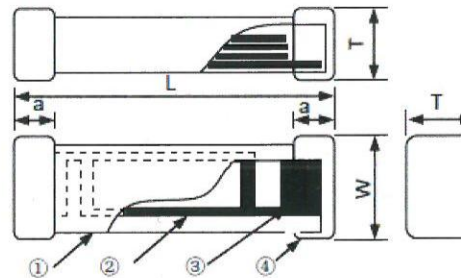
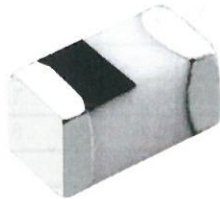


Automotive Grade Multilayer Chip Inductor — CL-SA Series

Construction



① Ceramic Material	③ Pull Out Electrode
② Internal Electrode	④ End-termination

Features

- Particular ceramic material and coil structure provide high frequency application range up to 10GHz
- Small size and low profile
- Available in various sizes
- Excellent solderability and heat resistance

Dimensions

Unit: mm

Type	Size (Inch)	L	W	T	a
CL01-SA	0201	0.60±0.03	0.30±0.03	0.30±0.03	0.10~0.20
CL02-SA	0402	1.00±0.10	0.50±0.10	0.50±0.10	0.10~0.30

Applications

- RF and Wireless Communication
- Information Technology Equipment Which Includes Computer
- Telecommunications, Rated Detectors, Automotive Electronics, Cellular Phones
- Pagers, Audio Equipment, PDAs, Keyless Remote System and Low-voltage Power Supply Modules.

Part Numbering

CL	02	J	T		1N0	-S	A
Product Type	Dimensions	Inductance Tolerance	Packaging Code	Appearance	Inductance	Special	Function Code
	01: 0201 02: 0402	B: ±0.1nH C: ±0.2nH S: ±0.3nH G: ±2% H: ±3% J: ±5%	T: Taping Reel	: Standard Q: High Q	0N3: 0.3nH 1N0: 1.0nH 10N: 10nH R10: 100nH		A: Automotive Grade

Standard Electrical Specifications

CL01-SA Multilayer Chip Inductors / Standard Type

Inductance (nH)	Tolerance	Quality Factor /min.	L/Q Freq. (MHz)	SRF min. (GHz)	RDC (Ω) max.	IDC (mA) max.
0.3	± 0.1 nH	4	100	10.00	0.07	850
0.4	± 0.1 nH	4	100	10.00	0.07	850
0.5	± 0.1 nH	4	100	10.00	0.08	800
0.6	± 0.1 nH	4	100	10.00	0.08	800
0.7	± 0.1 nH	4	100	10.00	0.09	750
0.8	± 0.1 nH	4	100	10.00	0.10	750
0.9	± 0.1 nH	4	100	10.00	0.10	750
1.0	$\pm 0.1, 0.2, 0.3$ nH	4	100	10.00	0.14	600
1.1	$\pm 0.1, 0.2, 0.3$ nH	4	100	10.00	0.14	600
1.2	$\pm 0.1, 0.2, 0.3$ nH	4	100	10.00	0.14	600
1.3	$\pm 0.1, 0.2, 0.3$ nH	4	100	10.00	0.14	600
1.4	$\pm 0.1, 0.2, 0.3$ nH	4	100	10.00	0.18	550
1.5	$\pm 0.1, 0.2, 0.3$ nH	4	100	10.00	0.18	550
1.6	$\pm 0.1, 0.2, 0.3$ nH	4	100	10.00	0.18	500
1.7	$\pm 0.1, 0.2, 0.3$ nH	4	100	10.00	0.19	500
1.8	$\pm 0.1, 0.2, 0.3$ nH	4	100	10.00	0.19	500
1.9	$\pm 0.1, 0.2, 0.3$ nH	4	100	10.00	0.20	450
2.0	$\pm 0.1, 0.2, 0.3$ nH	4	100	10.00	0.20	450
2.1	$\pm 0.1, 0.2, 0.3$ nH	4	100	10.00	0.20	450
2.2	$\pm 0.1, 0.2, 0.3$ nH	4	100	10.00	0.22	450
2.3	$\pm 0.1, 0.2, 0.3$ nH	4	100	10.00	0.22	450
2.4	$\pm 0.1, 0.2, 0.3$ nH	4	100	10.00	0.24	450
2.5	$\pm 0.1, 0.2, 0.3$ nH	4	100	10.00	0.24	450
2.6	$\pm 0.1, 0.2, 0.3$ nH	4	100	10.00	0.25	450
2.7	$\pm 0.1, 0.2, 0.3$ nH	5	100	10.00	0.25	450
2.9	$\pm 0.1, 0.2, 0.3$ nH	5	100	9.50	0.28	450
3.0	$\pm 0.1, 0.2, 0.3$ nH	5	100	9.50	0.28	450
3.1	$\pm 0.1, 0.2, 0.3$ nH	5	100	9.50	0.28	450
3.2	$\pm 0.1, 0.2, 0.3$ nH	5	100	9.50	0.30	450
3.3	$\pm 0.1, 0.2, 0.3$ nH	5	100	9.50	0.30	450
3.4	$\pm 0.1, 0.2, 0.3$ nH	5	100	8.00	0.30	400
3.5	$\pm 0.1, 0.2, 0.3$ nH	5	100	8.00	0.30	400
3.6	$\pm 0.1, 0.2, 0.3$ nH	5	100	8.00	0.30	400
3.7	$\pm 0.1, 0.2, 0.3$ nH	5	100	8.00	0.30	400
3.8	$\pm 0.1, 0.2, 0.3$ nH	5	100	6.50	0.30	400
3.9	$\pm 0.1, 0.2, 0.3$ nH	5	100	6.50	0.30	400
4.3	$\pm 0.1, 0.2, 0.3$ nH	5	100	6.50	0.40	350
4.7	$\pm 0.1, 0.2, 0.3$ nH	5	100	6.50	0.40	350
5.1	$\pm 0.1, 0.2, 0.3$ nH	5	100	6.50	0.40	350
5.6	$\pm 0.1, 0.2, 0.3$ nH	5	100	6.00	0.40	350
6.2	$\pm 0.1, 0.2, 0.3$ nH	5	100	6.00	0.44	300
6.8	$\pm 3, 5\%$	5	100	5.40	0.50	300
7.5	$\pm 3, 5\%$	5	100	4.80	0.53	300
8.2	$\pm 3, 5\%$	5	100	4.80	0.55	250
9.1	$\pm 3, 5\%$	5	100	4.50	0.62	250
10	$\pm 3, 5\%$	5	100	4.50	0.65	250
12	$\pm 3, 5\%$	5	100	3.70	0.70	250
15	$\pm 3, 5\%$	5	100	2.20	0.80	250
18	$\pm 3, 5\%$	5	100	2.20	0.90	200

■ Operating temperature range: -55~+125°C

Standard Electrical Specifications

CL02-SA Multilayer Chip Inductors / Standard Type

Inductance (nH)	Tolerance	Quality Factor /min.	L/Q Freq. (MHz)	SRF min. (GHz)	RDC (Ω) max.	IDC (mA) max.
0.3	± 0.1 nH	8	100	10.00	0.08	1000
0.4	± 0.1 nH	8	100	10.00	0.08	1000
0.5	± 0.1 nH	8	100	10.00	0.08	1000
0.6	± 0.1 nH	8	100	10.00	0.08	1000
0.7	± 0.1 nH	8	100	10.00	0.08	1000
0.8	± 0.1 nH	8	100	10.00	0.08	1000
1.0	$\pm 0.1, 0.2, 0.3$ nH	8	100	10.00	0.08	1000
1.1	$\pm 0.1, 0.2, 0.3$ nH	8	100	10.00	0.08	1000
1.2	$\pm 0.1, 0.2, 0.3$ nH	8	100	10.00	0.09	1000
1.3	$\pm 0.1, 0.2, 0.3$ nH	8	100	10.00	0.09	1000
1.5	$\pm 0.1, 0.2, 0.3$ nH	8	100	10.00	0.10	1000
1.6	$\pm 0.1, 0.2, 0.3$ nH	8	100	10.00	0.10	1000
1.8	$\pm 0.1, 0.2, 0.3$ nH	8	100	10.00	0.12	900
2.0	$\pm 0.1, 0.2, 0.3$ nH	8	100	10.00	0.12	900
2.2	$\pm 0.1, 0.2, 0.3$ nH	8	100	10.00	0.13	900
2.4	$\pm 0.1, 0.2, 0.3$ nH	8	100	10.00	0.13	800
2.7	$\pm 0.1, 0.2, 0.3$ nH	8	100	6.00	0.16	800
3.0	$\pm 0.1, 0.2, 0.3$ nH	8	100	6.00	0.16	800
3.3	$\pm 0.1, 0.2, 0.3$ nH	8	100	6.00	0.16	800
3.6	$\pm 0.1, 0.2, 0.3$ nH	8	100	6.00	0.20	700
3.9	$\pm 0.1, 0.2, 0.3$ nH	8	100	6.00	0.20	700
4.3	$\pm 0.1, 0.2, 0.3$ nH	8	100	6.00	0.20	700
4.7	$\pm 0.1, 0.2, 0.3$ nH	8	100	6.00	0.20	700
5.1	$\pm 0.1, 0.2, 0.3$ nH	8	100	5.30	0.23	600
5.6	$\pm 0.1, 0.2, 0.3$ nH	8	100	4.50	0.23	600
6.2	$\pm 0.1, 0.2, 0.3$ nH	8	100	4.50	0.25	600
6.8	$\pm 2, 3, 5\%$	8	100	4.50	0.25	600
7.5	$\pm 2, 3, 5\%$	8	100	4.20	0.28	500
8.2	$\pm 2, 3, 5\%$	8	100	3.70	0.28	500
9.1	$\pm 2, 3, 5\%$	8	100	3.40	0.30	500
10	$\pm 2, 3, 5\%$	8	100	3.40	0.30	500
12	$\pm 2, 3, 5\%$	8	100	3.00	0.45	400
15	$\pm 2, 3, 5\%$	8	100	2.50	0.55	400
18	$\pm 2, 3, 5\%$	8	100	2.20	0.65	300
22	$\pm 2, 3, 5\%$	8	100	1.90	0.70	300
27	$\pm 2, 3, 5\%$	8	100	1.70	0.80	300
33	$\pm 2, 3, 5\%$	8	100	1.60	0.90	200
39	$\pm 2, 3, 5\%$	8	100	1.20	1.00	200
47	$\pm 2, 3, 5\%$	8	100	1.10	1.10	200
56	$\pm 2, 3, 5\%$	8	100	1.00	1.10	200
68	$\pm 2, 3, 5\%$	8	100	0.80	1.20	200
82	$\pm 5\%$	8	100	0.60	1.30	200
100	$\pm 5\%$	8	100	0.60	1.60	200

Operating temperature range: $-55\sim+125^{\circ}\text{C}$

High Q Electrical Specifications

CL01-SA Multilayer Chip Inductors / High Q Type

Inductance (nH)	Tolerance	Quality Factor /min.	L/Q Freq. (MHz)	SRF min. (GHz)	RDC (Ω) max.	IDC (mA) max.
0.3	$\pm 0.1, 0.2nH$	11	100	18.00	0.07	850
0.4	$\pm 0.1, 0.2nH$	11	100	18.00	0.07	850
0.5	$\pm 0.1, 0.2nH$	11	100	18.00	0.08	850
0.6	$\pm 0.1, 0.2nH$	11	100	18.00	0.08	850
0.7	$\pm 0.1, 0.2nH$	12	100	18.00	0.09	750
0.8	$\pm 0.1, 0.2nH$	12	100	18.00	0.10	750
0.9	$\pm 0.1, 0.2nH$	12	100	18.00	0.12	700
1.0	$\pm 0.1, 0.2nH$	12	100	17.00	0.14	600
1.1	$\pm 0.1, 0.2nH$	12	100	17.00	0.14	600
1.2	$\pm 0.1, 0.2nH$	12	100	15.00	0.14	600
1.3	$\pm 0.1, 0.2nH$	12	100	15.00	0.15	600
1.4	$\pm 0.1, 0.2nH$	12	100	14.00	0.15	600
1.5	$\pm 0.1, 0.2nH$	12	100	13.50	0.15	600
1.6	$\pm 0.1, 0.2nH$	12	100	13.00	0.15	600
1.7	$\pm 0.1, 0.2nH$	12	100	12.50	0.19	500
1.8	$\pm 0.1, 0.2nH$	12	100	12.50	0.20	500
1.9	$\pm 0.1, 0.2nH$	12	100	12.50	0.20	450
2.0	$\pm 0.1, 0.2nH$	12	100	12.50	0.20	450
2.1	$\pm 0.1, 0.2nH$	12	100	12.00	0.22	450
2.2	$\pm 0.1, 0.2nH$	12	100	12.00	0.22	450
2.3	$\pm 0.1, 0.2nH$	12	100	11.50	0.24	450
2.4	$\pm 0.1, 0.2nH$	12	100	11.00	0.25	450
2.5	$\pm 0.1, 0.2nH$	12	100	11.00	0.25	450
2.6	$\pm 0.1, 0.2nH$	12	100	11.00	0.25	450
2.7	$\pm 0.1, 0.2nH$	12	100	11.00	0.25	450
2.8	$\pm 0.1, 0.2nH$	12	100	9.50	0.25	450
2.9	$\pm 0.1, 0.2nH$	12	100	9.50	0.25	450
3.0	$\pm 0.1, 0.2nH$	12	100	9.50	0.25	450
3.1	$\pm 0.1, 0.2nH$	12	100	9.50	0.30	450
3.2	$\pm 0.1, 0.2nH$	12	100	9.50	0.30	450
3.3	$\pm 0.1, 0.2nH$	12	100	9.50	0.30	400
3.4	$\pm 0.1, 0.2nH$	12	100	8.00	0.30	400
3.5	$\pm 0.1, 0.2nH$	12	100	8.00	0.30	400
3.6	$\pm 0.1, 0.2nH$	12	100	8.00	0.30	400
3.7	$\pm 0.1, 0.2nH$	12	100	7.00	0.30	400
3.8	$\pm 0.1, 0.2nH$	12	100	7.00	0.35	350
3.9	$\pm 0.1, 0.2nH$	12	100	6.50	0.35	350
4.3	$\pm 3, 5\%$	12	100	6.50	0.40	350
4.7	$\pm 3, 5\%$	12	100	6.50	0.40	350
5.1	$\pm 3, 5\%$	12	100	6.50	0.40	350
5.6	$\pm 3, 5\%$	12	100	6.00	0.44	300
6.2	$\pm 3, 5\%$	12	100	6.00	0.50	300
6.8	$\pm 3, 5\%$	12	100	5.40	0.53	300
7.5	$\pm 3, 5\%$	12	100	4.80	0.55	250
8.2	$\pm 3, 5\%$	12	100	4.80	0.62	250
9.1	$\pm 3, 5\%$	12	100	4.50	0.65	250
10	$\pm 3, 5\%$	11	100	4.00	0.70	250
12	$\pm 3, 5\%$	11	100	3.70	0.75	250
15	$\pm 3, 5\%$	11	100	3.10	0.85	250
18	$\pm 3, 5\%$	11	100	2.80	1.00	200

Operating temperature range: $-55\sim+125^{\circ}C$

■ Environmental Characteristics

Item	Requirement	Test Condition									
High Temperature Expose (Storage)	Appearance: No damage Inductance: Within $\pm 10\%$ of initial value Q: Within $\pm 20\%$ of initial value	at $+125 \pm 5^\circ\text{C}$ for 1000 hrs Measurement at 24 ± 4 hrs after test conclusion									
Temperature Cycle	Appearance: No damage Inductance: Within $\pm 10\%$ of initial value Q: Within $\pm 20\%$ of initial value	-55°C to $+125^\circ\text{C}$, 1000 cycles Dwell time: 30 min Transition times ≤ 1 min									
Biased Humidity	Appearance: No damage Inductance: Within $\pm 10\%$ of initial value Q: Within $\pm 20\%$ of initial value	1000 hrs $85 \pm 2^\circ\text{C}/85\% \text{RH}$, full rated current Measurement at 24 ± 4 hrs after test conclusion									
Operational Life	Appearance: No damage Inductance: Within $\pm 10\%$ of initial value Q: Within $\pm 20\%$ of initial value	1000 hrs @ $125 \pm 5^\circ\text{C}$, full rated current Measurement at 24 ± 4 hrs after test conclusion									
Mechanical Shock	Appearance: No damage Inductance: Within $\pm 10\%$ of initial value Q: Within $\pm 20\%$ of initial value	Condition F: 1500g's / 0.5ms / Half sine									
Vibration Test	Appearance: No damage Inductance: Within $\pm 10\%$ of initial value Q: Within $\pm 20\%$ of initial value	5g's for 20min, 12cycles each of 3 orientations Test form 10-2000Hz., 12cycles each of 3 orientations									
Solderability	More than 95% of terminal electrode should be Covered with new solder Appearance: No damage	$235 \pm 5^\circ\text{C}$ for 5 ± 1 seconds									
Resistance to Soldering Heat	More than 95% of terminal electrode should be Covered with new solder Appearance: No damage Inductance: Within $\pm 10\%$ of initial value Q: Within $\pm 20\%$ of initial value	$265 \pm 5^\circ\text{C}$ for 10 ± 1 seconds									
Board Flex	Appearance: No damage	Epoxy-PCB(1.6mm) Deflection 2mm(min) 60s minimum holding time									
Terminal Strength	Appearance: No damage	<table border="1"> <thead> <tr> <th>Size</th> <th>Apply Force(F)</th> <th>Test Time</th> </tr> </thead> <tbody> <tr> <td>0201</td> <td>2N</td> <td>10 ± 1 sec</td> </tr> <tr> <td>0402</td> <td>5N</td> <td>10 ± 1 sec</td> </tr> </tbody> </table>	Size	Apply Force(F)	Test Time	0201	2N	10 ± 1 sec	0402	5N	10 ± 1 sec
Size	Apply Force(F)	Test Time									
0201	2N	10 ± 1 sec									
0402	5N	10 ± 1 sec									
ESD	Appearance: No damage Inductance: Within $\pm 10\%$ of initial value Q: Within $\pm 20\%$ of initial value	Classification levels 1C									

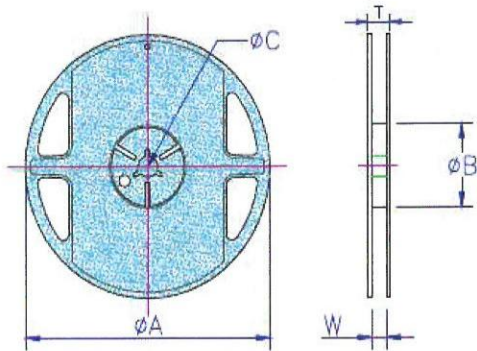
■ Reference Standards: AEC-Q200

■ Storage Temperature: $15 \sim 28^\circ\text{C}$; Humidity < 80%RH

■ Packaging Specifications

Reel Dimension

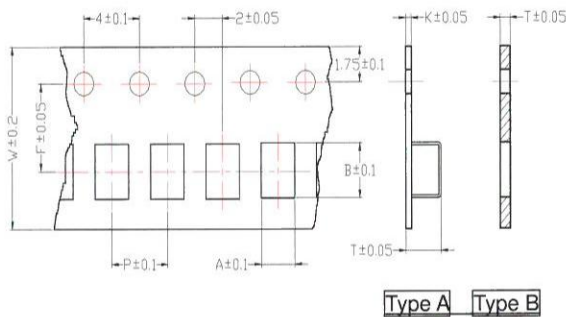
Unit: mm



Type	A	B	C	W	T	Quantity (EA)
CL01-SA	178±1	60.0±0.5	13.0±0.20	9.00±0.5	12.0±0.15	15,000
CL02-SA	178±1	60.0±0.5	13.0±0.20	9.00±0.5	12.0±0.15	10,000

Tape Specifications

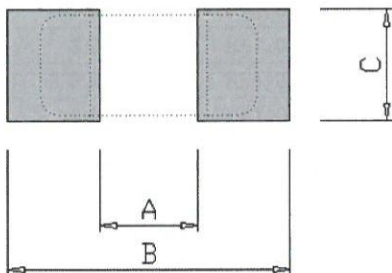
Unit: mm



Type	A	B	T	W	P	F	K	Tape
CL01-SA	0.36	0.66	0.42	8	2	3.5	-	B
CL02-SA	0.60	1.12	0.60	8	2	3.5	-	B

■ Recommend Land Pattern

Unit: mm



Type	A	B	C
CL01-SA	0.20-0.30	0.80-0.90	0.20-0.30
CL02-SA	0.40	1.40-1.50	0.50-0.60