

YAGEO CORPORATION

Lead-Free & RoHs Compliance!!

SPECIFICATION FOR APPROVAL

CUSTOMER : _____
CUSTOMER P/N : _____
OUR DWG No : _____
QUANTITY : _____ Pcs. DATE : 2010/11/01
ITEM : CLH2012T-22NJ-N

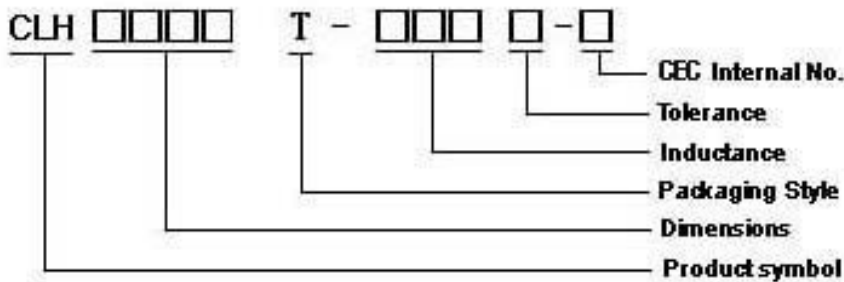
SPECIFICATION ACCEPTED BY:	
COMPONENT ENGINEER	
ELECTRICAL ENGINEER	
MECHANICAL ENGINEER	
APPROVED	
REJECTED	

DRAWN BY Sally	CHECKED BY Ling	APPROVED BY Slddo
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CLH2012T Series Specification

1 Scope: This specification applies to Multilayer ceramic chip inductors

2 Part Numbering: Product Identification



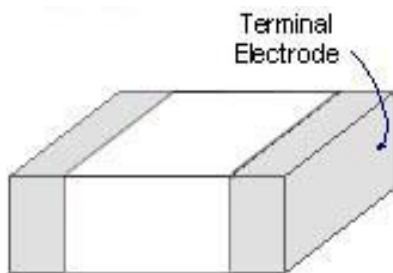
3 Rating:

Operating Temperature: $-55^{\circ}\text{C} \sim 125^{\circ}\text{C}$

Storage Temperature: $-55^{\circ}\text{C} \sim 125^{\circ}\text{C}$ (after PCB)

$-5^{\circ}\text{C} \sim 40^{\circ}\text{C}$, Humidity 40%~70% (before PCB)

4 Marking:

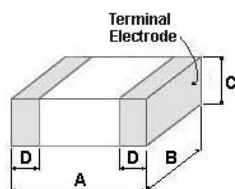


5 Standard Testing Condition

	Unless otherwise specified	In case of doubt
Temperature	Ordinary Temperature(15 to 35°C)	20±2°C
Humidity	Ordinary Humidity(25 to 85% RH)	60 to 70 % RH

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6 Configuration and Dimensions:



TYPE	CLH2012	
REMARK	< 390nH	≥ 390nH
A m/m	2.0±0.2	
B m/m	1.25±0.2	
C m/m	0.9±0.2	1.2±0.2
D m/m	0.5±0.3	

7 ELECTRICAL CHARACTERISTICS :

Part No.	Inductance (nH)	L,Q Test Freq.	Q Min.	SRF (MHZ)Typ.	RDC (Ω)Max.	IDC (mA)Max.	Tolerance
CLH2012T-1N0□-N	1	100 MHz,200 mV	10	>6000	0.1	300	S
CLH2012T-1N2□-N	1.2	100 MHz,200 mV	10	>6000	0.1	300	S
CLH2012T-1N5□-N	1.5	100 MHz,200 mV	10	>6000	0.1	300	S
CLH2012T-1N8□-N	1.8	100 MHz,200 mV	10	>6000	0.1	300	S
CLH2012T-2N2□-N	2.2	100 MHz,200 mV	10	>6000	0.1	300	S
CLH2012T-2N7□-N	2.7	100 MHz,200 mV	12	>6000	0.1	300	S
CLH2012T-3N3□-N	3.3	100 MHz,200 mV	12	>6000	0.13	300	S,K
CLH2012T-3N9□-N	3.9	100 MHz,200 mV	12	5400	0.15	300	S,K
CLH2012T-4N7□-N	4.7	100 MHz,200 mV	12	4500	0.2	300	S,K
CLH2012T-5N6□-N	5.6	100 MHz,200 mV	12	4000	0.23	300	S,K,J
CLH2012T-6N8□-N	6.8	100 MHz,200 mV	15	3650	0.25	300	J,K
CLH2012T-8N2□-N	8.2	100 MHz,200 mV	15	3000	0.28	300	J,K
CLH2012T-10N□-N	10	100 MHz,200 mV	15	2500	0.3	300	J,K
CLH2012T-12N□-N	12	100 MHz,200 mV	15	2450	0.35	300	J,K
CLH2012T-15N□-N	15	100 MHz,200 mV	15	2000	0.4	300	J,K
CLH2012T-18N□-N	18	100 MHz,200 mV	15	1750	0.45	300	J,K
CLH2012T-22N□-N	22	100 MHz,200 mV	15	1700	0.5	300	J,K
CLH2012T-27N□-N	27	100 MHz,200 mV	15	1550	0.55	300	J,K
CLH2012T-33N□-N	33	100 MHz,200 mV	15	1350	0.6	300	J,K
CLH2012T-39N□-N	39	100 MHz,200 mV	18	1300	0.65	300	J,K
CLH2012T-47N□-N	47	100 MHz,200 mV	18	1200	0.7	300	J,K
CLH2012T-56N□-N	56	100 MHz,200 mV	18	1150	0.75	300	J,K
CLH2012T-68N□-N	68	100 MHz,200 mV	18	1000	0.8	300	J,K
CLH2012T-82N□-N	82	100 MHz,200 mV	18	850	0.9	300	J,K
CLH2012T-R10□-N	100	100 MHz,200 mV	18	730	1	300	J,K

NOTE: □-tolerance J=±5% / K=±10% / S=±0.3nH

1. Operating temperature range – 5 5 °C ~ 1 2 5 °C

2. IDC: Applied the current to coils, the inductance shall be less than 10% initial value.

"-N" FOR COMPLETELY LEAD FREE TYPE(INCLUDING FERRITE BODY & SOLDER)

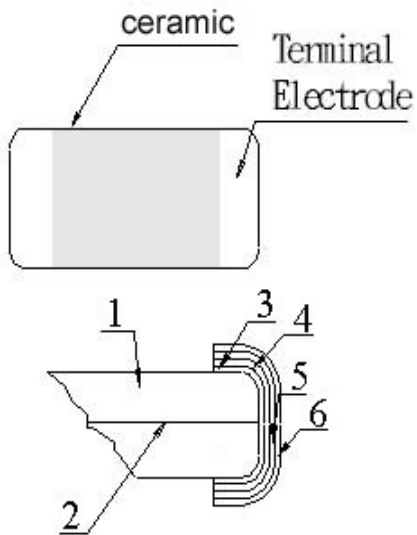
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Part No.	Inductance (nH)	L,Q Test Freq.	Q Min.	SRF (MHZ)Typ.	RDC (Ω)Max.	IDC (mA)Max.	Tolerance
CLH2012T-R12 \square -N	120	50 MHz,200 mV	13	650	1.2	300	J,K
CLH2012T-R15 \square -N	150	50 MHz,200 mV	13	550	1.4	300	J,K
CLH2012T-R18 \square -N	180	50 MHz,200 mV	13	500	1.8	300	J,K
CLH2012T-R22 \square -N	220	50 MHz,200 mV	12	450	2	300	J,K
CLH2012T-R27 \square -N	270	50 MHz,200 mV	12	400	2.5	200	J,K
CLH2012T-R33 \square -N	330	50 MHz,200 mV	12	380	3	200	J,K
CLH2012T-R39 \square -N	390	50 MHz,200 mV	10	330	3.5	200	J,K
CLH2012T-R47 \square -N	470	50 MHz,200 mV	10	300	4	200	J,K

CLH2012T Series Specification

8 CLH2012T Series

8.1 Construction:



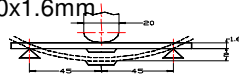
8.2 Material List:

NO	PART	MATERIAL
1	Main Substance	Al ₂ O ₃ -B ₂ O ₃ -SiO ₂
2	Silver electrode	Ag
3	Silver electrode	Ag
4	Cu plating	Cu
5	Ni plating	Ni
6	Sn plating	Sn

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9 Reliability Of Ceramic Multilayer Chip Inductor For High Freq.

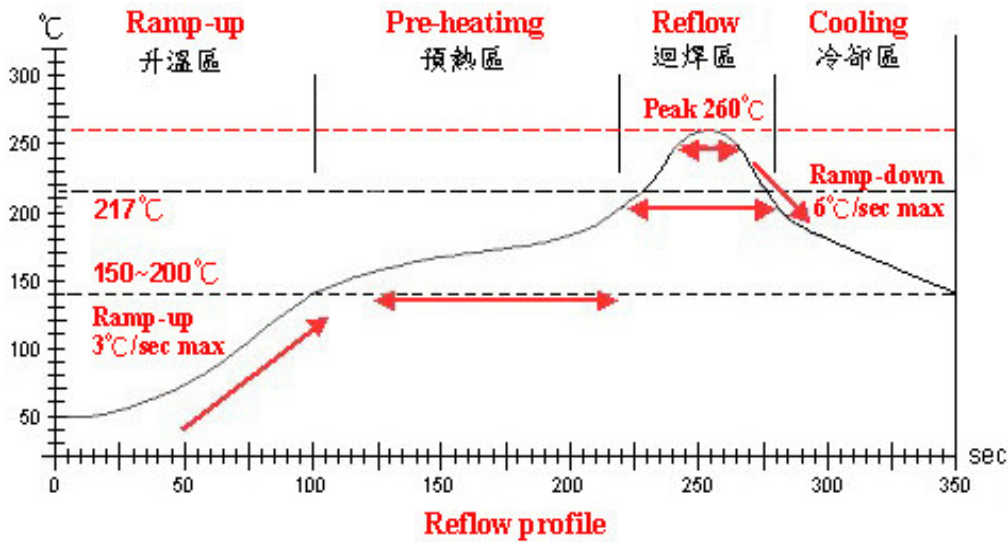
1-1.Mechanical Performance

No	Item	Specification	Test Method
1-1-1	Flexure Strength	The forces applied on the right conditions must not damage the terminal electrode and the ferrite	Test device shall be soldered on the substrate Substrate Dimension: 100x40x1.6mm Deflection: 2.0mm Keeping Time: 30sec *For 100505, substrate dimension is 100x40x0.8mm 
1-1-2	Vibration		Test device shall be soldered on the substrate Oscillation Frequency: 10 to 55 to 10Hz for 1min Amplitude: 1.5mm Time: 2hrs for each axis (X, Y & Z), total 6hrs
1-1-3	Resistance to Soldering Heat	Appearance: No damage	Pre-heating: 150°C, 1min Solder Composition: Sn/Pb = 63/37 Solder Composition: Sn/Ag3.0/Cu0.5(Pb-Free) Solder Temperature: 260±5°C Immersion Time: 10±1sec
1-1-4	Solder ability	The electrodes shall be at least 95% covered with new solder coating	Pre-heating: 150°C, 1min Solder Composition: Sn/Pb = 63/37 Solder Temperature: 220±5°C Solder Composition: Sn/Ag3.0/Cu0.5(Pb-Free) Solder Temperature: 245±5°C (Pb-Free) Immersion Time: 4±1sec

1-2.Environmental Performance

No	Item	Specification	Test Method															
1-2-1	Temperature Cycle	Appearance: No damage Inductance: within±10% of initial value Q change: within±30% of initial value	One cycle: <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Time (min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55±3</td> <td>30</td> </tr> <tr> <td>2</td> <td>25±2</td> <td>3</td> </tr> <tr> <td>3</td> <td>125±3</td> <td>30</td> </tr> <tr> <td>4</td> <td>25±2</td> <td>3</td> </tr> </tbody> </table> Total: 100cycles Measured after exposure in the room condition for 24hrs	Step	Temperature (°C)	Time (min)	1	-55±3	30	2	25±2	3	3	125±3	30	4	25±2	3
Step	Temperature (°C)	Time (min)																
1	-55±3	30																
2	25±2	3																
3	125±3	30																
4	25±2	3																
1-2-2	Humidity Resistance		Temperature: 40±2°C Relative Humidity: 90 ~ 95% Time: 1000hrs Measured after exposure in the room condition for 24hrs															
1-2-3	High Temperature Resistance		Temperature: 125±3°C Relative Humidity: 20% Applied Current: Rated Current / Time: 1000hrs Measured after exposure in the room condition for 24hrs															
1-2-4	Low Temperature Resistance		Temperature: -55±3°C Relative Humidity: 0% / Time: 1000hrs Measured after exposure in the room condition for 24hrs															

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Lead-Free(LF) 標準溫度分析範圍

Refer to J-STD-020C

管制項目 Item.	升溫區 Ramp-up	預熱區 Pre-heating	迴焊區 Reflow	Peak Temp	冷卻區 Cooling
溫度範圍 Temp. scope	R.T. ~ 150°C	150°C ~ 200°C	217°C	260±5°C	Peak Temp. ~ 150°C
標準時間 Time spec.	—	60 ~ 180 sec	60 ~ 150sec	20 ~ 40 sec	—
實際時間 Time result	—	75 ~ 100 sec	90 ~ 120sec	20 ~ 35 sec	—

NOTE :

1. Re-flow possible times : within 2 times
2. Nitrogen adopted is recommended while in re-flow

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10 TEST DATA FOR PREPRODUCTION SAMPLES

QF-1419

DESCRIPTION: CLH2012T-22NJ-N

MEAS. Item	L (nH)	Q (MIN.)	SRF(MHz) (TYP.)	RDC (Ω)	A m/m	B m/m	C m/m	D m/m			
Spec	Customer	22±5%									
	Suggest		15-0	1700	0.5+0	2.0±0.2	1.25±0.2	0.9±0.2	0.5±0.3		
Test Freq.	200mV 100MHz	200mV 100MHz									
1	21.9	22	1855	0.152	2.06	1.28	0.91	0.51			
2	22.1	22	1855	0.153	2.02	1.27	0.88	0.52			
3	21.8	23	1855	0.158	2.04	1.29	0.9	0.52			
4	21.7	20	1931	0.15	2.05	1.29	0.88	0.53			
5	21.8	22	1862	0.157	2.04	1.29	0.9	0.51			
6	21.9	20	1855	0.157	2.05	1.27	0.88	0.51			
7	21.6	22	1912	0.153	2.02	1.28	0.88	0.51			
8	21.3	22	1868	0.151	2.02	1.28	0.91	0.52			
9	21.5	21	1931	0.153	2.06	1.26	0.9	0.51			
10	21.7	20	1862	0.152	2.06	1.27	0.91	0.51			
11											
12											
13											
14											
15											
\bar{X}	21.73	21.4	1878.6	0.1536	2.042	1.278	0.895	0.515			
R	0.8	3	76	0.008	0.04	0.03	0.03	0.02			
CUSTOMER											
SAMPLE											

TEST INSTRUMENT:

HP4291A RF IMPEDANCE / MATERIAL ANALYZER FOR L,Q
 CHEN HWA 502BC / HP4338B FOR RDC
 HPE4991A&HP8753D FOR SRF

APPEARANCE AND DIMENSIONS :

SPEC : MEET ITEM 6.

TEST METHOD : VISUAL INSPECTION AND MEASURED WITH SILDE CALIPERS.

TESTING CONDITIONS :

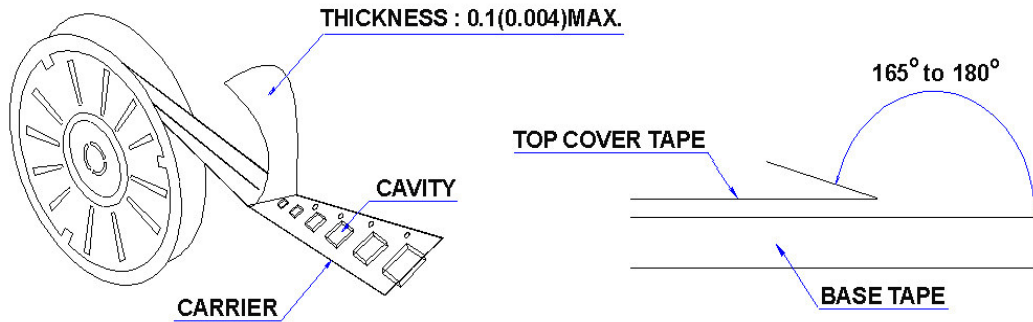
	Unless otherwise specified	In case of doubt
Temperature	Ordinary Temperature (15 to 35°C)	20 ± 2 °C
Humidity	Ordinary Humidity (25 to 85 %RH)	60 to 70 %RH

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11 PACKAGING

11.1 Packaging -Cover tape

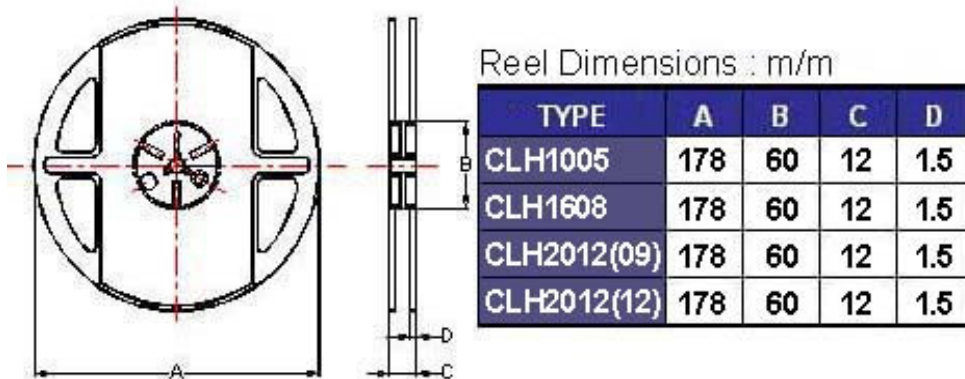
The force for tearing off cover tape is 10 to 100 grams in the arrow direction.



11.2 Packaging Quantity

TYPE	BULK	PCS/REEL
CLH1005	✓	10000
CLH1608	✓	4000
CLH2012(09)	✓	4000
CLH2012(12)	✓	3000

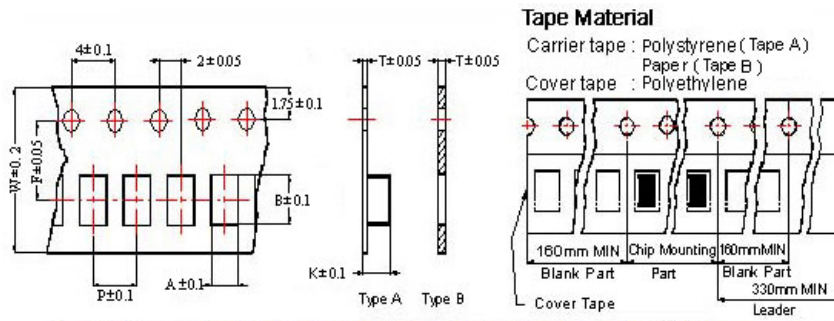
11.3 Reel Dimensions



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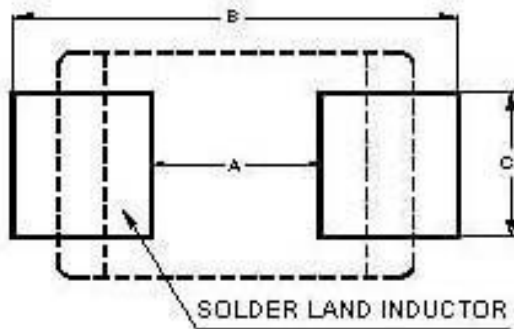
11 PACKAGING

11.4 Tape Dimensions in mm



TYPE	A	B	T	W	P	F	K	Tape Typ.
CLH1005	0.65	1.12	0.60	8	2	3.5		B
CLH1608	1.00	1.80	0.95	8	4	3.5		B
CLH2012(09)	1.58	2.42	0.95	8	4	3.5		B
CLH2012(12)	1.35	2.25	0.22	8	4	3.5	1.35	A

12 Recommended Pattern



Dimensions in mm

TYPE	A	B	C
CLH1005	0.4	1.2 ~ 1.4	0.5
CLH1608	0.7 ~ 0.8	1.8 ~ 2.0	0.6 ~ 0.8
CLH2012(09)	1.0 ~ 1.2	2.6 ~ 4.0	1.0 ~ 1.2
CLH2012(12)	1.0 ~ 1.2	2.6 ~ 4.0	1.0 ~ 1.2

13 Note:

1. Please make sure that your product is has been evaluated and confirmed against your specifications when our product is mounted to your product.
2. Do not knock nor drop.
3. All the items and parameters in this product specification have been prescribed on the premise that our product is used for the purpose, under the condition and in the environment agreed upon between you and us. You are requested not to use our product deviating from such agreement.

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14 Curve:

