APPLICATION

GMLI chip inductors can be used in a variety of electronics including:

- CD-ROMs
- Hard disks
- Modems
- Computers
- Printers
- Televisions

FEATURES

GMLI chip inductors are Mag.Layers line of high quality ferrite chip inductors. Using the latest innovations in multilayer technology, we have developed reliable chip inductors that have high quality characteristics.

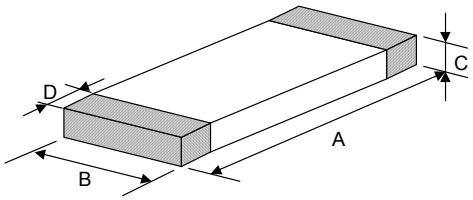
- **High Performance Characteristics**
  GMLI chips exhibit low DC resistance and high Q at high frequency.
- **Wide Inductance Range**
  GMLI chip inductors cover a wide range of inductance values from 0.047 μH to 220 μH.
- **High Reliability**
  GMLI chip inductors have a monolithic inorganic material construction that effectively minimizes electromagnetic interference.
- **High Soldering Heat Resistance**
  GMLI chip inductors have high quality termination allowing both flow and reflow soldering methods to be used.

PRODUCT IDENTIFICATION

GMLI	-	201209	-	1R0	J	□
①		②		③	④	⑤

① Product Code
② Dimension Code
③ Inductance
④ Tolerance Code: J=±5%, K=±10%, M=±20%
⑤ Code for Special Specification

PRODUCT DIMENSION



NOTE：Dimensions in mm

PRODUCT NO.	A	B	C	D
GMLI-201212 (0805)	2.0±0.20 (0.079±0.008)	1.2±0.20 (0.047±0.008)	1.2±0.20 (0.047±0.008)	0.5±0.30 (0.020±0.012)
GMLI-201209 (0805)	2.0±0.20 (0.079±0.008)	1.2±0.20 (0.047±0.008)	0.9±0.20 (0.035±0.008)	0.5±0.30 (0.020±0.012)

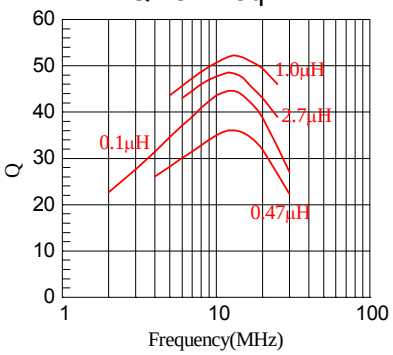
ELECTRICAL REQUIREMENTS

Part Number	Inductance (μH)	Q Min.	Test Freq. (MHz)	S.R.F. (MHz) Min.	R_{DC} (Ω) Max.	Rated Current (mA) Max.
GMLI-201209-47N□	0.047	15	50	320	0.20	300
GMLI-201209-68N□	0.068			280		
GMLI-201209-82N□	0.082			255		
GMLI-201209-R10□	0.10	20	25	235	0.30	250
GMLI-201209-R12□	0.12			220		
GMLI-201209-R15□	0.15			200	0.40	
GMLI-201209-R18□	0.18			185		
GMLI-201209-R22□	0.22			170	0.50	
GMLI-201209-R27□	0.27			150		
GMLI-201209-R33□	0.33			145	0.55	
GMLI-201209-R39□	0.39	25		135	0.65	200
GMLI-201209-R47□	0.47			125	0.65	
GMLI-201209-R56□	0.56			115	0.45	150
GMLI-201209-R68□	0.68			105	0.80	
GMLI-201209-R82□	0.82			100	1.00	
GMLI-201209-1R0□	1.0	45	10	75	0.40	50
GMLI-201209-1R2□	1.2			65	0.50	
GMLI-201209-1R5□	1.5			60		
GMLI-201209-1R8□	1.8			55	0.60	
GMLI-201209-2R2□	2.2			50	0.65	30
GMLI-201212-2R7□	2.7			45	0.75	
GMLI-201212-3R3□	3.3			41	0.80	
GMLI-201212-3R9□	3.9	45	10	38	0.90	15
GMLI-201212-4R7□	4.7			35	1.00	
GMLI-201212-5R6□	5.6	50	4	32	0.90	
GMLI-201212-6R8□	6.8			29	1.00	
GMLI-201212-8R2□	8.2			26	1.10	
GMLI-201212-100□	10		2	24	1.15	
GMLI-201212-120□	12		1	22	1.25	
GMLI-201212-150□	15	30		19	0.80	5
GMLI-201212-180□	18			18	0.90	
GMLI-201212-220□	22			16	1.10	
GMLI-201212-270□	27			14	1.15	
GMLI-201212-330□	33		0.4	13	1.25	

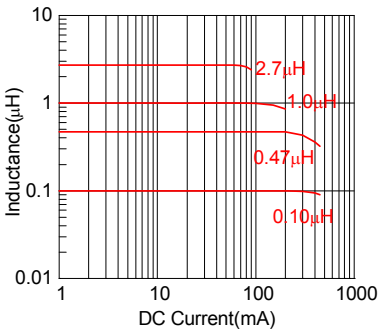
- Inductance change should be less than ±10% when rated current is applied.

TYPICAL ELECTRICAL CHARACTERISTICS (T=25℃)

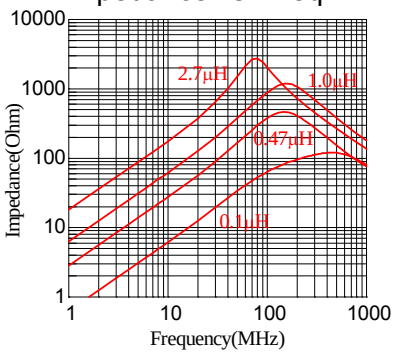
Q vs. Freq



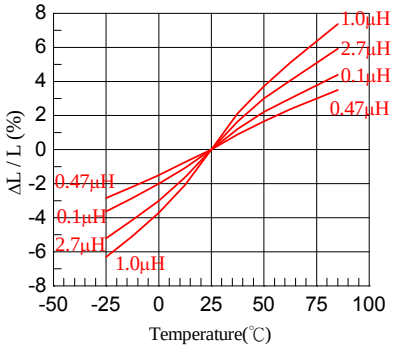
Inductance vs. Current



Impedance vs. Freq.



Inductance vs. Temp.



MEASURING METHOD / CONDITION

●Test Instrument:

L/Q: Agilent 4291B Impedance Analyzer
Test Fixture: Agilent 16192
Osc. Level: 500mV for L≦8.2 μH
100mV for L≧10 μH

SRF: Agilent 4291B Impedance Analyzer

R_{DC}: Agilent 34401A

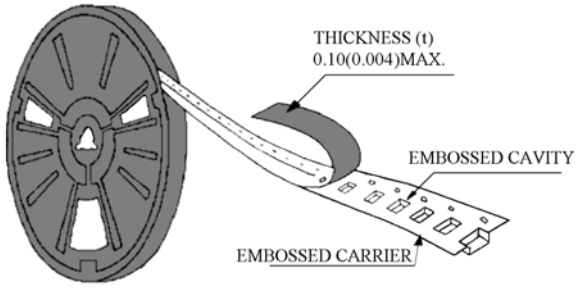
●Test Condition:

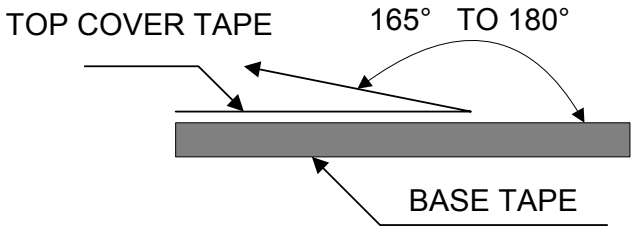
< Unless otherwise specified >
Temperature: 15°C to 35°C Humidity: 25% to 85% RH

< In case of doubt >
Temperature: 25°C ± 2°C Humidity: 60% to 70% RH

PACKAGING

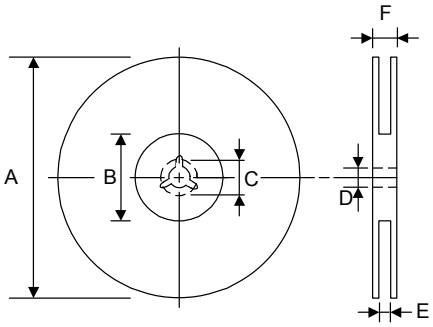
- **Peel-off Force**



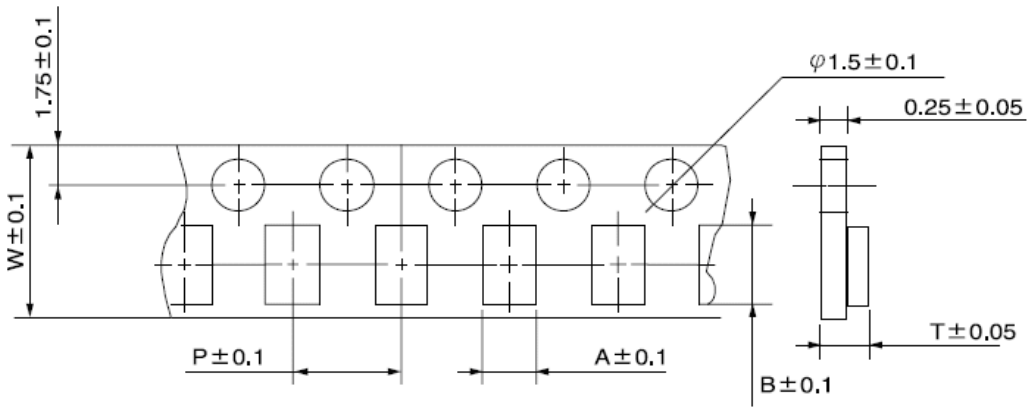


The force for peeling off cover tape is 10 grams in the arrow direction.

- **Dimension** (Unit: mm)

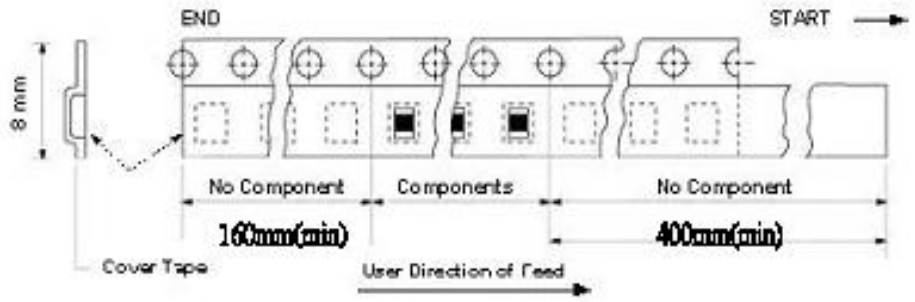


TYPE	A	B	C	D	E	F
8 mm	178±1	60 +0.5 -0	-	13 ±0.2	9 ±0.5	12 ±0.5
12 mm	178±0.3	60 ±0.2	19.3 ±0.1	13.5 ±0.1	13.6 ±0.1	-



TYPE	SIZE	A	B	W	P	T		CHIPS/REEL
GMLI	201209	1.5	2.3	8	4	1.3,	*0.95±0.10	4000
	201212	1.5	2.3	8	4	1.3		4000

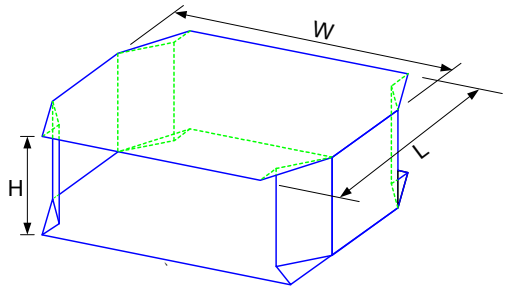
*For Paper Reels



- **Taping Quantity**

SERIES	2012
PCS/Reel	4000

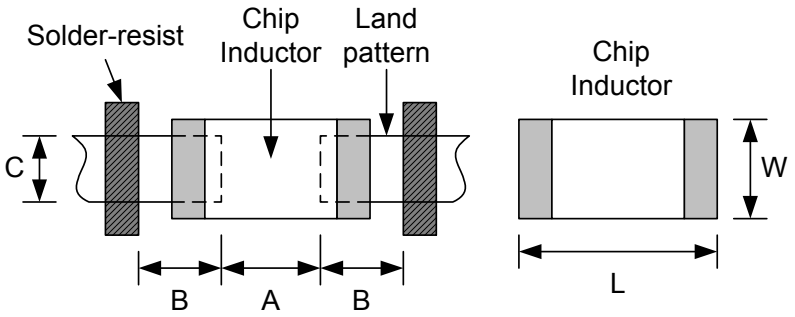
- **Tape Packing Case**



No. of Reels	W	L	H
2	18±0.5	18±0.5	2.4±0.2
3	18±0.5	18±0.5	3.6±0.2
4	18±0.5	18±0.5	4.8±0.2
5	18±0.5	18±0.5	6.0±0.2

Unit: cm

RECOMMENDED PCB LAYOUT

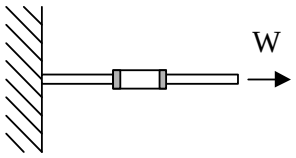
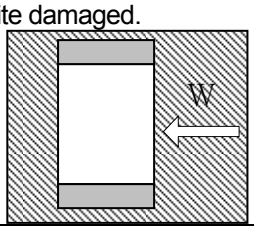
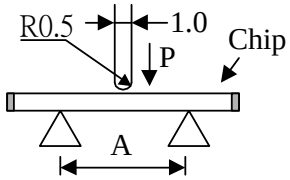
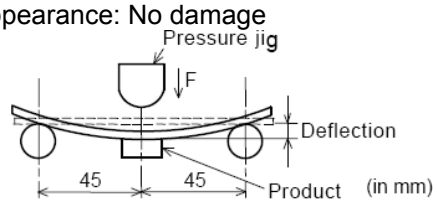


Unit: mm

Type		2012
Size	L	2.0
	W	1.2
A		0.8~1.2
B		0.8~1.2
C		0.9~1.6

RELIABILTY TEST

•Mechanical Performance Test

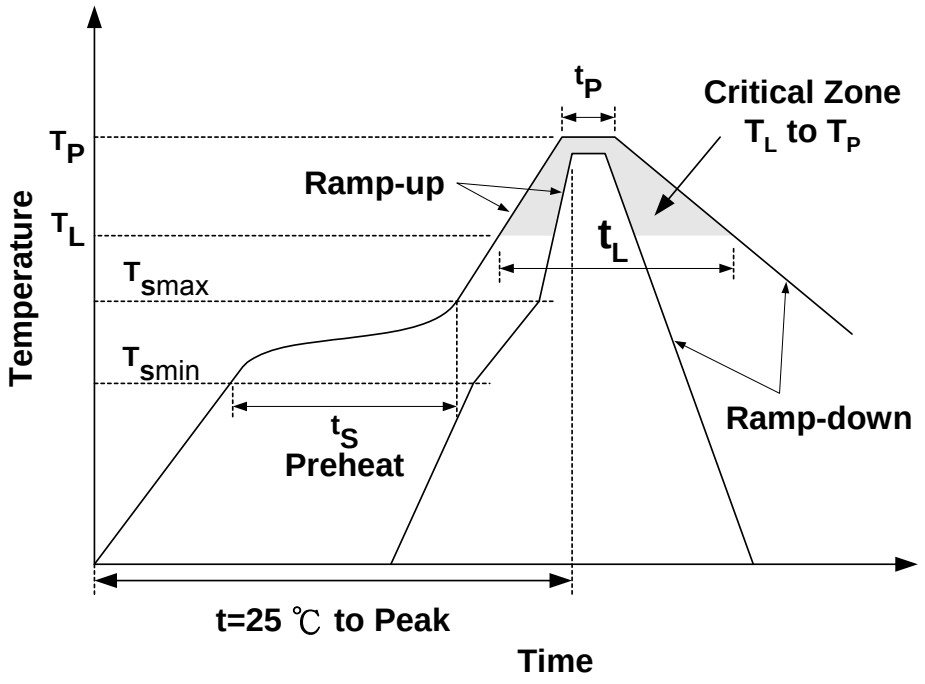
ITEM	SPECIFICATION	TEST CONDITION
Solderability	More than 90% of the terminal electrode shall be covered with fresh solder.	Solder: 96.5Sn-3.0Ag-0.5Cu Solder Temperature: 245 ± 5℃ Flux: Rosin Dip Time: 3 ± 1 Seconds
Soldering Heat Resistance	The chip shall not crack. More than 75% of the terminal electrode shall be covered with solder.	Solder: 96.5Sn-3.0Ag-0.5Cu Solder temperature : 260 ± 5℃ Flux: Rosin Dip time: 10 ± 1 seconds
Terminal Strength	The terminal electrode shall not be broken off nor the ferrite damaged. 	TYPE / W(KGF) / TIME (SEC) GMLI-160808 GMLI-201209 — 0.6 — 30 ± 5 GMLI-201212
Terminal Strength	The terminal electrode shall not be broken off nor the ferrite damaged. 	TYPE / W(KGF) / TIME (SEC) GMLI-160808 GMLI-201209 — 1.0 — 10 ± 5 GMLI-201212
Bending Strength	No mechanical damage. The ferrite shall not be damaged. 	TYPE / A(MM) / P(KGF) GMLI-160808 GMLI-201209 — 0.6 — 1.0 GMLI-201212 — 1.0 — 1.4
Bending Test	Appearance: No damage 	Substrate: PCB(100mm×40mm×1.6mm) Solder: Reflow Speed of Applying Force: 0.5mm / s Deflection: 2mm Hold Duration: 30 s
Vibration	Impedance shall be within ± 20% of the initial value. There shall be no mechanical damage.	The sample shall be soldered onto the printed circuit board and when a vibration having an amplitude of 1.52mm and a frequency of from 10 to 55Hz/1 minute repeated should be applied to the 3 directions (X,Y,Z) for 2 hours each.
Drop shock	No apparent damage	Dropped onto printed circuit board from 100cm height three times in x, y, z directions. The terminals shall be protected.

• Climatic test

ITEM	SPECIFICATION	TEST CONDITION
Thermal Shock (Temperature Cycle)	Impedance shall be within ± 20% of the initial value.	Temperature: -55℃~125℃ for 30 minutes each, 100 cycles.
Humidity Resistance		Temperature : 60℃ Humidity: 95% RH Time: 1000 ± 12 Hours
High Temperature Resistance		Temperature : 85℃±2℃ Time: 1000 ± 12 Hours
Low Temperature Resistance		Temperature : -40℃±2℃ Time: 1000 ± 12 Hours

1. Operating Temperature Range: -55 ℃ TO +125℃
2. Storage Condition: The temperature should be within -40℃~85℃ and humidity should be less than 75% RH. The product should be used within 6 months from the time of delivery.

RECOMMENDED REFLOW SOLDERING PROFILE



Profile Feature		Sn-Pb	Pb-Free
Preheat	t_s	60~120 seconds	60~180 seconds
	T_{smin}	100℃	150℃
	T_{smax}	150℃	200℃
Average ramp-up rate (T_{smax} to T_P)		3℃/second max.	3℃/second max.
Time main above	Temperature (T_L)	183℃	217℃
	Time (t_L)	60~150 seconds	60~150 seconds
Peak temperature (T_P)		230℃	250~260℃
Time within 5℃ of actual peak temperature (t_P)		10 seconds	10 seconds
Ramp-down rate		6℃/sec max.	6℃/sec max.
Time 25℃ to peak temperature		6 minutes max.	8 minutes max.

NOTES

The contents of this data sheet are subject to change without notice. Please confirm the specifications and delivery conditions when placing your order.