



Chip Inductor (CIL Series)



As it has ferrite body and 100 % Ag internal conductor, the CIL series Inductors have excellent Q characteristics and free of cross talk.

General Features

- Magnetic shielding eliminates crosstalk, thus permitting higher mounting density.
- Excellent solderability and high heat resistance for either flow or reflow soldering.
- Monolithic structure for high reliability.

Applications

- Resonance circuits, PLL circuits, noise suppression etc.

Part Numbering

<u>CI</u>	<u>L</u>	<u>10</u>	<u>J</u>	<u>1R5</u>	<u>K</u>	<u>N</u>	<u>C</u>
①	②	③	④	⑤	⑥	⑦	⑧

① SAMSUNG MULTILAYER CHIP INDUCTOR/BEADS

② SERIES CODE

CODE	DESCRIPTION OF CODE
L	Chip Inductor for Low frequency
H	Chip Inductor for High frequency



③ DIMENSION

CODE	DIMENSION(L×T)
05	1.0×0.5
10	1.6×0.8
21	2.0×1.25
31	3.2×1.6

④ MATERIAL CODE

CODE	DESCRIPTION OF CODE	APPLICATION
N	Characteristics of Ferrite materials	CIL series
J		
Y		
S		
T	Characteristics of Dielectric glass powder	CIH series

⑤ NOMINAL INDUCTANCE

The nominal inductance value is expressed in micro-Henry(μ H) or nano-Henry(nH) and identified by three-digit number, first two digits represent significant figures and last digit specifies the number of zeros to follow. The letter 'R' means the μ H and is used as the decimal point. The letter 'N' means the nH.

example)

100	:	10	×	10 ⁰	=	10 μ H
1R5	:	1.5				μ H
R10	:	0.1			=	100 nH
4N7	:	4.7				nH



⑥ INDUCTANCE TOLERANCE

CODE	DESCRIPTION OF CODE	CODE	DESCRIPTION OF CODE
S	$\pm 0.3 \text{ nH}$	J	$\pm 5\%$
K	$\pm 10\%$	M	$\pm 20\%$

⑦ THICKNESS OPTION

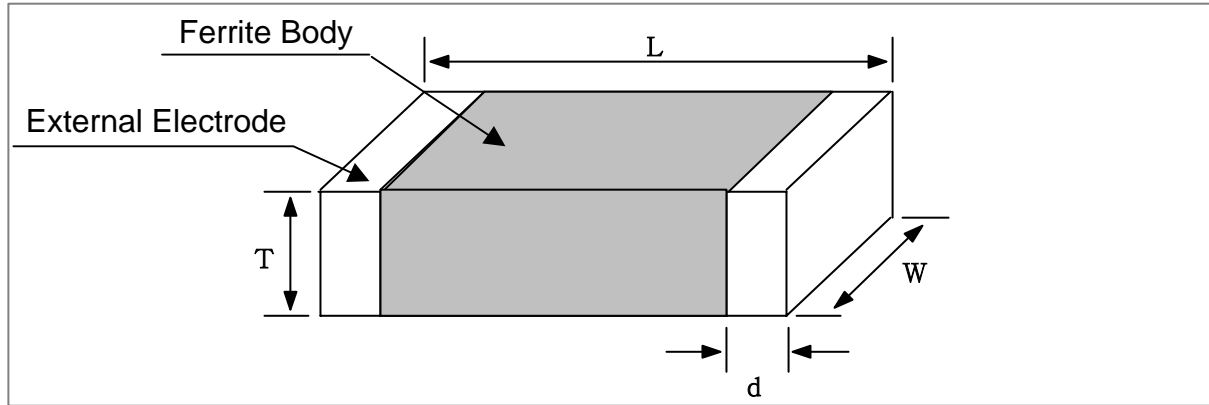
CODE	DESCRIPTION OF CODE
N	Standard thickness
A	Thinner than standard thickness
B	Thicker than standard thickness

⑧ PACKAGE TYPE

CODE	DESCRIPTION OF CODE
C	Paper taping type
E	Embossed (Plastic) taping type



APPEARANCE AND DIMENSION



CODE	EIA CODE	DIMENSION (mm)			
		L	W	T	d
10	0603	1.6 ± 0.15	0.8 ± 0.15	0.8 ± 0.15	0.3 ± 0.2
21	0805	2.0 ± 0.2	1.25 ± 0.2	0.85 ± 0.2 1.25 ± 0.2	0.5+0.2/-0.3
31	1206	3.2 ± 0.2	1.6 ± 0.2	0.6 ± 0.2 1.1 ± 0.2	0.5+0.2/-0.3

CIL Series


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CHARACTERISTIC LINE UP

● CIL 1608(0603) Type

Part No (1608 type)	Product's thickness (mm)	Inductance (μ H)	Q min	L,Q test frequency (MHz)	Self-resonant Frequency (MHz) min.	DC resistance (Ω),max	Rated Current (mA),max
CIL 10N 47N□	0.80 ± 0.15	0.047±20%,10%	10	50	260	0.3	50
CIL 10N 68N□	0.80 ± 0.15	0.068±20%,10%	10	50	250	0.3	50
CIL 10N 82N□	0.80 ± 0.15	0.082±20%,10%	10	50	245	0.3	50
CIL 10N R10□	0.80 ± 0.15	0.10±20%,10%	15	25	240	0.5	25
CIL 10N R12□	0.80 ± 0.15	0.12±20%,10%	15	25	205	0.5	25
CIL 10N R15□	0.80 ± 0.15	0.15±20%,10%	15	25	180	0.6	25
CIL 10N R18□	0.80 ± 0.15	0.18±20%,10%	15	25	165	0.6	25
CIL 10N R22□	0.80 ± 0.15	0.22±20%,10%	15	25	150	0.8	25
CIL 10N R27□	0.80 ± 0.15	0.27±20%,10%	15	25	136	0.8	25
CIL 10N R33□	0.80 ± 0.15	0.33±20%,10%	15	25	125	0.85	25
CIL 10N R39□	0.80 ± 0.15	0.39±20%,10%	15	25	110	1	25
CIL 10N R47□	0.80 ± 0.15	0.47±20%,10%	15	25	105	1.35	25
CIL 10N R56□	0.80 ± 0.15	0.56±20%,10%	15	25	95	1.55	25
CIL 10N R68□	0.80 ± 0.15	0.68±20%,10%	15	25	80	1.7	25
CIL 10N R82□	0.80 ± 0.15	0.82±20%,10%	15	25	75	2.1	25
CIL 10J 1R0□	0.80 ± 0.15	1.0±20%,10%	35	10	70	0.6	10
CIL 10J 1R2□	0.80 ± 0.15	1.2±20%,10%	35	10	60	0.8	10
CIL 10J 1R5□	0.80 ± 0.15	1.5±20%,10%	35	10	55	0.8	10
CIL 10J 1R8□	0.80 ± 0.15	1.8±20%,10%	35	10	50	0.95	10
CIL 10J 2R2□	0.80 ± 0.15	2.2±20%,10%	35	10	45	1.15	10
CIL 10J 2R7□	0.80 ± 0.15	2.7±20%,10%	35	10	40	1.35	10
CIL 10J 3R3□	0.80 ± 0.15	3.3±20%,10%	35	10	38	1.55	10
CIL 10J 3R9□	0.80 ± 0.15	3.9±20%,10%	35	10	36	1.7	10
CIL 10J 4R7□	0.80 ± 0.15	4.7±20%,10%	35	10	33	2.1	10
CIL 10Y 5R6□	0.80 ± 0.15	5.6±20%,10%	35	4	22	1.55	4
CIL 10Y 6R8□	0.80 ± 0.15	6.8±20%,10%	35	4	20	1.7	4
CIL 10Y 8R2□	0.80 ± 0.15	8.2±20%,10%	35	4	18	2.1	4
CIL 10Y 100□	0.80 ± 0.15	10.0±20%,10%	35	2	17	2.55	2
CIL 10Y 120□	0.80 ± 0.15	12.0±20%,10%	35	2	15	2.75	2
CIL 10S 150□	0.80 ± 0.15	15.0±20%,10%	20	1	14	1.7	1
CIL 10S 180□	0.80 ± 0.15	18.0±20%,10%	20	1	13	1.85	1
CIL 10S 220□	0.80 ± 0.15	22.0±20%,10%	20	1	11	2.1	1
CIL 10S 270□	0.80 ± 0.15	27.0±20%,10%	20	1	10	2.75	1
CIL 10S 330□	0.80 ± 0.15	33.0±20%,10%	20	0.4	9	2.95	1

□ : Tolerance (K: ± 10%, M: ± 20%)

* : Test equipment : HP4291A + HP16193A



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● CIL 2012(0805) Type

Part No	Product's thickness [mm]	Inductance [μ H]	Q min	L,Q test Frequency [MHz]	Self-Resonant Frequency [MHz], min	DC Resistance [Ω], max	Rated Current [mA], max
CIL 21N 47N□	0.85 ± 0.2	0.047±20%,10%	15	50	320	0.2	300
CIL 21N 68N□	0.85 ± 0.2	0.068±20%,10%	15	50	280	0.2	300
CIL 21N 82N□	0.85 ± 0.2	0.082±20%,10%	15	50	255	0.2	300
CIL 21N R10□	0.85 ± 0.2	0.10±20%,10%	20	25	235	0.3	250
CIL 21N R12□	0.85 ± 0.2	0.12±20%,10%	20	25	220	0.3	250
CIL 21N R15□	0.85 ± 0.25	0.15±20%,10%	20	25	200	0.4	250
CIL 21N R18□	0.85 ± 0.2	0.18±20%,10%	20	25	185	0.4	250
CIL 21N R22□	0.85 ± 0.2	0.22±20%,10%	20	25	170	0.5	250
CIL 21N R27□	0.85 ± 0.2	0.27±20%,10%	20	25	150	0.5	250
CIL 21N R33□	0.85 ± 0.2	0.33±20%,10%	20	25	145	0.55	250
CIL 21N R39□	0.85 ± 0.2	0.39±20%,10%	25	25	135	0.65	200
CIL 21N R47□	1.25 ± 0.2	0.47±20%,10%	25	25	125	0.65	200
CIL 21N R56□	1.25 ± 0.2	0.56±20%,10%	25	25	115	0.75	150
CIL 21N R68□	1.25 ± 0.2	0.68±20%,10%	25	25	105	0.8	150
CIL 21N R82□	1.25 ± 0.2	0.82±20%,10%	25	25	100	1	150
CIL 21J 1R0□	1.25 ± 0.2	1.0±20%,10%	45	10	75	0.4	50
CIL 21J 1R2□	0.85 ± 0.2	1.2±20%,10%	45	10	65	0.5	50
CIL 21J 1R5□	0.85 ± 0.2	1.5±20%,10%	45	10	60	0.5	50
CIL 21J 1R8□	0.85 ± 0.2	1.8±20%,10%	45	10	55	0.6	50
CIL 21J 2R2□	0.85 ± 0.2	2.2±20%,10%	45	10	50	0.65	30
CIL 21J 2R7□	0.85 ± 0.2	2.7±20%,10%	45	10	45	0.75	30
CIL 21J 3R3□	1.25 ± 0.2	3.3±20%,10%	45	10	41	0.8	30
CIL 21J 3R9□	1.25 ± 0.2	3.9±20%,10%	45	10	38	0.9	30
CIL 21J 4R7□	1.25 ± 0.2	4.7±20%,10%	45	10	35	1	30
CIL 21Y 5R6□	1.25 ± 0.2	5.6±20%,10%	50	4	32	0.9	15
CIL 21Y 6R8□	1.25 ± 0.2	6.8±20%,10%	50	4	29	1	15
CIL 21Y 8R2□	1.25 ± 0.2	8.2±20%,10%	50	4	26	1.1	15
CIL 21Y 100□	1.25 ± 0.2	10.0±20%,10%	50	2	24	1.15	15
CIL 21Y 120□	1.25 ± 0.2	12.0±20%,10%	50	2	22	1.25	15
CIL 21S 150□	1.25 ± 0.2	15.0±20%,10%	30	1	19	0.8	5
CIL 21S 180□	1.25 ± 0.2	18.0±20%,10%	30	1	18	0.9	5
CIL 21S 220□	1.25 ± 0.2	22.0±20%,10%	30	1	16	1.1	5
CIL 21S 270□	1.25 ± 0.2	27.0±20%,10%	30	1	14	1.15	5
CIL 21S 330□	1.25 ± 0.2	33.0±20%,10%	30	0.4	13	1.25	5

□ : Tolerance (K: ± 10%, M: ± 20%)

* : Test equipment : HP4291A + HP16193A



● CIL 3216(1206) Type

Part No	Product's thickness [mm]	Inductance [μH]	Q min	L,Q test Frequency [MHz]	Self-Resonant Frequency [MHz] min.	DC Resistance [Ω] max.	Rated Current [mA] max.
CIL 31N 47N□	0.6 ± 0.2	0.047±20%,10%	20	50	320	0.15	300
CIL 31N 68N□	0.6 ± 0.2	0.068±20%,10%	20	50	280	0.25	300
CIL 31N R10□	0.6 ± 0.2	0.10±20%,10%	20	25	235	0.25	250
CIL 31N R12□	0.6 ± 0.2	0.12±20%,10%	20	25	220	0.3	250
CIL 31N R15□	0.6 ± 0.2	0.15±20%,10%	20	25	200	0.3	250
CIL 31N R18□	0.6 ± 0.2	0.18±20%,10%	20	25	185	0.4	250
CIL 31N R22□	0.6 ± 0.2	0.22±20%,10%	20	25	170	0.4	250
CIL 31N R27□	0.6 ± 0.2	0.27±20%,10%	20	25	150	0.5	250
CIL 31N R33□	0.6 ± 0.2	0.33±20%,10%	20	25	145	0.6	250
CIL 31N R39□	0.85 ± 0.2	0.39±20%,10%	25	25	135	0.5	200
CIL 31N R47□	1.1 ± 0.2	0.47±20%,10%	25	25	125	0.6	200
CIL 31N R56□	1.1 ± 0.2	0.56±20%,10%	25	25	115	0.7	150
CIL 31N R68□	1.1 ± 0.2	0.68±20%,10%	25	25	105	0.8	150
CIL 31N R82□	1.1 ± 0.2	0.82±20%,10%	25	25	100	0.9	150
CIL 31J 1R0□	1.1 ± 0.2	1.0±20%,10%	45	10	75	0.4	100
CIL 31J 1R2□	1.1 ± 0.2	1.2±20%,10%	45	10	65	0.5	100
CIL 31J 1R5□	1.1 ± 0.2	1.5±20%,10%	45	10	60	0.5	50
CIL 31J 1R8□	1.1 ± 0.2	1.8±20%,10%	45	10	55	0.5	50
CIL 31J 2R2□	1.1 ± 0.2	2.2±20%,10%	45	10	50	0.6	50
CIL 31J 2R7□	1.1 ± 0.2	2.7±20%,10%	45	10	45	0.6	50
CIL 31J 3R3□	1.1 ± 0.2	3.3±20%,10%	45	10	41	0.7	50
CIL 31J 3R9□	1.1 ± 0.2	3.9±20%,10%	45	10	38	0.8	50
CIL 31J 4R7□	1.1 ± 0.2	4.7±20%,10%	45	10	35	0.9	50
CIL 31Y 5R6□	1.1 ± 0.2	5.6±20%,10%	50	4	32	0.7	25
CIL 31Y 6R8□	1.1 ± 0.2	6.8±20%,10%	50	4	29	0.8	25
CIL 31Y 8R2□	1.1 ± 0.2	8.2±20%,10%	50	4	26	0.9	25
CIL 31Y 100□	1.1 ± 0.2	10.0±20%,10%	50	2	24	1	25
CIL 31Y 120□	1.1 ± 0.2	12.0±20%,10%	50	2	22	1.05	15
CIL 31S 150□	1.1 ± 0.2	15.0±20%,10%	35	1	19	0.7	5
CIL 31S 180□	1.1 ± 0.2	18.0±20%,10%	35	1	18	0.7	5
CIL 31S 220□	1.1 ± 0.2	22.0±20%,10%	35	1	16	0.9	5
CIL 31S 270□	1.1 ± 0.2	27.0±20%,10%	35	1	14	0.9	5
CIL 31S 330□	1.1 ± 0.2	33.0±20%,10%	35	0.4	13	1.05	5

□ : Tolerance (K: ± 10%, M: ± 20%)

* : Test equipment : HP4291A + HP16193A


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RELIABILITY TEST CONDITION

ITEM	PERFORMANCE			TEST CONDITION
	CIL	CIH10/21	CIH05	
1. OPERATING TEMPERATURE RANGE	-40 to +85°C		-55 to +125°C	-
2. STORAGE TEMPERATURE RANGE	-40 to +85°C		-55 to +125°C	-
3. INDUCTANCE / Q	SEE THE SECTION OF ELECTRICAL PROPERTIES.			<ul style="list-style-type: none"> - MEASURING FREQUENCY : 1 to 100MHz (DEPENDS ON THE ITEMS) - MEASURING EQUIPMENT, TEST FIXTURE : HP4291A/B + HP16193A (CIL SERIES) HP4291A/B + HP16092A + IN-HOUSE MADE JIG (CIH 10/21 SERIES) HP4291A/B + HP16192A (CIH 05 SERIES) - SOURCE OSC LEVEL : 30 mV (CIL SERIES) 112 mV (CIH SERIES)
4. DC RESISTANCE	SEE THE SECTION OF ELECTRICAL PROPERTIES.			- MEASURING EQUIPMENT : HP4338A/B
5. SELF RESONANCE FREQUENCY (SRF)	SEE THE SECTION OF ELECTRICAL PROPERTIES.			<ul style="list-style-type: none"> - MEASURING EQUIPMENT : HP4291A + HP16193A (CIL SERIES) HP8719C (CIH SERIES)
6. HIGH TEMPERATURE TEST	NO APPARENT DAMAGE. INDUCTANCE CHANGE TO BE WITHIN ±10% TO THE INITIAL.			SOLDER THE SAMPLE ON PCB. EXPOSURE AT (T)*°C FOR 500 HOURS. 1-2 HOURS EXPOSURE AT ROOM TEMPERATURE AND HUMIDITY PRIOR TO MEASUREMENT. (*) T= 85±3 (CIL, CIH10/21) 125±3 (CIH05)
	Q VARIATION : WITHIN ±30%.	Q VARIATION : WITHIN ±20%.		
7. SOLDER HEAT RESISTANCE	NO MECHANICAL DAMAGE. REMAINING TERMINAL ELECTRODE : 70% MIN. INDUCTANCE CHANGE TO BE WITHIN ±10% TO THE INITIAL.			AFTER BEING DIPPED IN FLUX FOR 4±1 SECONDS, AND PREHEATED AT 150~180°C FOR 2~3 MIN , THE SPECIMEN SHALL BE IMMERSERD IN 60/40 TIN-LEAD ALLOY SOLDER AT 260±5°C FOR 10 ± 0.5 SECONDS.
	Q VARIATION : WITHIN ±30%.	Q VARIATION : WITHIN ±20%.		
8. SOLDERABILITY	MORE THAN 95% OF TERMINAL ELECTRODE SHOULD BE SOLDERED NEWLY.			AFTER BEING DIPPED IN FLUX FOR 4±1 SECONDS, AND PREHEATED AT 150~180°C FOR 2~3 MIN , THE SPECIMEN SHALL BE IMMERSERD IN SOLDER AT 230 ±5°C FOR 4± 1 SECONDS.



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ITEM	PERFORMANCE			TEST CONDITION
	CIL	CIH10/21	CIH05	
9. THERMAL SHOCK	NO APPARENT DAMAGE. INDUCTANCE CHANGE TO BE WITHIN $\pm 10\%$ TO THE INITIAL.			- CIL SERIES -25 \leftrightarrow +85 $^{\circ}\text{C}$, 60 MINUTES EACH. 100 CYCLES. - CIH 10/21 SERIES -40 \leftrightarrow +85 $^{\circ}\text{C}$, 60 MINUTES EACH. 100 CYCLES. - CIH 05 SERIES -55 \leftrightarrow +125 $^{\circ}\text{C}$, 60 MINUTES EACH. 100 CYCLES.
	Q VARIATION : WITHIN $\pm 30\%$.	Q VARIATION : WITHIN $\pm 20\%$.		
10. MOISTURE LOADING TEST	NO APPARENT DAMAGE. INDUCTANCE CHANGE TO BE WITHIN $\pm 10\%$ TO THE INITIAL.			- TEMPERATURE : 40 $\pm 2^{\circ}\text{C}$ (CIL, CIH 10/21) 60 $\pm 2^{\circ}\text{C}$ (CIH 05) - HUMIDITY : 90 ~ 95 %RH - DURATION : 500 ± 5 HRS. - CURRENT : RATED CURRENT
	Q VARIATION : WITHIN $\pm 30\%$.	Q VARIATION : WITHIN $\pm 20\%$.		
11. HIGH TEMPERATURE LOADING	NO APPARENT DAMAGE. INDUCTANCE CHANGE TO BE WITHIN $\pm 10\%$ TO THE INITIAL.			- TEMPERATURE : 85 $\pm 2^{\circ}\text{C}$ (CIL, CIH 10/21) 125 $\pm 2^{\circ}\text{C}$ (CIH 05) - DURATION : 500 ± 5 HRS. - CURRENT : RATED CURRENT
	Q VARIATION : WITHIN $\pm 30\%$.	Q VARIATION : WITHIN $\pm 20\%$.		
12. LOW TEMPERATURE RESISTANCE	NO APPARENT DAMAGE. INDUCTANCE CHANGE TO BE WITHIN $\pm 10\%$ TO THE INITIAL.			- TEMPERATURE : -40 $\pm 2^{\circ}\text{C}$ (CIL, CIH 10/21) -55 $\pm 2^{\circ}\text{C}$ (CIH 05) - DURATION : 500 ± 5 HRS.
	Q VARIATION : WITHIN $\pm 30\%$.	Q VARIATION : WITHIN $\pm 20\%$.		
13. BENDING TEST	NO APPARENT DAMAGE.			SOLDER THE SAMPLE ON PCB, BEND TO 2mm.
	<p style="text-align: right;">Unit : mm</p>			

CIL Series

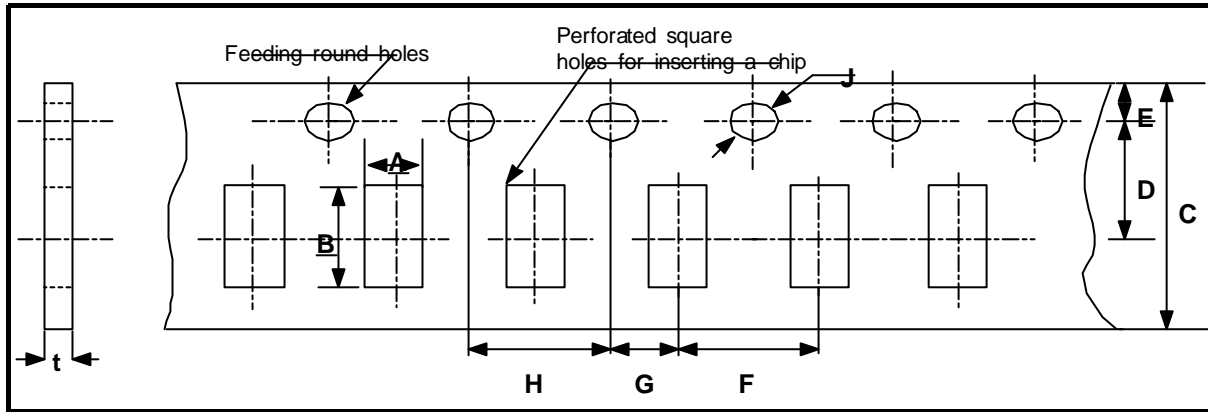


ITEM	PERFORMANCE			TEST CONDITION		
	CIL	CIH10/21	CIH05			
14. VIBRATION TEST	NO APPARENT DAMAGE. INDUCTANCE CHANGE TO BE WITHIN $\pm 10\%$ TO THE INITIAL.			APPLY VIBRATIONS IN EACH OF THE X, Y AND Z DIRECTIONS. - FREQUENCY : 10 ~ 55 ~ 10Hz - TOTAL AMPLITUDE : 1.52mm - TIME : 2 HRS. EACH (TOTAL 6 HRS.)		
	Q VARIATION : WITHIN $\pm 30\%$.	Q VARIATION : WITHIN $\pm 20\%$.				
15. DROP TEST	NO APPARENT DAMAGE. INDUCTANCE CHANGE TO BE WITHIN $\pm 10\%$ TO THE INITIAL.			DROP THE SAMPLE FROM A HEIGHT OF 1m TO CONCRETE GROUND 10 TIMES.		
	Q VARIATION : WITHIN $\pm 30\%$.	Q VARIATION : WITHIN $\pm 20\%$.				
16. TERMINAL TEST	NO INDICATION OF PEELING SHALL OCCUR ON THE TERMINAL ELECTRODE.			SIZE	W(Kgf)	TIME(SEC)
				05	0.1	30 \pm 5
				10	0.5	10 \pm 1
				21		
				31		

CIL Series

PACKAGING

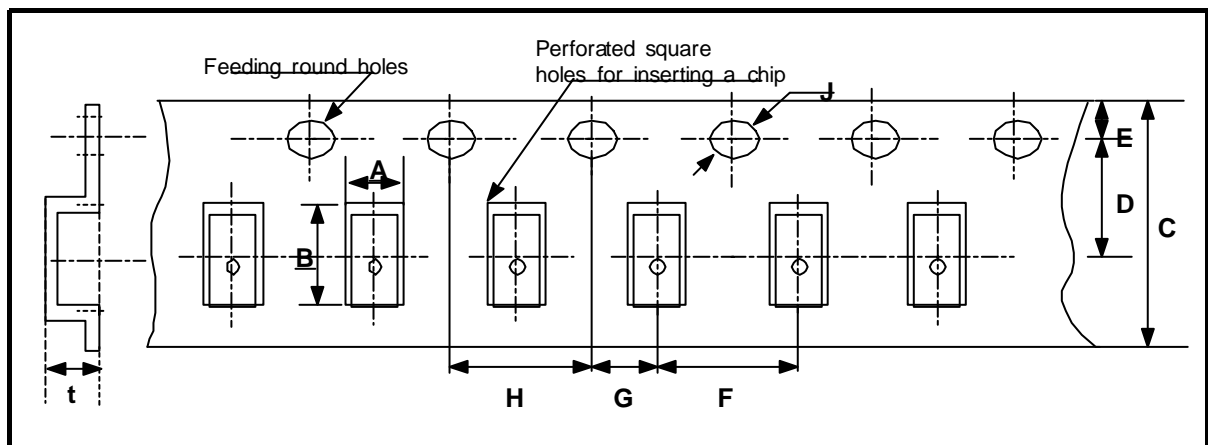
● CARDBOARD PAPER TAPE



unit : mm

TYPE	A	B	C	D	E	F	G	H	J	t max.
05	0.65 ± 0.1	1.15 ± 0.1	8.0 ± 0.2	3.5 ± 0.05	1.75 ± 0.1	2.0 ± 0.05	2.0 ± 0.1	4.0 ± 0.1	$\Phi 1.5$	0.8
10	1.0 ± 0.2	1.80 ± 0.2	± 0.2	± 0.05	± 0.1	4.0 ± 0.1	± 0.1	± 0.1	$+0.1/-0$	1.1

● EMBOSED PLASTIC TAPE



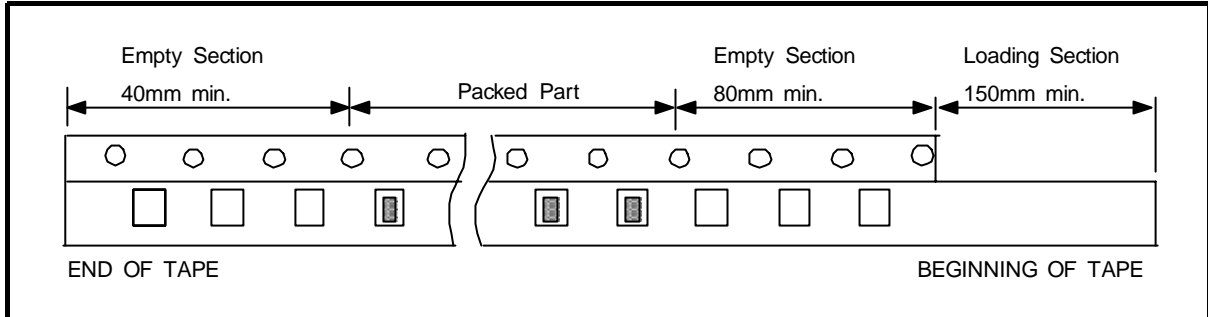
unit : mm

TYPE	A	B	C	D	E	F	G	H	J	t max.
21	0.85T									1.5
	1.0T	± 0.2	± 0.2	± 0.3	± 0.05					2.0
	1.25T					1.75 ± 0.1	4.0 ± 0.1	2.0 ± 0.1	4.0 ± 0.1	$\Phi 1.5$ $+0.1/-0$
31	0.6T	± 0.2	± 0.2	± 0.3	± 0.05					1.15
	1.1T									1.4



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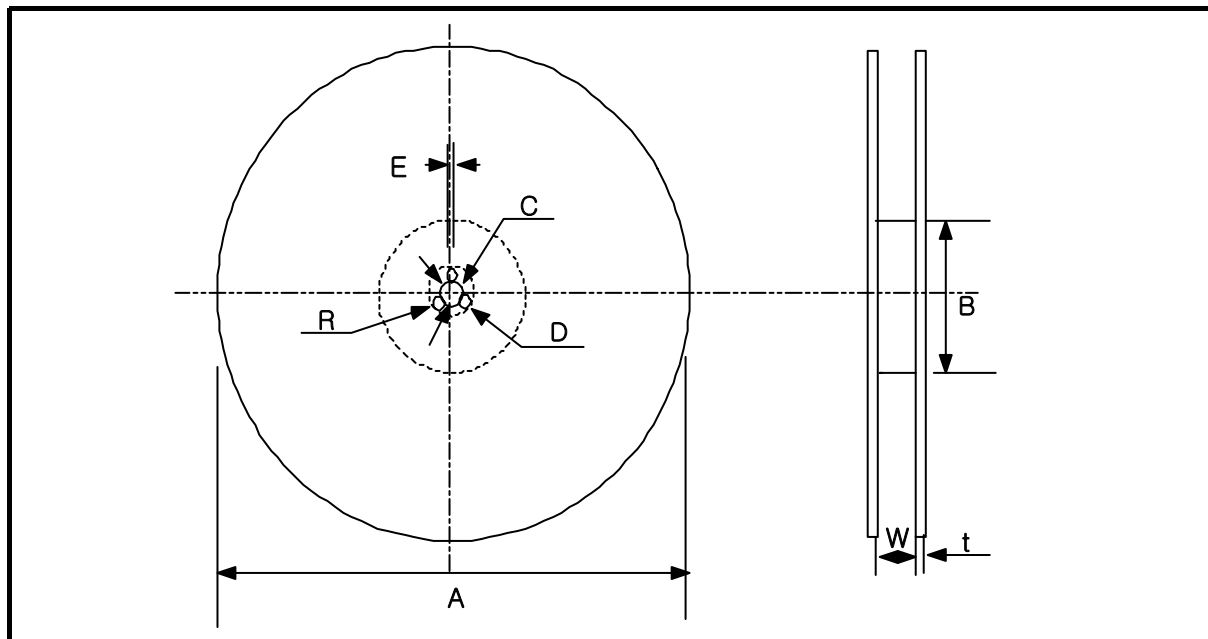
● TAPING SIZE



unit : pcs

Symbol	05	10	21			31	
			0.85T	1.0T	1.25T	0.6T	1.1T
7" Reel	10,000	4,000	4,000	3,000	2,000	4,000	3,000

● REEL DIMENSION



unit : mm

Tape Width	A	B	C	D	E	W	t	R
8 mm	$\phi 178 \pm 2.0$	$\phi 50 \pm 1.0$	$\phi 13 \pm 0.5$	21 ± 0.8	2.0 ± 0.5	10 ± 1.5	1.2 ± 0.5	1.0

CIL Series