

# Notice for TAIYO YUDEN products

Please read this notice before using the TAIYO YUDEN products.



## REMINDERS

- Product information in this catalog is as of October 2008. All of the contents specified herein are subject to change without notice due to technical improvements, etc. Therefore, please check for the latest information carefully before practical application or usage of the Products.

Please note that Taiyo Yuden Co., Ltd. shall not be responsible for any defects in products or equipment incorporating such products, which are caused under the conditions other than those specified in this catalog or individual specification.

- Please contact Taiyo Yuden Co., Ltd. for further details of product specifications as the individual specification is available.
- Please conduct validation and verification of products in actual condition of mounting and operating environment before commercial shipment of the equipment.
- All electronic components or functional modules listed in this catalog are developed, designed and intended for use in general electronics equipment.(for AV, office automation, household, office supply, information service, telecommunications, (such as mobile phone or PC) etc.). Before incorporating the components or devices into any equipment in the field such as transportation,( automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network (telephone exchange, base station) etc. which may have direct influence to harm or injure a human body, please contact Taiyo Yuden Co., Ltd. for more detail in advance.

Do not incorporate the products into any equipment in fields such as aerospace, aviation, nuclear control, submarine system, military, etc. where higher safety and reliability are especially required.

In addition, even electronic components or functional modules that are used for the general electronic equipment, if the equipment or the electric circuit require high safety or reliability function or performances, a sufficient reliability evaluation check for safety shall be performed before commercial shipment and moreover, due consideration to install a protective circuit is strongly recommended at customer's design stage.

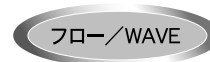
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Certain items in this catalog may require specific procedures for export according to "Foreign Exchange and Foreign Trade Control Law" of Japan, "U.S. Export Administration Regulations," and other applicable regulations. Should you have any question or inquiry on this matter, please contact our sales staff.  
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# ラジアルリード形インダクタ

## RADIAL LEADED INDUCTORS



OPERATING TEMP.	-25~+105°C (製品自己発熱含む) (Including self-generated heat)
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### 特長 FEATURES

- ・LHL08~LHL16シリーズはケースタイプであるので、基板上での自立安定性に優れる
- ・大電流用にはLHL08/LHL10/LHL13/LHL16が対応
- ・LHLP10/LHLP12/LHLP16は大電流用の磁気シールドタイプ
- ・LHLP10シリーズはテーピング対応可能
- ・The LHL08~LHL16 series radial inductors are encapsulated in a resin housing which adds to the stability of the mounted part on a printed circuit board.
- ・The LHL08/LHL10/LHL13/LHL16 series are for high current applications.
- ・The LHLP10/LHLP12/LHLP16 series are shielded type for high current applications.
- ・LHLP10 series is also available in ammo packaging.

### 用途 APPLICATIONS

- ・一般民生(CTV,PDPTV,LCDTV,DVD等の家電)、産機用機器の電源用チョークコイル
- ・各種フィルタ用ピーキングコイル
- ・Ideal for use as a power choke coil in general household appliances (TVS,PDPTV,LCDTV,DVD,etc) and industrial equipment.
- ・Can also be used as a peaking coil in filtering applications.

### 形名表記法 ORDERING CODE

<b>1</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
形式	外形寸法 (mm以下)	包装	公称インダクタンス[μH]	インダクタンス許容差[%]
LH ラジアルリードインダクタ	08 9.0 10 11.0 12 13.0 13 14.0 16 17.0	NB 単品 (LHL) TB つづら折りテーピング (LHL)	例 1R0 1.0 150 15 102 1000 ※R=小数点	J ±5 K ±10 M ±20 N ±30
<b>2</b>				<b>7</b>
形状記号				当社管理記号
L△ テーピング対応品 LZ 大電流、低RDCタイプ LP 磁気シールドタイプ △=スペース				△△△ 標準品 △=スペース



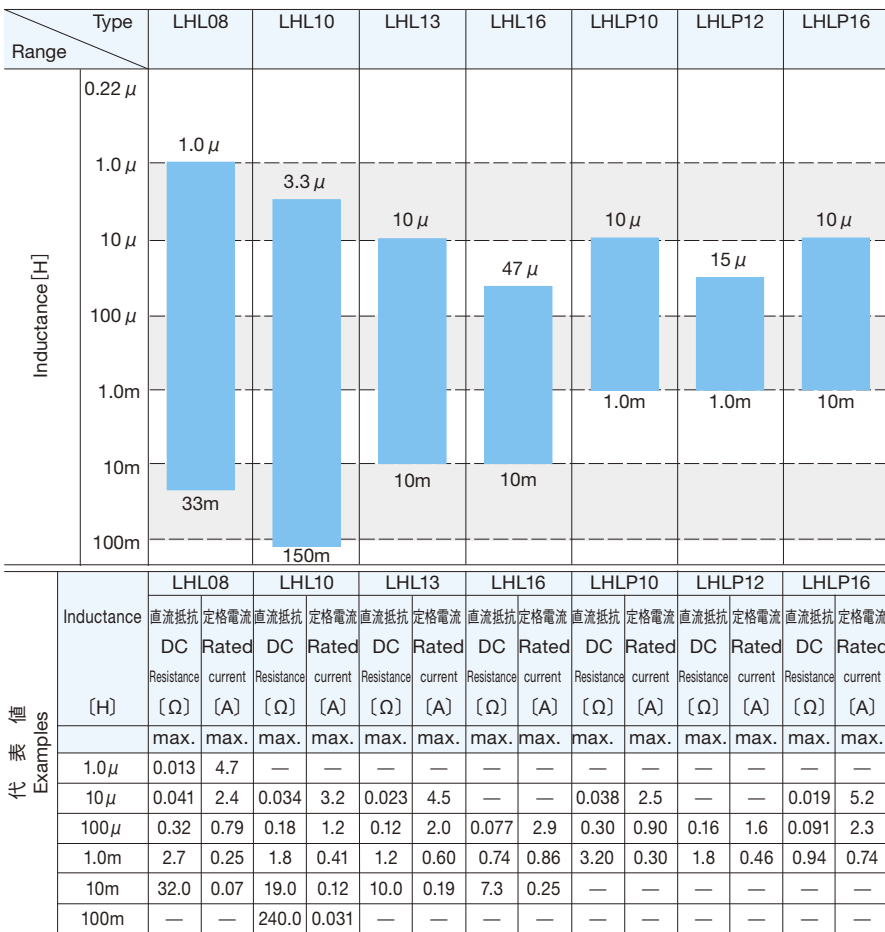
<b>1</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
Type	External dimensions (mm max)	Packaging Code	Nominal Inductance (μH)	Inductance Tolerances (%)
LH Radial leaded inductor	08 9.0 10 11.0 12 13.0 13 14.0 16 17.0	NB Bulk (LHL) TB Ammo packaging (LHL)	example 1R0 1.0 150 15 102 1000 ※R=Decimal point	J ±5 K ±10 M ±20 N ±30
<b>2</b>				<b>7</b>
Configuration				Internal code
L△ Standard type Taping available LZ High current, low RDC type LP Shielded type Bulk △=Blank space				△△△ Standard product △=Blank space

# 外形寸法 EXTERNAL DIMENSIONS

Type	LHL08	LHL10	LHL13	LHL16	LHLP10	LHLP12	LHLP16
Fig.							
D	9.0max (0.354max)	11.0max (0.433max)	14.0max (0.551max)	17.0max (0.669max)	11.0max (0.433max)	13.0max (0.512max)	17.0max (0.669max)
H <sub>2</sub>	9.5max (0.374max)	14.0max (0.551max)	17.0max (0.669max)	21.0max (0.827max)	11.0max (0.433max)	16.0max (0.624max)	19.0max (0.741max)
ℓ	5.0±1.0 (0.197±0.039)	5.0±1.0 (0.197±0.039)	5.0±1.0 (0.197±0.039)	5.0±1.0 (0.197±0.039)	5.0±1.0 (0.197±0.039)	5.0±1.0 (0.197±0.039)	5.0±1.0 (0.197±0.039)
F	5.0±1.0 (0.197±0.039)	5.0±1.0 (0.197±0.039)	7.5±1.0 (0.295±0.039)	7.5±1.0 (0.295±0.039)	5.0±1.0 (0.197±0.039)	5.0±1.0 (0.197±0.039)	7.5±1.0 (0.295±0.039)
φd	0.6±0.05 (0.024±0.002)	0.6±0.05 (0.024±0.002)	0.8±0.05 (0.031±0.002)	0.8±0.05 (0.031±0.002)	0.6±0.05 (0.024±0.004)	0.6±0.05 (0.024±0.004)	0.8±0.05 (0.031±0.004)

Unit : mm (inch)

# 概略バリエーション AVAILABLE INDUCTANCE RANGE



セレクションガイド  
Selection Guide

アイテム一覧  
Part Numbers

特性図  
Electrical Characteristics

梱包  
Packaging

信頼性  
Reliability Data

使用上の注意  
Precautions



etc

LHL08

形名 Ordering code	EHS (Environmental Hazardous Substances)	公称 インダクタンス Inductance [μH]	インダクタンス 許容差 Inductance Tolerance	Q (min.)	自己共振 周波数 Self-resonant frequency [MHz] (min.)	直流抵抗 DC Resistance [Ω] (max.)	定格電流 Rated current [A] (max.)	測定 周波数 Measuring frequency [MHz]	
LH L 08 □ 1R0N	RoHS	1.0	± 30%	40	76	0.013	4.7	7.96	
LH L 08 □ 1R5M	RoHS	1.5	± 20%		65	0.014	4.4		
LH L 08 □ 2R2M	RoHS	2.2			56	0.017	4.1		
LH L 08 □ 2R7M	RoHS	2.7			48	0.019	3.5		
LH L 08 □ 3R3M	RoHS	3.3			41	0.021	3.2		
LH L 08 □ 3R9M	RoHS	3.9			33	0.024	3.1		
LH L 08 □ 4R7M	RoHS	4.7			30	0.025	3.0		
LH L 08 □ 5R6M	RoHS	5.6			23	0.028	2.9		
LH L 08 □ 6R8M	RoHS	6.8			21	0.030	2.8		
LH L 08 □ 8R2M	RoHS	8.2			19	0.034	2.5		
LH L 08 □ 100K	RoHS	10		± 10%	65	17	0.041	2.4	2.52
LH L 08 □ 120K	RoHS	12	50		16	0.044	2.3		
LH L 08 □ 150K	RoHS	15			13	0.053	2.0		
LH L 08 □ 180K	RoHS	18			12	0.060	1.9		
LH L 08 □ 220K	RoHS	22	40		11	0.068	1.8		
LH L 08 □ 270K	RoHS	27			10	0.091	1.5		
LH L 08 □ 330K	RoHS	33			35	8.8	0.10	1.4	
LH L 08 □ 390K	RoHS	39	25			8.4	0.12	1.3	
LH L 08 □ 470K	RoHS	47				8.2	0.15	1.2	
LH L 08 □ 560K	RoHS	56			7.9	0.17	1.1		
LH L 08 □ 680K	RoHS	68	20	7.0	0.20	1.0	0.796		
LH L 08 □ 820K	RoHS	82		35	6.5	0.22		0.90	
LH L 08 □ 101K	RoHS	100			25	5.7		0.32	0.79
LH L 08 □ 121K	RoHS	120	20			5.2		0.36	0.70
LH L 08 □ 151K	RoHS	150		35		4.7		0.41	0.64
LH L 08 □ 181K	RoHS	180			25	4.2		0.66	0.60
LH L 08 □ 221K	RoHS	220	20			3.7		0.73	0.53
LH L 08 □ 271K	RoHS	270		30		3.5		0.85	0.51
LH L 08 □ 331K	RoHS	330			25	3.2		0.97	0.44
LH L 08 □ 391K	RoHS	390	20			2.9		1.1	0.41
LH L 08 □ 471K	RoHS	470		25		2.4	1.3	0.38	
LH L 08 □ 561K	RoHS	560			30	2.2	1.5	0.35	
LH L 08 □ 681K	RoHS	680	45			2.0	1.8	0.32	
LH L 08 □ 821K	RoHS	820		55		1.6	2.3	0.30	
LH L 08 □ 102J	RoHS	1000			65	1.5	2.7	0.25	
LH L 08 □ 122J	RoHS	1200	55			1.4	3.2	0.22	
LH L 08 □ 152J	RoHS	1500		65		1.3	4.1	0.20	
LH L 08 □ 182J	RoHS	1800			55	1.2	4.8	0.19	
LH L 08 □ 222J	RoHS	2200	65			1.1	5.6	0.16	
LH L 08 □ 272J	RoHS	2700		55		1.0	7.5	0.15	
LH L 08 □ 332J	RoHS	3300			65	0.85	8.5	0.14	
LH L 08 □ 392J	RoHS	3900	55			0.78	9.7	0.11	
LH L 08 □ 472J	RoHS	4700		65		0.68	14	0.10	
LH L 08 □ 562J	RoHS	5600			60	0.62	16	0.093	
LH L 08 □ 682J	RoHS	6800	55			0.61	18	0.092	
LH L 08 □ 822J	RoHS	8200		60		0.60	20	0.084	
LH L 08 □ 103J	RoHS	10000			60	0.48	32	0.070	
LH L 08 □ 123J	RoHS	12000	60			0.44	36	0.064	
LH L 08 □ 153J	RoHS	15000		60		0.35	62	0.051	
LH L 08 □ 183J	RoHS	18000			60	0.30	72	0.048	
LH L 08 □ 223J	RoHS	22000	60			0.28	82	0.044	
LH L 08 □ 273J	RoHS	27000		60		0.25	90	0.042	
LH L 08 □ 333J	RoHS	33000			60	0.23	100	0.040	

形名の□には包装記号 (TB: テーピング, NB: 単品) が入ります。

□ Please specify the packaging code. (TB: Taping, NB: Bulk)

LHL10

形名 Ordering code	EHS (Environmental Hazardous Substances)	公称 インダクタンス Inductance [μH]	インダクタンス 許容差 Inductance Tolerance	Q (min.)	自己共振 周波数 Self-resonant frequency [MHz] (min.)	直流抵抗 DC Resistance [Ω] (max.)	定格電流 Rated current [A] (max.)	測定 周波数 Measuring frequency [MHz]		
LH L 10 □3R3M	RoHS	3.3	± 20%	50	46	0.019	4.2	7.96		
LH L 10 □3R9M	RoHS	3.9			40	0.022	4.1			
LH L 10 □4R7M	RoHS	4.7			38	0.024	4.0			
LH L 10 □5R6M	RoHS	5.6			34	0.025	3.8			
LH L 10 □6R8M	RoHS	6.8			30	0.028	3.4			
LH L 10 □8R2M	RoHS	8.2			24	0.031	3.3			
LH L 10 □100K	RoHS	10	± 10%	90	19	0.034	3.2	2.52		
LH L 10 □120K	RoHS	12			16	0.038	2.8			
LH L 10 □150K	RoHS	15			12	0.042	2.6			
LH L 10 □180K	RoHS	18			9.2	0.046	2.4			
LH L 10 □220K	RoHS	22		60	8.6	0.061	2.1			
LH L 10 □270K	RoHS	27			7.1	0.069	2.0			
LH L 10 □330K	RoHS	33			6.8	0.078	1.9			
LH L 10 □390K	RoHS	39		50	6.7	0.085	1.8			
LH L 10 □470K	RoHS	47			6.2	0.093	1.7			
LH L 10 □560K	RoHS	56		± 10%	40	5.2	0.10		1.6	0.796
LH L 10 □680K	RoHS	68				4.9	0.12		1.5	
LH L 10 □820K	RoHS	82				4.7	0.13		1.4	
LH L 10 □101K	RoHS	100	3.8			0.18	1.2			
LH L 10 □121K	RoHS	120	3.2			0.25	1.0			
LH L 10 □151K	RoHS	150	2.9		0.29	0.95				
LH L 10 □181K	RoHS	180	2.6		0.40	0.80				
LH L 10 □221K	RoHS	220	2.3		0.44	0.75				
LH L 10 □271K	RoHS	270	30		2.1	0.50	0.70			
LH L 10 □331K	RoHS	330			2.0	0.56	0.68			
LH L 10 □391K	RoHS	390		1.8	0.62	0.63				
LH L 10 □471K	RoHS	470		1.7	0.84	0.57				
LH L 10 □561K	RoHS	560		1.5	0.93	0.52				
LH L 10 □681K	RoHS	680	1.4	1.0	0.48					
LH L 10 □821K	RoHS	820	1.3	1.4	0.42					
LH L 10 □102J	RoHS	1000	± 5%	50	1.2	1.8	0.41	0.252		
LH L 10 □122J	RoHS	1200			0.87	2.3	0.33			
LH L 10 □152J	RoHS	1500			0.83	2.7	0.30			
LH L 10 □182J	RoHS	1800			0.75	3.0	0.29			
LH L 10 □222J	RoHS	2200			0.70	3.9	0.25			
LH L 10 □272J	RoHS	2700			0.67	4.3	0.24			
LH L 10 □332J	RoHS	3300			0.56	5.8	0.21			
LH L 10 □392J	RoHS	3900			0.54	6.4	0.20			
LH L 10 □472J	RoHS	4700			0.49	7.1	0.19			
LH L 10 □562J	RoHS	5600			0.41	9.0	0.17			
LH L 10 □682J	RoHS	6800			0.38	10	0.16			
LH L 10 □822J	RoHS	8200			0.36	12	0.15			
LH L 10 □103J	RoHS	10000		60	0.29	19	0.12	L:1kHz Q:0.0796		
LH L 10 □123J	RoHS	12000			0.27	21	0.11			
LH L 10 □153J	RoHS	15000			0.24	34	0.090			
LH L 10 □183J	RoHS	18000			0.21	38	0.081			
LH L 10 □223J	RoHS	22000			0.20	43	0.075			
LH L 10 □273J	RoHS	27000			0.15	67	0.060			
LH L 10 □333J	RoHS	33000		40	0.14	76	0.056			
LH L 10 □393J	RoHS	39000			0.13	84	0.053			
LH L 10 □473J	RoHS	47000			0.12	96	0.050			
LH L 10 □563J	RoHS	56000			0.10	170	0.036			
LH L 10 □683J	RoHS	68000		30	0.095	200	0.035			
LH L 10 □823J	RoHS	82000			0.088	210	0.033			
LH L 10 □104J	RoHS	100000	0.085		240	0.031				
LH L 10 □124J	RoHS	120000	0.070		260	0.030				
LH L 10 □154J	RoHS	150000	0.069	300	0.028					

形名の□には包装記号 (TB : テーピング, NB : 単品) が入ります。

□ Please specify the packaging code. (TB : Taping, NB : Bulk)

LHL13

形名 Ordering code	EHS (Environmental Hazardous Substances)	公称 インダクタンス Inductance [μH]	インダクタンス 許容差 Inductance Tolerance	Q (min.)	自己共振 周波数 Self-resonant frequency [MHz] (min.)	直流抵抗 DC Resistance [Ω] (max.)	定格電流 Rated current [A] (max.)	測定 周波数 Measuring frequency [MHz]	
LH L 13 □100K	RoHS	10	± 10%	140	19	0.023	4.5	2.52	
LH L 13 □150K	RoHS	15			12	0.028	4.0		
LH L 13 □220K	RoHS	22		100	7.6	0.035	3.4		
LH L 13 □330K	RoHS	33			6.9	0.043	3.2		
LH L 13 □470K	RoHS	47		70	5.6	0.052	2.8		
LH L 13 □680K	RoHS	68		50	4.4	0.070	2.4		
LH L 13 □101K	RoHS	100			3.3	0.12	2.0		
LH L 13 □151K	RoHS	150		40	2.6	0.19	1.5	0.796	
LH L 13 □221K	RoHS	220			2.2	0.23	1.3		
LH L 13 □331K	RoHS	330		30	1.8	0.35	1.1		
LH L 13 □471K	RoHS	470			1.5	0.43	0.90		
LH L 13 □681K	RoHS	680			1.2	0.61	0.80		
LH L 13 □102J	RoHS	1000		± 5%	40	1.0	1.2		0.60
LH L 13 □152J	RoHS	1500				0.83	1.8	0.45	
LH L 13 □222J	RoHS	2200	0.70			2.2	0.40		
LH L 13 □332J	RoHS	3300	0.60			3.4	0.33		
LH L 13 □472J	RoHS	4700	0.43		4.7	0.28			
LH L 13 □682J	RoHS	6800	30		0.38	5.6	0.25		
LH L 13 □103J	RoHS	10000	70		0.30	10	0.19	L:1kHz Q:0.0796MHz	

形名の□には包装記号 (TB : テーピング, NB : 単品) が入ります。

□ Please specify the packaging code. (TB : Taping, NB : Bulk)

LHL16

形名 Ordering code	EHS (Environmental Hazardous Substances)	公称 インダクタンス Inductance [μH]	インダクタンス 許容差 Inductance Tolerance	Q (min.)	自己共振 周波数 Self-resonant frequency [MHz] (min.)	直流抵抗 DC Resistance [Ω] (max.)	定格電流 Rated current [A] (max.)	測定 周波数 Measuring frequency [MHz]
LH L 16 □470K	RoHS	47	± 10%	70	4.5	0.046	3.7	2.52
LH L 16 □680K	RoHS	68			3.9	0.054	3.3	
LH L 16 □101K	RoHS	100		60	2.7	0.077	2.9	0.796
LH L 16 □151K	RoHS	150			2.3	0.11	2.4	
LH L 16 □221K	RoHS	220			1.9	0.15	2.0	
LH L 16 □331K	RoHS	330		40	1.6	0.21	1.5	
LH L 16 □471K	RoHS	470		30	1.4	0.28	1.3	
LH L 16 □681K	RoHS	680		± 5%	20	1.2	0.35	
LH L 16 □102J	RoHS	1000				0.84	0.74	0.86
LH L 16 □152J	RoHS	1500				0.69	0.93	0.75
LH L 16 □222J	RoHS	2200	0.56			1.4	0.60	
LH L 16 □332J	RoHS	3300	0.49			2.2	0.50	
LH L 16 □472J	RoHS	4700	0.41	2.6	0.40			
LH L 16 □682J	RoHS	6800	0.35	3.9	0.33			
LH L 16 □103J	RoHS	10000	70	0.26	7.3	0.25	L:1kHz Q:0.0796MHz	

形名の□には包装記号 (TB : テーピング, NB : 単品) が入ります。

□ Please specify the packaging code. (TB : Taping, NB : Bulk)



LHLP10NB

形名 Ordering code	EHS (Environmental Hazardous Substances)	公称 インダクタンス Nominal Inductance [ $\mu$ H]	L測定 周波数 L Measuring frequency	インダクタンス 許容差 Inductance Tolerance [%]	直流抵抗 DC Resistance [ $\Omega$ ] (max.)	定格電流 Rated current [A] (max.)
LH LP10□100M	RoHS	10	2.52	± 20	0.038	2.5
LH LP10□150M	RoHS	15			0.049	2.2
LH LP10□220M	RoHS	22			0.075	1.9
LH LP10□330M	RoHS	33			0.094	1.7
LH LP10□470M	RoHS	47			0.15	1.3
LH LP10□680M	RoHS	68			0.23	1.0
LH LP10□101K	RoHS	100	0.796	± 10	0.30	0.90
LH LP10□151K	RoHS	150			0.47	0.78
LH LP10□221K	RoHS	220			0.70	0.63
LH LP10□331K	RoHS	330			0.88	0.58
LH LP10□471K	RoHS	470			1.3	0.46
LH LP10□681K	RoHS	680			1.9	0.38
LH LP10□102K	RoHS	1000	0.252		3.2	0.30

形名の□には包装記号 (TB : テーピング, NB : 単品) が入ります。

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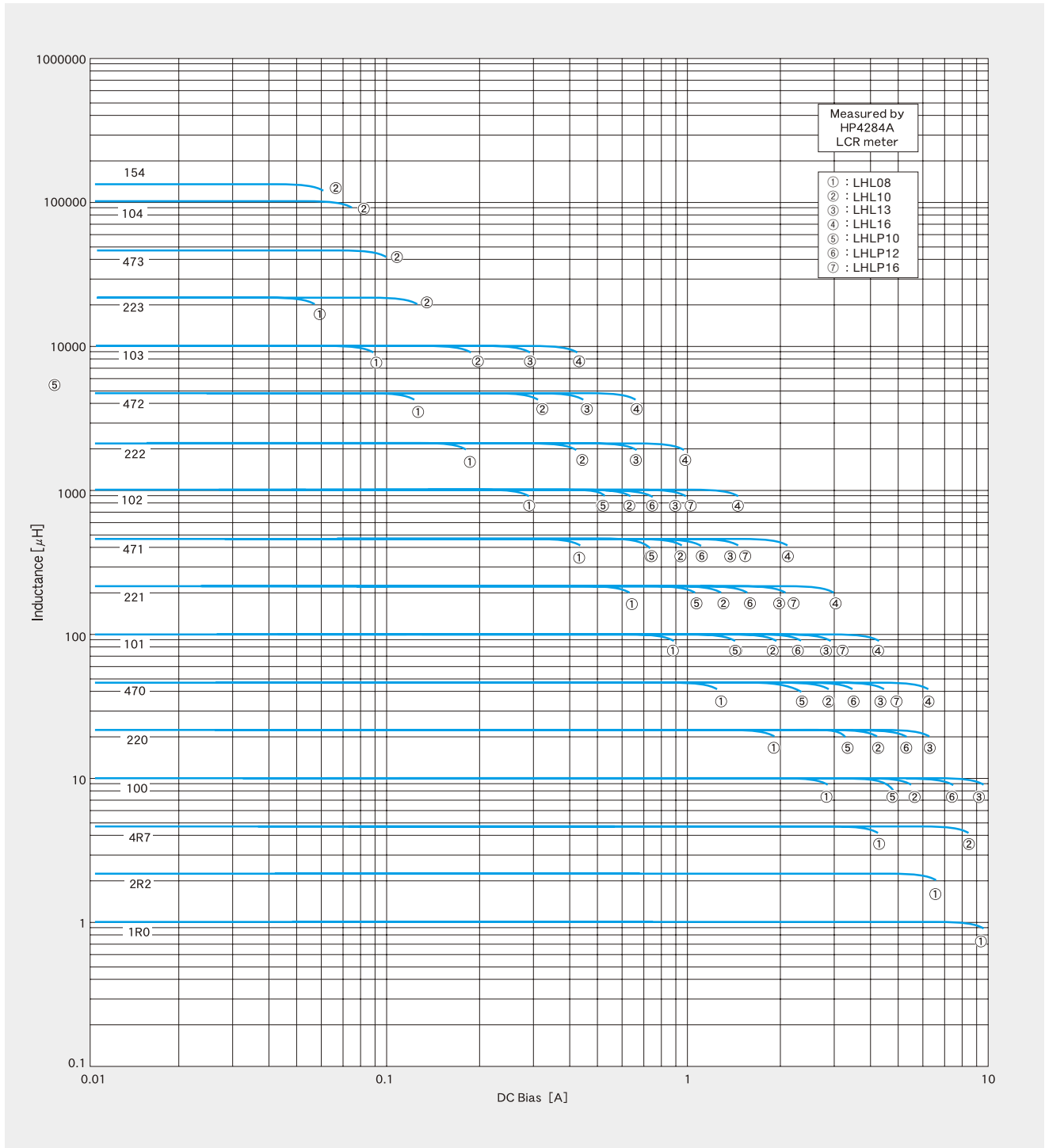
LHLP12NB

形名 Ordering code	EHS (Environmental Hazardous Substances)	公称 インダクタンス Nominal Inductance [ $\mu$ H]	L測定 周波数 L Measuring frequency	インダクタンス 許容差 Inductance Tolerance [%]	直流抵抗 DC Resistance [ $\Omega$ ] (max.)	定格電流 Rated current [A] (max.)
LH LP12NB150M	RoHS	15	2.52	± 20	0.035	3.3
LH LP12NB220M	RoHS	22			0.050	2.7
LH LP12NB330M	RoHS	33			0.070	2.4
LH LP12NB470M	RoHS	47			0.081	2.1
LH LP12NB680M	RoHS	68			0.12	1.7
LH LP12NB101K	RoHS	100	0.796	± 10	0.16	1.6
LH LP12NB151K	RoHS	150			0.24	1.3
LH LP12NB221K	RoHS	220			0.38	0.95
LH LP12NB331K	RoHS	330			0.46	0.89
LH LP12NB471K	RoHS	470			0.69	0.74
LH LP12NB681K	RoHS	680			1.1	0.58
LH LP12NB102K	RoHS	1000	0.252		1.8	0.46

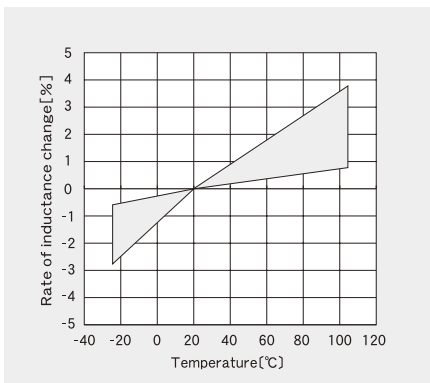
LHLP16NB

形名 Ordering code	EHS (Environmental Hazardous Substances)	公称 インダクタンス Nominal Inductance [ $\mu$ H]	L測定 周波数 L Measuring frequency	インダクタンス 許容差 Inductance Tolerance [%]	直流抵抗 DC Resistance [ $\Omega$ ] (max.)	定格電流 Rated current [A] (max.)
LH LP16NB100M	RoHS	10	1kHz	± 20	0.019	5.2
LH LP16NB150M	RoHS	15			0.025	5.1
LH LP16NB220M	RoHS	22			0.027	4.6
LH LP16NB330M	RoHS	33			0.035	4.0
LH LP16NB470K	RoHS	47			0.045	3.4
LH LP16NB680K	RoHS	68		0.062	3.1	
LH LP16NB101K	RoHS	100		0.091	2.3	
LH LP16NB151K	RoHS	150		0.14	1.9	
LH LP16NB221K	RoHS	220		0.20	1.5	
LH LP16NB331K	RoHS	330		0.31	1.3	
LH LP16NB471K	RoHS	470	0.47	1.0		
LH LP16NB681K	RoHS	680	0.58	0.98		
LH LP16NB102K	RoHS	1000			0.94	0.74

直流重畳特性例 DC Bias characteristics

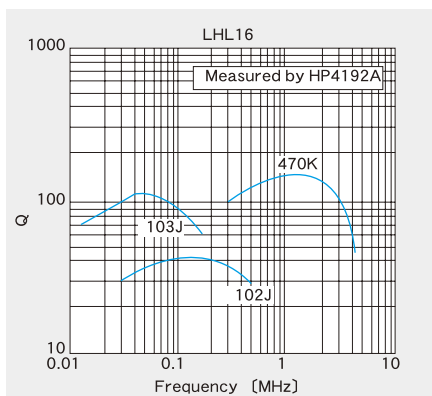
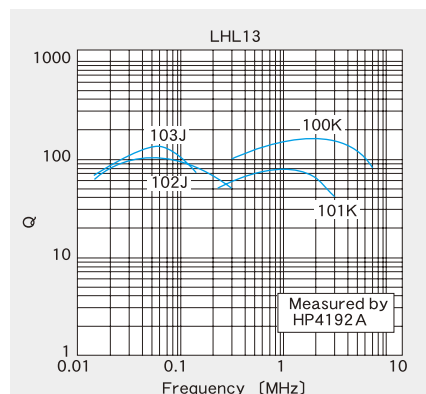
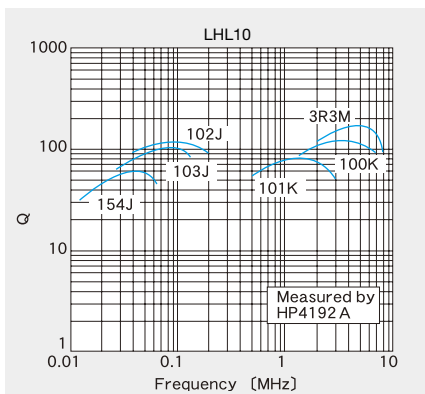
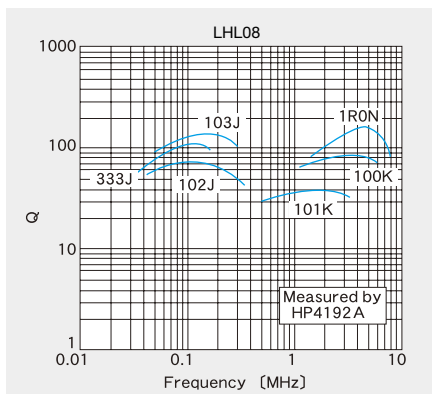


インダクタンス温度特性例 Temperature characteristics





Q－周波数特性例 Q-vs- Frequency characteristics

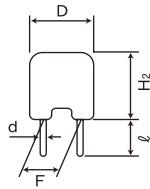


①最小受注単位数 Minimum Quantity

形式 (EIA) Type	標準数量 (pcs) Standard quantity		
	箱づめ	袋づめ	テーピング
	Box	Bulk	Taped
LHL 08	—	100	1000
LHL 10	—	50	500
LHL 13	—	25	500
LHL 16	500	—	250
LHLP10	500	—	200
LHLP12NB	300	—	—
LHLP16NB	200	—	—

②製品単品寸法 Bulk dimensions

LHL08~16

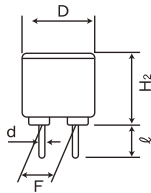


形式 Type	寸法 Dimensions (mm)				
	$\phi D$ (max)	$H_2$ (max)	F*	$l$	$\phi d$
LHL 08	9.0 (0.354)	9.5 (0.374)	5.0±1.0 (0.197±0.039)	5.0±1.0 (0.197±0.039)	0.6±0.05 (0.024±0.002)
LHL 10	11.0 (0.433)	14.0 (0.551)	5.0±1.0 (0.197±0.039)	5.0±1.0 (0.197±0.039)	0.6±0.05 (0.024±0.002)
LHL 13	14.0 (0.551)	17.0 (0.669)	7.5±1.0 (0.295±0.039)	5.0±1.0 (0.197±0.039)	0.8±0.05 (0.031±0.002)
LHL 16	17.0 (0.669)	21.0 (0.827)	7.5±1.0 (0.295±0.039)	5.0±1.0 (0.197±0.039)	0.8±0.05 (0.031±0.002)

\* リード端子根元 (接着部) 寸法とする。 Unit : mm (inch)

\* Measured at the base of the leads.

LHLP10~16

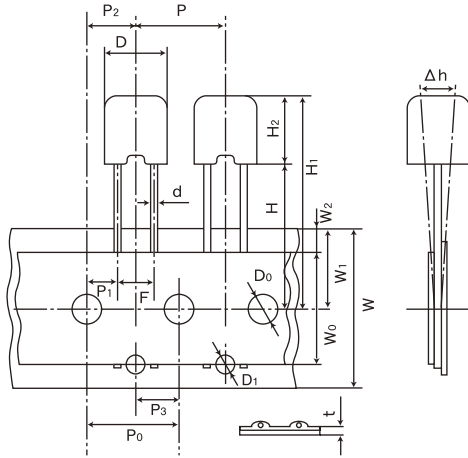


形式 Type	寸法 Dimensions (mm)				
	$\phi D$ (max)	$H_2$ (max)	F*	$l$	$\phi d$
LHLP10	11.0 (0.433)	11.0 (0.433)	5.0±1.0 (0.197±0.039)	5.0±1.0 (0.197±0.039)	0.6±0.05 (0.024±0.004)
LHLP12	13.0 (0.512)	16.0 (0.624)	5.0±1.0 (0.197±0.039)	5.0±1.0 (0.197±0.039)	0.6±0.05 (0.024±0.004)
LHLP16	17.0 (0.669)	19.0 (0.741)	7.5±1.0 (0.295±0.039)	5.0±1.0 (0.197±0.039)	0.8±0.05 (0.031±0.004)

\* リード端子根元 (接着部) 寸法とする。 Unit : mm (inch)

\* Measured at the base of the leads.

・LHL08~16

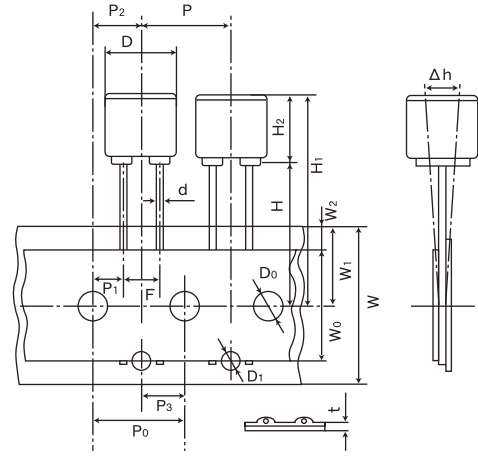


	LHL08	LHL10	LHL13	LHL16
D	φ 9.0max (φ 0.354max)	φ 11.0max (φ 0.433max)	φ 14.0max (φ 0.551max)	φ 17.0max (φ 0.669max)
H <sub>1</sub>	30.5max (1.20max)	34.0max (1.34max)	37.0max (1.46max)	41.0max (1.61max)
H	18.0 <sup>+2.0</sup> <sub>-0.0</sub> (0.709 <sup>+0.079</sup> <sub>-0.000</sub> )	18.0 <sup>+2.0</sup> <sub>-0.0</sub> (0.709 <sup>+0.079</sup> <sub>-0.000</sub> )	18.0 <sup>+2.0</sup> <sub>-0.0</sub> (0.709 <sup>+0.079</sup> <sub>-0.000</sub> )	18.0 <sup>+2.0</sup> <sub>-0.0</sub> (0.709 <sup>+0.079</sup> <sub>-0.000</sub> )
H <sub>2</sub>	9.5max (0.374max)	14.0max (0.551max)	17.0max (0.669max)	21.0max (0.827max)
P	12.7±1.0 (0.500±0.039)	12.7±1.0 (0.500±0.039)	15.0±1.0 (0.591±0.039)	30.0±1.0 (1.18±0.039)
P <sub>0</sub>	12.7±0.3 <sup>※1</sup> (0.500±0.012)	12.7±0.3 <sup>※1</sup> (0.500±0.012)	15.0±0.3 <sup>※1</sup> (0.591±0.012)	15.0±0.3 <sup>※1</sup> (0.591±0.012)
P <sub>1</sub>	3.85±0.7 (0.152±0.028)	3.85±0.7 (0.152±0.028)	3.75±0.7 (0.148±0.028)	3.75±0.7 (0.148±0.028)
P <sub>2</sub>	6.35±1.3 (0.250±0.051)	6.35±1.3 (0.250±0.051)	7.50±1.3 (0.295±0.051)	7.50±1.3 (0.295±0.051)
F	5.0 <sup>+0.8</sup> <sub>-0.2</sub> (0.197 <sup>+0.031</sup> <sub>-0.008</sub> )	5.0 <sup>+0.8</sup> <sub>-0.2</sub> (0.197 <sup>+0.031</sup> <sub>-0.008</sub> )	7.50 <sup>+0.8</sup> <sub>-0.2</sub> (0.295 <sup>+0.031</sup> <sub>-0.008</sub> )	7.50±0.5 (0.295±0.020)
h	0.0±2.0 (0.0±0.079)	0.0±2.0 (0.0±0.079)	0.0±2.0 (0.0±0.079)	0.0±2.0 (0.0±0.079)
W	18.0 <sup>+1.0</sup> <sub>-0.5</sub> (0.709 <sup>+0.039</sup> <sub>-0.020</sub> )	18.0 <sup>+1.0</sup> <sub>-0.5</sub> (0.709 <sup>+0.039</sup> <sub>-0.020</sub> )	18.0 <sup>+1.0</sup> <sub>-0.5</sub> (0.709 <sup>+0.039</sup> <sub>-0.020</sub> )	18.0 <sup>+1.0</sup> <sub>-0.5</sub> (0.709 <sup>+0.039</sup> <sub>-0.020</sub> )
W <sub>0</sub>	12.5min (0.492min)	12.5min (0.492min)	12.5min (0.492min)	12.5min (0.492min)
W <sub>1</sub>	9.0±0.5 (0.354±0.020)	9.0±0.5 (0.354±0.020)	9.0±0.5 (0.354±0.020)	9.0±0.5 (0.354±0.020)
W <sub>2</sub>	3.0max <sup>※2</sup> (0.118max)	3.0max <sup>※2</sup> (0.118max)	3.0max <sup>※2</sup> (0.118max)	3.0max <sup>※2</sup> (0.118max)
D <sub>0</sub>	φ 4.0±0.2 (φ 0.158±0.008)	φ 4.0±0.2 (φ 0.158±0.008)	φ 4.0±0.2 (φ 0.158±0.008)	φ 4.0±0.2 (φ 0.158±0.008)
φ d	φ 0.6±0.05 (φ 0.024±0.002)	φ 0.6±0.05 (φ 0.024±0.002)	φ 0.8±0.05 (φ 0.031±0.002)	φ 0.8±0.05 (φ 0.031±0.002)
t	0.6±0.3 (0.024±0.012)	0.6±0.3 (0.024±0.012)	0.6±0.3 (0.024±0.012)	0.6±0.3 (0.024±0.012)
D <sub>1</sub>	φ 1.8 (0.071)	φ 1.8 (0.071)	φ 1.8 (0.071)	—
P <sub>3</sub>	6.35 (0.25)	6.35 (0.25)	7.50 (0.25)	—

Unit : mm (inch)

- ※1 累積ピッチ誤差は20ピッチにつき1mm以内。
- ※2 貼付テープは台紙よりはみ出さないこと。
- ※1 Accumulated error for 20 pitches is 1mm.
- ※2 Bonding tape must not protrude from the base tape.

・LHLP10TB



	LHLP10
D	φ 11.0max (φ 0.433max)
H <sub>1</sub>	32.0max (1.26max)
H	18.0 <sup>+2.0</sup> <sub>-0.0</sub> (0.709 <sup>+0.079</sup> <sub>-0.000</sub> )
H <sub>2</sub>	11.0max (0.433max)
P	12.7±1.0 (0.500±0.039)
P <sub>0</sub>	12.7±0.3 <sup>※1</sup> (0.500±0.012)
P <sub>1</sub>	3.85±0.7 (0.152±0.028)
P <sub>2</sub>	6.35±1.3 (0.250±0.051)
F	5.0 <sup>+0.8</sup> <sub>-0.2</sub> (0.197 <sup>+0.031</sup> <sub>-0.008</sub> )
h	0.0±2.0 (0.0±0.079)
W	18.0 <sup>+1.0</sup> <sub>-0.5</sub> (0.709 <sup>+0.039</sup> <sub>-0.020</sub> )
W <sub>0</sub>	12.5min (0.492min)
W <sub>1</sub>	9.0±0.5 (0.354±0.020)
W <sub>2</sub>	3.0max <sup>※2</sup> (0.118max)
D <sub>0</sub>	φ 4.0±0.2 (φ 0.158±0.008)
φ d	φ 0.6±0.05 (φ 0.024±0.002)
t	0.6±0.3 (0.024±0.012)
D <sub>1</sub>	φ 1.8 (0.071)
P <sub>3</sub>	6.35 (0.25)

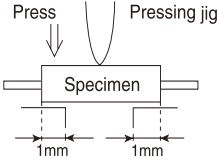
Unit : mm (inch)

- ※1 累積ピッチ誤差は20ピッチにつき1mm以内。
- ※2 貼付テープは台紙よりはみ出さないこと。
- ※1 Accumulated error for 20 pitches is 1mm.
- ※2 Bonding tape must not protrude from the base tape.

Item	Specified Value						Test Method and Remarks
	FA02 Type	CAL45 Type	LHL □□□	FBA/FBR	FL05 □ Type	FL06BT Type	
1. Operating temperature Range	-25~+105°C			-25~+85°C	-25~+105°C		FA·CA·FL : Including self-generated heat  LHL□□□ : Including self-generated heat
2. Storage temperature Range	-40~+85°C						
3. Rated current	Within the specified tolerance						FA·CA : The maximum DC value having inductance within 10% and temperature increase within 20°C by the application of DC bias. LHL□□□ : The maximum DC value having inductance decrease within 10% (LHLC08, LHLC10 : within 30%) and temperature increase within the following specified temperature by the application of DC bias. Reference temperature : 25°C (LHL08, LHL10, LHL13) : 30°C (LHL16, LHLP□□) : 40°C (LHLC08, LHLC10)  FB : No disconnection or appearance abnormality by continuous current application for 30 min. Change after the application shall be within ±20% of the initial value. This is not guaranteed for electrical characteristics during current application.  FL : The maximum DC value having temperature rise within specified value.
4. Impedance				Within the specified tolerance		Refer to individual specification	FB : Measuring equipment : Impedance analyzer (HP4191A) or its equivalent Measuring frequency : Specified frequency  FL06BT : Measuring equipment : 4291A (HP) or its equivalent Measuring frequency : Specified frequency
5. Inductance	Within the specified tolerance				Within the specified tolerance		FA·CA : Measuring equipment : LCR meter (HP4285A + HP42851A or its equivalent) Measuring frequency : Specified frequency LHL□□□ : Measuring equipment : LCR meter (HP4285A + HP42851A or its equivalent) LCR meter (HP4262A) or its equivalent (at 1KHz) Measuring frequency : Specified frequency  FL05R□ : Measuring equipment : HP4262A or its equivalent. Measuring frequency : 1kHz

Item	Specified Value						Test Method and Remarks												
	FA02 Type	CAL45 Type	LHL□□□	FBA/FBR	FL05□ Type	FL06BT Type													
6.Q	Within the specified tolerance	/					FA・CA : Measuring equipment : LCR meter (HP4285A+HP42851A or its equivalent) Measuring frequency : Specified frequency  LHL□□□ (except LHLP) : Measuring equipment : LCR meter (HP4285A+HP42851A or its equivalent) LCR meter (HP4262A) or its equivalent (at 1kHz) Measuring frequency : Specified frequency												
7.DC Resistance	Within the specified tolerance						FA・CA : Measuring equipment : low ohmmeter (A&D AD5812 or its equivalent)  LHL□□□・FB・FL : Measuring equipment : DC ohmmeter												
8.Self resonance frequency	Within the specified tolerance	/					FA・CA : Measuring equipment : Network analyzer (Anritsu MS620J or its equivalent)  LHL□□□ (except LHLP) : Measuring equipment : (HP4191A, 4192A) its equivalent												
9.Temperature characteristic	△L/L : Within ±5%	/	△L/L : Within ±7% (except LHLP16 : Within ±20%)				FA・CA : Change of maximum inductance deviation in step 1to5 <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>step</th> <th>Temperature (°C)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20</td> </tr> <tr> <td>2</td> <td>-25 (Minimum operating temperature)</td> </tr> <tr> <td>3</td> <td>20 (Standard temperature)</td> </tr> <tr> <td>4</td> <td>+85 (Maximum operating temperature)</td> </tr> <tr> <td>5</td> <td>20</td> </tr> </tbody> </table> LHL□□□ Change of maximum inductance deviation in step 1to5 Temperature at step 1 : 20°C Temperature at step 2 : Minimum operating temperature Temperature at step 3 : 20°C (Standard temperature) Temperature at step 4 : Maximum operating temperature Temperature at step 5 : 20°C	step	Temperature (°C)	1	20	2	-25 (Minimum operating temperature)	3	20 (Standard temperature)	4	+85 (Maximum operating temperature)	5	20
step	Temperature (°C)																		
1	20																		
2	-25 (Minimum operating temperature)																		
3	20 (Standard temperature)																		
4	+85 (Maximum operating temperature)																		
5	20																		

Item	Specified Value						Test Method and Remarks																					
	FA02 Type	CAL45 Type	LHL□□□	FBA/FBR	FL05□ Type	FL06BT Type																						
10. Terminal strength : tensile force	No abnormality such as cut lead, or looseness.			No abnormality such as cut lead, or looseness.	No abnormality such as cut lead, or looseness.		FA・CA : Apply the stated tensile force progressively in the direction to draw terminal. <table border="1"> <tr> <th>force (N)</th> <th>duration (S)</th> </tr> <tr> <td>25</td> <td>5</td> </tr> </table> LHL□□□ : Apply the stated tensile force progressively in the direction to draw terminal. <table border="1"> <tr> <th>Nominal wire diameter tensile <math>\phi</math> d (mm)</th> <th>force (N)</th> <th>duration(S)</th> </tr> <tr> <td>0.3 &lt; <math>\phi</math> d ≤ 0.5</td> <td>5</td> <td rowspan="3">30 ± 5</td> </tr> <tr> <td>0.5 &lt; <math>\phi</math> d ≤ 0.8</td> <td>10</td> </tr> <tr> <td>0.8 &lt; <math>\phi</math> d ≤ 1.2</td> <td>25</td> </tr> </table> FBA/FBR : A bead shall be fixed and static loaded 20 ± 1N (2.0 ± 0.1 kgf) in axial direction of lead wire in 10 ± 1 seconds. FL05R□ : Fix the component in the direction to draw terminal, and gradually apply the tensile force of 4.9 N.	force (N)	duration (S)	25	5	Nominal wire diameter tensile $\phi$ d (mm)	force (N)	duration(S)	0.3 < $\phi$ d ≤ 0.5	5	30 ± 5	0.5 < $\phi$ d ≤ 0.8	10	0.8 < $\phi$ d ≤ 1.2	25							
force (N)	duration (S)																											
25	5																											
Nominal wire diameter tensile $\phi$ d (mm)	force (N)	duration(S)																										
0.3 < $\phi$ d ≤ 0.5	5	30 ± 5																										
0.5 < $\phi$ d ≤ 0.8	10																											
0.8 < $\phi$ d ≤ 1.2	25																											
11. Over current			There shall be no scorch or short of wire. LHLC08, LHLC10: There shall be no firing.				LHL□□□ : Measuring current : Rated current × 2 Duration : 5min. Number of measuring : one time																					
12. Terminal strength : bending	No abnormality such as cut lead, or looseness.						FA・CA : Suspend a mass at the end the terminal, incline the body though angel of 90 and return it to initial position. This operation is done over a period of 2-3 sec. Then second bend in the opposite direction shall be made. Number of bends : Two times. <table border="1"> <tr> <th>Nominal wire diameter tensile <math>\phi</math> d (mm)</th> <th>Bending force (N)</th> <th>Mass reference weight (kg)</th> </tr> <tr> <td>0.3 &lt; <math>\phi</math> d ≤ 0.5</td> <td>2.5</td> <td>0.25</td> </tr> <tr> <td>0.5 &lt; <math>\phi</math> d ≤ 0.8</td> <td>5</td> <td>0.50</td> </tr> </table> LH・FB : Suspend a mass at the end the terminal, incline the body though angel of 90 and return it to initial position. This operation is done over a period of 2-3 sec. Then second bend in the opposite direction shall be made. Number of bends : Two times. <table border="1"> <tr> <th>Nominal wire diameter tensile <math>\phi</math> d (mm)</th> <th>Bending force (N)</th> <th>Mass reference weight (kg)</th> </tr> <tr> <td>0.3 &lt; <math>\phi</math> d ≤ 0.5</td> <td>2.5</td> <td>0.25</td> </tr> <tr> <td>0.5 &lt; <math>\phi</math> d ≤ 0.8</td> <td>5</td> <td>0.5</td> </tr> <tr> <td>0.8 &lt; <math>\phi</math> d ≤ 1.2</td> <td>10</td> <td>1.0</td> </tr> </table>	Nominal wire diameter tensile $\phi$ d (mm)	Bending force (N)	Mass reference weight (kg)	0.3 < $\phi$ d ≤ 0.5	2.5	0.25	0.5 < $\phi$ d ≤ 0.8	5	0.50	Nominal wire diameter tensile $\phi$ d (mm)	Bending force (N)	Mass reference weight (kg)	0.3 < $\phi$ d ≤ 0.5	2.5	0.25	0.5 < $\phi$ d ≤ 0.8	5	0.5	0.8 < $\phi$ d ≤ 1.2	10	1.0
Nominal wire diameter tensile $\phi$ d (mm)	Bending force (N)	Mass reference weight (kg)																										
0.3 < $\phi$ d ≤ 0.5	2.5	0.25																										
0.5 < $\phi$ d ≤ 0.8	5	0.50																										
Nominal wire diameter tensile $\phi$ d (mm)	Bending force (N)	Mass reference weight (kg)																										
0.3 < $\phi$ d ≤ 0.5	2.5	0.25																										
0.5 < $\phi$ d ≤ 0.8	5	0.5																										
0.8 < $\phi$ d ≤ 1.2	10	1.0																										
13. Insulation resistance : between the terminals and body			100M $\Omega$ min.				LHL□□□ : Applied voltage : 500 VDC Duration : 60 sec.																					
14. Insulation resistance : between terminals and core				1M $\Omega$ min. (Other than material code MA)			FBA・FBR : Applied voltage : 100 VDC Duration : 60 ± 5 sec.																					
15. Withstanding : between the terminals and body			No abnormality such as insulation damage				LHL□□□ : According to JIS C5102. 7. 1. 3 (C) Metal global method Applied voltage : 500 VDC Duration : 60 sec.																					

Item	Specified Value						Test Method and Remarks
	FA02 Type	CAL45 Type	LHL□□□	FBA/FBR	FL05□ Type	FL06BT Type	
16.DC bias characteristic	△L/L : Within -10%						FA·CA : Measure inductance with application of rated current using LCR meter to compare it with the initial value.
17.Body strength	No abnormality as damage.			No abnormality such as cracks on body.			FA02 : Applied force : 30N Duration : 10 sec. Speed : Shall attain to specified force in 2 sec.  CAL45 : Applied force : 50N Duration : 10 sec. Speed : Shall attain to specified force in 2 sec.  FBA : Applied force : 50±3N Duration : 30±1 sec.  
18.Resistance to vibration	△L/L : Within±5% Q : 30min.	△L/L : Within±5%	Appearance : No abnormality △L/L : Within±5% Q change : Within±30% (LHLP : only △L/L)	Appearance : No abnormality Impedance change : Within±20%			FA·CA : Directions : 2 hrs each in X, Y and Z directions total : 6hrs. Frequency range : 10 to 55 to 10Hz(1min.) Amplitude : 1.5mm Mounting method : Soldering onto printed board. Recovery : At least 1hr of recovery under the standard condition after the test, followed by the measurement within 2hrs.  LHL□□□·FB : Directions : 2 hrs each in X, Y and Z directions total : 6hrs. Frequency range : 10 to 55 to 10Hz(1min.) Amplitude : 1.5mm (But don't exceed acceleration 196m/s (two power) Mounting method : Soldering onto printed board.



Item	Specified Value						Test Method and Remarks
	FA02 Type	CAL45 Type	LHL□□□	FBA/FBR	FL05□ Type	FL06BT Type	
19. Resistance to shock	No significant abnormality in appearance						FA・CA : Drop test Impact material : concrete or vinyl tile Height : 1m Total number of drops : 10 times
20. Solderability	At least 75% of terminal electrode is covered by new solder.	At least 75% of lead circumference is covered by new solder.	At least 90% of lead circumference is covered by new solder.	At least 75% of lead circumference is covered by new solder.			FA・CA : Solder temperature : 230±5°C Duration : 2±0.5 sec.  LHL□□□ : Solder temperature : 235±5°C Duration : 2±0.5 sec. Immersion depth : Up to 1.5mm from bottom of case.  FB : Solder temperature : 230±5°C Duration : 3±1 sec. Immersion depth : Up to 1.5mm from terminal root.  FL05R□ : Solder temperature : 230±5°C Duration : 2±0.5 sec. Immersion depth : Up to 2~2.5mm from terminal root.  FL06BT : Solder temperature : 230±5°C Duration : 3±1 sec. Immersion depth : Up to 0.5~1.0mm from terminal root.

Item	Specified Value						Test Method and Remarks
	FA02 Type	CAL45 Type	LHL□□□	FBA/FBR	FL05□ Type	FL06BT Type	
21. Resistance to soldering heat	No significant abnormality in appearance		No significant abnormality in appearance Inductance change : Within ±5% Q change : Within ±30% (LHLP : only △L/L)	No significant abnormality in appearance Impedance change : Within ±20%	Refer to individual specification	No significant abnormality in appearance Impedance change : Within ±20%	<p>FA・CA :</p> <p>Solder temperature : 260±5°C (CP02・LA02) 270±5°C (LA03・LA04・LA45)</p> <p>Duration : 5±0.5 sec. One time</p> <p>Immersed conditions : Inserted into substrate with t = 1.6mm</p> <p>Recovery : At least 1hr of recovery under the standard condition after the test, followed by the measurement within 2hrs.</p> <p>LHL□□□ :</p> <p>Solder bath method Solder temperature : 260±5°C Duration : 10±1 sec. : Up to 1.5mm from bottom of case.</p> <p>Manual soldering Solder temperature : 350±10°C (At the tip of soldering iron) Duration : 5±1 sec. : Up to 1.5mm from bottom of case.</p> <p>Caution : No excessive pressing shall be applied to terminald</p> <p>Recovery : 4 to 24hrs of recovery under the standard condition after the tset.</p> <p>FB :</p> <p>Solder bath method Condition 1 Solder temperature : 260±5°C Duration : 10±1 sec. Immersion depth : Up to 1.5mm from terminal root.</p> <p>Condition 2 Solder temperature : 350±5°C Duration : 3±1 sec. Immersion depth : Up to 1.5mm from terminal root. Recovery : 3hrs of recovery under the standard condition after the test.</p> <p>FL :</p> <p>Solder condition : 260±5°C 10±1 sec. Immersion depth : Up to 0.5 to 1.0mm from terminal root. Recovery : 3hrs of recovery under the standard condition after the test.</p>

Item	Specified Value						Test Method and Remarks																																													
	FA02 Type	CAL45 Type	LHL□□□	FBA/FBR	FL05□ Type	FL06BT Type																																														
22. Resisance to solvent	Please avoid the ultrasonic cleaning of this product.			No significant abnormality in appearance Impedance change : Within±20%			FB : Solvent temperature : 20~25°C Duration : 30±5 sec. Solvent type : Acetone, trichloroethylene Recovery : 3hrs of recovery under the standard condition after the test.																																													
23. Thermal shock	△L/L : Within±10% Q : 30min.	△L/L : Within±10%	Appearance : No abnormality Inductance change : Within±10% Q change : Within±30% (LHLP : only △L/L)	Appearance : No abnormality Impedance change : Within±20%	Refer to individual specification	Appearance : No abnormality Impedance change : Within±20%	FA・CA : Conditions for 1 cycle <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Duration (min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-25<sup>+0</sup><sub>-3</sub></td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>Within 3</td> </tr> <tr> <td>3</td> <td>+85<sup>+2</sup><sub>-0</sub></td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>Within 3</td> </tr> </tbody> </table> Number of cycles : 5 cycles Recovery : At least 1hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2hrs.  LHL□□□・FB : According to JIS C0025 Conditions for 1 cycle <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Duration (min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Minimum operating temperature<sup>+0</sup><sub>-3</sub></td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>Within 3</td> </tr> <tr> <td>3</td> <td>Maximum operating temperature<sup>+2</sup><sub>-0</sub></td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>Within 3</td> </tr> </tbody> </table> Number of cycles : 10 cycles (LHL□□□) : 5 cycles (FBA, FBR) Recovery : 4 to 24hrs of recovery under the standard condition after the removal from the test chamber. (LHL□□□) : 3hrs of recovery under the standard condition after the removal from the test chamber. (FBA, FBR)  FL : According to JIS C0025 Conditions for 1 cycle <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Duration (min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-25<sup>+0</sup><sub>-3</sub></td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>Within 3</td> </tr> <tr> <td>3</td> <td>+85<sup>+2</sup><sub>-0</sub></td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>Within 3</td> </tr> </tbody> </table> Number of cycles : 10 cycles Recovery : 1 to 2hrs of recovery under the standard condition after the removal from the test chamber.	Step	Temperature (°C)	Duration (min)	1	-25 <sup>+0</sup> <sub>-3</sub>	30±3	2	Room temperature	Within 3	3	+85 <sup>+2</sup> <sub>-0</sub>	30±3	4	Room temperature	Within 3	Step	Temperature (°C)	Duration (min)	1	Minimum operating temperature <sup>+0</sup> <sub>-3</sub>	30±3	2	Room temperature	Within 3	3	Maximum operating temperature <sup>+2</sup> <sub>-0</sub>	30±3	4	Room temperature	Within 3	Step	Temperature (°C)	Duration (min)	1	-25 <sup>+0</sup> <sub>-3</sub>	30±3	2	Room temperature	Within 3	3	+85 <sup>+2</sup> <sub>-0</sub>	30±3	4	Room temperature	Within 3
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Item	Specified Value						Test Method and Remarks
	FA02 Type	CAL45 Type	LHL□□□	FBA/FBR	FL05□ Type	FL06BT Type	
24.Damp heat	△L/L : Within±10% Q : 30min.	△L/L : Within±10%		Appearance : No abnormality Impedance change : Within±20%			FA・CA : Temperature : 40±2°C Humidity : 90~95%RH Duration : 1000 hrs Recovery : At least 1hr of recovery under the standard removal from test chamber, followed by the measurement within 2hrs.  FB : Temperature : 60±2°C Humidity : 90~95%RH Duration : 1000 hrs Recovery : 1 to 2hrs of recovery under the standard condition after the removal from the test chamber.
25.Loading under damp heat	△L/L : Within±10% Q : 30min.	△L/L : Within±10%	Appearance : No abnormality Inductance change : Within±10% Q change : Within±30% (LHLP : only △L/L)	Refer to individual specification		Appearance : No abnormality Impedance change : Within±20%	FA・CA : Temperature : 40±2°C Humidity : 90~95%RH Duration : 1000 hrs Applied current : Rated current Recovery : At least 1hr of recovery under the standard removal from test chamber, followed by the measurement within 2hrs.  LHL□□□ : Temperature : 40±2°C Humidity : 90~95%RH Duration : 1000±24 hrs Applied current : Rated current Recovery : 1 to 2hrs of recovery under the standard condition after the removal from the test chamber.  FL : Temperature : 60±3°C Humidity : 90~95%RH Duration : 500 (+12, -0)hrs Applied current : Rated current Recovery : 1 to 2hrs of recovery under the standard condition after the removal from the test chamber.
26.Loading at high temperature	△L/L : Within±10% Q : 30min.	△L/L : Within±10%					FA・CA : Temperature : 85±2°C Duration : 1000 hrs Applied current : Rated current Recovery : At least 1hr of recovery under the standard removal from test chamber, followed by the measurement within 2hrs.

Item	Specified Value						Test Method and Remarks
	FA02 Type	CAL45 Type	LHL□□□	FBA/FBR	FL05□ Type	FL06BT Type	
27.Low temperature life test	△L/L : Within±10% Q : 30min.	△L/L : Within±10%	Appearance : No abnormality Inductance change : Within±10% Q change : Within±30% (LHLP : only △L/L)		Refer to individual specification	Appearance : No abnormality Impedance change : Within±20%	FA・CA : Temperature : -25±2°C Duration : 1000 hrs Recovery : At least 1hr of recovery under the standard removal from test chamber, followed by the measurement within 2hrs.  LHL□□□ : Temperature : -40±3°C Duration : 1000±24 hrs Recovery : 1 to 2hrs of recovery under the standard condition after the removal from the test cfamber.  FL : Temperature : -40±3°C Duration : 500 (+12, -0) hrs Recovery : 1 to 2hrs of recovery under the standard condition after the removal from the test cfamber.
28.High temperature life test			Appearance : No abnormality Inductance change : Within±10% Q change : Within±30%		Refer to individual specification	Appearance : No abnormality Impedance change : Within±20%	LHL□□□ : Temperature : 105±3°C Duration : 1000±24 hrs Recovery : 1 to 2hrs of recovery under the standard condition after the removal from the test cfamber.  FL : Temperature : 85±3°C Duration : 500 (+12, -0) hrs Recovery : 1 to 2hrs of recovery under the standard condition after the removal from the test cfamber.

FA Type, CAL Type, LH Type, FB Type, FL Type

Stages	Precautions	Technical considerations
1.Circuit Design	<p>Operating environment,</p> <p>1.The products described in this specification are intended for use in general electronic equipment,(office supply equipment, telecommunications systems, measuring equipment, and household equipment). They are not intended for use in mission-critical equipment or systems requiring special quality and high reliability (traffic systems, safety equipment, aerospace systems, nuclear control systems and medical equipment including life-support systems,) where product failure might result in loss of life, injury or damage. For such uses, contact TAIYO YUDEN Sales Department in advance.</p>	
2.PCB Design	<p>Design</p> <p>1.Please design insertion pitches of a base in the pitches that fitted a terminal interval.</p>	<p>1.When Inductors are mounted onto a PC board, hole dimensions on the board should match the lead pitch of the component, if not, it will cause breakage of the terminals or cracking of terminal roots covered with resin as excess stress travels through the terminal legs.</p>
3.Considerations for automatic placement	<p>Adjustment of mounting machine</p> <p>1.Excessive impact load should not be imposed on the products when mounting onto the PC boards.</p> <p>2.Mounting and soldering conditions should be checked beforehand.</p>	<p>1. When installing products, care should be taken not to apply distortion stress as it may deform the products.</p>
4.Soldering	<p>Wave soldering</p> <p>1.Please refer to the specifications in the catalog for a wave soldering.</p> <p>2.Do not immerse the entire Inductors in the flux during the soldering operation.</p> <p>Lead free soldering</p> <p>1.When using products with lead free soldering, we request to use them after confirming of adhesion, temperature of resistance to soldering heat, soldering etc sufficiently.</p> <p>Recommended conditions for using a soldering iron:</p> <p>Put the soldering iron on the land-pattern.</p> <p>Soldering iron's temperature - Below 350 °C</p> <p>Duration - 3 seconds or less</p> <p>The soldering iron should not directly touch the inductor.</p> <p>◆Reflow soldering</p> <p>1.As for reflow soldering, please contact our sales staff.</p>	<p>1.If products are used beyond the range of the recommended conditions, heat stresses may deform the products, and consequently degrade the reliability of the products.</p>
5.Cleaning	<p>Cleaning conditions</p> <p>1.CP Type, LA type, CAL type, LH type</p> <p>Please do not do cleaning by a supersonic wave.</p>	<p>CP Type, LA type, CAL type, LH type</p> <p>1.If washing by supersonic waves, supersonic waves may deform products.</p>
6.Handling	<p>Handling</p> <p>1.Keep the inductors away from all magnets and magnetic objects.</p> <p>Mechanical considerations</p> <p>1.Please do not give the inductors any excessive mechanical shocks.</p> <p>2.LH type</p> <p>If inductors are dropped onto the floor or a hard surface they should not be used.</p> <p>Packing</p> <p>1.Please do not give the inductors any excessive mechanical shocks.</p> <p>In loading, please pay attention to handling indication mentioned in a packing box (a loading direction / number of maximum loading / fragile item).</p>	<p>1.There is a case that a characteristic varies with magnetic influence.</p> <p>1.There is a case to be damaged by a mechanical shock.</p> <p>2.LH type</p> <p>There is a case to be broken by a fall.</p> <p>1.There is a case that a lead route turns at by a fall or an excessive shock.</p>
7.Storage conditions	<p>Storage</p> <p>1.To maintain the solderability of terminal electrodes and to keep the packing material in good condition, temperature and humidity in the storage area should be controlled..</p> <p>•Recommended conditions</p> <p>Ambient temperature           0~40°C</p> <p>Humidity                         Below 70 % RH</p> <p>The ambient temperature must be kept below 30°C. Even under ideal storage conditions, solderability of products electrodes may decrease as time passes. For this reason, inductors should be used within one year from the time of delivery.</p> <p>In case of storage over 6 months, solderability shall be checked before actual usage.</p>	<p>1. Under a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of terminal electrodes and deterioration of taping/packaging materials may take place.</p>