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.

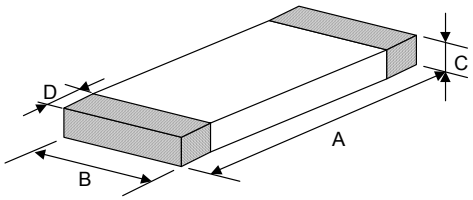
- **High Performance Characteristics**
  GMLI chips exhibit low DC resistance and high Q at high frequency.
- **Wide Inductance Range**
  GMLI chip inductors cover a wide range of inductance values from 0.047 μH to 220 μH.
- **High Reliability**
  GMLI chip inductors have a monolithic inorganic material 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	-	160808	-	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-321611 (1206)	3.2±0.20 (0.126±0.008)	1.6±0.20 (0.063±0.008)	1.1±0.20 (0.043±0.008)	0.5±0.30 (0.020±0.012)
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)
GMLI-160808 (0603)	1.6±0.15 (0.063±0.006)	0.8±0.15 (0.031±0.006)	0.8±0.15 (0.031±0.006)	0.3±0.20 (0.012±0.008)
GMLI-100505 (0402)	1.0±0.10 (0.039±0.004)	0.5±0.10 (0.019±0.004)	0.5±0.10 (0.019±0.004)	0.25±0.10 (0.0095±0.004)

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-100505-R12□	0.12	10	25	180	0.70	25
GMLI-100505-R15□	0.15			165	0.90	
GMLI-100505-R18□	0.18			150	1.10	
GMLI-100505-R22□	0.22			135	1.30	
GMLI-100505-R27□	0.27			120	1.50	
GMLI-100505-R33□	0.33			105	1.70	
GMLI-100505-R39□	0.39	20	10	85	0.60	10
GMLI-100505-R47□	0.47			80	0.70	

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

Part Number	Inductance (μH)	Q Min.	Test Freq. (MHz)	S.R.F. (MHz) Min.	R_{DC} (Ω) Max.	Rated Current (mA) Max.
GMLI-160808-47N□	0.047	10	50	260	0.30	50
GMLI-160808-68N□	0.068			250		
GMLI-160808-82N□	0.082			245		
GMLI-160808-R10□	0.10	15	25	240	0.50	
GMLI-160808-R12□	0.12			205		
GMLI-160808-R15□	0.15			180	0.60	
GMLI-160808-R18□	0.18			165		
GMLI-160808-R22□	0.22			150	0.80	
GMLI-160808-R27□	0.27			136		
GMLI-160808-R33□	0.33			125	0.85	35
GMLI-160808-R39□	0.39			110	1.00	
GMLI-160808-R47□	0.47			105	1.35	
GMLI-160808-R56□	0.56			95	1.55	
GMLI-160808-R68□	0.68			90	1.70	
GMLI-160808-R82□	0.82			85	2.10	
GMLI-160808-1R0□	1.0	35	10	75	0.60	25
GMLI-160808-1R2□	1.2			65	0.80	
GMLI-160808-1R5□	1.5			60		
GMLI-160808-1R8□	1.8			55	0.95	
GMLI-160808-2R2□	2.2			50	1.15	15
GMLI-160808-2R7□	2.7			45	1.35	
GMLI-160808-3R3□	3.3			40	1.55	
GMLI-160808-3R9□	3.9			35	1.70	
GMLI-160808-4R7□	4.7			33	2.10	
GMLI-160808-5R6□	5.6		4	22	1.55	5
GMLI-160808-6R8□	6.8			20	1.70	
GMLI-160808-8R2□	8.2			18	2.10	
GMLI-160808-100□	10	30	2	17	1.85	3
GMLI-160808-120□	12			15	2.10	
GMLI-160808-150□	15	20	1	14	1.70	1

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

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	0.75	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-201209-2R7□	2.7			45	0.75	
GMLI-201209-3R3□	3.3			41	0.80	
GMLI-201209-3R9□	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.

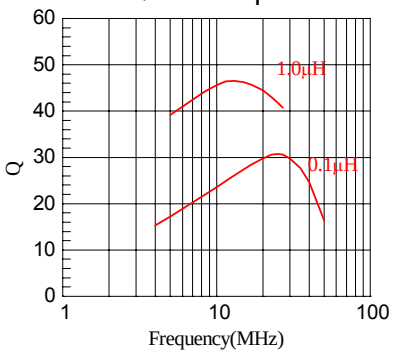
Part Number	Inductance (μH)	Q Min.	Test Freq. (MHz)	S.R.F. (MHz) Min.	R_{DC} (Ω) Max.	Rated Current (mA) Max.
GMLI-321611-47N□	0.047	20	50	320	0.15	300
GMLI-321611-68N□	0.068			280	0.25	
GMLI-321611-R10□	0.10		25	235		250
GMLI-321611-R12□	0.12			250	0.30	
GMLI-321611-R15□	0.15			200		
GMLI-321611-R18□	0.18			185	0.40	
GMLI-321611-R22□	0.22			170	050	
GMLI-321611-R27□	0.27			150		
GMLI-321611-R33□	0.33			145	0.60	
GMLI-321611-R39□	0.39	25		135	0.50	200
GMLI-321611-R47□	0.47			125	0.60	
GMLI-321611-R56□	0.56			115	0.70	150
GMLI-321611-R68□	0.68			105	0.80	
GMLI-321611-R82□	0.82			100	0.90	
GMLI-321611-1R0□	1.0	30	10	75	0.40	100
GMLI-321611-1R2□	1.2			65	0.50	
GMLI-321611-1R5□	1.5			60		50
GMLI-321611-1R8□	1.8			55		
GMLI-321611-2R2□	2.2			50	0.60	
GMLI-321611-2R7□	2.7			45		
GMLI-321611-3R3□	3.3			41	0.70	
GMLI-321611-3R9□	3.9			38	0.80	
GMLI-321611-4R7□	4.7			35	0.90	
GMLI-321611-5R6□	5.6	35	4	32	0.70	25
GMLI-321611-6R8□	6.8			29	0.90	
GMLI-321611-8R2□	8.2			26		
GMLI-321611-100□	10		2	24	1.00	25
GMLI-321611-120□	12			22	1.05	15
GMLI-321611-150□	15	30	1	19	0.70	5
GMLI-321611-180□	18	30	1	18	0.70	
GMLI-321611-220□	22			16	0.90	
GMLI-321611-270□	27			14		
GMLI-321611-330□	33		0.4	13	1.05	

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

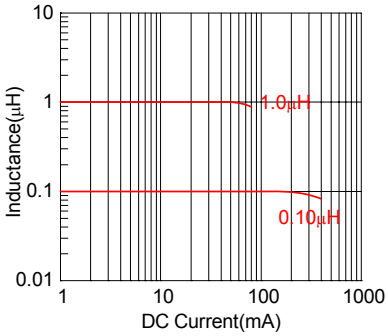
ELECTRICAL CHARACTERISTICS (T=25℃)

GMLI-1608

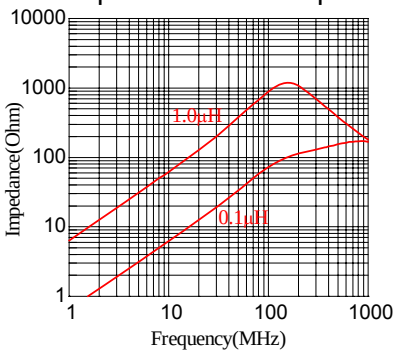
Q vs. Freq.



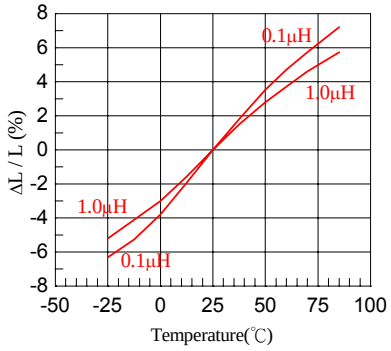
Inductance vs. Current



Impedance vs. Freq.

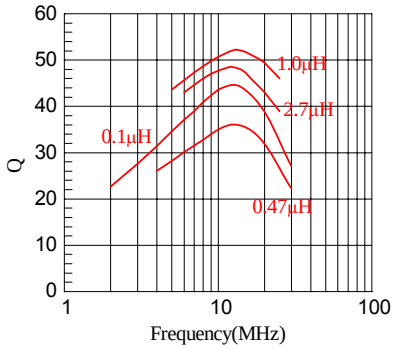


Inductance vs. Temp.

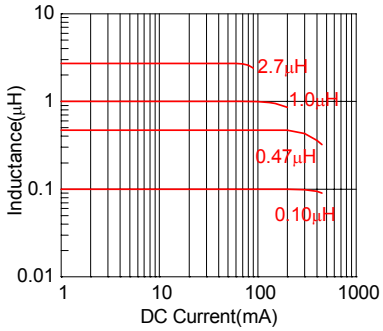


GMLI-2012

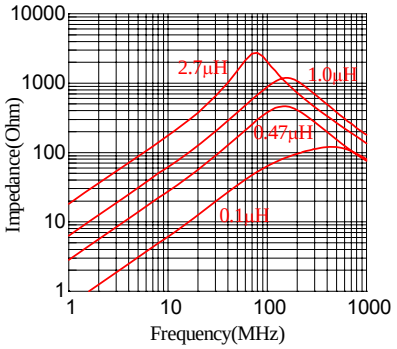
Q vs. Freq



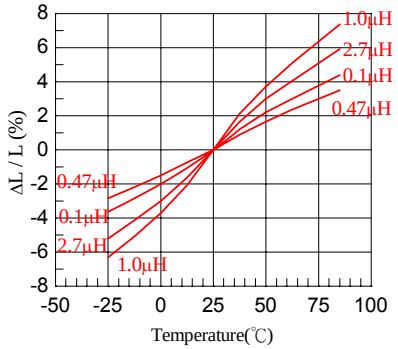
Inductance vs. Current



Impedance vs. Freq.

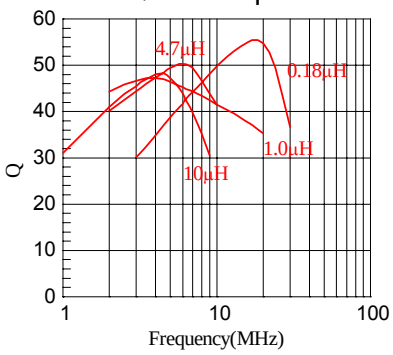


Inductance vs. Temp.

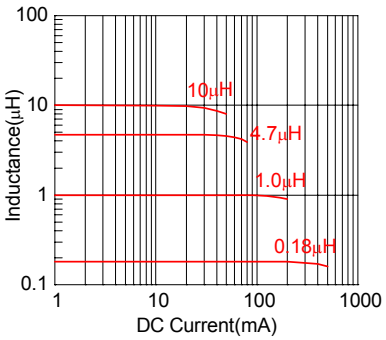


GMLI-3216

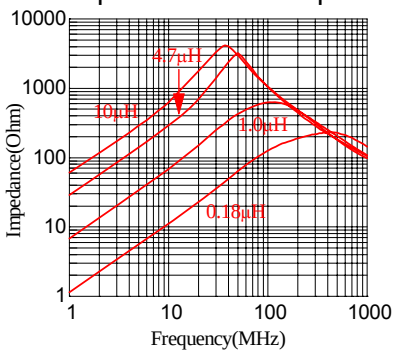
Q vs. Freq.



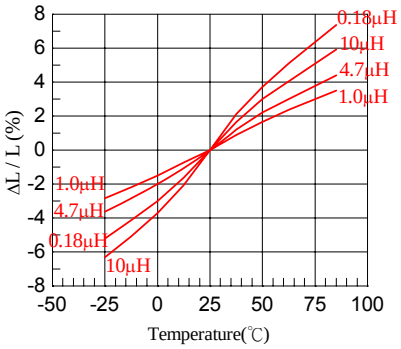
Inductance vs. Current



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

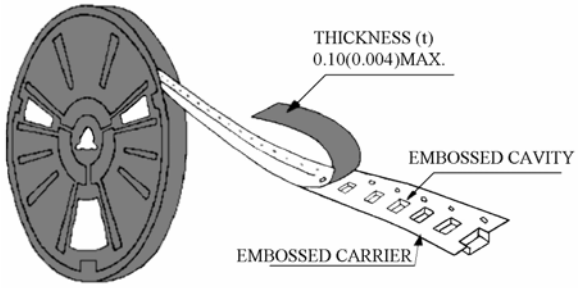
- Test Condition:

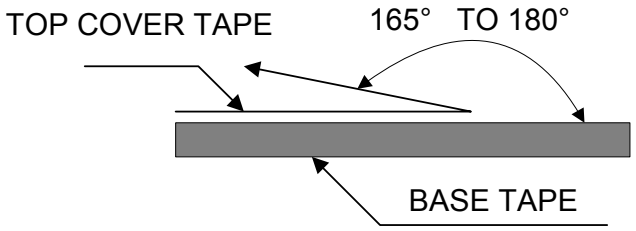
< Unless otherwise specified >
Temperature: 15°C to 35°C Humidity: 25% to 85% RH

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

PACKAGING

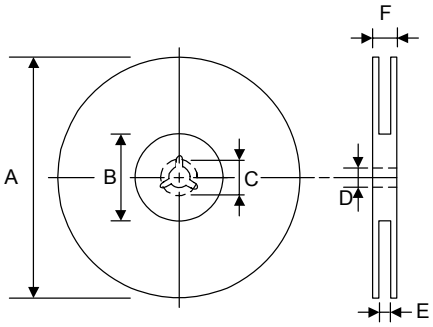
- **Peel-off Force**



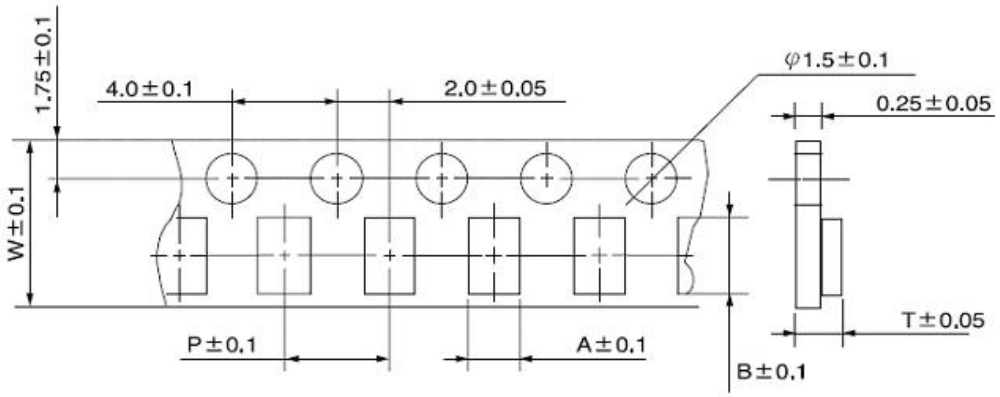


The force for peeling off cover tape is 10 grams in the arrow direction.

- **Dimension** (Unit: mm)

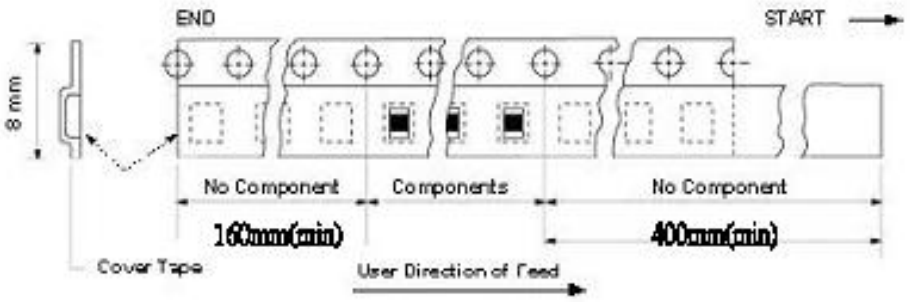


TYPE	A	B	C	D	E	F
8 mm	178±1	60 +0.5 -0	-	13 ±0.2	9 ±0.5	12 ±0.5
12 mm	178±0.3	60 ±0.2	19.3 ±0.1	13.5 ±0.1	13.6 ±0.1	-



TYPE	SIZE	A	B	W	P	T	CHIPS/REEL
GMLI	100505	0.6	1.1	8	2	1.0	10000
	160808	1.1	1.9	8	4	1.1, *0.95±0.05	4000
	201209	1.5	2.3	8	4	1.3, *0.95±0.10	4000
	201212	1.5	2.3	8	4	1.3	3000
	321611	1.9	3.5	8	4	1.5	3000

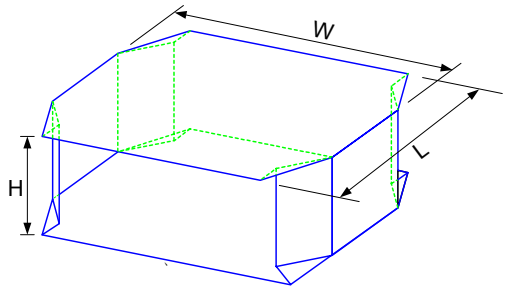
*For Paper Reels



- **Taping Quantity**

SERIES	4532	4516	3225	3216	2012 1608	1005
PCS/Reel	1000	2000	2500	3000	4000	10000

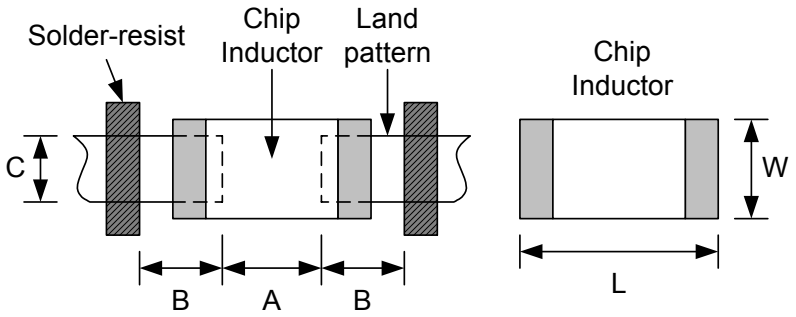
- **Tape Packing Case**



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

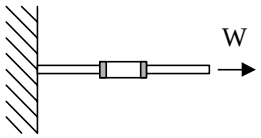
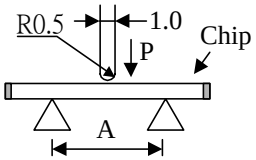


Unit: mm

Type		1005	1608	2012	3216
Size	L	1.0	1.6	2.0	3.2
	W	0.5	0.8	1.2	1.6
A		0.45~0.55	0.6~0.8	0.8~1.2	1.8~2.2
B		0.40~0.50	0.6~0.8	0.8~1.2	1.1~1.6
C		0.40~0.50	0.6~0.8	0.9~1.6	0.9~1.6

RELIABILTY TEST

•MECHANICAL PERFORMANCE TEST

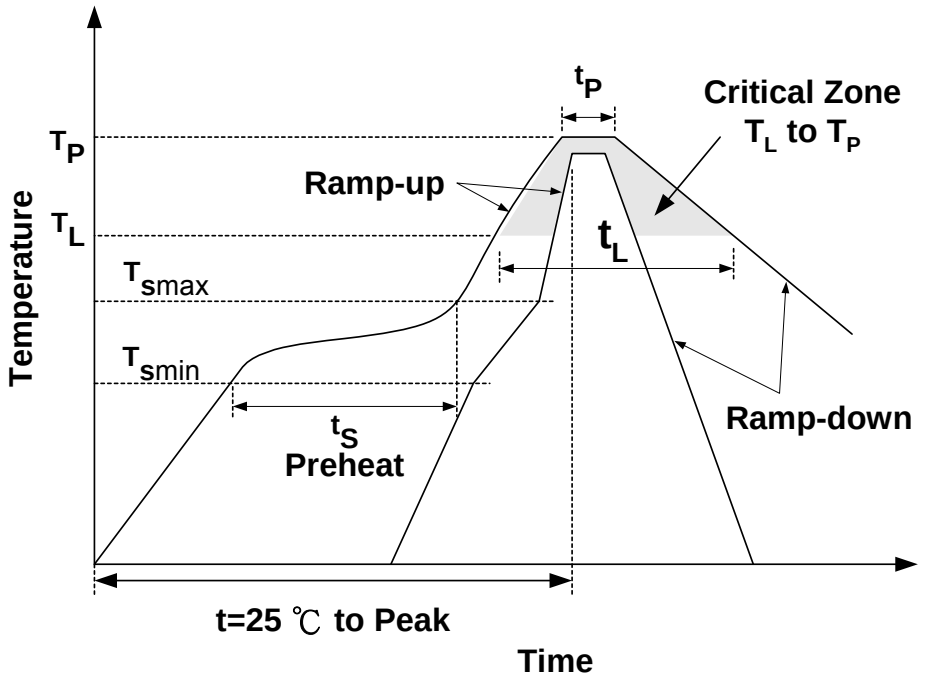
ITEM	SPECIFICATION	TEST CONDITION		
Solderability	More than 90% of the terminal electrode shall be covered with fresh solder.	Solder: Sn-3.0Ag-0.5Cu Solder Temperature: 240 ± 5℃ Flux: Rosin Dip Time: 3 ± 1 Seconds		
Soldering Heat Resistance	The chip shall not crack. More than 75% of the terminal electrode shall be covered with solder.	Solder 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-100505	0.2	30±5
		GMLI-160808	0.6	
		GMLI-201209/12	0.6	
		GMLI-321611	1.0	
Bending Strength	No mechanical damage. The ferrite shall not be damaged. 	TYPE	A(MM)	P(KGF)
		GMLI-100505	0.4	0.2
		GMLI-160808	1.0	0.6
		GMLI-201209/12	1.4	1.0
		GMLI-321611	2.0	2.0

• CLIMATIC TEST

ITEM	SPECIFICATION	TEST CONDITION
Thermal Shock (Temperature Cycle)	No mechanical damage. Inductance shall be within ± 5% of the initial value, and Q (shall be) within ± 30% of the initial value.	Temperature: -40℃,85℃ 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.