

	Series	Structure	Size Code in inch (in mm)	Inductance Range (H)										Rated Current (A)				
				0.1n	1n	10n	100n	1μ	10μ	100μ	1m	10m	10m	100m	1	10	100	
Inductors for Power Lines	LQH3NPN_MR p34	Wire Wound Ferrite Core Type	1212 (3030)					1μH	47μH					460mA	2.15A			
	LQH31CN_03 p121		1206 (3216)				120nH	100μH					80mA	970mA				
	LQH32CN_23 p123		1210 (3225)					1μH	560μH				60mA	800mA				
	LQH32CN_33 p125		1210 (3225)				150nH	10μH					450mA	1.45A				
	LQH32CN_53 p127		1210 (3225)					1μH	100μH				100mA	1A				
	LQH32DN_23 p129		1210 (3225)					1μH	560μH				60mA	800mA				
	LQH32DN_53 p131		1210 (3225)					1μH	100μH				100mA	1A				
	LQH32PB_N0 p20		1210 (3225)					470nH	120μH				200mA	3.4A				
	LQH32PB_NC p22		1210 (3225)					470nH	22μH				650mA	4.4A				
	LQH32PN_N0 p24		1210 (3225)					470nH	120μH				200mA	3.4A				
	LQH32PN_NC p26		1210 (3225)					470nH	22μH				650mA	4.4A				
	DEM3512C p391		1514 (3735)					680nH	22μH				530mA	2.5A				
	DEM3518C p392		1514 (3735)					560nH	22μH				880mA	3.4A				
	LQH44PN_GR p40		1515 (4040)					680nH	47μH				410mA	2.5A				
	LQH44PN_J0 p42		1515 (4040)					1μH	47μH				380mA	2A				
	LQH44PN_P0 p44		1515 (4040)					1μH	22μH				800mA	2.95A				
	LQH43CN_03 p133		1812 (4532)					1μH	470μH				90mA	1.08A				
	LQH43CN_33 p135		1812 (4532)					560nH	3.9μH				1.6A	2.95A				
	LQH43PB_26 p36		1812 (4532)					1μH	220μH				240mA	3.4A				
	LQH43PN_26 p38		1812 (4532)					1μH	220μH				240mA	3.4A				
	DEM4518C p393		1818 (4745)					1.2μH	22μH				1A	3.5A				
	LQH5BPB_T0 p46		2020 (5050)					470nH	22μH				1.4A	7.7A				
	LQH5BPN_38 p48		2020 (5050)					1μH	150μH				650mA	7A				
	LQH5BPN_T0 p50		2020 (5050)					470nH	22μH				1.4A	7.7A				
	D52LC p394		2020 (5252)					1.2μH	100μH				260mA	2.44A				
	D53LC High Current p395		2020 (5252)					1.1μH	100μH				460mA	3.87A				
	D53LC Low Rdc p396		2020 (5252)					4.7μH	220μH				350mA	2.31A				
	LQH55DN_03 p137		2220 (5750)					120nH	10mH				50mA	6A				
	DG6045C p399		2424 (6060)					1μH	100μH				900mA	9.5A				
	DG6050C p401		2424 (6060)					1.2μH	100μH				1.2A	9.8A				
	D63LCB p397		2524 (6362)					1μH	150μH				440mA	4.52A				
	LQH66SN_03 p139		2525 (6363)					270nH	10mH				50mA	6A				
	DS75LC p402		2929 (7373)					1μH	470μH				430mA	9.2A				
	DEM8030C p405		3131 (8080)					1.5μH	47μH				1.3A	7.5A				
	DEM8040C p406		3131 (8080)					1.5μH	33μH				2.4A	10A				
	DEM8045C p407		3131 (8080)					1.5μH	47μH				2.1A	11.2A				
	DG8040C p404		3131 (8080)					1μH	100μH				1.3A	10.4A				
	DEM10050C p408		3939 (100100)					1.5μH	33μH				3.5A	15.3A				
	DS104C2 p409		4040 (101101)					1.1μH	120μH				970mA	11.7A				
	DS106C2 p411		4040 (101101)					1.2μH	330μH				690mA	12A				
	DS126C2 p413		4949 (125125)					1.7μH	680μH				580mA	11.8A				
DFE201208S p302	Wire Wound Metal Alloy Core Type	0805 (2012)					470nH	2.2μH				1.8A	4A					
DFE201210S p304		0805 (2012)					470nH	2.2μH				2.1A	4.8A					
DFE201210U p340		0805 (2012)					240nH	2.2μH				2A	6.5A					
DFE201610C p306		0806 (2016)					560nH	2.2μH				1.5A	2.8A					
DFE201610E p336		0806 (2016)					240nH	10μH				1A	6.3A					
DFE201610P p328		0806 (2016)					240nH	2.2μH				2A	5.4A					
DFE201610R p320		0806 (2016)					470nH	2.2μH				1.6A	3A					
DFE201612C p308		0806 (2016)					470nH	2.2μH				1.6A	3.4A					
DFE201612E p338		0806 (2016)					330nH	4.7μH				1.8A	6.3A					
DFE201612P p330		0806 (2016)					240nH	2.2μH				2.1A	6.5A					
DFE201612R p322		0806 (2016)					470nH	2.2μH				1.7A	3.5A					
DFE252007F p342		1008 (2520)					470nH	4.7μH				1.2A	3.3A					

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● Part Numbering

Inductors for Power Lines

(Part Number)

LQ	M	21	P	N	R54	M	G	0	D
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩

① Product ID

Product ID	
LQ	Chip Inductors (Chip Coils)

② Structure

Code	Structure
H	Wire Wound Type (Ferrite Core)
W	
M	Multilayer Type (Ferrite Core)

③ Dimensions (LxW)

Code	Nominal Dimensions (LxW)	Size Code (in inch)
15	1.0x0.5mm	0402
18	1.6x0.8mm	0603
21	2.0x1.25mm	0805
2M	2.0x1.6mm	0806
2H	2.5x2.0mm	1008
3N	3.0x3.0mm	1212
31	3.2x1.6mm	1206
32	3.2x2.5mm	1210
43	4.5x3.2mm	1812
44	4.0x4.0mm	1515
5B	5.0x5.0mm	2020
55	5.7x5.0mm	2220
66	6.3x6.3mm	2525

④ Applications and Characteristics

Code	Series	Applications and Characteristics
D	LQM	for Choke (Low-current DC Power Supplies)
F		for Choke (DC Power Supplies)
D	LQH	for Choke
S		for Choke (Magnetically Shielded Type)
C	LQH/LQW	for Choke (Coating Type)
P	LQM/LQH	for Power Line

⑤ Category

Code	Category
N	Standard Type
B	Special Feature Classification
W	

⑥ Inductance

Expressed by three-digit alphanumerics. The unit is micro-henry (μH). 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 0.1μH, 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. For those products whose inductance values are specified using three designated digits, these values may be indicated using the closest two digits instead.

⑦ Inductance Tolerance

Code	Inductance Tolerance
D	±0.5nH
J	±5%
K	±10%
M	±20%
N	±30%

⑧ Features (Except for LQH□□P/LQM□□P)

Code	Features	Series
0	Standard Type	LQM/LQH*1 /LQW
1	Low DC Resistance	LQW
2	Standard Type	LQH32C/32D
3	Low DC Resistance	LQH32C/43CN
5	Low Profile Type	LQH2MC/32C/32D
7	Large Current Type	LQM21F
8	Low DC Resistance /Large Current Type	

*1 Except for LQH32 Series

⑨ Thickness

(LQH□□P/LQM□□P Only • Except for LQH43P/LQH5BPN_38)

Code	Nominal Dimensions (T)
B	0.35mm
C	0.5mm
D	0.6mm
E	0.7mm
F	0.8mm
O	0.85mm
G	0.9mm
J	1.1mm
M	1.4mm
N	1.55mm
P	1.65mm
T	2.0mm

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⑨ Electrode (Except for LQH□□P/LQM□□P)

•Lead (Pb) Free

Code	Electrode	Series
0	Sn	LQM/LQW
2		LQH2MC
3	LF Solder	LQH (Except for LQH2MC)

⑨ Specification

(LQH□□P/LQM□□P Only • Except for LQH43P/LQH5BPN_38)

Code	Specification
0/S	Standard Type
C	Good Bias Current Characteristics Type
H/A/E	High Spec Type (Low DC Resistance; Good Bias Current Characteristics Type)
R	Low DC Resistance Type

⑧⑨ Thickness (LQH43P/LQH5BPN_38 Only)

Code	Dimensions (T)
26	2.6mm
38	4.0mm max.

⑩ Packaging

Code	Packaging	Series
K	Embossed Taping (ø330mm Reel)	LQH* ¹ /LQM21* ²
F		LQH3NP_MR
L	Embossed Taping (ø180mm Reel)	LQH* ⁵ /LQM18P/LQM21* ² /LQM31P/LQM32P/LQM2HP/LQM2MP
E		LQH3NP_MR
B	Bulk	LQH2MC/LQM/LQW
J	Paper Taping (ø330mm Reel)	LQM18/LQM21* ³
D	Paper Taping (ø180mm Reel)	LQM18/LQM21* ⁴ /LQW

*1 Except for LQH2MC/LQH2HP_G0/LQH3NP/LQH43C

*2 LQM21D(22 - 47μH)/LQM21F(4.7 - 47μH)

*3 LQM21D(1.0 - 10μH)/LQM21F(1.0 - 2.2μH)

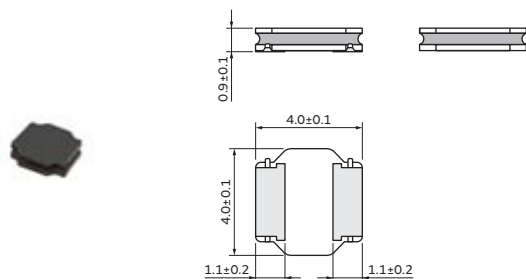
*4 LQM21D(1.0 - 10μH)/LQM21F(1.0 - 2.2μH)/LQM21P

*5 Except for LQH3NP_MR

Inductors for Power Lines

LQH44PN_GR Series 1515 (4040) inch (mm)

Appearance/Dimensions



(in mm)

Packaging

Code	Packaging	Minimum Quantity
K	ø330mm Embossed Taping	4500
L	ø180mm Embossed Taping	1000

Rated Value (□: packaging code)

Part Number	Inductance	Inductance Test Frequency	Rated Current (Isat)*	Rated Current (Itemp)*	DC Resistance	S.R.F.* (min.)
LQH44PNR68NGR□	0.68μH ±30%	1MHz	2400mA	2500mA(Ambient temp.85°C) 1500mA(Ambient temp.105°C)	0.043Ω±20%	54MHz
LQH44PN2R2NGR□	2.2μH ±30%	1MHz	1600mA	2000mA(Ambient temp.85°C) 1200mA(Ambient temp.105°C)	0.074Ω±20%	45MHz
LQH44PN3R3NGR□	3.3μH ±30%	1MHz	1500mA	1700mA(Ambient temp.85°C) 1000mA(Ambient temp.105°C)	0.11Ω±20%	25MHz
LQH44PN4R7MGR□	4.7μH ±20%	1MHz	1200mA	1600mA(Ambient temp.85°C) 960mA(Ambient temp.105°C)	0.13Ω±20%	17MHz
LQH44PN6R8MGR□	6.8μH ±20%	1MHz	850mA	1400mA(Ambient temp.85°C) 840mA(Ambient temp.105°C)	0.17Ω±20%	15MHz
LQH44PN100MGR□	10μH ±20%	1MHz	800mA	1100mA(Ambient temp.85°C) 660mA(Ambient temp.105°C)	0.27Ω±20%	13MHz
LQH44PN150MGR□	15μH ±20%	1MHz	640mA	900mA(Ambient temp.85°C) 540mA(Ambient temp.105°C)	0.42Ω±20%	10MHz
LQH44PN220MGR□	22μH ±20%	1MHz	500mA	750mA(Ambient temp.85°C) 450mA(Ambient temp.105°C)	0.57Ω±20%	8MHz
LQH44PN330MGR□	33μH ±20%	1MHz	400mA	480mA(Ambient temp.85°C) 280mA(Ambient temp.105°C)	1.4Ω±20%	6MHz
LQH44PN470MGR□	47μH ±20%	1MHz	360mA	410mA(Ambient temp.85°C) 240mA(Ambient temp.105°C)	1.7Ω±20%	6MHz

Operating temp. range (Self-temp. rise included): -40 to 125°C

Operating temp. range (Self-temp. rise not included): -40 to 105°C

Class of Magnetic Shield: Magnetic Resin

For reflow soldering only

*Isat: Rated Current based on Inductance change

*Itemp: Rated Current based on Temperature rise

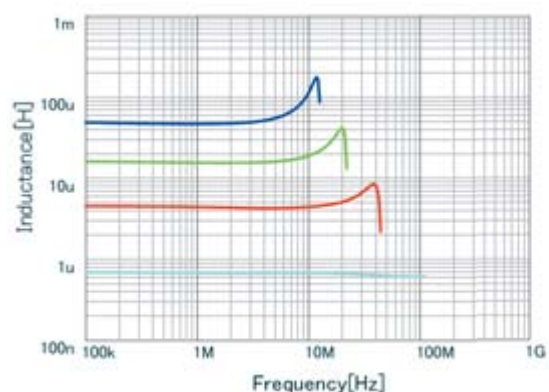
*S.R.F.: Self-Resonant Frequency

When rated current is applied to the products, inductance will be within ±30% of initial inductance value range. Keep the temperature (ambient temperature plus self-generation of heat) under 125°C. When rated current is applied to the products, the temperature rise caused by self-generated heat shall be limited to 40°C max (ambient temperature 85°C). When rated current is applied to the products, the temperature rise caused by self-generated heat shall be limited to 20°C max (ambient temperature 85-105°C).

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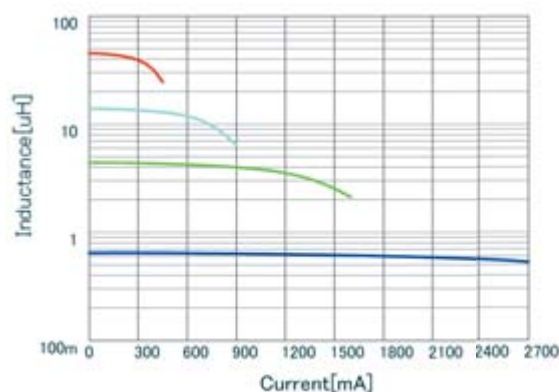
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Inductance-Frequency Characteristics (Typ.)



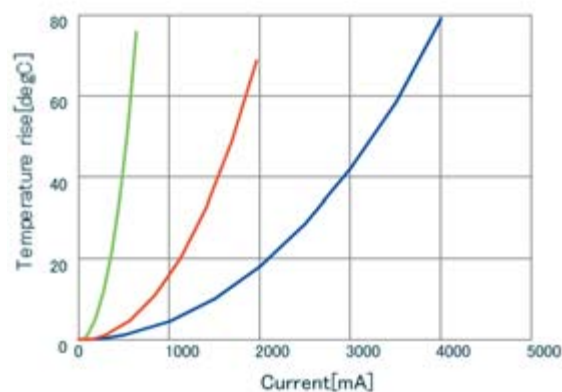
■	LQH44PN470MGR L
■	LQH44PN150MGR L
■	LQH44PN4R7MGR L
■	LQH44PNR68NGR L

Inductance-Current Characteristics (Typ.)



■	LQH44PNR68NGR DC-Bias, 20
■	LQH44PN4R7MGR DC-Bias, 20
■	LQH44PN470MGR DC-Bias, 20
■	LQH44PN150MGR DC-Bias, 20

Temperature Rise Characteristics (Typ.)

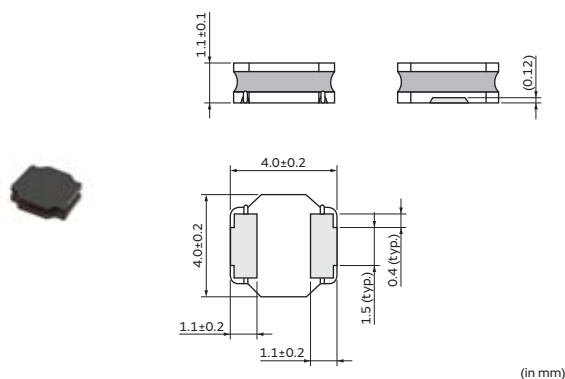


■	LQH44PNR68NGR DT_Current
■	LQH44PN470MGR DT_Current
■	LQH44PNR68MGR DT_Current

Inductors for Power Lines

LQH44PN_J0 Series 1515 (4040) inch (mm)

Appearance/Dimensions



Packaging

Code	Packaging	Minimum Quantity
K	ø330mm Embossed Taping	4500
L	ø180mm Embossed Taping	1000

Rated Value (□: packaging code)

Part Number	Inductance	Inductance Test Frequency	Rated Current (Isat)*	Rated Current (Itemp)*	DC Resistance	S.R.F.* (min.)
LQH44PN1R0NJ0□	1.0μH ±30%	100kHz	2000mA	1530mA	0.048Ω±20%	130MHz
LQH44PN1R5MJ0□	1.5μH ±20%	100kHz	1600mA	1380mA	0.061Ω±20%	90MHz
LQH44PN2R2MJ0□	2.2μH ±20%	100kHz	1320mA	1230mA	0.074Ω±20%	68MHz
LQH44PN3R3MJ0□	3.3μH ±20%	100kHz	900mA	1000mA	0.088Ω±20%	55MHz
LQH44PN4R7MJ0□	4.7μH ±20%	100kHz	840mA	980mA	0.117Ω±20%	50MHz
LQH44PN6R8MJ0□	6.8μH ±20%	100kHz	720mA	860mA	0.143Ω±20%	38MHz
LQH44PN100MJ0□	10μH ±20%	100kHz	560mA	790mA	0.207Ω±20%	30MHz
LQH44PN150MJ0□	15μH ±20%	100kHz	430mA	610mA	0.385Ω±20%	25MHz
LQH44PN220MJ0□	22μH ±20%	100kHz	400mA	550mA	0.480Ω±20%	18MHz
LQH44PN330MJ0□	33μH ±20%	100kHz	360mA	430mA	0.740Ω±20%	15MHz
LQH44PN470MJ0□	47μH ±20%	100kHz	300mA	380mA	1.014Ω±20%	13MHz

Operating temp. range (Self-temp. rise included): -40 to 125°C

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

Class of Magnetic Shield: Magnetic Resin

For reflow soldering only

*Isat: Rated Current based on Inductance change

*Itemp: Rated Current based on Temperature rise

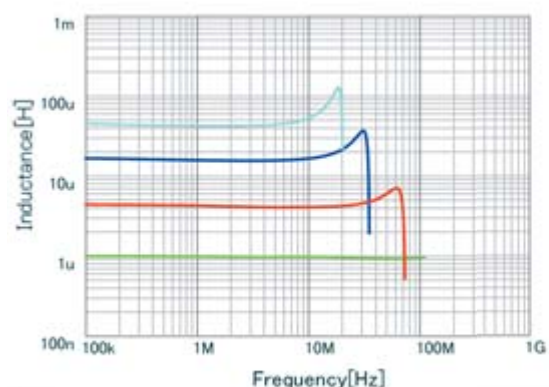
*S.R.F.: Self-Resonant Frequency

When rated current is applied to the products, inductance will be within ±30% of nominal inductance value. When rated current is applied to the products, self-temperature rise shall be limited to 40°C max. Keep the temperature (ambient temperature plus self-generation of heat) under 125°C.

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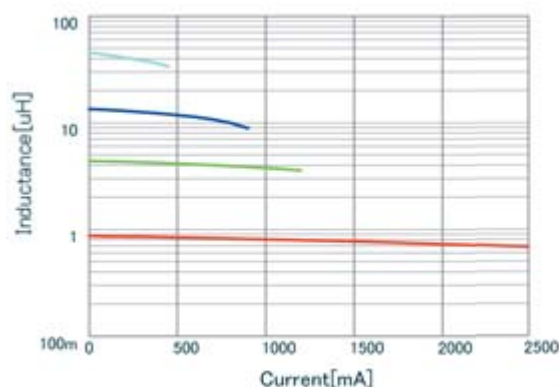
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Inductance-Frequency Characteristics (Typ.)



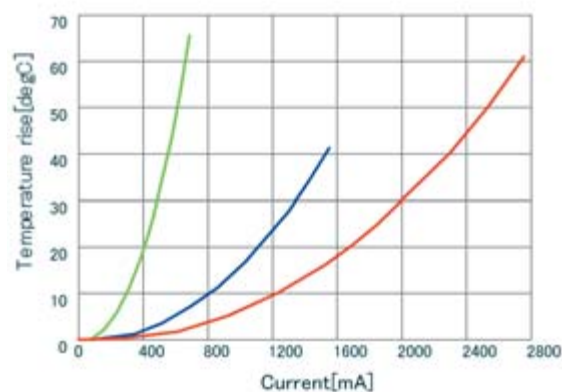
■ LQH44PN150MJ0 L
 ■ LQH44PN1R0NJ0 L
 ■ LQH44PN4R7MJ0 L
 ■ LQH44PN470MJ0 L

Inductance-Current Characteristics (Typ.)



■ LQH44PN150MJ0 DC-Bias, 20
 ■ LQH44PN4R7MJ0 DC-Bias, 20
 ■ LQH44PN1R0NJ0 DC-Bias, 20
 ■ LQH44PN470MJ0 DC-Bias, 20

Temperature Rise Characteristics (Typ.)

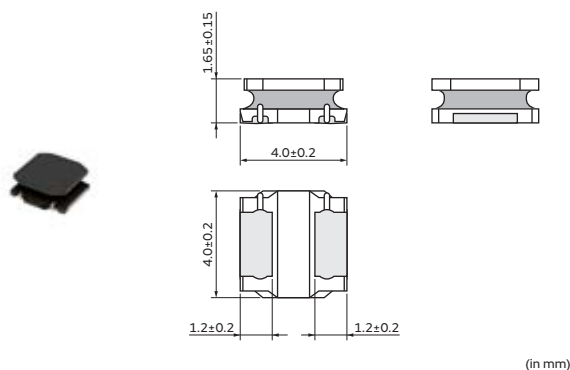


■ LQH44PN6R8MJ0 DT_Current
 ■ LQH44PN470MJ0 DT_Current
 ■ LQH44PN1R0NJ0 DT_Current

Inductors for Power Lines

LQH44PN_P0 Series 1515 (4040) inch (mm)

Appearance/Dimensions



Packaging

Code	Packaging	Minimum Quantity
K	ø330mm Embossed Taping	3500
L	ø180mm Embossed Taping	1000

Rated Value (□: packaging code)

Part Number	Inductance	Inductance Test Frequency	Rated Current (Isat)*	Rated Current (Itemp)*	DC Resistance	S.R.F.* (min.)
LQH44PN1R0NP0□	1.0μH ±30%	1MHz	2950mA	2450mA	0.030Ω±20%	90MHz
LQH44PN2R2MP0□	2.2μH ±20%	1MHz	2500mA	1800mA	0.049Ω±20%	70MHz
LQH44PN3R3MP0□	3.3μH ±20%	1MHz	2100mA	1770mA	0.065Ω±20%	50MHz
LQH44PN4R7MP0□	4.7μH ±20%	1MHz	1700mA	1700mA	0.080Ω±20%	40MHz
LQH44PN6R8MP0□	6.8μH ±20%	1MHz	1400mA	1340mA	0.12Ω±20%	35MHz
LQH44PN100MP0□	10μH ±20%	1MHz	1150mA	1170mA	0.16Ω±20%	25MHz
LQH44PN220MP0□	22μH ±20%	1MHz	800mA	790mA	0.37Ω±20%	17MHz

Operating temp. range (Self-temp. rise included): -40 to 125°C

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

Class of Magnetic Shield: Magnetic Resin

For reflow soldering only

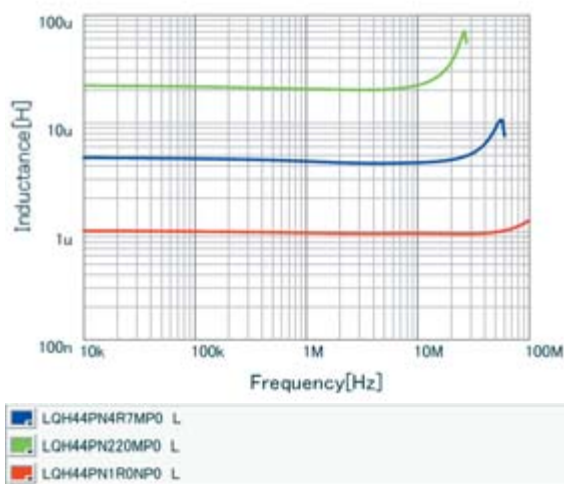
*Isat: Rated Current based on Inductance change

*Itemp: Rated Current based on Temperature rise

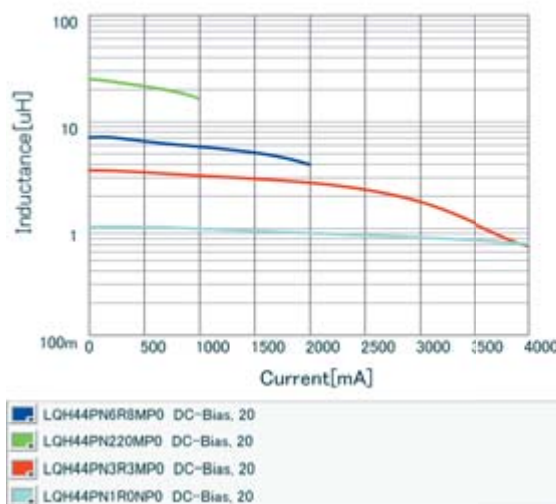
*S.R.F.: Self-Resonant Frequency

When rated current is applied to the products, inductance will be within ±30% of nominal inductance value. When rated current is applied to the products, self-temperature rise shall be limited to 40°C max. Keep the temperature (ambient temperature plus self-generation of heat) under 125°C.

Inductance-Frequency Characteristics (Typ.)



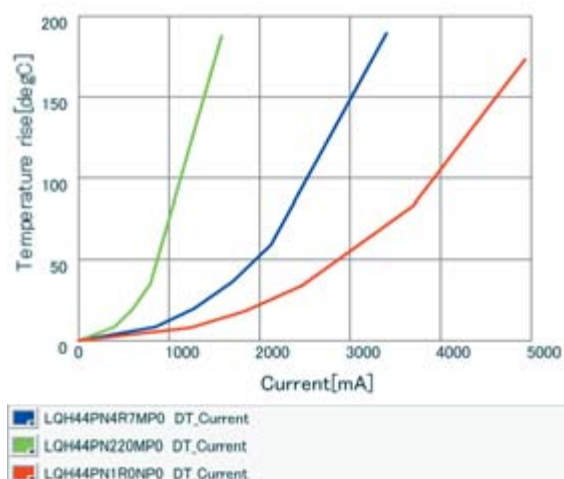
Inductance-Current Characteristics (Typ.)



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Temperature Rise Characteristics (Typ.)



Inductors for Power Lines ⚠️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.

Notice

Storage and Operating Condition

<Operating Environment>

Do not use products in a chemical atmosphere such as chlorine gas, acid or sulfide gas.

<Storage Requirements>

1. Storage Period

The LQM series should be used within 6 months; the other products should be used within 12 months.
Check solderability if this period is exceeded.

2. Storage Conditions

- (1) Store products in a warehouse in compliance with the following conditions:
Temperature: -10 to +40°C.
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.

Handling

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

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.
- In rare cases, the laser recognition cannot recognize this component. Please contact us when you use laser recognition. (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/LQW18C. Please use caution regarding the temperature of the substrate and air around the part.

LQH_C/D/H/M/N/P 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.
- Temperature may rise up to max. 40°C when applying the rated current to Inductors for Power Lines. Use caution regarding the temperature rating of the circuit board and components around the chip Inductors.

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 the excessive current over 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 products.

Continued on the following page. ↗

Inductors for Power Lines ⚠Caution/Notice

Continued from the preceding page. ↘

<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.

(LQW, LQH 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.

<Rated Current>

(LQH2HP_GR/JR, LQH2MPN_GR, LQH3NP_GR/JR/ME, LQH44P_GR, LQH5BPN_38 Series)

When rated current is applied to the products, Inductance will be within $\pm 30\%$ of specified inductance value range.

(Other LQH_P Series except for LQH2HP_G0 Series)

When rated current is applied to the products, Inductance will be within $\pm 30\%$ of nominal inductance value.

• Rated Current Based on Temperature Rise

For LQH2MC series and LQH_P series, rated current is set to keep the temperature rise caused by self heating 40°C or less.

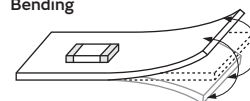
For other Inductors for Power Lines, please refer to individual specifications.

<Handling of a Substrate>

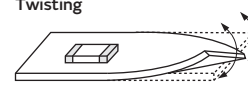
After mounting products on a substrate, do not apply any stress to the product caused by bending or twisting the substrate when cropping the substrate, inserting and removing a connector from the substrate, or tightening a screw to the substrate.

Excessive mechanical stress may cause cracking in the Product.

Bending



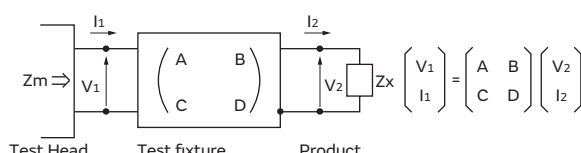
Twisting



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) Z_x and measured value Z_m can be described by input/output current/voltage.

$$Z_m = \frac{V_1}{I_1}, \quad Z_x = \frac{V_2}{I_2}$$

3. Thus, the relation between Z_x and Z_m is shown in the following:

$$Z_x = \alpha \frac{Z_m - \beta}{1 - Z_m \Gamma}$$

$$\text{where, } \alpha = D / A = 1$$

$$\beta = B / D = Z_{sm} - (1 - Y_{om} Z_{sm}) Z_{ss}$$

$$\Gamma = C / A = Y_{om}$$

(Z_{sm} : measured impedance of short chip
 Z_{ss} : residual impedance of short chip*
 Y_{om} : measured admittance when opening the fixture)

*Residual impedance of short chip

Residual Impedance	Series
0.556nH	LQW15C
0.771nH	LQW18C

4. L_x and Q_x should be calculated with the following equation.

$$L_x = \frac{\text{Im}(Z_x)}{2\pi f}, \quad Q_x = \frac{\text{Im}(Z_x)}{\text{Re}(Z_x)}$$

L_x : Inductance of chip Inductors (chip coils)
 Q_x : Q of chip Inductors (chip coils)
 f : Measuring frequency

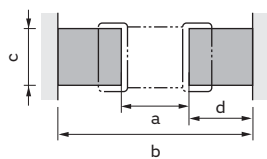
Inductors for Power Lines Soldering and Mounting

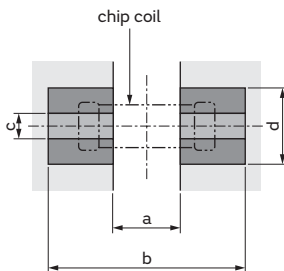
1. Standard Land Pattern Dimensions

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 Resist Land Pattern Solder Resist
(in mm)

Series	Standard Land Dimensions							
LQM18F/18P (Except for LQM18P_CH/FH/GH) LQM21D/21F/21P (Except for LQM21P_CA/CH/EH/GH) LQM2MP (Except for LQM2MP_GH) LQM2HP (Except for LQM2HP_CH/EH/GH/JH) LQM31P LQM32P LQH2MC LQH31C LQH32P LQH44P_P0/J0/GR LQH5BP LQH55D/66S LQW15CN_00 LQW15C_10 LQW18C		Part Number		a	b	c	d	
		LQM18F/18P	Flow	0.7	2.2-2.6	0.7	-	
			Reflow		1.8-2.0			
		LQM21D/21F/21P			1.2	3.0-4.0	1.0	-
		LQM2MP			0.8	2.4	1.8	-
		LQM2HP			1.6	3.0	1.5	-
		LQM31P			2.0	4.2-5.2	1.2	-
		LQM32P			1.9	3.6	2.7	-
		LQH2MC			0.8	2.6	1.0	-
		LQH31C			1.0	4.5	1.5	-
		LQH32P			1.3	3.8	2.0	-
		LQH44P_P0			1.3	4.4	3.0	-
		LQH44P_J0/GR			1.5	4.4	2.7	-
		LQH5BP			1.8	5.5	4.1	1.85
		LQH55D/66S			2.0	8.0	3.5	-
		LQW15CN_00			0.4	1.4	0.6	-
		LQW15C_10			0.4	1.4	0.66	-
		LQW18C			0.7	2.2	1.0	-

LQM18P_CH/FH/GH LQM21P_CA/CH/EH/GH LQM2MP_GH LQM2HP_CH/EH/GH/JH		Part Number	Rated Current (A)	a	b	c	Land Pad Thickness and Dimension d		
							18μm	35μm	70μm
		LQM18P_CH	0-0.7	0.7	1.8-2.0	0.7	0.7	0.7	0.7
			0.7-1.05				1.1	0.7	0.7
		LQM18P_FH	0-0.7	0.7	1.8-2.0	0.7	0.7	0.7	0.7
			0.7-1.7				1.4	0.7	0.7
		LQM18P_GH	0-0.7	0.7	1.8-2.0	0.7	0.7	0.7	0.7
			0.7-1.15				1.2	0.7	0.7
		LQM21P_CA	-	1.2	3.0-4.0	1.0	1.3	1.0	1.0
		LQM21P_CH	0-1.0	1.2	3.0-4.0	1.0	1.0	1.0	1.0
			1.0-1.5				1.5	1.0	1.0
			1.5-				2.0	1.5	1.0
		LQM21P_EH LQM21P_GH	0-1.0	1.2	3.0-4.0	1.0	1.0	1.0	1.0
			1.0-1.5				1.5	1.0	1.0
			1.5-3.1				3.0	1.5	1.0
		LQM2MP_GH	0-1.5	0.8	2.4	1.8	1.8	1.8	1.8
			1.5-2.5				2.4	1.8	1.8
			2.5-5.0				5.0	2.4	1.8
		LQM2HP_CH	0-1.5	1.6	3.0	1.5	1.5	1.5	1.5
			1.5-3.0				3.0	1.5	1.5
		LQM2HP_EH	0-1.5	1.6	3.0	1.5	1.5	1.5	1.5
1.5-3.0	3.0		1.5				1.5		
3.0-5.0	5.0		3.0				1.5		
LQM2HP_GH	0-1.5	1.6	3.0	1.5	1.5	1.5	1.5		
	1.5-2.6				2.4	1.5	1.5		
	3.3-4.2				4.4	3.6	2.4		
LQM2HP_JH	0-1.6	1.6	3.0	1.5	1.5	1.5	1.5		
	1.6-2.4				2.4	1.5	1.5		
	2.4-3.5				3.6	2.4	1.5		

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

Continued on the following page. ➤

Inductors for Power Lines Soldering and Mounting

Continued from the preceding page. ↘

Land Pattern + Solder Resist Land Pattern Solder Resist
(in mm)

Series	Standard Land Dimensions
LQH2HP (Except for LQH2HP_GR)	
LQH2HP_GR/JR	
LQH32C/D	
LQH3NP (Except for LQH3NP_JR/GR/ME)	
LQH3NP_JR/GR/ME	
LQH43C LQH43P	

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.

For LQH2MC/2MP/2HP/3NP/32D/32P/43PB/44P/5BP/55D/66S, LQM2MP_DH/EH/GH/2HP_CH/EH/GH/JH/18P_CH/DH/FH/GH/21P_CA/CH/EH/GH/32P, LQW15C/18C series, please use reflow soldering.

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.

The flux used for the LQW15C/18C series should be a rosin-based flux that includes a middle activator equivalent to 0.06wt% to 0.1wt% chlorine.

For additional mounting methods, please contact Murata.

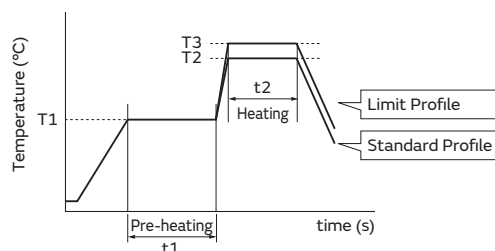
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Inductors for Power Lines Soldering and Mounting

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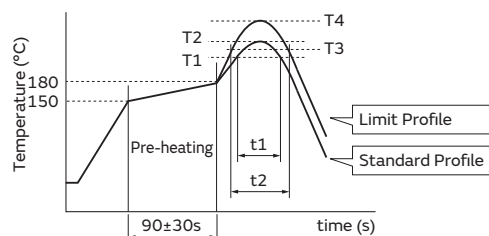
(2) Soldering profile

●Flow Soldering profile (Sn-3.0Ag-0.5Cu solder)



Series	Pre-heating		Standard Profile			Limit Profile		
	Temp. (T1)	Time. (t1)	Temp. (T2)	Time. (t2)	Cycle of flow	Temp. (T3)	Time. (t2)	Cycle of flow
LQM18F/18P (Except for CH/DH/FH/GH) LQM21D/21F/21P (Except for CA/CH/EH/GH) LQM2MP (Except for DH/EH/GH) LQM2HP (Except for CH/EH/GH/JH) LQM31P LQH31C	150°C	60s min.	250°C	4 to 6s	2 times max.	265±3°C	5s max.	2 times max.
LQH32C LQH43C/43PN	150°C	60s min.	250°C	4 to 6s	2 times max.	265±3°C	5s max.	1 time

●Reflow Soldering profile (Sn-3.0Ag-0.5Cu solder)



Series	Standard Profile				Limit Profile			
	Heating		Peak temperature (T2)	Cycle of reflow	Heating		Peak temperature (T4)	Cycle of reflow
	Temp. (T1)	Time. (t1)			Temp. (T3)	Time. (t2)		
LQM18F/18P LQM21D/21F/21P/2MP/2HP LQM31P/32P LQH2MC, LQH2HP LQH31C LQH32D_23 (Except for 391/471/561) LQH32D_53 LQH3NP/32P/43P/44P/5BP LQW15C/18C	220°C	30 to 60s	245±3°C	2 times max.	230°C	60s max.	260°C/10s	2 times max.
LQH32C LQH32D_23 (391/471/561 only) LQH43C LQH55D, LQH66S	220°C	30 to 60s	245±3°C	2 times max.	230°C	60s max.	260°C/10s	1 time

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Inductors for Power Lines Soldering and Mounting

Continued from the preceding page. ↘

(3) Reworking with a Soldering Iron

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.

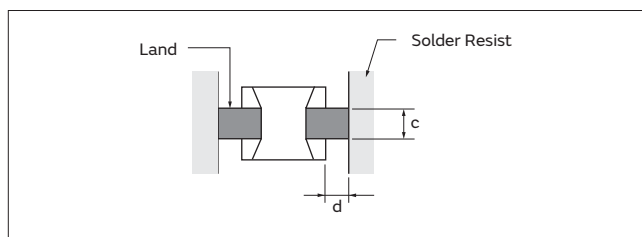
Soldering time: within 3 s

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

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.



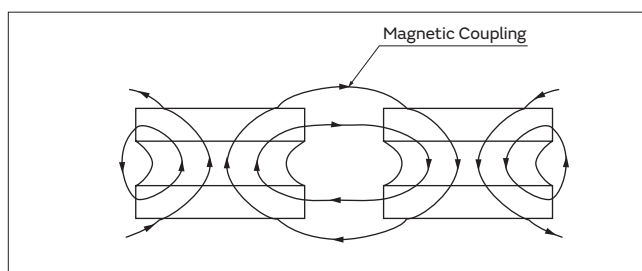
(2) Land Pattern Designing (LQH series, LQW series)

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

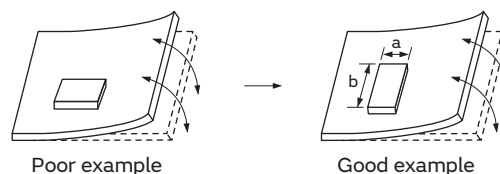
Since some chip inductors (chip coils) are constructed like an open magnetic circuit, narrow spacing between inductors (coils) may cause magnetic coupling. LQM, LQH66S, and LQH_P series have a magnetically shielded structure. The structure makes their coupling coefficient smaller than that of conventional chip inductors (chip coils).



(4) PCB Warping

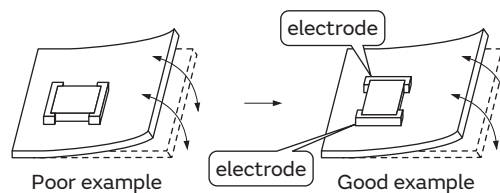
The PCB should be designed so that products are not subjected to mechanical stress caused by warping of the board.

Products should be located in a sideways direction (Length: $a < b$) to mechanical stress.



Except LQH3NP/44P/5BP

The electrode part of the product should be located as in the figure to avoid mechanical stress.



LQH3NP/44P/5BP

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Inductors for Power Lines Soldering and Mounting

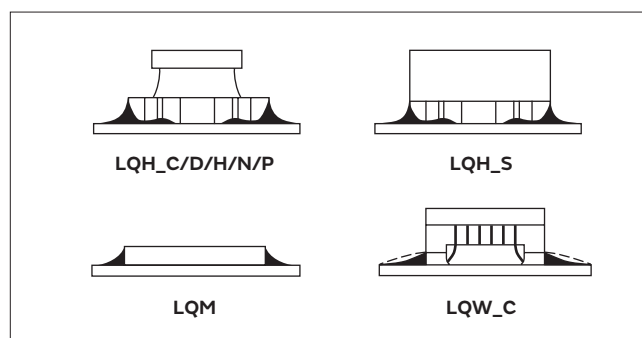
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(5) Amount of Solder Paste

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

- LQW15C: 50 to 100μm
- LQM, LQW18C, LQH2MC/2HP, LQH3NP/32P, LQH43PB/LQH44P/5BP: 100 to 150μm
- LQH31C/32C, LQH43C/43PN, LQH55D, LQH66S: 200 to 300μm



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.

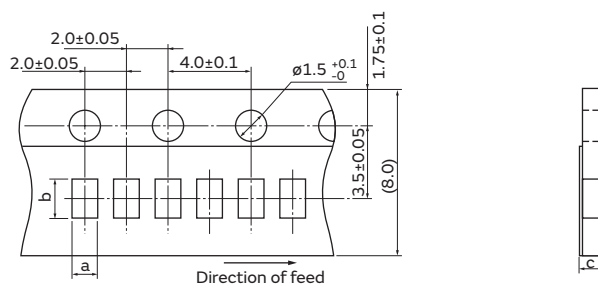
- (a) Alcohol cleaning agents
 - Isopropyl alcohol (IPA)
- (b) Aqueous cleaning agents
 - Pine Alpha ST-100S
 - LQH66S series: Aqueous agents should not be used because they may cause quality deterioration or damage to appearance.

- (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 Power Lines Packaging

Minimum Quantity and 8mm Width Taping Dimensions



Paper Tape

Part Number	Dimensions		Total Thickness of Tape	Packaging Code (Minimum Qty. (pcs.))		
	a	b		ø180mm reel	ø330mm reel	Bulk
LQW15CN_00	0.64: 70nH to 200nH	1.18	0.8 max.	D (10000)	—	B (500)
	0.66: 18nH to 48nH					
LQW15C_10	0.69	1.18	0.8 max.	D (10000)	—	B (500)

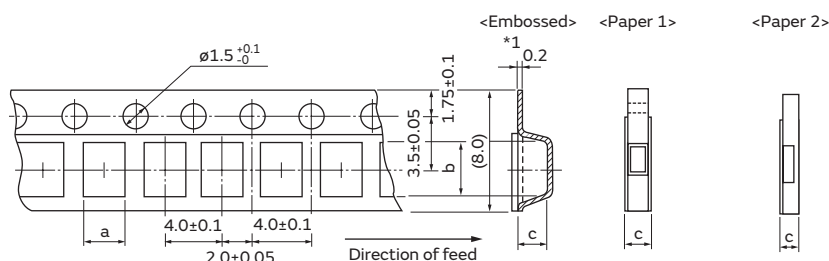
(in mm)

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Inductors for Power Lines Packaging

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Minimum Quantity and 8mm Width Taping Dimensions



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

*1: 0.25 LQM2HP/2MP/31P_00, LQH2, LQM21P

Paper Tape 1

Part Number	Dimensions		Total Thickness of Tape	Packaging Code (Minimum Qty. (pcs.))		
	a	b		$\phi 180$ mm reel	$\phi 330$ mm reel	Bulk
LQM21D (1 to 10 μ H)	1.45	2.25	1.1 max.	D (4000)	J (10000)	B (1000)
LQM21F (1 to 2.2 μ H)	1.45	2.25	1.1 max.	D (4000)	J (10000)	B (1000)
LQM21P_C0	1.45	2.25	0.8 max.	D (4000)	—	B (1000)
LQM21P_CA	1.45	1.45	0.9 max.	D (3000)	—	B (1000)
LQM21P_CH	1.45	2.25	0.7 max.	D (3000)	—	B (1000)
LQM21P_EH	1.45	2.25	1.0 max.	D (3000)	—	B (1000)
LQM21P_G	1.45	2.25	1.1 max.	D (4000)	—	B (1000)
LQM18F	1.05	1.85	1.1 max.	D (4000)	J (10000)	B (1000)
LQM18P_D0	1.05	1.85	0.85 max.	D (4000)	—	B (1000)
LQM18P_CH	1.1	1.9	0.95 max.	D (4000)	—	B (1000)
LQM18P_GH	1.1	1.9	1.25 max.	D (4000)	—	B (1000)
LQW18C	1.0	1.8	1.1 max.	D (4000)	—	B (500)

Paper Tape 2

Part Number	Dimensions		Total Thickness of Tape	Packaging Code (Minimum Qty. (pcs.))		
	a	b		$\phi 180$ mm reel	$\phi 330$ mm reel	Bulk
LQM18PN_DH	1.05	1.85	1.05 max.	D (4000)	—	B (1000)

(in mm)

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Inductors for Power Lines Packaging

Continued from the preceding page. ↘

Minimum Quantity and 8mm Width Taping Dimensions

Embossed Tape

Part Number	Dimensions		Depth of Cavity	Packaging Code (Minimum Qty. (pcs.))		
	a	b	c	ø180mm reel	ø330mm reel	Bulk
LQM18P_B0	1.0	1.8	0.50	L (4000)	—	B (1000)
LQM18P_C0	1.0	1.8	0.60	L (4000)	—	B (1000)
LQM18P_F0	1.0	1.8	1.0	L (4000)	—	B (1000)
LQM21D (22 to 47μH)	1.45	2.25	1.3	L (3000)	K (10000)	B (1000)
LQM21F (4.7 to 47μH)	1.45	2.25	1.3	L (3000)	K (10000)	B (1000)
LQM21P_GH	1.45	2.25	1.05	L (3000)	—	B (1000)
LQM2HP_CH	2.3	2.8	0.6	L (3000)	—	B (1000)
LQM2HP_J0/JC	2.25	2.75	1.3	L (3000)	—	B (1000)
LQM2HP_JH	2.25	2.75	1.3	L (3000)	—	—
LQM2HP_G	2.3	2.8	1.1	L (3000)	—	B (1000)
LQM2HP_GH	2.3	2.8	1.1	L (3000)	—	—
LQM2HP_E0/EH	2.3	2.8	0.9	L (3000)	—	B (1000)
LQM2MP_DH/EH	1.9	2.4	0.9	L (3000)	—	B (1000)
LQM2MP_G0	1.85	2.25	1.1	L (3000)	—	B (1000)
LQM2MP_GH	1.9	2.4	1.1	L (3000)	—	—
LQM31P_00	1.9	3.5	1.05	L (3000)	—	B (1000)
LQM31P_C0	1.9	3.5	0.75	L (4000)	—	B (1000)
LQM32P_G0/GC	2.9	3.6	1.15	L (3000)	—	B (1000)
LQH31C	1.9	3.6	2.0	L (2000)	K (7500)	—
LQH32C_33/_23, LQH32D_23	2.9	3.6	2.1	L (2000)	K (7500)	—
LQH32C_53, LQH32D_53	2.9	3.6	1.7	L (2000)	K (7500)	—
LQH32P	2.9	3.6	1.7	L (2000)	K (7500)	—
LQH2MC_02	1.9	2.3	1.05	L (3000)	—	B (100)
LQH2MC_52	1.9	2.3	0.8	L (3000)	—	B (100)

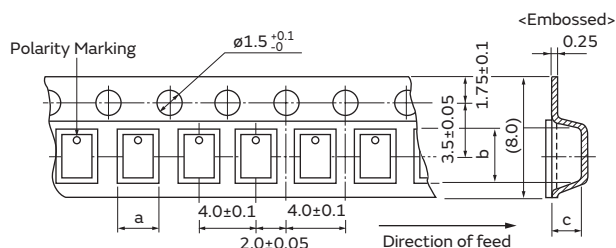
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Inductors for Power Lines Packaging

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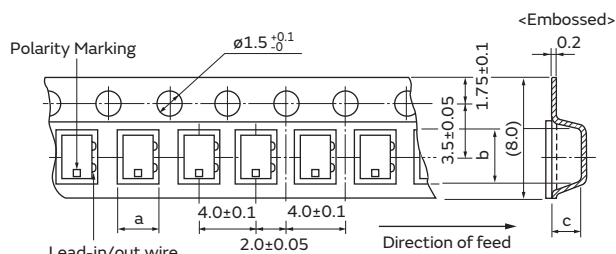
Minimum Quantity and 8mm Width Taping Dimensions



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

Embossed Tape

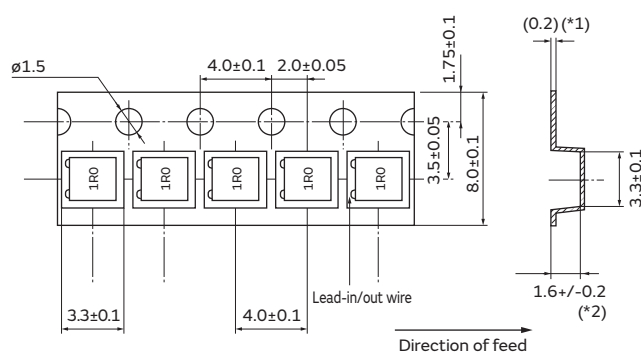
Part Number	Dimensions		Depth of Cavity	Packaging Code (Minimum Qty. (pcs.))		
	a	b		$\phi 180$ mm reel	$\phi 330$ mm reel	Bulk
LQH2HP_GR	2.3	2.8	1.1	L (3000)	—	—
LQH2HP_JR	2.3	2.8	1.3	L (2000)	—	—



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

Embossed Tape

Part Number	Dimensions		Depth of Cavity	Packaging Code (Minimum Qty. (pcs.))		
	a	b		$\phi 180$ mm reel	$\phi 330$ mm reel	Bulk
LQH3NP_MR	3.3	3.3	1.6	E (2000)	F (8000)	—



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

*1 0.3 LQH3NP_GR
*2 1.1 ± 0.1 LQH3NP_GR

Embossed Tape

Part Number	Dimensions		Depth of Cavity	Packaging Code (Minimum Qty. (pcs.))		
	a	b		$\phi 180$ mm reel	$\phi 330$ mm reel	Bulk
LQH3NP_GR	3.3	3.3	1.1	L (3000)	—	—
LQH3NP_JR	3.3	3.3	1.6	L (2000)	—	—
LQH3NP_ME	3.3	3.3	1.6	L (2000)	—	—

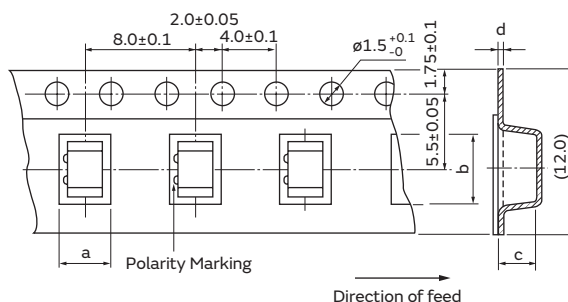
(in mm)

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Inductors for Power Lines 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	c	d	ø180mm reel	ø330mm reel	Bulk
LQH43C	3.6	4.9	2.7	0.3	L (500)	—	—
LQH43P	3.6	4.9	2.7	0.3	L (500)	K (2500)	—
LQH44P_J0/GR	4.3	4.3	1.4	0.3	L (1000)	K (3500)	—
LQH44P_P0	4.3	4.3	1.9	0.3	L (1000)	K (3500)	—
LQH5BP_38	5.3	5.3	4.2	0.4	L (400)	K (1500)	—
LQH5BP_T0	5.3	5.3	2.4	0.3	L (500)	K (3000)	—
LQH55D	5.4	6.1	5.0	0.4	L (350)	K (1500)	—
LQH66S	6.7	6.7	5.6	0.4	L (350)	K (1500)	—

(in mm)