RoHS Compliant
Directive 2002/95/EC

SPECIFICATION

Customer:

Item:	CRYSTAL UNIT
Type:	NX3215SA
Nominal Frequency:	32.768 kHz
Customer's Spec. No.:	---
NDK Spec. No.:	STD-MUA-8

Receipt

Charge:

Sales	NDK Italy Srl : P. Bandera	Tel. 39-02-96702920
Engineer	Engineering Dept.1 : I. Miyahara	Tel. 81-(0)4-2900-6631

Approved	K. Ueki
Checked	---
Drawn	I. Miyahara

Revision Record

Rev.	Rev. Date	Items	Contents	Remarks
---	03. Okt. 2012	Issue	---	---

NIHON DEMPA KOGYO CO., LTD.

1. Customer specifications number : ---

2. NDK specification number : EXS00A-MU00332

3. Type : NX3215SA

4. Electrical characteristics
   - 4.1. Nominal Frequency (F_0) : 32.768 kHz
   - 4.2. Overtone Order : Fundamental
   - 4.3. Adjustment Tolerance : $\pm 20 \times 10^{-6}$ Max. (at + 25 °C)
   - 4.4. Turning Point : + 25°C ± 5°C
   - 4.5. Temperature coefficient : -0.035×10^{-6} / °C^2 Max.
   - 4.6. Equivalent resistance (R_1) : 70 kΩ Max.
   - 4.7. Shunt capacitance (C_0) : 1.0 ± 0.5 pF
   - 4.8. Motional capacitance (C1) : 4.0 ± 2.0 fF
   - 4.9. Insulation resistance : Terminal to terminal insulation resistance also terminal to cover insulation resistance must be 500MΩ (min) when DC100V ±15V is applied.

5. Measurement circuit
   - 5.1. Frequency measurement
     - ・Measuring instrument : Network Analyzer (CNA-LF made in Transat corp.)
     - ・Load capacitance : 12.5 pF
     - ・Level of drive : 0.5 μW
   - 5.2. Equivalent resistance measurement
     - ・Measuring instrument : Network Analyzer (CNA-LF made in Transat corp.)
     - ・Load capacitance : Series
     - ・Level of drive : 0.5 μW

6. Other performances
   - 6.1. Operating temperature range : - 40 to + 85 °C
   - 6.2. Storage Temperature range : - 40 to + 85 °C
   - 6.3. Maximum Drive Level : 0.5 μW Max.
   - 6.4. Aging (at +25 °C) : $\pm 3 \times 10^{-6}$ Max. / 1 year

7. Examination results document
   Since a performance is guaranteed, an examination results document does not submit.

8. Application drawing
   - 8.1. External dimension : EXD14B-00284
   - 8.2. Taping and reel figure : EXK17B-00179
   - 8.3. Marking Drawing : EXH11B-00247
   - 8.4. Reliability assurance item : EXS30B-00661

9. Notice

9.1. Order items are manufactured according to specification. As to conditions, which are not indicated in this specification and unpredictable such as applied condition and oscillation margin, please check them beforehand.

9.2. Unless we receive request for modification within 3 weeks from the issue date of this NDK 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 request within 3 weeks from the issue data of this specification sheet, we would like to discuss with you separately.

9.3. 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.

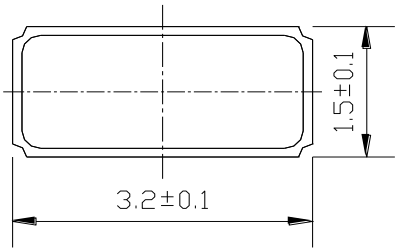
9.4. Where any change to the process condition is made due to the change(s) in the production line, inform personnel of the specifications.

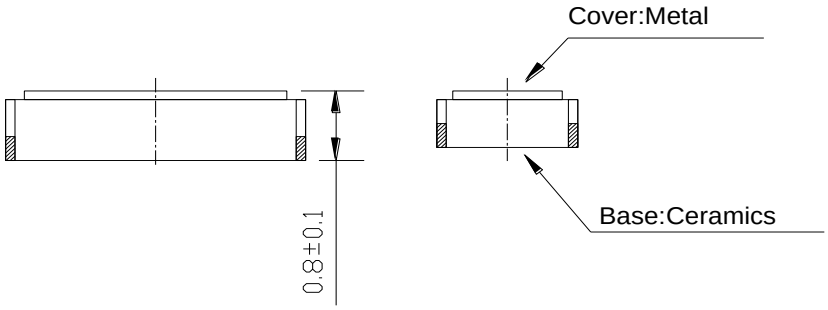
9.5. Should this specification data give rise to any disputes relating to any intellectual property rights or any other rights of a third person, the company shall not indemnify anyone for any damage. Their disclosure must not be construed as the grant of a license to use any of the intellectual property rights owned by the company.

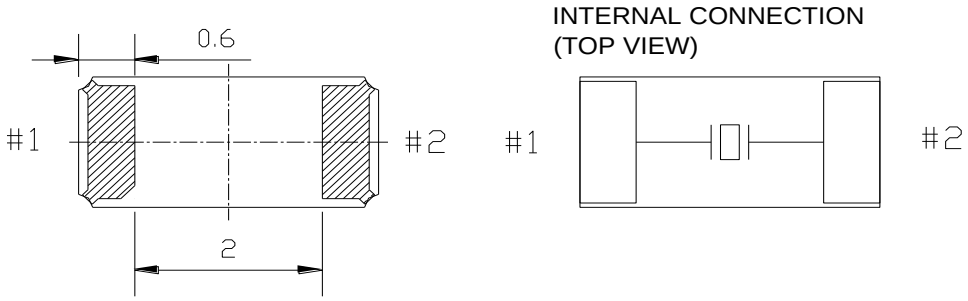
9.6. If you intend to use products listed on this specification for applications that may result in loss of life or assets (controls relating to safety, medical equipment, aeronautical equipment, space equipment, etc.), please do not fail to advise us of your intention beforehand.

9.7. In the company's production process whatever amount of ozone depleting substances (ODS) as specified in the Montreal protocol is not used.

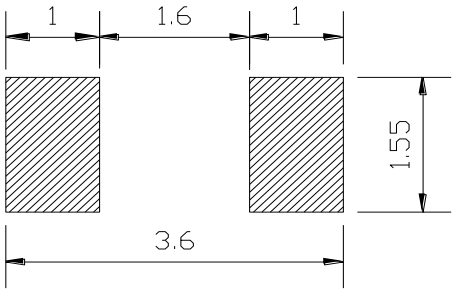
9.8. Information contained in this specification must not be quoted, reproduced or used for other purposes including processing either in part or in full without obtaining prior approval from the company.







Recommended soldering pattern



	Date of Revise	Charge	Approved	Reason
A	8.Nov.2004	S.Kawanishi	K.Ono	Type change

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	25.May.2004	S.Kawanishi	Dimension:mm	±0.2	10 / 1
Designed	25.May.2004	S.Kawanishi	Title (Provisional name)	Drawing No.	Rev.
Checked	25.May.2004	M.Ishihara	**NX3215SA Dimension of External**	**EXD14B-00284**	A
Approved	25.May.2004	K.Ono			

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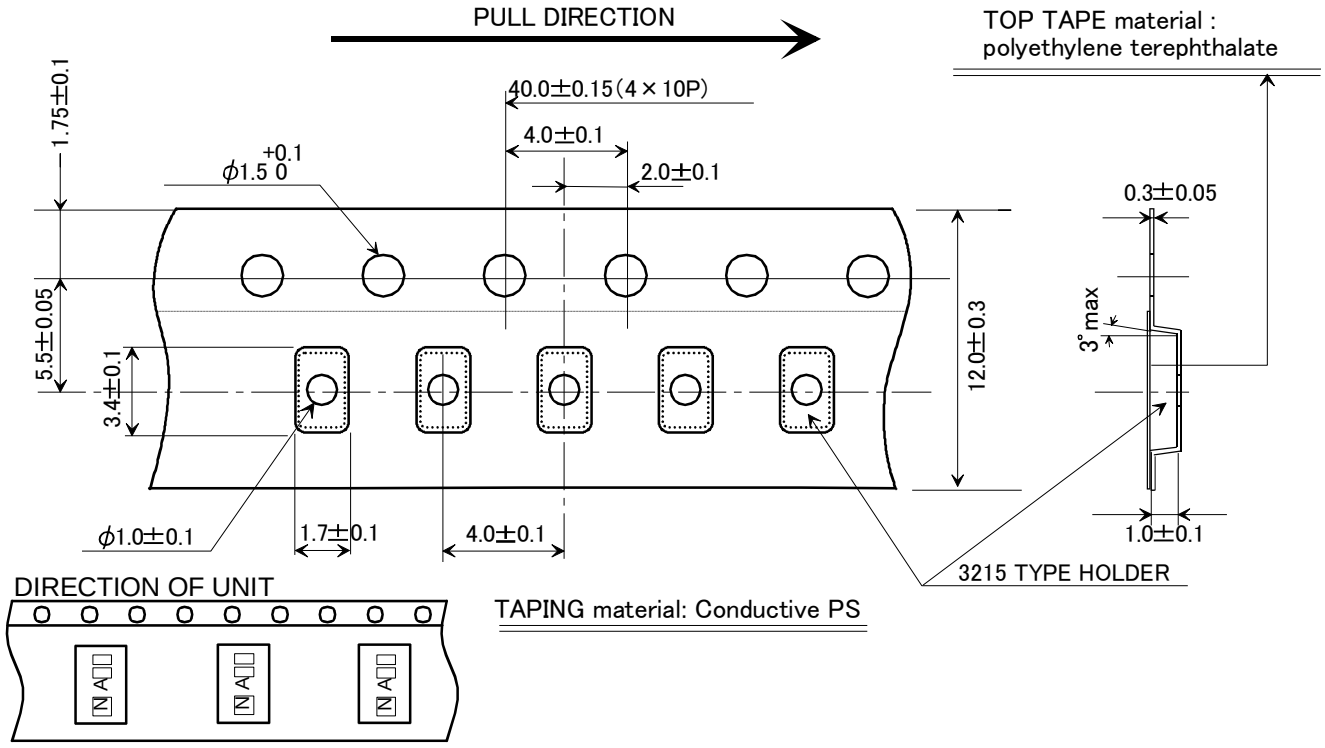

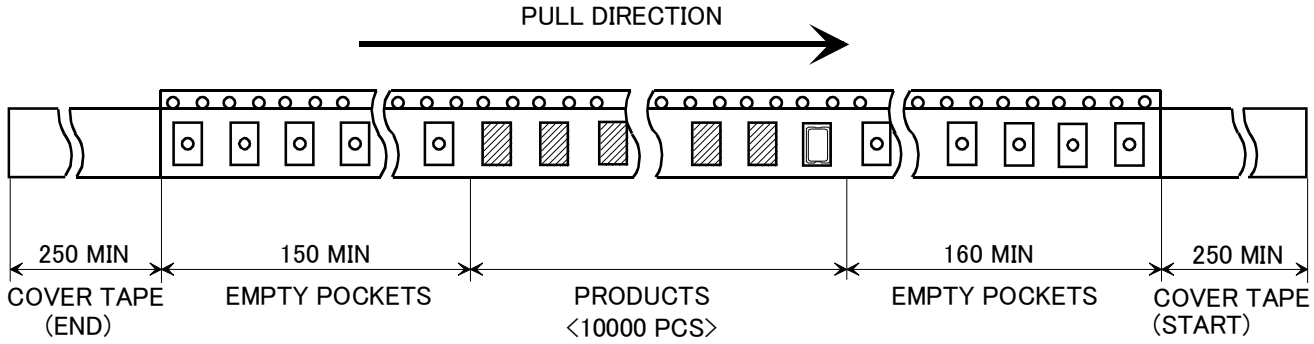

	Date of Revise	Charge	Approved	Reason
B	17.Jan.2007	S. Kawanishi	K. Ono	Changed direction of unit

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	31.May.2004	K.Oguri	Dimension:mm		/
Designed	31.May.2004	S. Kawanishi	Title: **3215 TYPE Taping and Reel Spec.**	Drawing No.: **EXK17B-00179 1/2**	Rev.: B
Checked	----------	----------			
Approved	31.May.2004	K. Ono			

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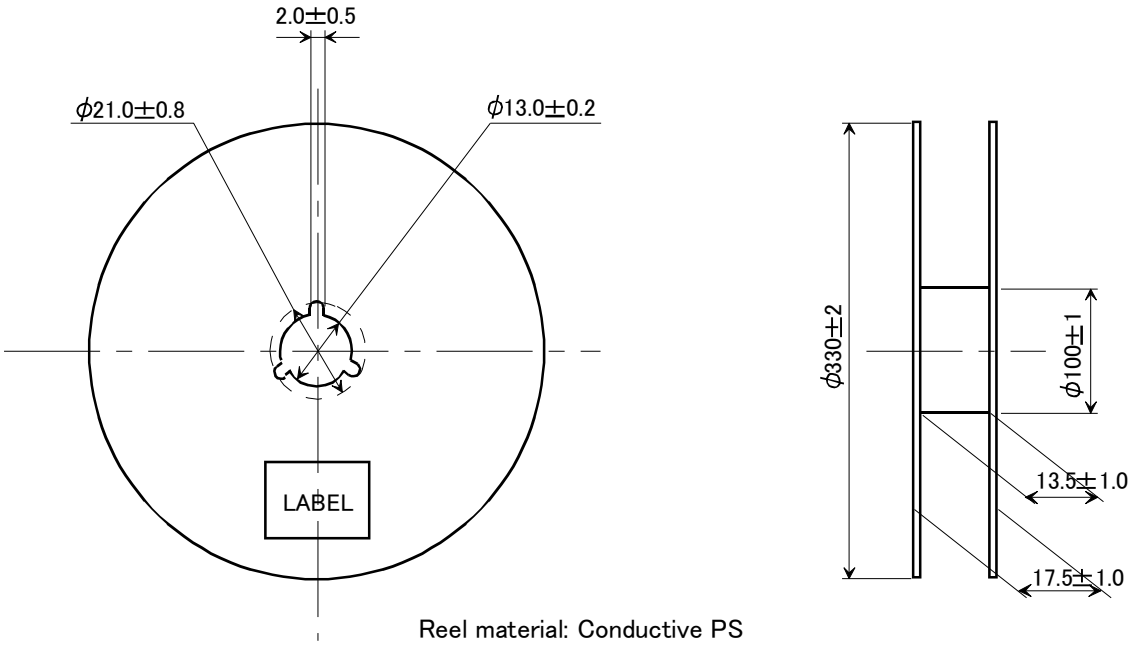
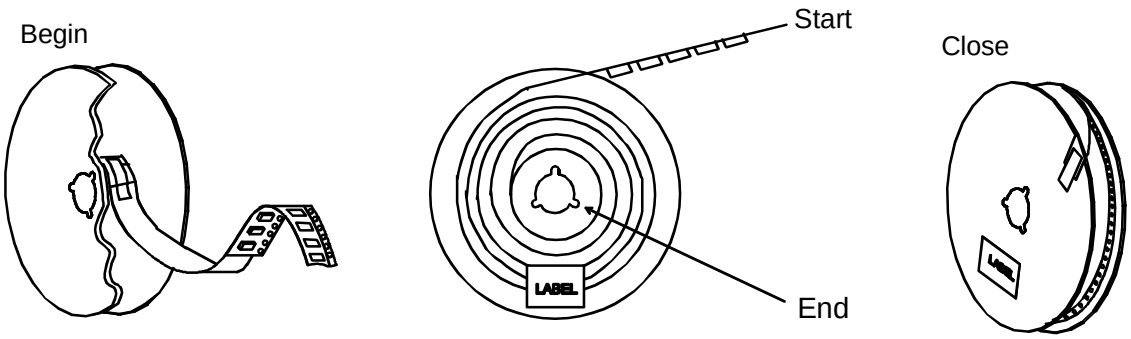
Form M-1



Reel material: Conductive PS

EIAJ standard reel



10000pcs-Product Tape

	Date of Revise	Charge	Approved	Reason
B	17.Jan.2007	S. Kawanishi	K. Ono	Changed direction of unit

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	31.May.2004	K.Oguri	Dimension:mm		/
Designed	31.May.2004	S. Kawanishi	Title	Drawing No.	Rev.
Checked	----------	----------	**3215 TYPE Taping and Reel Spec.**	**EXK17B-00179 2/2**	B
Approved	31.May.2004	K. Ono			

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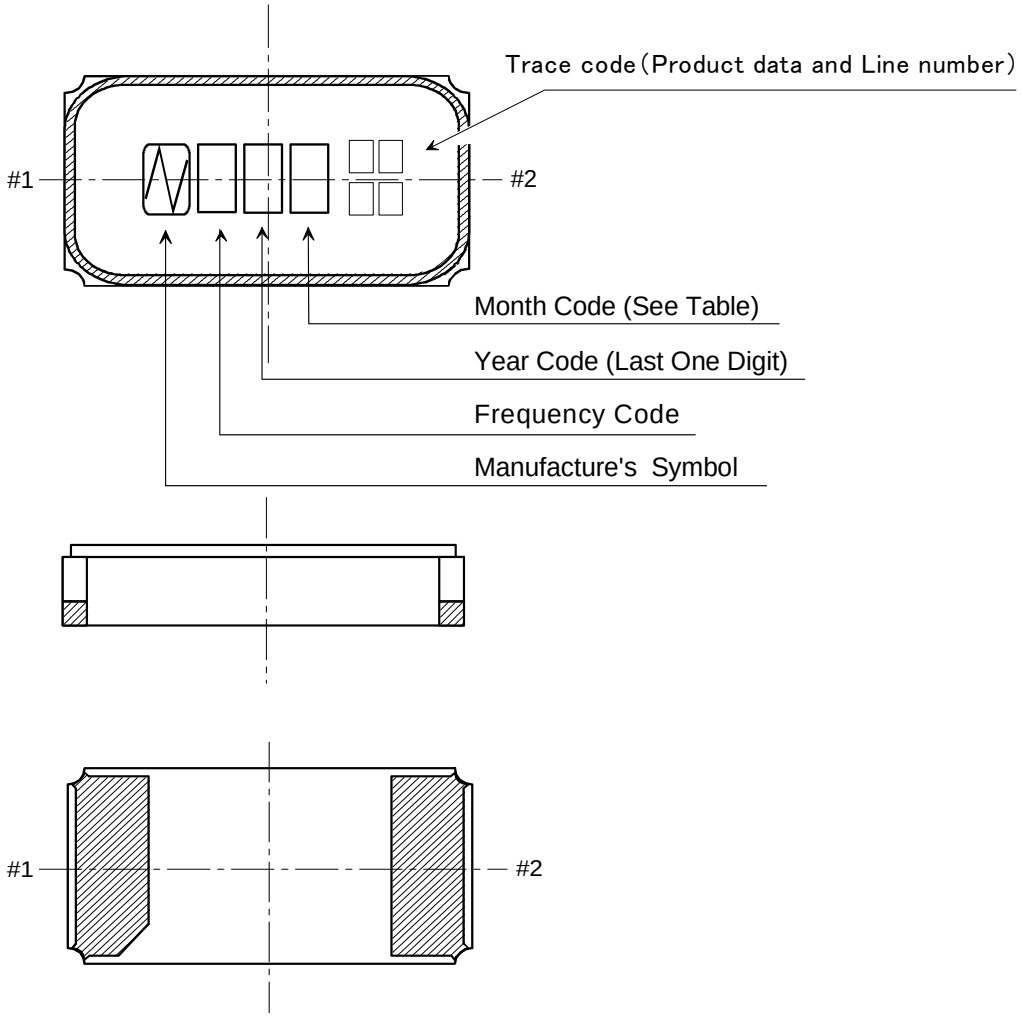

NOTE

1. Month Code

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

2. Frequency Code

   A : 32.768kHz

3. Marking Method

   Marking Method is Laser Triming.

	Date of Revise	Charge	Approved	Reason
B	28.June.2006	S.Kawanishi	K.Ono	Trace code added

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	25.May.2004	Y.Iwai	Dimension:mm		/
Designed	25.May.2004	Y.Iwai	Title	Drawing No.	Rev.
Checked	25.May.2004	M.Ishihara	**NX3215SA Marking Drawing**	**EXH11B-00247**	B
Approved	25.May.2004	K.Ono			

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Reliability assurance item

(page: 1/2)

No.	Test Item	Test Methods	Specification Code
1	AGING	1 year at 25 °C +/- 3°C	a
2	COLD RESISTANCE	at –40 °C for 500 hours.	a
3	HUMIDITY	at +85 °C with 80 to 85 % RH for 500 hours.	a
4	THERMAL SHOCK	Temperature cycle as shown in (Fig.1) for 100 cycle. +85 °C +/- 3 °C -40 °C +/- 3 °C 30 minutes 30 minutes ONE CYCLE (Fig.1)	a
5	VIBRATION	Frequency Range : 10 to 2000Hz Amplitude or Acceleration : 1.52 mm or 20 G 1 cycle : 20 minutes Test time : Three mutually perpendicular axes each 12 times.	a
6	SHOCK 1	Shock : 3000 Gs 0.3 msec. Test time : Six mutually perpendicular axes each 1 times.	a
7	SHOCK 2	Shock : Device are put on the weight of 200 g and dropped on concrete board. Height : 1.5 m Drop times : Six mutually perpendicular axes each 10 times.	b
8	SOLDERABILITY	Residual heat temperature 150 °C Residual heat time 60 to 120 sec Peak temperature 240°C (more than 215 °C 10 to 30 sec)	c
9	REFLOW RESISTANCE	Temperature cycle as shown in (Fig2.) for 3 cycle.	a

Specification code	Specification
a	dF/F ≤ +/- 5ppm dCI ≤ +/- 5 kohm
b	dF/F ≤ +/- 15ppm dCI ≤ +/- 5 kohm
c	The electrodes shall acquire a new solder coat over at least 90 % of immersed area.

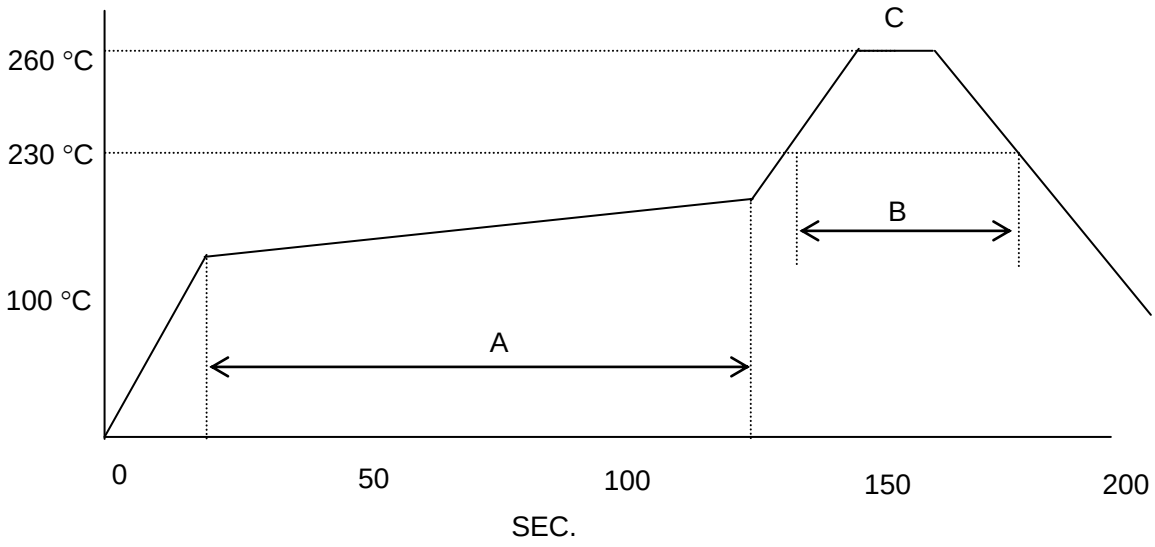

Fig.2 REFLOW

A: 150 to 180 °C (60 to 120 sec.)
B: 230 °C min. (30 sec. max.)
C: PEAK-TEMP. 260 °C +/- 5 °C (10sec. max.)