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

CI	L	10	J	1R5	K	N	C
❶	❷	❸	❹	❺	❻	❼	❽

❶ SAMSUNG MULTILAYER CHIP INDUCTOR/BEADS

❷ SERIES CODE

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

❸ 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

❹ 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

❺ NOMINAL INDUCTANCE

The nominal inductance value is expressed in micro-Henry(μH) 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 μH and is used as the decimal point. The letter 'N' means the nH.

example)

100 : 10 × 10° = 10μH
1R5 : 1.5 μH
R10 : 0.1 μH = 100 nH
4N7 : 4.7 nH

❻ INDUCTANCE TOLERANCE

CODE	DESCRIPTION OF CODE	CODE	DESCRIPTION OF CODE
S	± 0.3 nH	**J**	± 5%
K	± 10%	**M**	± 20%

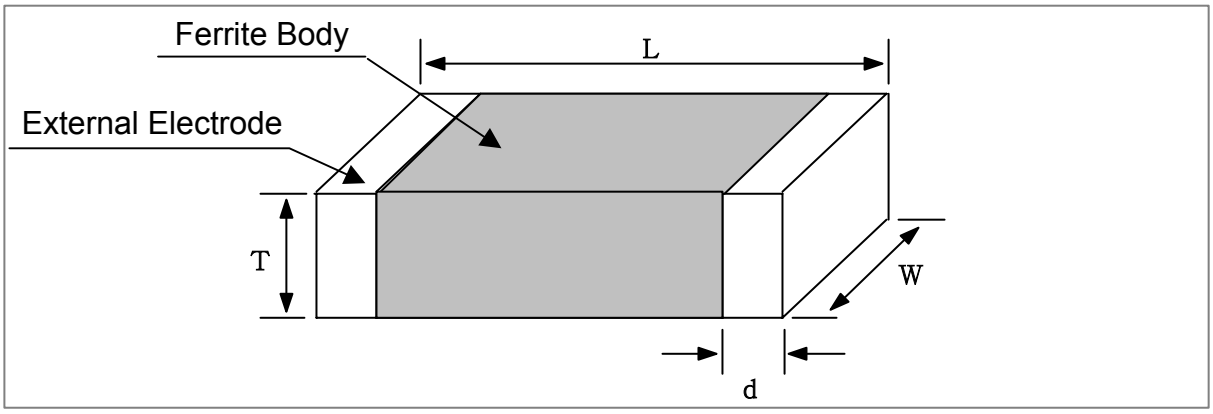
❼ THICKNESS OPTION

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

❽ PACKAGE TYPE

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

APPEARANCE AND DIMENSON



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

CHARACTERISTIC LINE UP

● CIL 1608(0603) Type

Part No (1608 type)	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 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

● CIL 2012(0805) Type

Part No	Product's thickness [mm]	Inductance [μH]	Q min	L,Q test Frequency [MHz	Self-Resonant Frequrncy [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

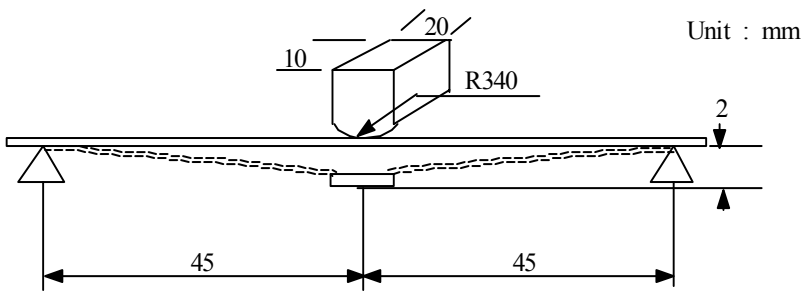
● CIL 3216(1206) Type

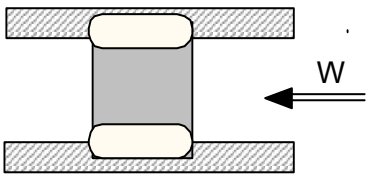
Part No	Product's thickness [mm]	Inductance [μH]	Q min	L,Q test Frequency [MHz]	Self-Resonant Frequency [MHz] min.	DC Resistance [Ω] max.	Rated Current [mA] max.
CIL 31N 47N☐	0.6 ± 0.2	0.047±20%,10%	20	50	320	0.15	300
CIL 31N 68N☐	0.6 ± 0.2	0.068±20%,10%	20	50	280	0.25	300
CIL 31N R10☐	0.6 ± 0.2	0.10±20%,10%	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

RELIABILITY TEST CONDITION

ITEM	PERFORMANCE			TEST CONDITION
	CIL	CIH10/21	CIH05	
1. OPERATING TEMPERATURE RANGE	-40 to +85℃		-55 to +125℃	-
2. STORAGE TEMPERATURE RANGE	-40 to +85℃		-55 to +125℃	-
3. INDUCTANCE / Q	SEE THE SECTION OF ELECTRICAL PROPERTIES.			- 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.			- 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)*** ℃ 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℃ FOR 2~3 MIN , THE SPECIMEN SHALL BE IMMERSED IN 60/40 TIN-LEAD ALLOY SOLDER AT 260±5℃ 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℃ FOR 2~3 MIN , THE SPECIMEN SHALL BE IMMERSED IN SOLDER AT 230 ±5℃ FOR 4±1 SECONDS.

ITEM	PERFORMANCE			TEST CONDITION
	CIL	CIH10/21	CIH05	
9. THERMAL SHOCK	NO APPARENT DAMAGE. INDUCTANCE CHANGE TO BE WITHIN ±10% TO THE INITIAL.			- CIL SERIES -25 ↔ +85℃, 60 MINUTES EACH. 100 CYCLES. - CIH 10/21 SERIES -40 ↔ +85℃, 60 MINUTES EACH. 100 CYCLES. - CIH 05 SERIES -55 ↔ +125℃, 60 MINUTES EACH. 100 CYCLES.
	Q VARIATION : WITHIN ±30%.	Q VARIATION : WITHIN ±20%.		
10. MOISTURE LOADING TEST	NO APPARENT DAMAGE. INDUCTANCE CHANGE TO BE WITHIN ±10% TO THE INITIAL.			- TEMPERATURE : 40±2℃ (CIL, CIH 10/21) 60±2℃ (CIH 05) - HUMIDITY : 90 ~ 95 %RH - DURATION : 500±5 HRS. - CURRENT : RATED CURRENT
	Q VARIATION : WITHIN ±30%.	Q VARIATION : WITHIN ±20%.		
11. HIGH TEMPERATURE LOADING	NO APPARENT DAMAGE. INDUCTANCE CHANGE TO BE WITHIN ±10% TO THE INITIAL.			- TEMPERATURE : 85±2℃ (CIL, CIH 10/21) 125±2℃ (CIH 05) - DURATION : 500±5 HRS. - CURRENT : RATED CURRENT
	Q VARIATION : WITHIN ±30%.	Q VARIATION : WITHIN ±20%.		
12. LOW TEMPERATURE RESISTANCE	NO APPARENT DAMAGE. INDUCTANCE CHANGE TO BE WITHIN ±10% TO THE INITIAL.			- TEMPERATURE : -40±2℃ (CIL, CIH 10/21) -55±2℃ (CIH 05) - DURATION : 500±5 HRS.
	Q VARIATION : WITHIN ±30%.	Q VARIATION : WITHIN ±20%.		
13. BENDING TEST	NO APPARENT DAMAGE.			SOLDER THE SAMPLE ON PCB, BEND TO 2mm.
	 Unit : mm			

<table>
<tr><th rowspan="2">ITEM</th><th colspan="3">PERFORMANCE</th><th rowspan="2">TEST CONDITION</th></tr>
<tr><th>CIL</th><th>CIH10/21</th><th>CIH05</th></tr>
<tr><td rowspan="2">14. VIBRATION TEST</td><td colspan="3">NO APPARENT DAMAGE.
INDUCTANCE CHANGE TO BE WITHIN ±10% TO THE INITIAL.</td><td rowspan="2">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.)</td></tr>
<tr><td>Q VARIATION : WITHIN ±30%.</td><td colspan="2">Q VARIATION : WITHIN ±20%.</td></tr>
<tr><td rowspan="2">15. DROP TEST</td><td colspan="3">NO APPARENT DAMAGE.
INDUCTANCE CHANGE TO BE WITHIN ±10% TO THE INITIAL.</td><td rowspan="2">DROP THE SAMPLE FROM A HEIGHT OF 1m TO CONCRETE GROUND 10 TIMES.</td></tr>
<tr><td>Q VARIATION : WITHIN ±30%.</td><td colspan="2">Q VARIATION : WITHIN ±20%.</td></tr>
<tr><td rowspan="2">16. TERMINAL TEST</td><td colspan="3" rowspan="2">NO INDICATION OF PEELING SHALL OCCUR ON THE TERMINAL ELECTRODE.</td><td colspan="3"><table>
<tr><th>SIZE</th><th>W(Kgf)</th><th>TIME(SEC)</th></tr>
<tr><td>05</td><td>0.1</td><td>30±5</td></tr>
<tr><td>10</td><td rowspan="3">0.5</td><td rowspan="3">10±1</td></tr>
<tr><td>21</td></tr>
<tr><td>31</td></tr>
</table></td></tr>
<tr><td colspan="5"> 
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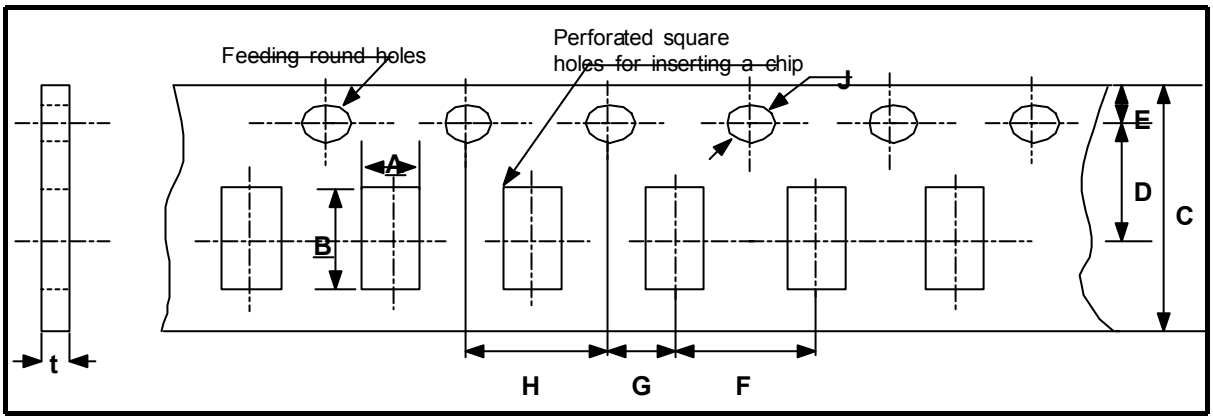
</table>

PACKAGING

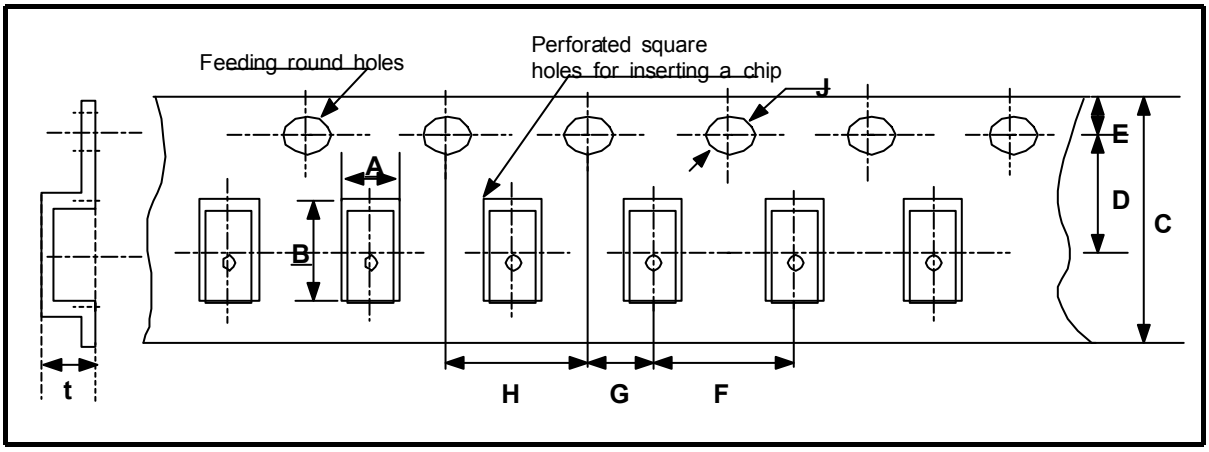
● CARDBOARD PAPER TAPE



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	Φ1.5 +0.1/-0	0.8
10	1.0 ±0.2	1.80 ±0.2				4.0 ±0.1				1.1

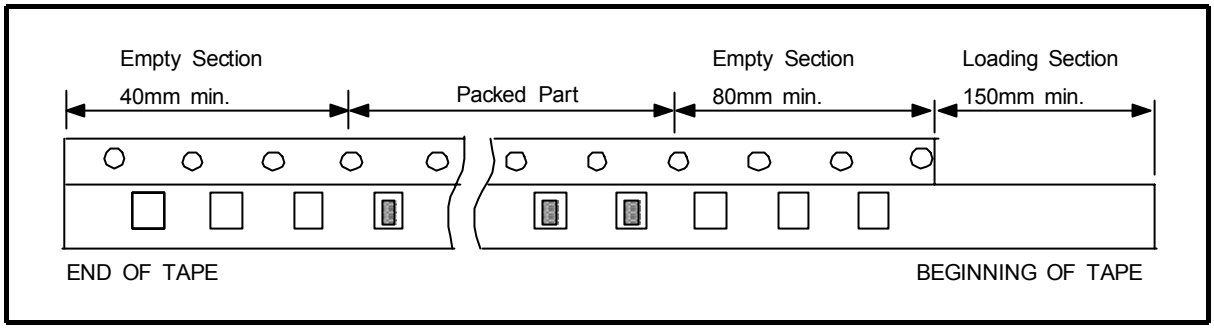
● EMBOSSED PLASTIC TAPE



unit : mm

TYPE		A	B	C	D	E	F	G	H	J	t max.
21	0.85T	1.50 ±0.2	2.3 ±0.2	8.0 ±0.3	3.5 ±0.05	1.75 ±0.1	4.0 ±0.1	2.0 ±0.1	4.0 ±0.1	Φ1.5 +0.1/-0	1.5
	1.0T										2.0
	1.25T										2.0
31	0.6T	1.90 ±0.2	4.9 ±0.2	12.0 ±0.3	5.5 ±0.05						1.15
	1.1T										1.4

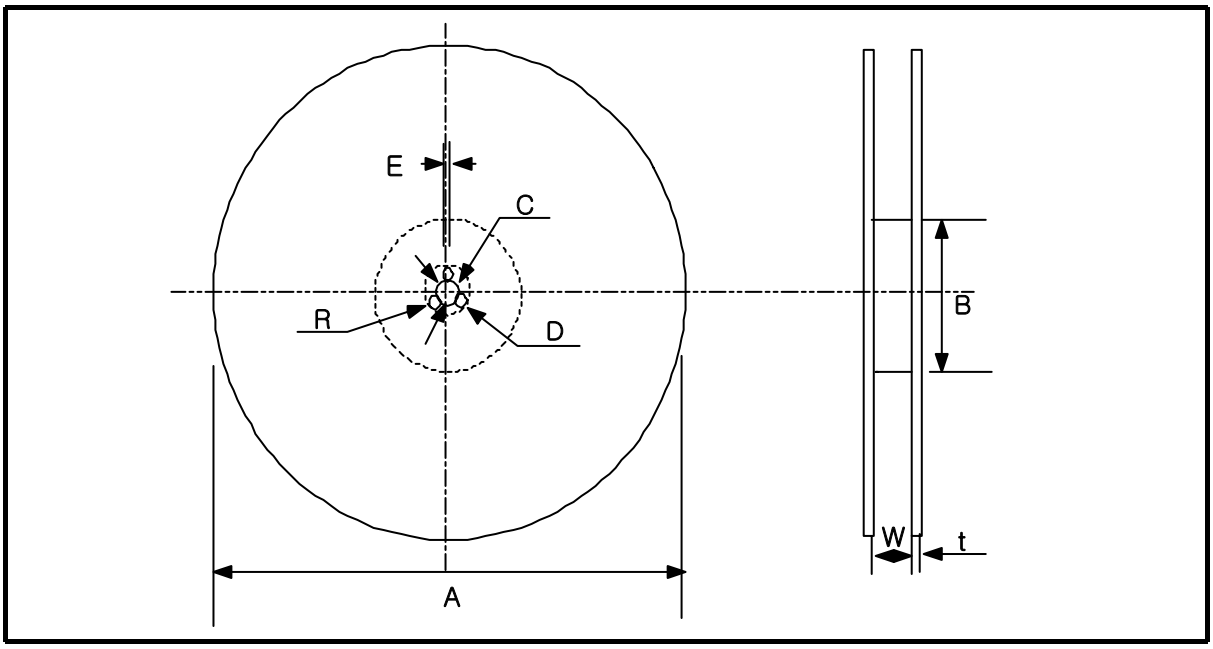
● TAPING SIZE



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	ϕ178± 2.0	ϕ50±1.0	ϕ13±0.5	21±0.8	2.0±0.5	10±1.5	1.2±0.5	1.0