Ver. 1.00

SPECIFICATION

WOUND CHIP INDUCTORS

CB TYPE

TAIYO YUDEN

1. Range of application

This specification sheet applies to small wound chip inductor, CB TYPE.

2. Ordering code

Example : CB (1) 2012 (2) T (3) 100 (4) M (5) R (6)

(1) Type
(2) External dimensions
(3) Packing style (T: Taping)
(4) Inductance
(5) Inductance tolerance (M=±20 %)
(6) Inductance tolerance (R: Low Rdc type)

3. Standard measuring method

Inductance	:	LCR meter	(HP 4285A or equivalent)
Self-resonance frequency	:	Impedance/Material Analyzer	(HP 4291A or equivalent)
DC resistance	:	DC Ohmmeter	(A&D AD-5812 or equivalent)

Standard test conditions

Unless otherwise specified, temperature is 20±15 ℃ and the humidity is 65±20 %.
Should any doubt arise about the test results, further test shall be conducted at a temperature of 20±2 ℃ and a humidity of 65±5 %.
Inductance is in accordance with our standard measurement figures.

4. Operating temperature range

−25 ℃ to +105 ℃ (Containing self temperature increase)

5. Storage temperature range

−40 ℃ to +85 ℃ (Product without taping)

6. Electrical characteristics

Refer to table 1 and 3.

7. External dimensions and structural diagram

Refer to Table 2.

8. Mechanical characteristics

Refer to Table 3.

9. Environment test performance standards

Refer to Table 3.

10. Taping method

Refer to Table 4.

11. Packing form

Refer to Table 5.

12. Reflow profile chart

Refer to Table 6.

	Table 1	
	ELECTRICAL CHARACTERISTICS	(2 / 1 3)

【CB2012 type】

Ordering Code	Nominal Inductance [μH]	Inductance Tolerance [%]	D.C. Resistance ±30% [Ω]	Self Resonant Frequency min [MHz]	Rated Current max[mA] ①	Rated Current max[mA] ②	Measuring Frequency [MHz]
CB 2012 T 1R0M	1.0	±20	0.15	100	500	900	7.96
CB 2012 T 2R2M	2.2	±20	0.23	80	410	770	7.96
CB 2012 T 3R3M	3.3	±20	0.3	55	330	650	7.96
CB 2012 T 4R7M	4.7	±20	0.4	45	300	580	7.96
CB 2012 T 100M	10	±20	0.7	28	190	440	2.52
CB 2012 T 100MR	10	±20	0.5	32	200	520	2.52
CB 2012 T 150M	15	±20	1.3	28	170	320	2.52
CB 2012 T 220M	22	±20	1.7	16	135	280	2.52
CB 2012 T 470M	47	±20	3.7	11	90	190	2.52
CB 2012 T 680M	68	±20	6.0	6	70	140	2.52
CB 2012 T 101M	100	±20	7.0	8	60	130	0.796

【CB2016type】

Ordering Code	Nominal Inductance [μH]	Inductance Tolerance [%]	D.C. Resistance ±30% [Ω]	Self Resonant Frequency min [MHz]	Rated Current max[mA] ①	Rated Current max[mA] ②	Measuring Frequency [MHz]
CB 2016 T 1R0M	1.0	±20	0.09	100	600	1100	7.96
CB 2016 T 1R5M	1.5	±20	0.11	80	550	1000	7.96
CB 2016 T 2R2M	2.2	±20	0.13	70	510	1000	7.96
CB 2016 T 3R3M	3.3	±20	0.20	55	400	800	7.96
CB 2016 T 4R7M	4.7	±20	0.25	45	340	740	7.96
CB 2016 T 6R8M	6.8	±20	0.35	38	300	600	7.96
CB 2016 T 100M	10	±20	0.50	32	250	520	2.52
CB 2016 T 150M	15	±20	0.70	28	210	440	2.52
CB 2016 T 220M	22	±20	1.0	16	165	370	2.52
CB 2016 T 330M	33	±20	1.7	14	130	270	2.52
CB 2016 T 470M	47	±20	2.4	11	110	240	2.52
CB 2016 T 680M	68	±20	3.0	10	90	210	2.52
CB 2016 T 101M	100	±20	4.5	8	70	170	0.796

*For rated current of ordinary small power choke coils, please refer to the rated current ① in the above table.

*Rated current ② is the current for instantaneous flow such as plunging current of DC/DC converter.
In case of usage in the circuit where large current may be semicontinuously applied over 5 minutes with auto recovery circuit, etc., please contact our sales section before practical application.

Rated current ① : Current value to guarantee –30 % of nominal inductance

Rated current ② : Current value to guarantee component temperature within ΔT=40 ℃ with current flow.
(It is not the current to guarantee the inductance value.)

	Table 1	
	ELECTRICAL CHARACTERISTICS	(3 / 1 3)

【CB2518 type】

Ordering Code	Nominal Inductance [μH]	Inductance Tolerance [%]	D.C. Resistance ±30% [Ω]	Self Resonant Frequency min [MHz]	Rated Current max[mA] ①	Rated Current max[mA] ②	Measuring Frequency [MHz]
CB 2518 T 1R0M	1.0	±20	0.06	100	1200	1500	7.96
CB 2518 T 1R5M	1.5	±20	0.07	80	650	1400	7.96
CB 2518 T 2R2M	2.2	±20	0.09	68	510	1300	7.96
CB 2518 T 3R3M	3.3	±20	0.11	54	440	1200	7.96
CB 2518 T 4R7MR	4.7	±20	0.10	46	310	1200	7.96
CB 2518 T 4R7M	4.7	±20	0.13	46	340	1100	7.96
CB 2518 T 6R8M	6.8	±20	0.15	38	270	930	2.52
CB 2518 T 100M	10	±20	0.25	30	250	820	2.52
CB 2518 T 150M	15	±20	0.32	23	180	650	2.52
CB 2518 T 220M	22	±20	0.50	19	165	580	2.52
CB 2518 T 330M	33	±20	0.70	15	130	460	2.52
CB 2518 T 470M	47	±20	0.95	12	110	420	2.52
CB 2518 T 680M	68	±20	1.50	9.5	70	310	2.52
CB 2518 T 101M	100	±20	2.1	9.0	60	260	0.796
CB 2518 T 151M	150	±20	3.2	7.0	55	210	0.796
CB 2518 T 221M	220	±20	4.5	5.5	50	180	0.796
CB 2518 T 331M	330	±20	7.0	4.5	40	140	0.796
CB 2518 T 471M	470	±20	10	3.5	35	120	0.796
CB 2518 T 681M	680	±20	17	3.0	30	90	0.796
CB 2518 T 102M	1000	±20	24	2.4	25	75	0.252

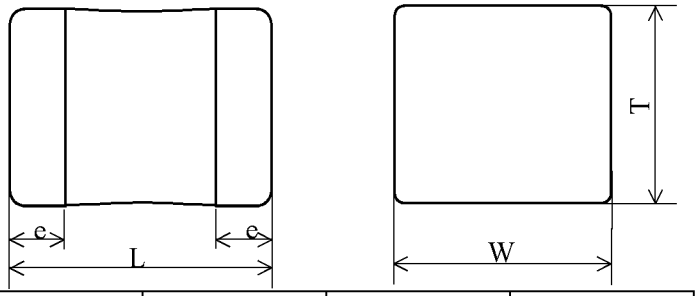
*For rated current of ordinary small power choke coils, please refer to the rated current ① in the above table.

*Rated current ② is the current for instantaneous flow such as plunging current of DC/DC converter.
In case of usage in the circuit where large current may be semicontinuously applied over 5 minutes with auto recovery circuit, etc., please contact our sales section before practical application.

Rated current ① : Current value to guarantee –30 % of nominal inductance

Rated current ② : Current value to guarantee component temperature within ΔT=40 ℃ with current flow.
(It is not the current to guarantee the inductance value.)

1. External dimensions

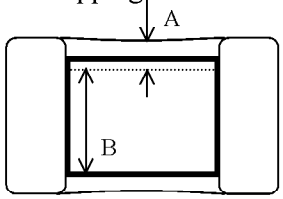


Type	L	W	T	e
CB2012	2.0±0.2	1.25±0.2	1.25±0.2	0.5±0.2
CB2016	2.0±0.2	1.6±0.2	1.6±0.2	0.5±0.2
CB2518	2.5±0.2	1.8±0.2	1.8±0.2	0.5±0.2

Unit: mm

※ External appearance

・Resin chipping



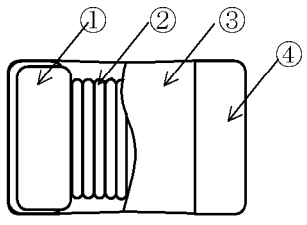
Set □ area as reference for flat level, over 70 % shall be flat.
Judgment shall be made according to the dimension below.
Insufficient resin on one side shall be **A** Max.
In case of insufficient resin on both side over **B** of flat surface shall be ensured.
(Template R part is not included on reference area.)

・In the above reference area, pin holes which are not bigger than the size specified in the below table are acceptable.
Resin crack or pinhole which locates outside of specified area or which has contact with frame, shall be also regarded as non-defective.

Type	A	B	Pin holes dimensions
CB2012	0.45	0.7	ϕ0.5
CB2016	0.5	1.0	ϕ0.5
CB2518	0.6	1.1	ϕ0.5

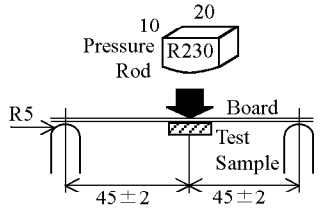
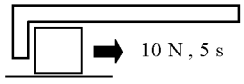
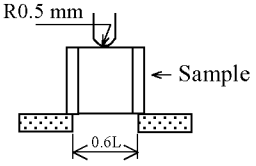
Unit: mm

2. Structural diagram



①	Ferrite core	Ni－Zn ferrite
②	Coil material	Polyurethane-copper wire
③	Over-coating resin	Epoxy resin, containing ferrite powder
④	Electrode	External electrode (foundation) Ag
		External electrode (plating) Ni／Sn

	Table 3	
	STANDARDS	(5 / 1 3)

	Item	Standard	Test method
ELECTRICAL CHARACTERISTICS	Inductance	Refer to Table 1	LCR meter (HP4285A or equivalent)
	Self resonant frequency	Refer to Table 1	Impedance/material analyzer (HP4291A or equivalent)
	DC resistance	Refer to Table 1	DC ohm meter (A&D AD-5812 or equivalent)
	Rated current	Refer to Table 1.	The maximum DC value having inductance decrease within 30 % and temperature increase within 40 ℃ by the application of DC bias shall be respectively measured.
	Insulation resistance	Not less then 1×10^{8} Ω.	0.2 mm diameter copper wires were wound around the coils three times and measurements were take after 50 V DC was applied between the wire and the terminals for a period of 30 seconds.
	Over current test	No smoke and no fire.	1.5 times the rated current ② was applied for a period of 5 minutes.
MECHANICAL CHARACTERISTICS	Resistance to Flexure substrate	No damage.	The test samples shall be soldered to the testing board and by reflow soldering conditions as show in table 6. Apply pressure in the direction of the arrow until bent width reaches 2 mm.  Unit : mm Substrate size : 100×40×1.0 Substrate material : glass epoxy-resin Solder cream thickness : 0.15 Land size: Refer to figure 1
	Adhesion of Terminal electrode	Shall not come off PC board.	The test samples shall be soldered to the testing board and by reflow soldering conditions as shown table 6.  Applied force : 10 N to X and Y directions. Duration : 5 s. Solder cream thickness : 0.15 mm (Land size refer to recommended Land Pattern Dimensions of "Precaution")
	Body strength	No damage.	Applied force : 10 N Duration : 10 s 

<table>
<tr><th></th><th>Item</th><th>Standard</th><th>Test method</th></tr>
<tr><td rowspan="6">ENVIRONMENT TESTS</td><td>Resistance to vibration</td><td>△L/L → within±10 %
No abnormality observed in appearance.</td><td>The test samples shall be soldered to testing jig as shown in under table.<table><tr><td>Frequency range</td><td>10～55 Hz</td></tr><tr><td>Overall Amplitude</td><td>1.5 mm (Shall not exceed acceleration 196 m/S^2)</td></tr><tr><td>Sweeping Method</td><td>10 to 55 to 10 Hz for 1 min.</td></tr><tr><td>Time</td><td>2 hours each in X, Y, and Z Direction.</td></tr></table></td></tr>
<tr><td>Resistance to soldering</td><td>△L/L → within±10 %
No abnormality observed in appearance.</td><td>3 time of reflow oven at 230 ℃ min for 30±10 sec, with peak temperature at 250$^{5}_{0}$ ℃ for 5 sec max.

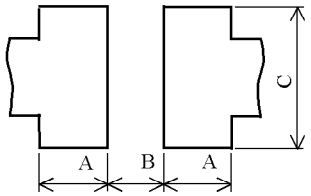
Substrate thickness : 1.0 mm
Substrate material : glass epoxy-resin</td></tr>
<tr><td>Solderability</td><td>At least 90 % of terminal electrode is covered by new solder.</td><td>The test samples be submerged molten solder as shown in under table.
Flux : methanol solution with 25 % of rosin.or equivalent.<table><tr><td>Solder Temperature</td><td>230±5 ℃</td></tr><tr><td>Time</td><td>5±0.5 s</td></tr><tr><td>Immersing Speed</td><td>25 mm/s</td></tr></table></td></tr>
<tr><td>Temperature characteristics</td><td>△L/L → within±15 %
No abnormality observed in appearance.</td><td>Measurement were taken in a temperature range of −25 ℃ to +85 ℃ and the value at +20 ℃ was used as the standard value.</td></tr>
<tr><td>Thermal shock</td><td>△L/L → within±10 %
No abnormality observed in appearance.</td><td>The test samples shall be soldered to the testing jig and by reflow soldering conditions as shown in table 6.
The test samples shall be left for the specified time at each of temperature in steps from 1 to 4, as shown in under table in sequence.
The temperature cycles shall be repeated 100 cycles in the Method.
Conditions for 1 cycle.<table><tr><th>Step</th><th>Temperature</th><th>Time (min)</th></tr><tr><td>1</td><td>−40±3 ℃</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>within 3</td></tr><tr><td>3</td><td>85±2 ℃</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp</td><td>within 3</td></tr></table></td></tr>
<tr><td>Low temperature life test</td><td>△L/L → within±10 %
No abnormality observed in appearance.</td><td>The test samples shall be soldered to the testing jig and by reflow soldering conditions as shown in table 6.
And after that proceed the test as shown condition under table.<table><tr><td>Temperature</td><td>−40±2 ℃</td></tr><tr><td>Time</td><td>1 000+24 h</td></tr></table></td></tr>
</table>

<table>
<tr><th></th><th>Item</th><th>Standard</th><th>Test method</th></tr>
<tr><td rowspan="3">ENVIRONMENT TESTS</td><td>High temperature life test</td><td>△L/L → within±10 %
No abnormality observed in appearance.</td><td>The test samples shall be soldered to the testing jig and by reflow soldering conditions as shown in table 6.
And after that proceed the test as shown condition under table.
<table><tr><td>Temperature</td><td>85±2 ℃</td></tr><tr><td>Time</td><td>1 000+24 h</td></tr></table></td></tr>
<tr><td>Damp heat life test</td><td>△L/L → within±10 %
No abnormality observed in appearance.</td><td>The test samples shall be soldered to the testing jig and by reflow soldering conditions as shown in table 6.
The test samples shall be put in thermostatic oven set at temperature with humidity, as shown in under table.
<table><tr><td>Temperature</td><td>60±2 ℃</td></tr><tr><td>Humidity</td><td>90～95 %RH</td></tr><tr><td>Time</td><td>1 000+24 h</td></tr></table></td></tr>
<tr><td>Loading under damp heat life test</td><td>△L/L → within±10 %
No abnormality observed in appearance.</td><td>The test samples shall be soldered to the testing jig and by reflow soldering conditions as shown in table 6.
The test samples shall be put in thermostatic oven set at temperature with humidity, as shown in under table, and with the rated current ① continuously applied.
<table><tr><td>Temperature</td><td>60±2 ℃</td></tr><tr><td>Humidity</td><td>90～95 %RH</td></tr><tr><td>Current</td><td>Refer to Table 1</td></tr><tr><td>Time</td><td>1 000+24 h</td></tr></table></td></tr>
</table>

Standard measuring condition	Unless otherwise specified, measurements were taken within 48 hours after the coils was stored at room temperature and in normal humidity for not less than 2 hour.

- Class－Ⅰ and Class－Ⅱ ozone depleting substances (ODS), etc., which are regulated by the Federal Law for Atmosphere Purification, are not included in the products not it applied to the products at any stage of manufacturing processes.
- The bromide flame proof materials are not used at all.
- The product and the specifications described above are not included in the list of export regulations in Japan and USA.

Refer to figure 1　　Resistance to Flexure substrate Land size

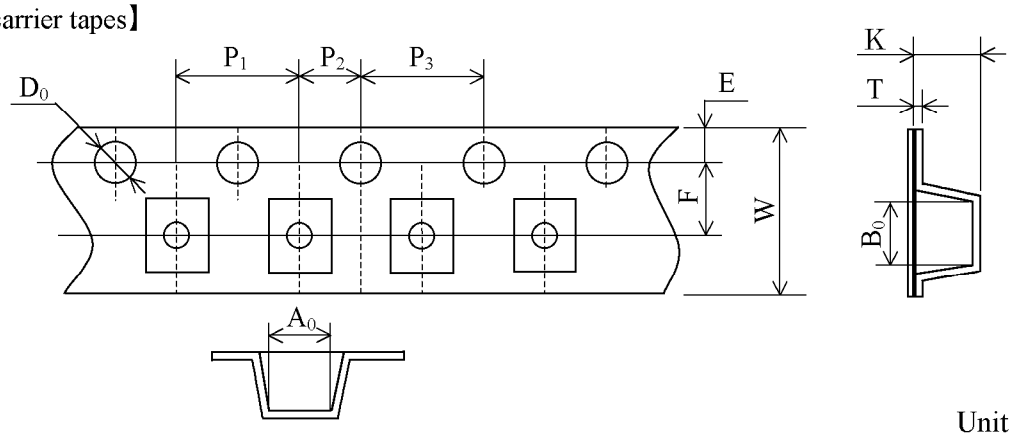


Type	A	B	C
CB2012	0.7	1.0	1.5
CB2016	0.9	0.8	1.8
CB2518	0.9	1.3	2.0

Unit : mm

1. Dimensions

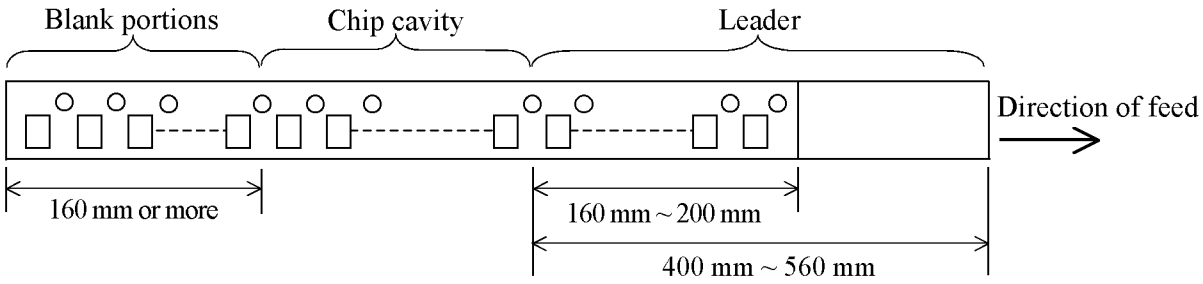
【Emboss carrier tapes】



Unit : mm

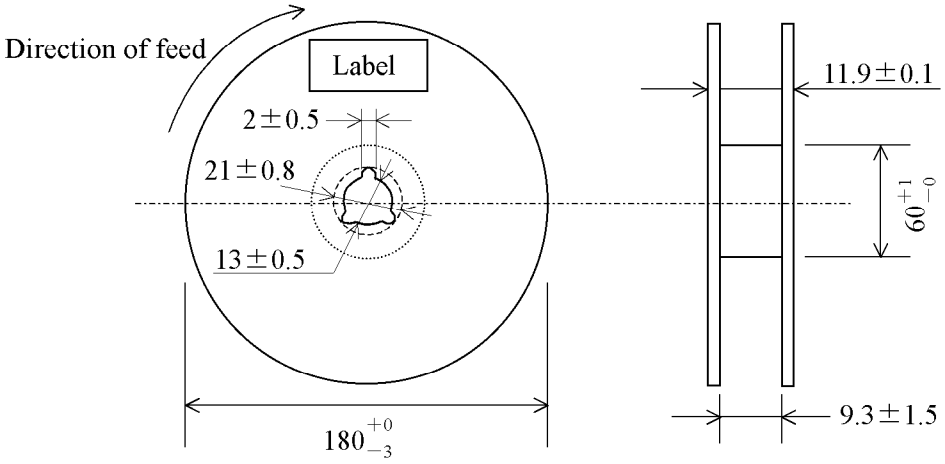
Type	A_0	B_0	W	F	E	P_1	P_2	P_3	D_0	T	K
CB2012	1.45 ±0.20	2.25 ±0.20	8.00 ±0.30	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	ϕ 1.50 +0.10 −0	0.25 ±0.05	1.30 ±0.10
CB2016	1.90 ±0.20	2.20 ±0.20	8.00 ±0.30	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	ϕ 1.50 +0.10 −0	0.30 ±0.05	1.85 ±0.10
CB2518	2.15 ±0.20	2.70 ±0.20	8.00 ±0.30	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	ϕ 1.50 +0.10 −0	0.30 ±0.05	2.10 ±0.10

2. Direction of rolling



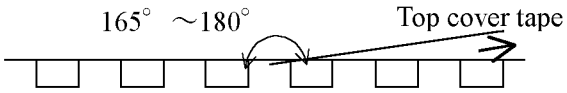
3. Reel

Unit : mm



Label position : the opposite side of pilot holes

4. Top tape strength



【Emboss carrier tapes】

Peel-off strength	:	0.2 N～0.7 N
Peel-off angle	:	165° ～180°
Peel-off speed	:	300 mm/min

1. Taping packing quantity

Type	Standard Quantity (pcs／1 reel)	Carrier tapes
CB2012	3 000	Emboss carrier tapes
CB2016	2 000	Emboss carrier tapes
CB2518	2 000	Emboss carrier tapes

2. The allowable number of empty components

The number of empty compartments in a reel, which shall not appear continuously, must be limited to 2.

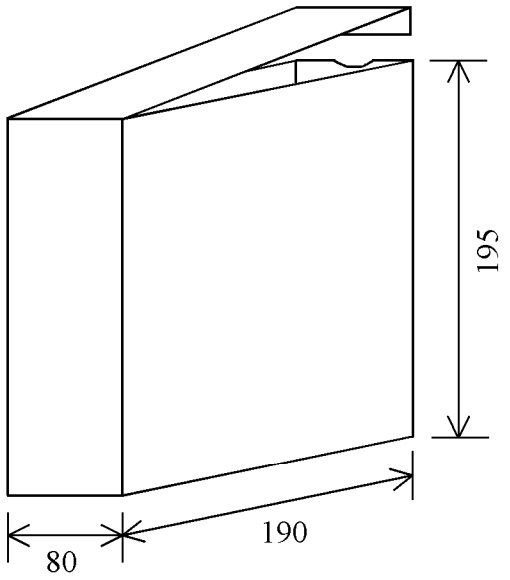
3. Marking

The following items shall be marked legibly each unit pack.

(1) The name of manufacturing company
(2) Manufacture's name (Taiyo Yuden Co., Ltd.)
(3) Lot number
(4) Date (stamp)
(5) The number of components packed in a reel

4. Dimensions of packing box (taping)

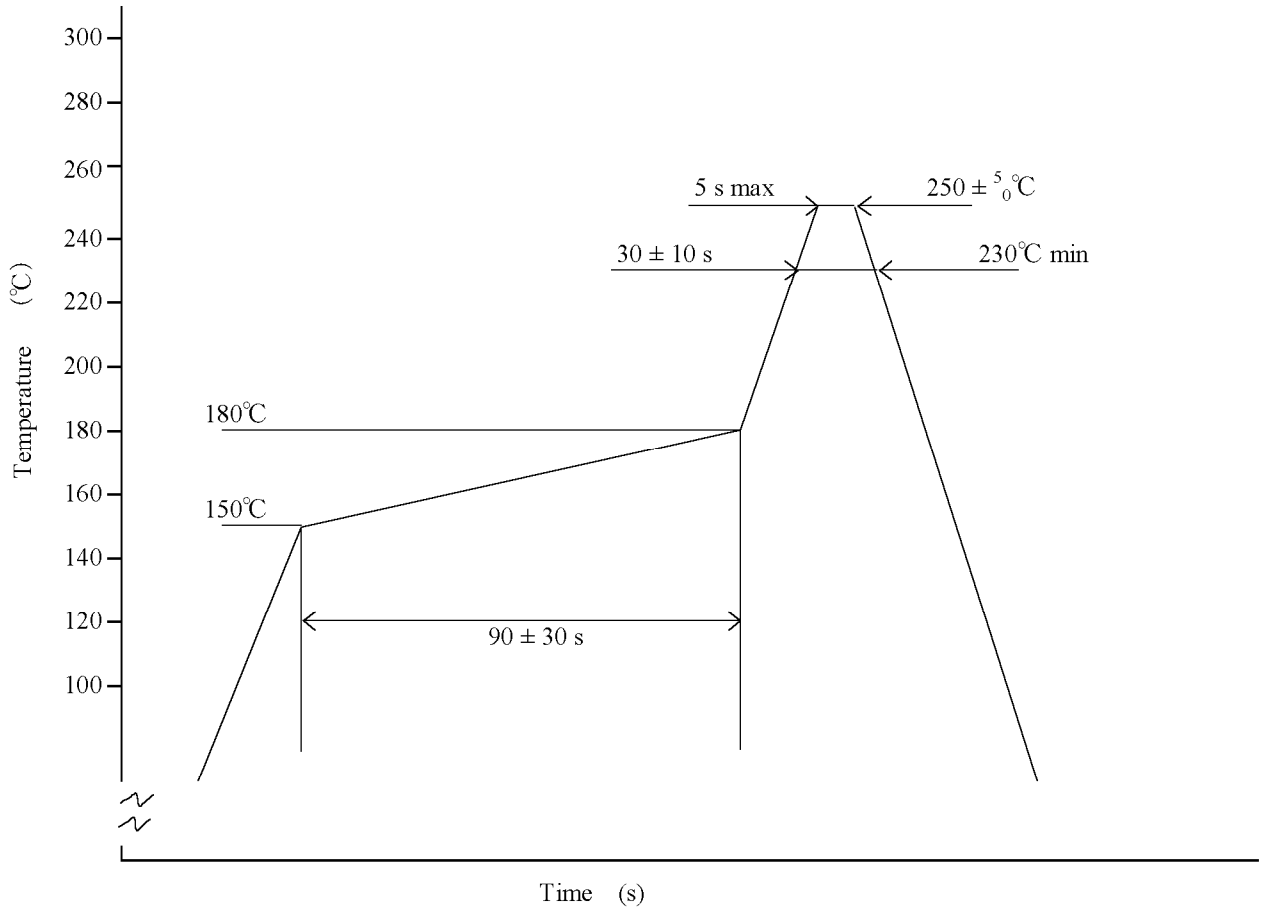
※ Reference



Unit : mm

Type	Standard Quantity (pcs)
CB2012	15 000
CB2016	10 000
CB2518	10 000

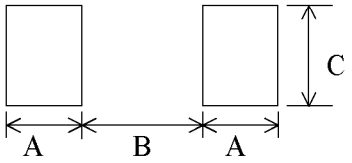
	Table 6	
	REFLOW PROFILE CHART (REFERENCE)	(1 1 / 1 3)



※ At using TAIYO YUDEN products of this specification and in using the lead free soldering, We request to use then after confirming of adhesion, temperature of resistance to soldering heat, soldering etc sufficiently.

1. Surface Mounting

- Mounting and soldering conditions should be checked beforehand.
- This inductors only using reflow soldering.
- Recommended Land-Pattern :



Unit : mm

Type	A	B	C
CB2012	0.7	0.8	1.45
CB2016	0.7	0.8	1.8
CB2518	0.8	1.2	2.0

- Recommended conditions for using a soldering iron:
  Put the soldering iron on the land-pattern.
  Soldering iron's temperature Below 350 ℃
  Duration 3 seconds or less
- The soldering iron should not directly touch the inductor.

2. Handling

- Keep the inductors away from all magnets and maganetic objects.
- When splitting the PC boards after mounting inductors, care should be taken not to give any stresses of deflection or twisting to the board.
- Board separation should not be done manually, but by using the appropriate devices.
- Please do not give the inductors any excessive mechanical shocks.
- Please avoid operation, which apply excessive stress and/or temperature to the products, such as resin molding.
- Washing by supersonic waves shall be avoided.

3. Storage

- To maintain the solderability of terminal electrodes and to keep the packing material in good condition, temperature and humidity in the storage area should be controlled.
  Recommended conditions.
  Ambient temperature 0 ～ 40 ℃
  Humidity Below 70 % RH
  The ambient temperature must be kept below 30 ℃. Even under ideal storage conditions, solderability of products electrodes may decrease as time passes, so inductors should be used within 6 months from the time of delivery.

4. Production Sites

- TAIYO YUDEN CO., LTD. (JAPAN)
- CHUKI SEIKI CO., LTD. (JAPAN)

◎ This English version of the specification is made out by translating the Japanese original into English faithfully, but in case where there exists any inconsistency or difference between the two the Japanese original shall govern.

SPECIAL NOTICE

All of the contents specified here are subject to change without notice due to technical improvements, etc. Therefore, please check latest version of the components specifications carefully before practical application or usage of the components. Please note that Taiyo Yuden Co,.Ltd. shall not be responsible for any of deficiency to components or equipments to be used, which are caused under the condition other than specified in the specification.

All electronic components listed in this catalog are developed, designed and intended for use in general electronics equipments. (for AV, household, office supply, information service, telecomm -unications, etc.). Before incorporating the components into any equipments in the field such as aerospace, aviation, nuclear control, submarine, transportation, (automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network etc. where higher safety and reliability are especially required, please contact Taiyo Yuden Co.,Ltd. for more detail in advance. And before incorporating the components or devices into the equipments not mentioned in the above, if there is possibility of direct damage or injury to human body, please contact Taiyo Yuden Co.,Ltd. for more detail in advance. In addition, even electronic components or devices are used for the general electronic equipments, if the equipments or the electric circuit require high safety or reliability function or performances, sufficient reliability evaluation-check for the safety shall be performed before use and moreover, due consideration to install a protective circuit is strongly recommended at the design stage.