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 2010. 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.

- The contents of this catalog are applicable to the products which are purchased from our sales offices or distributors (so called "TAIYO YUDEN's official sales channel").
  It is only applicable to the products purchased from any of TAIYO YUDEN's official sales channel.

- Please note that Taiyo Yuden Co., Ltd. shall have no responsibility for any controversies or disputes that may occur in connection with a third party's intellectual property rights and other related rights arising from your usage of products in this catalog. Taiyo Yuden Co., Ltd. grants no license for such rights.

- Caution for export
  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.

AXIAL LEADED INDUCTORS

WAVE

FEATURES

- Extremely reliable inductors that are ideal for automatic insertion.
- Highly efficient automated production processes can provide high quality inductors in large volumes.
- Wide selection of configurations including axial leaded, formed radial leads and bulk products to meet most manufacturing needs.

APPLICATIONS

- Use for TVs, DVD, audio equipment, communication instrument, tuner, and general electrical instrument.

ORDERING CODE

L A L △ 0 2 T B R 2 2 K ○ ○ ○ ○ ○

❶Type

LA	Axial leaded inductor

❷Product Specification

L△	Standard type
N△	High current type
P△	Standard type (Lead diameter : 0.45φmm)

△=Blank space

❸Dimensions (L×D) [mm] max

02	3.4×2.3(LAL/LAP) 3.6×2.4(LAN)

❹Lead configurations

KR	Formed lead/bulk
NA	Axial lead/bulk
TA	Axial lead (26mm lead space) /ammo pack
TB	Axial lead (52mm lead space) /ammo pack
VD	Formed lead/ammo pack

❺Nominal inductance [μH]

example	
1R5	1.5
120	12

※R=decimal point

❻Inductance tolerance [%]

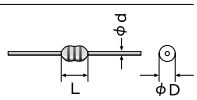
J	±5
K	±10

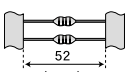
❼Internal code

△△△△△	Standard product

△=Blank space

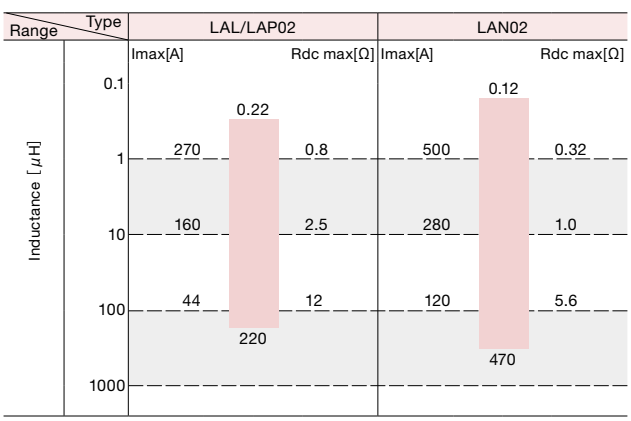
EXTERNAL DIMENSIONS/STANDARD QUANTITY



Type	Dimensions [mm] (inch)			Taped		Bulk		Standard Quantity (pcs)				
								Lead Configuration Code				
	L	φD	φd	Straight	Formed	Straight	Formed	TA	TB	VD	NA	KR
LAL02	3.4max. (0.134max.)	2.3max. (0.091max.)	0.5±0.05 (0.018±0.002)	TB  52 (2.05)	VD  Pitch : 5mm(0.197)	NA 	———	2,000			500	2,000
LAP02	3.4max. (0.134max.)	2.3max. (0.091max.)	0.45±0.05 (0.018±0.002)	TA  26 (1.02)	———	———	KR  Pitch : 5mm(0.197)	2,000	–			2,000
LAN02	3.6max. (0.142max.)	2.4max. (0.094max.)										

Unit : mm (inch)

AVAILABLE INDUCTANCE RANGE



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PART NUMBERS

LAL/LAP02

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Q (min.)	Measuring frequency [MHz]	Self−resonant frequency [MHz] (min.)	DC Resistance [Ω] (max.)	Rated current [mA] (max.)
LA□ 02 ○ R22K		RoHS	0.22	±10%	35	25.2	450	0.40	400
LA□ 02 ○ R27K		RoHS	0.27				410	0.43	380
LA□ 02 ○ R33K		RoHS	0.33				360	0.48	370
LA□ 02 ○ R39K		RoHS	0.39				300	0.51	350
LA□ 02 ○ R47K		RoHS	0.47				230	0.56	330
LA□ 02 ○ R56K		RoHS	0.56				210	0.61	320
LA□ 02 ○ R68K		RoHS	0.68				190	0.67	310
LA□ 02 ○ R82K		RoHS	0.82				170	0.74	290
LA□ 02 ○ 1R0K		RoHS	1.0				150	0.80	270
LA□ 02 ○ 1R2K		RoHS	1.2		40	7.96	110	0.9	260
LA□ 02 ○ 1R5K		RoHS	1.5				80	1.0	250
LA□ 02 ○ 1R8K		RoHS	1.8				60	1.1	240
LA□ 02 ○ 2R2K		RoHS	2.2				45	1.2	230
LA□ 02 ○ 2R7K		RoHS	2.7				40	1.3	220
LA□ 02 ○ 3R3K		RoHS	3.3				38	1.4	210
LA□ 02 ○ 3R9K		RoHS	3.9				35	1.6	200
LA□ 02 ○ 4R7K		RoHS	4.7				32	1.7	190
LA□ 02 ○ 5R6K		RoHS	5.6				30	1.9	180
LA□ 02 ○ 6R8K		RoHS	6.8				28	2.0	175
LA□ 02 ○ 8R2K		RoHS	8.2				26	2.2	165
LA□ 02 ○ 100K		RoHS	10				24	2.5	160
LA□ 02 ○ 120K		RoHS	12			2.52	22	2.5	150
LA□ 02 ○ 150K		RoHS	15				20	2.8	145
LA□ 02 ○ 180K		RoHS	18				18	3.1	140
LA□ 02 ○ 220K		RoHS	22				17	3.4	130
LA□ 02 ○ 270K		RoHS	27				16	4.3	80
LA□ 02 ○ 330K		RoHS	33				14	4.7	76
LA□ 02 ○ 390K		RoHS	39				13	5.2	74
LA□ 02 ○ 470K		RoHS	47				12	5.8	70
LA□ 02 ○ 560K		RoHS	56				11	6.4	68
LA□ 02 ○ 680K		RoHS	68				10	7.2	64
LA□ 02 ○ 820K		RoHS	82				9.5	11	46
LA□ 02 ○ 101K		RoHS	100				9.0	12	44
LA□ 02 ○ 121K		RoHS	120		40	0.796	8.0	13	42
LA□ 02 ○ 151K		RoHS	150				6.0	16	39
LA□ 02 ○ 181K		RoHS	180				5.5	18	37
LA□ 02 ○ 221K		RoHS	220				5.0	20	35

□ Please specify the Product Specification (Lead) code. (L:standard 0.5mm or P:0.45mm)
○ Please specify the Lead configuration code.

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PART NUMBERS

●FAN02

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Q (min.)	Measuring frequency [MHz]	Self−resonant frequency [MHz] (min.)	DC Resistance [Ω] (max.)	Rated current [mA] (max.)
LAN02 ○ R12K		RoHS	0.12	±10%	50	25.2	500	0.12	850
LAN02 ○ R15K		RoHS	0.15				500	0.14	800
LAN02 ○ R18K		RoHS	0.18				500	0.15	760
LAN02 ○ R22K		RoHS	0.22				500	0.16	730
LAN02 ○ R27K		RoHS	0.27				500	0.18	690
LAN02 ○ R33K		RoHS	0.33				480	0.19	660
LAN02 ○ R39K		RoHS	0.39				430	0.21	640
LAN02 ○ R47K		RoHS	0.47				380	0.23	610
LAN02 ○ R56K		RoHS	0.56				350	0.25	580
LAN02 ○ R68K		RoHS	0.68				310	0.27	550
LAN02 ○ R82K		RoHS	0.82				270	0.29	520
LAN02 ○ 1R0J		RoHS	1.0	±5%			240	0.32	500
LAN02 ○ 1R2J		RoHS	1.2			7.96	210	0.35	480
LAN02 ○ 1R5J		RoHS	1.5				190	0.38	450
LAN02 ○ 1R8J		RoHS	1.8				140	0.42	430
LAN02 ○ 2R2J		RoHS	2.2				90	0.47	410
LAN02 ○ 2R7J		RoHS	2.7				70	0.52	390
LAN02 ○ 3R3J		RoHS	3.3				50	0.57	370
LAN02 ○ 3R9J		RoHS	3.9		40		35	0.63	360
LAN02 ○ 4R7J		RoHS	4.7				32	0.69	340
LAN02 ○ 5R6J		RoHS	5.6				30	0.75	320
LAN02 ○ 6R8J		RoHS	6.8				28	0.84	310
LAN02 ○ 8R2J		RoHS	8.2				26	0.92	290
LAN02 ○ 100J		RoHS	10				24	1.0	280
LAN02 ○ 120J		RoHS	12			2.52	22	1.0	280
LAN02 ○ 150J		RoHS	15				20	1.2	265
LAN02 ○ 180J		RoHS	18				18	1.3	250
LAN02 ○ 220J		RoHS	22				17	1.5	235
LAN02 ○ 270J		RoHS	27				15	1.7	220
LAN02 ○ 330J		RoHS	33		50		14	2.2	180
LAN02 ○ 390J		RoHS	39				13	2.4	170
LAN02 ○ 470J		RoHS	47				12	2.8	160
LAN02 ○ 560J		RoHS	56				10	4.1	140
LAN02 ○ 680J		RoHS	68				9.2	4.5	130
LAN02 ○ 820J		RoHS	82				8.8	5.0	125
LAN02 ○ 101J		RoHS	100				8.0	5.6	120
LAN02 ○ 121J		RoHS	120			0.796	6.6	9.2	90
LAN02 ○ 151J		RoHS	150				5.8	10.5	85
LAN02 ○ 181J		RoHS	180				5.4	11.5	80
LAN02 ○ 221J		RoHS	220				4.8	13	75
LAN02 ○ 271J		RoHS	270				3.6	16	70
LAN02 ○ 331J		RoHS	330				3.4	18	66
LAN02 ○ 391J		RoHS	390				3.2	20	63
LAN02 ○ 471J		RoHS	470				3.0	22	60

○ Please specify the Lead configuration code.

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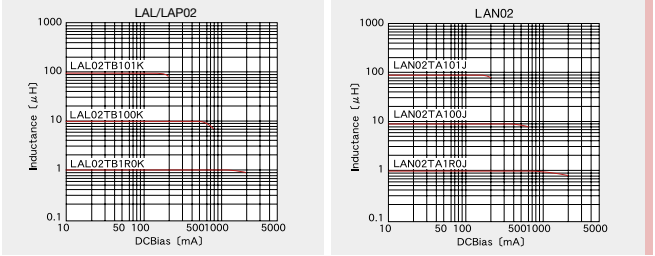
ELECTRICAL CHARACTERISTICS

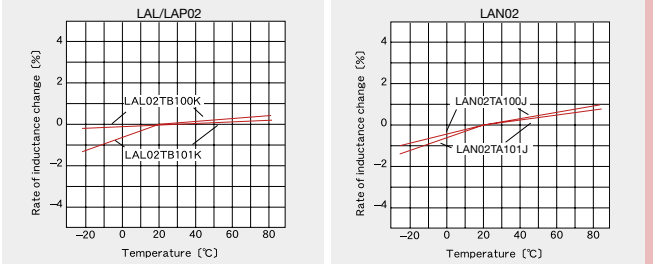
DC Bias characteristics

(Measured by HP4285A)



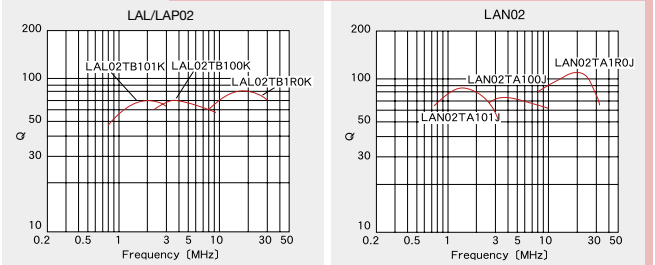
Temperature characteristics

(Measured by HP4285A)



Q-Characteristics

(Measured by HP4285A+HP42851A)



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PACKAGING

①Minimum Quantity

●Taping for Straight Leads

Type	Lead Configuration code	Standard quantity (pcs.)
LAL02	TB	2,000
LAP02	TA	2,000
LAN02	TA	2,000

●Taping for Formed Leads

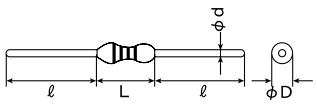
Type	Lead Configuration code	Standard quantity (pcs.)
LAL02	VD	2,000

●Bulk

Type	Lead Configuration code	Standard quantity (pcs.)
LAL02	NA	500
LAP02	KR	2,000
LAN02	KR	2,000

②Dimension

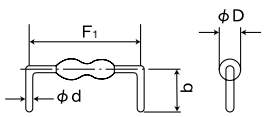
●NA



Type	Dimensions				Minimum insertion pitch
	φD	L	φd	ℓ	
LAL02	2.3max (0.091max)	3.4max (0.134max)	0.50±0.05 (0.020±0.002)	24±2.0 (0.945±0.079)	5.0 (0.197)

Unit : mm(inch)

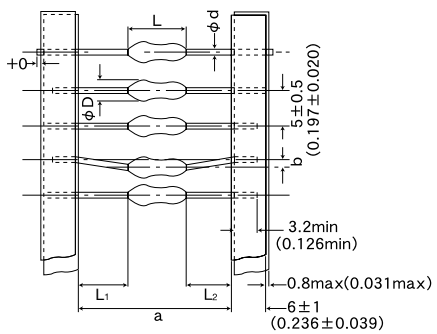
●KR



Type	Lead configuration code	Dimensions			
		φD	F_1	φd	b
LAP02	KR	2.3max (0.091max)	5.0±0.5 (0.197±0.020)	0.45±0.05 (0.018±0.002)	7.0±1.0 (0.276±0.039)
LAN02	KR	2.4max (0.094max)	5.0±0.5 (0.197±0.020)	0.45±0.05 (0.018±0.002)	7.0±1.0 (0.276±0.039)

Unit : mm(inch)

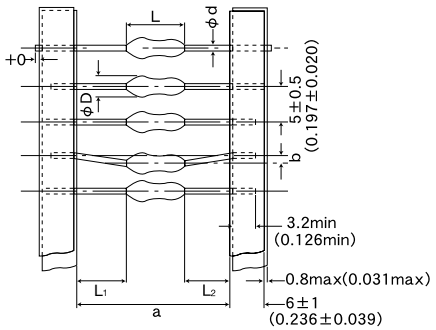
●TA(a : 26mm lead space)
(1.02 inch)



Type	Dimensions						Minimum insertion pitch
	φD	L	a	b	$\|L_1-L_2\|$	φd	
LAP02	2.3max (0.091max)	3.4max (0.134max)	$26^{+0.5}_{0}$ ($1.02^{+0.020}_{0}$)	0.8max (0.031max)	0.5max (0.020max)	0.45±0.05 (0.018±0.002)	5.0 (0.197)
LAN02	2.4max (0.094max)	3.6max (0.142max)	$26^{+0.5}_{0}$ ($1.02^{+0.020}_{0}$)	0.8max (0.031max)	0.5max (0.020max)	0.45±0.05 (0.018±0.002)	5.0 (0.197)

Unit : mm(inch)

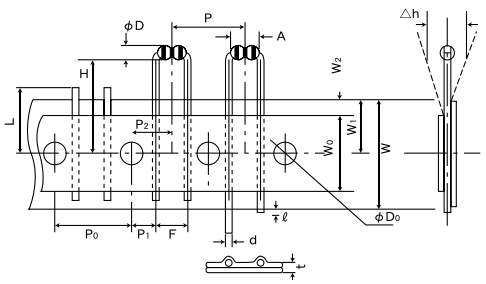
●TB(a : 52mm lead space)
(2.05 inches)



Type	Dimensions						Minimum insertion pitch
	φD	L	a	b	$\|L_1-L_2\|$	φd	
LAL02	2.3max (0.091max)	3.4max (0.134max)	52^{+2}_{-1} ($2.05^{+0.079}_{-0.039}$)	1.2max (0.047max)	1.0max (0.039max)	0.5±0.05 (0.020±0.002)	5.0 (0.197)

Unit : mm(inch)

●VD



Type	Symbol	Dimensions	Symbol	Dimensions
LAL02	A	3.9max (0.154max)	W	$18.0^{+1.0}_{-0.5}$ ($0.709^{+0.039}_{-0.020}$)
	φD	2.3max (0.091max)	W_0	12.5 min. (0.492 min.)
	H	19.5±0.5 (0.768±0.020)	W_1	$9.0^{+0.75}_{-0.5}$ ($0.354^{+0.030}_{-0.020}$)
	P	12.7±1.0 (0.500±0.039)	W_2	3.0 max. (0.118 max.)
	P_0	12.7±0.3 (0.500±0.012)	ℓ	2.0 max. (0.079 max.)
	P_1 P_2	3.85±0.7 (0.152±0.028) 6.35±0.5 (0.250±0.020)	$φD_0$	4.0±0.3 (0.157±0.012)
	F	5.08±0.5 (0.200±0.020)	φd	0.50±0.05 (0.020±0.002)
	△h	0±1.0 (0±0.039)	L	11.0 max. (0.433 max.)
	—	—	t	0.5±0.2 (0.020±0.008)

Unit : mm(inch)

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RADIAL LEADED INDUCTORS

WAVE

FEATURES

- 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 packaging.

APPLICATIONS

- 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.

OPERATING TEMP.

- −25℃~105℃ (Including self-generated heat)

ORDERING CODE

L H △ L △ 0 8 T B 1 0 1 K ○ ○ ○

❶Type	
LH	Radial leaded inductor

❷Configuration	
L△	Standard type Taping available
LP	Shielded type Bulk

△=Blank space

❸External dimensions (mm max)	
08	9.0
10	11.0
12	13.0
13	14.0
16	17.0

❹Packaging Code	
NB	Bulk (LHL)
TB	Ammo packaging (LHL)

❺Nominal Inductance (μH)	
example	
1R0	1.0
150	15
102	1000

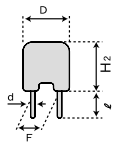
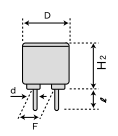
※R=Decimal point

❻Inductance Tolerances (%)	
J	±5
K	±10
M	±20
N	±30

❼Internal code	
△△△	Standard product

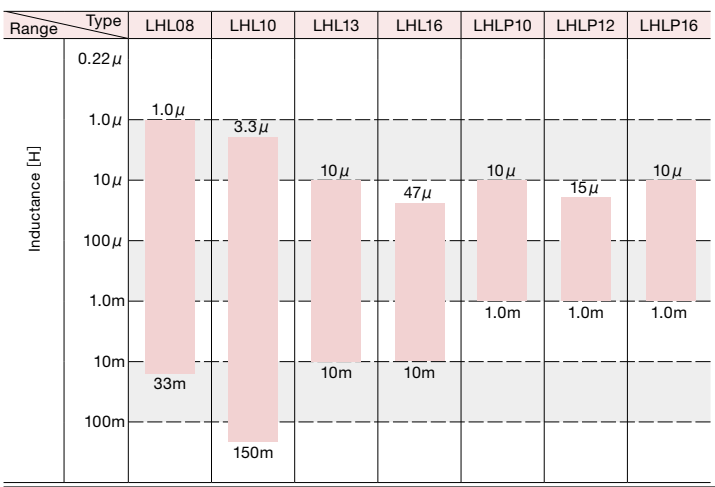
△=Blank space

EXTERNAL DIMENSIONS/STANDARD QUANTITY

Type	Fig.	D	H_2	ℓ	F	φd	Standard Quantity (pcs) Box	Bulk	Taped
LHL08		9.0 max. (0.354 max.)	9.5 max. (0.374 max.)	5.0±1.0 (0.197±0.039)	5.0±1.0 (0.197±0.039)	0.6±0.05 (0.024±0.002)	—	100	1000
LHL10		11.0 max. (0.433 max.)	14.0 max. (0.551 max.)	5.0±1.0 (0.197±0.039)	5.0±1.0 (0.197±0.039)	0.6±0.05 (0.024±0.002)	—	50	500
LHL13		14.0 max. (0.551 max.)	17.0 max. (0.669 max.)	5.0±1.0 (0.197±0.039)	7.5±1.0 (0.295±0.039)	0.8±0.05 (0.031±0.002)	—	25	500
LHL16		17.0 max. (0.669 max.)	21.0 max. (0.827 max.)	5.0±1.0 (0.197±0.039)	7.5±1.0 (0.295±0.039)	0.8±0.05 (0.031±0.002)	500	—	250
LHLP10		11.0 max. (0.433 max.)	11.0 max. (0.433 max.)	5.0±1.0 (0.197±0.039)	5.0±1.0 (0.197±0.039)	0.6±0.05 (0.024±0.004)	500	—	200
LHLP12		13.0 max. (0.512 max.)	16.0 max. (0.624 max.)	5.0±1.0 (0.197±0.039)	5.0±1.0 (0.197±0.039)	0.6±0.05 (0.024±0.004)	300	—	—
LHLP16		17.0 max. (0.669 max.)	19.0 max. (0.741 max.)	5.0±1.0 (0.197±0.039)	7.5±1.0 (0.295±0.039)	0.8±0.05 (0.031±0.004)	200	—	—

Unit : mm (inch)

AVAILABLE INDUCTANCE RANGE



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PART NUMBERS

LHL08

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Q (min.)	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Measuring frequency [MHz]
LHL08□1R0N		RoHS	1.0	±30%	40	76	0.013	4.7	7.96
LHL08□1R5M		RoHS	1.5	±20%		65	0.014	4.4	
LHL08□2R2M		RoHS	2.2			56	0.017	4.1	
LHL08□2R7M		RoHS	2.7			48	0.019	3.5	
LHL08□3R3M		RoHS	3.3			41	0.021	3.2	
LHL08□3R9M		RoHS	3.9			33	0.024	3.1	
LHL08□4R7M		RoHS	4.7			30	0.025	3.0	
LHL08□5R6M		RoHS	5.6			23	0.028	2.9	
LHL08□6R8M		RoHS	6.8			21	0.030	2.8	
LHL08□8R2M		RoHS	8.2			19	0.034	2.5	
LHL08□100K		RoHS	10	±10%	65	17	0.041	2.4	2.52
LHL08□120K		RoHS	12			16	0.044	2.3	
LHL08□150K		RoHS	15		50	13	0.053	2.0	
LHL08□180K		RoHS	18			12	0.060	1.9	
LHL08□220K		RoHS	22			11	0.068	1.8	
LHL08□270K		RoHS	27			10	0.091	1.5	
LHL08□330K		RoHS	33		40	8.8	0.10	1.4	
LHL08□390K		RoHS	39			8.4	0.12	1.3	
LHL08□470K		RoHS	47			8.2	0.15	1.2	
LHL08□560K		RoHS	56			7.9	0.17	1.1	
LHL08□680K		RoHS	68		35	7.0	0.20	1.0	
LHL08□820K		RoHS	82			6.5	0.22	0.90	
LHL08□101K		RoHS	100		25	5.7	0.32	0.79	0.796
LHL08□121K		RoHS	120			5.2	0.36	0.70	
LHL08□151K		RoHS	150		20	4.7	0.41	0.64	
LHL08□181K		RoHS	180		35	4.2	0.66	0.60	
LHL08□221K		RoHS	220			3.7	0.73	0.53	
LHL08□271K		RoHS	270		25	3.5	0.85	0.51	
LHL08□331K		RoHS	330			3.2	0.97	0.44	
LHL08□391K		RoHS	390		20	2.9	1.1	0.41	
LHL08□471K		RoHS	470		25	2.4	1.3	0.38	
LHL08□561K		RoHS	560			2.2	1.5	0.35	
LHL08□681K		RoHS	680			2.0	1.8	0.32	
LHL08□821K		RoHS	820		30	1.6	2.3	0.30	
LHL08□102J		RoHS	1000	±5%	55	1.5	2.7	0.25	0.252
LHL08□122J		RoHS	1200		45	1.4	3.2	0.22	
LHL08□152J		RoHS	1500		55	1.3	4.1	0.20	
LHL08□182J		RoHS	1800			1.2	4.8	0.19	
LHL08□222J		RoHS	2200			1.1	5.6	0.16	
LHL08□272J		RoHS	2700			1.0	7.5	0.15	
LHL08□332J		RoHS	3300			0.85	8.5	0.14	
LHL08□392J		RoHS	3900			0.78	9.7	0.11	
LHL08□472J		RoHS	4700		65	0.68	14	0.10	
LHL08□562J		RoHS	5600			0.62	16	0.093	
LHL08□682J		RoHS	6800			0.61	18	0.092	
LHL08□822J		RoHS	8200			0.60	20	0.084	
LHL08□103J		RoHS	10000		60	0.48	32	0.070	L:1kHz Q:0.0796
LHL08□123J		RoHS	12000			0.44	36	0.064	
LHL08□153J		RoHS	15000			0.35	62	0.051	
LHL08□183J		RoHS	18000			0.30	72	0.048	
LHL08□223J		RoHS	22000			0.28	82	0.044	
LHL08□273J		RoHS	27000			0.25	90	0.042	
LHL08□333J		RoHS	33000			0.23	100	0.040	

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

LHL10

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Q (min.)	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Measuring frequency [MHz]
LHL10□3R3M		RoHS	3.3	±20%	50	46	0.019	4.2	7.96
LHL10□3R9M		RoHS	3.9			40	0.022	4.1	
LHL10□4R7M		RoHS	4.7			38	0.024	4.0	
LHL10□5R6M		RoHS	5.6			34	0.025	3.8	
LHL10□6R8M		RoHS	6.8			30	0.028	3.4	
LHL10□8R2M		RoHS	8.2			24	0.031	3.3	
LHL10□100K		RoHS	10	±10%	90	19	0.034	3.2	2.52
LHL10□120K		RoHS	12			16	0.038	2.8	
LHL10□150K		RoHS	15			12	0.042	2.6	
LHL10□180K		RoHS	18			9.2	0.046	2.4	
LHL10□220K		RoHS	22		60	8.6	0.061	2.1	
LHL10□270K		RoHS	27			7.1	0.069	2.0	
LHL10□330K		RoHS	33			6.8	0.078	1.9	
LHL10□390K		RoHS	39			6.7	0.085	1.8	
LHL10□470K		RoHS	47		50	6.2	0.093	1.7	
LHL10□560K		RoHS	56			5.2	0.10	1.6	

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PART NUMBERS

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Q (min.)	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Measuring frequency [MHz]
LHL10□680K		RoHS	68	±10%	40	4.9	0.12	1.5	2.52
LHL10□820K		RoHS	82			4.7	0.13	1.4	
LHL10□101K		RoHS	100			3.8	0.18	1.2	0.796
LHL10□121K		RoHS	120			3.2	0.25	1.0	
LHL10□151K		RoHS	150			2.9	0.29	0.95	
LHL10□181K		RoHS	180			2.6	0.40	0.80	
LHL10□221K		RoHS	220			2.3	0.44	0.75	
LHL10□271K		RoHS	270		30	2.1	0.50	0.70	
LHL10□331K		RoHS	330			2.0	0.56	0.68	
LHL10□391K		RoHS	390			1.8	0.62	0.63	
LHL10□471K		RoHS	470			1.7	0.84	0.57	
LHL10□561K		RoHS	560			1.5	0.93	0.52	
LHL10□681K		RoHS	680			1.4	1.0	0.48	
LHL10□821K		RoHS	820			1.3	1.4	0.42	
LHL10□102J		RoHS	1000	±5%	50	1.2	1.8	0.41	0.252
LHL10□122J		RoHS	1200			0.87	2.3	0.33	
LHL10□152J		RoHS	1500			0.83	2.7	0.30	
LHL10□182J		RoHS	1800			0.75	3.0	0.29	
LHL10□222J		RoHS	2200			0.70	3.9	0.25	
LHL10□272J		RoHS	2700			0.67	4.3	0.24	
LHL10□332J		RoHS	3300			0.56	5.8	0.21	
LHL10□392J		RoHS	3900			0.54	6.4	0.20	
LHL10□472J		RoHS	4700			0.49	7.1	0.19	
LHL10□562J		RoHS	5600			0.41	9.0	0.17	
LHL10□682J		RoHS	6800			0.38	10	0.16	
LHL10□822J		RoHS	8200			0.36	12	0.15	
LHL10□103J		RoHS	10000		60	0.29	19	0.12	L:1kHz Q:0.0796
LHL10□123J		RoHS	12000			0.27	21	0.11	
LHL10□153J		RoHS	15000			0.24	34	0.090	
LHL10□183J		RoHS	18000			0.21	38	0.081	
LHL10□223J		RoHS	22000			0.20	43	0.075	
LHL10□273J		RoHS	27000		40	0.15	67	0.060	
LHL10□333J		RoHS	33000			0.14	76	0.056	
LHL10□393J		RoHS	39000			0.13	84	0.053	
LHL10□473J		RoHS	47000			0.12	96	0.050	
LHL10□563J		RoHS	56000		30	0.10	170	0.036	
LHL10□683J		RoHS	68000			0.095	200	0.035	
LHL10□823J		RoHS	82000			0.088	210	0.033	
LHL10□104J		RoHS	100000			0.085	240	0.031	L:1kHz Q:0.0252
LHL10□124J		RoHS	120000			0.070	260	0.030	
LHL10□154J		RoHS	150000			0.069	300	0.028	

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

●LHL13

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Q (min.)	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Measuring frequency [MHz]
LHL13□100K		RoHS	10	±10%	140	19	0.023	4.5	2.52
LHL13□150K		RoHS	15			12	0.028	4.0	
LHL13□220K		RoHS	22		100	7.6	0.035	3.4	
LHL13□330K		RoHS	33			6.9	0.043	3.2	
LHL13□470K		RoHS	47		70	5.6	0.052	2.8	
LHL13□680K		RoHS	68			4.4	0.070	2.4	
LHL13□101K		RoHS	100		50	3.3	0.12	2.0	0.796
LHL13□151K		RoHS	150			2.6	0.19	1.5	
LHL13□221K		RoHS	220		40	2.2	0.23	1.3	
LHL13□331K		RoHS	330		30	1.8	0.35	1.1	
LHL13□471K		RoHS	470			1.5	0.43	0.90	
LHL13□681K		RoHS	680			1.2	0.61	0.80	
LHL13□102J		RoHS	1000	±5%		1.0	1.2	0.60	0.252
LHL13□152J		RoHS	1500		40	0.83	1.8	0.45	
LHL13□222J		RoHS	2200			0.70	2.2	0.40	
LHL13□332J		RoHS	3300			0.60	3.4	0.33	
LHL13□472J		RoHS	4700			0.43	4.7	0.28	
LHL13□682J		RoHS	6800		30	0.38	5.6	0.25	
LHL13□103J		RoHS	10000		70	0.30	10	0.19	L:1kHz Q:0.0796MHz

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

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PART NUMBERS

LHL16

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Q (min.)	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Measuring frequency [MHz]
LHL16□470K		RoHS	47	±10%	70	4.5	0.046	3.7	2.52
LHL16□680K		RoHS	68			3.9	0.054	3.3	
LHL16□101K		RoHS	100		60	2.7	0.077	2.9	0.796
LHL16□151K		RoHS	150			2.3	0.11	2.4	
LHL16□221K		RoHS	220			1.9	0.15	2.0	
LHL16□331K		RoHS	330		40	1.6	0.21	1.5	
LHL16□471K		RoHS	470		30	1.4	0.28	1.3	
LHL16□681K		RoHS	680		20	1.2	0.35	1.1	
LHL16□102J		RoHS	1000	±5%		0.84	0.74	0.86	0.252
LHL16□152J		RoHS	1500			0.69	0.93	0.75	
LHL16□222J		RoHS	2200			0.56	1.4	0.60	
LHL16□332J		RoHS	3300			0.49	2.2	0.50	
LHL16□472J		RoHS	4700			0.41	2.6	0.40	
LHL16□682J		RoHS	6800			0.35	3.9	0.33	
LHL16□103J		RoHS	10000		70	0.26	7.3	0.25	L:1KHz Q:0.0796MHz

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

LHLP10

Ordering code		EHS (Environmental Hazardous Substances)	Nominal Inductance [μH]	L Measuring frequency	Inductance Tolerance	DC Resistance [Ω] (max.)	Rated current [A] (max.)
LHLP10□100M		RoHS	10	2.52	±20%	0.038	2.5
LHLP10□150M		RoHS	15			0.049	2.2
LHLP10□220M		RoHS	22			0.075	1.9
LHLP10□330M		RoHS	33			0.094	1.7
LHLP10□470M		RoHS	47			0.15	1.3
LHLP10□680M		RoHS	68			0.23	1.0
LHLP10□101K		RoHS	100	0.796	±10%	0.30	0.90
LHLP10□151K		RoHS	150			0.47	0.78
LHLP10□221K		RoHS	220			0.70	0.63
LHLP10□331K		RoHS	330			0.88	0.58
LHLP10□471K		RoHS	470			1.3	0.46
LHLP10□681K		RoHS	680			1.9	0.38
LHLP10□102K		RoHS	1000	0.252		3.2	0.30

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

LHLP12NB

Ordering code		EHS (Environmental Hazardous Substances)	Nominal Inductance [μH]	L Measuring frequency	Inductance Tolerance	DC Resistance [Ω] (max.)	Rated current [A] (max.)
LHLP12NB150M		RoHS	15	2.52	±20%	0.035	3.3
LHLP12NB220M		RoHS	22			0.050	2.7
LHLP12NB330M		RoHS	33			0.070	2.4
LHLP12NB470M		RoHS	47			0.081	2.1
LHLP12NB680M		RoHS	68			0.12	1.7
LHLP12NB101K		RoHS	100	0.796	±10%	0.16	1.6
LHLP12NB151K		RoHS	150			0.24	1.3
LHLP12NB221K		RoHS	220			0.38	0.95
LHLP12NB331K		RoHS	330			0.46	0.89
LHLP12NB471K		RoHS	470			0.69	0.74
LHLP12NB681K		RoHS	680			1.1	0.58
LHLP12NB102K		RoHS	1000	0.252		1.8	0.46

LHLP16NB

Ordering code		EHS (Environmental Hazardous Substances)	Nominal Inductance [μH]	L Measuring frequency	Inductance Tolerance	DC Resistance [Ω] (max.)	Rated current [A] (max.)
LHLP16NB100M		RoHS	10	1kHz	±20%	0.019	5.2
LHLP16NB150M		RoHS	15			0.025	5.1
LHLP16NB220M		RoHS	22			0.027	4.6
LHLP16NB330M		RoHS	33			0.035	4.0
LHLP16NB470K		RoHS	47		±10%	0.045	3.4
LHLP16NB680K		RoHS	68			0.062	3.1
LHLP16NB101K		RoHS	100			0.091	2.3
LHLP16NB151K		RoHS	150			0.14	1.9
LHLP16NB221K		RoHS	220			0.20	1.5
LHLP16NB331K		RoHS	330			0.31	1.3
LHLP16NB471K		RoHS	470			0.47	1.0
LHLP16NB681K		RoHS	680			0.58	0.98
LHLP16NB102K		RoHS	1000			0.94	0.74

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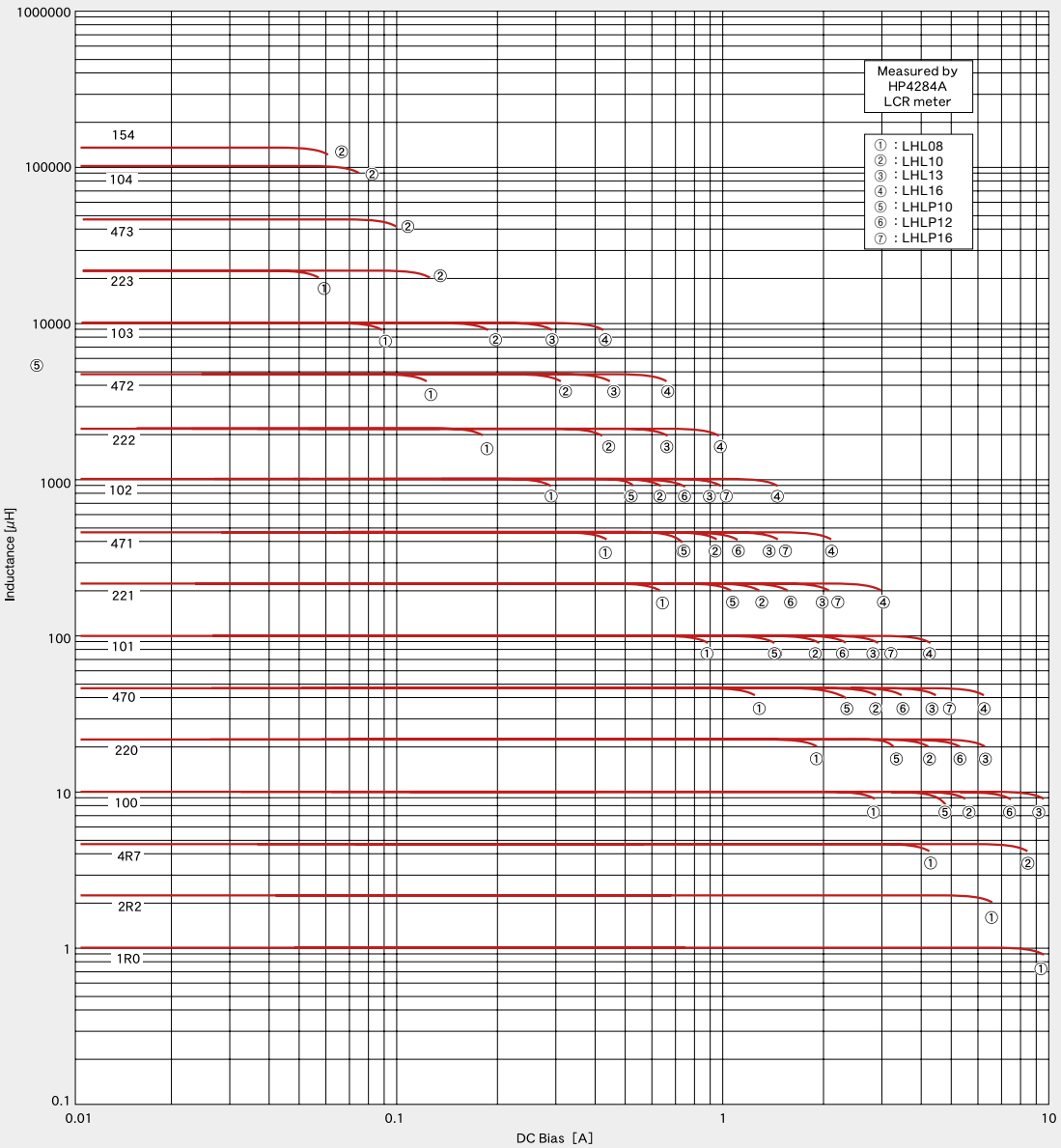
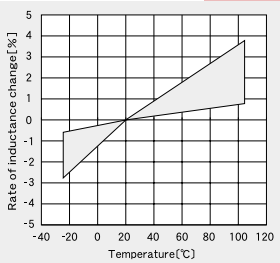
ELECTRICAL CHARACTERISTICS

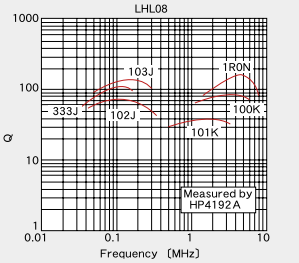
DC Bias characteristics

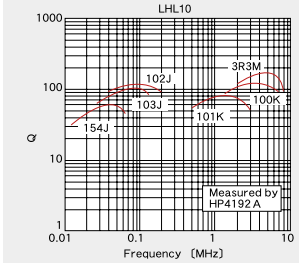


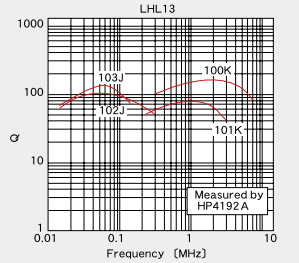
Temperature characteristics

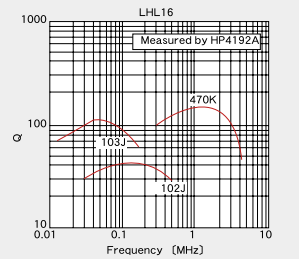


Q-vs-Frequency characteristics









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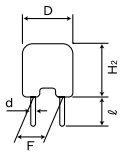
PACKAGING

①Minimum Quantity

Type (EIA)	Standard quantity (pcs)		
	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	—	—

②Bulk dimensions

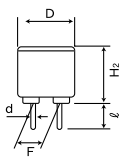
●LHL08～16



Type	Dimensions				
	φD(max)	H_2(max)	F*	ℓ	φd
LHL08	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)
LHL10	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)
LHL13	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)
LHL16	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)

*Measured at the base of the leads. Unit : mm(inch)

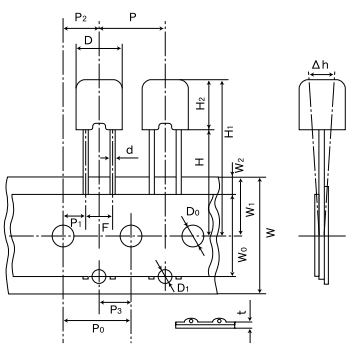
●LHLP10～16



Type	Dimensions				
	φD(max)	H_2(max)	F*	ℓ	φd
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)

*Measured at the base of the leads. Unit : mm(inch)

●LHL08～16

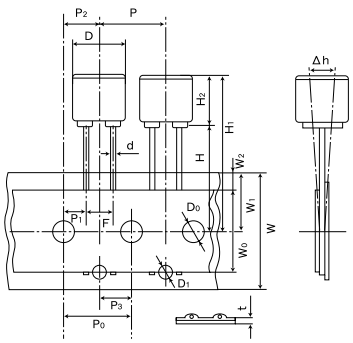


	LHL08	LHL10	LHL13	LHL16
D	φ9.0 max (φ0.354 max)	φ11.0 max (φ0.433 max)	φ14.0 max (φ0.551 max)	φ17.0 max (φ0.669 max)
H_1	30.5 max (1.20 max)	34.0 max (1.34 max)	37.0 max (1.46 max)	41.0 max (1.61 max)
H	$18.0^{+2.0}_{-0.0}$ ($0.709^{+0.079}_{-0.000}$)	$18.0^{+2.0}_{-0.0}$ ($0.709^{+0.079}_{-0.000}$)	$18.0^{+2.0}_{-0.0}$ ($0.709^{+0.079}_{-0.000}$)	$18.0^{+2.0}_{-0.0}$ ($0.709^{+0.079}_{-0.000}$)
H_2	9.5 max (0.374 max)	14.0 max (0.551 max)	17.0 max (0.669 max)	21.0 max (0.827 max)

	LHL08	LHL10	LHL13	LHL16
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_0	12.7±0.3※1 (0.500±0.012)	12.7±0.3※1 (0.500±0.012)	15.0±0.3※1 (0.591±0.012)	15.0±0.3※1 (0.591±0.012)
P_1	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_2	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	$5.0^{+0.8}_{-0.2}$ ($0.197^{+0.031}_{-0.008}$)	$5.0^{+0.8}_{-0.2}$ ($0.197^{+0.031}_{-0.008}$)	$7.50^{+0.8}_{-0.2}$ ($0.295^{+0.031}_{-0.008}$)	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	$18.0^{+1.0}_{-0.5}$ ($0.709^{+0.039}_{-0.020}$)	$18.0^{+1.0}_{-0.5}$ ($0.709^{+0.039}_{-0.020}$)	$18.0^{+1.0}_{-0.5}$ ($0.709^{+0.039}_{-0.020}$)	$18.0^{+1.0}_{-0.5}$ ($0.709^{+0.039}_{-0.020}$)
W_0	12.5 min (0.492 min)	12.5 min (0.492 min)	12.5 min (0.492 min)	12.5 min (0.492 min)
W_1	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_2	3.0 max※2 (0.118 max)	3.0 max※2 (0.118 max)	3.0 max※2 (0.118 max)	3.0 max※2 (0.118 max)
D_0	φ4.0±0.2 (φ0.158±0.008)	φ4.0±0.2 (φ0.158±0.008)	φ4.0±0.2 (φ0.158±0.008)	φ4.0±0.2 (φ0.158±0.008)
φd	φ0.6±0.05 (φ0.024±0.002)	φ0.6±0.05 (φ0.024±0.002)	φ0.8±0.05 (φ0.031±0.002)	φ0.8±0.05 (φ0.031±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_1	φ1.8 (0.071)	φ1.8 (0.071)	φ1.8 (0.071)	—
P_3	6.35 (0.25)	6.35 (0.25)	7.50 (0.25)	—

※1 Accumulated error for 20 pitches is 1mm. Unit : mm(inch)
※2 Bonding tape must not protrude from the base tape.

●LHLP10TB



Type	Symbol	Dimensions	Symbol	Dimensions
LHLP10	D	φ11.0 max (φ0.433 max)	W	$18.0^{+1.0}_{-0.5}$ ($0.709^{+0.039}_{-0.020}$)
	H_1	32.0 max (1.26 max)	W_0	12.5 min (0.492 min)
	H	$18.0^{+2.0}_{-0.0}$ ($0.709^{+0.079}_{-0.000}$)	W_1	9.0±0.5 (0.354±0.020)
	H_2	11.0 max (0.433 max)	W_2	3.0 max※2 (0.118 max)
	P	12.7±1.0 (0.500±0.039)	D_0	φ4.0±0.2 (φ0.158±0.008)
	P_0	12.7±0.3※1 (0.500±0.012)	φd	φ0.6±0.05 (φ0.024±0.002)
	P_1	3.85±0.7 (0.152±0.028)	t	0.6±0.3 (0.024±0.012)
	P_2	6.35±1.3 (0.250±0.051)	D_1	φ1.8 (0.071)
	F	$5.0^{+0.8}_{-0.2}$ ($0.197^{+0.031}_{-0.008}$)	P_3	6.35 (0.25)
	h	0.0±2.0 (0.0±0.079)		

Unit : mm(inch)

※1 Accumulated error for 20 pitches is 1mm.
※2 Bonding tape must not protrude from the base tape.

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HIGH CURRENT LEADED INDUCTORS

WAVE

FEATURES

- CAL45 is high current type, and has superior DC bias characteristics.
- Wide selection of configurations including axial leaded, formed radial leads to meet most manufacturing needs.
- LHLC08/LHLC10 series which are encapsulated in a resin housing, are radial leaded inductor for high current applications.

APPLICATIONS

- For DC/DC converter (LCD TV, PDP TV, CTV, DVD etc.)

OPERATING TEMP.

- −25℃～105℃ (Including self-generated heat)

ORDERING CODE

【CA type】

C A L △ 4 5 T B 1 0 0 K ○ ○ ○ ○ ○

❶Type	
CA	High current axial leaded inductor

❷Product Specification	
L△	Standard type

△=Blank space

❸Dimensions (L×D) [mm] max	
45	8.0×4.4

❹Lead Configurations	
TB	Axial lead (52mm lead space)/ ammo pack
VB	Formed lead/ ammo pack

❺Nominal Inductance [μH]	
example	
1R5	1.5
120	12

※R=decimal point

❻Inductance Tolerance [%]	
K	±10

❼Internal code	
△△△△△	Standard product

△= Blank space

【LH type】

L H △ L C 0 8 T B 1 0 1 K ○ ○ ○

❶Type	
LH△	Radial leaded inductor

△=Blank space

❷Product Specification	
LC	High current type

❸Dimensions [mm] max	
08	9.0
10	11.0

❹Packing Code	
NB	Bulk
TB	Ammo packing

❺Nominal Inductance [μH]	
example	
1R5	1.5
120	12
102	1000

※R=decimal point

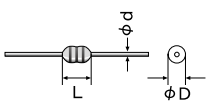
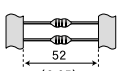
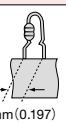
❻Inductance Tolerance [%]	
J	±5
K	±10
M	±20

❼Internal code	
△△△	Standard product

△= Blank space

EXTERNAL DIMENSIONS/STANDARD QUANTITY

【CA type】

Type	Fig.	Dimensions [mm] (inch)			Taped		Standard Quantity (pcs)		
		L	φD	φd	Straight	Formed	Bulk	Taped	
CAL45		8.0max (0.315max)	4.4max (0.173max)	0.65±0.05 (0.026±0.002)			—	Axial lead	2000
								Formed lead	1500

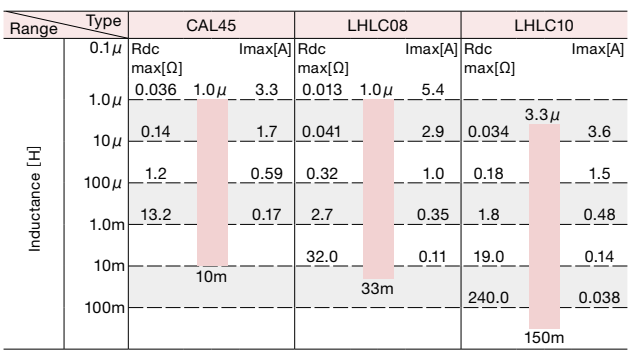
Unit : mm (inch)

【LH type】

Type	Fig.	D	H_2	ℓ	F	φd	Standard Quantity (pcs)	
							Bulk	Taped
LHLC08		9.0max (0.354max)	9.5max (0.374max)	5.0±1.0 (0.197±0.039)	5.0±1.0 (0.197±0.039)	0.6±0.05 (0.024±0.002)	100	1000
LHLC10		11.0max (0.433max)	14.0max (0.551max)	5.0±1.0 (0.197±0.039)	5.0±1.0 (0.197±0.039)	0.6±0.05 (0.024±0.002)	50	500

Unit : mm (inch)

AVAILABLE INDUCTANCE RANGE



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PART NUMBERS

CAL45

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Q (refarence)	Self-resonant frequency [MHz] (refarence)	Measuring frequency [MHz]	DC Resistance [Ω] (max.)	Rated current ※) [mA] (max.)	
									Saturation current Idc1	Temperature rise current Idc2
CAL 45 ○ 1R0K		RoHS	1.0	±10%	30	350	7.96	0.036	5600	3300
CAL 45 ○ 1R2K		RoHS	1.2			300		0.039	5000	3200
CAL 45 ○ 1R5K		RoHS	1.5			300		0.041	4400	3000
CAL 45 ○ 1R8K		RoHS	1.8			200		0.048	4100	2800
CAL 45 ○ 2R2K		RoHS	2.2			200		0.054	3900	2700
CAL 45 ○ 2R7K		RoHS	2.7			70		0.058	3500	2500
CAL 45 ○ 3R3K		RoHS	3.3			70		0.066	3100	2400
CAL 45 ○ 3R9K		RoHS	3.9			40		0.072	3000	2300
CAL 45 ○ 4R7K		RoHS	4.7			40		0.079	2800	2200
CAL 45 ○ 5R6K		RoHS	5.6			35		0.089	2500	2100
CAL 45 ○ 6R8K		RoHS	6.8			35		0.097	2200	2000
CAL 45 ○ 8R2K		RoHS	8.2			30		0.110	2000	1900
CAL 45 ○ 100K		RoHS	10		40	25	2.52	0.14	1700	1800
CAL 45 ○ 120K		RoHS	12			25		0.17	1600	1450
CAL 45 ○ 150K		RoHS	15			25		0.19	1400	1430
CAL 45 ○ 180K		RoHS	18			20		0.24	1250	1300
CAL 45 ○ 220K		RoHS	22			20		0.28	1200	1220
CAL 45 ○ 270K		RoHS	27			17		0.33	1100	1130
CAL 45 ○ 330K		RoHS	33		30	15		0.37	1000	1080
CAL 45 ○ 390K		RoHS	39			13		0.47	920	900
CAL 45 ○ 470K		RoHS	47			13		0.52	890	870
CAL 45 ○ 560K		RoHS	56			11		0.75	790	710
CAL 45 ○ 680K		RoHS	68			10		0.78	700	700
CAL 45 ○ 820K		RoHS	82			9		0.92	620	640
CAL 45 ○ 101K		RoHS	100		40	9	0.796	1.2	590	630
CAL 45 ○ 121K		RoHS	120		50	7		1.6	550	490
CAL 45 ○ 151K		RoHS	150		60	7		1.8	490	470
CAL 45 ○ 181K		RoHS	180			5		2.3	420	450
CAL 45 ○ 221K		RoHS	220		80	5		2.9	370	425
CAL 45 ○ 271K		RoHS	270		70	5		3.4	350	355
CAL 45 ○ 331K		RoHS	330			4.5		3.6	320	330
CAL 45 ○ 391K		RoHS	390			4		4.9	290	280
CAL 45 ○ 471K		RoHS	470		80	4		6.3	270	240
CAL 45 ○ 561K		RoHS	560			3		7.0	250	240
CAL 45 ○ 681K		RoHS	680			3		7.8	240	220
CAL 45 ○ 821K		RoHS	820			2.5		11.0	220	210
CAL 45 ○ 102K		RoHS	1000			2.5	0.252	13.2	190	170
CAL 45 ○ 122K		RoHS	1200			2		17	170	150
CAL 45 ○ 152K		RoHS	1500			2		22	150	140
CAL 45 ○ 182K		RoHS	1800			1.5		27	140	120
CAL 45 ○ 222K		RoHS	2200			1.5		36	130	110
CAL 45 ○ 272K		RoHS	2700		70	1.2		45	110	90
CAL 45 ○ 332K		RoHS	3300			1.2		65	100	75
CAL 45 ○ 392K		RoHS	3900			1		69	95	70
CAL 45 ○ 472K		RoHS	4700			1		80	90	65
CAL 45 ○ 562K		RoHS	5600			1		90	90	60
CAL 45 ○ 682K		RoHS	6800			1		100	80	60
CAL 45 ○ 822K		RoHS	8200			0.7		125	75	50
CAL 45 ○ 103K		RoHS	10000		30	0.6	0.0796	155	65	45

○ Please specify the Lead configuration code.

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 10%. (at 20℃)
※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40℃. (at 20℃)
※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

LHLC08

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Q (min.)	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Measuring frequency [MHz]
LH LC08□□1R0N		RoHS	1.0	±30%	40	76	0.013	5.4	7.96
LH LC08□□1R5M		RoHS	1.5	±20%		65	0.014	5.2	
LH LC08□□2R2M		RoHS	2.2			56	0.017	4.8	
LH LC08□□2R7M		RoHS	2.7			48	0.019	4.2	
LH LC08□□3R3M		RoHS	3.3			41	0.021	3.8	
LH LC08□□3R9M		RoHS	3.9			33	0.024	3.7	
LH LC08□□4R7M		RoHS	4.7			30	0.025	3.6	
LH LC08□□5R6M		RoHS	5.6			23	0.028	3.5	
LH LC08□□6R8M		RoHS	6.8			21	0.030	3.4	
LH LC08□□8R2M		RoHS	8.2			19	0.034	3.0	
LH LC08□□100K		RoHS	10	±10%	65	17	0.041	2.9	2.52
LH LC08□□120K		RoHS	12			16	0.044	2.8	
LH LC08□□150K		RoHS	15		50	13	0.053	2.6	
LH LC08□□180K		RoHS	18			12	0.060	2.4	
LH LC08□□220K		RoHS	22			11	0.068	2.3	

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PART NUMBERS

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Q (min.)	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Measuring frequency [MHz]
LH LC08□□270K		RoHS	27	±10%	50	10	0.091	2.0	2.52
LH LC08□□330K		RoHS	33		40	8.8	0.10	1.9	
LH LC08□□390K		RoHS	39			8.4	0.12	1.7	
LH LC08□□470K		RoHS	47			8.2	0.15	1.5	
LH LC08□□560K		RoHS	56			7.9	0.17	1.4	
LH LC08□□680K		RoHS	68		35	7.0	0.20	1.3	
LH LC08□□820K		RoHS	82			6.5	0.22	1.2	
LH LC08□□101K		RoHS	100		25	5.7	0.32	1.0	0.796
LH LC08□□121K		RoHS	120			5.2	0.36	0.96	
LH LC08□□151K		RoHS	150		20	4.7	0.41	0.88	
LH LC08□□181K		RoHS	180		35	4.2	0.66	0.71	
LH LC08□□221K		RoHS	220			3.7	0.73	0.66	
LH LC08□□271K		RoHS	270		25	3.5	0.85	0.63	
LH LC08□□331K		RoHS	330			3.2	0.97	0.59	
LH LC08□□391K		RoHS	390		20	2.9	1.1	0.55	
LH LC08□□471K		RoHS	470		25	2.4	1.3	0.49	
LH LC08□□561K		RoHS	560			2.2	1.5	0.47	
LH LC08□□681K		RoHS	680			2.0	1.8	0.44	
LH LC08□□821K		RoHS	820		30	1.6	2.3	0.38	
LH LC08□□102J		RoHS	1000	±5%	55	1.5	2.7	0.35	0.252
LH LC08□□122J		RoHS	1200		45	1.4	3.2	0.31	
LH LC08□□152J		RoHS	1500		55	1.3	4.1	0.29	
LH LC08□□182J		RoHS	1800			1.2	4.8	0.26	
LH LC08□□222J		RoHS	2200			1.1	5.6	0.23	
LH LC08□□272J		RoHS	2700			1.0	7.5	0.21	
LH LC08□□332J		RoHS	3300			0.85	8.5	0.19	
LH LC08□□392J		RoHS	3900			0.78	9.7	0.18	
LH LC08□□472J		RoHS	4700		65	0.68	14	0.16	
LH LC08□□562J		RoHS	5600			0.62	16	0.15	
LH LC08□□682J		RoHS	6800			0.61	18	0.14	
LH LC08□□822J		RoHS	8200			0.60	20	0.13	
LH LC08□□103J		RoHS	10000		60	0.48	32	0.11	L:1kHz Q:0.0796
LH LC08□□123J		RoHS	12000			0.44	36	0.084	
LH LC08□□153J		RoHS	15000			0.35	62	0.068	
LH LC08□□183J		RoHS	18000			0.30	72	0.066	
LH LC08□□223J		RoHS	22000			0.28	82	0.057	
LH LC08□□273J		RoHS	27000			0.25	90	0.054	
LH LC08□□333J		RoHS	33000			0.23	100	0.053	

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

●LHLC10

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Q (min.)	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Measuring frequency [MHz]
LH LC10□□3R3M		RoHS	3.3	±20%	50	46	0.019	5.0	7.96
LH LC10□□3R9M		RoHS	3.9			40	0.022	4.8	
LH LC10□□4R7M		RoHS	4.7			38	0.024	4.7	
LH LC10□□5R6M		RoHS	5.6			34	0.025	4.5	
LH LC10□□6R8M		RoHS	6.8			30	0.028	4.1	
LH LC10□□8R2M		RoHS	8.2			24	0.031	3.9	
LH LC10□□100K		RoHS	10	±10%	90	19	0.034	3.6	2.52
LH LC10□□120K		RoHS	12			16	0.038	3.4	
LH LC10□□150K		RoHS	15			12	0.042	3.2	
LH LC10□□180K		RoHS	18			9.2	0.046	3.0	
LH LC10□□220K		RoHS	22		60	8.6	0.061	2.8	
LH LC10□□270K		RoHS	27			7.1	0.069	2.7	
LH LC10□□330K		RoHS	33			6.8	0.078	2.6	
LH LC10□□390K		RoHS	39			6.7	0.085	2.4	
LH LC10□□470K		RoHS	47		50	6.2	0.093	2.3	
LH LC10□□560K		RoHS	56			5.2	0.10	2.1	
LH LC10□□680K		RoHS	68		40	4.6	0.12	2.0	
LH LC10□□820K		RoHS	82			4.7	0.13	1.8	
LH LC10□□101K		RoHS	100			3.8	0.18	1.5	0.796
LH LC10□□121K		RoHS	120			3.2	0.25	1.3	
LH LC10□□151K		RoHS	150			2.9	0.29	1.2	
LH LC10□□181K		RoHS	180			2.6	0.40	1.0	
LH LC10□□221K		RoHS	220			2.3	0.44	0.95	
LH LC10□□271K		RoHS	270	±10%	30	2.1	0.50	0.90	0.796
LH LC10□□331K		RoHS	330			2.0	0.56	0.86	
LH LC10□□391K		RoHS	390			1.8	0.62	0.75	
LH LC10□□471K		RoHS	470			1.7	0.84	0.65	
LH LC10□□561K		RoHS	560			1.5	0.93	0.61	
LH LC10□□681K		RoHS	680			1.4	1.0	0.57	
LH LC10□□821K		RoHS	820			1.3	1.4	0.50	

To next page

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PART NUMBERS

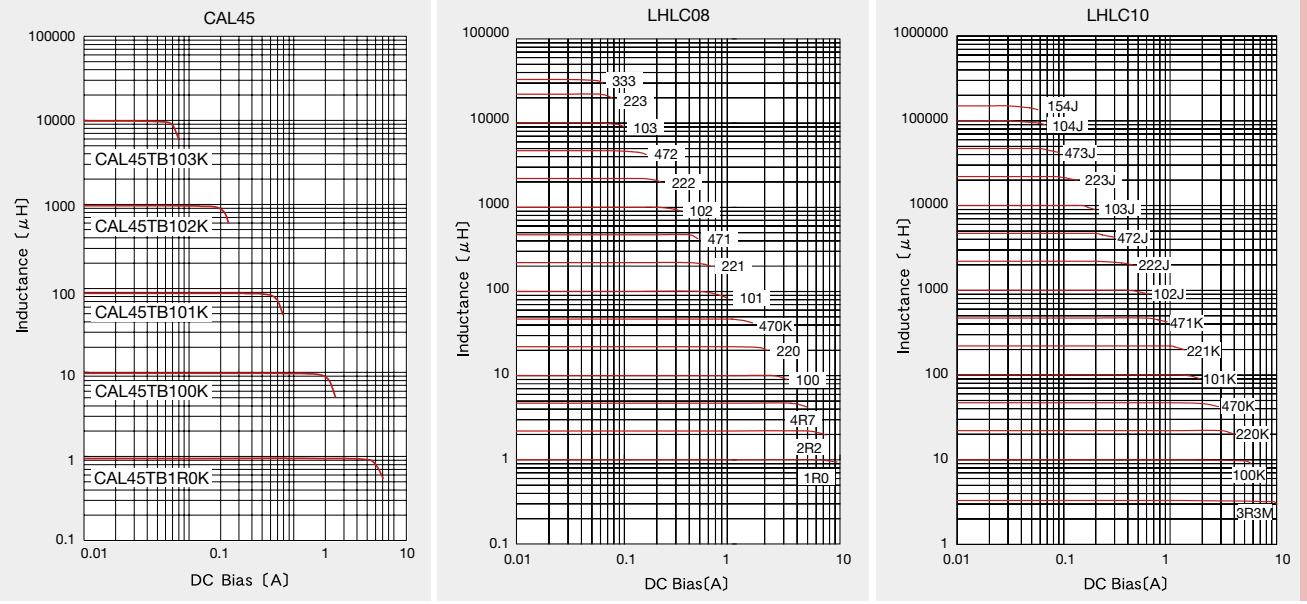
Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Q (min.)	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Measuring frequency [MHz]
LH LC10□□102J		RoHS	1000	±5%	50	1.2	1.8	0.48	0.252
LH LC10□□122J		RoHS	1200			0.87	2.3	0.40	
LH LC10□□152J		RoHS	1500			0.83	2.7	0.37	
LH LC10□□182J		RoHS	1800			0.75	3.0	0.36	
LH LC10□□222J		RoHS	2200			0.70	3.9	0.32	
LH LC10□□272J		RoHS	2700			0.67	4.3	0.30	
LH LC10□□332J		RoHS	3300			0.56	5.8	0.26	
LH LC10□□392J		RoHS	3900			0.54	6.4	0.25	
LH LC10□□472J		RoHS	4700			0.49	7.1	0.24	
LH LC10□□562J		RoHS	5600			0.41	9.0	0.21	
LH LC10□□682J		RoHS	6800			0.38	10	0.20	
LH LC10□□822J		RoHS	8200			0.36	12	0.18	
LH LC10□□103J		RoHS	10000		60	0.29	19	0.14	L:1kHz Q:0.0796
LH LC10□□123J		RoHS	12000			0.27	21	0.13	
LH LC10□□153J		RoHS	15000			0.24	34	0.11	
LH LC10□□183J		RoHS	18000			0.21	38	0.10	
LH LC10□□223J		RoHS	22000			0.20	43	0.095	
LH LC10□□273J		RoHS	27000		40	0.15	67	0.076	
LH LC10□□333J		RoHS	33000			0.14	76	0.068	
LH LC10□□393J		RoHS	39000			0.13	84	0.065	
LH LC10□□473J		RoHS	47000			0.12	96	0.061	
LH LC10□□563J		RoHS	56000		30	0.10	170	0.045	
LH LC10□□683J		RoHS	68000			0.095	200	0.043	
LH LC10□□823J		RoHS	82000			0.088	210	0.041	
LH LC10□□104J		RoHS	100000			0.085	240	0.038	L:1kHz Q:0.0252
LH LC10□□124J		RoHS	120000			0.070	260	0.037	
LH LC10□□154J		RoHS	150000			0.069	300	0.035	

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

ELECTRICAL CHARACTERISTICS

DC Bias characteristics

(Measured by HP4285A)



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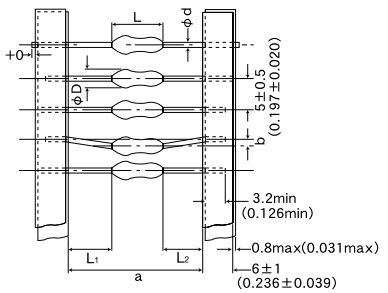
PACKAGING

①Minimum Quantity

Type (EIA)	Standard quantity (pcs)		
	Bulk	Taped	
CAL45	—	Axial lead	2000
		Formed lead	1500
LHLC08	100	1000	
LHLC10	50	500	

②Taping dimensions

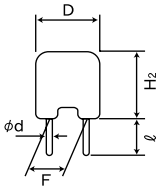
● CAL 45 TB(a : 52mm lead space)
(2.05 inches)



Type	Dimensions						Minimum insertion pitch
	φD	L	a	b	$\|L_1-L_2\|$	φd	
CAL45	4.4max (0.173max)	8.0max (0.315max)	52^{+2}_{-1} ($2.05^{+0.079}_{-0.039}$)	1.2max (0.047max)	1.0max (0.039max)	0.65±0.05 (0.026±0.002)	10.0 (0.394)

Unit : mm(inch)

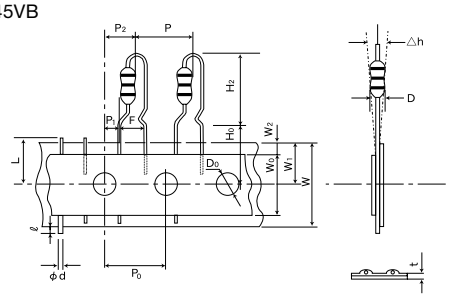
③Bulk dimensions



Type	Dimensions				
	φD (max)	H_2 (max)	F*	ℓ	φd
LHLC08	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)
LHLC10	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)

*Measured at the base of the leads. Unit : mm(inch)

● CAL 45VB

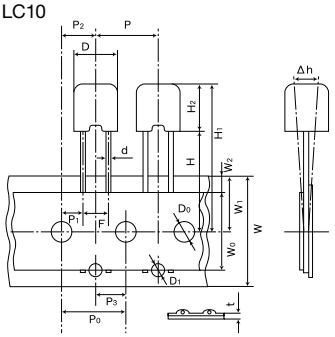


Type	Symbol	Dimensions	Symbol	Dimensions
CAL 45	D	φ4.4max	W	$18.0^{+1.0}_{-0.5}$ ($0.709^{+0.039}_{-0.020}$)
	H_2	14.0max (0.551max)	W_0	12.5min (0.492min)
	H_0	16.0±1.0 (0.630±0.039)	W_1	$9.0^{+0.75}_{-0.5}$ ($0.354^{+0.030}_{-0.020}$)
	P	12.7±1.0 (0.500±0.039)	W_2	3.0max ※2 (0.118max)
	P_0	12.7±0.3 ※1 (0.500±0.012)	ℓ	2.0max (0.079max)
	P_1	3.85±0.7 (0.152±0.028)	D_0	φ4.0±0.2 (φ0.157±0.008)
	P_2	6.35±1.3 (0.250±0.051)	φd	φ0.65±0.05 (φ0.026±0.002)
	F	5.0±1.0 (0.197±0.039)	L	11.0max (0.433max)
	△h	0.0±2.0 (0.0±0.079)	t	0.9max (0.035max)

Unit : mm(inch)

※1 Accumulated error for 20 pitches is ± 1mm.
※2 Bonding tape must not protrude from the base tape.

● LHLC08, LHLC10



	LHLC08	LHLC10
D	φ9.0max (φ0.354max)	φ11.0max (φ0433max)
H_1	30.5max (1.20max)	34.0max (1.34max)
H	$18.0^{+2.0}_{-0.0}$ ($0.709^{+0.079}_{-0.000}$)	$18.0^{+2.0}_{-0.0}$ ($0.709^{+0.079}_{-0.000}$)
H_2	9.5max (0.374max)	14.0max (0.551max)
P	12.7±1.0 (0.500±0.039)	12.7±1.0 (0.500±0.039)
P_0	12.7±0.3※1 (0.500±0.012)	12.7±0.3※1 (0.500±0.012)
P_1	3.85±0.7 (0.152±0.028)	3.85±0.7 (0.152±0.028)
P_2	6.35±1.3 (0.250±0.051)	6.35±1.3 (0.250±0.051)
F	$5.0^{+0.8}_{-0.2}$ ($0.197^{+0.031}_{-0.008}$)	$5.0^{+0.8}_{-0.2}$ ($0.197^{+0.031}_{-0.008}$)
h	0.0±2.0 (0.0±0.079)	0.0±2.0 (0.0±0.079)
W	$18.0^{+1.0}_{-0.5}$ ($0.709^{+0.039}_{-0.020}$)	$18.0^{+1.0}_{-0.5}$ ($0.709^{+0.039}_{-0.020}$)
W_0	12.5min (0.492min)	12.5min (0.492min)
W_1	9.0±0.5 (0.354±0.020)	9.0±0.5 (0.354±0.020)
W_2	3.0max※2 (0.118max)	3.0max※2 (0.118max)
D_0	φ4.0±0.2 (φ0.158±0.008)	φ4.0±0.2 (φ0.158±0.008)
φd	φ0.6±0.05 (φ0.024±0.002)	φ0.6±0.05 (φ0.024±0.002)
t	0.6±0.3 (0.024±0.012)	0.6±0.3 (0.024±0.012)
D_1	φ1.8 (0.071)	φ1.8 (0.071)
P_3	6.35 (0.25)	6.35 (0.25)

※1 Accumulated error for 20 pitches is 1mm. Unit : mm(inch)
※2 Bonding tape must not protrude from the base tape.

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LEADED FERRITE BEADS INDUCTORS

WAVE

FEATURES

- Use of high loss ferrite material.
- Easy mounting on PC boards.
- Available in a wide range of values and configurations to suit most applications.

APPLICATIONS

- Waveform correction of digital signals from digital equipment and absorption of high-frequency noise from data lines.

OPERATING TEMP.

- −25℃～85℃

ORDERING CODE

F B A 0 4 H A 4 5 0 B B ○ ○ ○

❶Type	
FB	Ferrite Beads

❷Configuration	
A	Axial lead
R	Radial lead

❸Core Dimensions (mm)	
03	ϕ2.5
04	ϕ3.5
05	5.0
06	6.0
07	7.5

❹Material code	
HA	Refer to impedance curves for material difference
VA	

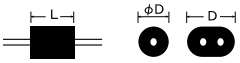
❺Nominal Impedance	
example	
850	85
121	120

Excluding 03Type

❻Lead configuration (mm)			
AB	Straight lead (26mm lead space) / ammo	SA	Straight lead (FBR05 type) / ammo
BB	Straight lead (52mm lead space) / ammo	SB	Straight lead (FBR07 type) / ammo
KD	Formed lead (10mm pitch) / bulk	TB	Straight lead (FBR07 type) / ammo
KE	Formed lead (12.5mm pitch) / bulk	UB	Radial lead formed / ammo
KF	Formed lead / bulk (15.0mm pitch) / bulk	US	Formed lead (crimped) / bulk
NA	Lead (2.5mm pitch)/bulk (FBR)	VB	Dual side lead formed (crimped) / ammo
	Straight lead / bulk (FBA)	VS	Formed lead / bulk
NB	Formed lead (crimped) / bulk		

❼Internal code	
−00	Standard Products

EXTERNAL DIMENSIONS/STANDARD QUANTITY



Type		Configurations: Taping Straight	Configurations: Taping Formed	Configurations: Bulk Straight	Configurations: Bulk Formed	Dimensions D	Dimensions L	Standard Quantity (pcs): Type	Lead Configuration	Bulk	Taped Ammo
FBA	03HA450□-00 03VA450□-00	AB,BB W:26,52 (1.02, 2.05) P:5.0 (0.197)	VB UB P: 12.7 (0.500)	NA	KD,KE,KF F: 10, 12.5, 15 (0.39, 0.492, 0.591) VS US F: 5.0 (0.197)	2.5±0.2 (0.098±0.008)	4.5±0.3 (0.177±0.012)	FBA03	NA, KD, US	1000	—
									KE, KF, VS	500	—
									AB, BB	—	2000
									UB, VB	—	3000
	04HA450□-00 04VA450□-00	AB,BB W:26,52 (1.02,2.05) P:5.0 (0.197)	VB UB P: 12.7 (0.500)	NA	KD,KE,KF F: 10, 12.5, 15 (0.39, 0.492, 0.591) VS US F: 5.0 (0.197)	3.5±0.2 (0.138±0.008)	4.5±0.3 (0.177±0.012)	FBA04	NA, KD, US	1000	—
	04HA600□-00 04VA600□-00	AB,BB W:26,52 (1.02, 2.05) P:5.0 (0.197)	VB P	NA	KD,KE,KF F: 10, 12.5, 15 (0.39, 0.492, 0.591) VS	3.5±0.2 (0.138±0.008)	$6.0^{+0.5}_{-0}$ $(0.236^{+0.020}_{-0})$		KE, KF, VS	500	—
									AB, BB	—	1000
	04HA900□-00 04VA900□-00	AB,BB W:26,52 (1.02, 2.05) P:5.0 (0.197)	VB P: 12.7 (0.500)	NA	KE,KF F: 12.5, 15 (0.492, 0.591) VS	3.5±0.2 (0.138±0.008)	9.0±0.5 (0.354±0.020)		UB, VB	—	3000
FBR	05VA121□-00	—	SA P: 12.7 (0.500)	—	NA F: 2.5 (0.098)	5.0 max. (0.197 max.)	7.5 (0.295)	FBR05	NA	1000	—
									SA	—	2000
	06HA850NA-00 06VA850NA-00	—	—	—	NA F: 2.5 (0.098)	6.0±0.5 (0.236±0.020)	5.0 (0.197)	FBR06	NA	1000	—
	06HA121NA-00 06VA121NA-00						7.0 (0.276)				
	07HA850□-00 07VA850□-00	—	SB,TB P: 12.7 (0.500)	—	NB F: 5.0 (0.197)	7.5±0.5 (0.295±0.020)	5.5 (0.217)	FBR07	NB	1000	—
	07HA121□-00 07VA121□-00						7.5 (0.295)		SB	—	2000

□Please specify the lead configuration code. Unit : mm (inch)

Note: Lead diameter (ϕd) shall fall within a range of 0.65mm±0.05mm, FBR05, and FBR07 types however, will have a lead diameter (ϕd) range of 0.6mm±0.05mm.

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PART NUMBERS

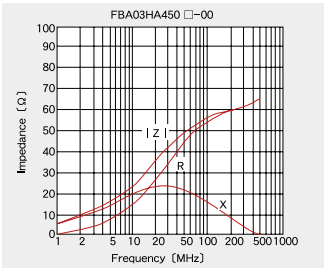
Ordering code		EHS (Environmental Hazardous Substances)	Impedance [Ω] min.	Measuring frequency [MHz] Material HA	Measuring frequency [MHz] Material VA	Rated Current [A] max. Material HA	Rated Current [A] max. Material VA
FBA	03 △ 450 □ −00	RoHS	35.0	50	100	7.0	7.0
	04 △ 450 □ −00	RoHS	45.0	50	100	7.0	7.0
	04 △ 600 □ −00	RoHS	60.0	50	100	7.0	7.0
	04 △ 900 □ −00	RoHS	90.0	50	100	7.0	7.0
FBR	05 VA 121 □ −00	RoHS	120.0	—	100	—	7.0
	06 △ 850 NA −00	RoHS	85.0	50	100	7.0	7.0
	06 △ 121 NA −00	RoHS	120.0	50	100	7.0	7.0
	07 △ 850 □ −00	RoHS	85.0	50	100	7.0	7.0
	07 △ 121 □ −00	RoHS	120.0	50	100	7.0	7.0

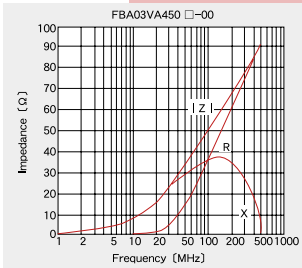
△Please specify material codes (HA,VA) and □ lead configuration code.
※DC Resistance : 0.01Ω max., Insulation resistance : 1.0MΩ min.

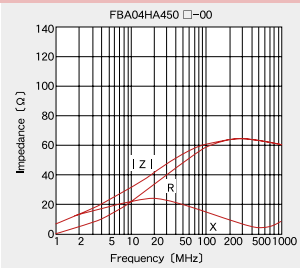
ELECTRICAL CHARACTERISTICS

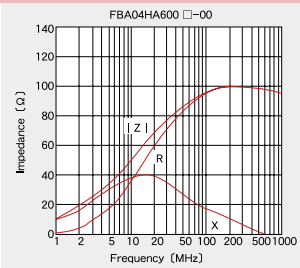
IMPEDANCE-vs-FREQUENCY CHARACTERISTICS

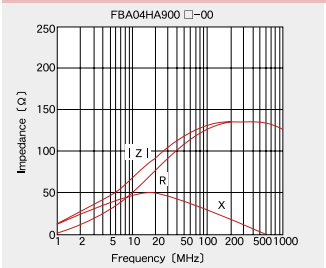
(Measured by HP4191A)

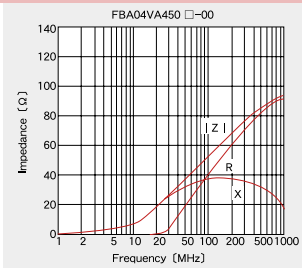


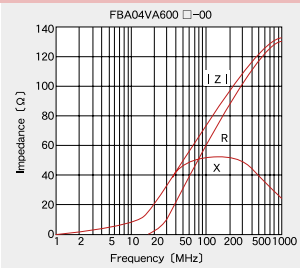


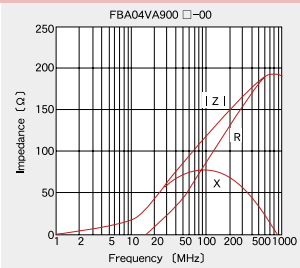


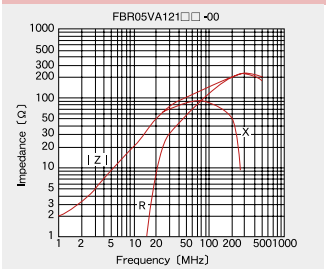


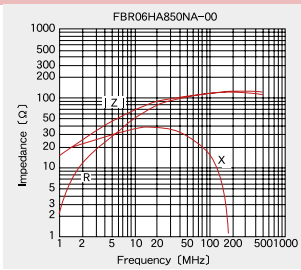


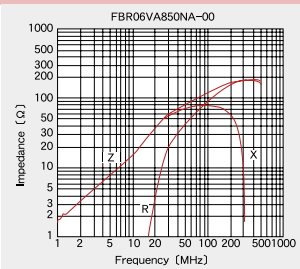


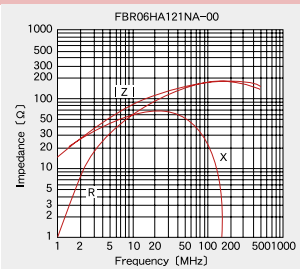


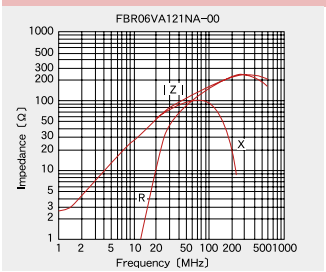


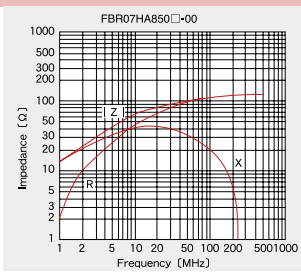


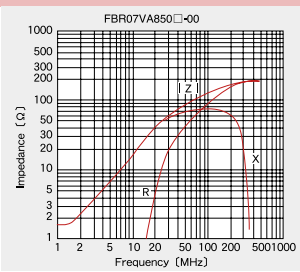


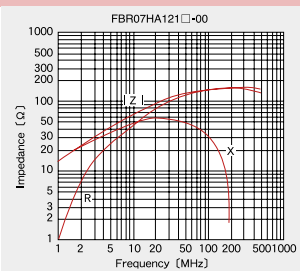


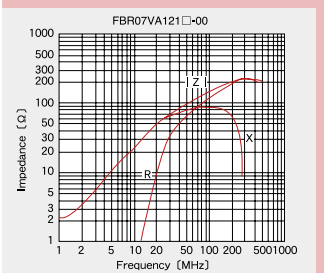












＊This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our specification. For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (http://www.ty-top.com/) or CD catalogs.

PACKAGING

①Minimum Quantity

● Axial lead (FBA)

Type	Lead Configuration	Standard quantity [pcs]	
		Bulk	Taped Ammo
FBA03	NA, KD, US	1000	—
	KE, KF, VS	500	—
	AB, BB	—	2000
	UB, VB	—	3000
FBA04	NA, KD, US	1000	—
	KE, KF, VS	500	—
	AB, BB	—	1000
	VB, UB	—	3000

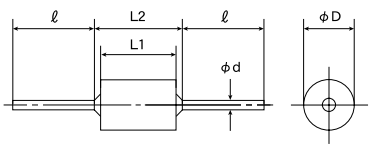
● Radial lead (FBR)

Type	Lead Configuration	Standard quantity [pcs]	
		Bulk	Taped Ammo
FBR05	NA	1000	—
	SA	—	2000
FBR06	NA	1000	—
FBR07	NB	1000	—
	SB	—	2000

②Bulk dimensions

Axial lead (FBA)

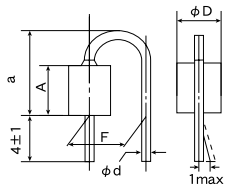
● NA



Type	Dimensions				
	ϕD	L1	L2	ϕd	ℓ
FBA03□450	2.5±0.2 (0.098±0.008)	4.5±0.3 (0.177±0.012)	6.5 max. (0.256 max.)	0.65±0.05 (0.026±0.002)	18 min. (0.709 min.)
FBA04□450	3.5±0.2 (0.138±0.008)	4.5±0.3 (0.177±0.012)	6.5 max. (0.256 max.)		
FBA04□600	3.5±0.2 (0.138±0.008)	$6.0^{+0.5}_{-0}$ ($0.236^{+0.020}_{-0}$)	8.5 max. (0.335 max.)		
FBA04□900	3.5±0.2 (0.138±0.008)	9.0±0.5 (0.354±0.020)	11.0 max. (0.433 max.)		

Unit : mm (inch)

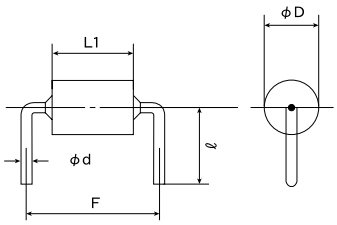
● US



Type	Dimensions				
	ϕD	A	a	F	ϕd
FBA03□450	2.5±0.2 (0.098±0.008)	4.5±0.3 (0.177±0.012)	9.0 max. (0.354 max.)	5.0±1.0 (0.197±0.039)	0.65±0.05 (0.026±0.002)
FBA04□450	3.5±0.2 (0.138±0.008)	4.5±0.3 (0.177±0.012)	9.0 max. (0.354 max.)		

Unit : mm (inch)

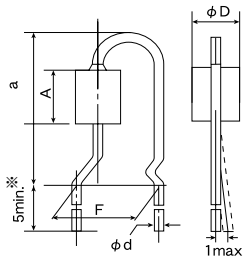
● KD/KE/KF



Type	Lead Symbol	Dimensions				
		ϕD	F	L1	ϕd	ℓ
FBA03□450	KD	2.5±0.2 (0.098±0.008)	10.0±1.0 (0.394±0.040)	4.5±0.3 (0.177±0.012)	0.65±0.05 (0.026±0.020)	7.0±2.0 (0.276±0.079)
FBA04□450		3.5±0.2 (0.138±0.008)	10.0±1.0 (0.394±0.040)	4.5±0.3 (0.177±0.012)		7.5±2.0 (0.295±0.079)
FBA04□600		3.5±0.2 (0.138±0.008)	10.0±1.0 (0.394±0.040)	$6.0^{+0.5}_{-0}$ ($0.236^{+0.020}_{-0}$)		7.5±2.0 (0.295±0.079)
FBA03□450	KE	2.5±0.2 (0.098±0.008)	12.5±1.0 (0.492±0.004)	4.5±0.3 (0.177±0.012)	0.65±0.05 (0.026±0.020)	7.0±2.0 (0.276±0.079)
FBA04□450		3.5±0.2 (0.138±0.008)	12.5±1.0 (0.492±0.004)	4.5±0.3 (0.177±0.012)		7.5±2.0 (0.295±0.079)
FBA04□600		3.5±0.2 (0.138±0.008)	12.5±1.0 (0.492±0.004)	$6.0^{+0.5}_{-0}$ ($0.236^{+0.020}_{-0}$)		7.5±2.0 (0.295±0.079)
FBA04□900		3.5±0.2 (0.138±0.008)	12.5±1.0 (0.492±0.004)	9.0±0.5 (0.354±0.020)		7.5±2.0 (0.295±0.079)
FBA03□450	KF	2.5±0.2 (0.098±0.008)	15.0±1.0 (0.591±0.004)	4.5±0.3 (0.177±0.012)	0.65±0.05 (0.026±0.020)	7.0±2.0 (0.276±0.079)
FBA04□450		3.5±0.2 (0.138±0.008)	15.0±1.0 (0.591±0.004)	4.5±0.3 (0.177±0.012)		7.5±2.0 (0.295±0.079)
FBA04□600		3.5±0.2 (0.138±0.008)	15.0±1.0 (0.591±0.004)	$6.0^{+0.5}_{-0}$ ($0.236^{+0.020}_{-0}$)		7.5±2.0 (0.295±0.079)
FBA04□900		3.5±0.2 (0.138±0.008)	15.0±1.0 (0.591±0.004)	9.0±0.53 (0.354±0.020)		7.5±2.0 (0.295±0.079)

Unit : mm (inch)

● VS



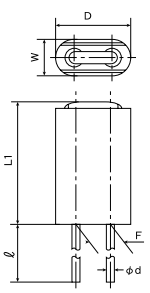
※5±1 for 900 type only

Type	Dimensions				
	ϕD	A	a	F	ϕd
FBA03□450	2.5±0.2 (0.098±0.008)	4.5±0.3 (0.177±0.012)	12.5 max. (0.492 max.)	5.0±1.0 (0.197±0.039)	0.65±0.05 (0.026±0.002)
FBA04□450	3.5±0.2 (0.138±0.008)	4.5±0.3 (0.177±0.012)	12.5 max. (0.492 max.)	5.0±1.0 (0.197±0.039)	0.65±0.05 (0.026±0.002)
FBA04□600	3.5±0.2 (0.138±0.008)	$6.0^{+0.5}_{-0}$ ($0.236^{+0.020}_{-0}$)	12.5 max. (0.492 max.)	5.0±1.0 (0.197±0.039)	0.65±0.05 (0.026±0.002)
FBA04□900	3.5±0.2 (0.138±0.008)	9.0±0.5 (0.354±0.020)	16.0 max. (0.630 max.)	5.0±1.0 (0.197±0.039)	0.65±0.05 (0.026±0.002)

Unit : mm (inch)

Radial lead (FBR)

● NA



Type	Dimensions					
	D	L1	ϕd	ℓ	W	F
FBR05VA121	5.0 max. (0.197 max.)	9.0 max. (0.354 max.)	0.65±0.05 (0.026±0.002)	10.0^{+3}_{-5} ($0.394^{+0.118}_{-0.197}$)	2.5 max. (0.098 max.)	2.5±1.0 (0.098±0.039)
FBR06□850	6.0±0.5 (0.236±0.020)	7.0 max. (0.276 max.)	0.65±0.05 (0.026±0.002)	10.0^{+3}_{-5} ($0.394^{+0.118}_{-0.197}$)	3.0±0.5 (0.118±0.020)	2.5±1.0 (0.098±0.039)
FBR06□121	6.0±0.5 (0.236±0.020)	9.0 max. (0.354 max.)	0.65±0.05 (0.026±0.002)	10.0^{+3}_{-5} ($0.394^{+0.118}_{-0.197}$)	3.0±0.5 (0.118±0.020)	2.5±1.0 (0.098±0.039)

Unit : mm (inch)

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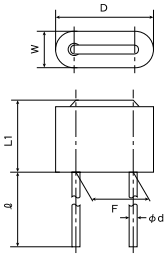
PACKAGING

● NB

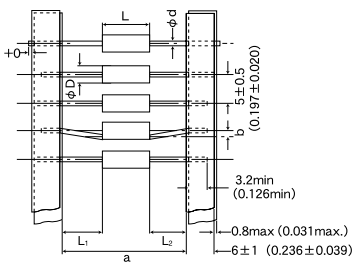


Type	Dimensions					
	D	L1	ϕd	ℓ	W	F
FBR07□850	7.5±0.5 (0.295±0.020)	7.0 max. (0.276 max.)	0.6±0.05 (0.024±0.002)	5.0^{+1}_{-2} ($0.197^{+0.039}_{-0.079}$)	2.5 max. (0.098 max.)	$5.0^{+1}_{-0.5}$ ($0.197^{+0.039}_{-0.020}$)
FBR07□121	7.5±0.5 (0.295±0.020)	9.0 max. (0.354 max.)	0.6±0.05 (0.024±0.002)	5.0^{+1}_{-2} ($0.197^{+0.039}_{-0.079}$)	2.5 max. (0.098 max.)	$5.0^{+1}_{-0.5}$ ($0.197^{+0.039}_{-0.020}$)

Unit : mm (inch)

③Taping Dimensions

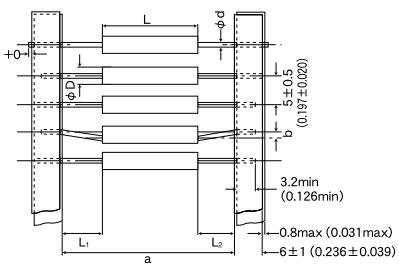
● AB (a:26mm) (1.02inch lead space)



Type	Dimensions						Minimum insertion pitch
	ϕD	L	a	b	$\|L_1-L_2\|$	ϕd	
FBA03	2.5±0.2 (0.098±0.008)	4.5±0.3 (0.177±0.012)	$26.0^{+1.5}_{-0}$ ($1.02^{+0.059}_{-0}$)	0.8max (0.031max)	1.0 max (0.039 max)	0.65±0.05 (0.026±0.002)	10.0 (0.394)
FBA04 □450	3.5±0.2 (0.138±0.008)	4.5±0.3 (0.177±0.012)	$26.0^{+1.5}_{-0}$ ($1.02^{+0.059}_{-0}$)	0.8max (0.031max)	1.0 max (0.039 max)	0.65±0.05 (0.026±0.002)	10.0 (0.394)
FBA04 □600		$6.0^{+0.5}_{-0}$ ($0.236^{+0.020}_{-0}$)					
FBA04 □900		9.0±0.5 (0.354±0.020)					

Unit : mm (inch)

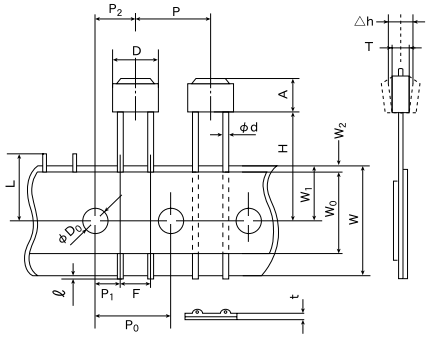
● BB (a :52mm) (2.05inches lead space)



Type	Dimensions						Minimum insertion pitch
	ϕD	L	a	b	$\|L_1-L_2\|$	ϕd	
FBA03	2.5±0.2 (0.098±0.008)	4.5±0.3 (0.177±0.012)	52.0^{+2}_{-1} ($2.05^{+0.079}_{-0.039}$)	1.2 max (0.047 max)	1.0 max (0.039 max)	0.65±0.05 (0.026±0.002)	10.0 (0.394)
FBA04 □450	3.5±0.2 (0.138±0.008)	4.5±0.3 (0.177±0.012)	52.0^{+2}_{-1} ($2.05^{+0.079}_{-0.039}$)	1.2max (0.047max)	1.0 max (0.039 max)	0.65±0.05 (0.026±0.002)	10.0 (0.394)
FBA04 □600		$6.0^{+0.5}_{-0}$ ($0.236^{+0.020}_{-0}$)					
FBA04 □900		9.0±0.5 (0.354±0.020)					

Unit : mm (inch)

● SA (F:2.5mm pitch) (0.098 inches)



Type	Symbol	Dimensions	Symbol	Dimensions
FBR05	A	121: 9.0 max. (0.354 max.)	W	$18.0^{+1.0}_{-0.5}$ ($0.709^{+0.039}_{-0.020}$)
	T	2.5 max. (0.098 max.)	W_0	12.5 min. (0.492 min.)
	D	5.0 max. (0.197 max.)	W_1	$9.0^{+0.75}_{-0.5}$ ($0.354^{+0.039}_{-0.020}$)
	H	$18.0^{+2.0}_{-0}$ ($0.709^{+0.079}_{-0}$)	W_2	3.0 max. ※2 (0.118 max.)
	P	12.7±1.0 (0.500±0.039)	ℓ	1.0 max. (0.039 max.)
	P_0	12.7±0.3 ※1 (0.500±0.039)	ϕD_0	4.0±0.3 (0.157±0.012)
	P_1	5.1±0.7 (0.201±0.028)	ϕd	0.65±0.05 (0.026±0.002)
	P_2	6.35±1.3 (0.250±0.051)	L	11.0 max. (0.433 max.)
	F	$2.5^{+1.0}_{-0.5}$ ($0.098^{+0.039}_{-0.020}$)	t	0.7±0.2 (0.028±0.008)
	△h	0.0±2.0 (0.0±0.079)		

Unit : mm(inch)

※1 Accumulated error for 20 pitches is ±2mm.
※2 Bonding tape must not protrude from the base tape.

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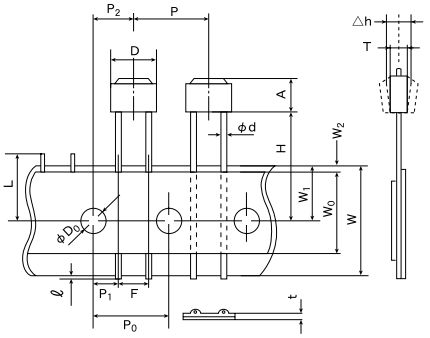
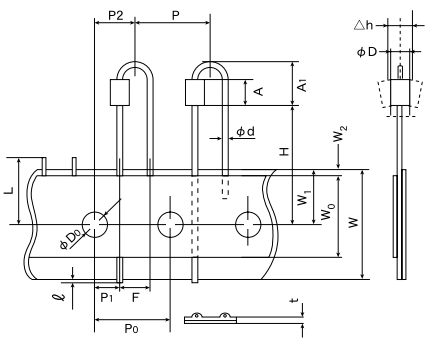
SB/TB (F: 5mm pitch) (0.197 inches)



Type	Symbol	Dimensions	Symbol	Dimensions
FBR07	A	121: 9.0 max. (0.354 max.) 850: 7.0 max. (0.276 max.)	△h	0.0±2.0 (0.0±0.079)
			W	$18.0^{+1.0}_{-0.5}$ ($0.709^{+0.039}_{-0.020}$)
	T	2.5 max. (0.098 max.)	W_0	12.5 min. (0.492 min.)
	D	7.5±0.5 (0.925±0.020)	W_1	$9.0^{+0.75}_{-0.5}$ ($0.354^{+0.039}_{-0.020}$)
	H	SB: $18.0^{+2.0}_{-0}$ ($0.709^{+0.079}_{-0}$) TB: 16.0±0.5 (0.630±0.020)	W_2	3.0 max. ※2 (0.118 max.)
			ℓ	1.0 max. (0.039 max.)
	P	12.7±1.0 (0.500±0.039)	ϕD_0	4.0±0.3 (0.157±0.012)
	P_0	12.7±0.3 ※1 (0.500±0.012)	ϕd	0.65±0.05 (0.02±0.002)
	P_1	3.85±0.8 (0.152±0.028)	L	11.0 max. (0.433 max.)
	P_2	6.35±1.3 (0.250±0.051)	t	0.7±0.2 (0.028±0.008)
	F	$5.0^{+1.0}_{-0.5}$ ($0.197^{+0.039}_{-0.020}$)		Unit : mm(inch)

※1 Accumulated error for 20 pitches is ±2mm.
※2 Bonding tape must not protrude from the base tape.

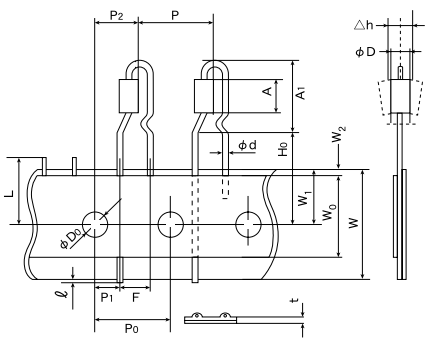
UB



Type	Symbol	Dimensions	Symbol	Dimensions
FBA03□450 FBA04□450	A	4.5±0.3 (0.177±0.012)	△h	0.0±2.0 (0.0±0.079)
	A_1	9.0 max. (0.354 max.)	W	$18.0^{+1.0}_{-0.5}$ ($0.709^{+0.039}_{-0.020}$)
	ϕD	03: 2.7 max. (0.106 max.) 04: 3.7 max. (0.146 max.)	W_0	12.5 min. (0.492 min.)
			W_1	$9.0^{+0.75}_{-0.5}$ ($0.354^{+0.039}_{-0.020}$)
	H	$20.0^{+0.5}_{-1.0}$ ($0.787^{+0.020}_{-0.039}$)	W_2	3.0 max. ※2 (0.118 max.)
	P	12.7±1.0 (0.500±0.039)	ℓ	1.0 max. (0.039 max.)
	P_0	12.7±0.3 ※1 (0.500±0.012)	ϕD_0	4.0±0.3 (0.157±0.012)
	P_1	3.85±0.8 (0.152±0.032)	ϕd	0.65±0.05 (0.026±0.002)
	P_2	6.35±1.3 (0.250±0.051)	L	11.0 max. (0.433 max.)
	F	5.0±1.0 (0.197±0.039)	t	0.7±0.2 (0.028±0.008)

※1 Accumulated error for 20 pitches is ±2mm. Unit : mm (inch)
※2 Bonding tape must not protrude from the base tape.

VB



Type	Symbol	Dimensions	Symbol	Dimensions
FBA03□450 FBA04□450 FBA04□600 FBA04□900	A	450: 4.5±0.3 (0.177±0.012) 600: $6.0^{+0.5}_{-0}$ ($0.236^{+0.020}_{-0}$) 900: 9.0±0.5 (0.354±0.020)	F	5.0±1.0 (0.197±0.039)
			△h	0.0±2.0 (0.0±0.079)
			W	$18.0^{+1.0}_{-0.5}$ ($0.709^{+0.039}_{-0.020}$)
	A_1	450: 600: 12.5 max. (0.492 max.) 900: 16.0 max. (0.630 max.)	W_0	12.5 min. (0.492 min.)
			W_1	$9.0^{+0.75}_{-0.5}$ ($0.354^{+0.039}_{-0.020}$)
	ϕD	3.7 max. (0.146 max.)	W_2	3.0 max. ※2 (0.118 max.)
	H_0	16.0±0.5 (0.650±0.020)	ℓ	1.0 max. (0.039 max.)
	P	12.7±1.0 (0.500±0.039)	ϕD_0	4.0±0.3 (0.157±0.012)
	P_0	12.7±0.3 ※1 (0.500±0.012)	ϕd	0.65±0.05 (0.026±0.002)
	P_1	3.85±0.8 (0.152±0.032)	L	11.0 max. (0.433 max.)
	P_2	6.35±1.3 (0.250±0.051)	t	0.7±0.2 (0.028±0.008)

※1 Accumulated error for 20 pitches is ±2mm. Unit : mm (inch)
※2 Bonding tape must not protrude from the base tape.

RELIABILITY DATA

1. Operating temperature Range	
LA Type	−25～+105℃
CAL45 Type	
LHL□□□	
FBA/FBR	−25～+85℃
FL05□ Type	−25～+105℃
FL06BT Type	

【Test Method and Remarks】
LA・CA・FL : Including self-generated heat
LHL□□□ : Including self-generated heat

2. Storage temperature Range	
LA Type	−40～+85℃
CAL45 Type	
LHL□□□	
FBA/FBR	
FL05□ Type	
FL06BT Type	

3. Rated current	
LA Type	Within the specified tolerance
CAL45 Type	
LHL□□□	
FBA/FBR	
FL05□ Type	
FL06BT Type	

【Test Method and Remarks】
LA, CA : The maximum DC value having inductance within 10% and temperature incease within 40℃ (LA:20℃) 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℃ (LHL08, LHL10, LHL13)
: 30℃ (LHL16, LHLP□□)
: 40℃ (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 electrial characteristics during current application.
FL : The maximum DC value having temperature rise within specified value.

4. Impedance	
LA Type	
CAL45 Type	
LHL□□□	
FBA/FBR	Within the specified tolerance
FL05□ Type	
FL06BT Type	Refer to individual specification

【Test Method and Remarks】
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	
LA Type	Within the specified tolerance
CAL45 Type	
LHL□□□	
FBA/FBR	
FL05□ Type	Within the specified tolerance
FL06BT Type	

【Test Method and Remarks】
LA, 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 (HP4263A) or its equivalent (at 1KHz)
Measuring frequency : Specified frequency
FL05R□ : Measuring equipment : HP4262A or its equivalent
Measuring frequency : 1kHz

6. Q	
LA Type	Within the specified tolerance
CAL45 Type	
LHL□□□	
FBA/FBR	
FL05□ Type	
FL06BT Type	

【Test Method and Remarks】
LA : 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 (HP4263A) or its equivalent (at 1kHz)
Measuring frequency : Specified frequency

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RELIABILITY DATA

7. DC Resisitance	
LA Type	Within the specified tolerance
CAL45 Type	
LHL□□□	
FBA/FBR	
FL05□ Type	
FL06BT Type	

【Test Method and Remarks】
LA, CA : Measuring equipment : low ohmmeter (A&D AD5812 or its equivalent)
LHL□□□・FB・FL : Measuring equipment : DC ohmmeter

8. Self resonance frequency	
LA Type	Within the specified tolerance
CAL45 Type	
LHL□□□	
FBA/FBR	
FL05□ Type	
FL06BT Type	

【Test Method and Remarks】
LA : Measuring equipment : Network analyzer (Anritsu MS620J or its equivalent)
LHL□□□ (except LHLP) : Measuring equipment : (HP4191A, 4192A) its equivalent

9. Temperature characteristic	
LA Type	△L/L : Within ±5%
CAL45 Type	
LHL□□□	△L/L : Within ±7% (except LHLP16 : Within ±20%)
FBA/FBR	
FL05□ Type	
FL06BT Type	

【Test Method and Remarks】
LA : Change of maximum inductance deviation in step 1 to 5

Step	Temperature (℃)
1	20
2	−25 (Minimum operating temperature)
3	20 (Standard temperature)
4	+85 (Maximum operating temperature)
5	20

LHL□□□ : Change of maximum inductance deviation in step 1 to 5
Temperature at step 1 : 20℃
Temperature at step 2 : Minimum operating temperature
Temperature at step 3 : 20℃ (Standard temperature)
Temperature at step 4 : Maximum operating temperature
Temperature at step 5 : 20℃

10. Tensile strength test	
LA Type	No abnormality such as cut lead, or looseness.
CAL45 Type	
LHL□□□	
FBA/FBR	No abnormality such as cut lead, or looseness.
FL05□ Type	No abnormality such as cut lead, or looseness.
FL06BT Type	

【Test Method and Remarks】
LA : Apply the stated tensile force progressively in the direction to draw terminal.

force (N)	duration (s)
25	5

CA : Apply the stated tensile force progressively in the direction to draw terminal.

force (N)	duration (s)
10	10

LHL□□□ : Apply the stated tensile force progressively in the direction to draw terminal.

Nominal wire diameter tensile φd (mm)	force (N)	duration (s)
0.3<φd≦0.5	5	30±5
0.5<φd≦0.8	10	
0.8<φd≦1.2	25	

FBA/FBR : The body of a component shall be fixed and a tensile force of 20±1N shall be applied to the lead wire in the axial diretion of the component during 10±1 seconds.
FL05R□ : Fix the body of a component in the direction to draw terminal,and gradually apply the tensile force of 4.9N.

11. Over current	
LA Type	No emission of smoke no firing.
CAL45 Type	
LHL□□□	There shall be no scorch or short of wire. LHLC08,LHLC10 : There shall be no firing.
FBA/FBR	
FL05□ Type	
FL06BT Type	

【Test Method and Remarks】
LHL□□□/LA・CAL45 Type : Measuring current : Rated current×2
Duration : 5 min.
Number of measuring : one time

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12. Terminal strength : bending	
LA Type	No abnormality such as cut lead, or looseness.
CAL45 Type	
LHL□□□	
FBA/FBR	
FL05□ Type	
FL06BT Type	

【Test Method and Remarks】

LA, CA : Suspend a weight of specified mass at the end of the terminals and incline the body through the angle of 90 degrees and return it to the 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.

Nominal wire diameter tensile φd (mm)	Bending force (N)	Mass reference weight (kg)
0.3<φd≦0.5	2.5	0.25
0.5<φd≦0.8	5	0.50

LH・FB : Suspend a weight of specified mass at the end of the terminals and incline the body through the angle of 90 degrees and return it to the 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.

Nominal wire diameter tensile φd (mm)	Bending force (N)	Mass reference weight (kg)
0.3<φd≦0.5	2.5	0.25
0.5<φd≦0.8	5	0.5
0.8<φd≦1.2	10	1.0

13. Insulation resisitance : between the terminals and body	
LA Type	
CAL45 Type	
LHL□□□	100MΩ min.
FBA/FBR	
FL05□ Type	
FL06BT Type	

【Test Method and Remarks】
LHL□□□ : Applied voltage : 500 VDC
Duration : 60 sec.

14. Insulation resistance : between terminals and core	
LA Type	
CAL45 Type	
LHL□□□	
FBA/FBR	1MΩ min. (Other than materail code MA)
FL05□ Type	
FL06BT Type	

【Test Method and Remarks】
FBA・FBR : Applied voltage : 100 VDC
Duration : 60±5 sec.

15. Withstanding : between the terminals and body	
LA Type	
CAL45 Type	
LHL□□□	No abnormality such as insulation damage
FBA/FBR	
FL05□ Type	
FL06BT Type	

【Test Method and Remarks】
LHL□□□ : Accoding to JIS C5102. 7. 1. 3 (C)
Metal global method
Applied voltage : 500 VDC
Duration : 60 sec.

16. DC bias characteristic	
LA Type	△L/L : Within −10%
CAL45 Type	
LHL□□□	
FBA/FBR	
FL05□ Type	
FL06BT Type	

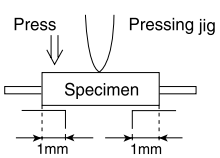
【Test Method and Remarks】
LA, CA : Measure inductance with appliation of rated current using LCR meter to compare it with the initial value.

17. Body strength	
LA Type	No abnormality as damage.
CAL45 Type	
LHL□□□	
FBA/FBR	No abnormality such as cracks on body.
FL05□ Type	
FL06BT Type	

【Test Method and Remarks】
LA : 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.



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18. Resisitance to vibration	
LA Type	△L/L : Within ±5%　Q : 30min
CAL45 Type	△L/L : Within ±5%
LHL□□□	Appearance : No abnomality　△L/L : Within ±5%　Q change : Within ±30% (LHLP : only △L/L)
FBA/FBR	Appearance : No abnomality　Impedance change : Within ±20%
FL05□ Type	
FL06BT Type	

【Test Method and Remarks】
LA, 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^2 (two power))
Mounting method : Soldering onto printed board.

19. Resistance to shock	
LA Type	No significant abnormality in appearance
CAL45 Type	
LHL□□□	
FBA/FBR	
FL05□ Type	
FL06BT Type	

【Test Method and Remarks】
LA, CA : Drop test
Impact material : concrete or vinyl tile
Height : 1m
Total number of drops : 10 times

20. Solderability	
LA Type	At least 75% of terminal electrode is covered by new solder.
CAL45 Type	
LHL□□□	At least 75% of terminal electrode is covered by new solder.
FBA/FBR	At least 90% of terminal electrode is covered by new solder.
FL05□ Type	At least 75% of terminal electrode is covered by new solder.
FL06BT Type	

【Test Method and Remarks】
LA, CA : Solder temperature : 230±5℃
Duration : 2±0.5 sec.

LHL□□□ : Solder temperature : 235±5℃
Duration : 2±0.5 sec.
Immersion depth : Up to 1.5mm from bottom of case.

FB : Solder temperature : 230±5℃
Duration : 3±1 sec.
Immersion depth : Up to 1.5mm from terminal root.

FL05R□ : Solder temperature : 230±5℃
Duration : 2±0.5 sec.
Immersion depth : Up to 2 to 2.5mm from terminal root.

FL06BT : Solder temperature : 230±5℃
Duration : 3±1 sec.
Immersion depth : Up to 0.5 to 1.0mm from terminal root.

21. Resisitance to soldering heat		
LA Type	No significant abnormality in appearance	
CAL45 Type	△L/L : Within ±5%	
LHL□□□	No significant abnormality in appearance	Inductance change : Within ±5%　Q change : Within ±30%(LHLP : only △L/L)
FBA/FBR	No significant abnormality in appearance	Impedance change : Within ±20%
FL05□ Type	Refer to individual specification	
FL06BT Type	No significant abnormality in appearance	Impedance change : Within ±20%

【Test Method and Remarks】
LA, CA : Solder temperature : (CA) 270±5℃, (LA) 260±5℃
Duration : 5±0.5 sec.　One time
Immersed conditions : Inserted into substrate with t=1.6mm
Recovery : At least 1hr of recovery under the standard condition after the test, followed by the measurement within 2hrs.

LHL□□□ : Solder bath method : Solder temperature : 260±5℃
Duration : 10±1 sec.
Up to 1.5mm from the bottom of case.
Manual soldering : Solder temperature : 350±10℃ (At the tip of soldering iron)
Duration : 5±1 sec.
Up to 1.5mm from the bottom of case.
Caution : No excessive pressing shall be applied to terminals.
Recovery : 4 to 24hrs of recovery under the standard condition after the test.

FB : Solder bath method : Condition 1 : Solder temperature : 260±5℃
Duration : 10±1 sec.
Immersion depth : Up to 1.5mm from the terminal root.
Condition 2 : Solder temperature : 350±5℃
Duration : 3±1 sec.
Immersion depth : Up to 1.5mm from the terminal root.
Recovery : 3hrs of recovery under the standard condition after the test.

FL : Solder condition : 260±5℃　10±1 sec.
Immersion depth : Up to 0.5 to 1.0mm from the terminal root.
Recovery : 3hrs of recovery under the standard condition after the test.

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22. Resisitance to solvent	
LA Type	Please avoid the ultrasonic cleaning of this product.
CAL45 Type	
LHL□□□	
FBA/FBR	No significant abnormality in appearance　　Impedance change : Within ±20%
FL05□ Type	
FL06BT Type	

【Test Method and Remarks】
FB : Solvent temperature : 20～25℃
Duration : 30±5 sec.
Solvent type : Acetone, trichloroethylene
Recovery : 3hrs of recovery under the standard condition after the test.

23. Thermal shock	
LA Type	△L/L : Within ±10%　Q : 30min
CAL45 Type	△L/L : Within ±10%
LHL□□□	Appearance : No abnormality　Inductance change : Within ±10%　Q change : Within ±30% (LHLP : only △L/L)
FBA/FBR	Appearance : No abnormality　Impedance change : Within ±20%
FL05□ Type	Refer to individual specification
FL06BT Type	Appearance : No abnormality　Impedance change : Within ±20%

【Test Method and Remarks】
LA, CA : Conditions for 1cycle

Step	Temperature (℃)	Duration (min.)
1	-25^{+0}_{-3}	30±3
2	Room temperature	Within 3
3	$+85^{+2}_{-0}$	30±3
4	Room temperature	Within 3

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 : Accoding to JIS C0025
Conditions for 1 cycle

Step	Temperature (℃)	Duration (min.)
1	Minimum operating temperature$^{+0}_{-3}$	30±3
2	Room temperature	Within 3
3	Minimum operating temperature$^{+2}_{-0}$	30±3
4	Room temperature	Within 3

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 : Accoding to JIS C0025
Conditions for 1 cycle

Step	Temperature (℃)	Duration (min.)
1	-25^{+0}_{-3}	30±3
2	Room temperature	Within 3
3	$+85^{+2}_{-0}$	30±3
4	Room temperature	Within 3

Number of cycles : 10 cycles
Recovery : 1 to 2hrs of recovery under the standard condition after the removal from the test chamber.

24. Damp heat	
LA Type	△L/L : Within ±10%　Q : 30min
CAL45 Type	△L/L : Within ±10%
LHL□□□	
FBA/FBR	Appearance : No abnormality　Impedance change : Within ±20%
FL05□ Type	
FL06BT Type	

【Test Method and Remarks】
LA, CA : Temperature : 40±2℃
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℃
Humidity : 90～95%RH
Duration : 1000 hrs
Recovery : 1 to 2hrs of recovery under the standard condition after the removal from the test chamber.

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25. Loading under damp heat	
LA Type	△L/L : Within ±10%　Q : 30min
CAL45 Type	△L/L : Within ±10%
LHL□□□	Appearance : No abnormality　Inductance change : Within ±10%　Q change : Within ±30% (LHLP : only △L/L)
FBA/FBR	
FL05□ Type	Refer to individual specification
FL06BT Type	Appearance : No abnormality　Impedance change : Within ±20%

【Test Method and Remarks】

LA, CA : Temperature : 40±2℃
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℃
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℃
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	
LA Type	△L/L : Within ±10%　Q : 30min
CAL45 Type	△L/L : Within ±10%
LHL□□□	
FBA/FBR	
FL05□ Type	
FL06BT Type	

【Test Method and Remarks】

LA, CA : Temperature : 85±2℃
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.

27. Low temperature life test	
LA Type	△L/L : Within ±10%　Q : 30min
CAL45 Type	△L/L : Within ±10%
LHL□□□	Appearance : No abnormality　Inductance change : Within ±10%　Q change : Within ±30% (LHLP : only △L/L)
FBA/FBR	
FL05□ Type	Refer to individual specification
FL06BT Type	Appearance : No abnormality　Impedance change : Within ±20%

【Test Method and Remarks】

LA, CA : Temperature : −25±2℃
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℃
Duration : 1000±24 hrs
Recovery : 1 to 2hrs of recovery under the standard condition after the removal from the test chamber.

FL : Temperature : −40±3℃
Duration : 500 (+12, −0) hrs
Recovery : 1 to 2hrs of recovery under the standard condition after the removal from the test chamber.

28. High temperature life test	
LA Type	
CAL45 Type	
LHL□□□	Appearance : No abnormality　Inductance change : Within ±10%　Q change : Within ±30% (LHLP : only △L/L)
FBA/FBR	
FL05□ Type	Refer to individual specification
FL06BT Type	Appearance : No abnormality　Impedance change : Within ±20%

【Test Method and Remarks】

LHL□□□ : Temperature : 105±3℃
Duration : 1000±24 hrs
Recovery : 1 to 2hrs of recovery under the standard condition after the removal from the test chamber.
FL : Temperature : 85±3℃
Duration : 500 (+12, −0) hrs
Recovery : 1 to 2hrs of recovery under the standard condition after the removal from the test chamber.

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PRECAUTIONS

CAL Type, LH Type, FB Type, FL Type, LA Type

1. Circuit Design	
Precautions	◆Operating environment 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.

2. PCB Design	
Precautions	◆Design 1. Please design insertion pitches as matching to that of leads of the component on PCBs.
Technical consider-ations	◆Design 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.

3. Considerations for automatic placement	
Precautions	◆Adjustment of mounting machine 1. Excessive impact load should not be imposed on the products when mounting onto the PC boards. 2. Mounting and soldering conditions should be checked beforehand.
Technical consider-ations	◆Adjustment of mounting machine 1. When installing products, care should be taken not to apply distortion stress as it may deform the products.

4. Soldering	
Precautions	◆Wave soldering 1. Please refer to the specifications in the catalog for a wave soldering. 2. Do not immerse the entire inductor in the flux during the soldering operation. ◆Lead free soldering 1. When using products with lead free soldering, we request to use them after confirming adhesion, temperature of resistance to soldering heat, soldering etc sufficiently. Recommended conditions for using a soldering iron: ・Put the soldering iron on the land-pattern. ・Soldering iron's temperature - Below 350℃ ・Duration - 3 seconds or less ・The soldering iron should not directly touch the inductor. ◆Reflow soldering 1. As for reflow soldering, please contact our sales staff.
Technical consider-ations	◆Lead free soldering 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.

5. Cleaning	
Precautions	◆Cleaning conditions 1. CAL type, LH type, LA Type Please do not do cleaning by a supersonic wave.
Technical consider-ations	◆Cleaning conditions 1. CAL type, LH type, LA Type If washing by supersonic waves, supersonic waves may deform products.

6. Handling	
Precautions	◆Handling 1. Keep the inductors away from all magnets and magnetic objects. ◆Mechanical considerations 1. Please do not give the inductors any excessive mechanical shocks. 2. LH type If inductors are dropped onto the floor or a hard surface they should not be used. ◆Packing 1. Please do not give the inductors any excessive mechanical shocks. In loading, please pay attention to handling indication mentioned in a packing box (a loading direction / number of maximum loading / fragile item).
Technical consider-ations	◆Handling 1. There is a case that a characteristic varies with magnetic influence. ◆Mechanical considerations 1. There is a case to be damaged by a mechanical shock. 2. LH type There is a case to be broken by a fall. ◆Packing 1. There is a case that a lead wire could be deformed by a fall or an excessive shock.

7. Storage conditions	
Precautions	◆Storage 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. Recommended conditions ・Ambient temperature 0～40℃ ・Humidity Below 70% RH The ambient temperature must be kept below 30℃. 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. In case of storage over 6 months, solderability shall be checked before actual usage.
Technical consider-ations	◆Storage 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.

* This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our specification. For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (http://www.ty-top.com/) or CD catalogs.