

## Multilayer Chip Inductor / CL TYPE

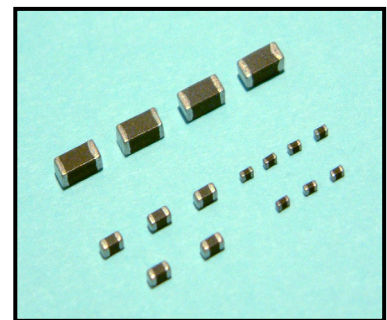
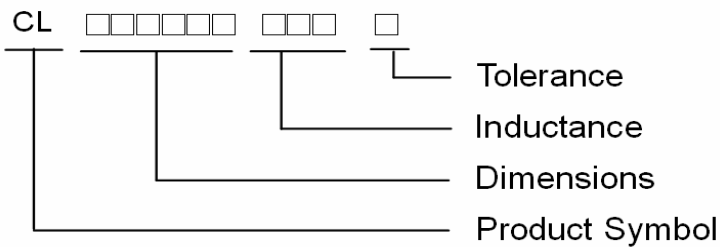
### Features:

1. Closed magnetic circuit avoids crosstalk.
2. S.M.T. type.
3. Excellent solderability and heat resistance.
4. High reliability.
5. The products contain no lead and also support lead-free soldering.

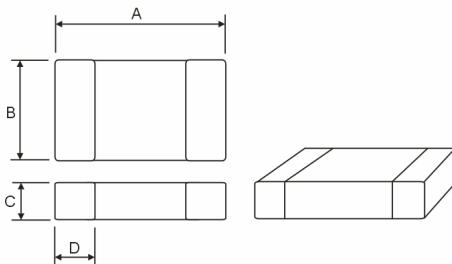
### Applications:

For main board, CD-ROM, hard disk driver, digital TVs and VTRs Printers, wireless phone, personal computers and general consumer and computers products.

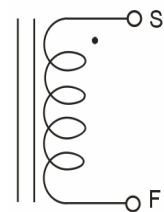
### Product Identification :



### Shape and Dimension



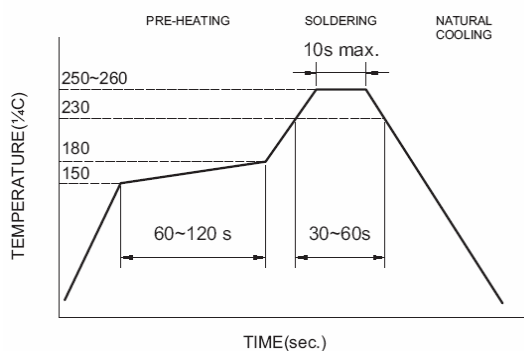
### Schematic



Dimensions in mm

TYPE	A(mm)	B(mm)	C(mm)	D(mm)
<b>CL160808</b>	1.6±0.2	0.8±0.2	0.8±0.2	0.3±0.2
<b>CL201209</b>	2.0±0.2	1.25±0.2	0.9±0.2	0.5±0.3
<b>CL201212</b>	2.0±0.2	1.25±0.2	1.25±0.2	0.5±0.3
<b>CL321611</b>	3.2±0.2	1.6±0.2	1.1±0.2	0.5±0.3

### Recommended Reflow



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### Electrical Characteristics ( CL160808 TYPE )

Part No.	Inductance ( $\mu$ H)	Tolerance ( $\pm$ %)	L,Q Test Freq. (MHz)	Q Min	SRF (MHz)Min.	DCR ( $\Omega$ ) Max	Rated Current (mA) Max
CL160808T-33N□	0.033	20	50 MHz,200 mV	15	270	0.20	50
CL160808T-47N□	0.047	20	50 MHz,200 mV	15	260	0.30	50
CL160808T-56N□	0.056	20	50 MHz,200 mV	15	255	0.30	50
CL160808T-68N□	0.068	20	50 MHz,200 mV	15	250	0.30	50
CL160808T-82N□	0.082	20	50 MHz,200 mV	15	245	0.30	50
CL160808T-R10□	0.1	10, 20	25 MHz,200 mV	25	240	0.50	50
CL160808T-R12□	0.12	10, 20	25 MHz,200 mV	25	205	0.50	50
CL160808T-R15□	0.15	10, 20	25 MHz,200 mV	25	180	0.60	50
CL160808T-R18□	0.18	10, 20	25 MHz,200 mV	25	165	0.60	50
CL160808T-R22□	0.22	10, 20	25 MHz,200 mV	25	150	0.80	50
CL160808T-R27□	0.27	10, 20	25 MHz,200 mV	25	136	0.80	50
CL160808T-R33□	0.33	10, 20	25 MHz,200 mV	25	125	0.85	35
CL160808T-R39□	0.39	10, 20	25 MHz,200 mV	25	110	1.00	35
CL160808T-R47□	0.47	10, 20	25 MHz,200 mV	25	105	1.35	35
CL160808T-R56□	0.56	10, 20	25 MHz,200 mV	25	95	1.50	35
CL160808T-R68□	0.68	10, 20	25 MHz,200 mV	25	85	1.70	35
CL160808T-R82□	0.82	10, 20	25 MHz,200 mV	25	75	2.10	35
CL160808T-1R0□	1	10, 20	10 MHz,200 mV	35	65	0.60	25
CL160808T-1R2□	1.2	10, 20	10 MHz,200 mV	35	60	0.80	25
CL160808T-1R5□	1.5	10, 20	10 MHz,200 mV	35	55	0.80	25
CL160808T-1R8□	1.8	10, 20	10 MHz,200 mV	35	50	0.95	25
CL160808T-2R2□	2.2	10, 20	10 MHz,200 mV	35	45	1.10	15
CL160808T-2R7□	2.7	10, 20	10 MHz,200 mV	35	40	1.30	15
CL160808T-3R3□	3.3	10, 20	10 MHz,200 mV	35	38	1.50	15
CL160808T-3R9□	3.9	10, 20	10 MHz,200 mV	35	36	1.7	15
CL160808T-4R7□	4.7	10, 20	4 MHz,200 mV	35	33	2.1	15
CL160808T-5R6□	5.6	10, 20	4 MHz,200 mV	35	22	1.5	5
CL160808T-6R8□	6.8	10, 20	4 MHz,60 mV	35	20	1.7	5
CL160808T-8R2□	8.2	10, 20	2 MHz,60 mV	30	18	2.1	5
CL160808T-100□	10	10, 20	2 MHz,60 mV	30	17	2.55	5
CL160808T-120□	12	10, 20	1 MHz,60 mV	30	15	2.6	3

### Electrical Characteristics ( CL201209 TYPE )

Part No.	Inductance ( $\mu$ H)	Tolerance ( $\pm$ %)	L,Q Test Freq. (MHz)	Q Min	SRF (MHz)Min.	DCR ( $\Omega$ ) Max	Rated Current (mA) Max
CL201209T-22N□	0.022	20	50 MHz,200 mV	20	320	0.20	300
CL201209T-33N□	0.033	20	50 MHz,200 mV	20	320	0.20	300
CL201209T-47N□	0.047	20	50 MHz,200 mV	20	320	0.20	300
CL201209T-56N□	0.056	20	50 MHz,200 mV	20	320	0.20	300

## Multilayer Chip Inductor / CL TYPE

### Electrical Characteristics ( CL201209 TYPE )

Part No.	Inductance ( $\mu$ H)	Tolerance ( $\pm$ %)	L,Q Test Freq. (MHz)	Q Min	SRF (MHz)Min.	DCR ( $\Omega$ ) Max	Rated Current (mA) Max
CL201209T-68N□	0.068	20	50 MHz,200 mV	20	280	0.20	300
CL201209T-82N□	0.082	20	50 MHz,200 mV	20	255	0.20	300
CL201209T-R10□	0.1	10, 20	25 MHz,200 mV	25	235	0.30	250
CL201209T-R12□	0.12	10, 20	25 MHz,200 mV	25	220	0.30	250
CL201209T-R15□	0.15	10, 20	25 MHz,200 mV	25	200	0.40	250
CL201209T-R18□	0.18	10, 20	25 MHz,200 mV	25	185	0.40	250
CL201209T-R22□	0.22	10, 20	25 MHz,200 mV	25	170	0.50	250
CL201209T-R27□	0.27	10, 20	25 MHz,200 mV	25	150	0.50	250
CL201209T-R33□	0.33	10, 20	25 MHz,200 mV	25	145	0.55	250
CL201209T-R39□	0.39	10, 20	25 MHz,200 mV	25	135	0.65	250
CL201209T-R47□	0.47	10, 20	25 MHz,200 mV	25	125	0.65	250
CL201209T-R56□	0.56	10, 20	25 MHz,200 mV	25	115	0.75	150
CL201209T-R68□	0.68	10, 20	25 MHz,200 mV	25	105	0.80	150
CL201209T-R82□	0.82	10, 20	25 MHz,200 mV	25	100	1.00	150
CL201209T-1R0□	1	10, 20	10 MHz,200 mV	45	75	0.40	50
CL201209T-1R2□	1.2	10, 20	10 MHz,200 mV	45	65	0.50	50
CL201209T-1R5□	1.5	10, 20	10 MHz,200 mV	45	60	0.50	50
CL201209T-1R8□	1.8	10, 20	10 MHz,200 mV	45	55	0.60	50
CL201209T-2R2□	2.2	10, 20	10 MHz,200 mV	45	50	0.65	30

### Electrical Characteristics ( CL201212 TYPE )

Part No.	Inductance ( $\mu$ H)	Tolerance ( $\pm$ %)	L,Q Test Freq. (MHz)	Q Min	SRF (MHz)Min.	DCR ( $\Omega$ ) Max	Rated Current (mA) Max
CL201212T-2R7□	2.7	10, 20	10 MHz,200 mV	45	45	0.75	30
CL201212T-3R3□	3.3	10, 20	10 MHz,200 mV	45	41	0.80	30
CL201212T-3R9□	3.9	10, 20	10 MHz,200 mV	45	38	0.90	30
CL201212T-4R7□	4.7	10, 20	10 MHz,200 mV	45	35	1.00	30
CL201212T-5R6□	5.6	10, 20	4 MHz,200 mV	45	32	0.90	15
CL201212T-6R8□	6.8	10, 20	4 MHz,200 mV	45	29	1.00	15
CL201212T-8R2□	8.2	10, 20	4 MHz,200 mV	45	26	1.10	15
CL201212T-100□	10	10, 20	2 MHz,60 mV	45	24	1.10	15
CL201212T-120□	12	10, 20	2 MHz,60 mV	45	22	1.20	15
CL201212T-150□	15	10, 20	1 MHz,60 mV	30	19	0.80	5
CL201212T-180□	18	10, 20	1 MHz,60 mV	30	18	0.90	5
CL201212T-220□	22	10, 20	1 MHz,60 mV	30	16	1.10	5

### Electrical Characteristics ( CL321611 TYPE )

Part No.	Inductance ( $\mu$ H)	Tolerance ( $\pm$ %)	L,Q Test Freq. (MHz)	Q Min	SRF (MHz)Min.	DCR ( $\Omega$ ) Max	Rated Current (mA) Max
CL321611T-47N□	0.047	20	50 MHz,200 mV	20	320	0.15	300
CL321611T-56N□	0.056	20	50 MHz,200 mV	20	280	0.25	300
CL321611T-68N□	0.068	20	50 MHz,200 mV	20	280	0.25	300

## Multilayer Chip Inductor / CL TYPE

### Electrical Characteristics ( CL321611 TYPE )

Part No.	Inductance ( $\mu$ H)	Tolerance ( $\pm$ %)	L,Q Test Freq. (MHz)	Q Min	SRF (MHz)Min.	DCR ( $\Omega$ ) Max	Rated Current (mA) Max
CL321611T-82N□	0.082	20	50 MHz,200 mV	20	250	0.25	300
CL321611T-R10□	0.1	10, 20	25 MHz,200 mV	25	235	0.25	250
CL321611T-R12□	0.12	10, 20	25 MHz,200 mV	25	220	0.30	250
CL321611T-R15□	0.15	10, 20	25 MHz,200 mV	25	200	0.30	250
CL321611T-R18□	0.18	10, 20	25 MHz,200 mV	25	185	0.40	250
CL321611T-R22□	0.22	10, 20	25 MHz,200 mV	25	170	0.40	250
CL321611T-R27□	0.27	10, 20	25 MHz,200 mV	25	150	0.50	250
CL321611T-R33□	0.33	10, 20	25 MHz,200 mV	25	145	0.60	250
CL321611T-R39□	0.39	10, 20	25 MHz,200 mV	25	135	0.50	200
CL321611T-R47□	0.47	10, 20	25 MHz,200 mV	25	125	0.60	200
CL321611T-R56□	0.56	10, 20	25 MHz,200 mV	25	115	0.70	150
CL321611T-R68□	0.68	10, 20	25 MHz,200 mV	25	105	0.80	150
CL321611T-R82□	0.82	10, 20	25 MHz,200 mV	25	100	0.90	150
CL321611T-1R0□	1	10, 20	10 MHz,200 mV	45	75	0.40	100
CL321611T-1R2□	1.2	10, 20	10 MHz,200 mV	45	65	0.50	100
CL321611T-1R5□	1.5	10, 20	10 MHz,200 mV	45	60	0.50	80
CL321611T-1R8□	1.8	10, 20	10 MHz,200 mV	45	55	0.50	70
CL321611T-2R2□	2.2	10, 20	10 MHz,200 mV	45	50	0.60	60
CL321611T-2R7□	2.7	10, 20	10 MHz,200 mV	45	45	0.60	60
CL321611T-3R3□	3.3	10, 20	10 MHz,200 mV	45	41	0.70	60
CL321611T-3R9□	3.9	10, 20	10 MHz,200 mV	45	38	0.80	50
CL321611T-4R7□	4.7	10, 20	10 MHz,200 mV	45	35	0.90	50
CL321611T-5R6□	5.6	10, 20	4 MHz,200 mV	45	32	0.70	25
CL321611T-6R8□	6.8	10, 20	4 MHz,200 mV	45	29	0.80	25
CL321611T-8R2□	8.2	10, 20	4 MHz,200 mV	45	26	0.90	25
CL321611T-100□	10	10, 20	2 MHz,60 mV	45	24	1.00	25

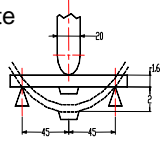
#### NOTE:

1. Operating temperature range  $-55^{\circ}\text{C} \sim 125^{\circ}\text{C}$
2. Rated Current : Applied the current to coils, the temperature rise shall not be more than  $30^{\circ}\text{C}$
3. □Tolerance : K=10% ; M=20%

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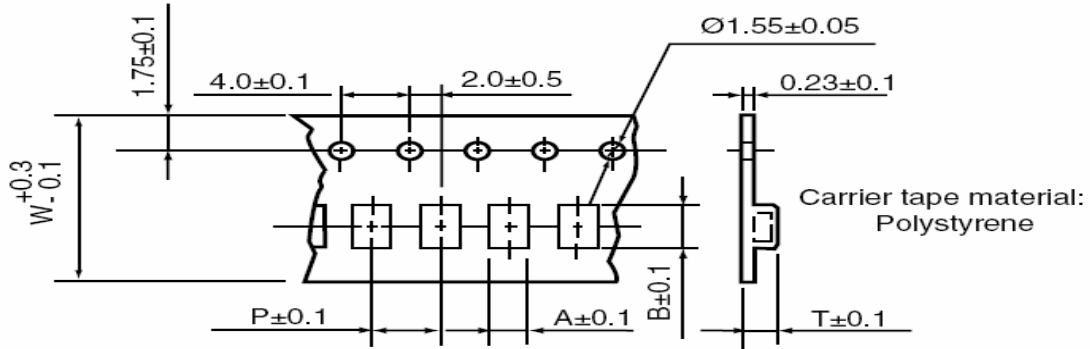
### 4. Reliability and Test Conditions(可靠性測試條件)

#### 1-1.Mechanical Performance

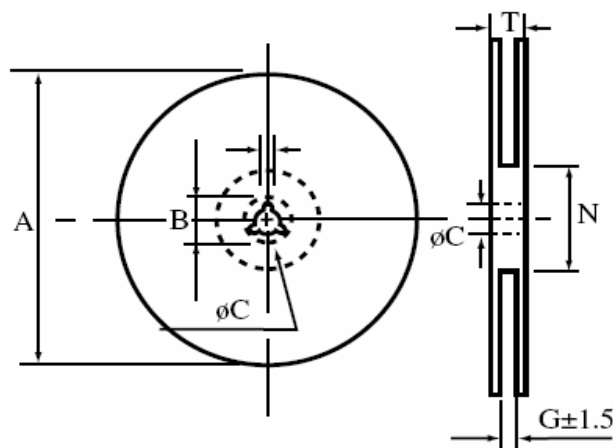
Item	Specification	Test Method															
Flexure Strength	The forces applied on the right conditions must not damage the terminal electrode and the ferrite	Test device shall be soldered on the substrate Substrate Dimension: 100x40x1.6mm Deflection: 2.0mm Keeping Time: 30sec *For 100505, substrate dimension is 100x40x0.8mm 															
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															
Resistance to Soldering Heat	Appearance: No damage More than 75% of the terminal electrode should be covered with solder. Inductance : within $\pm 30\%$ of initial value Q: within $\pm 30\%$ of initial value Inductance: within $\pm 20\%$ of initial value(160808T over 12uH)	Pre-heating: 150°C, 1min Solder Composition: Sn/Pb = 63/37 Solder Composition: Sn/Ag3.0/Cu0.5(Pb-Free) Solder Temperature: 260 $\pm$ 5°C Immersion Time: 10 $\pm$ 1sec															
Solder ability	The electrodes shall be at least 90% covered with new solder coating	Pre-heating: 150°C, 1min Solder Composition: Sn/Pb = 63/37 Solder Temperature: 220 $\pm$ 5°C Solder Composition: Sn/Ag3.0/Cu0.5(Pb-Free) Solder Temperature: 245 $\pm$ 5°C (Pb-Free) Immersion Time: 4 $\pm$ 1sec															
Temperature Cycle	Appearance: No damage Inductance: within $\pm 10\%$ of initial value Q change: within $\pm 30\%$ of initial value	One cycle: <table border="1" data-bbox="829 1321 1268 1512"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Time (min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-25<math>\pm</math>3</td> <td>30</td> </tr> <tr> <td>2</td> <td>25<math>\pm</math>2</td> <td>3</td> </tr> <tr> <td>3</td> <td>85<math>\pm</math>3</td> <td>30</td> </tr> <tr> <td>4</td> <td>25<math>\pm</math>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	-25 $\pm$ 3	30	2	25 $\pm$ 2	3	3	85 $\pm$ 3	30	4	25 $\pm$ 2	3
Step		Temperature (°C)	Time (min)														
1		-25 $\pm$ 3	30														
2		25 $\pm$ 2	3														
3		85 $\pm$ 3	30														
4	25 $\pm$ 2	3															
Humidity Resistance	Temperature: 40 $\pm$ 2°C Relative Humidity: 90 ~ 95% / Time: 1000hrs Measured after exposure in the room condition for 24hrs																
High Temperature Resistance	Temperature: 85 $\pm$ 3°C Relative Humidity: 20% Applied Current: Rated Current / Time: 1000hrs Measured after exposure in the room condition for 24hrs																
Low Temperature Resistance	Temperature: -25 $\pm$ 3°C Relative Humidity: 0% / Time: 1000hrs Measured after exposure in the room condition for 24hrs																

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### 4 .Packing Specifications



TYPE	Packaging Quantity		Tape Dimension				
	Pcs / Reel	Inner box	A	B	W	P	T
CL160808	4000	20000	1.05	1.85	8	4	0.95
CL201209	4000	20000	1.58	2.42	8	4	0.95
CL201212	3000	15000	1.35	2.25	8	4	0.22
CL321611	3000	10000	1.88	3.5	8	4	0.22



TYPE	Reel Dimension					
	A	B	C	G	N	T
8mm	$178 \pm 2$	$21.0 \pm 0.8$	$13.0 \pm 0.8$	10	75	12.5
12mm	$178 \pm 2$	$21.0 \pm 0.8$	$13.0 \pm 0.8$	14	75	16.5