

Specification Sheet for Approved

Customer Name:	
Customer Part No.:	
Ceaiya Part No:	CWCI0402C Series
Spec No:	C-0402C

【For Customer Approval Only】

If you Approval, Please Stamp

【RoHS Compliant Parts】

Approved By	Checked By	Prepared By
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【Version of Changed Record】				
Rev.	Effective Date	Changed Contents	Change Reasons	Approved By
A0	2024-12-07	New release	/	Li qing hui

Specification Sheet for SMD Chip Inductor

1. Scope

This specification applies to the CWCI0402C Series of wire wound SMD chip inductor.

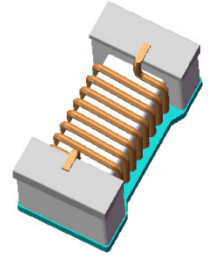
2. Product Description and Identification (Part Number)

1) Description:

CWCI0402C series of Wire wound SMD chip inductor.

2) Product Identification (Part Number)

CWCI 0402 C - 10N S T
 ① ② ③ ④ ⑤ ⑥



①	Type
CWCI	Wire Wound Chip Inductor

②	External Dimensions
	0402[1005]

③	Material type
C	Ceramic

⑤	Inductance Tolerance
B	$\pm 0.1\text{nH}$
C	$\pm 0.2\text{nH}$
S	$\pm 0.3\text{nH}$
D	$\pm 0.5\text{nH}$
G	$\pm 2\%$
H	$\pm 3\%$
J	$\pm 5\%$

④	Nominal Inductance
Example	Example
4N7	4.7nH
10N	10nH
R10	100nH

⑥	Packing
T	Tape & Reel

3. Electrical Characteristics

Please refer to Item 5.

- Operating temperature range (individual chip without packing): $-25^{\circ}\text{C} \sim +100^{\circ}\text{C}$ (Including Self-heating) .
- Storage temperature and humidity range (product with tapping): $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$ and RH 70% (Max.).

4. Shape and Dimensions (Unit:mm)

Dimensions and recommended PCB pattern for reflow soldering, please see Fig4-1 and Table4-1

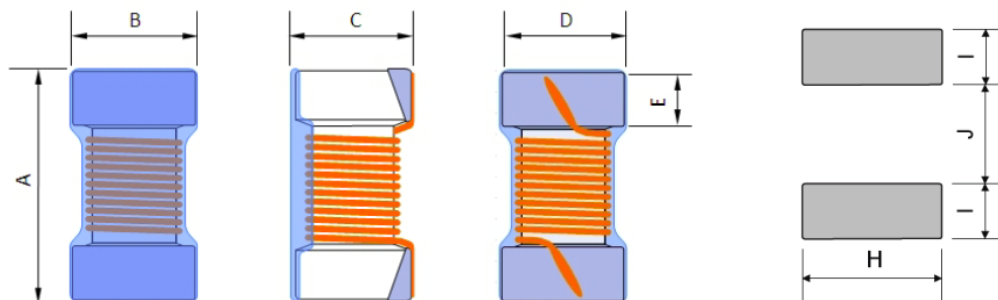


Fig4-1.

Table 4-1.

Series	A	B	C	D	E	H	I	J
CWCI0402C	1.1 ± 0.1	0.6 ± 0.1	0.55 ± 0.1	0.5 Ref	0.2 Ref	0.65 Ref	0.35 Ref	0.5 Ref

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5. Electrical Characteristics

Part No.	Inductance @100MHz	Tolerance	Min. Quality Factor	Q Test Freq.	Max.DC Resistance	Max.Rated Current	Min. Self-resonant Frequency
	nH	-	-	MHz	Ω	mA	MHz
	L	-	Q	Freq.	DCR	I _r	S.R.F
CWCI0402C-1N0□T	1.0	C.S.D	10	250	0.052	1360	>6000
CWCI0402C-1N3□T	1.3	S.D	10	250	0.032	1000	>6000
CWCI0402C-2N0□T	2.2	C.S.D	10	250	0.048	900	>6000
CWCI0402C-2N2□T	2.2	C.S.D	13	250	0.050	850	>6000
CWCI0402C-2N4□T	2.4	C.S.D	26	250	0.080	850	>6000
CWCI0402C-2N7□T	2.7	C.S.D	16	250	0.050	850	>6000
CWCI0402C-3N3□T	3.3	C.S.D	15	250	0.062	800	>6000
CWCI0402C-3N5□T	3.5	C.S.D.J	18	250	0.062	780	>6000
CWCI0402C-3N6□T	3.6	C.S.D.J	16	250	0.063	790	>6000
CWCI0402C-3N9□T	3.9	C.S.D.J	15	250	0.080	790	>6000
CWCI0402C-4N7□T	4.7	C.S.D.J	15	250	0.130	640	6000
CWCI0402C-5N1□T	5.1	C.S.D.J	25	250	0.120	600	6000
CWCI0402C-5N6□T	5.6	C.S.D.J	17	250	0.120	620	4000
CWCI0402C-6N2□T	6.2	C.S.D.J	18	250	0.130	620	4000
CWCI0402C-6N5□T	6.5	C.S.D.J	18	250	0.100	700	4800
CWCI0402C-6N8□T	6.8	S.D.J	18	250	0.100	700	4800
CWCI0402C-7N5□T	7.5	S.D.J	18	250	0.110	620	4500
CWCI0402C-8N2□T	8.2	S.D.J	20	250	0.120	620	4400
CWCI0402C-9N1□T	9.1	S.D.J	22	250	0.100	680	4160
CWCI0402C-12N□T	12	D.H.J	23	250	0.135	600	3600
CWCI0402C-13N□T	13	D.H.J	23	250	0.230	440	3450
CWCI0402C-14N□T	14	D.H.J	28	250	0.230	440	3450
CWCI0402C-15N□T	15	D.H.J	24	250	0.220	560	3280
CWCI0402C-18N□T	18	D.H.J	20	250	0.230	370	3000
CWCI0402C-22N□T	22	H.J	20	250	0.330	370	2600
CWCI0402C-24N□T	24	H.J	20	250	0.350	370	2600
CWCI0402C-27N□T	27	H.J	24	250	0.380	320	2480
CWCI0402C-33N□T	33	H.J	20	250	0.520	260	2000
CWCI0402C-36N□T	36	H.J	24	250	0.440	320	2320
CWCI0402C-39N□T	39	H.J	25	250	0.600	250	2100
CWCI0402C-47N□T	47	H.J	20	250	0.950	200	2100
CWCI0402C-56N□T	56	H.J	22	200	0.970	100	1760

6. Test and Measurement Procedures

6.1 Test Conditions

Unless otherwise specified, the standard atmospheric conditions for measurement/test as:

- a. Ambient Temperature: $20 \pm 15^{\circ}\text{C}$
- b. Relative Humidity: $65\% \pm 20\%$
- c. Air Pressure: 86 KPa to 106KPa

If any doubt on the results, measurements/tests should be made within the following limits:

- a. Ambient Temperature: $20 \pm 2^{\circ}\text{C}$

b. Relative Humidity: $65\% \pm 5\%$

- c. Air Pressure: 86KPa to 106KPa

6.2 Visual Examination

- a. Inspection Equipment: 30X magnifier

6.3 Electrical Test

6.3.1 DC Resistance (DCR)

- a. Refer to Item 5.
- b. Test equipment: HIOKI3540 or equivalent.

6.3.2 Inductance (L)

- a. Refer to Item 5.
- b. Test equipment: Agilent 4287A+ Agilent 16197A or equivalent.
- c. Test signal: -13dBm or 10mA
- d. Test frequency refers to Item 3.

6.3.3 Q Factor (Q)

- a. Refer to Item 5
- b. Test equipment: Agilent4287A + Agilent16197A or equivalent.
- c. Test signal: -13dBm or 10mA
- d. Test frequency refers to Item 5.

6.3.4 Self-Resonant Frequency (SRF)

- a. Refer to Item 5
- b. Test equipment: Agilent4991B + Agilent16197A and HP 8753E or equivalent.
- c. Test signal: -20dBm or 50mV

6.3.5 Saturation Current (IDC)

- a. Refer to Item 5
- b. Test equipment: Electric Power, Electric current meter, Agilent4991A + Agilent16197A or equivalent
- c. Measurement method:
 - 1. Set test current to be 0 mA.
 - 2. Measure initial chip inductance.
 - 3. Gradually increase voltage and measure chip inductance for corresponding current.
- d. Definition of Saturation Current (IDC): IDC is direct electric current as chip inductance drop just 10% from its value without current.

6.3.6 Rated Current (I_{rms})

e. Refer to Item 5.

f. Test equipment (see Fig.6.3.4-1): Electric Power, Electric current meter, Thermometer.

g. Measurement method (see Fig.6.3.4-1):

1. Set test current to be 0 mA.

2. Measure initial temperature of chip surface.

3. Gradually increase voltage and measure chip temperature for corresponding current.

h. Definition of Rated Current (I_{rms}): I_{rms} is direct electric current as chip surface temperature rose just 15°C against chip initial surface temperature (T_a) (see Fig.6.3.4-2)

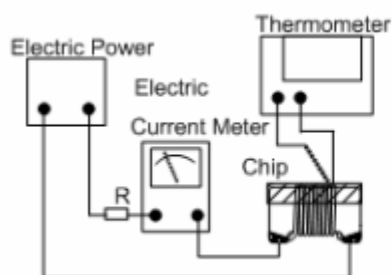


Fig. 6.3.4-1

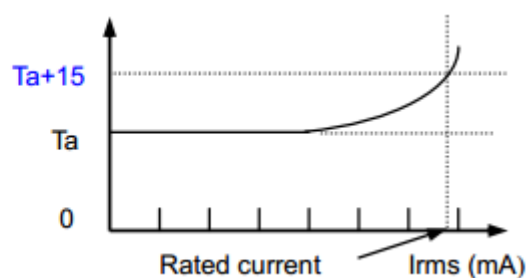
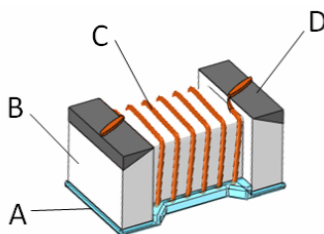


Fig. 6.3.4-2

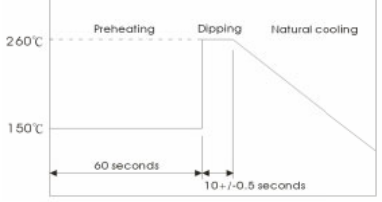
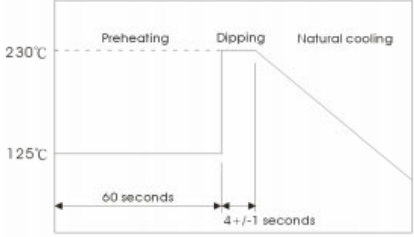
7. Structure: See the following.



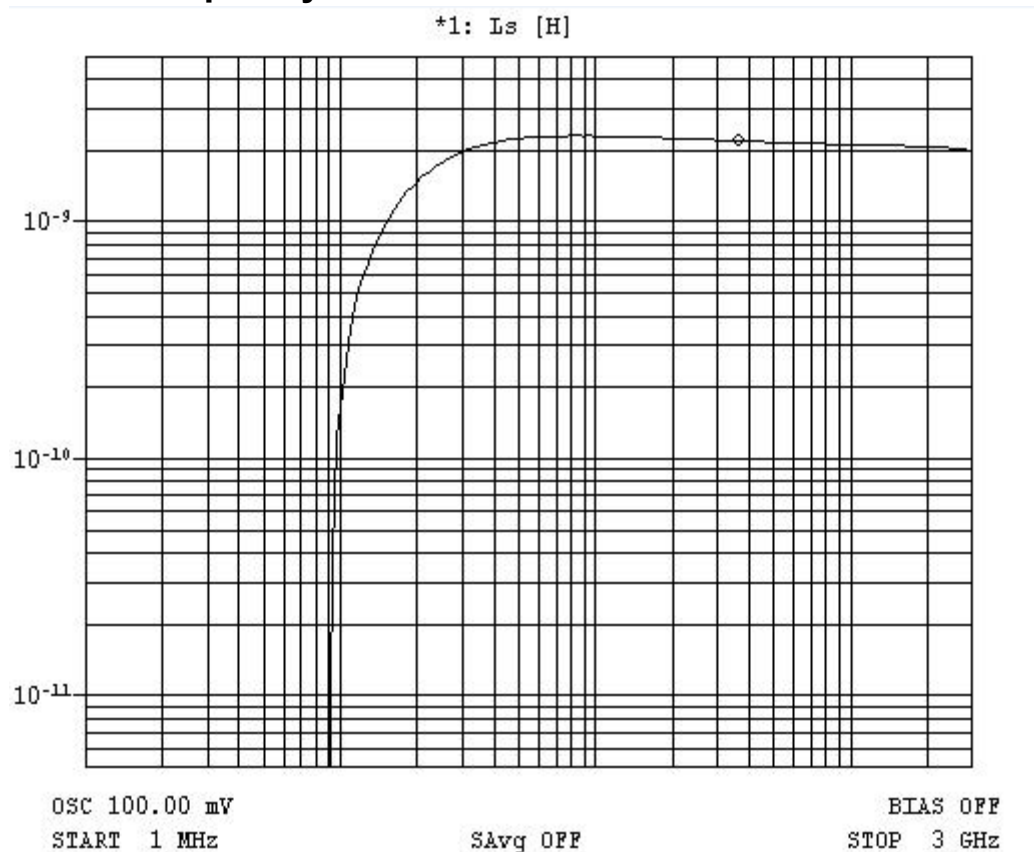
No.	Components	Material
A	Coating	Ultraviolet epoxy resin
B	Core	Ceramic
C	Wire	Polyurethane system enameled copper wire
D	Electrodes	Ag/Ag-Pd with Ni and Sn plating

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8. Reliability Test

Items	Performance	Test Condition															
8.1 Solder Heat Resistance 耐焊锡热	Appearance: No significant abnormality. Inductance change: Within $\pm 20\%$ 外观：无明显异常 电感值：变化值在初始值 20%以内	Preheat: 150°C , 60sec. Solder: H63A Solder temperature: $260 \pm 5^{\circ}\text{C}$ Flux for lead free: rosin Dip time: $10 \pm 0.5\text{sec}$. 预热： 150°C ，60 sec 锡炉温度： $260 \pm 5^{\circ}\text{C}$ 助焊剂：rosin. 时间： $10 \pm 0.5\text{sec}$ 															
8.2 Solderability Test 端面焊锡性	More than 90% of the terminal electrode should be covered with solder. 端电极之锡覆盖面达 90%以上	Preheat: $125 \pm 25^{\circ}\text{C}$, 60sec. Solder: H63A Solder temperature: $230 \pm 5^{\circ}\text{C}$ Flux for lead free: rosin Dip time: $4 \pm 1\text{sec}$ 预热： 125°C ，60 sec 锡炉温度： $230 \pm 5^{\circ}\text{C}$ 助焊剂：rosin. 时间： $4 \pm 1\text{sec}$ 															
8.3 High Temperature Resistance Test 高温放置测试	Appearance: no damage. Inductance: within $\pm 20\%$ of initial value. No disconnection or short circuit. 外观不能破损 电感值：变化值在初始值 20%以内 电性无短路或断线。	Temperature: $85 \pm 2^{\circ}\text{C}$. Applied current: rated current. Duration: 500 hrs															
8.4 Humidity Resistance Test 高湿放置测试	Appearance: no damage. Inductance: within $\pm 20\%$ of initial value. No disconnection or short circuit. 外观不能破损 电感值：变化值在初始值 20%以内 电性无短路或断线。	Temperature: $40 \pm 2^{\circ}\text{C}$. Applied current: rated current. Duration: 500 hrs Humidity: 90~95%															
9.5 Thermal shock 热冲击试验	Appearance: no damage. Inductance: within $\pm 20\%$ of initial value. No disconnection or short circuit. 外观不能破损 电感值：变化值在初始值 20%以内 电性无短路或断线。	Condition for 1 cycle Step1: $-25 \pm 2^{\circ}\text{C}$, $30 \pm 3\text{ min}$. Step2: Room temperature within 15 min. Step3: $+85 \pm 5^{\circ}\text{C}$, $30 \pm 3\text{ min}$. Step4: Room temperature within 15 min. Number of cycles: 50PCS <table border="1" data-bbox="1129 1541 1481 1753"> <thead> <tr> <th>Phase</th><th>Temperature($^{\circ}\text{C}$)</th><th>Time(min)</th></tr> </thead> <tbody> <tr> <td>1</td><td>$-25 \pm 2^{\circ}\text{C}$</td><td>$30 \pm 3$</td></tr> <tr> <td>2</td><td>Room Temp.</td><td>15</td></tr> <tr> <td>3</td><td>$+85 \pm 2^{\circ}\text{C}$</td><td>$30 \pm 3$</td></tr> <tr> <td>4</td><td>Room Temp.</td><td>15</td></tr> </tbody> </table>	Phase	Temperature($^{\circ}\text{C}$)	Time(min)	1	$-25 \pm 2^{\circ}\text{C}$	30 ± 3	2	Room Temp.	15	3	$+85 \pm 2^{\circ}\text{C}$	30 ± 3	4	Room Temp.	15
Phase	Temperature($^{\circ}\text{C}$)	Time(min)															
1	$-25 \pm 2^{\circ}\text{C}$	30 ± 3															
2	Room Temp.	15															
3	$+85 \pm 2^{\circ}\text{C}$	30 ± 3															
4	Room Temp.	15															
8.6 Humidity Resistance 高湿测试	Appearance: no damage. Inductance: within $\pm 20\%$ of initial value. No disconnection or short circuit. 外观不能破损 电感值：变化值在初始值 20%以内 电性无短路或断线。	Humidity: 90~95%RH. Temperature: $40 \pm 5^{\circ}\text{C}$. Applied current: rated current. Duration: $500 \pm 12\text{hrs}$. Measured at room temperature after placing for 2 to 3hrs. 湿度：90~95%RH. 温度： $40 \pm 5^{\circ}\text{C}$. 须加电流：额定电流。 放置时间： $500 \pm 12\text{hrs}$.															

9. Inductance vs. Frequency Characteristics



10. Packaging and Storage

10.1 Packaging

There is one type of packaging for the chip inductors. Please specify the packing code when ordering.

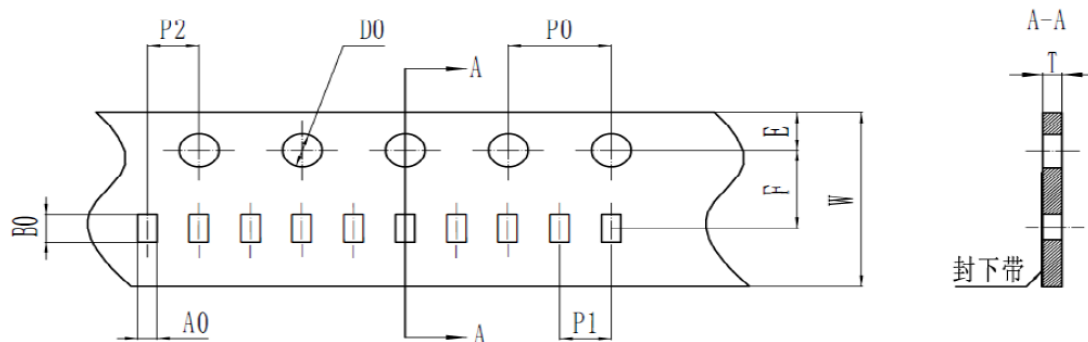
Tape Carrier Packaging:

Packaging code: T

Type	0402
Tape	Punched Tape
Quantity	10K

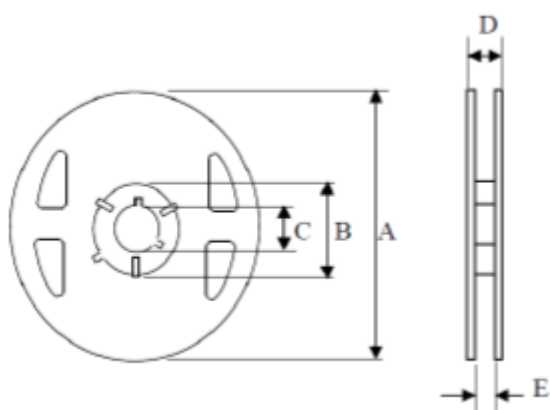
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10.2 Taping Dimensions (Unit: mm)



A0	B0	W	F	E	P1	P2	P0	D0	T
0.70 ±0.03	1.18 ±0.03	8.0 ±0.10	3.50 ±0.05	1.75 ±0.10	2.0 ±0.05	2.0 ±0.05	4.0 ±0.10	1.55 ±0.05	0.65 ±0.03

10.3 Reel Dimensions (Unit: mm)



Symbol	T
A	180
B	60
C	13
D	13.5
E	8.4