🖄 Note • Please read rating and 🖄 CAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.	
This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.	

	Series	Structure	Size Code in inch (in mm)	Inductance Range (H) ) 0.1n 1n 10n 100n 1µ 10µ 100µ 1m 10m 10m 100m 1 10 100
	DFE252008C p310		1008 (2520)	) 470nH 47µH 1.1А 3А
	DFE252010C p312		1008 (2520)	) 470nH 10μH 1Α 3.5A
	DFE252010F p344		1008 (2520)	330nH 1.3A 6.8A
	DFE252010P p332		1008 (2520)	) 330nH 47µН 1.7A 57A
	DFE252010R p324		1008 (2520)	) 1µН 47µН 1.4А 3А
	DFE252012C p314		1008 (2520)	1A 1A 3.8A
	DFE252012F p346		1008 (2520)	) 330nH 1.44 7.6A
	DFE252012P p334		1008 (2520)	) 330nH 47µН 2А 6.6А
	DFE252012R p326		1008 (2520)	1 1/4 4.7µн 1.7А 3.4А
	DFE322510C p316		1210 (3225)	470nH 10μΗ 1Α 3.8A
	DFE322512C p318		1210 (3225)	470nH 1.2A 47A
	DFE322512F p348		1210 (3225)	470nH 1.7A 6.7A
	FDSD0412 p350	-	1515 (4040)	) 330nH 4,7µН 2.5А 7,5А
	FDSD0415 p352		1515 (4040)	220nH 4,7µH 2.9A 12A
	FDSD0420 p354		1515 (4040)	
nes	FDSD0512 p356		2019 (5249)	
Inductors for Power Lines	FDSD0515 p358		2019 (5249)	
Nod	FDSD0518 p360	Wire Wound	2019 (5249)	
for	FDV0530 p364	Metal Alloy	2322 (5856)	
tors	FCUL0530 p378	Core Type	2322 (5857)	
Iduc	FCUL0624 p380		2726 (6866)	
<u> </u>	FCUL0630 p382		2726 (6866)	
	FDUE0640 p369		2726 (6967)	
	FDUE0650 p370		2726 (6967)	
	FDV0618 p365		2726 (6967)	
	FDV0620 p366	-	2726 (6967)	
	FDVE0630 p367		2726 (6967)	
	FDSD0630 p362		2726 (7066)	
	FCUL1040 p384		4239 (106100)	
	FCUL1060 p386		4239 (106100)	
	FDUE1040D p371		4239 (106100)	
	FDVE1040 p368		4239 (106100)	
	FDA1055 p375		4242 (108108)	
	FDUE1245 p372		4848 (123121)	
	FDA1254 p377		5049 (126125)	
	FDUE1260 p373		5050 (127127)	
	LQB15NN_10 p165		0402 (1005)	
	LQB18NN_10 p167		0603 (1608)	
	LQM18NN_00 P183	Multilayer Type	0603 (1608)	
	LQM21NN_10 p185		0805 (2012)	
its	LLB2520 p422		1008 (2520)	
Inductors for General Circuits	LLM2520 p423		1008 (2520)	
ral C	LQH31HN_03 p169		1206 (3216)	
jene	LQH31MN_03 p171		1206 (3216)	
for G	LLM3225 P425		1210 (3225)	
ors 1	LQH32MN_23 p173	Wire Wound Ferrite Core	1210 (3225)	
duct	LQH44NN_03 p181	Туре	1515 (4040)	
Ē	LQH43MN_03 p175			
	LQH43NN_03 P178		1812 (4532)	
	LQW04CA_00 p187		1812 (4532)	
			03019 (0805)	
	LQW15CA_00 P188		0402 (1005)	22nH 2µH 130mA 1.3A

Continued on the following page. 🖊

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#### Part Numbering

#### Inductors for General Use



#### 1 Product ID

Product ID	
LQ	Chip Inductors (Chip Coils)

#### 2 Structure

Code	Structure
В	Multilayer Type (Ferrite Core)
н	Wire Wound Type (Ferrite Core)
М	Multilayer Type (Ferrite Core)
W	Wire Wound Type (Ferrite Core)

#### 2 Dimensions (LxW)

Code	Nominal Dimensions (LxW)	Size Code (in inch)
04	0.8x0.4mm	03019
15	1.0x0.5mm	0402
18	1.6x0.8mm	0603
21	2.0x1.25mm	0805
31	3.2x1.6mm	1206
32	3.2x2.5mm	1210
43	4.5x3.2mm	1812
44	4.0x4.0mm	1515

#### Applications and Characteristics

Code	Series	Applications and Characteristics
с	LQW	for Choke
N	LQB/LQM	for Resonant Circuit
N	LQH	for Resonant Circuit
М		for Resonant Circuit (Coating Type)

#### Category

\_\_\_\_

Code	Category			
А	General Impedance Device (Near GHz Band)			
N	General	Standard Type		

#### Packaging

Code	Packaging	Series
к	Embossed Taping (ø330mm Reel)	LQH/LQM21*1
L	Embossed Taping (ø180mm Reel)	LQH/LQM21*1
В	Bulk	LQB/LQM/LQW
L	Paper Taping (ø330mm Reel)	LQB/LQM18/LQM21*2
D	Paper Taping (ø180mm Reel)	LQB/LQM18/LQM21*2/LQW

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\*1 LQM21N(2.7 - 4.7μH) only. \*2 LQM21N(0.1 - 2.2μH) only.

#### 6 Inductance

Expressed by three-digit alphanumerics. The unit is micro-henry ( $\mu$ H). The first and second figures are significant digits, and the third figure expresses the number of zeros that follow the two figures. If there is a decimal point, it is expressed by the capital letter "**R**." In this case, all figures are significant digits. If inductance is less than 0.1 $\mu$ H, the inductance code is expressed by a combination of two figures and the capital letter "**N**," and the unit of inductance is nano-henry (nH). The capital letter "**N**" indicates the unit of "nH," and also

expresses a decimal point. In this case, all figures are significant digits.

#### Inductance Tolerance

Code	Inductance Tolerance
J	±5%
к	±10%
М	±20%
N	±30%

#### 8 Features

Code	Features	Series
0	Standard Type	LQM*1/LQH*2/LQW
1	Standard Type	LQB/LQM21N
2	Standard Type	LQH32M

\*1 Except for LQM21N Series

\*2 Except for LQH32 Series

#### Selectrode

Lead (Pb) Free

Code	Electrode	Series
0	Sn	LQB/LQM/LQW
3	LF Solder	LQH

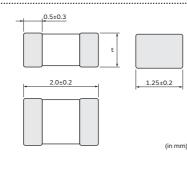
**TOKO Products** 

Inductors for Power Lines

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# Inductors for General Circuits LQM21NN\_10 Series 0805 (2012) inch (mm)

#### Appearance/Dimensions



Dimension of t	Inductance: 0.1 to 2.2µH	0.85±0.2
Dimension of t	Inductance: 2.7 to 4.7µH	1.25±0.2

#### Packaging (Inductance: 0.10µH to 2.2µH)

Code	Packaging	Minimum Quantity
D	ø180mm Paper Taping	4000
J	ø330mm Paper Taping	10000
В	Packing in Bulk	1000

#### Packaging (Inductance: $2.7\mu$ H to $4.7\mu$ H)

Code	Packaging	Minimum Quantity		
к	ø330mm Embossed Taping	10000		
L	ø180mm Embossed Taping	3000		
В	Packing in Bulk	1000		

#### Rated Value ( $\Box$ : packaging code)

Rated Value (L: pad							
Part Number	Inductance	Inductance Test Frequency	Q (min.)	Q Test Frequency	Rated Current	Max. of DC Resistance	S.R.F.* (min.)
LQM21NNR10K10	0.10µH ±10%	25MHz	20	25MHz	250mA	0.26Ω	340MHz
LQM21NNR12K10	0.12µH ±10%	25MHz	20	25MHz	250mA	0.29Ω	310MHz
LQM21NNR15K10	0.15µH ±10%	25MHz	20	25MHz	250mA	0.32Ω	270MHz
LQM21NNR18K10	0.18µH ±10%	25MHz	20	25MHz	250mA	0.35Ω	250MHz
LQM21NNR22K10	0.22µH ±10%	25MHz	20	25MHz	250mA	0.38Ω	220MHz
LQM21NNR27K10	0.27µH ±10%	25MHz	20	25MHz	250mA	0.42Ω	200MHz
LQM21NNR33K10	0.33µH ±10%	25MHz	20	25MHz	250mA	0.48Ω	180MHz
LQM21NNR39K10	0.39µH ±10%	25MHz	25	25MHz	200mA	0.53Ω	165MHz
LQM21NNR47K10	0.47µH ±10%	25MHz	25	25MHz	200mA	0.57Ω	150MHz
LQM21NNR56K10	0.56µH ±10%	25MHz	25	25MHz	150mA	0.63Ω	140MHz
LQM21NNR68K10	0.68µH ±10%	25MHz	25	25MHz	150mA	0.72Ω	125MHz
LQM21NNR82K10	0.82µH ±10%	25MHz	25	25MHz	150mA	0.81Ω	115MHz
LQM21NN1R0K10	1.0µH ±10%	10MHz	45	10MHz	50mA	0.40Ω	107MHz
LQM21NN1R2K10	1.2µH ±10%	10MHz	45	10MHz	50mA	0.47Ω	97MHz
LQM21NN1R5K10	1.5µH ±10%	10MHz	45	10MHz	50mA	0.50Ω	87MHz
LQM21NN1R8K10	1.8µH ±10%	10MHz	45	10MHz	50mA	0.57Ω	80MHz
LQM21NN2R2K10	2.2µH ±10%	10MHz	45	10MHz	30mA	0.63Ω	71MHz
LQM21NN2R7K10	2.7µH ±10%	10MHz	45	10MHz	30mA	0.69Ω	66MHz
LQM21NN3R3K10	3.3µH ±10%	10MHz	45	10MHz	30mA	0.80Ω	59MHz
LQM21NN3R9K10	3.9µH ±10%	10MHz	45	10MHz	30mA	0.89Ω	53MHz
LQM21NN4R7K10	4.7µH ±10%	10MHz	45	10MHz	30mA	1.00Ω	47MHz

Operating temp. range (Self-temp. rise not included): -40 to 85°C

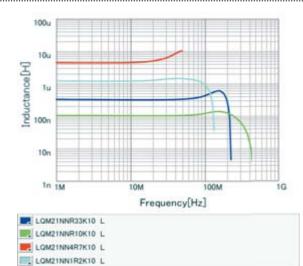
Class of Magnetic Shield: Ferrite Core

\*S.R.F.: Self-Resonant Frequency

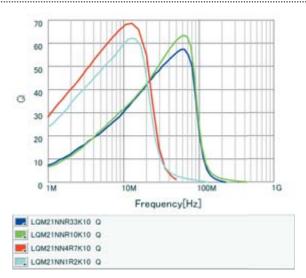
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#### Inductance-Frequency Characteristics (Typ.)



#### Q-Frequency Characteristics (Typ.)



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#### Inductors for General Circuits 🖄 Caution/Notice

### Caution

#### Rating

#### 1. About the Rated Current

Do not use products beyond the rated current as this may create excessive heat and deteriorate the insulation resistance.

#### 2. About Excessive Surge Current

Surge current (pulse current or rush current) greater than the specified rated current applied to the product may cause a critical failure, such as an open circuit or burnout caused by excessive temperature rise.

Please contact us in advance if applying a surge current.

Inductors for Power Lines

## Inducto

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Inductors for Power Lines

months; the other products should be used within 12 months.

1. Storage Period

Notice

Check solderability if this period is exceeded.

Do not use products in a chemical atmosphere such as

Storage and Operating Condition

<Operating Environment>

<Storage Requirements>

chlorine gas, acid or sulfide gas.

- 2. Storage Conditions
  - (1) Store products in a warehouse in compliance with the following conditions:

The LQB series and LQM series should be used within 6

Temperature: -10 to +40 degrees C.

#### Handling

This item is designed to have sufficient strength, but handle with care to avoid chipping or breaking its ceramic structure.

LQH\_M/N series

- To prevent breaking the wire, avoid touching with sharp materials, such as tweezers or the bristles of a cleaning brush, to the wire wound portion of this product.
- To prevent breaking the core, avoid applying excessive mechanical shock to products mounted on the board. LQW\_C series
  - To prevent breaking the wire, avoid touching with sharp materials, such as tweezers or other materials such as the bristles of a cleaning brush, to the wire wound portion.
  - To prevent breaking the core, avoid applying excessive mechanical shock to products mounted on the board.
  - In some mounting machines, when picking up components, a support pin pushes the components up from the bottom of the base tape. In this case, please remove the support pin. The support pin may damage the components and break the wire.

Humidity: 15 to 85% (relative humidity)

Do not subject products to rapid changes in temperature and humidity.

Do not store them in a chemical atmosphere such as one containing sulfurous acid gas or alkaline gas. This will prevent electrode oxidation, which causes poor solderability and possible corrosion of inductors.

- (2) Do not store products in bulk packaging to prevent collision among inductors, which causes core chipping and wire breakage.
- (3) Store products on pallets to protect from humidity, dust, etc.
- (4) Avoid heat shock, vibration, direct sunlight, etc.
- In rare cases, the laser recognition cannot recognize this component. Please contact us when you use laser recognizion. (There is no problem with the permeation and reflection type.)
- The product temperature rises about 40°C maximum when the permissible current is applied to LQW15C. Please use caution regarding the temperature of the substrate and air around the part.

LQB series and LQM series

- There is the possibility that magnetism may change the inductance value. Do not use a magnet or tweezers with magnetism when handling chip inductors. (The tip of the tweezers should be molded with resin or pottery.)
- When excessive current over the rated current is applied, it may cause the inductance value to change due to magnetism.

<Transportation>

Do not apply excessive vibration or mechanical shock to product.

Continued on the following page. 🖊



#### Inductors for General Circuits 🖄 Caution/Notice

Continued from the preceding page.  $\searrow$ 

#### <Resin Coating>

When coating products with resin, the relatively high resin curing stress may change inductance values.

For exterior coating, select resin carefully so that electrical and mechanical performance of the product is not affected. Prior to use, please evaluate reliability with the product mounted in your application set.

#### (LQH/LQW series)

An open circuit issue may occur by mechanical stress caused by the resin, amount/cured shape of resin, or operating conditions, etc. Some resins containing impurities or chloride may possibly generate chlorine by hydrolysis under some operating conditions, causing corrosion of the inductor wire and leading to an open circuit. <Handling of a Substrate>

After mounting products on a substrate, do not apply any stress to the product caused by bending or twisting the substrate when cropping the substrate, inserting and removing a connector from the substrate, or tightening a screw to the substrate.

Excessive mechanical stress may cause cracking in the Product.

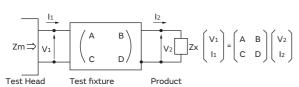
## Bending

Twisting 

#### Measuring Method

#### Measuring Method of Inductance/Q

1. Residual elements and stray elements of test fixtures can be described by F-parameter as shown in the following:



2. The impedance of chip inductors (chip coils) Zx and measured value Zm can be described by input/output current/voltage.

$$Zm = \frac{V_1}{l_1} , \quad Zx = \frac{V_2}{l_2}$$

3. Thus, the relation between Zx and Zm is shown in the following:

$$\begin{aligned} Zx &= \alpha \quad \frac{Zm - \beta}{1 - Zm\Gamma} \\ & \text{where, } \alpha = D \ / \ A = 1 \\ & \beta = B \ / \ D = Zsm - (1 - Yom \ Zsm) \ Zsm \\ & \Gamma = C \ / \ A = Yom \\ & \\ & \\ & \\ & Zsm: \text{ measured impedance of short chip} \\ & \\ & \\ & \\ & Yom: \text{ measured admittance when opening the fixture} \end{aligned}$$

\*Residual impedance of short chip

L

Residual Impedance	Series
0.556nH	LQW04CA/15CA

4. Lx and Qx should be calculated with the following equation.

$$x = \frac{\text{Im}(Zx)}{2\pi f}$$
,  $Qx = \frac{\text{Im}(Zx)}{\text{Re}(Zx)}$ 

Lx: Inductance of chip Inductors (chip coils) Qx: Q of chip Inductors (chip coils) f: Measuring frequency Inductors for General Circuits

**RF Inductors** 

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#### Inductors for General Circuits Soldering and Mounting

#### 1. Standard Land Pattern Dimensions

A high Q value is achieved when the PCB electrode land pattern is designed so that it does not project beyond the chip Inductor's (chip coil's) electrode.

		Land Pattern + Solder	r Resist	Land I	Pattern 🗆	Solder Resist
						(in mm)
Series		Standard Land Dimens	ions			
LQB15N		Part Num	nber	a	b	с
LQB18N			Reflow	0.4	1.2 to 1.4	0.5
LQM18N	0		Flow		2.2 to 2.6	
LQM21N	<u>↓</u>		Reflow	0.7	1.8 to 2.0	0.7
LQH31M	<b>a</b> ►	LQM21N		1.2	3.0 to 4.0	1.0
LQH44N	<mark>⊸ b</mark>	LQH31M		1.0	4.5	1.5
LQW04CA_00		LQH44N		1.3	4.4	3.0
LQW15CA_00		LQW04CA_	00	0.45	1.05	0.48
		LQW15CA_	00	0.45	1.45	0.64
LQH43M						
LQH43N		<b>₩</b> ₩7777				

Attention should be paid to potential magnetic coupling effects when using the Inductor (coil) as a resonator.

#### 2. Standard Soldering Conditions

- (1) Soldering method
  - Chip Inductors (Chip coils) can be flow or reflow soldered.
  - Please contact Murata regarding other soldering methods.

Solder: Use Sn-3.0Ag-0.5Cu solder.

Flux: Use rosin-based flux, but not strongly acidic flux

- (with chlorine content exceeding 0.2wt%).
- Do not use water-soluble flux.

For additional mounting methods, please contact Murata.

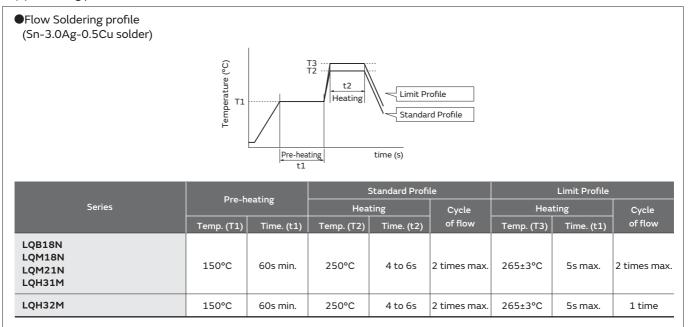
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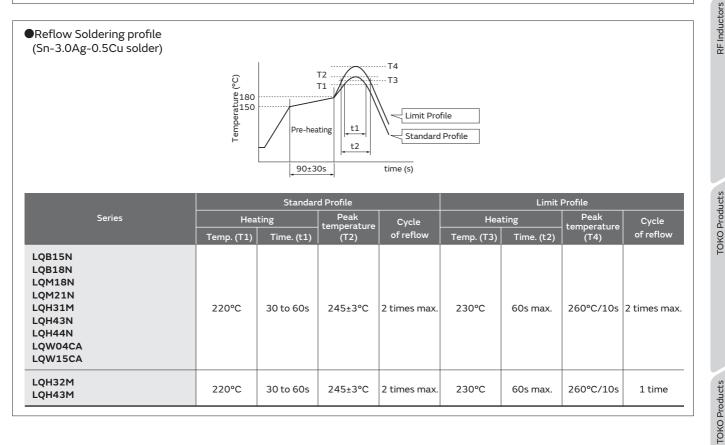


#### Inductors for General Circuits Soldering and Mounting

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(2) Soldering profile





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(3) Reworking with a Soldering Iron

\*Except for LQW04CA

Preheating at 150°C for 1 minute is required. Do not directly touch the ceramic element with the tip of the soldering iron. The reworking soldering conditions are as follows: Soldering iron power output: 80W max. Temperature of soldering iron tip: 350°C Diameter of soldering iron end: 3.0mm max. Soldering time: within 3 s

Please keep the fix time with the soldering iron within 2 times.

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Inductors for Power Lines

Inductors for General Circuits

Inductors for Power Lines

Inductors for General Circuits

#### Inductors for General Circuits Soldering and Mounting

Continued from the preceding page.  $\searrow$ 

#### 3. Mounting Instructions

(1) Land Pattern Dimensions

Large lands reduce the Q of the mounted chip. Also, large protruding land areas (bordered by lines having the dimensions "c" and "d" shown) cause floating and electrode leaching.

#### (2) Land Pattern Designing (LQH series)

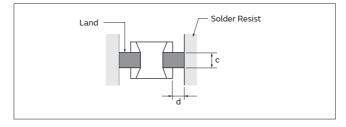
Please follow the recommended patterns. Otherwise, their performance, which includes electrical performance or solderability, may be affected, or result in "position shift" in the soldering process.

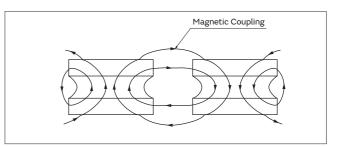
#### (3) Magnetic Coupling

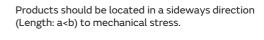
Since some chip inductors (chip coils) are constructed like an open magnetic circuit, narrow spacing between inductors (coils) may cause magnetic coupling. LQB/LQM series have a magnetically shielded structure. The structure makes their coupling coefficient smaller than that of conventional chip inductors (chip coils).

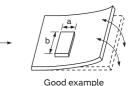
#### (4) PCB Warping

The PCB should be designed so that products are not subjected to mechanical stress caused by warping the board.





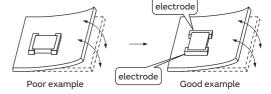


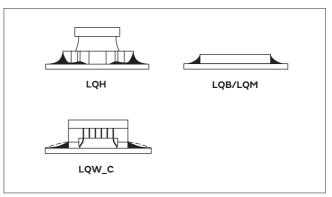


Poor example

The electrode part of the product should be located

as in the figure to avoid mechanical stress.





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#### (5) Amount of Solder Paste

Excessive solder causes electrode corrosion, while insufficient solder causes low electrode bonding strength. Adjust the amount of solder paste as shown on the right so that the correct amount is applied. Guideline of solder paste thickness

- LQM: 100 to 150µm
- LQB: 100 to 200µm
- LQH: 200 to 300µm
- LQW04CA: 80 to 100µm
- + LQW15CA: 50 to 100 $\mu m$

Note • Please read rating and (LCAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.
 • This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

O05E.pdf Apr.28,2017

#### Inductors for General Circuits Soldering and Mounting

Continued from the preceding page.  $\searrow$ 

#### 4. Cleaning

The following conditions should be observed when cleaning chip inductors (chip coils):

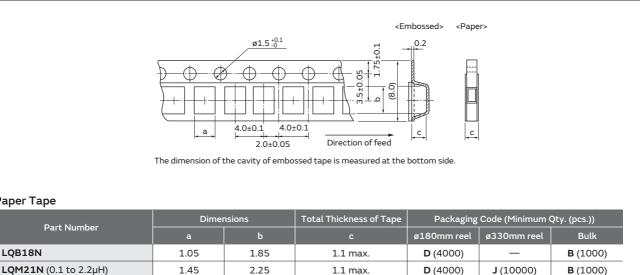
- (1) Cleaning Temperature: 60°C max. (40°C max. for alcohol cleaning agents)
- (2) Ultrasonic
  Output: 20W/l max.
  Duration: 5 minutes max.
  Frequency: 28 to 40kHz
  Care should be taken not to cause resonance of the PCB and mounted products.
- (3) Cleaning agent The following cleaning agents have been tested on individual components. Evaluation in complete assembly should be done prior to production.
  - (a) Alcohol cleaning agents Isopropyl alcohol (IPA)
  - (b) Aqueous cleaning agents Pine Alpha ST-100S

(4) Ensure that flux residue is completely removed. Component should be thoroughly dried after aqueous agents have been removed with deionized water.

For additional cleaning methods, please contact Murata.

#### Inductors for General Circuits Packaging

#### Minimum Quantity and 8mm Width Taping Dimensions



1.1 max.

**D** (4000)

**J** (10000)

#### **Embossed Tape**

Paper Tape

LQB18N

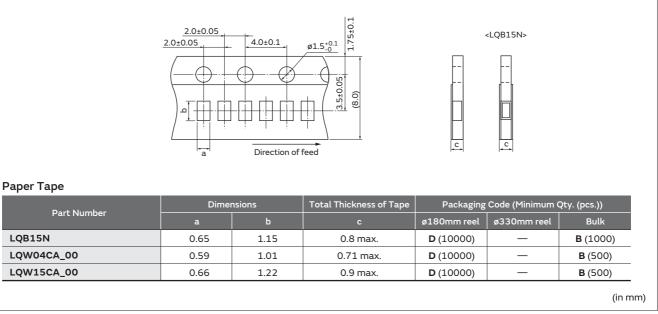
LQM18N

Part Number	Dimensions		Depth of Cavity	Packaging Code (Minimum Qty. (pcs.))		
	a	b	с	ø180mm reel	ø330mm reel	Bulk
<b>LQM21N</b> (2.7 to 4.7µH)	1.45	2.25	1.3	L (3000)	K (10000)	<b>B</b> (1000)
LQH31M	1.9	3.6	2.0	L (2000)	<b>K</b> (7500)	—
LQH32M	2.9	3.6	2.1	L (2000)	<b>K</b> (7500)	—

#### Minimum Quantity and 8mm Width Taping Dimensions

1.05

1.85



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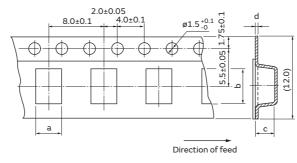
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**B** (1000)

#### Inductors for General Circuits Packaging

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#### Minimum Quantity and 12mm Width Embossed Taping Dimensions



The dimension of the cavity of embossed tape is measured at the bottom side.

#### Embossed Tape

Part Number		Dimensions (*c:	Depth of Cavity)	Packaging Code (Minimum Qty. (pcs.))			
	a	b	с	d	ø180mm reel	ø330mm reel	Bulk
LQH43M	3.6	4.9	2.7	0.3	<b>L</b> (500)	<b>K</b> (2500)	—
LQH43N	3.6	4.9	2.7	0.3	<b>L</b> (500)	<b>K</b> (2500)	_
LQH44N	4.3	4.3	4.7	0.4	L (250)	<b>K</b> (1500)	_

(in mm)

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