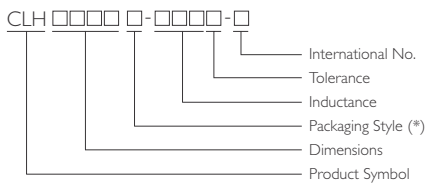


Multilayer Chip Inductors High Frequency

CLH Series



PRODUCT IDENTIFICATION



* B: Bulk ; T: Tape and Reel

APPLICATIONS

RF Resonance and Impedance Matching Circuit

RF and Wireless Communication

Information Technology Equipments, Computers, Telecommunications, Radar Detectors, Automotive Electronics, Cellular Phones, Pagers, PDAs, Keyless Remote Systems.

Use in L-C Filter Configurations

OUTLINE

Yageo high frequency multilayer ceramic chip inductor is formed without wound wire.

Monolithic laminated structure.

FEATURES

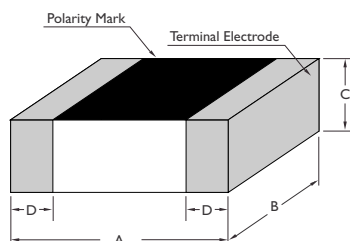
Excellent Q Factor and SRF Characteristic

Cost Effective

Small size of 1005/1608 is suitable for small portable equipment.

Supports Operating Frequency Bands up to 6GHz with Nominal Inductance Values from 1.0nH To 470nH

SHAPES AND DIMENSIONS



Dimensions : mm

TYPE	INDUCTANCE RANGE	A	B	C	D
CLH1005	All	1.00 ± 0.10	0.50 ± 0.10	0.50 ± 0.10	0.25 ± 0.10
CLH1608	All	1.60 ± 0.15	0.80 ± 0.15	0.80 ± 0.15	0.30 ± 0.20
CLH2012	< 180nH	2.00 ± 0.20	1.25 ± 0.20	0.90 ± 0.20	0.50 ± 0.30
	$\geq 180\text{nH}$	2.00 ± 0.20	1.25 ± 0.20	1.20 ± 0.30	0.50 ± 0.30



ELECTRICAL CHARACTERISTICS CLH1005T (0402) SERIES

PART NO.	INDUCTANCE at 100MHz (nH)	TOLERANCE	Q Min. at 100MHz	Q TYPICAL		SRF (MHz) Min.	DC RESISTANCE (Ω) Max.	RATED CURRENT (mA) Max.
				at 100MHz	at 800MHz			
CLH1005T-1N0□-S	1.0	S	8	9	28	10,000	0.10	300
CLH1005T-1N2□-S	1.2	S	8	9	28	10,000	0.10	300
CLH1005T-1N5□-S	1.5	S	8	10	28	9,000	0.10	300
CLH1005T-1N8□-S	1.8	S	8	10	28	8,700	0.10	300
CLH1005T-2N2□-S	2.2	S	8	10	29	8,100	0.12	300
CLH1005T-2N7□-S	2.7	S	8	11	30	7,700	0.12	300
CLH1005T-3N3□-S	3.3	S, K	8	11	30	6,300	0.15	300
CLH1005T-3N9□-S	3.9	S, K	8	11	31	6,100	0.15	300
CLH1005T-4N7□-S	4.7	S, K	8	11	31	5,400	0.18	300
CLH1005T-5N6□-S	5.6	S, K	8	11	31	5,100	0.20	300
CLH1005T-6N8□-S	6.8	J, K	8	11	33	4,550	0.25	300
CLH1005T-8N2□-S	8.2	J, K	8	12	32	4,100	0.25	300
CLH1005T-10N□-S	10	J, K	8	12	32	3,900	0.30	300
CLH1005T-12N□-S	12	J, K	8	12	31	3,000	0.30	300
CLH1005T-15N□-S	15	J, K	8	12	30	2,600	0.40	300
CLH1005T-18N□-S	18	J, K	8	12	29	2,350	0.50	300
CLH1005T-22N□-S	22	J, K	8	12	28	2,000	0.60	300
CLH1005T-27N□-S	27	J, K	8	12	27	1,900	1.00	300
CLH1005T-33N□-S	33	J, K	8	10	25	1,700	1.50	200
CLH1005T-39N□-S	39	J, K	8	10	25	1,600	1.80	200
CLH1005T-47N□-S	47	J, K	8	9	22	1300	2.00	200
CLH1005T-56N□-S	56	J, K	8	10	21	1250	2.00	200
CLH1005T-68N□-S	68	J, K	8	10	15	1000	2.20	100
CLH1005T-82N□-S	82	J, K	8	9	13	900	2.50	100
CLH1005T-R10□-S	100	J, K	8	9	10	850	2.50	100

Note : Tolerance : □ – S = $\pm 0.3\text{nH}$ J = $\pm 5\%$

K = $\pm 10\%$

Test Conditions : L/Q – Agilent E4991A

Fixture – Agilent 16197A

SRF – HP8753D

RDC – HP4338B



ELECTRICAL CHARACTERISTICS CLH1608T (0603) SERIES

PART NO.	INDUCTANCE at 100MHz (nH)	TOLERANCE	Q Min. at 100MHz	Q TYPICAL		SRF (MHz) Min.	DC RESISTANCE (Ω) Max.	RATED CURRENT (mA) Max.
				at 100MHz	at 800MHz			
CLH1608T-1N0□-S	1.0	S	10	12	60	10,000	0.10	500
CLH1608T-1N2□-S	1.2	S	10	13	60	10,000	0.10	500
CLH1608T-1N5□-S	1.5	S	10	13	57	8,000	0.10	500
CLH1608T-1N8□-S	1.8	S	10	13	51	8,000	0.10	500
CLH1608T-2N2□-S	2.2	S	11	13	46	7,200	0.10	500
CLH1608T-2N7□-S	2.7	S	11	13	46	6,200	0.10	500
CLH1608T-3N3□-S	3.3	S, K	11	13	47	5,200	0.12	500
CLH1608T-3N9□-S	3.9	S, K	11	13	47	5,000	0.14	500
CLH1608T-4N7□-S	4.7	S, K	11	13	41	4,750	0.16	500
CLH1608T-5N6□-S	5.6	S, K	11	13	41	4,100	0.18	500
CLH1608T-6N8□-S	6.8	J, K	11	13	44	3750	0.22	500
CLH1608T-8N2□-S	8.2	J, K	11	13	44	3300	0.24	500
CLH1608T-10N□-S	10	J, K	11	13	45	3,000	0.26	400
CLH1608T-12N□-S	12	J, K	13	15	46	2,600	0.28	400
CLH1608T-15N□-S	15	J, K	13	15	48	2,500	0.32	400
CLH1608T-18N□-S	18	J, K	13	15	48	2,400	0.35	400
CLH1608T-22N□-S	22	J, K	15	17	45	2,000	0.40	400
CLH1608T-27N□-S	27	J, K	15	17	43	1,900	0.45	400
CLH1608T-33N□-S	33	J, K	15	18	39	1,600	0.55	400
CLH1608T-39N□-S	39	J, K	15	18	37 *	1400	0.60	300
CLH1608T-47N□-S	47	J, K	15	18	35 *	1,300	0.70	300
CLH1608T-56N□-S	56	J, K	15	18	32 *	1100	0.75	300
CLH1608T-68N□-S	68	J, K	15	18	34 *	1050	0.85	300
CLH1608T-82N□-S	82	J, K	15	18	32 *	900	1.00	300
CLH1608T-R10□-S	100	J, K	15	18	20 *	770	1.20	300
CLH1608T-R12□-S	120 ***	J, K	8 ***	16 ***	23 **	680	1.60	250
CLH1608T-R15□-S	150 ***	J, K	8 ***	14 ***	23 **	550	2.00	250
CLH1608T-R18□-S	180 ***	J, K	8 ***	14 ***	21 **	540	2.40	200

Note : *** at 50MHz ** at 300MHz * at 500MHz

Tolerance : □ – S = ±0.3nH J = ±5% K = ±10%

Test Conditions : L/Q – Agilent E4991A Fixture – Agilent 16197A

SRF – HP8753D

RDC – HP4338B



ELECTRICAL CHARACTERISTICS CLH2012T (0805) SERIES

PART NO.	INDUCTANCE at 100MHz (nH)	TOLERANCE	Q Min. at 100MHz	Q TYPICAL		SRF (MHz) Min.	DC RESISTANCE (Ω) Max.	RATED CURRENT (mA) Max.
				at 100MHz	at 800MHz			
CLH2012T-1N0□-S	1.0	S	11	13	40	> 6000	0.10	500
CLH2012T-1N2□-S	1.2	S	11	13	40	> 6000	1.10	500
CLH2012T-1N5□-S	1.5	S	11	13	40	> 6000	0.10	500
CLH2012T-1N8□-S	1.8	S	11	13	45	> 6000	0.10	500
CLH2012T-2N2□-S	2.2	S	11	13	48	> 6000	0.10	500
CLH2012T-2N7□-S	2.7	S	11	13	48	> 6000	0.10	500
CLH2012T-3N3□-S	3.3	S, K	13	15	56	> 6000	0.13	500
CLH2012T-3N9□-S	3.9	S, K	13	15	54	5400	0.15	500
CLH2012T-4N7□-S	4.7	S, K	13	15	50	4500	0.20	500
CLH2012T-5N6□-S	5.6	S, K	13	15	53	4000	0.23	500
CLH2012T-6N8□-S	6.8	J, K	13	15	51	3650	0.25	500
CLH2012T-8N2□-S	8.2	J, K	13	15	53	3000	0.28	500
CLH2012T-10N□-S	10	J, K	14	16	45	2500	0.30	500
CLH2012T-12N□-S	12	J, K	14	16	48	2450	0.35	400
CLH2012T-15N□-S	15	J, K	15	17	48	2000	0.40	400
CLH2012T-18N□-S	18	J, K	15	17	43	1750	0.45	400
CLH2012T-22N□-S	22	J, K	15	17	47	1700	0.50	400
CLH2012T-27N□-S	27	J, K	16	18	38	1550	0.55	400
CLH2012T-33N□-S	33	J, K	17	19	35	1350	0.60	400
CLH2012T-39N□-S	39	J, K	19	21	40	1300	0.65	400
CLH2012T-47N□-S	47	J, K	19	21	38	1200	0.70	400
CLH2012T-56N□-S	56	J, K	18	21	31	1150	0.75	400
CLH2012T-68N□-S	68	J, K	19	21	28	1000	0.80	400
CLH2012T-82N□-S	82	J, K	20	22	16	850	0.90	400
CLH2012T-R10□-S	100	J, K	21	23		730	1.00	400
CLH2012T-R12□-S	120 *	J, K	13 *	22		650	1.20	300
CLH2012T-R15□-S	150 *	J, K	13 *	22		550	1.40	300
CLH2012T-R18□-S	180 *	J, K	13 *	23		500	1.80	300
CLH2012T-R22□-S	220 *	J, K	12 *	20		450	2.00	300
CLH2012T-R27□-S	270 *	J, K	12 *	20		400	2.50	300
CLH2012T-R33□-S	330 *	J, K	12 *	22		380	3.00	300

Note : * at 50MHz

Tolerance : □ – S = $\pm 0.3\text{nH}$ J = $\pm 5\%$

K = $\pm 10\%$

Test Conditions : L/Q – Agilent E4991A

Fixture – Agilent 16197A

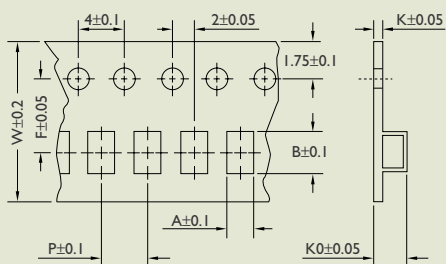
SRF – HP8753D

RDC – HP4338B



TAPE DIMENSIONS

Dimensions : mm



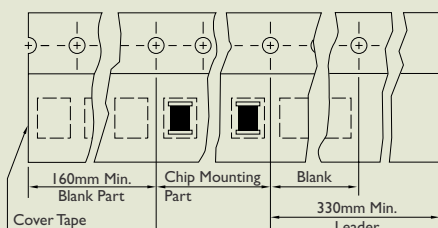
TYPE		A	B	K0	W	P	F	K
CLH1005		0.65	1.15	0.6	8	2	3.5	0.6
CLH1608		1.1	1.9	0.95	8	4	3.5	0.95
CLH2012	< 180nH	1.42	2.25	1.04	8	4	3.5	0.22
	≥ 180nH	1.42	2.25	1.4	8	4	3.5	0.22

TAPE MATERIAL

Carrier Tape : Polystyrene for 201209, 201212

Paper for 160808, 100505

Cover Type : Polyethyene

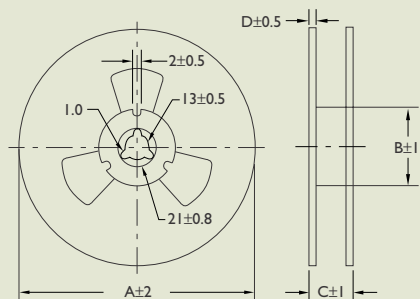


PACKAGING QUANTITY

TYPE	BULK	QUANTITY/REEL
CLH100505	√	10000
CLH160808	√	4000
CLH201209	√	4000
CLH201212	√	3000

REEL DIMENSIONS

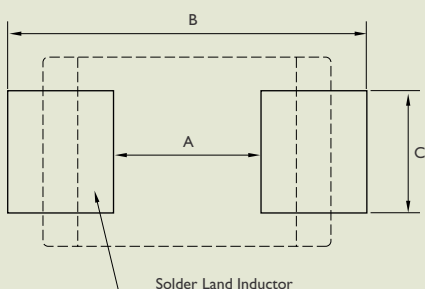
Dimensions : mm



TYPE		A	B	C	D
CLH1005		178	60	12	1.5
CLH1608		178	60	12	1.5
CLH2012	09	178	60	12	1.5
	12	178	60	12	1.5

RECOMMENDED PATTERN

Dimensions : mm

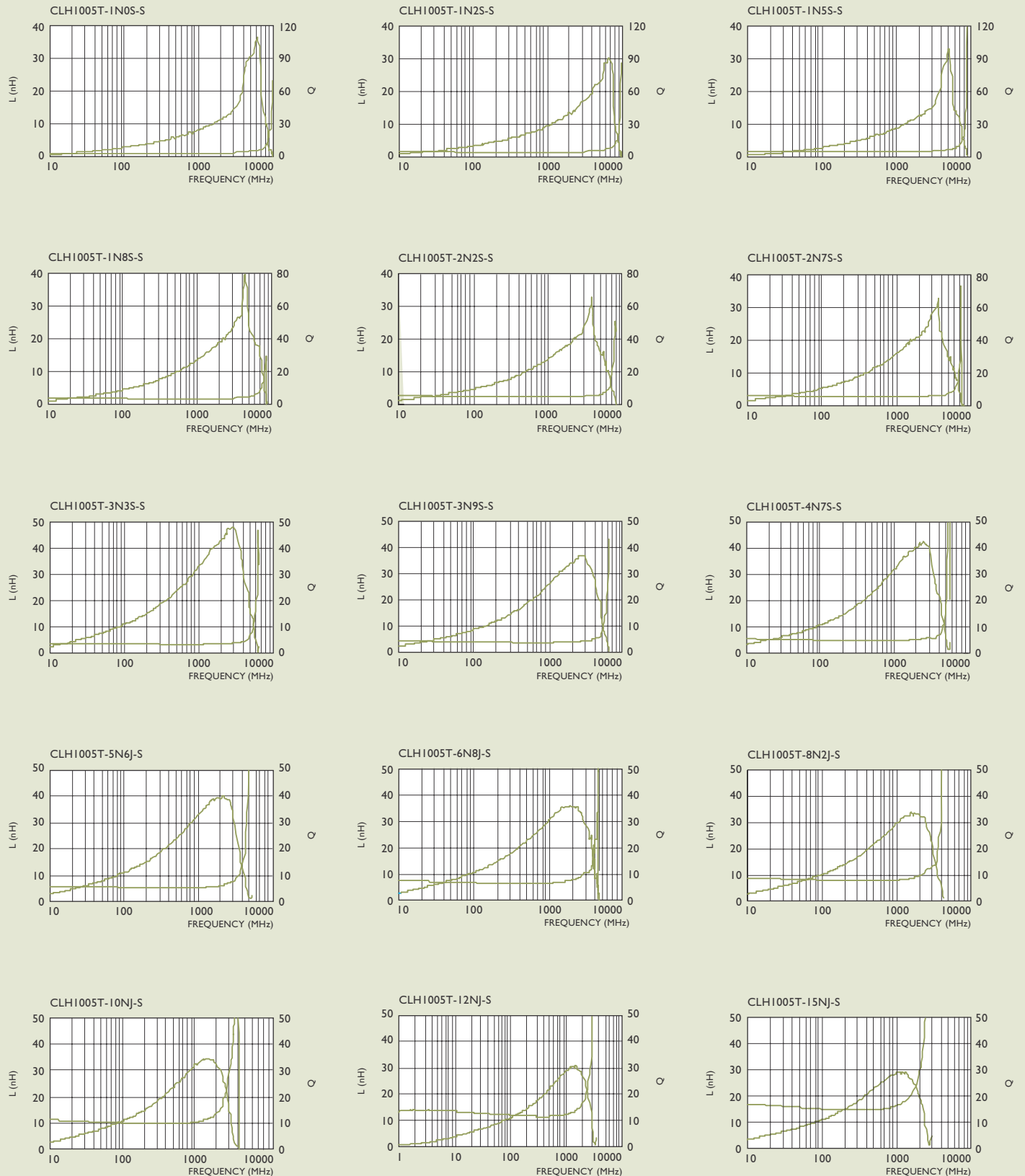


TYPE		A	B	C
CLH1005		0.4	1.2 ~ 1.4	0.4
CLH1608		0.8	2.4 ~ 3.4	0.6
CLH2012	09	1.2	3.0 ~ 4.0	1.0
	12	1.2	3.0 ~ 4.0	1.0



TYPICAL ELECTRICAL CHARACTERISTICS

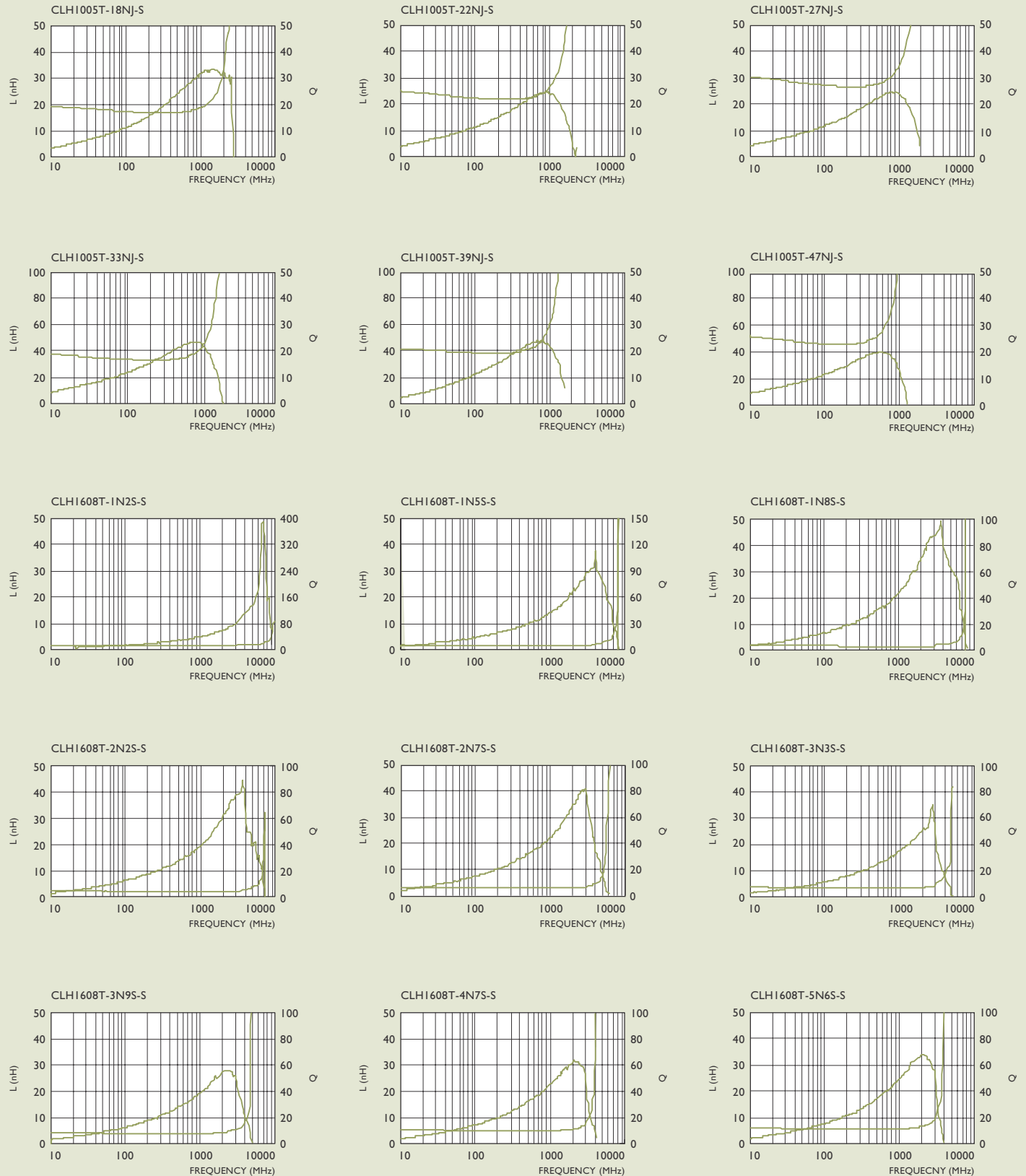
Test Instruments : HP4291A Impedance / Material Analyzer





TYPICAL ELECTRICAL CHARACTERISTICS

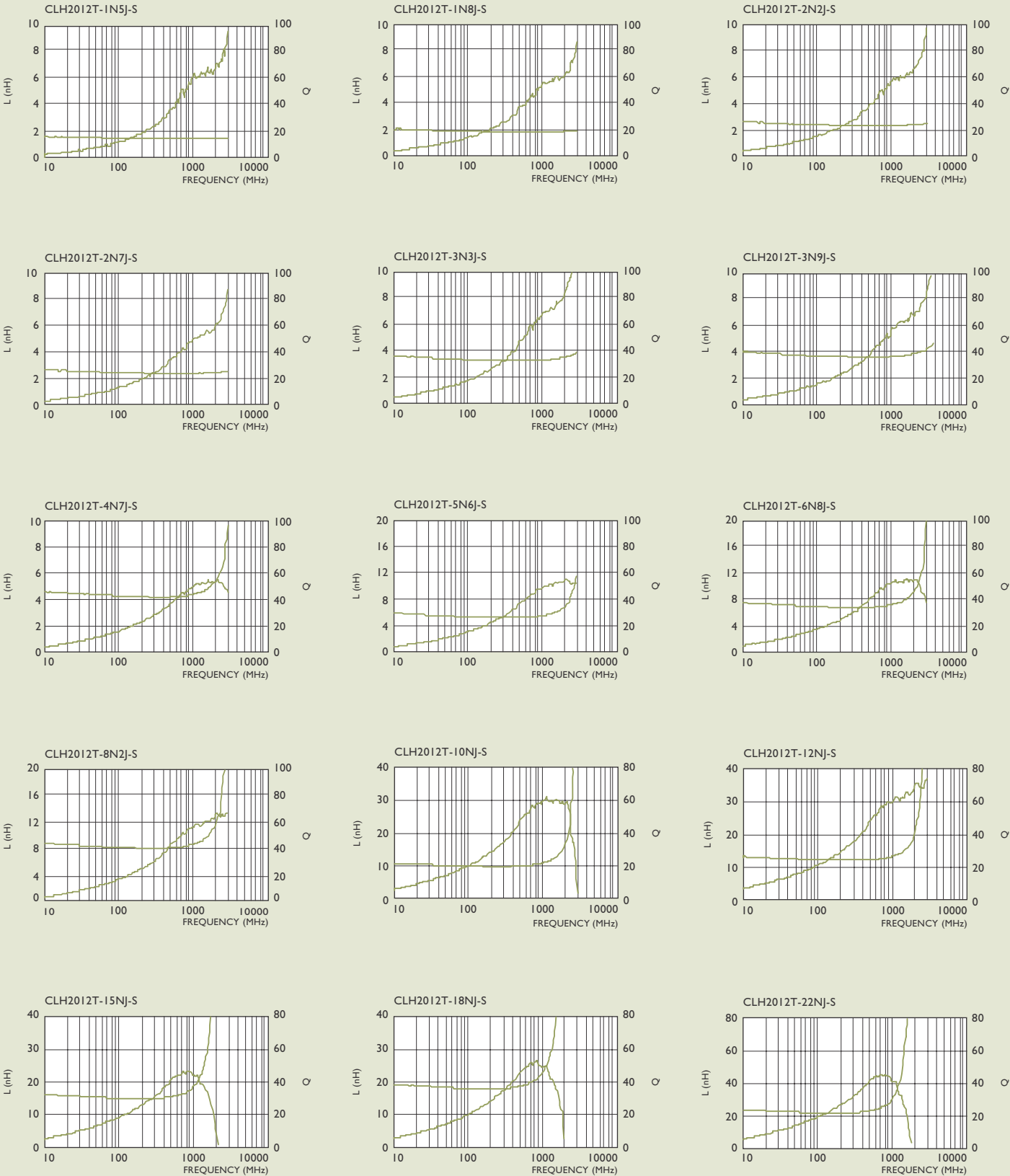
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TYPICAL ELECTRICAL CHARACTERISTICS

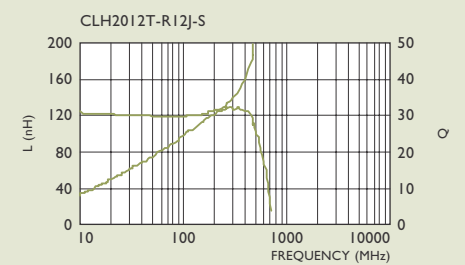
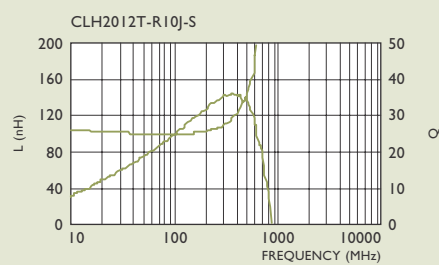
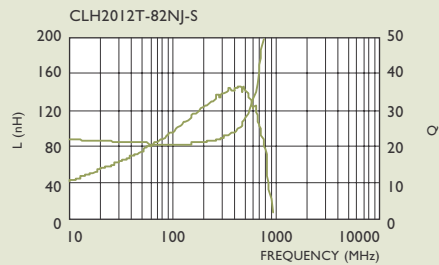
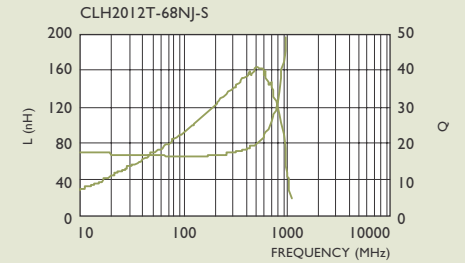
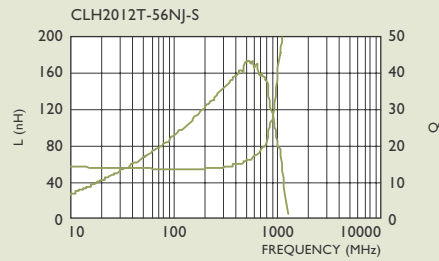
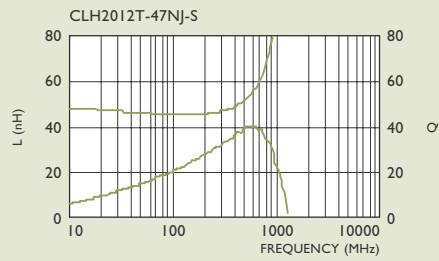
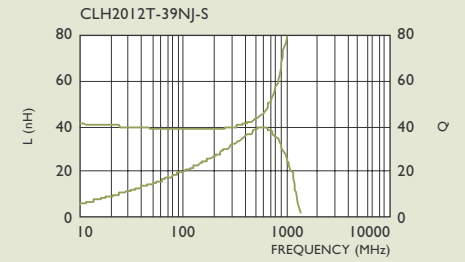
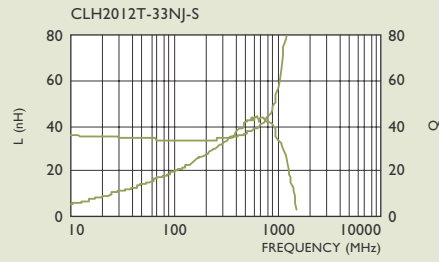
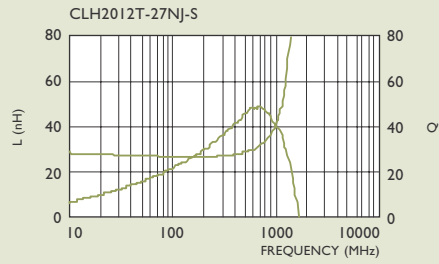
Test Instruments : HP4291A Impedance / Material Analyzer





TYPICAL ELECTRICAL CHARACTERISTICS

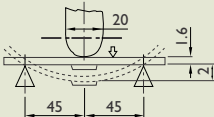
Test Instruments : HP4291A Impedance / Material Analyzer





CLH SERIES RELIABILITY TEST

I-1 MECHANICAL PERFORMANCE

NO.	ITEM	SPECIFICATION	TEST CONDITIONS
I-1-1	Flexure Strength	Appearance : No Damage L Change : within $\pm 10\%$ Q Change : within $\pm 30\%$	Test device shall be soldered on the substrate. Substrate Dimension : $100 \times 40 \times 1.6\text{mm}$ Deflection : 2.0mm Keeping Time : 30Sec.  * For 100505, substrate dimension is $100 \times 40 \times 0.8\text{mm}$.
I-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.
I-1-3	Resistance to Soldering Heat	Appearance : No Damage	Pre-heating : 150°C , 1Min. Solder Composition : Sn/Pb = 63/37 Solder Temperature : $260 \pm 5^\circ\text{C}$ Immersion Time : $10 \pm 1\text{Sec.}$
I-1-4	Solderability	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 : $230 \pm 5^\circ\text{C}$ Immersion Time : $4 \pm 1\text{Sec.}$

I-2 ENVIRONMENTAL PERFORMANCE

NO.	ITEM	SPECIFICATION	TEST CONDITIONS															
I-2-1	Temperature Cycle	Appearance : No Damage L Change : within ± 10% Q Change : within ± 30%	One Cycle <table><tr><th>Step</th><th>Temperature (°C)</th><th>Time (Min.)</th></tr><tr><td>1</td><td>-25 ± 3</td><td>30</td></tr><tr><td>2</td><td>25 ± 2</td><td>3</td></tr><tr><td>3</td><td>85 ± 3</td><td>30</td></tr><tr><td>4</td><td>25 ± 2</td><td>3</td></tr></table> Total : 100 Cycles Measured after Exposure in the Room Condition for 24Hrs.	Step	Temperature (°C)	Time (Min.)	1	-25 ± 3	30	2	25 ± 2	3	3	85 ± 3	30	4	25 ± 2	3
Step	Temperature (°C)	Time (Min.)																
1	-25 ± 3	30																
2	25 ± 2	3																
3	85 ± 3	30																
4	25 ± 2	3																
I-2-2	Humidity Resistance		Temperature : 40 ± 2°C Relative Humidity : 90 ~ 95% Time : 1000Hrs. Measured after Exposure in the Room Condition for 24Hrs.															
I-2-3	High Temperature Resistance		Temperature : 85 ± 3°C Relative Humidity : 20% Applied Current : Rated Current Time : 1000Hrs. Measured after Exposure in the Room Condition for 24Hrs.															
I-2-4	Low Temperature Resistance		Temperature : -25 ± 3°C Relative Humidity : 0% Time : 1000Hrs. Measured after Exposure in the Room Condition for 24Hrs.															