# **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.

# 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.

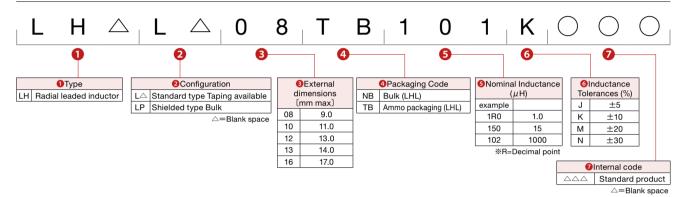
# APPLICATIONS

- 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°C~105°C (Including self-generated heat)

# ORDERING CODE

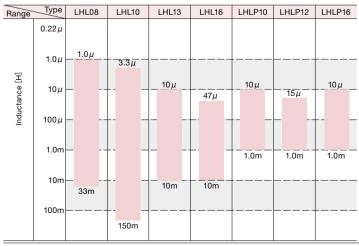


## EXTERNAL DIMENSIONS/STANDARD QUANTITY

Solid   Soli	Tuna	Fin-	D		e.	F	4.4	Stand	lard Quantity	(pcs)
LHL10  LHL10  LHL10  LHL10  LHL10  LHL10  LHL10  LHL110  LHL11	Type	Fig.	U D	H <sub>2</sub>	l k		φd	Box	Bulk	Taped
Color   Colo	1 11 00		9.0 max.	9.5 max.	5.0±1.0	5.0±1.0	0.6±0.05	_	100	1000
LHL10  LHL13  LHL13  LHL14  LHL15  LHL16  LHL16  LHL16  LHL16  LHL16  LHL16  LHL16  LHL17  LHL17  LHL17  LHL18  LHL18  LHL18  LHL18  LHL18  LHL18  LHL18  LHL19  LH	LHLU6	, D	(0.354 max.)	(0.374 max.)	(0.197±0.039)	(0.197±0.039)	(0.024±0.002)	_	100	1000
LHL13  LHL13  LHL13  LHL13  LHL14  LHL15  LHL16  LHL16  LHL16  LHL16  LHL16  LHL16  LHL16  LHL16  LHL17  LHL17  LHL18  LHL18  LHL18  LHL18  LHL18  LHL18  LHL18  LHL18  LHL19  LH	1 11110		11.0 max.	14.0 max.	5.0±1.0	5.0±1.0	0.6±0.05		50	500
LHL13     14.0 max. (0.55f max.)     17.0 max. (0.669 max.)     5.0±1.0 (0.197±0.039) (0.295±0.039) (0.031±0.002)     -     25     500       LHL16     17.0 max. (0.669 max.) (0.827 max.) (0.827 max.) (0.197±0.039) (0.295±0.039) (0.031±0.002)     500     -     250       LHLP10     11.0 max. (0.433 max.) (0.433 max.) (0.433 max.) (0.197±0.039) (0.197±0.039) (0.197±0.039) (0.024±0.004)     0.0±0.05 (0.024±0.004) (0.024±0.004)     500     -     200       LHLP12     13.0 max. (0.512 max.) (0.624 max.) (0.624 max.) (0.197±0.039) (0.197±0.039) (0.197±0.039) (0.197±0.039) (0.024±0.004)     300     -     -       LHLP16     17.0 max. 19.0 max. (0.512 max.) (0.624 max.) (0.197±0.039) (0.197±0.039) (0.024±0.004)     0.0±0.05 (0.024±0.004)     300     -     -	LHLIU		(0.433 max.)	(0.551 max.)	(0.197±0.039)	(0.197±0.039)	(0.024±0.002)	_	30	300
Color   Colo	111140		14.0 max.	17.0 max.	5.0±1.0	7.5±1.0	0.8±0.05		25	500
LHLP10  LHLP10	LHLI3	│ <u></u>	(0.551 max.)	(0.669 max.)	(0.197±0.039)	(0.295±0.039)	(0.031±0.002)	_		500
Color   Colo	111146		17.0 max.	21.0 max.	5.0±1.0	7.5±1.0	0.8±0.05	500		050
LHLP10  LHLP12  (0.433 max.) (0.433 max.) (0.197±0.039) (0.197±0.039) (0.024±0.004) 500 - 200  13.0 max. (0.512 max.) (0.624 max.) (0.197±0.039) (0.197±0.039) (0.024±0.004) 300  LHLP16  17.0 max. 19.0 max. 5.0±1.0 7.5±1.0 0.8±0.05 200	LHLIO	'	(0.669 max.)	(0.827 max.)	(0.197±0.039)	(0.295±0.039)	(0.031±0.002)	500	_	250
Color   Colo	1.111.D10	, D ,	11.0 max.	11.0 max.	5.0±1.0	5.0±1.0	0.6±0.05	500		200
LHLP12 (0.512 max.) (0.624 max.) (0.197±0.039) (0.197±0.039) (0.024±0.004) 300	LHLPIU		(0.433 max.)	(0.433 max.)	(0.197±0.039)	(0.197±0.039)	(0.024±0.004)	500	_	200
(0.512 max.) (0.624 max.) (0.197±0.039) (0.197±0.039) (0.024±0.004)  17.0 max. 19.0 max. 5.0±1.0 7.5±1.0 0.8±0.05	I LUI D10	1 1 2 T	13.0 max.	16.0 max.	5.0±1.0	5.0±1.0	0.6±0.05	200	_	
LHLP16	LHLP 12		(0.512 max.)	(0.624 max.)	(0.197±0.039)	(0.197±0.039)	(0.024±0.004)	300	_	_
LEILP10   ←	LULDIC	7 0 7 0	17.0 max.	19.0 max.	5.0±1.0	7.5±1.0	0.8±0.05	000		
F $(0.669  \text{max.})  (0.741  \text{max.})  (0.197 \pm 0.039)  (0.295 \pm 0.039)  (0.031 \pm 0.004)  $	LHLP 16	, <del>, →,</del> ; F	(0.669 max.)	(0.741 max.)	(0.197±0.039)	(0.295±0.039)	(0.031±0.004)	200	_	-

### Unit: mm (inch)

# **AVAILABLE INDUCTANCE RANGE**



<sup>\*</sup> 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.

# ●LHL08

Ordering code	EHS (Environmental Hazardous	Inductance [µH]	Inductance Tolerance	Q (min.)	Self-resonant frequency	DC Resistance [Ω] (max.)	Rated current (A) (max.)	Measuring frequency
LIII 00 TABON	Substances)		1.000/		[MHz] (min.)		4.7	(MHz)
LHL08 TRON	RoHS RoHS	1.0 1.5	±30%	-	76 65	0.013	4.7 4.4	
LHL08 TR5M	RoHS	2.2	-			0.014	4.4	
LHL08 2R2M			-		56	0.017		
LHL08 2R7M	RoHS	2.7	_		48	0.019	3.5	
LHL08 3R3M	RoHS	3.3	1.000/	40	41	0.021	3.2	7.96
LHL08 3R9M	RoHS	3.9	±20%		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	4		21	0.030	2.8	
LHL08□8R2M	RoHS	8.2			19	0.034	2.5	
LHL08□100K	RoHS	10		65	17	0.041	2.4	
LHL08□120K	RoHS	12	_		16	0.044	2.3	
LHL08□150K	RoHS	15			13	0.053	2.0	
LHL08□180K	RoHS	18		50	12	0.060	1.9	
LHL08□220K	RoHS	22		30	11	0.068	1.8	
LHL08□270K	RoHS	27	]		10	0.091	1.5	2.52
LHL08□330K	RoHS	33			8.8	0.10	1.4	2.02
LHL08□390K	RoHS	39	_	40	8.4	0.12	1.3	
LHL08□470K	RoHS	47		40	8.2	0.15	1.2	
LHL08□560K	RoHS	56			7.9	0.17	1.1	
LHL08□680K	RoHS	68	±10%	0.5	7.0	0.20	1.0	
LHL08□820K	RoHS	82		35	6.5	0.22	0.90	
LHL08□101K	RoHS	100			5.7	0.32	0.79	
LHL08□121K	RoHS	120		25	5.2	0.36	0.70	
LHL08□151K	RoHS	150		20	4.7	0.41	0.64	
LHL08□181K	RoHS	180			4.2	0.66	0.60	
LHL08□221K	RoHS	220	1	35	3.7	0.73	0.53	
LHL08□271K	RoHS	270	1		3.5	0.85	0.51	
LHL08□331K	RoHS	330	-	25	3.2	0.97	0.44	0.796
LHL08□391K	RoHS	390	1	20	2.9	1.1	0.41	
LHL08□471K	RoHS	470	-		2.4	1.3	0.38	
LHL08□561K	RoHS	560	-	25	2.2	1.5	0.35	
LHL08 681K	RoHS	680	-	25	2.0	1.8	0.32	
LHL08 821K	RoHS	820	-	30	1.6	2.3	0.30	
LHL08 102J	RoHS	1000		55	1.5	2.7	0.25	
		1200	-	45	1.4		0.23	
LHL08□122J LHL08□152J	RoHS RoHS	1500	4	45	1.3	3.2 4.1	0.22	
			-					
LHL08 182J	RoHS	1800	-		1.2	4.8	0.19	
LHL08 222J	RoHS	2200	-	55	1.1	5.6	0.16	
LHL08 272J	RoHS	2700	-		1.0	7.5	0.15	0.252
LHL08□332J	RoHS	3300	-		0.85	8.5	0.14	
LHL08□392J	RoHS	3900	-		0.78	9.7	0.11	
LHL08 472J	RoHS	4700			0.68	14	0.10	
LHL08□562J	RoHS	5600	±5%	65	0.62	16	0.093	
LHL08□682J	RoHS	6800			0.61	18	0.092	
LHL08□822J	RoHS	8200	1		0.60	20	0.084	
LHL08□103J	RoHS	10000	_		0.48	32	0.070	
LHL08□123J	RoHS	12000	]		0.44	36	0.064	
LHL08□153J	RoHS	15000			0.35	62	0.051	1.400-
LHL08□183J	RoHS	18000	_	60	0.30	72	0.048	L:1kHz Q:0.0796
LHL08□223J	RoHS	22000	_		0.28	82	0.044	Q:0.0796
LHL08□273J	RoHS	27000	$\dashv$		0.25	90	0.042	
LHL08□333J	RoHS	33000	1		0.23	100	0.040	

LHL08□333J RoHS

□ 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			46	0.019	4.2	
LHL10□3R9M	RoHS	3.9	±20% 50		40	0.022	4.1	
LHL10□4R7M	RoHS	4.7		38	0.024	4.0	7.96	
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	1   -		24	0.031		3.3
LHL10□100K	RoHS	10			19	0.034	3.2	
LHL10□120K	RoHS	12		90	16	0.038	2.8	
LHL10□150K	RoHS	15			12	0.042	2.6	
LHL10□180K	RoHS	18	1		9.2	0.046	2.4	
LHL10□220K	RoHS	22	±10%		8.6	0.061	2.1	0.50
LHL10□270K	RoHS	27	±10%	00	7.1	0.069	2.0	2.52
LHL10□330K	RoHS	33		60	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			4.9	0.12	1.5	2.52
LHL10□820K	RoHS	82			4.7	0.13	1.4	2.52
LHL10□101K	RoHS	100			3.8	0.18	1.2	
LHL10□121K	RoHS	120		40	3.2	0.25	1.0	
LHL10□151K	RoHS	150			2.9	0.29	0.95	
LHL10□181K	RoHS	180	1		2.6	0.40	0.80	
LHL10□221K	RoHS	220	±10%		2.3	0.44	0.75	
LHL10□271K	RoHS	270	±10%		2.1	0.50	0.70	0.700
LHL10□331K	RoHS	330	1		2.0	0.56	0.68	0.796
LHL10□391K	RoHS	390	1		1.8	0.62	0.63	
LHL10□471K	RoHS	470	1	30	1.7	0.84	0.57	
LHL10□561K	RoHS	560	1		1.5	0.93	0.52	
LHL10□681K	RoHS	680	1		1.4	1.0	0.48	
LHL10□821K	RoHS	820	1		1.3	1.4	0.42	
LHL10□102J	RoHS	1000			1.2	1.8	0.41	
LHL10□122J	RoHS	1200	1		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	0.252
LHL10□272J	RoHS	2700		50	0.67	4.3	0.24	
LHL10□332J	RoHS	3300		50	0.56	5.8	0.21	0.252
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			0.29	19	0.12	
LHL10□123J	RoHS	12000	±5%		0.27	21	0.11	
LHL10□153J	RoHS	15000	]	60	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	]		0.15	67	0.060	L:1kHz
LHL10□333J	RoHS	33000		40	0.14	76	0.056	Q:0.0796
LHL10□393J	RoHS	39000		40	0.13	84	0.053	
LHL10□473J	RoHS	47000			0.12	96	0.050	
LHL10□563J	RoHS	56000			0.10	170	0.036	
LHL10□683J	RoHS	68000			0.095	200	0.035	
LHL10□823J	RoHS	82000		20	0.088	210	0.033	
LHL10□104J	RoHS	100000	]	30	0.085	240	0.031	
LHL10□124J	RoHS	120000			0.070	260	0.030	L:1kHz O:0.0252
LHL10□154J	RoHS	150000			0.069	300	0.028	Q:0.0252

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		140	19	0.023	4.5	
LHL13□150K	RoHS	15		140	12	0.028	4.0	
LHL13□220K	RoHS	22		100	7.6	0.035	3.4	2.52
LHL13□330K	RoHS	33		100	6.9	0.043	3.2	2.52
LHL13□470K	RoHS	47	70		5.6	0.052	2.8	
LHL13□680K	RoHS	68	±100/	±100/		0.070	2.4	
LHL13□101K	RoHS	100	±10%	±10% 50		0.12	2.0	
LHL13□151K	RoHS	150	]		2.6	0.19	1.5	
LHL13□221K	RoHS	220		40	2.2	0.23	1.3	0.796
LHL13□331K	RoHS	330			1.8	0.35	1.1	0.796
LHL13□471K	RoHS	470		30	1.5	0.43	0.90	
LHL13□681K	RoHS	680		30	1.2	0.61	0.80	
LHL13□102J	RoHS	1000			1.0	1.2	0.60	
LHL13□152J	RoHS	1500			0.83	1.8	0.45	
LHL13□222J	RoHS	2200		40	0.70	2.2	0.40	0.252
LHL13□332J	RoHS	3300	40	0.60	3.4	0.33	0.252	
LHL13□472J	RoHS	4700	±5%		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

<sup>☐</sup> Please specify the packaging code. (TB: Taping, NB: Bulk)

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# ●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		70	4.5	0.046	3.7	0.50
LHL16□680K	RoHS	68	1	70	3.9	0.054	3.3	2.52
LHL16□101K	RoHS	100	1			0.077	2.9	
LHL16□151K	RoHS	150	60		2.3	0.11	2.4	
LHL16□221K	RoHS	220	±10%		1.9	0.15	2.0	0.796
LHL16□331K	RoHS	330	]	40	1.6	0.21	1.5	0.796
LHL16□471K	RoHS	470	1	30	1.4	0.28	1.3	]
LHL16□681K	RoHS	680	1		1.2	0.35	1.1	
LHL16□102J	RoHS	1000			0.84	0.74	0.86	
LHL16□152J	RoHS	1500	1		0.69	0.93	0.75	
LHL16□222J	RoHS	2200	1	20	0.56	1.4	0.60	0.050
LHL16□332J	RoHS	3300	1		0.49	2.2	0.50	0.252
LHL16□472J	RoHS	4700	±5%		0.41	2.6	0.40	
LHL16□682J	RoHS	6800	1		0.35	3.9	0.33	
LHL16□103J	RoHS	10000		70	0.26	7.3	0.25	L:1KHz Q:0.0796MHz

<sup>☐</sup> 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			0.038	2.5
LHLP10□150M	RoHS	15			0.049	2.2
LHLP10□220M	RoHS	22	2.52	±00%	0.075	1.9
LHLP10□330M	RoHS	33	2.52	±20%	0.094	1.7
LHLP10□470M	RoHS	47			0.15	1.3
LHLP10□680M	RoHS	68			0.23	1.0
LHLP10□101K	RoHS	100			0.30	0.90
LHLP10□151K	RoHS	150			0.47	0.78
LHLP10□221K	RoHS	220	0.796		0.70	0.63
LHLP10□331K	RoHS	330	0.790	±10%	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

<sup>☐</sup> Please specify the packaging code. (TB: Taping, NB: Bulk)

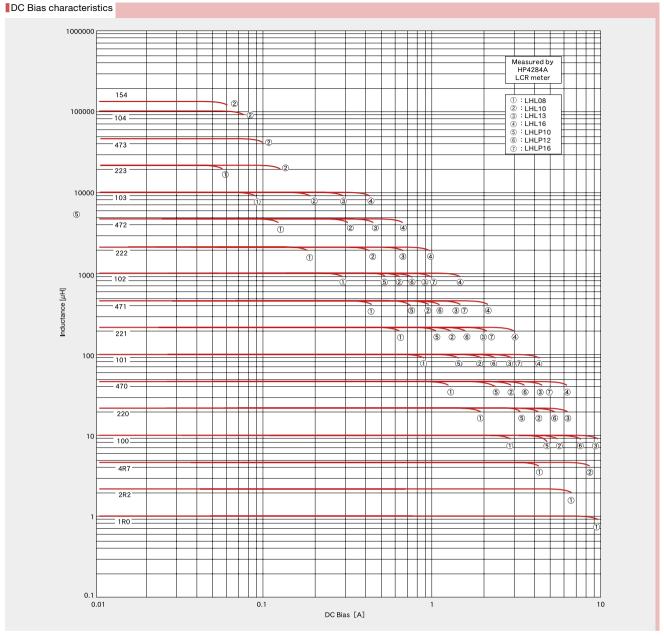
# ●LHLP12NB

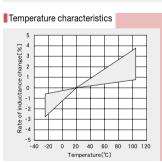
Ordering code	EHS (Environmental Hazardous Substances)	Nominal Inductance [µH]	L Measuring frequency	Inductance Tolerance	DC Resistance [Ω] (max.)	Rated current (A) (max.)
LHLP12NB150M	RoHS	15			0.035	3.3
LHLP12NB220M	RoHS	22			0.050	2.7
LHLP12NB330M	RoHS	33	2.52	±20%	0.070	2.4
LHLP12NB470M	RoHS	47			0.081	2.1
LHLP12NB680M	RoHS	68			0.12	1.7
LHLP12NB101K	RoHS	100			0.16	1.6
LHLP12NB151K	RoHS	150			0.24	1.3
LHLP12NB221K	RoHS	220	0.700		0.38	0.95
LHLP12NB331K	RoHS	330	0.796	±10%	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

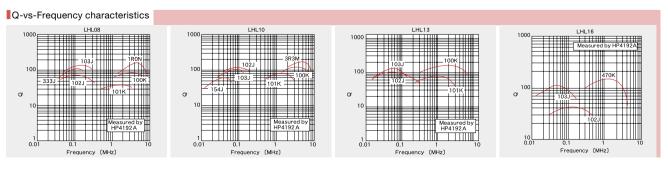
# ●LHLP16NB

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			0.019	5.2
LHLP16NB150M	RoHS	15		±00%	0.025	5.1
LHLP16NB220M	RoHS	22		±20%	0.027	4.6
LHLP16NB330M	RoHS	33			0.035	4.0
LHLP16NB470K	RoHS	47			0.045	3.4
LHLP16NB680K	RoHS	68			0.062	3.1
LHLP16NB101K	RoHS	100	1kHz		0.091	2.3
LHLP16NB151K	RoHS	150			0.14	1.9
LHLP16NB221K	RoHS	220		±10%	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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# 1)Minimum Quantity

Type (EIA)	S	Standard quantity (pcs)						
Type (EIA)	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								
туре	φD(max)	H <sub>2</sub> (max)	F*	l	φd					
LHL08	9.0	9.5	5.0±1.0	5.0±1.0	0.6±0.05					
	(0.354)	(0.374)	(0.197±0.039)	(0.197±0.039)	(0.024±0.002)					
LHL10	11.0	14.0	5.0±1.0	5.0±1.0	0.6±0.05					
	(0.433)	(0.551)	(0.197±0.039)	(0.197±0.039)	(0.024±0.002)					
LHL13	14.0	17.0	7.5±1.0	5.0±1.0	0.8±0.05					
	(0.551)	(0.669)	(0.295±0.039)	(0.197±0.039)	(0.031±0.002)					
LHL16	17.0	21.0	7.5±1.0	5.0±1.0	0.8±0.05					
	(0.669)	(0.827)	(0.295±0.039)	(0.197±0.039)	(0.031±0.002)					

\*Measured at the base of the leads.

Unit: mm(inch)

●LHLP10~16

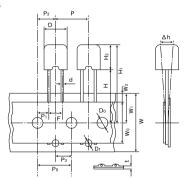


Tuna	Dimensions								
Type	φD(max)	H <sub>2</sub> (max)	F*	l	φd				
LHLP10	11.0	11.0	5.0±1.0	5.0±1.0	0.6±0.05				
	(0.433)	(0.433)	(0.197±0.039)	(0.197±0.039)	(0.024±0.004)				
LHLP12	13.0	16.0	5.0±1.0	5.0±1.0	0.6±0.05				
	(0.512)	(0.624)	(0.197±0.039)	(0.197±0.039)	(0.024±0.004)				
LHLP16	17.0	19.0	7.5±1.0	5.0±1.0	0.8±0.05				
	(0.669)	(0.741)	(0.295±0.039)	(0.197±0.039)	(0.031±0.004)				

\*Measured at the base of the leads.

Unit: mm(inch)

●LHL08~16



	LHL08	LHL10	LHL13	LHL16
D	φ9.0 max	φ11.0 max	φ14.0 max	φ17.0 max
	(φ0.354 max)	(φ0.433 max)	(φ0.551 max)	(φ0.669 max)
H <sub>1</sub>	30.5 max	34.0 max	37.0 max	41.0 max
	(1.20 max)	(1.34 max)	(1.46 max)	(1.61 max)
н	18.0 <sup>+2.0</sup> <sub>-0.0</sub>	18.0 <sup>+2.0</sup> <sub>-0.0</sub>	18.0 <sup>+2.0</sup> <sub>-0.0</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>	9.5 max	14.0 max	17.0 max	21.0 max
	(0.374 max)	(0.551 max)	(0.669 max)	(0.827 max)

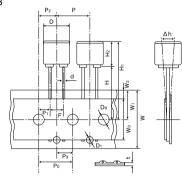
	LHL08	LHL10	LHL13	LHL16
Р	12.7±1.0	12.7±1.0	15.0±1.0	30.0±1.0
	(0.500±0.039)	(0.500±0.039)	(0.591±0.039)	(1.18±0.039)
$P_0$	12.7±0.3 <sup>*1</sup>	12.7±0.3 <sup>*1</sup>	15.0±0.3 <sup>*1</sup>	15.0±0.3 <sup>*1</sup>
	(0.500±0.012)	(0.500±0.012)	(0.591±0.012)	(0.591±0.012)
P <sub>1</sub>	3.85±0.7	3.85±0.7	3.75±0.7	3.75±0.7
	(0.152±0.028)	(0.152±0.028)	(0.148±0.028)	(0.148±0.028)
P <sub>2</sub>	6.35±1.3	6.35±1.3	7.50±1.3	7.50±1.3
	(0.250±0.051)	(0.250±0.051)	(0.295±0.051)	(0.295±0.051)
F	5.0 <sup>+0.8</sup> <sub>-0.2</sub>	5.0 <sup>+0.8</sup> <sub>-0.2</sub>	7.50 <sup>+0.8</sup> <sub>-0.2</sub>	7.50±0.5
	(0.197 <sup>+0.031</sup> <sub>-0.008</sub> )	(0.197 <sup>+0.031</sup> <sub>-0.008</sub> )	(0.295 <sup>+0.031</sup> <sub>-0.008</sub> )	(0.295±0.020)
h	0.0±2.0	0.0±2.0	0.0±2.0	0.0±2.0
	(0.0±0.079)	(0.0±0.079)	(0.0±0.079)	(0.0±0.079)
W	18.0 <sup>+1.0</sup> <sub>-0.5</sub>	18.0 <sup>+1.0</sup> <sub>-0.5</sub>	18.0 <sup>+1.0</sup> <sub>-0.5</sub>	18.0 <sup>+1.0</sup> <sub>-0.5</sub>
	(0.709 <sup>+0.039</sup> <sub>-0.020</sub> )			
W <sub>o</sub>	12.5 min	12.5 min	12.5 min	12.5 min
	(0.492 min)	(0.492 min)	(0.492 min)	(0.492 min)
W <sub>1</sub>	9.0±0.5	9.0±0.5	9.0±0.5	9.0±0.5
	(0.354±0.020)	(0.354±0.020)	(0.354±0.020)	(0.354±0.020)
W <sub>2</sub>	3.0 max** <sup>2</sup>	3.0 max** <sup>2</sup>	3.0 max** <sup>2</sup>	3.0 max*2
	(0.118 max)	(0.118 max)	(0.118 max)	(0.118 max)
D <sub>0</sub>	φ4.0±0.2	φ4.0±0.2	φ4.0±0.2	φ4.0±0.2
	(φ0.158±0.008)	(φ0.158±0.008)	(φ0.158±0.008)	(φ0.158±0.008)
φd	φ0.6±0.05	φ0.6±0.05	$\phi$ 0.8 $\pm$ 0.05	φ0.8±0.05
	(φ0.024±0.002)	(φ0.024±0.002)	( $\phi$ 0.031 $\pm$ 0.002)	(φ0.031±0.002)
t	0.6±0.3	0.6±0.3	0.6±0.3	0.6±0.3
	(0.024±0.012)	(0.024±0.012)	(0.024±0.012)	(0.024±0.012)
D <sub>1</sub>	φ1.8 (0.071)	φ1.8 (0.071)	φ1.8 (0.071)	_
P <sub>3</sub>	6.35 (0.25)	6.35 (0.25)	7.50 (0.25)	_

\*\*1 Accumulated error for 20 pitches is 1mm.

\*\*2 Bonding tape must not protrude from the base tape.

Unit: mm(inch)

# • LHLP10TB



Type	Symbol	Dimensions	Symbol	Dimensions
Туре	D	φ11.0 max (φ0.433 max)	W	18.0 <sup>+1.0</sup> (0.709 <sup>+0.039</sup> <sub>-0.020</sub> )
	H <sub>1</sub>	32.0 max (1.26 max)	W <sub>o</sub>	12.5 min (0.492 min)
	Н	$18.0^{+2.0}_{-0.0} \\ (0.709^{+0.079}_{-0.000})$	W <sub>1</sub>	9.0±0.5 (0.354±0.020)
	H <sub>2</sub>	11.0 max (0.433 max)	W <sub>2</sub>	3.0 max** <sup>2</sup> (0.118 max)
LHLP10	Р	12.7±1.0 (0.500±0.039)	D <sub>0</sub>	φ4.0±0.2 (φ0.158±0.008)
LHLP10	P <sub>0</sub>	12.7±0.3 <sup>*1</sup> (0.500±0.012)	φd	φ0.6±0.05 (φ0.024±0.002)
	P <sub>1</sub>	3.85±0.7 (0.152±0.028)	t	0.6±0.3 (0.024±0.012)
	P <sub>2</sub>	6.35±1.3 (0.250±0.051)	D <sub>1</sub>	φ1.8 (0.071)
	F	5.0 <sup>+0.8</sup> <sub>-0.2</sub> (0.197 <sup>+0.031</sup> <sub>-0.008</sub> )	P <sub>3</sub>	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.

# RELIABILITY DATA

Operating temperature Range				
LA Type				
CAL45 Type				
LHL	1 20 11000			
FBA/FBR	_25~+85°C			
FL05 Type	_25~+105℃			
FL06BT Type	25'5+105'C			
Test Method and Remarks				
LA·CA·FL: Including self-generated he	eat			
LHL				
2. Storage temperature Range				
LA Type				
CAL45 Type				
	-			
LHL				
FBA/FBR				
FL05 Type				
FL06BT Type				
71.				
3. Rated current				
LA Type				
CAL45 Type	1			
	1			
LHL	Within the specified tolerance			
FBA/FBR				
FL05□ Type				
FL06BT Type				
Test Method and Remarks				
	aving inductance within 10% and temperature incease within 40°C (LA:20°C) by the application of DC bias.			
	aving inductance decrease within 10% (LHLC08, LHLC10: within 30%) and temperature increase within the following specified			
temperature by the applica				
	25°C (LHL08, LHL10, LHL13)			
	30°C (LHL16, LHLP□□)			
: 4	40°C (LHLC08, LHLC10)			
	arance abnormality by continuous current application for 30 min. Change after the application shall be within $\pm 20\%$ of the initial value.			
	electrial characteristics during current application.			
FL : The maximum DC value ha	aving temperature rise within specified value.			
4. Impedance				
LA Type				
CAL45 Type				
LHL				
FBA/FBR	Within the specified tolerance			
FL05 Type	William the opening televance			
FL06BT Type	Refer to individual specification			
Test Method and Remarks				
	dance analyzer (HP4191A) or its equivalent			
Measuring frequency : Spec				
FL06BT : Measuring equipment : 4291/				
Measuring frequency : Specified frequency				
5. Inductance				
LA Type	ł			
CAL45 Type	Within the specified tolerance			
LHL				
FBA/FBR				
FL05 Type	Within the specified tolerance			
FL06BT Type				
	L			
[Test Method and Remarks]	CD mater (UD4095A + UD40951A or its equivalent)			
LA, CA : Measuring equipment : L0  Measuring frequency : S	CR meter (HP4285A + HP42851A or its equivalent)			
	pecinea frequency CR meter (HP4285A+HP42851A or its equivalent)			
	CR meter (HP4263A) or its equivalent (at 1KHz)			
Measuring frequency : S	pecified frequency			
FL05R : Measuring requertey : 6				
	P4262A or its equivalent			
Measuring frequency : 14				
Measuring frequency : 18				
6. Q				
6. Q	kHz			
6. Q LA Type				
6. Q LA Type CAL45 Type	kHz			
6. Q LA Type CAL45 Type LHL	kHz			
6. Q LA Type CAL45 Type LHL	kHz			
6. Q LA Type CAL45 Type LHL	kHz			
6. Q LA Type CAL45 Type LHL	kHz			
6. Q LA Type CAL45 Type LHL□□□ FBA/FBR FL05□ Type FL06BT Type	kHz			
6. Q LA Type CAL45 Type LHL FBA/FBR FL05 Type FL06BT Type [Test Method and Remarks]	Within the specified tolerance			
6. Q LA Type CAL45 Type LHL FBA/FBR FL05 Type FL06BT Type [Test Method and Remarks]	Within the specified tolerance  Within the specified tolerance  For (HP4285A + HP42851A or its equivalent)			
6. Q  LA Type  CAL45 Type  LHL            FBA/FBR  FL05   Type  FL06BT Type  [Test Method and Remarks]  LA : Measuring equipment : LCR mete Measuring frequency : Specified	Within the specified tolerance  Within the specified tolerance  or (HP4285A + HP42851A or its equivalent)  I frequency quipment : LCR meter (HP4285A+HP42851A or its equivalent)			
6. Q  LA Type  CAL45 Type  LHL  FBA/FBR  FL05  Type  FL06BT Type  [Test Method and Remarks]  LA: Measuring equipment: LCR mete Measuring frequency: Specified LHL  (except LHLP): Measuring e	Within the specified tolerance  Per (HP4285A + HP42851A or its equivalent)  If requency			

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RELIA	BILITY [	DATA				
7. DC Resisitance						
LA Type						
CAL45 Type	)					
LHL			1			
FBA/FBR			Within the specif	ed tolerance		
FL05□ Type	Э					
FL06BT Type	e					
Test Metho	d and Rem	arks]	•			
				5812 or its equivaler	nt)	
LHL	FB*FL : IVI	easuring equipm	ent: DC ohmmet	er		
8. Self resor	nance frequ	uency				
LA Type			Within the specif	ed tolerance		
CAL45 Type	)					
LHL						
FBA/FBR						
FL05DT Type						
Test Metho		arke]				
			nalyzer (Anritsu M	S620J or its equival	lent)	
LHL	except LHL	.P): Measuring e	equipment : (HP41	91A, 4192A) its equi	valent	
9. Temperat	ture charac	teristic				
LA Type	taro oriarao	10110110	△L/L: Within ±	5%		
CAL45 Type	)					
LHL			△L/L: Within ±	7% (except LHLP16	: Within ±20%)	
FBA/FBR		<u> </u>			<del>_</del>	
FL05□ Type	Э					
FL06BT Type						
Test Metho			leviation in step 1 t	n 5		
Live : Onlinge						
	Step 1	Ien	nperature (°C)			
	2	-25 (Minimum	n operating tempe	rature)		
	3		dard temperature			
	4	,	n operating tempe			
	5	·	20			
	Change of	f maximum induc	tance deviation in	eton 1 to 5		
LNL		re at step 1 : 20		step 1 to 5		
	Temperati	ure at step 2 : M	linimum operating			
			0°C (Standard tem∣ laximum operating			
		re at step 5 : 20		temperature		
10. Tensile s	etronath to	> <del>+</del>				
LA Type	3trength tec	,				
CAL45 Type	)		No abnormality s	uch as cut lead, or I	looseness.	
LHL						
FBA/FBR			No abnormality s	uch as cut lead, or l	looseness.	
FL05□ Type			No abnormality s	uch as cut lead, or l	ooseness.	
FL06BT Type		. •				
Test Metho			rce progressively i	n the direction to dra	aw terminal	
2, .	,			Talle direction to dir	aw torriiriai.	
		e (N) di	uration (s)			
		.5	3			
CA :	Apply the	stated tensile for	rce progressively i	n the direction to dra	aw terminal.	
		. ,	uration (s)			
	1	0	10			
	. A l Al			a dia a dina adia a da di	A	
LHLUUU:		stated tensile for al wire diameter t		force (N)	duration (s)	
	NOTHING	0.3<φd≦0	,	5	duration (3)	
		0.5<φd≦0		10	30±5	
		0.8<φd≦1	1.2	25	1	
EDA/EDD	The beauty	- 6	ah ali ba Carada ad	- t! - ff 00	LANCE DE LE CONTRACTOR	
					±1N shall be applied digradually apply the	to the lead wire in the axial diretion of the component during 10±1 seconds. tensile force of 4.9N.
		-,			- g ,pp.,	
11. Over cui	ırrent					
LA Type			No emission of s	moke no firina		
CAL45 Type	)		No emission of s			
	)		There shall be no	scorch or short of		
CAL45 Type	•		There shall be no			
CAL45 Type			There shall be no	scorch or short of		
CAL45 Type  LHL  FBA/FBR	Ð		There shall be no	scorch or short of		
CAL45 Type LHL	e e od and Rem		There shall be no LHLC08,LHLC10	scorch or short of v: There shall be no	firing.	
CAL45 Type LHL	e e od and Rem	arks] Гуре: Measuring Duration	There shall be no LHLC08,LHLC10	scorch or short of	firing.	

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### RELIABILITY DATA

2. Terminal strength: bending				
No observatible such as such land as lessance				
No abnormality such as cut lead, or looseness.				

[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.

tumber of bonds 1 1110 timoer					
Nominal wire diameter tensile	Bending force	Mass reference weight			
φd (mm)	(N)	(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 $\phi$ d (mm)	Bending force (N)	Mass reference weight (kg)
0.3<¢d≦0.5	2.5	0.25
0.5<φd≦0.8	5	0.5
0.8<φd≦1.2	10	1.0

: Shall attain to specified force in 2 sec.

12 Inculation registers as the transmit	pe terminals and hady
13. Insulation resisitance: between the	ie terminais and body
LA Type	-
CAL45 Type	in the state of th
LHL	100M $\Omega$ min.
FBA/FBR	
FL05□ Type	
FL06BT Type	
[Test Method and Remarks] LHL : Applied voltage : 500 VDC Duration : 60 sec.	
14. Insulation resistance : between ter	rminals and core
LA Type	
CAL45 Type	
LHL	
FBA/FBR	1MΩ min. (Other than materail code MA)
FL05 Type	The state of the s
FL06BT Type	1
Test Method and Remarks	1
FBA·FBR: Applied voltage: 100 VDC Duration: 60±5 se	
15. Withstanding: between the termin	nals and body
LA Type	
CAL45 Type	
LHL .	No abnormality such as insulation damage
FBA/FBR	
FL05 Type	
FL06BT Type	1
[Test Method and Remarks] LHL□□□: Accoding to JIS C5102. 7. Metal global method Applied voltage: 500 VDI Duration: 60 sec.	C
16. DC bias characteristic	
LA Type	T
CAL45 Type	- △L/L: Within -10%
	-
LHL DD	-
FBA/FBR	-
FL05 Type	4
FL06BT Type	
[Test Method and Remarks] LA, CA: Measure inductance with app	pliation of rated current using LCR meter to compare it with the initial value.
17. Body strength	
LA Type	No abnormality as damage.
CAL45 Type	The abnormancy as utilities.
LHL	
FBA/FBR	No abnormality such as cracks on body.
FL05□ Type	
FL06BT Type	
[Test Method and Remarks] LA : Applied force : 30N	o specified force in 2 sec. Press   Pressing jig

1mm

FBA

CAL45: Applied force: 50N Duration

: Applied force : 50±3N

Speed

Duration

: 10 sec.

: 30±1 sec.

Specimen

1mm

<sup>\*</sup> 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.

	itance to vibration	
LA Type		△L/L: Within ±5% Q:30min
CAL45 Typ		△L/L: Within ±5%
LHL		Appearance: No abnomality $\triangle$ L/L: Within $\pm$ 5% Q change: Within $\pm$ 30% (LHLP: only $\triangle$ L/L)
FBA/FBR		Appearance: No abnomality Impedance change: Within ±20%
FL05□ Ty <sub>l</sub> FL06BT Ty		
	hod and Remarks] : Directions : 2 Frequency range : 1 Amplitude : 1 Mounting method : S	2 hrs each in X, Y and Z directions total : 6hrs. 10 to 55 to 10Hz (1min.) 1.5mm Soldering onto printed board. At least 1hr of recovery under the standard condition after the test, followed by the measurement within 2hrs.
LHL□□□	Frequency range : 1 Amplitude : 1	2 hrs each in X, Y and Z directions total : 6hrs. 10 to 55 to 10Hz (1min.) 1.5mm (But don't exceed acceleration 196m/s² (two power)) Soldering onto printed board.
19. Resist	tance to shock	
LA Type		No significant abnormality in appearance
CAL45 Typ		,
_HL□□□		
FBA/FBR		
FL05□ Ty <sub>l</sub>	·	
FL06BT Ty	•	
LA, CA Impa Heigl Total	hod and Remarks] : Drop test ict material : concrete or vir ht : 1m I number of drops : 10 times	
20. Solder LA Type	rability	At local 75% of targinal electrode is accorded by a superior
CAL45 Typ	ре	At least 75% of terminal electrode is covered by new solder.
LHL		At least 75% of terminal electrode is covered by new solder.
BA/FBR		At least 90% of terminal electrode is covered by new solder.
FL05□ Ty <sub>l</sub>	ре	At least 75% of terminal electrode is covered by new selder
L06BT Ty	/pe	At least 75% of terminal electrode is covered by new solder.
_A, CA _HL□□□	: Solder temperature : 23: Duration : 2±	=0.5 sec. 5±5°C =0.5 sec.
FB	: Solder temperature : 23 Duration : 3±	=1 sec.
FL05R□	immersion depth : Up	to 1.5mm from terminal root.
		=0.5 sec.
	Duration : 2± Immersion depth : Up  : Solder temperature : 23: Duration : 3±	±0.5 sec. to 2 to 2.5mm from terminal root. 0±5°C ±1 sec.
FL06BT	Duration : 2± Immersion depth : Up  Solder temperature : 23: Duration : 3± Immersion depth : Up	±0.5 sec. to 2 to 2.5mm from terminal root. 0±5°C
FL06BT 21. Resisi	Duration : 2± Immersion depth : Up  : Solder temperature : 23: Duration : 3±	=0.5 sec. to 2 to 2.5mm from terminal root.  0±5°C =1 sec. to 0.5 to 1.0mm from terminal root.
FL06BT 21. Resisi LA Type	Duration : 2± Immersion depth : Up  : Solder temperature : 23: Duration : 3± Immersion depth : Up	=0.5 sec. to 2 to 2.5mm from terminal root.  0±5°C =1 sec. to 0.5 to 1.0mm from terminal root.  No significant abnormality in appearance
FL06BT  21. Resisi LA Type CAL45 Typ	Duration : 2± Immersion depth : Up  : Solder temperature : 23: Duration : 3± Immersion depth : Up  itance to soldering heat	=0.5 sec. to 2 to 2.5mm from terminal root.  0±5°C =1 sec. to 0.5 to 1.0mm from terminal root.  No significant abnormality in appearance  △L/L: Within ±5%
21. Resisi  A Type  CAL45 Typ	Duration : 2± Immersion depth : Up  : Solder temperature : 23: Duration : 3± Immersion depth : Up  itance to soldering heat	=0.5 sec. to 2 to 2.5mm from terminal root.  0±5°C =1 sec. to 0.5 to 1.0mm from terminal root.  No significant abnormality in appearance  △L/L: Within ±5%  No significant abnormality in appearance Inductance change: Within ±5% Q change: Within ±30%(LHLP: only △L/L)
21. Resisi  A Type  CAL45 Tyr  HL	Duration : 2± Immersion depth : Up  : Solder temperature : 23: Duration : 3± Immersion depth : Up	=0.5 sec. to 2 to 2.5mm from terminal root.  0±5°C =1 sec. to 0.5 to 1.0mm from terminal root.  No significant abnormality in appearance  △L/L: Within ±5%  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%
21. Resisi LA Type CAL45 Typ LHL FBA/FBR FL05 Typ	Duration : 2± Immersion depth : Up  : Solder temperature : 23: Duration : 3± Immersion depth : Up itance to soldering heat	=0.5 sec. o to 2 to 2.5mm from terminal root.  0±5°C =1 sec. o to 0.5 to 1.0mm from terminal root.  No significant abnormality in appearance △L/L: Within ±5%  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
21. Resisi  A Type CAL45 Typ  HL          BA/FBR      FL06BT Ty  Test Meth	Duration : 2± Immersion depth : Up : Solder temperature : 23: Duration : 3± Immersion depth : Up sitance to soldering heat  Dee	=0.5 sec. to 2 to 2.5mm from terminal root.  0±5°C =1 sec. to 0.5 to 1.0mm from terminal root.  No significant abnormality in appearance  △L/L: Within ±5%  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%
21. Resisi  A Type  CAL45 Typ  CAL45 Typ  FBA/FBR  FL05 Typ  FL06BT Ty  Test Meth  A, CA	Duration : 2± Immersion depth : Up  : Solder temperature : 23: Duration : 3± Immersion depth : Up  itance to soldering heat  pe  pe  /pe hod and Remarks] : Solder temperature : (( Duration : 5 Immersed conditions : In Recovery : A	=0.5 sec. 0 to 2 to 2.5mm from terminal root.  0±5°C =1 sec. 0 to 0.5 to 1.0mm from terminal root.  No significant abnormality in appearance □∠/L: Within ±5% 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%  Refer to individual specification No significant abnormality in appearance Impedance change: Within ±20%  CA) 270±5°C, (LA) 260±5°C ±0.5 sec. One time serted into substrate with t=1.6mm to substra
21. Resisi LA Type CAL45 Typ CAL45 Typ FBA/FBR FL05 Typ FL06BT Ty Test Meth LA, CA	Duration : 2± Immersion depth : Up  : Solder temperature : 23: Duration : 3± Immersion depth : Up  itance to soldering heat  De  pe //pe hod and Remarks] : Solder temperature Duration : 5 Immersed conditions : Ir Recovery : A  : Solder bath method : S D  Manual soldering : S	co.to 2 to 2.5mm from terminal root.  0±5°C c1 sec. ot to 0.5 to 1.0mm from terminal root.  No significant abnormality in appearance  △L/L: Within ±5%  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%  CA) 270±5°C, (LA) 260±5°C  ±0.5 sec. One time serted into substrate with t=1.6mm t least 1hr of recovery under the standard condition after the test, followed by the measurement within 2hrs.  Rolder temperature: 260±5°C  Duration: 10±1 sec. Up to 1.5mm from the bottom of case.  Folder temperature: 350±10°C (At the tip of soldering iron)  Formulation: 55±1 sec.
21. Resisi LA Type CAL45 Typ CAL45 Typ FBA/FBR FL05 Typ FL06BT Ty Test Meth LA, CA	Duration : 2± Immersion depth : Up  : Solder temperature : 23: Duration : 3± Immersion depth : Up  itance to soldering heat  Dee  pe  //pe  hod and Remarks] : (( Duration : 5 Immersed conditions : Ir Recovery : A  : Solder bath method : S D  Manual soldering : S Caution : N	=0.5 sec. 0 to 2 to 2.5mm from terminal root.  0±5°C 1 sec. 0 to 0.5 to 1.0mm from terminal root.  No significant abnormality in appearance  △L/L: Within ±5%  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%  CA) 270±5°C, (LA) 260±5°C  ±0.5 sec. One time  secreted into substrate with t=1.6mm  t least 1hr of recovery under the standard condition after the test, followed by the measurement within 2hrs.  Indicate the present of the standard condition of case.  Older temperature: 260±5°C  For the standard condition of case.  Older temperature: 350±10°C (At the tip of soldering iron)
21. Resisi LA Type CAL45 Typ LHL CAL45 Typ L	Duration : 2± Immersion depth : Up  : Solder temperature : 23: Duration : 3± Immersion depth : Up  itance to soldering heat  Dee  : Solder temperature : (0 Duration : 5 Immersed conditions : Ir Recovery : A  : Solder bath method : S  Caution : N Recovery : 4 : Solder bath method : C	2.0.5 sec. 10 to 2 to 2.5mm from terminal root.  2.1 sec. 2.1 to 0.5 to 1.0mm from terminal root.  No significant abnormality in appearance  △ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □
21. Resisi LA Type CAL45 Typ CAL45 Typ FBA/FBR FL05 Typ FL06BT Ty [Test Meth LA, CA	Duration : 2± Immersion depth : Up  : Solder temperature : 23: Duration : 3± Immersion depth : Up  itance to soldering heat  Duration : 1  pe pe rype hod and Remarks] : (5 Immersed conditions : Ir Recovery : A  : Solder bath method : S  Manual soldering : S  Caution : N Recovery : 4  : Solder bath method : C	10.2 to 2.5 mm from terminal root.  0±5°C 11 sec. 11 to 0.5 to 1.0mm from terminal root.  No significant abnormality in appearance  △L/L: Within ±5%  No significant abnormality in appearance  Inductance change: Within ±5%  No significant abnormality in appearance  Refer to individual specification  No significant abnormality in appearance  Impedance change: Within ±20%  Refer to individual specification  No significant abnormality in appearance  Impedance change: Within ±20%  CA) 270±5°C, (LA) 260±5°C  ±0.5 sec.  One time  serted into substrate with t=1.6mm  t least 1hr of recovery under the standard condition after the test, followed by the measurement within 2hrs.  Indicate temperature: 260±5°C  Formation: 10±1 sec.  Up to 1.5mm from the bottom of case.  Iolder temperature: 350±10°C (At the tip of soldering iron)  inuration: 5±1 sec.  Up to 1.5mm from the bottom of case.  Iolder temperature: 260±5°C  Duration: 10±1 sec.  Inmersion depth: Up to 1.5mm from the test.  Formidition 1: Solder temperature: 260±5°C  Duration: 10±1 sec.  Immersion depth: Up to 1.5mm from the terminal root.  Formidition 2: Solder temperature: 250±5°C  Duration: 10±1 sec.  Immersion depth: Up to 1.5mm from the terminal root.

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### RELIABILITY DATA

22. Resisitance to solvent				
LA Type	Disease sucid the ultresserie election of this word.			
CAL45 Type	Please avoid the ultrasonic cleaning of this product.			
LHL				
FBA/FBR	No significant abnormality in appearance	Impedance change: Within ±20%		
FL05 Type				
FL06BT Type				
Terror and the second of the	•			

[Test Method and Remarks]

FB : Solvent temperature : 20~25°C : 30±5 sec. Duration Solvent type

Acetone, trichloroethylene : 3hrs of recovery under the standard condition after the test. Recovery

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

[Test Method and Remarks]

LA, CA : Conditions for 1cycle

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

Number of cycles: 5 cycles

: At least 1hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2hrs. Recovery

Step	Temperature (°C)	Duration (min.)
1	Minimum operating temperature <sup>+0</sup> <sub>-3</sub>	30±3
2	Room temperature	Within 3
3	Minimum operating temperature <sup>+2</sup> <sub>-0</sub>	30±3
4	Room temperature	Within 3

Number of cycles : 10 cycles (LHL

: 5 cycles (FBA, FBR)
: 4 to 24hrs of recovery under the standard condition after the removal from the test chamber. (LHL Recovery

: 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 (°C)	Duration (min.)
1	$-25^{+0}_{-3}$	30±3
2	Room temperature	Within 3
3	+85 <sup>+2</sup> <sub>-0</sub>	30±3
4	Room temperature	Within 3

Number of cycles: 10 cycles

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
FL05 Type	
FL06BT Type	

[Test Method and Remarks] LA, CA: Temperature: 40±2°C Humidity: 90~95%RH 1000 hrs Duration

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.

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05.1.					
	ng under damp heat				
LA Type			$\triangle$ L/L: Within $\pm$ 10% Q: 30min		
CAL45 Typ			△L/L: Within ±10%		
HL	]	Α	Appearance: No abnormality	Imductance change: Within ±10%	Q change: Within ±30% (LHLP: only △L/L)
BA/FBR					
-L05□ Typ	ре	F	Refer to individual specification		
FL06BT Ty	/ре	Α	Appearance: No abnormality	Impedance change : Within $\pm 20\%$	
Test Meth LA, CA	Humidity : 9 Duration : 1 Applied current : F		ent	emoval from test chamber, followed by the	e measurement within 2hrs.
.HL	Humidity : 9 Duration : 1 Applied current : F		nrs ent	ndition after the removal from the test char	mber.
FL	Humidity : 9 Duration : 5 Applied current : F		−0) hrs ent	ndition after the removal from the test char	mber.
26. Loadin	ng at high temperature	re			
_A Type	5 . 5		△L/L : Within ±10% Q : 30min		
CAL45 Typ	ne .		△L/L : Within ±10%		
			-L/L . WILLIIII - 10/0		
FBA/FBR	1				
FL05 Typ					
FL06BT Tyl	<u>'</u>				
	Duration : 1	85±2°C 1000 hrs Bated curre	ent		
LA, CA	: Temperature : 8 Duration : 1 Applied current : F	1000 hrs Rated curre		emoval from test chamber, followed by the	e measurement within 2hrs.
27. Low te	: Temperature : 8 Duration : 1 Applied current : F Recovery : A	1000 hrs Rated curro At least 1hi		removal from test chamber, followed by the	e measurement within 2hrs.
_A, CA  27. Low te _A Type	: Temperature : 8 Duration : 1 Applied current : F Recovery : A emperature life test	1000 hrs Rated curre At least 1hi	r of recovery under the standard r	emoval from test chamber, followed by the	e measurement within 2hrs.
27. Low te LA Type CAL45 Typ	: Temperature : 8 Duration : 1 Applied current : F Recovery : A emperature life test	1000 hrs Rated curre At least 1hi	r of recovery under the standard r		
27. Low te LA Type CAL45 Typ	: Temperature : 8 Duration : 1 Applied current : F Recovery : A emperature life test	1000 hrs Rated curre At least 1hi	r of recovery under the standard r  \[ \text{L} \cdot \text{Within } \pm 10\%  \text{Q} : 30\text{min} \] \[ \text{L} \cdot \text{L} : \text{Within } \pm 10\% \]	emoval from test chamber, followed by the linear large $\pm 10\%$	e measurement within 2hrs.  Q change: Within ±30% (LHLP: only △L/L)
27. Low te  A Type  CAL45 Typ  LHL	: Temperature : 8 Duration : 1 Applied current : F Recovery : A emperature life test	1000 hrs Rated curre At least 1hi	r of recovery under the standard r  \[ \text{\subset} \L' \L : \text{Within } \pm 10\%  \text{Q} : 30\text{min} \]  \[ \text{\subset} \L' \L : \text{Within } \pm 10\%  \text{Appearance} : \text{No abnormality} \]		
27. Low te LA Type CAL45 Typ LHL	: Temperature : 8 Duration : 1 Applied current : F Recovery : A emperature life test	1000 hrs Rated curre At least 1hi	r of recovery under the standard r  \[ \text{\subset} \L' \text{: Within \$\pm 10\%}  \text{Q:30min} \] \[ \text{\subset} \L' \text{: Within \$\pm 10\%} \] \[ \text{Appearance : No abnormality} \] \[ \text{Refer to individual specification} \]	Inductance change : Within ±10%	
27. Low te LA Type CAL45 Typ LHL CAL45 Typ LHL CAL45 Typ LHL CAL45 Typ FBA/FBR FL050 Typ FL06BT Tyj Test Meth LA, CA	: Temperature : 8 Duration : 1 Applied current : F Recovery : A  emperature life test  pe pe rod and Remarks] : Temperature : -2 Duration : 100 Recovery : At l	1000 hrs Rated currr At least 1hi	r of recovery under the standard r  \[ \( \) L : Within \( \) ±10\%  \( \) Q : 30min \[ \) \[ \) \[ \) \[ \) \[ \) \[ \] \[ \) \[ \] \[ \) \[ \]		Q change: Within ±30% (LHLP: only △L/L)
27. Low te LA Type CAL45 Typ LHL CAL45 Typ LHL CAL45 Typ LHL CAL45 Typ LHL CAL45 Typ FBA/FBR FL05 CAL45 Typ LOBET Typ Test Meth LA, CA	: Temperature : 8 Duration : 1 Applied current : F Recovery : A  emperature life test  pe pe pe : Temperature : -2 Duration : 100 Recovery : At  Uration : 100 Recovery : 1 to	1000 hrs Rated curre At least 1hi  2  A  R  R  R  R  R  R  R  R  R  A  R  R	r of recovery under the standard r  \[ \text{\subset} \L : \text{Within } \pm 10\%  \text{Q} : 30\text{min} \]  \[ \text{\subset} \L : \text{Within } \pm 10\%  \text{Appearance} : \text{No abnormality} \]  Refer to individual specification  \text{Appearance} : \text{No abnormality} \]  If recovery under the standard renulations and \text{\subseteq} \subsete	Inductance change : Within ±10%  Impedance change : Within ±20%	Q change: Within ±30% (LHLP: only △L/L)  measurement within 2hrs.
27. Low te A Type CAL45 Type CAL45 Typ HL	: Temperature : 8 Duration : 1 Applied current : F Recovery : A  emperature life test  pe pe pod and Remarks] : Temperature : -2 Duration : 100 Recovery : At I Duration : 100 Recovery : 1 tt : Temperature : -4 Duration : 500	1000 hrs Rated currr At least 1hi  At least 1hi  A  B  B  A  25±2°C  1000 hrs  least 1hr o  40±3°C  100±24 hrs  100±24 hrs  100±26 hrs  100±26 hrs  100±26 hrs  100±27 hrs  100±27 hrs	ar of recovery under the standard condition of the standard co	Inductance change : Within ±10%  Impedance change : Within ±20%  noval from test chamber, followed by the r	Q change: Within ±30% (LHLP: only △L/L)  measurement within 2hrs.
27. Low te A Type CAL45 Typ HL	: Temperature : 8 Duration : 1 Applied current : F Recovery : A  emperature life test  pe pe yoe Temperature : -2 Duration : 100 Recovery : At I Duration : 100 Recovery : 1 tt : Temperature : -4 Duration : 500	1000 hrs Rated currr At least 1hi  At least 1hi  A  B  B  A  25±2°C  1000 hrs  least 1hr o  40±3°C  100±24 hrs  100±24 hrs  100±26 hrs  100±26 hrs  100±26 hrs  100±27 hrs  100±27 hrs	ar of recovery under the standard condition of the standard co	Inductance change: Within ±10%  Impedance change: Within ±20%  noval from test chamber, followed by the relation after the removal from the test chamber.	Q change: Within ±30% (LHLP: only △L/L)  measurement within 2hrs.
27. Low te A Type CAL45 Type CAL45 Typ HL BA/FBR FL05 Typ FL06BT Tyl Test Meth A, CA HL CA HL CB	: Temperature : 8 Duration : 1 Applied current : F Recovery : A  emperature life test  pe pe pe cod and Remarks : Temperature : -2 Duration : 100 Recovery : At l  : Temperature : -4 Duration : 100 Recovery : 1 to : Temperature : -4 Duration : 500 Recovery : 1 to	1000 hrs Rated currr At least 1hi  At least 1hi  A  B  B  A  25±2°C  1000 hrs  least 1hr o  40±3°C  100±24 hrs  100±24 hrs  100±26 hrs  100±26 hrs  100±26 hrs  100±27 hrs  100±27 hrs	ar of recovery under the standard condition of the standard co	Inductance change: Within ±10%  Impedance change: Within ±20%  noval from test chamber, followed by the relation after the removal from the test chamber.	Q change: Within ±30% (LHLP: only △L/L)  measurement within 2hrs.
27. Low te 27. Low te 27. Low te 28. Lose 27. Low te 28. High te 28. High te 28. Type	: Temperature : 8 Duration : 1 Applied current : F Recovery : A  emperature life test  pe pe ype nod and Remarks] : Temperature : -2 Duration : 100 Recovery : At I  : Temperature : -4 Duration : 100 Recovery : 1 to : Temperature : -4 Duration : 500 Recovery : 1 to : Temperature : -4 Duration : 500 Recovery : 1 to emperature life test	1000 hrs Rated currr At least 1hi  At least 1hi  A  B  B  A  25±2°C  1000 hrs  least 1hr o  40±3°C  100±24 hrs  100±24 hrs  100±26 hrs  100±26 hrs  100±26 hrs  100±27 hrs  100±27 hrs	ar of recovery under the standard condition of the standard co	Inductance change: Within ±10%  Impedance change: Within ±20%  noval from test chamber, followed by the relation after the removal from the test chamber.	Q change: Within ±30% (LHLP: only △L/L)  measurement within 2hrs.
27. Low te 27. Low te 27. Low te 27. Low te 28. High te 28. High te 28. A Type CAL45 Typ  ELO5D  EL 28. High te 24. Type CAL45 Typ  CAL45 Typ	: Temperature : 8 Duration : 1 Applied current : F Recovery : A  emperature life test  pe pe pod and Remarks] : Temperature : -2 Duration : 100 Recovery : At I Duration : 100 Recovery : 1 to : Temperature : -4 Duration : 500 Recovery : 1 to emperature life test	1000 hrs Rated curre At least 1hi  At least 1hi  F  A  25±2°C  100 hrs  1east 1hr o  40±3°C  100±24 hrs  100±24 hrs  100±27 corre  100±27 corr	r of recovery under the standard reactive in the standard condition in the	Inductance change: Within ±10%  Impedance change: Within ±20%  noval from test chamber, followed by the relation after the removal from the test chamber.	Q change: Within ±30% (LHLP: only △L/L)  measurement within 2hrs.  per.
27. Low te 27. Low te 27. Low te 27. Low te 28. Los Type 28. High te 28. High te 28. A Type 28. A Type 28. A Type 28. Los Type 29. Los Type 29. Los Type 29. Los Type 29. Los Type 20. Los	: Temperature : 8 Duration : 1 Applied current : F Recovery : A  emperature life test  pe pe pod and Remarks] : Temperature : -2 Duration : 100 Recovery : At I Duration : 100 Recovery : 1 to : Temperature : -4 Duration : 500 Recovery : 1 to emperature life test	1000 hrs Rated curre At least 1hi  At least 1hi  F  A  25±2°C  100 hrs  1east 1hr o  40±3°C  100±24 hrs  100±24 hrs  100±27 corre  100±27 corr	ar of recovery under the standard condition of the standard co	Inductance change: Within ±10%  Impedance change: Within ±20%  noval from test chamber, followed by the relation after the removal from the test chamber, the removal from the test chamber.	Q change: Within ±30% (LHLP: only △L/L)  measurement within 2hrs.
27. Low te LA Type CAL45 Typ LHL CAL45 Typ L	: Temperature : 8 Duration : 1 Applied current : F Recovery : A  pemperature life test  pe pe pe pe Type nod and Remarks] : Temperature : -2 Duration : 100 Recovery : At 1 Duration : 100 Recovery : 1 to : Temperature : -4 Duration : 500 Recovery : 1 to puration : 500 Recovery : 1 to	1000 hrs Rated curre At least 1hi  At least 1hi  A  25±2°C  100 hrs least 1hr o  40±3°C  100±24 hrs of re  40±3°C  100 thrs 100±24 hrs of re  100 thrs 100±10 thrs	r of recovery under the standard reaches and the standard reaches and the standard reaches are standard reaches as a standard reaches are standard reaches as a standard conditional standard conditio	Inductance change: Within ±10%  Impedance change: Within ±20%  noval from test chamber, followed by the relation after the removal from the test chamber, the removal from the test chamber.	Q change: Within ±30% (LHLP: only △L/L)  measurement within 2hrs.  per.
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Z7. Low te LA Type CAL45 Typ LHL CAL45 Typ Tost Meth LA, CA LHL CAL45 Typ CAL45 Typ LHL CAL45 Typ LH	: Temperature : 8 Duration : 1 Applied current : F Recovery : A  pemperature life test  pe  pe  pe    Duration : 100 Recovery : At     : Temperature : -4 Duration : 100 Recovery : 1 to   : Temperature : -4 Duration : 100 Recovery : 1 to   : Temperature : -4 Duration : 100 Recovery : 1 to   : Temperature : -4 Duration : 100 Recovery : 1 to   : Temperature : -4 Duration : 100   : Temperature : -4 Duration : 100   : Temperature : 105 Duration : 100   : Temperature : 105 Duration : 100	1000 hrs Rated curre At least 1hi  Rated curre At least 1hi  Rate 25±2°C  100 hrs 1east 1hr o  40±3°C  100±24 hrs 100±24	r of recovery under the standard results. Within ±10% Q:30min \( \text{QL/L}: \text{ Within } ±10% \) Appearance: No abnormality  Refer to individual specification Appearance: No abnormality  of recovery under the standard results are covery under the standard condition  (a) hrs (b) hrs (c) here (c)	Inductance change: Within ±10%  Impedance change: Within ±20%  noval from test chamber, followed by the relation after the removal from the test chamber than after the removal from the test chamber the removal from the test chamber than after the removal from the test chamber th	Q change: Within ±30% (LHLP: only △L/L)  measurement within 2hrs.  per.  Q change: Within ±30% (LHLP: only △L/L)

<sup>\*</sup> 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.

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

#### 1. Circuit Design

#### Operating environment

## Precautions

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-

**♦**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 considerations

◆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°C
- · 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 considerations

◆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

Cleaning conditions

CAL type, LH type, LA Type
 Please do not do cleaning by a supersonic wave

# Technical

considerations

1. CAL type, LH type, LA Type

If washing by supersonic waves, supersonic waves may deform products

# 6. Handling

### ◆Handling

Keep the inductors away from all magnets and magnetic objects.

# ◆Mechanical considerations Precautions

 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). ◆Handling

# Technical

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.

#### considerations

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

## ◆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.

# Precautions

Recommended conditions Ambient temperature ~40°C

 Humidity Below 70% RH

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 In case of storage over 6 months, solderability shall be checked before actual usage

#### Technical considerations

### 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

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