reference temperature shall be +25°C
			-23.0	-5.0	+13.1	ppm	at +105°C (Reference Spec.) The reference temperature shall be +25°C
			-9.9	+10.5	+30.9	ppm	at +115°C (Reference Spec.) The reference temperature shall be +25°C
5	Frequency Aging(at +25°C)	-	-1	-	+1	$\times 10^{-6}$	1year
			-3	-	+1	$\times 10^{-6}$	5 years
			-6	-	+2	$\times 10^{-6}$	10 years
6	Frequency Perturbation due to Activity Dip	-	-0.5	-	+0.5	$\times 10^{-6}$	Difference from fifth-order curve fit Drive level at 50uW
			-1	-	+1	$\times 10^{-6}$	Difference from fifth-order curve fit Drive level at 100uW
7	Frequency draft after reflow	-	-2	-	+2	$\times 10^{-6}$	2 times
8	Equivalent resistance	-	-	-	50	Ω	IEC PI-network / Series
9	Shunt Capacitance	C_0	-15%	0.73	+15%	pF	Not grounded
10	Motional Capacitance	C_1	-15%	2.13	+15%	fF	Not grounded

	Parameters	SYM.	Electrical Spec.				Notes
			min	typ	max	Units	

11	Motional Inductance	L_1	-15%	3.9	+15%	mH	Not grounded
12	Pulling Sensitivity	S	-30%	14.0	+30%	$\times 10^{-6}/\text{pF}$	at $CL=8\text{pF}$ /Not grounded $S(\times 10^{-6}/\text{pF})=C1/\{2*(C0+CL)^2\}$
13	Load capacitance	C_L	-	8	-	pF	IEC PI-network
14	Level of drive	-	-	10	200	μW	
15	Operating temperature range	T_{opr}	-40	-	+115	$^{\circ}\text{C}$	
16	Storage temperature range	T_{str}	-55	-	+125	$^{\circ}\text{C}$	
17	Insulation resistance	-	500	-	-	M Ω	When the circuit does not have enough value as above, please contact us.
18	Air-tightness	-	-	-	1.1×10^{-9}	Pa m ³ /s	

7. Thermistor characteristics (AEC-Q qualified)

	Parameters	SYM.	Electrical Spec.				Notes
			min	typ	max	Units	
1	Dimension	-	0.6×0.3×0.15 (typ)				mm
2	Resistance value	-	-1%	100	+1%	k Ω	at +25 $^{\circ}\text{C}$
3	B Constant	-	-1%	4250	+1%	K	at +25/+50 $^{\circ}\text{C}$
4	Rated power	-	-	-	100	mW	at +25 $^{\circ}\text{C}$
5	Operating Temperature range	T_{opr}	-50	-	+125		(*1)

(*1) This is the spec of Thermistor alone. For the Crystal Unit, "4.15 Operating temperature range" has priority.

Mounted conditions

Be sure to use the product under the following conditions. Otherwise, the characteristics deterioration or destruction of the product may result.

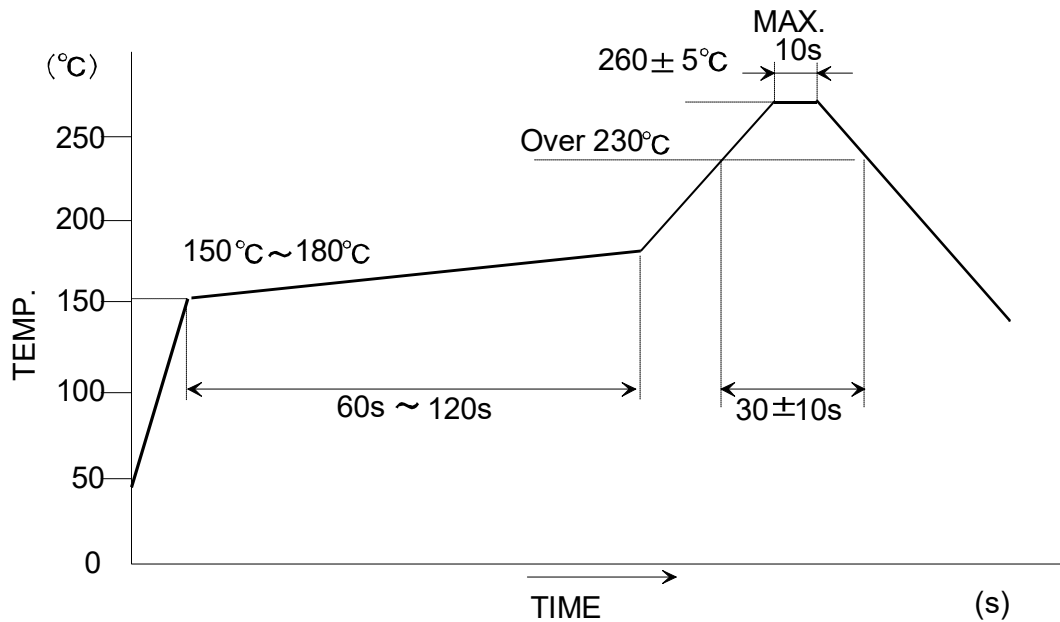
(1) Reflow soldering heat resistance

Peak Temp. : 265°C, 10sec.
 Heating : 230°C or higher, 40sec.
 Preheating : 150~180°C, 120sec.
 Reflow passage times : twice

(2) Manual soldering heat resistance

Pressing a soldering iron of 400°C on the terminal electrode for four seconds (twice).

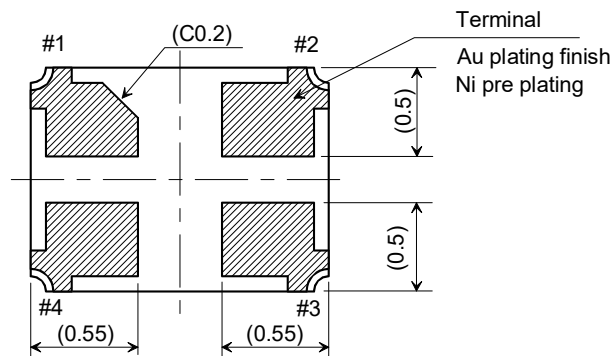
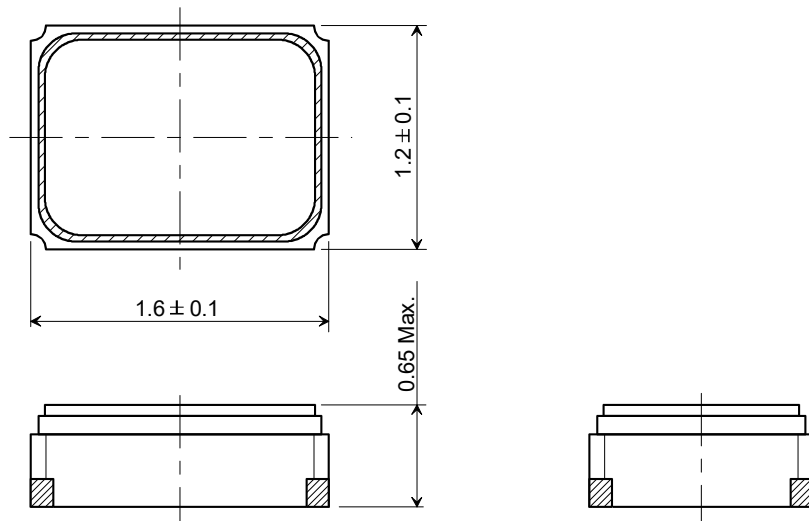
Recommendation reflow condition



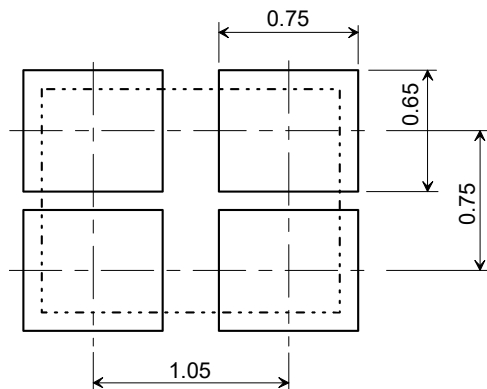
Dimension drawing

Unit : mm

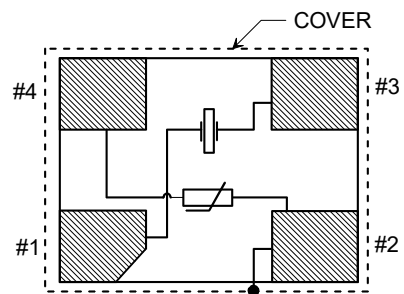
Tolerance : +/-0.1mm



Land pattern (Recommended)

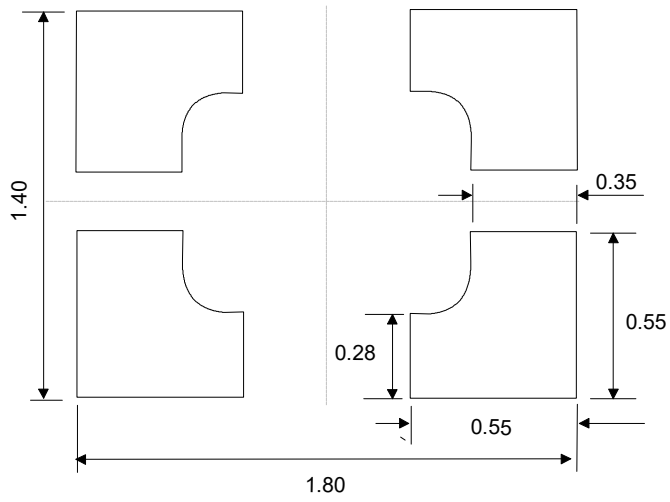


Terminal land connection (TOP VIEW)

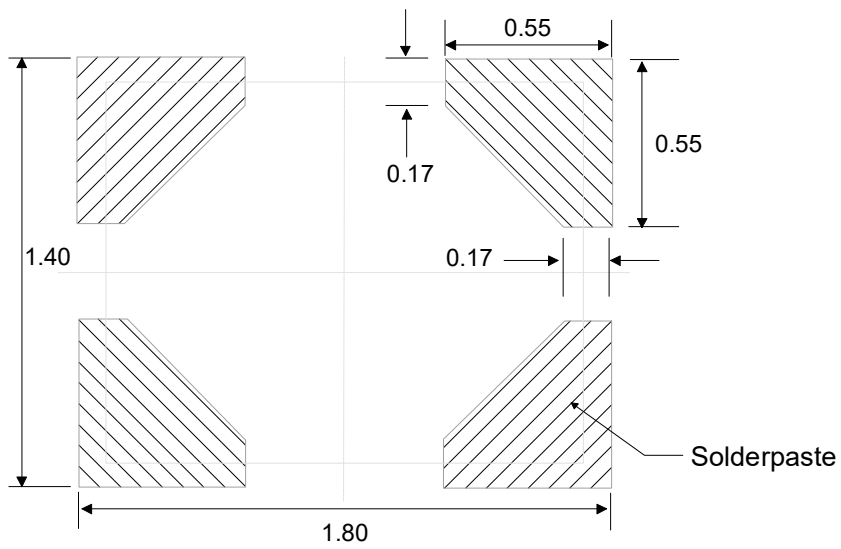


- #1: Crystal IN
- #2: Thermistor OUT and GND
- #3: Crystal OUT
- #4: Thermistor IN

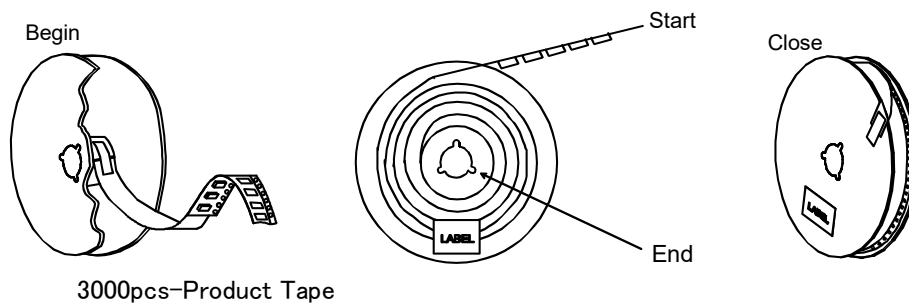
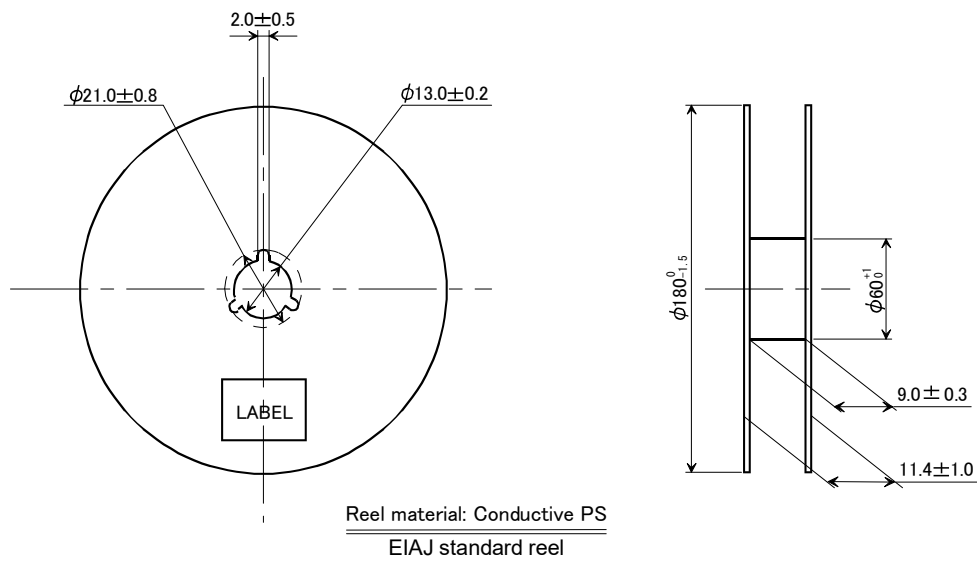
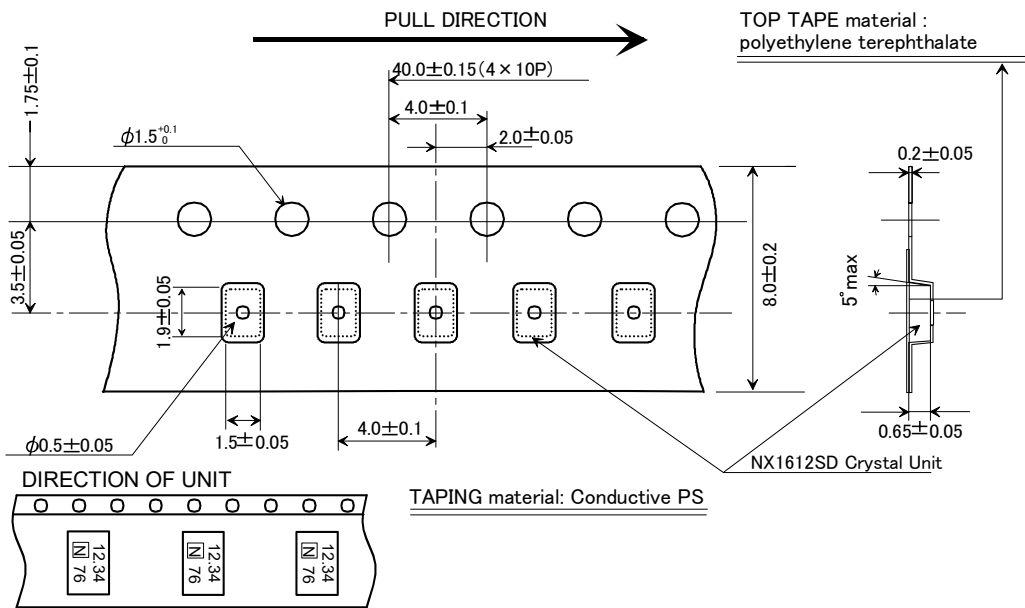
LAND PATTERN (TYPICAL)



stencil pattern (TYPICAL)

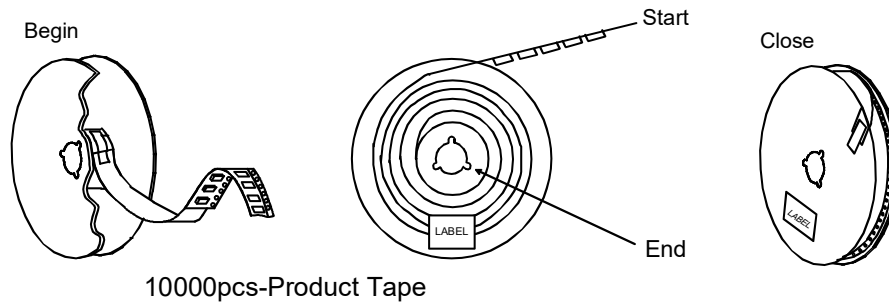
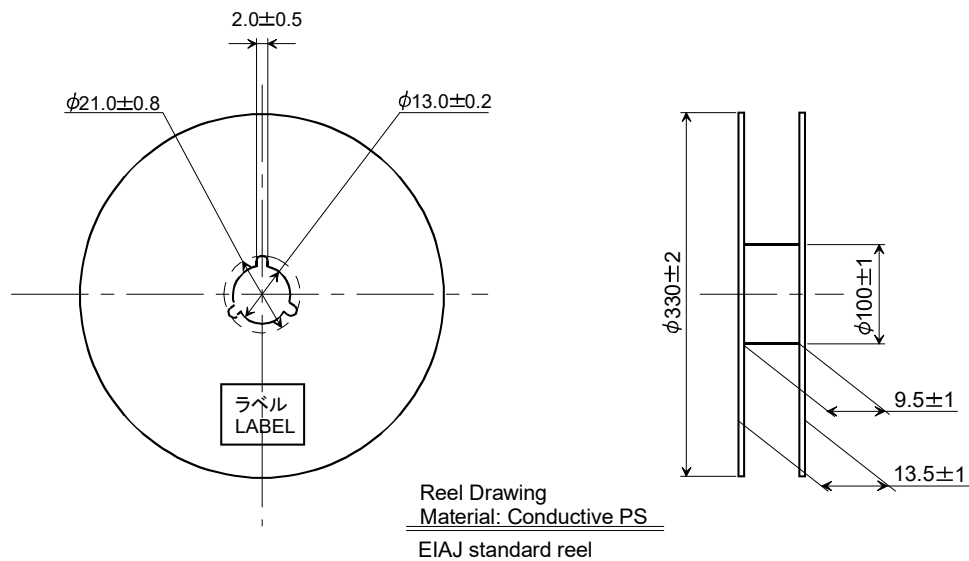
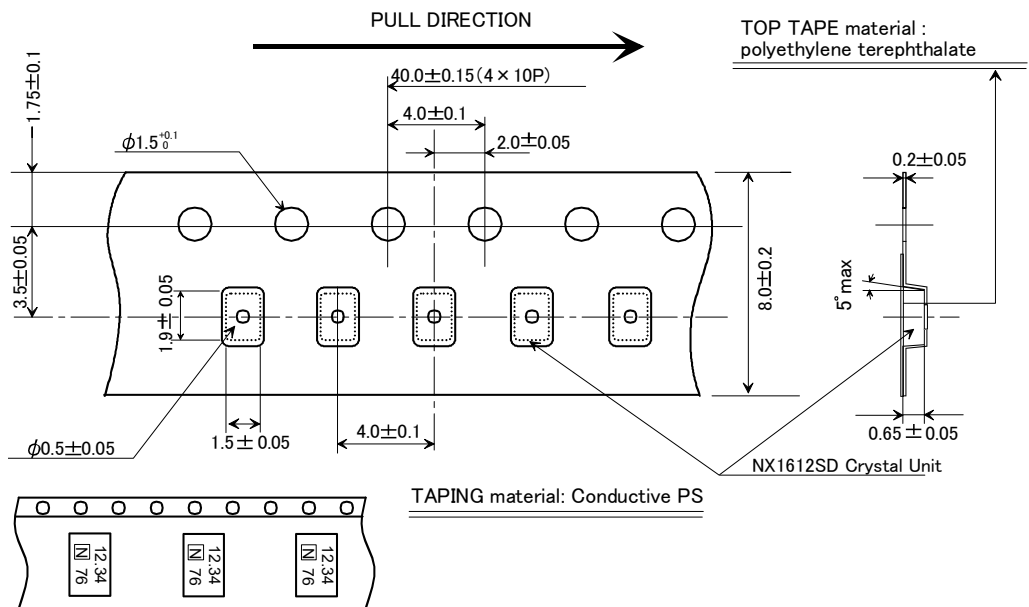


Taping and reel spec. ①

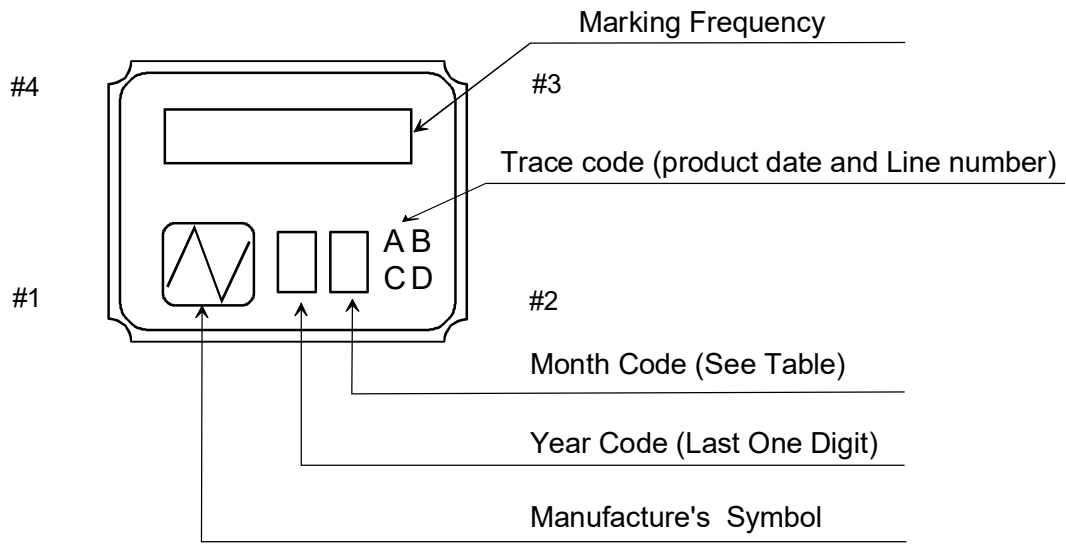
3,000pcs / reel (Reel dimension : $\phi 180$ mm)

Taping and reel spec.②

10,000pcs / reel (Reel dimension : $\phi 330$ mm)



Marking spec.



NOTE

1. Month Code Table

Month	1 Jan.	2 Feb.	3 Mar.	4 Apr.	5 May.	6 Jun.	7 Jul.	8 Aug.	9 Sep.	10 Oct.	11 Nov.	12 Dec.
Month Code	1	2	3	4	5	6	7	8	9	X	Y	Z

*Marking digits are not include a decimal point and dot mark.

Notes on use

1. Even if the appearance color etc. of the product differs by purchasing the component parts by more than two companies, there is no influence on the characteristics and reliability.
2. Since the crystal unit is a passive component, it is important to have appropriate circuit conditions. Please be sure to check the circuit conditions before using the crystal units, and ensure the necessary circuit margin, and confirm that the desired frequency is output. Moreover, please check the circuit conditions when using an existing crystal unit for another model or board. If the circuit conditions are not appropriate, there is a risk of oscillation stop or frequency deviation.
3. IN THE CASE OF THE FOLLOWING ITEMS, WE ARE NOT RESPONSIBLE FOR WARRANTY / COMPENSATION.
 - (1) WHEN PRODUCTS OF THIS SPECIFICATION ARE USED FOR EQUIPMENT RELATED TO HUMAN LIFE OR PROPERTY, IT IS THE RESPONSIBILITY OF THE CUSTOMER TO CONFIRM THE INFLUENCE ON THIS PRODUCT AND EQUIPMENT TO BE USED BEFOREHAND, CONDUCT NECESSARY SAFETY DESIGN (INCLUDING REDUNDANT DESIGN, MALFUNCTION PREVENTION DESIGN, etc.), AND PLEASE USE IT AFTER SECURING SUFFICIENT SAFETY OF EQUIPMENT.
 1. SAFETY-RELATED EQUIPMENT SUCH AS AUTOMOBILES, TRAINS, SHIPS, etc., OR EQUIPMENT DIRECTLY INVOLVED IN OPERATION
 2. AIRCRAFT EQUIPMENT
 3. SPACE EQUIPMENT
 4. MEDICAL EQUIPMENT
 5. MILITARY EQUIPMENT
 6. DISASTER PREVENTION / CRIME PREVENTION EQUIPMENT
 7. TRAFFIC LIGHT
 8. OTHER EQUIPMENT REQUIRING THE SAME PERFORMANCE AS THE ABOVE-MENTIONED EQUIPMENT
 - (2) IN CASES WHERE IT IS NOT INDICATED IN THE REQUESTED STANDARD AND IS USED UNDER CONDITIONS OF USE (INCLUDING CIRCUIT MARGIN etc.) THAT CAN NOT BE PREDICTED AT THE PRODUCTION STAGE.
 - (3) WHEN USING ULTRASONIC WELDING MACHINE. (THERE IS A POSSIBILITY THAT THE CHARACTERISTIC DEGRADATION IS CAUSED BY THE RESONANCE PHENOMENON OF THE PIEZOELECTRIC MATERIAL.(EXAMPLE; CRYSTAL PIECE))
WE WILL NOT TAKE ANY RESPONSIBILITY FOR THE INFLUENCE OF THE CUSTOMERS' PROCESS.SO, PLEASE SUFFICIENTLY EVALUATE AT A SAMPLE STEP WHEN YOU USE ULTRASONIC WELDING MACHINE.
 - (4) USING RESIN MOLD MAY AFFECT THE PRODUCT CHARACTERISTIC.
PLEASE MAKE SURE TO TELL OUR SALES CONTACT WHEN YOU USE RESIN MOLD. WE WILL PERFORM INDIVIDUAL CORRESPONDENCE ABOUT A DELIVERY SPECIFICATION AND AN EVALUATION METHOD. IN ADDITION, IF YOU USE RESIN MOLD WITHOUT CONTACTING US, AND CAUSES DAMAGES AGAINST A CUSTOMER OR A THIRD PARTY, WE WILL NOT BE LIABLE FOR THE DAMAGES AND OTHER RESPONSIBILITIES BECAUSE WE CONSIDER IT IS UNDER SELF-RESPONSIBILITY USING RESIN MOLD. WE WILL NOT TAKE ANY RESPONSIBILITY FOR THE INFLUENCE OF THE CUSTOMERS' PROCESS. PLEASE SUFFICIENTLY EVALUATE AT A SAMPLE STEP WHEN YOU USE RESIN MOLD.
 - (5) WHEN PERFORMING IMPROPER HANDLING THAT EXCEEDS THE GUARANTEED RANGE.

Notes on storage

1. When storing the product in high temperature and high humidity condition for a long time, product characteristics (solderability etc.) and packaging condition may be deteriorated. Please store product at temperature + 5°C ~ + 35°C, humidity 85% RH or less. The product is an electronic component, so please do not storage and use, under a dewing state.
2. The product storage deadline is 12 months after delivery in unopened state. Please use within storage deadline. If you exceed storage deadline, please check the product characteristics etc, please use.

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