ISO9001 & ISO14001 & TS16949 **CHILISIN ELECTRONICS CORP.**

Lead-Free & RoHs Compliance!!

SPECIFICATION FOR APPROVAL

CUSTOMER :	EL TECH		
CUSTOMER P/N :			
OUR DWG No :	CE1-370004		
QUANTITY :	X Pcs.	DATE :	2013/7/3
ITEM :	LVM202012-4R7M-NT		

SPECIFICATION ACCEPTED BY:	
COMPONENT ENGINEER	
ELECTRICAL ENGINEER	
MECHANICAL ENGINEER	
APPROVED	
REJECTED	

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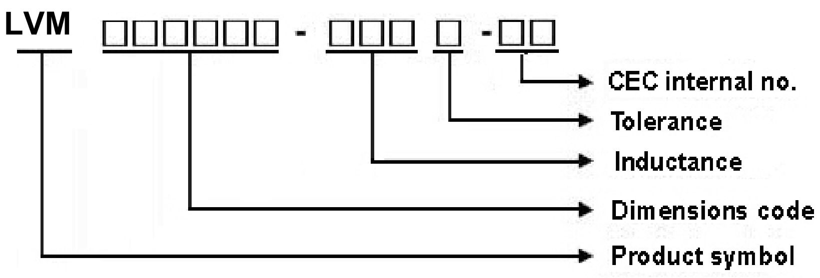
YG12B01561

LVM202012 Series Specification

1 Scope: This specification applies to SMD Power Inductor

2 Part Numbering: Product Identification



3 Rating:

Operating Temperature range: **−40℃～125℃(Including self - heating)**

Storage Temperature range: **-40℃～85℃ (For products in unopened tape package -5 to 40℃)**

4 Marking:

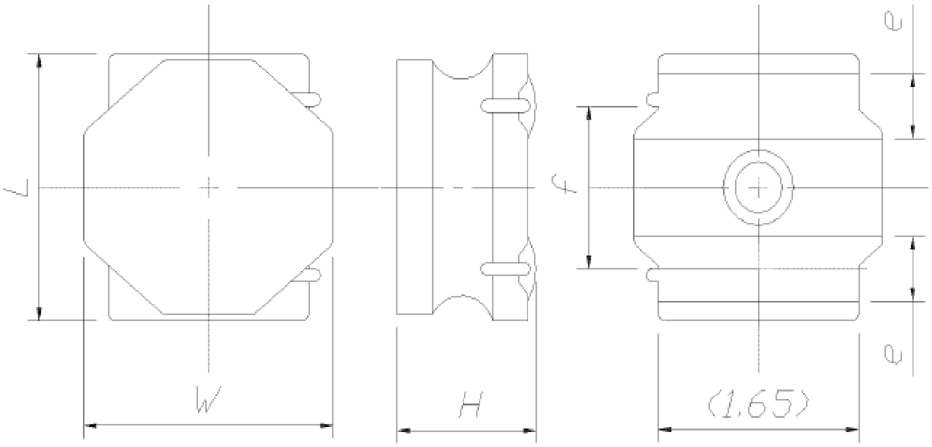
NO Marking

5 Standard Testing Condition

	Unless otherwise specified	In case of doubt
Temperature	Ordinary Temperature(20±15℃)	20±2℃
Humidity	Ordinary Humidity(65 ± 20%)	65 ± 5%

LVM202012 Series Specification

6 Configuration and Dimensions:



Description	Mark	Dimensions
Length	L	2.0±0.15
Width	W	2.0±0.15
Height	H	1.2Max.
Width of Electrode	e	0.50±0.2
Space between electrodes	f	1.25±0.2

(Unit: mm)

7 ELECTRICAL CHARACTERISTICS :

Ordering Code	Nominal Inductance [μH]	Inductance Tolerance [%]	D.C. Resistance [mΩ]		Rated Current [mA]			
			Typ	Max	Saturation Current Idc1(Typ)	Temperature Rise Current Idc2(Typ)	Saturation Current Idc1(max)	Temperature Rise Current Idc2(max)
LVM202012-4R7M-NT	4.7	±20	210	242	1300	1050	1150	950

Absolute maximum voltage: DC25V

*) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20 deg C)

*) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40 deg C. (at 20 deg C)

*) The rated current is the DC current value that satisfies both of current saturation current value and temperature rise current value.

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※ Caution for Temperature Rise.

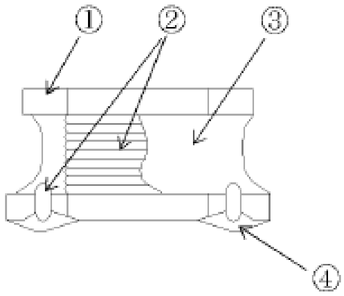
Temperature rise of this inductor depends on the installed board condition.

It shall be confirmed in the actual end product that temperature rise of inductor is within operating temperature.

LVM202012 Series Specification

8 LVM202012 Series

structural drawing



① Core	Metal magnetic core	
② Winding wire	Polyurethane-copper wire	
③ Over-coating resin	Epoxy resin, containing Metal magnetic powder	
④ Electrode	External electrode (substrate)	Ag
	External electrode (top surface solder coating)	Sn－Ag－Cu

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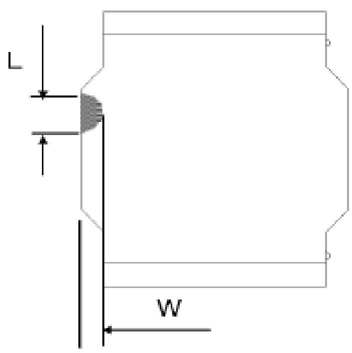
Core chipping

The appearance standard of the chipping size in top side, of bottom side metal magnetic core is following dimension.

L	W
0.4mmMax.	0.4mmMax.



LVM202012 Series Specification

10 TEST DATA FOR PREPRODUCTION SAMPLES

QF-1419

DESCRIPTION: LVM202012-4R7M-NT

MEAS. Item		L (uH)	RDC (mΩ)Max	Isat (mA)Typ.		L m/m	W m/m	H m/m				
Spec	Customer	4.7±20%										
	Suggest		242	1300		2.0±0.15	2.0±0.15	1.2 Max.				
Test Freq.		1MHz 1V										
1		4.04	220	1400		2.06	2.04	1.15				
2		4.32	223	1300		2.06	2.04	1.16				
3		4.15	221	1300		2.07	2.05	1.14				
4		4.27	221	1300		2.06	2.05	1.14				
5		4.06	220	1400		2.07	2.06	1.13				
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
$\overline{X}$		4.168	221	1340		2.064	2.048	1.144				
R		0.28	3	100		0.01	0.02	0.03				
CUSTOMER												
SAMPLE												

TEST INSTRUMENT:

L: Agilent/HP4284A+Agilent/HP42841A

RDC: DIGITAL MILLIOHM METER Chroma 16502, or equivalent

Isat & Irms: Agilent/HP4284A+Agilent/HP42841A

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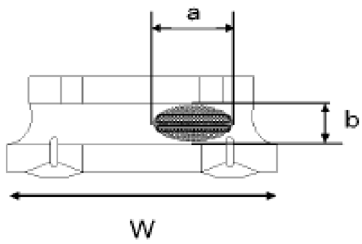
Exposed wire tolerance limit of coating resin part on product side
Size of exposed wire occurring to coating resin is specified below.



① Width direction(dimension a) : Acceptable when a<=w/2
Nonconforming when a>w/2

② Length direction (dimension b) : Dimension b is not specified.

③ When total area of exposed wire occurring to each sides is not greater than 50% of coating resin area, that is acceptable.

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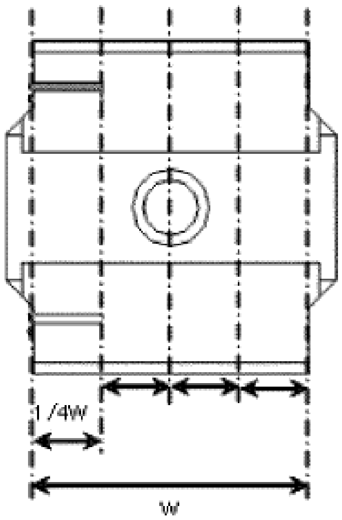
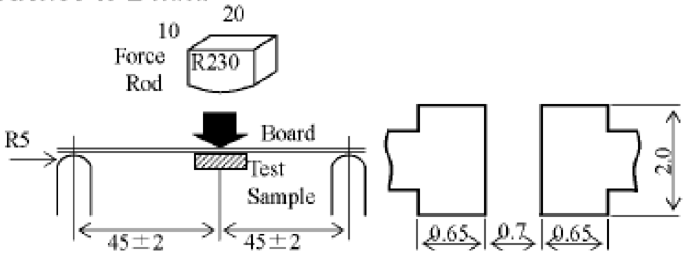
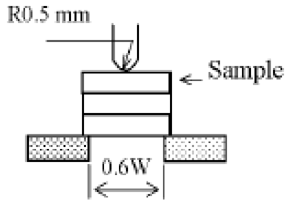
Electrode appearance criterion for exposed wire



Cross section of joint part	Appearance judgment
Only top side of wire is exposed. (regardless of whole tope side of wire exposed)	Good
Wire is soldered insufficiently and less than half of outer diameter is covered with solder.	Less than one-quarter of width of insufficiently soldered portion shall be acceptable. (More than one-quarter shall be segregated as reject.)

LVM202012 Series Specification

13 MECHANICAL Characteristics

Resistance to deflection	No damage.	The test samples shall be soldered to the test board by the reflow soldering conditions show in Table 15 As illustrated below, apply force in the direction of the arrow indicating until deflection of the test board reaches to 2 mm.  Land dimensions Test board size : 100×40×1.0 Test board material: glass epoxy-resin Solder cream thickness: 0.1 Unit: mm
Adhesion of Terminal electrode	Shall not come off PC board	The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 15  Applied force: 10 N to X and Y directions. Duration: 5 s. Solder cream thickness: 0.1 mm (Refer to recommended Land Pattern Dimensions defined in "Precaution")
Body strength	No damage.	Applied force: 20 N Duration: 10 s 

14 ENVIRONMENT TESTS

<table>
<tr><th>Test Item</th><th>Standard</th><th>Test method</th></tr>
<tr><td>Resistance to vibration</td><td>ΔL/L : within±10 %
No abnormality observed in appearance.</td><td>The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 15 Then it shall be submitted to below test conditions.
<table>
<tr><td>Frequency range</td><td>10Hz ～55 Hz</td></tr>
<tr><td>Total Amplitude</td><td>1.5 mm（May not exceed acceleration 196 m/S²）</td></tr>
<tr><td>Sweeping Method</td><td>10Hz to 55Hz to 10 Hz for 1 min.</td></tr>
<tr><td>Time</td><td>For 2 hours on each X, Y, and Z axis.</td></tr>
</table></td></tr>
<tr><td>Resistance to soldering heat (Reflow)</td><td>ΔL/L : within±10 %
No abnormality observed in appearance.</td><td>The test sample shall be exposed to reflow oven at 230±5 deg C for 40 seconds, with peak temperature at 260±5 deg C for 5 seconds, 2 times.

Test board thickness: 1.0 mm
Test board material: glass epoxy-resin</td></tr>
<tr><td>Solderability</td><td>At least 90 % of surface of terminal electrode is covered by new solder.</td><td>The test samples shall be dipped in flux, and then immersed in molten solder as shown in below table.
Flux: Methanol solution containing rosin 25 %.
<table>
<tr><td>Solder Temperature</td><td>245±5 deg C</td></tr>
<tr><td>Time</td><td>5±1.0 s.</td></tr>
<tr><td>Immersing Speed</td><td>25 mm/s</td></tr>
</table></td></tr>
<tr><td>Temperature characteristics</td><td>ΔL/L : within±10 %
No abnormality observed in appearance.</td><td>Measurement of inductance shall be taken at temperature range within -40 deg C to +125 deg C.
With reference to inductance value at +20 deg C, change rate shall be calculated.</td></tr>
<tr><td>Thermal shock</td><td>ΔL/L : within±10 %
No abnormality observed in appearance.</td><td>The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 15
The test samples shall be placed at specified temperature for specified time by step 1 to step 4 as shown in below table in sequence.
The temperature cycle shall be repeated 100 cycles.

Conditions of steps for 1 cycle
<table>
<tr><th>Step</th><th>Temperature</th><th>Time (min)</th></tr>
<tr><td>1</td><td>-40±3 deg C</td><td>30±3</td></tr>
<tr><td>2</td><td>Room Temp.</td><td>3 maximum</td></tr>
<tr><td>3</td><td>85±2 deg C</td><td>30±3</td></tr>
<tr><td>4</td><td>Room Temp</td><td>3 maximum</td></tr>
</table></td></tr>
<tr><td>Low temperature life test</td><td>ΔL/L : within±10 %
No abnormality observed in appearance.</td><td>The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 15
After that, the test samples shall be placed at test conditions as shown in below table.
<table>
<tr><td>Temperature</td><td>-40±2 deg C</td></tr>
<tr><td>Time</td><td>500 +24/-0 h</td></tr>
</table></td></tr>
</table>

14 ENVIRONMENT TESTS

Test Item	Standard	Test method
Loading at high temperature life test	ΔL/L : within±10 % No abnormality observed in appearance.	The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 15 The test samples shall be placed in thermostatic oven set at specified temperature and applied the rated current continuously as shown in below table. Temperature: 85±2 deg C Applied current: Rated current (Refer to Table 1) Time: 500 +24/-0 h
Damp heat life test	ΔL/L : within±10 % No abnormality observed in appearance.	The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 15 The test samples shall be placed in thermostatic oven set at specified temperature and humidity as shown in below table. Temperature: 60±2 deg C Humidity: 90～95 %RH Time: 500 +24/-0 h
Loading under damp heat life test	ΔL/L : within±10 % No abnormality observed in appearance.	The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 15 The test samples shall be placed in thermostatic oven set at specified temperature and humidity and applied the rated current continuously as shown in below table. Temperature: 60±2 deg C Humidity: 90～95 %RH Applied current: Rated current (Refer to Table 1) Time: 500 +24/-0 h

Standard measuring condition	Unless otherwise specified, the test samples are placed at room temperature and humidity and measured within 48 hours after exposure to test conditions.

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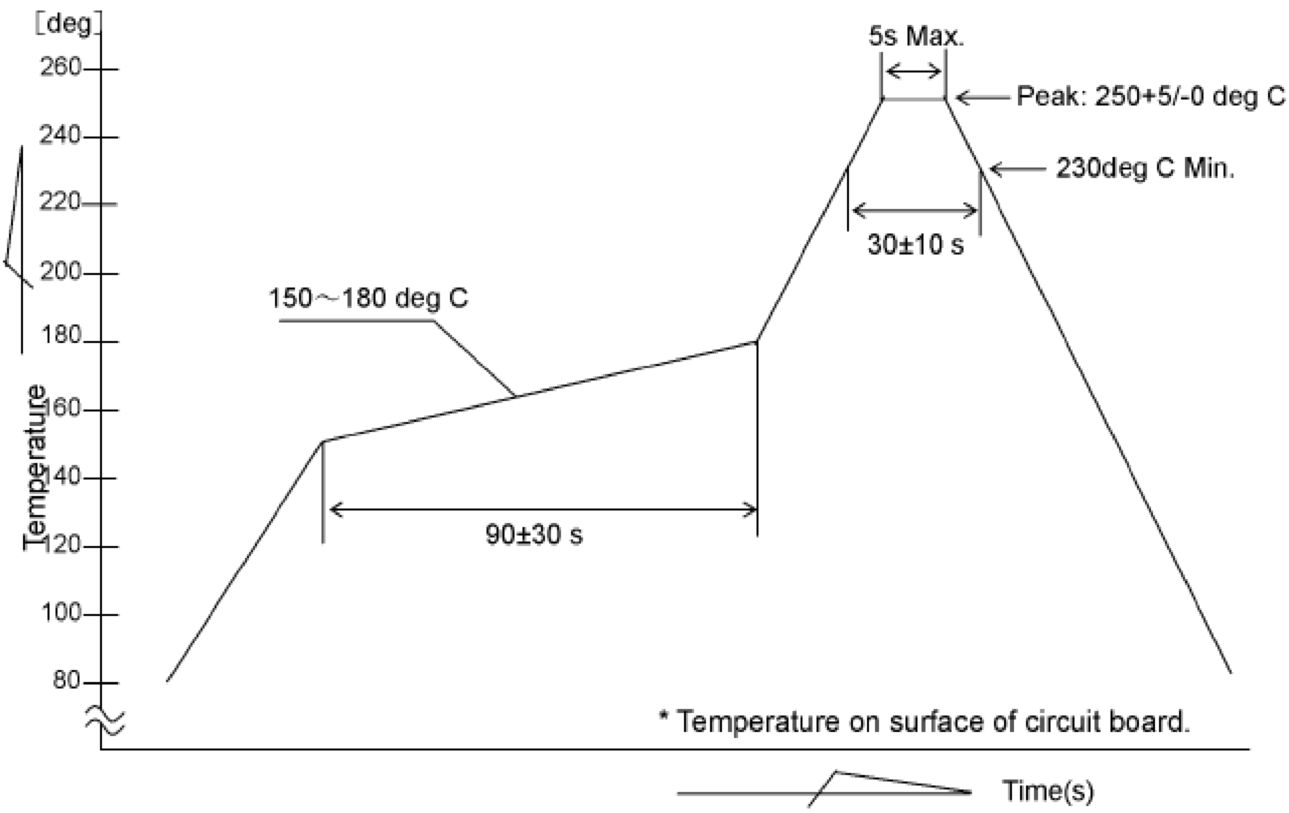
15 ENVIRONMENT TESTS



The products may be exposed to reflow soldering process of above profile up to two times.

LVM202012 Series Specification

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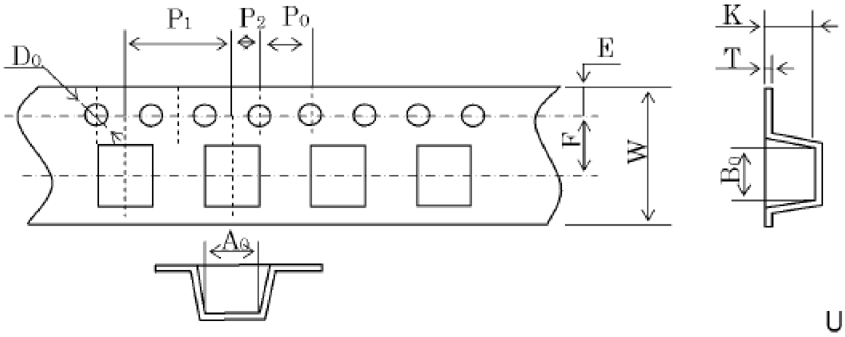
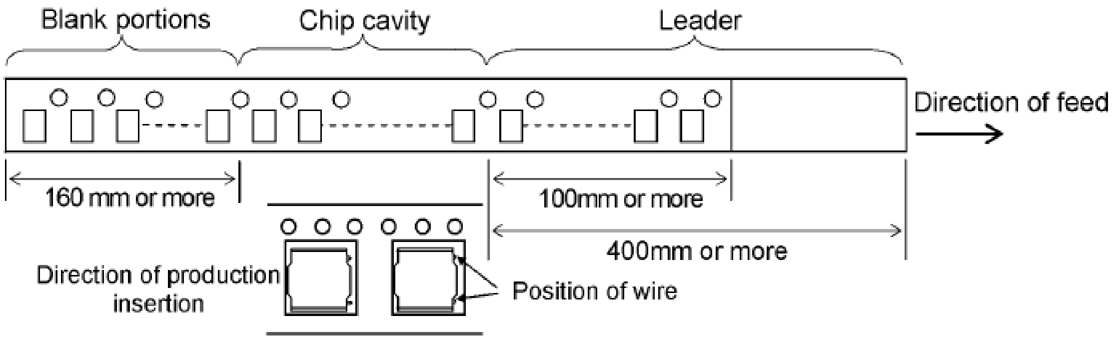
1. Dimensions



Unit: mm

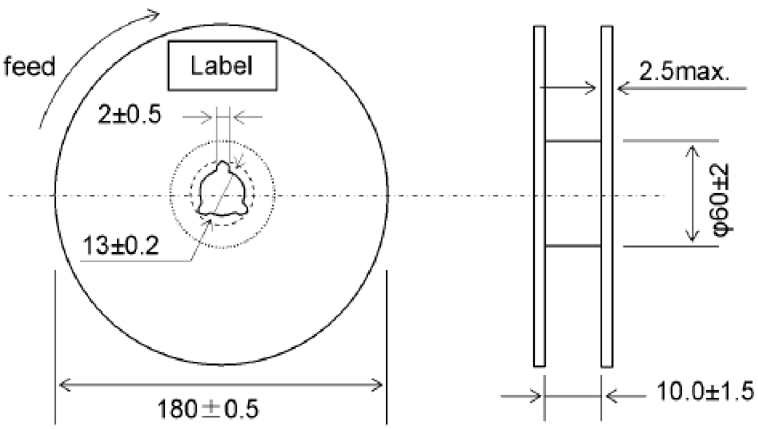
A_0	B_0	W	F	E	P_1	P_2	P_0	D_0	T	K
2.2 ±0.1	2.2 ±0.1	8.0 ±0.2	3.5 ±0.1	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	4.0 ±0.1	ϕ1.5 +0.1 −0	0.25 ±0.05	1.3 ±0.05

2. Direction of rolling



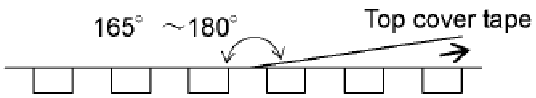
3. Reel

Unit: mm



Label position: On the opposite side of sprocket holes side of reel

4. Top tape strength



Peel-off strength	:	0.1 N~1.3 N
Peel-off angle	:	165° ~180°
Peel-off speed	:	300 mm/min

LVM202012 Series Specification

17 PACKING FORM

1. The number of components

A tape & reel package contains 2500 inductors.

2. Tape and Reel

Emboss carrier tape: 8mm-width and 4 mm-pitch
Reel: 180 mm-diameter

3. The allowable number of empty chip cavities

Maximum two (2) chip cavities missing product may exist in a reel but they may not be consecutive two cavities.

4. Marking

The following items shall be marked legibly on per tape & reel package.

(1) Customer part No.
(2) Our part No.
(3) Supplier name (TAIYO YUDEN CO., LTD.)
(4) Control No.
(5) Date (stamp)
(6) Quantity
(7) Country of the origin

5. Dimensions of packing box (for Tape & Reel package)

Length	135 mm
Width	185 mm
Height	185 mm

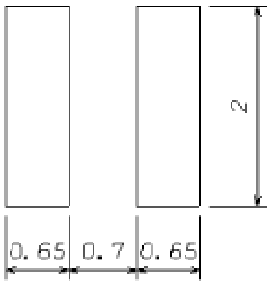
Standard Quantity: 25000 pcs.
A packing box contains 10 reels maximum.

LVM202012 Series Specification

16 Precautions

1. Surface Mounting

- Mounting and soldering conditions should be checked beforehand.
- Applicable soldering process to this products is reflow soldering only.
- Recommended Land-Pattern :



(Unit: mm)

2. Handling

- Keep the products away from all magnets and magnetic objects.
- Be careful not to subject the products to excessive mechanical shocks.
- Please avoid applying impact to the products after mounted on pc board.
- Avoid ultrasonic cleaning.
- Between the terminals on the bottom of the products, please do not provided pattern. Parts are arranged around the products (top panel, side) on the surface of the products. Please do not contact.

3. Storage

To prevent deterioration of the solderability of terminal electrodes and/or the packing materials of the products, please store the products under following storage conditions.

Ambient temperature range	-5 deg C to 40 deg C
Humidity	70 % RH maximum

Even under the ideal storage conditions, solderability of inductor's electrode deteriorates as time passes, so inductors should be used within 6 months after the delivery time.

4. Regarding Regulations

- Any Class－Ⅰ or Class－Ⅱ ozone-depleting substance (ODS) listed in the Clean Air Act in US for regulation is not included in the products or applied to the products at any stage of whose manufacturing processes.
- Certain brominated flame retardants (PBBs, PBDEs) are not used at all.
- The products of this specifications are not subject to the Export Trade Control Order in Japan or the Export Administration Regulations in US.

5. RoHS compliance

This product conforms to "RoHS compliance".

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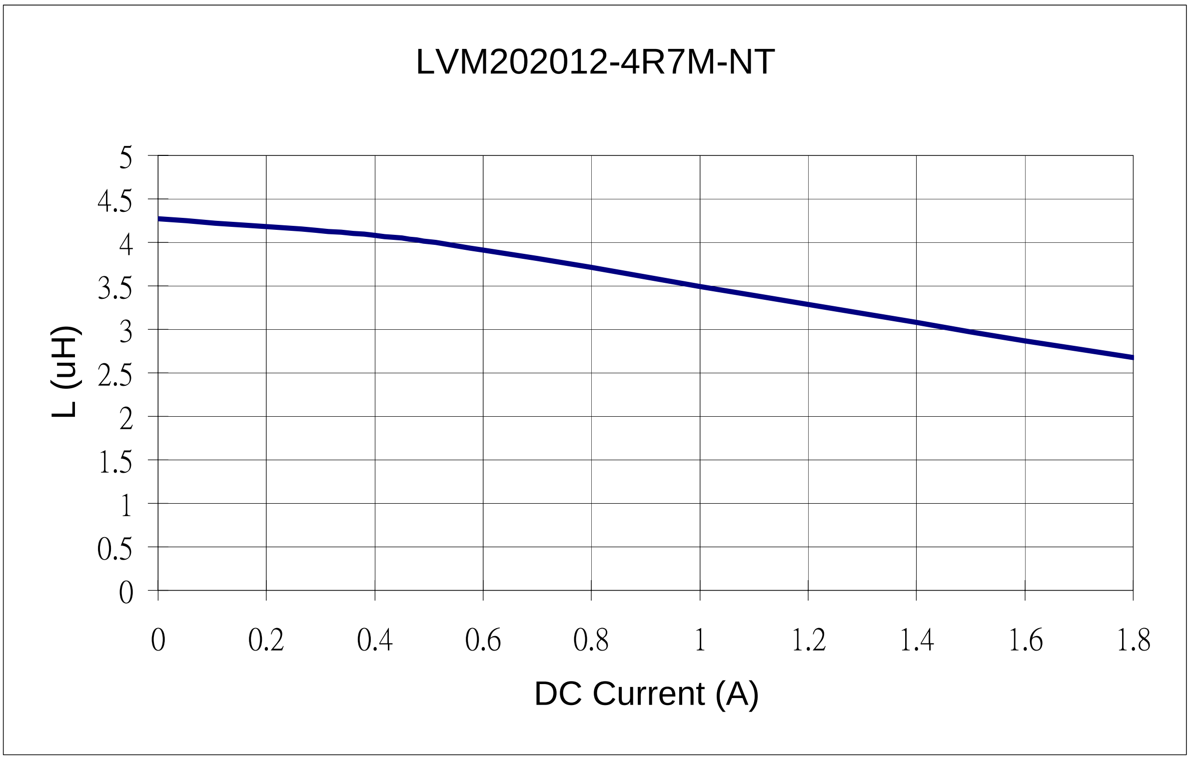
14 Curve:

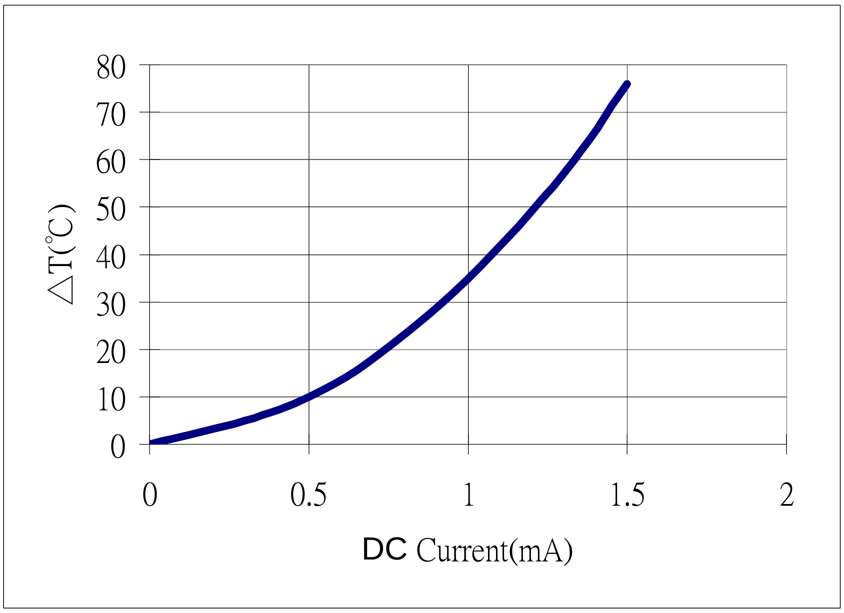
IDC(A)	L(uH)
0.0	4.27
0.4	4.08
0.6	3.91
0.8	3.71
1.0	3.49
1.2	3.29
1.4	3.08
1.6	2.87
1.8	2.68



LVM202012 Series Specification

18 Curve:

IDC(A)	△T(℃)	surface temp(℃)	time(minute)
0	0	25	30
0.3	5	30	30
0.5	10	35	30
0.7	18	43	30
1.0	35	60	30
1.3	57	82	30
1.5	76	101	30



Temperature test conditions:

1. Start as the atmosphere temp. @25℃.
2. Take the reading once it becomes stable.
3. Need to wait 90Sec at least, then change to the next applied current value.