

# APPROVAL SHEET

**WLCM0603**

**WLCM1005**

**WLCM1608**

**Multi-Layer Ceramic High Frequency Inductors**



\*Contents in this sheet are subject to change without prior notice.

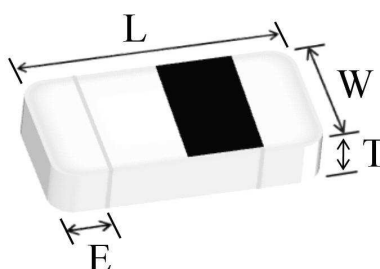
## FEATURES

1. Ceramic structure provides high reliability · high productivity.
2. Excellence Q and SRF characteristics for RF application.
3. Wide range inductance and various tolerance options.

## APPLICATIONS

1. Communication system front-end circuit: GSM/3G/LTE, Wi-Fi, GPS.
2. Cabel/Terrestrial/BS Tuner, Bluetooth, Wireless Audio, Remote control.
3. M2M: ZigBee, Proprietary wireless.
4. EMI solustion in high frequency circuits.

## SHAPE and DIMENSION



Unit: mm

WLCM Series	L	W	T	E (Min/Max)	Packing Qty (pcs/reel)
WLCM0603 (EIA 0201)	0.60±0.03	0.30±0.03	0.30±0.03	0.10~0.20	15,000
WLCM1005 (EIA 0402)	1.00±0.10	0.50±0.10	0.50±0.10	0.10~0.30	10,000
WLCM1608 (EIA 0603)	1.60±0.15	0.80±0.15	0.80±0.15	0.20~0.60	4,000

## Ordering Information

WL	CM	0603	Z0	S	1N2	T	B
<b>Product Code</b>	<b>Series</b>	<b>Dimensions</b>	<b>Series extension</b>	<b>Tolerance</b>	<b>Value</b>	<b>Packing Code</b>	
WL: Inductor	Ceramic multilayer inductor.	0603:EIA 0201 1005:EIA 0402 1608:EIA 0603	Z0:STD Z2:STD	B: ± 0.1nH C: ± 0.2nH S: ± 0.3nH G: ± 2% H: ± 3% J: ± 5%	1N2 =1.2nH 12N=12nH R10=100nH =0.10uH	T=7" Reeled (Paper tape)	B:STD

## Electrical Characteristics

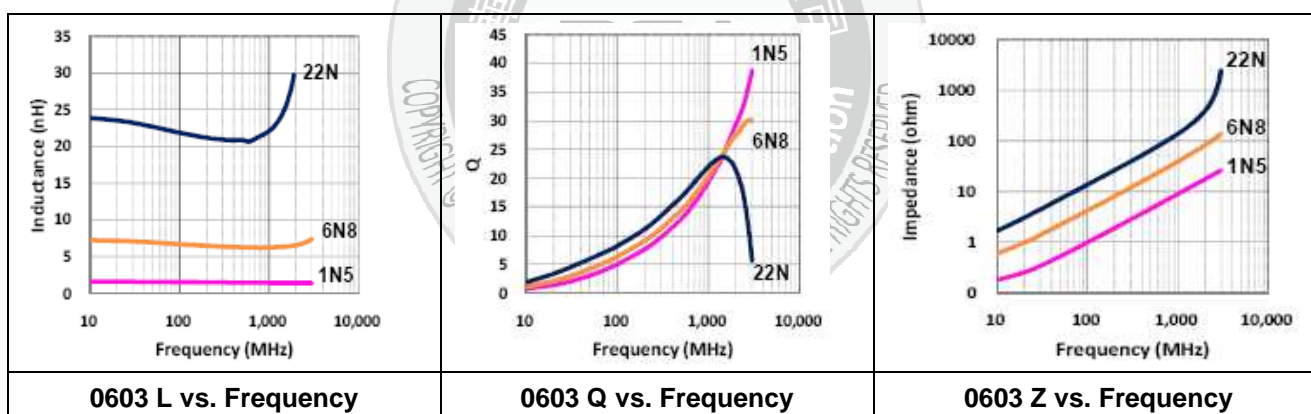
- WLCM0603 series (EIA 0201)

Operating Temperature range: -55°C to 125°C

Walsin Part Number	L(nH)	Tolerance	Q Min	Typical Q @ Frequency (MHz)	SRF (MHz)	RDC (Ω)	Rated Current (mA) Max.
					Min.	Max.	
WLCM0603Z0□0N3TB	0.3	B	4	100	10,000	0.07	850
WLCM0603Z0□0N4TB	0.4	B	4	100	10,000	0.07	850
WLCM0603Z0□0N5TB	0.5	B	4	100	10,000	0.08	800
WLCM0603Z0□0N6TB	0.6	B	4	100	10,000	0.08	800
WLCM0603Z0□0N7TB	0.7	B	4	100	10,000	0.09	750
WLCM0603Z0□0N8TB	0.8	B	4	100	10,000	0.10	750
WLCM0603Z0□0N9TB	0.9	B	4	100	10,000	0.10	750
WLCM0603Z0□1N0TB	1.0	B, C, S	4	100	10,000	0.14	600
WLCM0603Z0□1N1TB	1.1	B, C, S	4	100	10,000	0.14	600
WLCM0603Z0□1N2TB	1.2	B, C, S	4	100	10,000	0.14	600
WLCM0603Z0□1N3TB	1.3	B, C, S	4	100	10,000	0.14	600
WLCM0603Z0□1N4TB	1.4	B, C, S	4	100	10,000	0.18	550
WLCM0603Z0□1N5TB	1.5	B, C, S	4	100	10,000	0.18	550
WLCM0603Z0□1N6TB	1.6	B, C, S	4	100	10,000	0.18	500
WLCM0603Z0□1N7TB	1.7	B, C, S	4	100	10,000	0.19	500
WLCM0603Z0□1N8TB	1.8	B, C, S	4	100	10,000	0.19	500
WLCM0603Z0□1N9TB	1.9	B, C, S	4	100	10,000	0.20	450
WLCM0603Z0□2N0TB	2.0	B, C, S	4	100	10,000	0.20	450
WLCM0603Z0□2N1TB	2.1	B, C, S	4	100	10,000	0.20	450
WLCM0603Z0□2N2TB	2.2	B, C, S	4	100	10,000	0.22	450
WLCM0603Z0□2N3TB	2.3	B, C, S	4	100	10,000	0.22	450
WLCM0603Z0□2N4TB	2.4	B, C, S	4	100	10,000	0.24	450
WLCM0603Z0□2N5TB	2.5	B, C, S	4	100	10,000	0.24	450
WLCM0603Z0□2N6TB	2.6	B, C, S	4	100	10,000	0.25	450
WLCM0603Z0□2N7TB	2.7	B, C, S	5	100	10,000	0.25	450
WLCM0603Z0□2N9TB	2.9	B, C, S	5	100	9,500	0.28	450
WLCM0603Z0□3N0TB	3.0	B, C, S	5	100	9,500	0.28	450
WLCM0603Z0□3N1TB	3.1	B, C, S	5	100	9,500	0.28	450
WLCM0603Z0□3N2TB	3.2	B, C, S	5	100	9,500	0.30	450
WLCM0603Z0□3N3TB	3.3	B, C, S	5	100	9,500	0.30	450
WLCM0603Z0□3N4TB	3.4	B, C, S	5	100	8,000	0.30	400
WLCM0603Z0□3N5TB	3.5	B, C, S	5	100	8,000	0.30	400
WLCM0603Z0□3N6TB	3.6	B, C, S	5	100	8,000	0.30	400
WLCM0603Z0□3N7TB	3.7	B, C, S	5	100	8,000	0.30	400
WLCM0603Z0□3N8TB	3.8	B, C, S	5	100	6,500	0.30	400
WLCM0603Z0□3N9TB	3.9	B, C, S	5	100	6,500	0.30	400
WLCM0603Z0□4N3TB	4.3	B, C, S	5	100	6,500	0.40	350
WLCM0603Z0□4N7TB	4.7	B, C, S	5	100	6,500	0.40	350
WLCM0603Z0□5N1TB	5.1	B, C, S	5	100	6,500	0.40	350

Walsin Part Number	L(nH)	Tolerance	Q Min	Typical Q @ Frequency (MHz)	SRF (MHz)	RDC ( $\Omega$ )	Rated Current (mA) Max.
					Min.	Max.	
WLCM0603Z0□5N6TB	5.6	B, C, S	5	100	6,000	0.40	350
WLCM0603Z0□6N2TB	6.2	B, C, S	5	100	6,000	0.44	300
WLCM0603Z0□6N8TB	6.8	H, J	5	100	5,400	0.50	300
WLCM0603Z0□7N5TB	7.5	H, J	5	100	4,800	0.53	300
WLCM0603Z0□8N2TB	8.2	H, J	5	100	4,800	0.55	250
WLCM0603Z0□9N1TB	9.1	H, J	5	100	4,500	0.62	250
WLCM0603Z0□10NTB	10	H, J	5	100	4,500	0.65	250
WLCM0603Z0□12NTB	12	H, J	5	100	3,700	0.70	250
WLCM0603Z0□15NTB	15	H, J	5	100	2,200	0.80	250
WLCM0603Z0□18NTB	18	H, J	5	100	2,200	0.90	200
WLCM0603Z0□22NTB	22	H, J	5	100	2,000	1.20	150
WLCM0603Z0□27NTB	27	H, J	4	100	1,800	1.80	140
WLCM0603Z0□33NTB	33	J	4	100	1,700	2.10	120
WLCM0603Z0□39NTB	39	J	4	100	1,500	2.40	120

Typical Electrical Characteristic



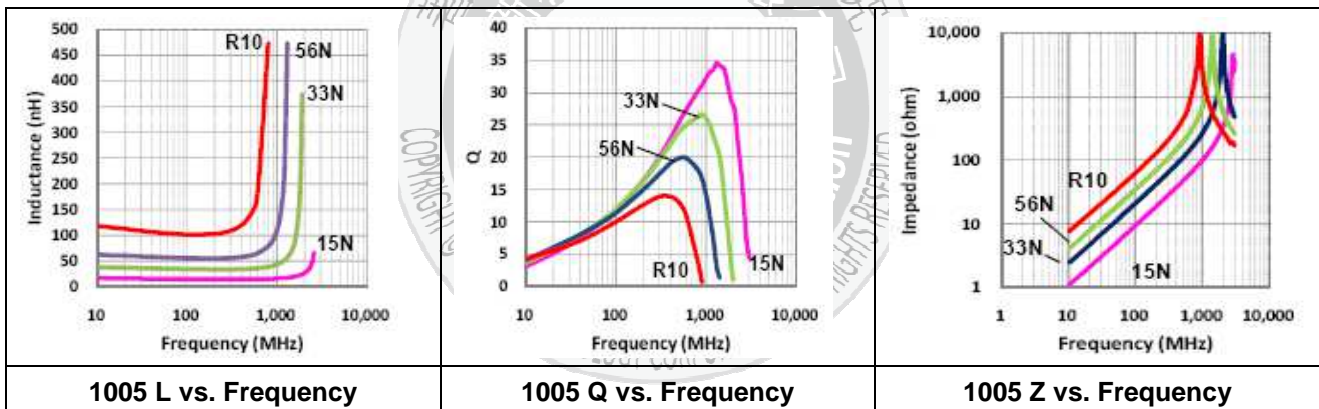
● WLCM1005 series (EIA 0402)

Operating Temperature range: -55°C to 125°C

Walsin Part Number	L(nH)	Tolerance	Q Min	Typical Q @ Frequency (MHz)	SRF (MHz)	RDC (Ω)	Rated Current (mA) Max
					Min.	Max.	
WLCM1005Z0□0N3TB	0.3	B	8	100	10,000	0.08	1000
WLCM1005Z0□0N4TB	0.4	B	8	100	10,000	0.08	1000
WLCM1005Z0□0N5TB	0.5	B	8	100	10,000	0.08	1000
WLCM1005Z0□0N6TB	0.6	B	8	100	10,000	0.08	1000
WLCM1005Z0□0N7TB	0.7	B	8	100	10,000	0.08	1000
WLCM1005Z0□0N8TB	0.8	B	8	100	10,000	0.08	1000
WLCM1005Z0□1N0TB	1.0	B, C, S	8	100	10,000	0.08	1000
WLCM1005Z0□1N1TB	1.1	B, C, S	8	100	10,000	0.08	1000
WLCM1005Z0□1N2TB	1.2	B, C, S	8	100	10,000	0.09	1000
WLCM1005Z0□1N3TB	1.3	B, C, S	8	100	10,000	0.09	1000
WLCM1005Z0□1N5TB	1.5	B, C, S	8	100	10,000	0.10	1000
WLCM1005Z0□1N6TB	1.6	B, C, S	8	100	10,000	0.10	1000
WLCM1005Z0□1N8TB	1.8	B, C, S	8	100	10,000	0.12	900
WLCM1005Z0□2N0TB	2.0	B, C, S	8	100	10,000	0.12	900
WLCM1005Z0□2N2TB	2.2	B, C, S	8	100	10,000	0.13	900
WLCM1005Z0□2N4TB	2.4	B, C, S	8	100	10,000	0.13	800
WLCM1005Z0□2N7TB	2.7	B, C, S	8	100	6,000	0.16	800
WLCM1005Z0□3N0TB	3.0	B, C, S	8	100	6,000	0.16	800
WLCM1005Z0□3N3TB	3.3	B, C, S	8	100	6,000	0.16	800
WLCM1005Z0□3N6TB	3.6	B, C, S	8	100	6,000	0.20	700
WLCM1005Z0□3N9TB	3.9	B, C, S	8	100	6,000	0.20	700
WLCM1005Z0□4N3TB	4.3	B, C, S	8	100	6,000	0.20	700
WLCM1005Z0□4N7TB	4.7	B, C, S	8	100	6,000	0.20	700
WLCM1005Z0□5N1TB	5.1	B, C, S	8	100	5,300	0.23	600
WLCM1005Z0□5N6TB	5.6	B, C, S	8	100	4,500	0.23	600
WLCM1005Z0□6N2TB	6.2	B, C, S	8	100	4,500	0.25	600
WLCM1005Z0□6N8TB	6.8	G, H, J	8	100	4,500	0.25	600
WLCM1005Z0□7N5TB	7.5	G, H, J	8	100	4,200	0.28	500
WLCM1005Z0□8N2TB	8.2	G, H, J	8	100	3,700	0.28	500
WLCM1005Z0□9N1TB	9.1	G, H, J	8	100	3,400	0.30	500
WLCM1005Z0□10NTB	10	G, H, J	8	100	3,400	0.30	500
WLCM1005Z0□12NTB	12	G, H, J	8	100	3,000	0.45	400
WLCM1005Z0□15NTB	15	G, H, J	8	100	2,500	0.55	400
WLCM1005Z0□18NTB	18	G, H, J	8	100	2,200	0.65	300
WLCM1005Z0□22NTB	22	G, H, J	8	100	1,900	0.70	300

Walsin Part Number	L(nH)	Tolerance	Q Min	Typical Q @ Frequency (MHz)	SRF (MHz)	RDC (Ω)	Rated Current (mA) Max
					Min.	Max.	
WLCM1005Z0□27NTB	27	G, H, J	8	100	1,700	0.80	300
WLCM1005Z0□33NTB	33	G, H, J	8	100	1,600	0.90	200
WLCM1005Z0□39NTB	39	G, H, J	8	100	1,200	1.00	200
WLCM1005Z0□47NTB	47	G, H, J	8	100	1,100	1.10	200
WLCM1005Z0□56NTB	56	G, H, J	8	100	1,000	1.10	200
WLCM1005Z0□68NTB	68	G, H, J	8	100	800	1.20	200
WLCM1005Z0□82NTB	82	J	8	100	600	1.30	200
WLCM1005Z0□R10TB	100	J	8	100	600	1.60	200
WLCM1005Z0□R12TB	120	J	8	100	600	1.60	150
WLCM1005Z0□R15TB	150	J	8	100	550	3.20	140

Typical Electrical Characteristic



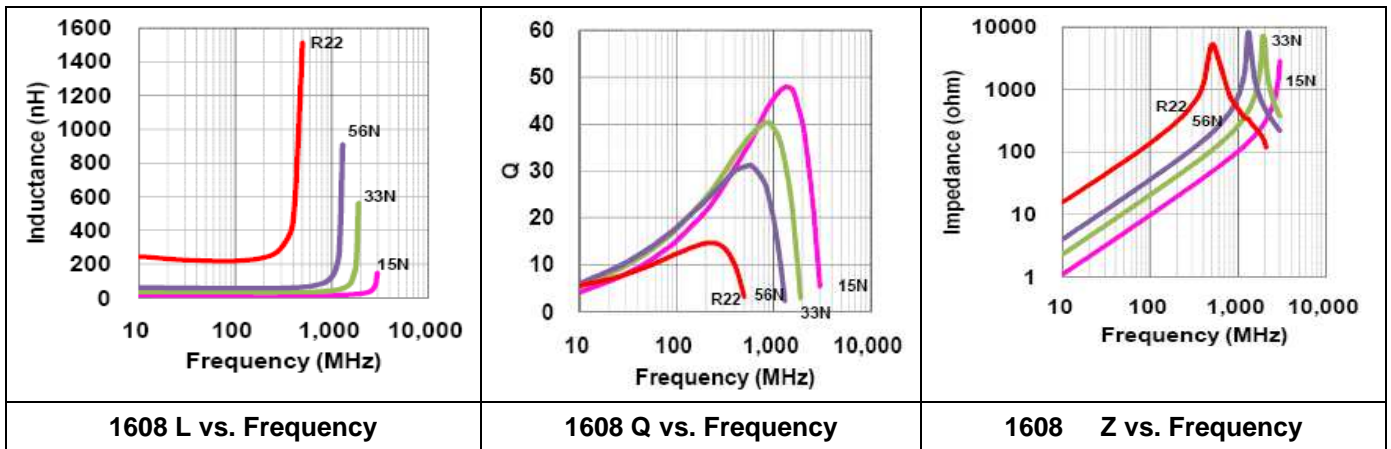
## Electrical Characteristics

- WLCM1608 series (EIA 0603)

Operating Temperature range: -55°C to 125°C

Walsin Part Number	L (nH)	Tolerance	Q (Min.)	Freq. (MHz)	DCR(Ω) Max.	S.R.F (MHz) Min.	Rated Current (mA) Max.
WLCM1608Z2□1N0TB	1.0	S	8	100	0.05	10,000	1,000
WLCM1608Z2□1N2TB	1.2	S	8	100	0.05	10,000	1,000
WLCM1608Z2□1N5TB	1.5	S	8	100	0.10	10,000	1,000
WLCM1608Z2□1N8TB	1.8	S	8	100	0.10	10,000	1,000
WLCM1608Z2□2N2TB	2.2	S	8	100	0.10	8,000	1,000
WLCM1608Z2□2N7TB	2.7	S	10	100	0.13	7,000	1,000
WLCM1608Z2□3N3TB	3.3	S	10	100	0.13	6,000	1,000
WLCM1608Z2□3N9TB	3.9	S	10	100	0.15	6,000	1,000
WLCM1608Z2□4N7TB	4.7	S	10	100	0.20	5,000	1,000
WLCM1608Z2□5N6TB	5.6	S	10	100	0.23	4,000	600
WLCM1608Z2□6N8TB	6.8	J	10	100	0.25	4,000	700
WLCM1608Z2□8N2TB	8.2	J	10	100	0.28	3,500	600
WLCM1608Z2□10NTB	10	J	12	100	0.30	3,400	600
WLCM1608Z2□12NTB	12	J	12	100	0.35	2,600	600
WLCM1608Z2□15NTB	15	J	12	100	0.40	2,300	600
WLCM1608Z2□18NTB	18	J	12	100	0.45	2,000	600
WLCM1608Z2□22NTB	22	J	12	100	0.50	1,600	600
WLCM1608Z2□27NTB	27	J	12	100	0.55	1,400	600
WLCM1608Z2□33NTB	33	J	12	100	0.60	1,200	600
WLCM1608Z2□39NTB	39	J	12	100	0.65	1,100	500
WLCM1608Z2□47NTB	47	J	12	100	0.70	900	500
WLCM1608Z2□56NTB	56	J	12	100	0.75	900	500
WLCM1608Z2□68NTB	68	J	12	100	0.85	700	400
WLCM1608Z2□82NTB	82	J	12	100	0.95	600	300
WLCM1608Z2□R10TB	100	J	12	100	1.00	600	300
WLCM1608Z2□R12TB	120	J	8	50	1.20	500	300
WLCM1608Z2□R15TB	150	J	8	50	1.20	500	300
WLCM1608Z2□R18TB	180	J	8	50	1.30	400	300
WLCM1608Z2□R22TB	220	J	8	50	1.50	400	300
WLCM1608Z2□R27TB	270	J	8	50	1.90	400	200
WLCM1608Z2□R33TB	330	J	8	50	2.10	350	200
WLCM1608Z2□R39TB	390	J	8	50	2.30	350	150
WLCM1608Z2□R47TB	470	J	8	50	2.60	300	150

### Typical Electrical Characteristic



### GENERAL TECHNICAL DATA

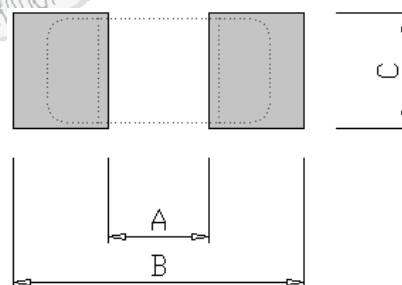
1. Operating temperature range: - 55°C ~ +125°C
2. Storage Condition: Less than 40°C and 70% RH
3. Storage Time: 6 months Max. (Size:0603、1005)  
12month Max. (Size:1608)
4. Soldering method: Reflow

### TEST INSTRUMENTS CONDITIONS

1. Agilent E4991A RF Impedance
2. Material Analyzer with fixture 16197A or equivalent (Size:0603、1005)
3. Material Analyzer with fixture 16192A (Size:1608)
4. Agilent 4338B Milliohm meter
5. Test Level : 500mV

### LAND PATTERNS REFLOW SOLDERING

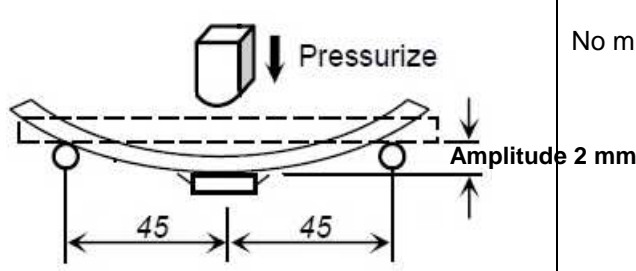
Solder land information :



Size(mm)	A	B	C
0603 (EIA 0201)	0.2 ~ 0.3 (0.008 ~ 0.012)	0.8 ~ 0.9 (0.031 ~ 0.035)	0.2 ~ 0.3 (0.008 ~ 0.012)
1005 (EIA 0402)	0.4 (0.016)	1.4 ~ 1.5 (0.055 ~ 0.059)	0.5 ~ 0.6 (0.020 ~ 0.024)
1608 (EIA 0603)	0.7 (0.028)	1.9 ~ 2.3 (0.075 ~ 0.091)	0.6 ~ 0.8 (0.024 ~ 0.031)

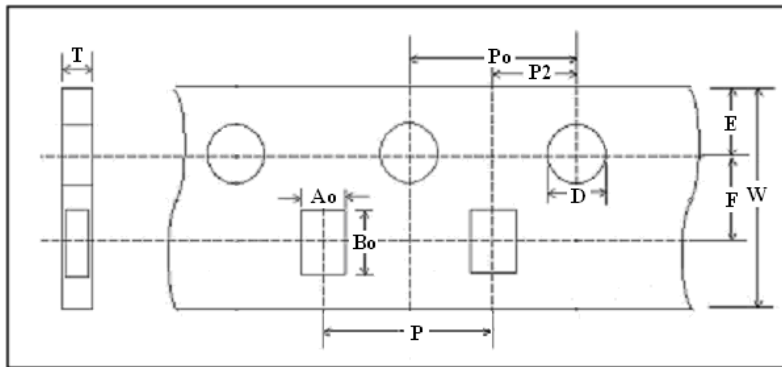
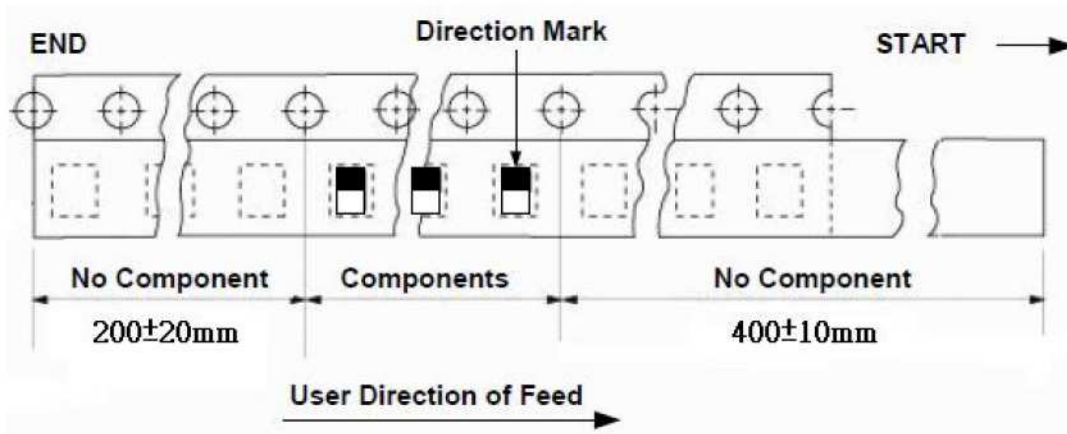


Test condition & Requirements (WLCM series)

Item	Test Condition	Requirements
<b>Temperature Cycle</b>	<ol style="list-style-type: none"> <li>1. Temperature : -55 ~ +125°C</li> <li>2. Cycle : 100 cycles</li> <li>3. Dwell time : 30minutes</li> <li>4. Measurement : at ambient temperature 24 hours after test completion</li> </ol>	<ol style="list-style-type: none"> <li>1. No mechanical damage</li> <li>2. Inductance value should be within <math>\pm 10\%</math> of the initial value</li> <li>3. Q vale should be within <math>\pm 20\%</math> of the initial value</li> </ol>
<b>Operational Life</b>	<ol style="list-style-type: none"> <li>1. Temperature: 85 <math>\pm</math> 5°C</li> <li>2. Testing time: 1000 hours</li> <li>3. Applied current: Full rated current</li> <li>4. Measurement: At ambient temperature 24 hours after test completion</li> </ol>	<ol style="list-style-type: none"> <li>1. No mechanical damage</li> <li>2. Inductance value should be within <math>\pm 10\%</math> of the initial value</li> <li>3. Q vale should be within <math>\pm 20\%</math> of the initial value</li> </ol>
<b>Biased Humidity</b>	<ol style="list-style-type: none"> <li>1. Temperature : 40°C <math>\pm</math> 2°C</li> <li>2. Humidity : 90 ~ 95 % RH</li> <li>3. Test time : 1000 hours</li> <li>4. Apply current : full rated current</li> <li>5. Measurement : at ambient temperature 24 hours after test completion</li> </ol>	<ol style="list-style-type: none"> <li>1. No mechanical damage</li> <li>2. Inductance value should be within <math>\pm 10\%</math> of the initial value</li> <li>3. Q vale should be within <math>\pm 20\%</math> of the initial value</li> </ol>
<b>Resistance to Solder Heat</b>	<ol style="list-style-type: none"> <li>1. Solder temperature : 260 <math>\pm</math> 5°C</li> <li>2. Flux : Rosin</li> <li>3. DIP time : 10 <math>\pm</math> 1 sec</li> </ol>	<ol style="list-style-type: none"> <li>1. More than 95 % of terminal electrode should be covered with new solder</li> <li>2. Inductance value should be within <math>\pm 10\%</math> of the initial value</li> <li>3. Q vale should be within <math>\pm 20\%</math> of the initial value</li> </ol>
<b>Solderability</b>	<ol style="list-style-type: none"> <li>1. Solder temperature : 235 <math>\pm</math> 5°C</li> <li>2. Flux : Rosin</li> <li>3. DIP time : 5 <math>\pm</math> 1 sec</li> </ol>	<ol style="list-style-type: none"> <li>1. More than 95 % of terminal electrode should be covered with new solder</li> <li>2. No mechanical damage</li> </ol>
<b>Bending Strength</b>	<ol style="list-style-type: none"> <li>1. Solder the chip to test jig then apply a force in the direction shown in below.</li> <li>2. The soldering shall be done with the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock.</li> </ol> 	No mechanical damage

## Packaging Specification

### Leader and Trailer Tape

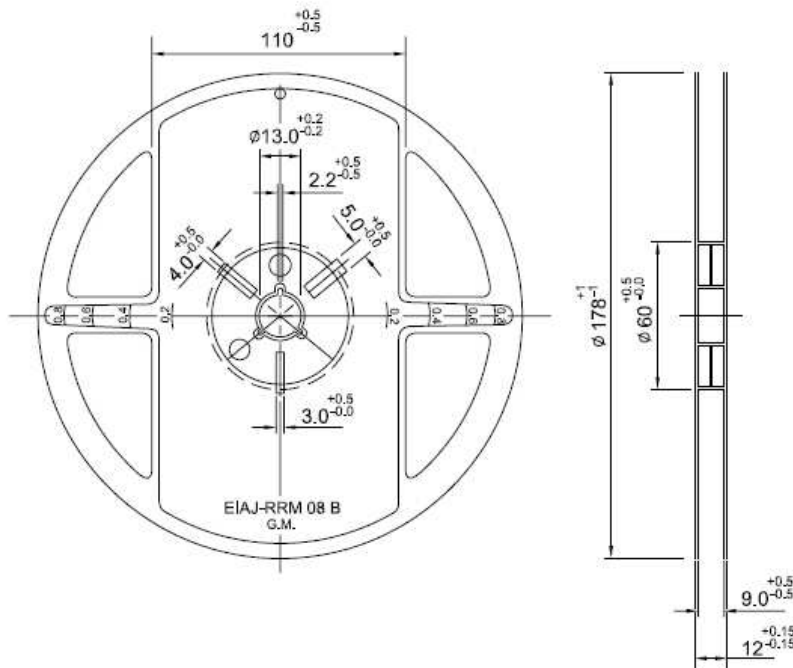


### Taping Dimension

(mm)	0603	1005	1608
Symbol	PAPER	PAPER	PAPER
W	$8.00 \pm 0.10$	$8.00 \pm 0.10$	$8.00 \pm 0.10$
P	$2.00 \pm 0.05$	$2.00 \pm 0.05$	$4.00 \pm 0.10$
E	$1.75 \pm 0.05$	$1.75 \pm 0.05$	$1.75 \pm 0.05$
F	$3.50 \pm 0.05$	$3.50 \pm 0.05$	$3.50 \pm 0.05$
D	$1.55 \pm 0.05$	$1.55 \pm 0.05$	$1.55 \pm 0.05$
P <sub>o</sub>	$4.00 \pm 0.10$	$4.00 \pm 0.10$	$4.00 \pm 0.10$
P <sub>2</sub>	$2.00 \pm 0.05$	$2.00 \pm 0.05$	$2.00 \pm 0.05$
A <sub>o</sub>	$0.36 \pm 0.02$	$0.60 \pm 0.03$	$0.98 \pm 0.03$
B <sub>o</sub>	$0.66 \pm 0.02$	$1.12 \pm 0.03$	$1.80 \pm 0.05$
T	$0.42 \pm 0.02$	$0.60 \pm 0.03$	$0.95 \pm 0.05$

**Packaging Specification**  
Reel

Unit : mm



**Quantity per reel**

7" Reel Packaging Quantity			
PART SIZE (EIA SIZE)	0603 (0201)	1005 (0402)	1608 (0603)
Qty.(pcs)	15,000	10,000	4,000
BOX	5 reels / inner box		

**RECOMMENDED SOLDERING CONDITIONS**

