

Crystal Unit

■ AT-41CD2 Data Sheet (for OA / AV)

Application

Consumer equipment

Features

High stability and high reliability crystal unit with a metallic package, also suitable for surface mounting

- Surface mount crystal unit
- High reliability is ensured by the use of a metallic package that is completely hermetically sealed.
- Automatic mounting by taping is possible.
- Reflow temperature profile
(Available for lead free soldering)



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

Pb free

1. Item : Crystal Unit
 2. Type : AT-41CD2
 3. Nominal Frequency : 3.000~75.000 MHz

1. NDK Spec. No. : Refer to Table1

4. Electrical Specifications

	Parameters	SYM.	Electrical Spec.				Notes
			min	typ	max	Units	
1	Nominal frequency	f_{nom}	3	-	75	MHz	---
2	Overtone order	-	*1			-	*1. Refer to Table1
3	Frequency tolerance	-	-20	-	+20	$\times 10^{-6}$	@ +25°C
4	Frequency versus temp. characteristics	-	-30	-	+30	$\times 10^{-6}$	The reference temperature shall be +25°C
5	Equivalent resistance	-	-	-	*1	Ω	*1. Refer to Table1 (PI-network / Series)
6	Load capacitance	C_L	-	*1	-	pF	PI-network
7	Level of drive	-	-	*1	*1	μW	*1. Refer to Table1
8	Operating temp. range	T_{opr}	-10	-	+70	°C	---
9	Storage temp. range	T_{str}	-40	-	+85	°C	---
10	Insulation resistance	-	500	-	-	M Ω	When terminal to terminal and terminal to cover were applied at DC100V $\pm 15V$.
11	Air-tightness	-	-	-	3.0×10^{-9}	Pa m ³ /s	---

Table.1. List of NDK Spec. No.

NDK Spec. No.	Overtone order	Frequency range [MHz]		Equivalent resistance	Load capacitance	Level of drive	
		Min.	Max.	[Ω]	[pF]	[μ W]	
LN-L-0002	Fundamental	3 \leq	< 3.2	400	16	Max. : 1000 Typ. : 500	
		3.2 \leq	< 3.5	200			
		3.5 \leq	< 4	150			
		4 \leq	< 4.5	120			
		4.5 \leq	< 5	100			
		5 \leq	< 6	80		Max. : 1000 Typ. : 50	
		6 \leq	< 8	70			
		8 \leq	< 10	60			
		10 \leq	< 12	50			
		12 \leq	\leq 37	40			
STD-LPH-3	3rd overtone	26 \leq	< 35	140	Series	Max. : 1000 Typ. : 500	
		35 \leq	< 48	100			
		48 \leq	\leq 75	80			
STD-LPH-5		3rd overtone	26 \leq	< 35	140	Series	Max. : 1000 Typ. : 10
			35 \leq	< 48	100		
			48 \leq	\leq 75	80		

Specifications shown are NDK standard spec. Other specifications than above are also available, so please contact us if you have any request.

Table.2. Supported frequency list

● mark indicates the currently available frequency.

Frequencies not listed in the list are also available, so please contact us if you have any request.

Frequency [MHz]	LN-L-0002
3.575611	●
3.579545	●
3.582056	●
3.633	●
3.648	●
3.6864	●
4.000	●
4.032	●
4.045	●
4.048	●
4.096	●
4.194304	●
4.332	●
4.433619	●
4.500	●
4.9152	●
4.91775	●
5.000	●
5.040	●
5.0688	●
6.000	●
6.143263	●
6.144	●
6.300	●
6.400	●
6.4512	●
6.764375	●
7.000	●
7.1505	●
7.15909	●
7.200	●
7.3216	●
7.3728	●
7.376974	●
7.500	●
7.680	●
7.9872	●
8.000	●
8.192	●
8.388608	●
8.4672	●
8.664	●
9.596	●
9.5979	●
9.82	●

Frequency [MHz]	LN-L-0002
9.8304	●
9.84375	●
9.990	●
10.000	●
10.008	●
10.17813	●
10.200	●
10.220	●
10.240	●
10.245	●
10.250	●
10.260	●
10.350	●
10.368	●
10.475	●
11.0592	●
11.060	●
11.2896	●
12.000	●
12.286525	●
12.288	●
12.352	●
12.500	●
12.550	●
12.580	●
12.800	●
13.012	●
13.225625	●
13.40156	●
13.500	●
13.560	●
13.631488	●
13.824	●
14.2848	●
14.31818	●
14.332	●
14.400	●
14.550	●
14.7456	●
15.000	●
15.360	●
15.400	●
15.975	●
16.000	●
16.010	●

Frequency [MHz]	LN-L-0002
16.128	●
16.200	●
16.250	●
16.257	●
16.384	●
16.666	●
16.670	●
16.875	●
16.9334	●
16.9344	●
17.000	●
17.280	●
17.664	●
17.734475	●
18.000	●
18.432	●
19.13856	●
19.170	●
19.200	●
19.555	●
19.6608	●
20.000	●
20.250	●
20.288	●
20.480	●
20.49978	●
20.500	●
20.50414	●
20.570	●
20.736	●
20.950	●
21.150	●
21.250	●
21.325	●
22.1184	●
22.5792	●
22.909088	●
23.040	●
24.000	●
24.576	●
25.000	●
25.100	●
26.000	●
27.000	●
28.000	●

Frequency [MHz]	LN-L-0002
28.322	●
28.375	●
28.800	●
29.4912	●
29.498928	●
30.000	●
31.200	●
33.333	●
33.8688	●
36.864	●

Frequency [MHz]	STD-LPH-3
26.900	●
27.000	●
36.4444	●
36.864	●
38.27712	●
40.000	●
41.140	●
41.600	●
42.000	●
45.1584	●
48.000	●
50.000	●
54.000	●

Frequency [MHz]	STD-LPH-5
60.000	●
74.100	●

Mounted conditions

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

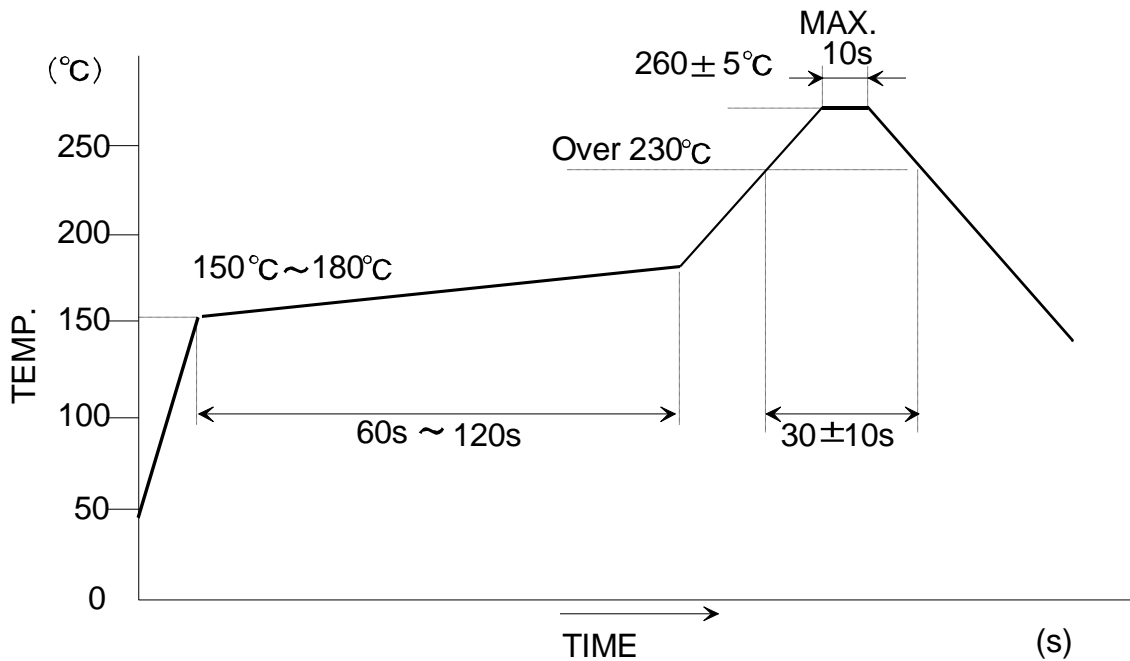
(1) Reflow soldering heat resistance

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).

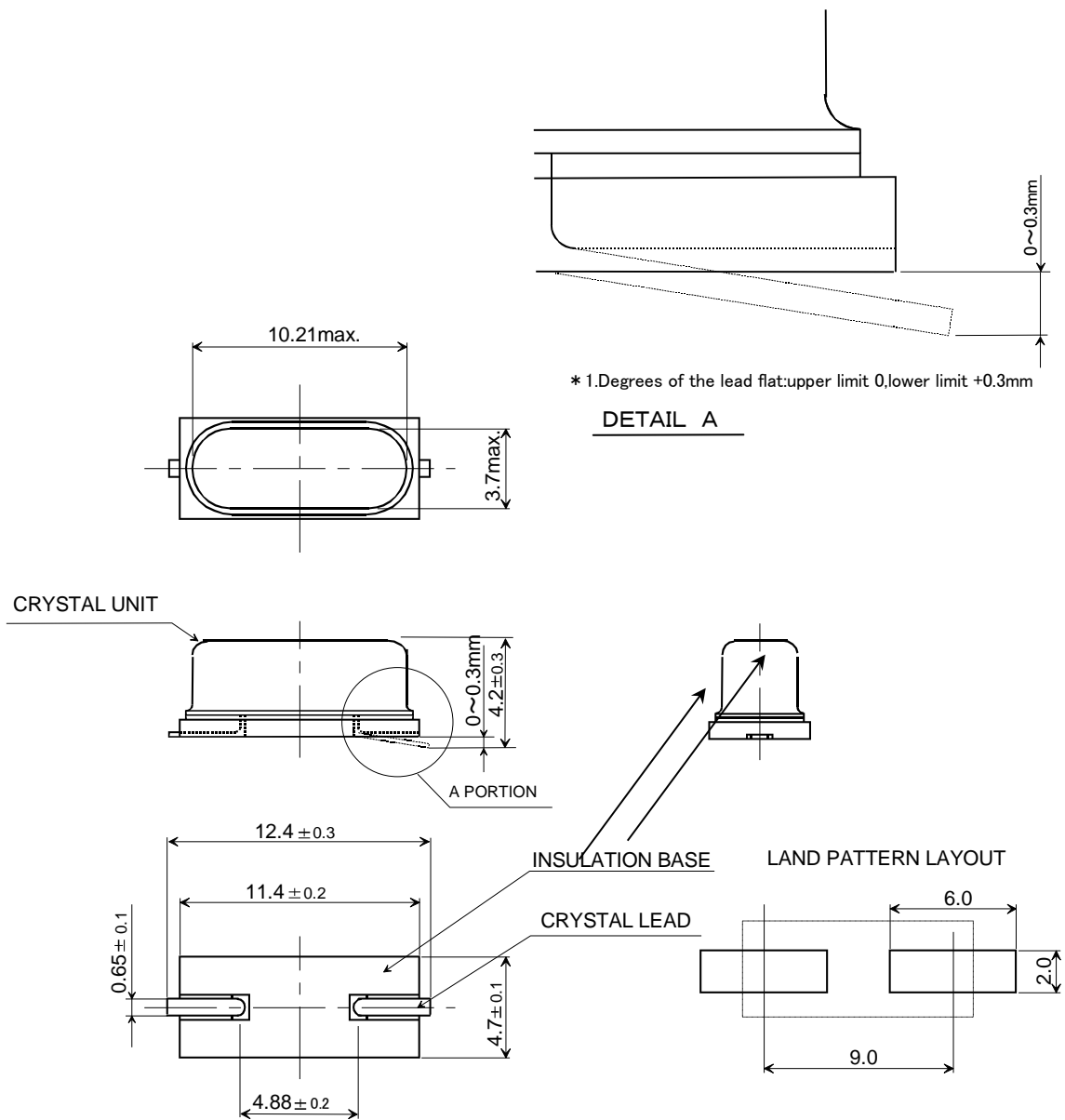
Recommendation reflow condition



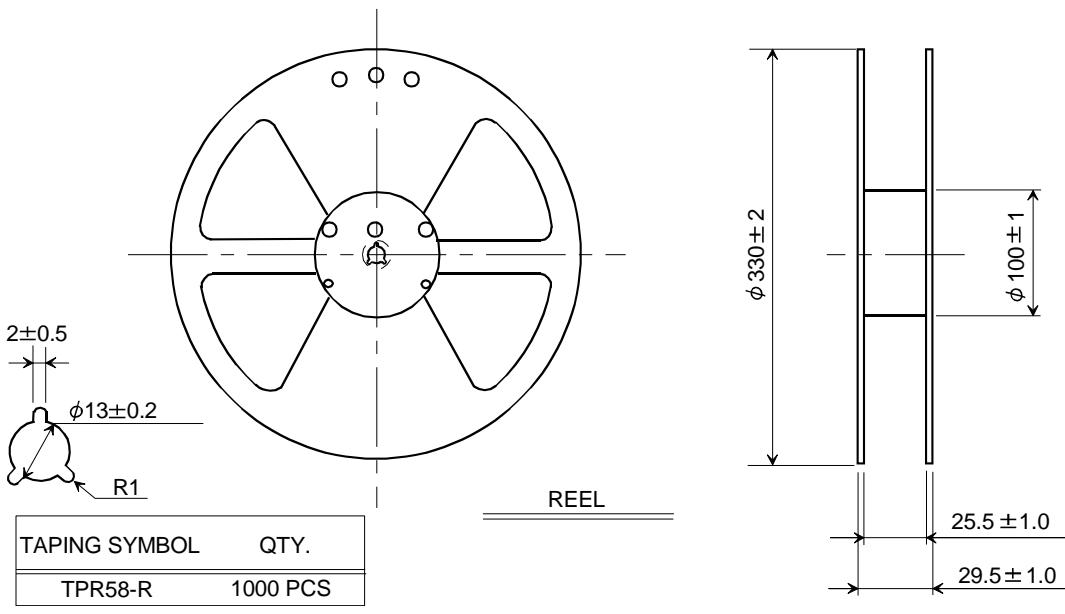
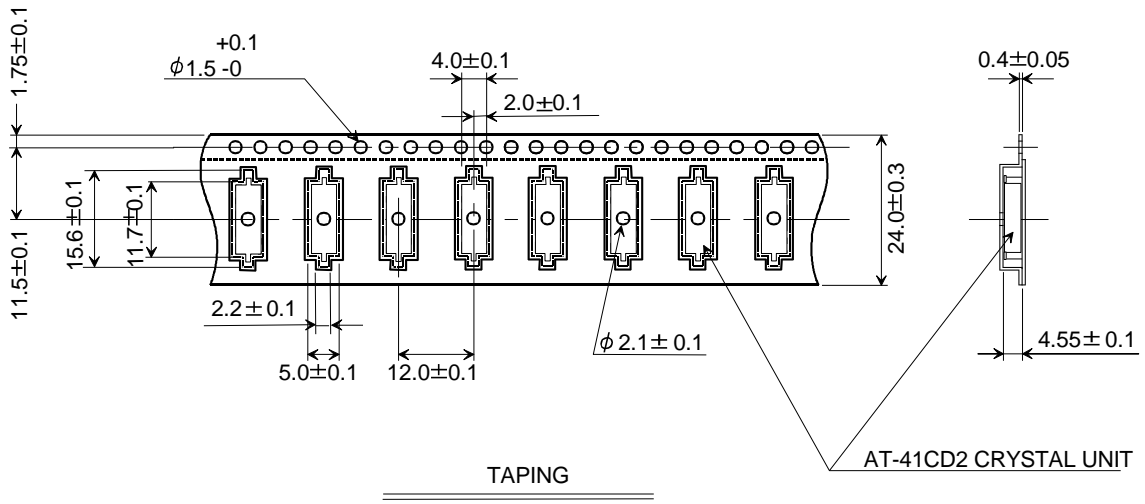
Dimension drawing

Unit : mm

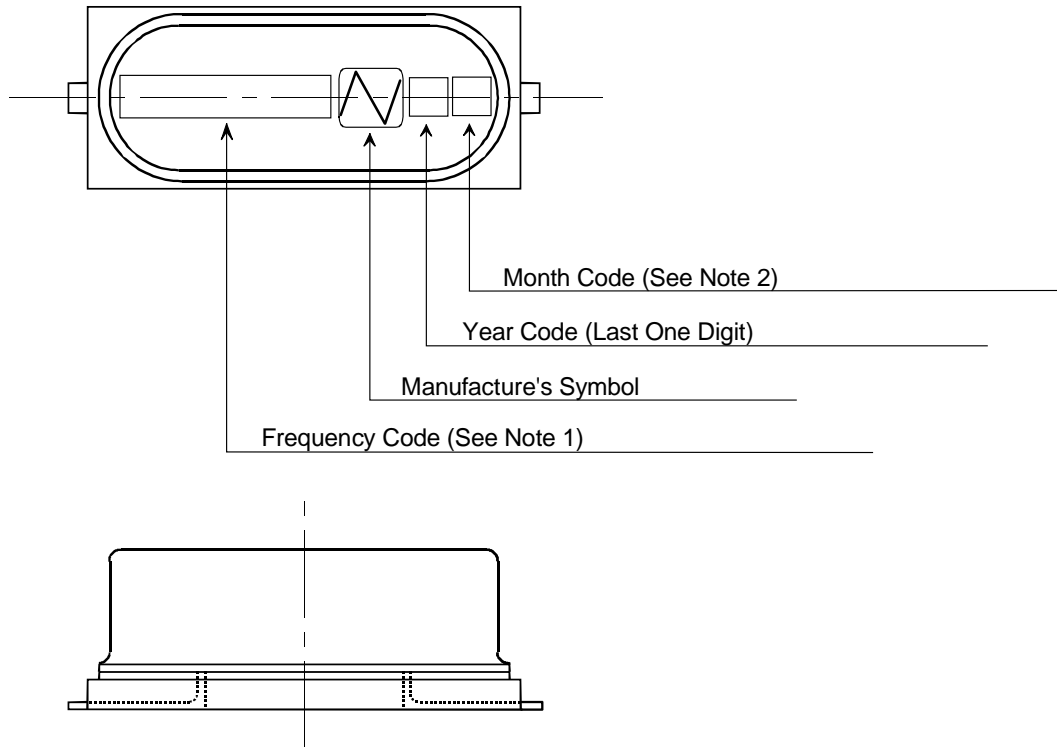
Tolerance : +/-0.1mm



Taping and reel spec.



Marking spec.



Note

1 Frequency Code

Frequency code is consist of five digits,first five digits of nominal frequency.

Example

Frequency	4.194304 MHz	4 MHz
Frequency code	4.1943	4.0000

2 Marking contents

Month	1	2	3	4	5	6	7	8	9	10	11	12
Month Code	1	2	3	4	5	6	7	8	9	X	Y	Z

Marking digit is uninclude 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.

4. This product cannot be used for equipment related to the safety of automobiles or equipment directly involved in operation.(example: air bag, TPMS, engine control, steering control, brake control etc.)

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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