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.

WOUND CHIP INDUCTORS (LB SERIES)

REFLOW

FEATURES

LB-series are Wound Chip Inductors having wide line-up, which are suitable for any circuit designs.

- LBC series has large rated current. They contribute to the miniaturization of the power supply circuit.
- LBR series has low DC resistance. They contribute to the miniaturization of the power supply circuit.
- LBMF series has a low loss characteristic.

APPLICATIONS

- They are suitable for an anti-noise measure on the power supply circuit of DSC, DVC, HDD, LCD-TV, mobile phones,PC, game equipments, various communication equipments and etc..

OPERATING TEMP.

- − 40 ～ 105℃ (Including-self-generated heat)

ORDERING CODE

L B △ 2 0 1 2 T 1 0 0 △ △ △ △ △

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽

❶Type	
LB	Wound chip inductor

❷Shape	
△	Standard products
C	High current
R	Low Rdc
MF	Low loss

❸External Dimensions (mm)	
1608(0603)	1.6×0.8
2012(0805)	2.0×1.25
2016(0806)	2.0×1.6
2518(1007)	2.5×1.8
3218(1207)	3.2×1.8
3225(1210)	3.2×2.5

❹Packaging	
T	Tape & Reel

❺Nominal Inductance(μH)	
example	
1R0	1
100	10
101	100

※R=decimal point

❻Inductance Tolerances (%)	
K	±10
M	±20

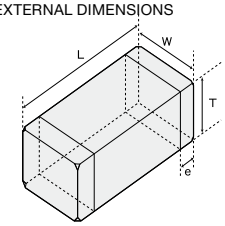
❼Special code	
△	Standard products
R	Low Rdc type

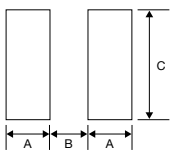
❽Internal code	
△△△	Standard Products

△=Blank space

EXTERNAL DIMENSIONS/STANDARD QUANTITY

EXTERNAL DIMENSIONS





Unit : mm

TYPE	A	B	C
1608	0.55	0.7	0.9
MF1608	0.55	0.7	1.0
2012	0.60	1.0	1.45
2016	0.60	1.0	1.8
2518	0.60	1.5	2.0
3218	0.85	1.7	2.0
3225	0.85	1.7	2.7

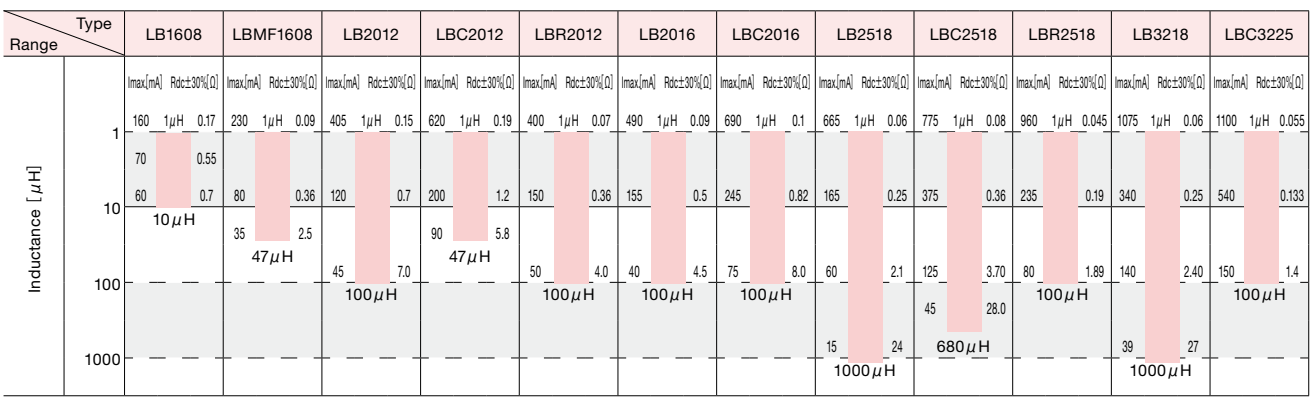
Surface Mounting

- Mounting and soldering conditions should be checked beforehand.
- Applicable soldering process to those products is reflow soldering only.
- Recommended Land Patterns

Type	L	W	T	e	Standard Quantity [pcs] Paper Tape	Standard Quantity [pcs] Embossed Tape
LB1608	1.6±0.1 (0.063±0.004)	0.8±0.1 (0.031±0.004)	0.8±0.1 (0.031±0.004)	0.35±0.15 (0.014±0.006)	4000	—
LBMF1608	1.6±0.2 (0.063±0.008)	0.8±0.2 (0.031±0.008)	0.8±0.2 (0.031±0.008)	0.45±0.15 (0.016±0.006)	—	3000
LB2012 LBC2012 LBR2012	2.0±0.2 (0.079±0.008)	1.25±0.2 (0.049±0.008)	1.25±0.2 (0.049±0.008)	0.5±0.2 (0.020±0.008)	—	2000
LB2016 LBC2016	2.0±0.2 (0.079±0.008)	1.6±0.2 (0.063±0.008)	1.6±0.2 (0.063±0.008)	0.5±0.2 (0.020±0.008)	—	2000
LB2518 LBC2518 LBR2518	2.5±0.2 (0.098±0.008)	1.8±0.2 (0.071±0.008)	1.8±0.2 (0.071±0.008)	0.5±0.2 (0.020±0.008)	—	2000
LB3218	3.2±0.2 (0.128±0.008)	1.8±0.2 (0.071±0.008)	1.8±0.2 (0.071±0.008)	0.6±0.2 (0.024±0.008)	—	2000
LBC3225	3.2±0.2 (0.128±0.008)	2.5±0.2 (0.098±0.008)	2.5±0.2 (0.098±0.008)	0.6±0.3 (0.024±0.012)	—	1000

Unit : mm(inch)

AVAILABLE INDUCTANCE RANGE



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PART NUMBERS

●1608(0603) TYPE

Ordering code		Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	DC Resistance (Ω) (±30%)	Rated current (mA) max.	Measuring frequency (MHz)
LB 1608T1R0M		1.0	±20%	100	0.17	160	7.96
LB 1608T2R2M		2.2		80	0.33	115	
LB 1608T4R7M		4.7		45	0.55	70	
LB 1608T8R2M		8.2		32	0.70	60	2.52
LB 1608T100M		10		32	0.70	60	

Ordering code		Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	DC Resistance (Ω) (±30%)	Rated current (mA) max.	Measuring frequency (MHz)
LBMF1608T1R0M		1.0	±20%	100	0.09	230	7.96
LBMF1608T2R2M		2.2		80	0.17	160	
LBMF1608T3R3M		3.3		60	0.22	130	
LBMF1608T4R7M		4.7		45	0.24	110	
LBMF1608T100□		10	±10% ±20%	32	0.36	80	2.52
LBMF1608T220□		22		16	1.00	50	
LBMF1608T470□		47		11	2.50	35	

・□Please specify the Inductance tolerance code(K or M)

●2012(0805) TYPE

Ordering code		Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	DC Resistance (Ω) (±30%)	Rated current (mA) max.	Measuring frequency (MHz)
LB 2012T1R0M		1.0	±20%	100	0.15	405	7.96
LB 2012T2R2M		2.2		80	0.23	260	
LB 2012T3R3M		3.3		55	0.30	235	
LB 2012T4R7M		4.7		45	0.40	190	
LB 2012T6R8M		6.8		38	0.47	135	
LB 2012T100□		10	±10% ±20%	32	0.7	120	2.52
LB 2012T100□R		10		32	0.5	120	
LB 2012T150□		15		28	1.3	100	
LB 2012T220□		22		16	1.7	80	
LB 2012T470□		47		11	3.7	60	
LB 2012T680□		68		10	6.0	50	
LB 2012T101□		100		8	7.0	45	0.796

・□Please specify the Inductance tolerance code(K or M)

Ordering code		Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	DC Resistance (Ω) (±30%)	Rated current (mA) max.	Measuring frequency (MHz)
LB C2012T1R0M		1.0	±20%	100	0.19	620	7.96
LB C2012T2R2M		2.2		70	0.33	430	
LB C2012T4R7M		4.7		45	0.5	295	
LB C2012T100□		10	±10% ±20%	40	1.2	200	2.52
LB C2012T220□		22		16	3.7	130	
LB C2012T470□		47		11	5.8	90	

・□Please specify the Inductance tolerance code(K or M)

Ordering code		Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	DC Resistance (Ω) (±30%)	Rated current (mA) max.	Measuring frequency (MHz)
LB R2012T1R0M		1.0	±20%	100	0.07	400	7.96
LB R2012T2R2M		2.2		80	0.13	260	
LB R2012T4R7M		4.7		45	0.24	200	
LB R2012T100□		10	±10% ±20%	32	0.36	150	2.52
LB R2012T220□		22		16	1	100	
LB R2012T470□		47		11	1.7	75	
LB R2012T101□		100		8	4	50	0.796

・□Please specify the Inductance tolerance code(K or M)

●2016(0806)TYPE

Ordering code		Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	DC Resistance (Ω) (±30%)	Rated current (mA) max.	Measuring frequency (MHz)
LB 2016T1R0M		1.0	±20%	100	0.09	490	7.96
LB 2016T1R5M		1.5		80	0.11	380	
LB 2016T2R2M		2.2		70	0.13	375	
LB 2016T3R3M		3.3		55	0.20	285	
LB 2016T4R7M		4.7		45	0.25	225	
LB 2016T6R8M		6.8		38	0.35	200	
LB 2016T100□		10	±10% ±20%	32	0.50	155	2.52
LB 2016T150□		15		28	0.70	130	
LB 2016T220□		22		16	1.0	105	
LB 2016T330□		33		14	1.7	85	
LB 2016T470□		47		11	2.4	70	
LB 2016T680□		68		10	3.0	55	
LB 2016T101□		100		8	4.5	40	0.796

・□Please specify the Inductance tolerance code(K or M)

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PART NUMBERS

Ordering code		Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	DC Resistance (Ω) (±30%)	Rated current (mA) max.	Measuring frequency (MHz)
LB C2016T1R0M		1.0	±20%	100	0.1	690	7.96
LB C2016T1R5M		1.5		80	0.15	600	
LB C2016T2R2M		2.2		70	0.2	520	
LB C2016T3R3M		3.3		55	0.27	410	
LB C2016T4R7M		4.7		45	0.37	355	
LB C2016T6R8M		6.8		38	0.59	290	
LB C2016T100□		10	±10% ±20%	32	0.82	245	2.52
LB C2016T150□		15		28	1.2	200	
LB C2016T220□		22		16	1.8	165	
LB C2016T330□		33		14	2.8	135	
LB C2016T470□		47		11	4.3	110	
LB C2016T680□		68		10	7	95	
LB C2016T101□		100		8	8	75	0.796

・□Please specify the Inductance tolerance code(K or M)

●2518(1007) TYPE

Ordering code		Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	DC Resistance (Ω) (±30%)	Rated current (mA) max.	Measuring frequency (MHz)
LB 2518T1R0M		1.0	±20%	100	0.06	665	7.96
LB 2518T1R5M		1.5		80	0.07	405	
LB 2518T2R2M		2.2		68	0.09	340	
LB 2518T3R3M		3.3		54	0.11	280	
LB 2518T4R7M		4.7		46	0.13	240	
LB 2518T4R7MR		4.7		46	0.10	235	
LB 2518T6R8M		6.8		38	0.15	195	
LB 2518T100□		10	±10% ±20%	30	0.25	165	2.52
LB 2518T150□		15		23	0.32	145	
LB 2518T220□		22		19	0.50	115	
LB 2518T330□		33		15	0.70	95	
LB 2518T470□		47		12	0.95	85	
LB 2518T680□		68		9.5	1.50	70	
LB 2518T101□		100		9	2.10	60	0.796
LB 2518T151□		150		7	3.20	45	
LB 2518T221□		220		5.5	4.50	40	
LB 2518T331□		330		4.5	7.00	30	
LB 2518T471□		470		3.5	10	25	
LB 2518T681□		680		3	17	20	
LB 2518T102□		1000		2.4	24	15	0.252

・□Please specify the Inductance tolerance code(K or M)

Ordering code		Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	DC Resistance (Ω) (±30%)	Rated current (mA) max.	Measuring frequency (MHz)
LB C2518T1R0M		1.0	±20%	100	0.08	775	7.96
LB C2518T1R0MR		1.0		100	0.065	890	
LB C2518T1R5M		1.5		80	0.11	730	
LB C2518T2R2M		2.2		68	0.13	630	
LB C2518T3R3M		3.3		54	0.16	560	
LB C2518T4R7M		4.7		41	0.2	510	
LB C2518T6R8M		6.8		38	0.3	420	
LB C2518T100□		10	±10% ±20%	30	0.36	375	2.52
LB C2518T150□		15		23	0.65	285	
LB C2518T220□		22		19	0.77	250	
LB C2518T330□		33		15	1.5	185	
LB C2518T470□		47		12	1.9	165	
LB C2518T680□		68		9.5	2.8	140	
LB C2518T101□		100		9	3.7	125	0.796
LB C2518T151□		150		7	6.1	95	
LB C2518T221□		220		5.5	8.4	80	
LB C2518T331□		330		4.5	12.3	65	
LB C2518T471□		470		3.5	22	50	
LB C2518T681□		680		3	28	45	

・□Please specify the Inductance tolerance code(K or M)

Ordering code		Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	DC Resistance (Ω) (±30%)	Rated current (mA) max.	Measuring frequency (MHz)
LB R2518T1R0M		1.0	±20%	100	0.045	960	7.96
LB R2518T2R2M		2.2		68	0.07	480	
LB R2518T4R7M		4.7		45	0.1	345	
LB R2518T100□		10	±10% ±20%	30	0.19	235	2.52
LB R2518T220□		22		19	0.44	175	
LB R2518T470□		47		11	0.84	120	
LB R2518T101□		100		9	1.89	80	0.796

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PART NUMBERS

●3218(1297) TYPE

Ordering code		Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	DC Resistance (Ω) (±30%)	Rated current (mA) max.	Measuring frequency (MHz)
LB 3218T1R0M		1.0	±20%	100	0.06	1075	7.96
LB 3218T1R5M		1.5		80	0.07	860	
LB 3218T2R2M		2.2		68	0.09	775	
LB 3218T3R3M		3.3		54	0.11	560	
LB 3218T4R7M		4.7		41	0.13	550	
LB 3218T6R8M		6.8		40	0.17	380	
LB 3218T100□		10	±10% ±20%	30	0.25	340	2.52
LB 3218T150□		15		25	0.32	300	
LB 3218T220□		22		19	0.49	255	
LB 3218T330□		33		15	0.75	215	
LB 3218T470□		47		12	0.92	205	
LB 3218T680□		68		11	1.49	145	
LB 3218T101□		100		8	2.40	140	0.796
LB 3218T151□		150		7	3.20	105	
LB 3218T221□		220		5	5.40	80	
LB 3218T331□		330		4	7.00	65	
LB 3218T471□		470		3.5	14.0	54	
LB 3218T681□		680		3	17.0	45	
LB 3218T102□		1000		2.4	27.0	39	0.252

・□Please specify the Inductance tolerance code(K or M)

●3225(1210) TYPE

Ordering code		Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	DC Resistance (Ω) (±30%)	Rated current (mA) max.	Measuring frequency (MHz)
LB C3225T1R0MR		1.0	±20%	250	0.055	1100	0.1
LB C3225T1R5MR		1.5		220	0.060	1000	
LB C3225T2R2MR		2.2		190	0.080	930	
LB C3225T3R3MR		3.3		160	0.095	820	
LB C3225T4R7MR		4.7		70	0.100	680	
LB C3225T6R8MR		6.8		50	0.120	620	
LB C3225T100□R		10	±10% ±20%	23	0.133	540	
LB C3225T150□R		15		20	0.195	420	
LB C3225T220□R		22		17	0.270	330	
LB C3225T330□R		33		13	0.410	300	
LB C3225T470□R		47		10	0.670	220	
LB C3225T680□R		68		8	1.00	190	
LB C3225T101□R		100		6	1.40	150	

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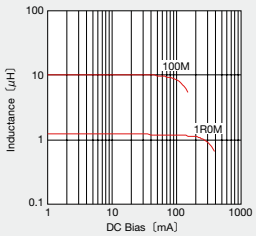
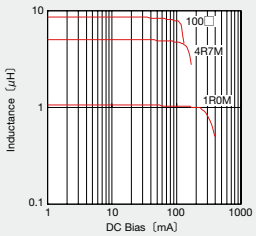
ELECTRICAL CHARACTERISTICS

DC Bias characteristics (Measured by HP4285A+42841A)

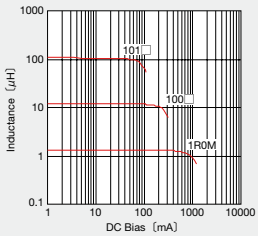
LB1608



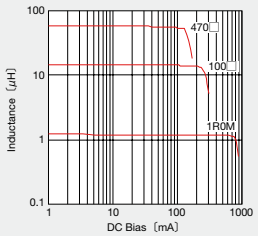
LBMF1608



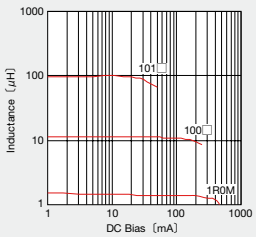
LB2012



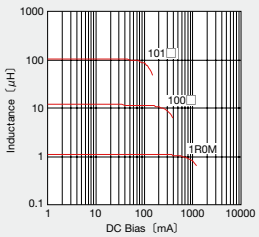
LBC2012



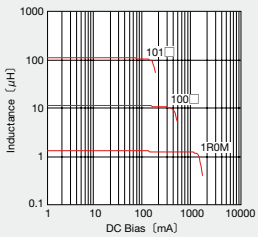
LBR2012



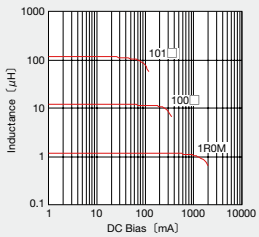
LB2016



LBC2016



LB2518



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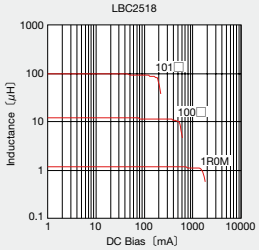

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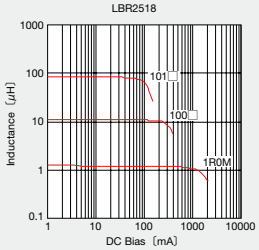

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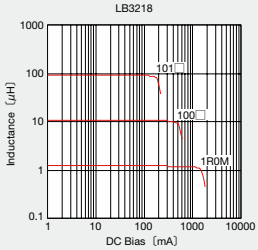

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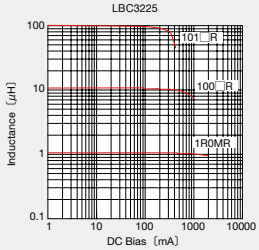

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WOUND CHIP POWER INDUCTORS (CB SERIES)

REFLOW

FEATURES

CB-series are Wound Chip Inductors having wide line-up, which are suitable for any circuit designs.

- CBC series has large rated current. They contribute to the miniaturization of the power supply circuit.
- CBL series has low profile characteristic. They contribute to the lowering of the equipments.
- CBMF series has a low loss characteristic.

APPLICATIONS

- They are suitable for an anti-noise measure on the power supply circuit of DSC, DVC, HDD, LCD-TV, mobile phones,PC, game equipments, various communication equipments and etc..

OPERATING TEMP.

- − 40 ～ 105℃ (Including-self-generated heat)

ORDERING CODE

C B △ 2 0 1 2 T 1 0 0 △ △ △ △ △

❶Type	
CB	Wound chip power inductor

❷Characteristic Spec	
△	Standard
C	High current
L	Low profile
MF	Low loss

❸External Dimensions (mm)	
1608(0603)	1.6×0.8
2012(0805)	2.0×1.25
2016(0806)	2.0×1.6
2518(1007)	2.5×1.8
3225(1210)	3.2×2.5

❹Packaging	
T	Tape & Reel

❺Nominal Inductance(μH)	
example	
1R0	1
100	10
101	100

※R=decimal point

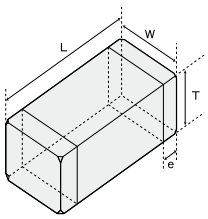
❻Inductance Tolerances(%)	
K	±10
M	±20

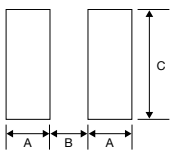
❼Special code	
△	Standard products
R	Low Rdc type

❽Internal code	
△△△	Standard Products

△=Blank space

EXTERNAL DIMENSIONS/STANDARD QUANTITY





Unit : mm

TYPE	A	B	C
MF1608	0.55	0.7	1.0
2012	0.60	1.0	1.45
2016	0.60	1.0	1.8
2518	0.60	1.5	2.0
3218	0.85	1.7	2.0
3225	0.85	1.7	2.7

Recommended Land Patterns

Surface Mounting

- Mounting and soldering conditions should be checked beforehand.
- Applicable soldering process to those products is reflow soldering only.
- Recommended Land Patterns

Type	L	W	T	e	Standard Quantity [pcs]	
					Paper Tape	Embossed Tape
CBMF1608	1.6±0.2 (0.063±0.008)	0.8±0.2 (0.031±0.008)	0.8±0.2 (0.031±0.008)	0.45±0.15 (0.016±0.006)	—	3000
CBL2012	2.0±0.2 (0.079±0.008)	1.25±0.2 (0.049±0.008)	0.9±0.1 (0.035±0.004)	0.5±0.2 (0.020±0.008)	4000	—
CB2012 CBC2012	2.0±0.2 (0.079±0.008)	1.25±0.2 (0.049±0.008)	1.25±0.2 (0.049±0.008)	0.5±0.2 (0.020±0.008)	—	2000
CB2016 CBC2016	2.0±0.2 (0.079±0.008)	1.6±0.2 (0.063±0.008)	1.6±0.2 (0.063±0.008)	0.5±0.2 (0.020±0.008)	—	2000
CB2518 CBC2518	2.5±0.2 (0.098±0.008)	1.8±0.2 (0.071±0.008)	1.8±0.2 (0.071±0.008)	0.5±0.2 (0.020±0.008)	—	2000
CBC3225	3.2±0.2 (0.126±0.008)	2.5±0.2 (0.098±0.008)	2.5±0.2 (0.098±0.008)	0.6±0.3 (0.024±0.012)	—	1000

Unit : mm(inch)

AVAILABLE INDUCTANCE RANGE

Inductance [μH] \ Type	CBMF1608	CBL2012	CB2012	CBC2012	CB2016	CBC2016	CB2518	CBC2518	CBC3225
	Imax[mA] Rdc±30% [Ω]	Imax[mA] Rdc±30% [Ω]	Imax[mA] Rdc±30% [Ω]	Imax[mA] Rdc±30% [Ω]	Imax[mA] Rdc±30% [Ω]	Imax[mA] Rdc±30% [Ω]	Imax[mA] Rdc±30% [Ω]	Imax[mA] Rdc±30% [Ω]	Imax[mA] Rdc±30% [Ω]
1	350 1μH 0.09	620 1μH 0.15	500 1μH 0.15	700 1μH 0.19	600 1μH 0.09	1100 1μH 0.1	1200 1μH 0.06	1000 1μH 0.08	1440 1μH 0.055
22	230 0.17	530 0.33	410 0.23	530 0.33	510 0.13	750 0.2	510 0.09	890 0.13	1130 0.08
10	115 0.36	440 1.0	200 0.5	240 1.2	250 0.5	380 0.82	250 2.40	480 0.36	900 0.133
47	50 2.5	100 4.2	90 3.7	120 5.8	110 2.4	150 4.3	110 0.95	240 1.90	390 0.67
	47μH	47μH		47μH					
100	— —	— —	60 7	— —	70 4.5	110 8	60 2.1	160 3.7	270 1.4
			100μH		100μH	100μH		65 28	100μH
1000	— —	— —	— —	— —	— —	— —	25 24	680μH	— —
							1000μH		

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PART NUMBERS

●1608(0603)TYPE

Ordering code		EHS (Environmental Hazardous Substances)	Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	Resistance DC (Ω) (±30%)	Rated current (mA)		Measuring frequency (MHz)
							Saturation current Idc1	Temperature rise current Idc2	
CBMF1608T1R0M		RoHS	1.0	±20%	100	0.09	290	770	7.96
CBMF1608T2R2M		RoHS	2.2		80	0.17	190	560	
CBMF1608T3R3M		RoHS	3.3		60	0.22	170	500	
CBMF1608T4R7M		RoHS	4.7		45	0.24	145	470	
CBMF1608T100□		RoHS	10	±10% ±20%	32	0.36	115	380	2.52
CBMF1608T220□		RoHS	22		16	1.00	70	230	
CBMF1608T470□		RoHS	47		11	2.50	50	140	

・□Please specify the Inductance tolerance code(K or M)

●2012(0805)TYPE

Ordering code		EHS (Environmental Hazardous Substances)	Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	Resistance DC (Ω) (±30%)	Rated current (mA)		Measuring frequency (MHz)
							Saturation current Idc1	Temperature rise current Idc2	
CB 2012T1R0M		RoHS	1.0	±20%	100	0.15	500	900	7.96
CB 2012T2R2M		RoHS	2.2		80	0.23	410	770	
CB 2012T3R3M		RoHS	3.3		55	0.30	330	650	
CB 2012T4R7M		RoHS	4.7		45	0.40	300	580	
CB 2012T6R8M		RoHS	6.8		35	0.47	250	540	
CB 2012T100□		RoHS	10	±10% ±20%	32	0.7	190	440	2.52
CB 2012T100□R		RoHS	10		32	0.5	200	520	
CB 2012T150□		RoHS	15		28	1.3	170	320	
CB 2012T220□		RoHS	22		16	1.7	135	280	
CB 2012T470□		RoHS	47		11	3.7	90	190	
CB 2012T680□		RoHS	68		10	6.0	70	140	
CB 2012T101□		RoHS	100		8	7.0	60	130	0.796

・□Please specify the Inductance tolerance code(K or M)

Ordering code		EHS (Environmental Hazardous Substances)	Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	Resistance DC (Ω) (±30%)	Rated current (mA)		Measuring frequency (MHz)
							Saturation current Idc1	Temperature rise current Idc2	
CB C2012T1R0M		RoHS	1.0	±20%	100	0.19	700	840	7.96
CB C2012T2R2M		RoHS	2.2		70	0.33	530	640	
CB C2012T4R7M		RoHS	4.7		45	0.5	360	520	
CB C2012T100□		RoHS	10	±10% ±20%	40	1.2	240	340	2.52
CB C2012T220□		RoHS	22		16	3.7	170	190	
CB C2012T470□		RoHS	47		11	5.8	120	150	

・□Please specify the Inductance tolerance code(K or M)

Ordering code		EHS (Environmental Hazardous Substances)	Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	Resistance DC (Ω) (±30%)	Rated current (mA)		Measuring frequency (MHz)
							Saturation current Idc1	Temperature rise current Idc2	
CB L2012T1R0M		RoHS	1.0	±20%	100	0.15	620	950	0.1
CB L2012T2R2M		RoHS	2.2		80	0.39	440	590	
CB L2012T4R7M		RoHS	4.7		45	0.66	275	490	
CB L2012T100M		RoHS	10		32	1	205	370	
CB L2012T220M		RoHS	22		23	2.1	150	250	
CB L2012T470M		RoHS	47		11	4.2	100	140	

・□Please specify the Inductance tolerance code(K or M)

●2016(0806)TYPE

Ordering code		EHS (Environmental Hazardous Substances)	Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	Resistance DC (Ω) (±30%)	Rated current (mA)		Measuring frequency (MHz)
							Saturation current Idc1	Temperature rise current Idc2	
CB 2016T1R0M		RoHS	1.0	±20%	100	0.09	600	1100	7.96
CB 2016T1R5M		RoHS	1.5		80	0.11	550	1000	
CB 2016T2R2M		RoHS	2.2		70	0.13	510	1000	
CB 2016T3R3M		RoHS	3.3		55	0.20	400	800	
CB 2016T4R7M		RoHS	4.7		45	0.25	340	740	
CB 2016T6R8M		RoHS	6.8		38	0.35	300	600	
CB 2016T100□		RoHS	10	±10% ±20%	32	0.50	250	520	2.52
CB 2016T150□		RoHS	15		28	0.70	210	440	
CB 2016T220□		RoHS	22		16	1.0	165	370	
CB 2016T330□		RoHS	33		14	1.7	130	270	
CB 2016T470□		RoHS	47		11	2.4	110	240	
CB 2016T680□		RoHS	68		10	3.0	90	210	
CB 2016T101□		RoHS	100		8	4.5	70	170	0.796

・□Please specify the Inductance tolerance code(K or M)

※)The saturation current value(Idc1) is the DC current value having inductance decrease down to 30%. (at 20℃)
※)The temperature rise current value(Idc2) is the DC current value having temperature increase up to 40℃. (at 20℃)

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PART NUMBERS

Ordering code		EHS (Environmental Hazardous Substances)	Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	Resistance DC (Ω) (±30%)	Rated current (mA)		Measuring frequency (MHz)
							Saturation current Idc1	Temperature rise current Idc2	
CB C2016T1R0M		RoHS	1.0	±20%	100	0.1	1100	1100	7.96
CB C2016T1R5M		RoHS	1.5		80	0.15	1000	1000	
CB C2016T2R2M		RoHS	2.2		70	0.2	750	720	
CB C2016T3R3M		RoHS	3.3		55	0.27	600	610	
CB C2016T4R7M		RoHS	4.7		45	0.37	550	530	
CB C2016T6R8M		RoHS	6.8		38	0.59	450	450	
CB C2016T100□		RoHS	10	±10% ±20%	32	0.82	380	350	2.52
CB C2016T150□		RoHS	15		28	1.2	300	300	
CB C2016T220□		RoHS	22		16	1.8	250	240	
CB C2016T330□		RoHS	33		14	2.8	220	220	
CB C2016T470□		RoHS	47		11	4.3	150	150	
CB C2016T680□		RoHS	68		10	7	130	130	
CB C2016T101□		RoHS	100		8	8	110	110	0.796

・□Please specify the Inductance tolerance code(K or M)

●2518(1007)TYPE

Ordering code		EHS (Environmental Hazardous Substances)	Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	Resistance DC (Ω) (±30%)	Rated current (mA)		Measuring frequency (MHz)
							Saturation current Idc1	Temperature rise current Idc2	
CB 2518T1R0M		RoHS	1.0	±20%	100	0.06	1200	1500	7.96
CB 2518T1R5M		RoHS	1.5		80	0.07	650	1400	
CB 2518T2R2M		RoHS	2.2		68	0.09	510	1300	
CB 2518T3R3M		RoHS	3.3		54	0.11	440	1200	
CB 2518T4R7MR		RoHS	4.7		46	0.10	310	1200	
CB 2518T4R7M		RoHS	4.7		46	0.13	340	1100	
CB 2518T6R8M		RoHS	6.8		38	0.15	270	930	
CB 2518T100□		RoHS	10	±10% ±20%	30	0.25	250	820	2.52
CB 2518T150□		RoHS	15		23	0.32	180	650	
CB 2518T220□		RoHS	22		19	0.50	165	580	
CB 2518T330□		RoHS	33		15	0.70	130	460	
CB 2518T470□		RoHS	47		12	0.95	110	420	
CB 2518T680□		RoHS	68		9.5	1.50	70	310	
CB 2518T101□		RoHS	100		9	2.10	60	260	0.796
CB 2518T151□		RoHS	150		7	3.20	55	210	
CB 2518T221□		RoHS	220		5.5	4.50	50	180	
CB 2518T331□		RoHS	330		4.5	7.00	40	140	
CB 2518T471□		RoHS	470		3.5	10	35	120	
CB 2518T681□		RoHS	680		3	17	30	90	
CB 2518T102□		RoHS	1000		2.4	24	25	75	0.252

・□Please specify the Inductance tolerance code(K or M)

Ordering code		EHS (Environmental Hazardous Substances)	Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	Resistance DC (Ω) (±30%)	Rated current (mA)		Measuring frequency (MHz)
							Saturation current Idc1	Temperature rise current Idc2	
CB C2518T1R0M		RoHS	1.0	±20%	100	0.08	1000	1200	7.96
CB C2518T1R5M		RoHS	1.5		80	0.11	950	1190	
CB C2518T2R2M		RoHS	2.2		68	0.13	890	1100	
CB C2518T3R3M		RoHS	3.3		54	0.16	730	1020	
CB C2518T4R7M		RoHS	4.7		41	0.2	680	920	
CB C2518T6R8M		RoHS	6.8		38	0.3	550	740	
CB C2518T100□		RoHS	10	±10% ±20%	30	0.36	480	680	2.52
CB C2518T150□		RoHS	15		23	0.65	350	500	
CB C2518T220□		RoHS	22		19	0.77	320	460	
CB C2518T330□		RoHS	33		15	1.5	270	320	
CB C2518T470□		RoHS	47		12	1.9	240	290	
CB C2518T680□		RoHS	68		9.5	2.8	200	200	
CB C2518T101□		RoHS	100		9	3.7	160	170	0.796
CB C2518T151□		RoHS	150		7	6.1	140	130	
CB C2518T221□		RoHS	220		5.5	8.4	115	110	
CB C2518T331□		RoHS	330		4.5	12.3	100	90	
CB C2518T471□		RoHS	470		3.5	22	80	70	
CB C2518T681□		RoHS	680		3	28	65	60	

・□Please specify the Inductance tolerance code(K or M)

※)The saturation current value(Idc1) is the DC current value having inductance decrease down to 30%. (at 20℃)
※)The temperature rise current value(Idc2) is the DC current value having temperature increase up to 40℃. (at 20℃)

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PART NUMBERS

●3225(1210)TYPE

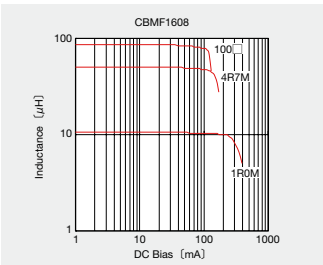
Ordering code		EHS (Environmental Hazardous Substances)	Inductance (μH)	Inductance Tolerance	Self-resonant frequency (MHz) min.	Resistance DC (Ω) (±30%)	Rated current (mA)		Measuring frequency (MHz)
							Saturation current Idc1	Temperature rise current Idc2	
CB C3225T1R0MR		RoHS	1.0	±20%	250	0.055	2000	1440	0.1
CB C3225T1R5MR		RoHS	1.5		220	0.06	2000	1310	
CB C3225T2R2MR		RoHS	2.2		190	0.08	2000	1130	
CB C3225T3R3MR		RoHS	3.3		160	0.095	2000	1040	
CB C3225T4R7MR		RoHS	4.7		70	0.1	1250	1010	
CB C3225T6R8MR		RoHS	6.8		50	0.12	930	940	
CB C3225T100□R		RoHS	10	±10% ±20%	23	0.133	900	900	
CB C3225T150□R		RoHS	15		20	0.195	730	850	
CB C3225T220□R		RoHS	22		17	0.27	620	780	
CB C3225T330□R		RoHS	33		13	0.41	500	570	
CB C3225T470□R		RoHS	47		10	0.67	390	480	
CB C3225T680□R		RoHS	68		8	1	320	410	
CB C3225T101□R		RoHS	100		6	1.4	270	340	

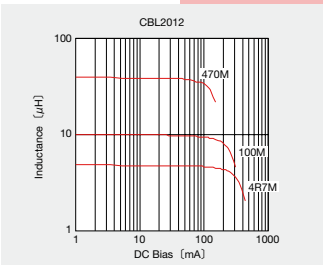
・□Please specify the Inductance tolerance code(K or M)

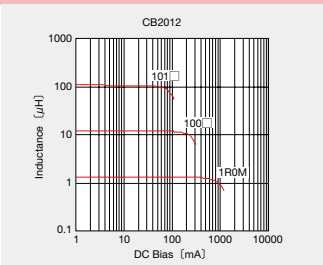
※)The saturation current value(Idc1) is the DC current value having inductance decrease down to 30%. (at 20℃)
※)The temperature rise current value(Idc2) is the DC current value having temperature increase up to 40℃. (at 20℃)

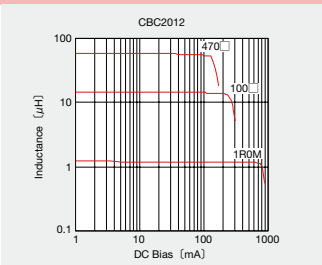
ELECTRICAL CHARACTERISTICS

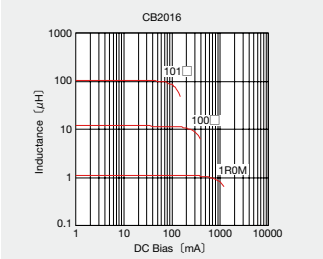
DC Bias characteristics Measured by HP4285A+42841A

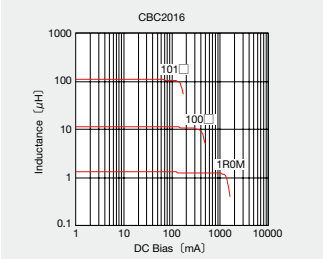


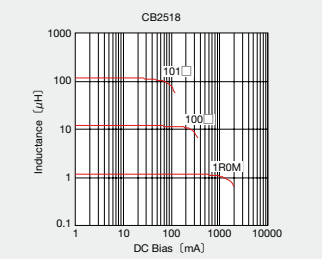


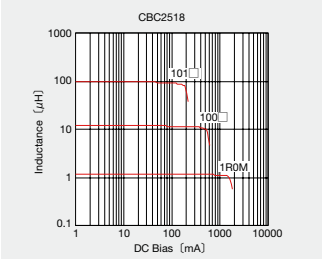


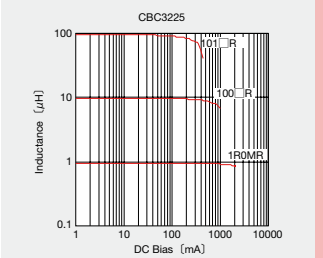












FERRITE PRODUCTS

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WOUND CHIP INDUCTORS FOR SIGNAL LINE (LB/LE SERIES M TYPE)

LB : REFLOW LE : WAVE REFLOW

FEATURES

- LBM2016 Series
  LBM2016-Series which are the wound chip inductors for signal line propose Down sizing with High Q and narrow tolerance.

- LEM2520 Series
  A high-quality inductor that is simple to mass-produce and conforms to the same production process and basic construction as an axial lead type inductor.

APPLICATIONS

- LBM series are suitable for the analog signal line of DSC, DVC, HDD, LCD-TV, game equipments, STB, various audio-visual equipments, various communication equipments and etc..

OPERATING TEMP.

- LBM2016 Series
  − 40 ～ 105℃ (Including-self-generated heat)

ORDERING CODE

L B M 2 0 1 6 T 1 0 0 J △

❶Type	
LBM	Wound chip inductor for signal line
LEM	Wound chip inductor for signal line

❷External Dimensions (mm)	
2016	2.0×1.6
2520	2.5×2.0

❸Packaging	
T	Tape & Reel

❹Nominal Inductance(μH)	
example	
R12	0.12
1R0	1.00
100	10.0

※R=decimal point

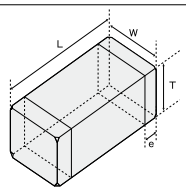
❺Inductance Tolerances	
J	±5%
K	±10%

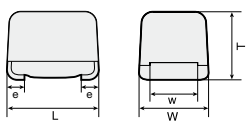
❻Internal code	
△	Standard Products

△=Blank space

EXTERNAL DIMENSIONS/STANDARD QUANTITY

LBM2016	LEM2520



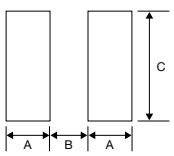


Type	L	W	T	e	W	Standard Quantity [pcs]	
						Paper Tape	Embossed Tape
LBM2016	2.0±0.2 (0.08±0.008)	1.6±0.2 (0.063±0.008)	1.6±0.2 (0.063±0.008)	0.5±0.2 (0.02±0.008)		—	2000
LEM2520	2.5±0.2 (0.098±0.008)	2.0±0.2 (0.079±0.008)	1.8±0.2 (0.071±0.008)	0.45 (0.018)	1.4±0.1 (0.055±0.004)		

Unit : mm (inch)

Recommended Land Patterns

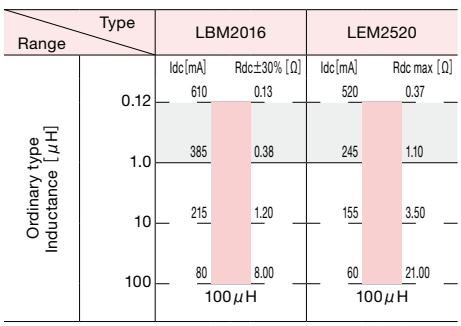
Surface Mounting
・Mounting and soldering conditions should be checked beforehand.
・Applicable soldering process to those products is reflow soldering only.(LB only)
・Recommended Land Patterns



Unit : mm

TYPE	A	B	C
LBM2016	0.6	1.0	1.8
LEM2520	0.9	1.5	1.5

AVAILABLE INDUCTANCE RANGE



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PART NUMBERS

LBM2016 TYPE

Ordering code		EHS (Environmental Hazardous Substances)	Inductance (μH)	Inductance Tolerance	Q (min.)	Self-resonant frequency (MHz) min.	Resistance DC (Ω) (±30%)	Rated current (mA) (max.)	Measuring frequency (MHz)
LB M2016TR12J		RoHS	0.12	±5%	30	600	0.13	610	25.2
LB M2016TR15J		RoHS	0.15			550	0.15	570	
LB M2016TR18J		RoHS	0.18			500	0.15	560	
LB M2016TR22J		RoHS	0.22			450	0.20	520	
LB M2016TR27J		RoHS	0.27			425	0.21	510	
LB M2016TR33J		RoHS	0.33			400	0.21	490	
LB M2016TR39J		RoHS	0.39			375	0.26	440	
LB M2016TR47J		RoHS	0.47			350	0.26	430	
LB M2016TR56J		RoHS	0.56			300	0.29	410	
LB M2016TR68J		RoHS	0.68			270	0.32	400	
LB M2016TR82J		RoHS	0.82			250	0.34	390	
LB M2016T1R0J		RoHS	1.0			220	0.38	385	7.96
LB M2016T1R2J		RoHS	1.2			180	0.41	370	
LB M2016T1R5J		RoHS	1.5			135	0.47	350	
LB M2016T1R8J		RoHS	1.8			100	0.48	345	
LB M2016T2R2J		RoHS	2.2			75	0.54	340	
LB M2016T2R7J		RoHS	2.7			55	0.59	310	
LB M2016T3R3J		RoHS	3.3			48	0.68	290	
LB M2016T3R9J		RoHS	3.9			43	0.74	275	
LB M2016T4R7J		RoHS	4.7			40	0.78	270	
LB M2016T5R6J		RoHS	5.6		25	36	0.88	255	
LB M2016T6R8J		RoHS	6.8			33	0.97	240	
LB M2016T8R2J		RoHS	8.2			30	1.10	225	
LB M2016T100J		RoHS	10			27	1.20	215	2.52
LB M2016T120J		RoHS	12			23	1.4	200	
LB M2016T150J		RoHS	15			20	1.5	190	
LB M2016T180J		RoHS	18			18	2.5	150	
LB M2016T220J		RoHS	22			17	2.8	140	
LB M2016T270J		RoHS	27			16	3.2	130	
LB M2016T330J		RoHS	33			15	3.6	125	
LB M2016T390J		RoHS	39		20	14	3.9	120	
LB M2016T470J		RoHS	47			13	4.1	115	
LB M2016T560J		RoHS	56			12	5.9	95	
LB M2016T680J		RoHS	68			11	7.0	90	
LB M2016T820J		RoHS	82			10	7.7	85	
LB M2016T101J		RoHS	100		15	9.0	8.0	80	0.796

LEM2520 TYPE

Ordering code		EHS (Environmental Hazardous Substances)	Inductance (μH)	Inductance Tolerance	Q (min.)	Self-resonant frequency (MHz) min.	Resistance DC (Ω) (max.)	Rated current (mA) (max.)	Measuring frequency (MHz)
LEM 2520 TR12K		RoHS	0.12	±10%	30	600	0.37	520	25.2
LEM 2520 TR15K		RoHS	0.15			550	0.42	480	
LEM 2520 TR18K		RoHS	0.18			500	0.46	460	
LEM 2520 TR22K		RoHS	0.22			450	0.52	430	
LEM 2520 TR27K		RoHS	0.27			425	0.56	420	
LEM 2520 TR33K		RoHS	0.33			400	0.60	400	
LEM 2520 TR39K		RoHS	0.39			375	0.65	375	
LEM 2520 TR47K		RoHS	0.47			350	0.68	350	
LEM 2520 TR56K		RoHS	0.56			300	0.75	325	
LEM 2520 TR68K		RoHS	0.68			270	0.85	300	
LEM 2520 TR82K		RoHS	0.82			250	1.00	260	
LEM 2520 T1R0J		RoHS	1.0	±5%		220	1.10	245	7.96
LEM 2520 T1R2J		RoHS	1.2			180	1.20	230	
LEM 2520 T1R5J		RoHS	1.5			135	1.30	220	
LEM 2520 T1R8J		RoHS	1.8			100	1.45	210	
LEM 2520 T2R2J		RoHS	2.2			75	1.55	200	
LEM 2520 T2R7J		RoHS	2.7			55	1.70	195	
LEM 2520 T3R3J		RoHS	3.3			48	1.90	185	
LEM 2520 T3R9J		RoHS	3.9			43	2.10	180	
LEM 2520 T4R7J		RoHS	4.7			40	2.30	175	
LEM 2520 T5R6J		RoHS	5.6		25	36	2.50	170	
LEM 2520 T6R8J		RoHS	6.8			33	2.70	165	
LEM 2520 T8R2J		RoHS	8.2			30	3.05	160	
LEM 2520 T100J		RoHS	10			27	3.50	155	2.52
LEM 2520 T120J		RoHS	12			23	3.80	150	
LEM 2520 T150J		RoHS	15			20	4.40	140	
LEM 2520 T180J		RoHS	18			18	4.80	130	
LEM 2520 T220J		RoHS	22			17	5.50	125	
LEM 2520 T270J		RoHS	27			16	6.30	115	
LEM 2520 T330J		RoHS	33			15	7.10	110	
LEM 2520 T390J		RoHS	39		20	14	9.50	90	
LEM 2520 T470J		RoHS	47			13	11.10	80	
LEM 2520 T560J		RoHS	56			12	12.10	75	
LEM 2520 T680J		RoHS	68			11	16.60	70	
LEM 2520 T820J		RoHS	82			10	19.00	65	
LEM 2520 T101J		RoHS	100		15	9	21.00	60	0.796

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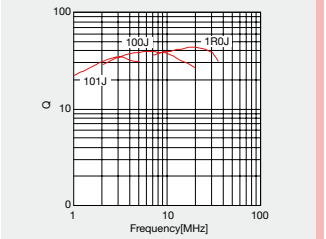
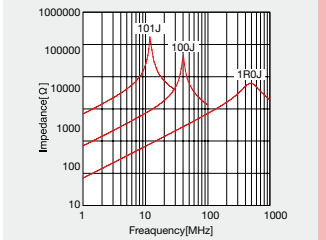
LBM2016

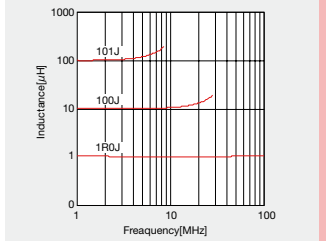
Q-vs-Frequency characteristics



Impedance-vs-Frequency characteristics

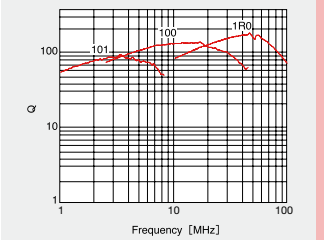


Inductance-vs-Frequency characteristics

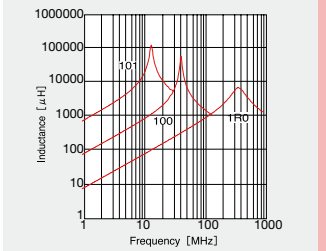


LEM2520

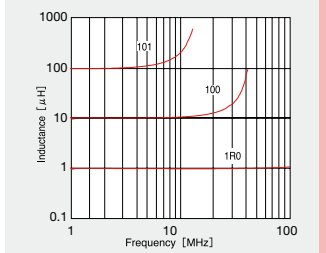
Q-vs-Frequency characteristics



Impedance-vs-Frequency characteristics



Inductance-vs-Frequency characteristics



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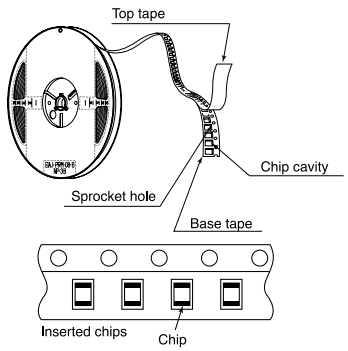
PACKAGING

①Minimum Quantity

Type	Standard Quantity [pcs]	
	Papar Tape	Embossed Tape
LBC3225/CBC3225	—	1000
LB3218	—	2000
LBR2518/LBC2518/LB251 /CB2518/CBC2518/LEM2520	—	2000
LBM2016/LBC2016/ LB2016/CB2016/CBC2016	—	2000
LB2012/LBC2012/LBR202 /CB2012/CBC2012	—	3000
CBL2012	4000	—
LB1608	4000	—
LBMF1608/CBMF1608	—	3000

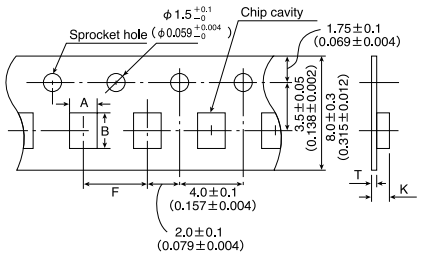
②Tape material

- Embossed tape



③Taping Dimensions

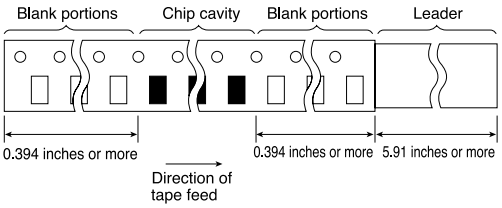
- Embossed Tape (0.315 inches wide)
- Card board carrier tape (0.315 inches wide)



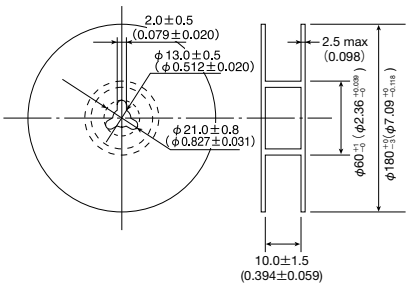
Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
LBM 2016	1.75±0.1 (0.069±0.004)	2.1±0.1 (0.083±0.004)	4.0±0.1 (0.157±0.004)	0.3±0.05 (0.012±0.002)	1.9max. (0.074)
LEM 2520	2.3±0.1 (0.091±0.004)	2.7±0.1 (0.106±0.004)	4.0±0.1 (0.157±0.004)	0.3±0.05 (0.012±0.002)	2.1±0.1 (0.083±0.004)
LBC3225/ CBC3225	2.8±0.1 (0.110±0.004)	3.5±0.1 (0.138±0.004)	4.0±0.1 (0.157±0.004)	0.3±0.05 (0.012±0.002)	4.0max. (0.157)
LB3218	2.1±0.1 (0.084±0.004)	3.5±0.1 (0.014±0.004)	4.0±0.1 (0.157±0.004)	0.3±0.05 (0.012±0.002)	2.2max. (0.086)
LB2518 / CB2518 LBC2518 / CBC2518 LBR2518	2.15±0.1 (0.085±0.004)	2.7±0.1 (0.107±0.004)	4.0±0.1 (0.157±0.004)	0.3±0.05 (0.012±0.002)	2.2max. (0.086)
LB2016/ CB2016 LBC2016 / CBC2016	1.75±0.1 (0.069±0.004)	2.1±0.1 (0.083±0.004)	4.0±0.1 (0.157±0.004)	0.3±0.05 (0.012±0.002)	1.9max. (0.074)
LB2012 / CB2012 LBC2012 / CBC2012 LBR2012	1.45±0.1 (0.058±0.004)	2.25±0.1 (0.09±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.010±0.002)	1.45max. (0.057)
CBL2012	1.55±0.1 (0.061±0.004)	2.3±0.1 (0.091±0.004)	4.0±0.1 (0.157±0.004)	1.1max. (0.044)	1.1max. (0.044)
LB1608	1.0±0.1 (0.059±0.004)	1.8±0.1 (0.072±0.004)	4.0±0.1 (0.157±0.004)	1.1max. (0.044)	1.1max. (0.044)
LBMF1608 / CBMF1608	1.1±0.1 (0.04±0.004)	1.9±0.1 (0.076±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.010±0.002)	1.2max. (0.047)

Unit : mm (inch)

④Leader and Blank Portion

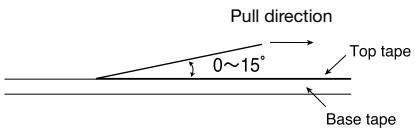


⑤Reel Size



⑥Top Tape Strength

The top tape requires a peel-off force 0.2 to 0.7N in the direction of the arrow as illustrated below.



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RELIABILITY DATA

1.Operating temperature Range	
LB, LBC, LBR, LBMF Series	−40～+105℃(Including self-generated heat)
CB, CBC, CBL, CBMF Series	
LBM Series	
LEM Series	−40～+85℃

2.Storage	
LB, LBC, LBR, LBMF Series	−40～+85℃
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	

【Test Methods and Remarks】
Please refer the term of "7. storage conditions" in precautions.

3.Rated Current	
LB, LBC, LBR, LBMF Series	Within the specified tolerance
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	

【Test Methods and Remarks】
LEM Series The maximum DC value having inductance decrease within 10% and temperature increase within 20℃ by the application of DC bias.

4.Inductance	
LB, LBC, LBR, LBMF Series	Within the specified tolerance
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	

【Test Methods and Remarks】
LEM Series Measuring equipment : LCR Meter(HP4285A+42851A or its equivalent)
Measuring frequency : Specified frequency
LB・LBC・LBR・CB・CBC・CBL・LBMF・CBMF・LBM Series Measuring equipment : LCR Mater(HP4285A or its equivalent)

5.Q	
LB, LBC, LBR, LBMF Series	
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	Within the specified tolerance

【Test Methods and Remarks】
LEM Series Measuring equipment : LCR Meter (HP4285A+42851A or its equivalent)
Measuring frequency : Specified frequency
LBM Series Measuring equipment : LCR Mater(HP4285A or its equivalent)

6.DC Resisitance	
LB, LBC, LBR, LBMF Series	Within the specified tolerance
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	

【Test Methods and Remarks】
Measuring equipment : DC Ohmmeter(HIOKI 3227 or its equivalent)

7.Self-Resonant Frequency	
LB, LBC, LBR, LBMF Series	Within the specified tolerance
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	

【Test Methods and Remarks】
Measuring equipment : Impedance analyzer(HP4291A or its equivalent)

8.Temperature Characteristic							
LBM2016	LEM2520						Inductance change:Within±5%
LB1608 CB2016	LB2012 LB2518	LBR2012 LBR2518	CB2012 CB2518	CBL2012 LBC3225	LB2016 CBC3225		Inductance change:Within±20%
LBMF1608 CBC2518	CBMF1608 LB3218	LBC2016	CBC2016	LBC2518			Inductance change:Within±25%
LBC2012	CBC2012						Inductance change:Within±35%

【Test Methods and Remarks】
Change of maximum inductance deviation in step 1-5

LB, CB Series

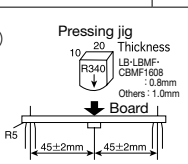
Step	1	2	3	4	5
Temperture(℃)	20	−40	20 (Reference temperature)	+85 (Maximum operating temperature)	20

LEM2520

Step	1	2	3	4	5
Temperture(℃)	20	−25	20 (Reference temperature)	+85 (Maximum operating temperature)	20

9.Rasistance to Flexure of Substrate	
LB, LBC, LBR, LBMF Series	No damage.
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	

【Test Methods and Remarks】
Warp : 2mm(LB・LBC・LBR・CB・CBC・CBL・LBM・LBMF・CBMF Series)
3mm(LEM2520)
Test substrate: Board according to JIS C0051



LEM2520 : 1.6mm

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RELIABILITY DATA

10.Body Strength	
LB, LBC, LBR, LBMF Series	No damage.
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	

【Test Methods and Remarks】

LB・LBC・LBR・CB・CBC・CBL・LBM・LEM2520	Applied force : 10N Duration : 10sec.
LB1608・LBMF1608・CBMF1608	Applied force : 5N Duration : 10sec.

11.Adhesion of terminal electrode	
LB, LBC, LBR, LBMF Series	No abnormality.
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	

【Test Methods and Remarks】

LB・LBC・LBR・CB・CBC・CBL・LBM・LBMF・CBMF・LEM2520	Applied force : 10N to X and Y directions Duration : 5 sec. Test substrate : Printed board
LB1608・CBMF1608・LBMF1608	Applied force : 5N to X and Y directions Duration : 5 sec. Test substrate : Printed board

12.Resistance to vibration		
LB, LBC, LBR, LBMF Series	Inductance change:Within±10%	No significant abnormality in appearance.
CB, CBC, CBL, CBMF Series		
LBM, LEM Series	Inductance change:Within±5%	No significant abnormality in appearance.

【Test Methods and Remarks】
LEM・LB・LBC・LBR・CB・CBC・CBL・LBM・LBMF・CBMF : According to JIS C5102 clause 8.2.
Vibration type : A
Directions : 2 hrs each in X, Y and Z directions. Total : 6 hrs
Frequency range : 10 to 55 to 10 Hz (1min.)
Amplitude : 1.5mm
Mounting method : Soldering onto printed board
Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.
LEM : Recovery
At least 1 hr of recovery under the standard condition after the test, followed by the measurement within 2 hrs.

13.Drop test		
LB, LBC, LBR, LBMF Series		
CB, CBC, CBL, CBMF Series		
LBM Series		
LEM Series	Inductance change:Within±5%	No significant abnormality in appearance.

【Test Methods and Remarks】
LEM :
Acceleration : 980m/sec2
Duration : 6msec
Number of times : 6 sides × 3 times
Mounting method : Soldering onto printed board
Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.
LEM : Recovery
At least 1 hr of recovery under the standard condition after the test, followed by the measurement within 2 hrs.

14.Solderability	
LB, LBC, LBR, LBMF Series	At least 90% of surface of terminal electrode is covered by new
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	

【Test Methods and Remarks】

LEM :	Solder temperature : 230±5℃ Duration : 5±0.5sec. Flux : Methanol solution with 25% of colophony
LB・LBC・LBR・CB・CBC・CBL・LBM・LBMF・CBMF :	Solder temperature : 245±5℃ Duration : 5±0.5sec Flux : Methanol solution with 25% of colophony

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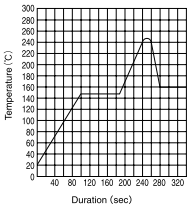
RELIABILITY DATA

15.Resistance to soldering	
LB, LBC, LBR, LBMF Series CB, CBC, CBL, CBMF Series	Inductance change:Within±10%
LEM Series	Inductance change:Within±5%
LEM2520	No significant abnormality in appearance.

【Test Methods and Remarks】
LEM :
Reflow condition 3 times of reflow over at 220±5℃ for 40sec. MAX, With Peak temperature at 240±5℃ for 5 sec. MAX. (Refer to a Profile of chart below.)

Flow condition
Solder temperature : 260±5℃
Duration : 10±1sec. Once

LB・LBC・LBR・CB・CBC・CBL・LBM・LBMF・CBMF :
3 times of reflow oven at 230℃ MIN for 40sec. with peak temperature at 260 ℃ for 5sec.



16.Resisitance to solvent	
LB, LBC, LBR, LBMF Series CB, CBC, CBL, CBMF Series LBM, LEM Series	No significant abnormality in appearance

【Test Methods and Remarks】
Solvent temperature : Room temperature
Type of solvent : Isopropyl alcohol
Cleaning conditions : 90s. Immersion and cleaning.

17.Thermal shock		
LB, LBC, LBR, LBMF Series CB, CBC, CBL, CBMF Series LBM Series	Inductance change:Within±10%	No significant abnormality in appearance.
LEM Series	Inductance change :Within±10% Q→ R12～4R7 : 30 min. 5R6～330 : 25 min. 390～820 : 20 min. 101 : 15 min.	

【Test Methods and Remarks】
LEM : Conditions for 1cycle

Step	Temperature(℃)	Duration(min)
1	−40	30
2	+85	30

Number of cycle : 100 cycle
Recovery : At least 1 hr of recovery under the standard condition after the test, followed by the measurement within 2 hrs.
LB・LBC・LBR・CB・CBC・CBL・LBM・LBMF・CBMF : −40～+85℃, maintain times 30min. ,100 cycle
Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.

18.Damp heat life test		
LB, LBC, LBR, LBMF Series CB, CBC, CBL, CBMF Series LBM Series	Inductance change:Within±10%	No significant abnormality in appearance.
LEM Series	Inductance change :Within±10% Q→ R12～4R7 : 30 min. 5R6～330 : 25 min. 390～820 : 20 min. 101 : 15 min.	

【Test Methods and Remarks】
Temperature : 60±2℃
Humidity : 90～95%RH
Duration : 1000 hrs
Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.
LEM : Recovery
At least 1 hr of recovery under the standard condition after the test, followed by the measurement within 2 hrs.

19.Loading under damp heat life test		
LB, LBC, LBR, LBMF Series CB, CBC, CBL, CBMF Series LBM Series	Inductance change:Within±10%	No significant abnormality in appearance.
LEM Series	Inductance change :Within±10% Q→ R12～4R7 : 30 min. 5R6～330 : 25 min. 390～820 : 20 min. 101 : 15 min.	

【Test Methods and Remarks】
Temperature : 60±2℃
Humidity : 90～95%RH
Duration : 1000 hrs
Applied current : Rated current
Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.
LEM : Recovery
At least 1 hr of recovery under the standard condition after the test, followed by the measurement within 2 hrs.

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RELIABILITY DATA

20.High temperature life test		
LB, LBC, LBR, LBMF Series		
CB, CBC, CBL, CBMF Series	Inductance change:Within±10%	No significant abnormality in appearance.
LBM Series		
LEM Series	Inductance change :Within±10% Q→ R12～4R7 : 30 min. 5R6～330 : 25 min. 390～820 : 20 min. 101 : 15 min.	

【Test Methods and Remarks】
Temperature : 85±2℃
Duration : 1000 hrs
Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.
LEM : Recovery
At least 1 hr of recovery under the standard condition after the test, followed by the measurement within 2 hrs.

21.Loading at high temperature life test		
LB, LBC, LBR, LBMF Series	Inductance change:Within±10%	No significant abnormality in appearance.
CB, CBC, CBL, CBMF Series		
LBM, LEM Series		

【Test Methods and Remarks】
Temperature : 85±2℃
Duration : 1000 hrs
Applied current : Rated current
Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.

22.Low temperature life test		
LB, LBC, LBR, LBMF Series		
CB, CBC, CBL, CBMF Series	Inductance change:Within±10%	No significant abnormality in appearance.
LBM Series		
LEM Series	Inductance change :Within±10% Q→ R12～4R7 : 30 min. 5R6～330 : 25 min. 390～820 : 20 min. 101 : 15 min.	

【Test Methods and Remarks】
Temperature : −40±2℃
Duration : 1000 hrs
Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.
LEM : Recovery
At least 1 hr of recovery under the standard condition after the test, followed by the measurement within 2 hrs.

23.Standard condition	
LB, LBC, LBR, LBMF Series	Standard test conditions Unless specified, Ambient temperature is 20±15℃ and the Relative humidity is 65±20%. If there is any doubt about the test results, further measurement shall be had within the following limits: Ambient Temperature: 20±2℃ Relative humidity: 65±5% Inductance value is based on our standard measurement systems.
CB, CBC, CBL, CBMF Series	
LBM, LEM Series	

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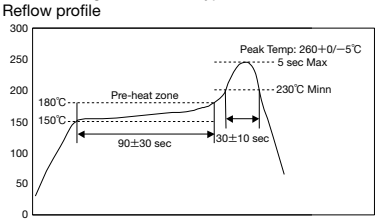
PRECAUTIONS

LEM Type, LB Type, CB 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	◆Land pattern design 1. Please contact any of our offices for a land pattern, and refer to a recommended land pattern of a right figure or specifications.
Technical consider-ations	PRECAUTIONS 【Recommended Land Patterns】 Surface Mounting ・Mounting and soldering conditions should be checked beforehand. ・Applicable soldering process to those products is reflow soldering only.

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	1. When installing products, care should be taken not to apply distortion stress as it may deform the products.

4. Soldering	
Precautions	◆Wave soldering（LEM Type only） 1. For wave soldering,please apply conditions meeting the range of the specifed conditions in our catalog or the relevant specifications. ◆Reflow soldering（LB and CB Types） 1. For reflow soldering with either leaded or lead-free solder,the profile specified in "point for controlling" is recommended. ◆Reflow soldering（LEM） 1. For reflow soldering, please apply conditions meeting the range of the specified conditions in our catalog or the relevant specifications. ◆Recommended conditions for using a soldering iron 1. Put the soldering iron on the land-pattern. Soldering iron's temperature - Below 350℃ Duration-3 seconds or less. The soldering iron shoud not come in contact with inductor directly.
Technical consider-ations	◆Wave soldering（LEM Type only） 1. Components can be damaged by excessive heat where soldering conditions exceed the specified range. ◆Reflow soldering（LB and CB Types） 1. Reflow profile  ◆Recommended conditions for using a soldering iron 1. Components can be damaged by excessive heat where soldering conditions exceed the specified range.

5. Cleaning	
Precautions	◆Cleaning conditions Washing by supersonic waves shall be avoided.
Technical consider-ations	◆Cleaning conditions If washed by supersonic waves, the products might be broken.

6. Handling	
Precautions	◆Handling 1. There is a case that a characteristic varies with magnetic influence. ◆Breakaway PC boards（splitting along perforations） 1. Planning pattern configurations and the position of products should be carefully performed to minimize stress. ◆Mechanical considerations 1. There is a case to be damaged by a mechanical shock.
Technical consider-ations	◆Handling 1. Keep the inductors away from all magnets and magnetic objects. ◆Breakaway PC boards（splitting along perforations） 1. When splitting the PC board after mounting inductors, care should be taken not to give any stresses of deflection or twisting to the board. 2. Board separation should not be done manually, but by using the appropriate devices. ◆Mechanical considerations 1. Please do not give the inductors any excessive mechanical shocks.

7. Storage conditions	
Precautions	◆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.
Technical consider-ations	◆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, LE type inductors should be used within one year from the time of delivery. LB type : Should be used within 6 months from the time of delivery. LE type : In case of storage over 6 months, solderability shall be checked before actual usage.

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WOUND CHIP POWER INDUCTORS(BR SERIES)

REFLOW

FEATURES

- Suitable for the use as a choke coil in smaller DC/DC converters.

APPLICATIONS

- BR-series are suitable for an anti-noise measure on the power supply circuit of DSC, DVC, eBOOK, LCD-TV, mobile phones,PC, game equipments, various communication equipments and etc..

OPERATING TEMP.

- − 40 ～ 105℃ (Including-self-generated heat)

ORDERING CODE

B R △ 2 5 1 8 T 2 R 2 M △ △ △

❶Type	
BR	Wound Chip Power Inductors

❷Characteristic Spec	
△	Low Rdc
L	Low profile
C	High Current

❸External Dimensions (W×L) : mm (inch)	
1608 (0603)	1.6×0.8mm
2012 (0805)	2.0×1.2mm
2016 (0806)	2.0×1.6mm
2515 (1006)	2.5×1.5mm
2518 (1007)	2.5×1.8mm
3225 (1210)	3.2×2.5mm

❹Packaging	
T	Tape & Reel

❺Nominal Inductance (μH)	
example	
R20	0.2
1R0	1.0
2R2	2.2
4R7	4.7

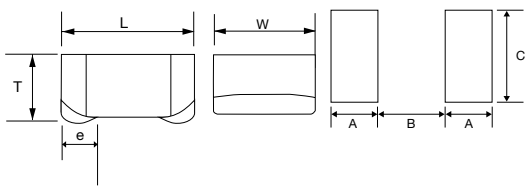
※R=decimal point

❻Inductance tolerance	
M	±20%
K	±10%

❼Internal code	
△△△	Standard product

△=Blank Space

EXTERNAL DIMENSIONS/STANDARD QUANTITY



Type	A	B	C
1608	0.55	0.70	1.00
2012	0.60	1.00	1.45
2016	0.60	1.00	1.80
2515	0.60	1.50	1.70
2518	0.60	1.50	2.00
3225	0.85	1.70	2.70

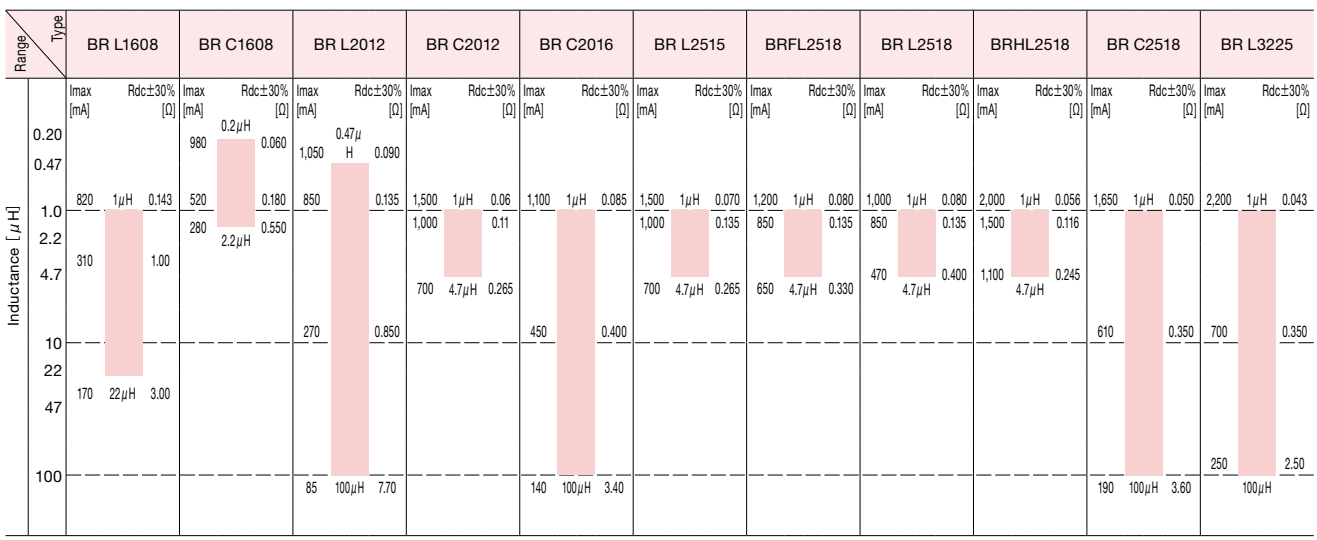
Unit : mm

Recommended Land Patterns
Surface Mounting
・Mounting and soldering conditions should be checked beforehand.
・Applicable soldering process to this products is reflow soldering only.

Type	L	W	T	e	Standard Quantity [pcs] Paper Tape	Embossed Tape
BR L1608	1.6±0.2 (0.063±0.008)	0.8±0.2 (0.031±0.008)	0.7 max (0.028 max)	0.45±0.15 (0.016±0.006)	—	3000
BR C1608	1.6±0.2 (0.063±0.008)	0.8±0.2 (0.031±0.008)	0.8±0.2 (0.031±0.008)	0.45±0.15 (0.016±0.006)	—	3000
BR L2012	2.00±0.20 (0.078±0.008)	1.25±0.20 (0.049±0.008)	1.00 max (0.040 max)	0.5±0.2 (0.020±0.008)	—	3000
BR C2012	2.00±0.20 (0.078±0.008)	1.25±0.20 (0.049±0.008)	1.4 max (0.056 max)	0.5±0.2 (0.020±0.008)	—	2000
BR C2016	2.00±0.20 (0.078±0.008)	1.6±0.20 (0.063±0.008)	1.6±0.20 (0.063±0.008)	0.5±0.2 (0.020±0.008)	—	2000
BR L2515	2.5±0.2 (0.098±0.008)	1.5±0.2 (0.060±0.008)	1.2 max (0.048 max)	0.5±0.2 (0.020±0.008)	—	2000
BRFL2518	2.5±0.2 (0.098±0.008)	1.8±0.2 (0.071±0.008)	1.00 max (0.040 max)	0.5±0.2 (0.020±0.008)	—	3000
BR L2518	2.5±0.2 (0.098±0.008)	1.8±0.2 (0.071±0.008)	1.2 max (0.048 max)	0.5±0.2 (0.020±0.008)	—	3000
BRHL2518	2.5±0.2 (0.098±0.008)	1.8±0.2 (0.071±0.008)	1.5 max (0.060 max)	0.5±0.2 (0.020±0.008)	—	2000
BR C2518	2.5±0.2 (0.098±0.008)	1.8±0.2 (0.071±0.008)	1.8±0.2 (0.071±0.008)	0.5±0.2 (0.020±0.008)	—	2000
BR L3225	3.2±0.2 (0.126±0.008)	2.5±0.2 (0.098±0.008)	1.7 max (0.068 max)	0.75±0.2 (0.03±0.008)	—	2000

Unit : mm

AVAILABLE INDUCTANCE RANGE



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PART NUMBERS

●1608(0603)TYPE

Ordering code		EMS	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz](min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [MHz]
							Saturation current Idc1	Temperture rise current Idc2	
BR L1608T1R0M		RoHS	1.0	±20%	300	0.143	525	820	1.0
BR L1608T1R5M		RoHS	1.5		250	0.275	405	590	
BR L1608T2R2M		RoHS	2.2		200	0.405	335	490	
BR L1608T3R3M		RoHS	3.3		190	0.590	255	450	
BR L1608T4R7M		RoHS	4.7		150	1.00	225	310	
BR L1608T6R8M		RoHS	6.8		60	1.17	180	290	
BR L1608T100M		RoHS	10		30	2.00	160	220	
BR L1608T150M		RoHS	15		15	2.45	125	200	
BR L1608T220M		RoHS	22		13	3.00	100	170	

Ordering code		EMS	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz](min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [MHz]
							Saturation current Idc1	Temperture rise current Idc2	
BR C1608TR20M		RoHS	0.20	±20%	400	0.060	1,750	980	7.96
BR C1608TR35M		RoHS	0.35		300	0.080	1,400	810	
BR C1608TR45M		RoHS	0.45		200	0.090	1,250	800	
BR C1608TR56M		RoHS	0.56		170	0.095	1,150	760	
BR C1608TR77M		RoHS	0.77		150	0.110	1,000	660	
BR C1608T1R0M		RoHS	1.00		140	0.180	850	520	
BR C1608T1R5M		RoHS	1.50		120	0.300	700	410	
BR C1608T2R2M		RoHS	2.20		100	0.550	550	280	

●2012(0805)TYPE

Ordering code		EMS	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz](min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [MHz]
							Saturation current Idc1	Temperture rise current Idc2	
BR L2012TR47M		RoHS	0.47	±20%	350	0.090	1,100	1,050	7.96
BR L2012T1R0M		RoHS	1.0		300	0.135	850	850	
BR L2012T1R5M		RoHS	1.5		250	0.180	700	750	
BR L2012T2R2M		RoHS	2.2		200	0.300	600	550	
BR L2012T3R3M		RoHS	3.3		190	0.500	490	440	
BR L2012T4R7M		RoHS	4.7		150	0.550	340	400	
BR L2012T6R8M		RoHS	6.8		60	0.750	290	350	
BR L2012T100M		RoHS	10		30	0.850	270	330	2.52
BR L2012T150M		RoHS	15		15	1.00	220	300	
BR L2012T220M		RoHS	22		13	1.30	190	270	
BR L2012T330M		RoHS	33		8.0	2.00	150	220	
BR L2012T470M		RoHS	47		7.0	3.50	125	160	
BR L2012T680M		RoHS	68		6.5	5.80	100	110	
BR L2012T101M		RoHS	100		6.0	7.70	85	85	0.796

Ordering code		EMS	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz](min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [MHz]
							Saturation current Idc1	Temperture rise current Idc2	
BR C2012T1R0M		RoHS	1.0	±20%	490	0.060	1,500	1,400	1.0
BR C2012T1R5MD		RoHS	1.5		390	0.090	1,200	1100	
BR C2012T2R2MD		RoHS	2.2		350	0.110	1,100	1000	
BR C2012T3R3MD		RoHS	3.3		300	0.170	800	870	
BR C2012T4R7MD		RoHS	4.7		250	0.265	700	600	

●2016(0806)TYPE

Ordering code		EMS	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz](min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [MHz]
							Saturation current Idc1	Temperture rise current Idc2	
BR C2016T1R0M		RoHS	1.0	±20%	450	0.085	1,350	1,100	0.10
BR C2016T1R5M		RoHS	1.5		370	0.150	1,100	820	
BR C2016T2R2M		RoHS	2.2		250	0.180	910	760	
BR C2016T3R3M		RoHS	3.3		140	0.220	740	680	
BR C2016T4R7M		RoHS	4.7		78	0.270	660	610	
BR C2016T6R8M		RoHS	6.8		39	0.330	550	560	
BR C2016T100□		RoHS	10	±10% ±20%	35	0.400	450	520	
BR C2016T150□		RoHS	15		28	0.60	400	410	
BR C2016T220□		RoHS	22		24	1.00	310	310	
BR C2016T330□		RoHS	33		13	1.70	270	240	
BR C2016T470□		RoHS	47		11	2.20	210	210	
BR C2016T680□		RoHS	68		8	2.80	200	190	
BR C2016T101□		RoHS	100		7	3.40	140	170	

・Please specify the inductance tolerance code. (M or K)

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20℃)
※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40℃. (at 20℃)

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PART NUMBERS

●2515(1006)TYPE

Ordering code		EMS	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz](min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [MHz]
							Saturation current Idc1	Temperture rise current Idc2	
BR L2515T1R0M		RoHS	1.0	±20%	160	0.070	1,500	1,350	1.0
BR L2515T1R5M		RoHS	1.5		130	0.100	1,200	1150	
BR L2515T2R2M		RoHS	2.2		100	0.135	1,000	1000	
BR L2515T3R3MD		RoHS	3.3		70	0.215	800	750	
BR L2515T4R7MD		RoHS	4.7		60	0.265	650	700	

●2518(1007)TYPE

Ordering code		EMS	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz](min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [MHz]
							Saturation current Idc1	Temperture rise current Idc2	
BRFL2518T1R0M		RoHS	1.0	±20%	130	0.090	1200	1200	1.0
BRFL2518T1R5M		RoHS	1.5		100	0.110	1100	1000	
BRFL2518T2R2M		RoHS	2.2		80	0.130	850	950	
BRFL2518T3R3M		RoHS	3.3		70	0.220	700	700	
BRFL2518T4R7M		RoHS	4.7		60	0.330	650	650	

Ordering code		EMS	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz](min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [MHz]
							Saturation current Idc1	Temperture rise current Idc2	
BR L2518T1R0M		RoHS	1.0	±20%	130	0.080	1300	1000	7.96
BR L2518T1R5M		RoHS	1.5		100	0.100	1200	920	
BR L2518T2R2M		RoHS	2.2		80	0.135	900	850	
BR L2518T3R3M		RoHS	3.3		70	0.300	750	580	
BR L2518T4R7M		RoHS	4.7		60	0.400	650	470	

Ordering code		EMS	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz](min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [MHz]
							Saturation current Idc1	Temperture rise current Idc2	
BRHL2518T1R0M		RoHS	1.0	±20%	100	0.055	2,000	1,400	1.0
BRHL2518T1R5M		RoHS	1.5		80	0.085	1,700	1100	
BRHL2518T2R2M		RoHS	2.2		68	0.115	1,500	1000	
BRHL2518T3R3MD		RoHS	3.3		54	0.165	1,200	800	
BRHL2518T4R7MD		RoHS	4.7		46	0.245	1,100	750	

Ordering code		EMS	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz](min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [MHz]
							Saturation current Idc1	Temperture rise current Idc2	
BR C2518T1R0M		RoHS	1.0	±20%	280	0.050	2,550	1,650	1.0
BR C2518T1R5M		RoHS	1.5		230	0.080	2,100	1300	
BR C2518T2R2M		RoHS	2.2		200	0.120	1,800	1000	
BR C2518T3R3M		RoHS	3.3		150	0.175	1,450	860	
BR C2518T4R7M		RoHS	4.7		100	0.230	1,250	750	
BR C2518T6R8M		RoHS	6.8		45	0.280	1050	680	
BR C2518T100□		RoHS	10	±10% ±20%	20	0.350	890	610	
BR C2518T150□		RoHS	15		13	0.43	760	550	
BR C2518T220□		RoHS	22		10	0.56	640	490	
BR C2518T330□		RoHS	33		8	0.85	560	390	
BR C2518T470□		RoHS	47		6.5	1.45	410	300	
BR C2518T680□		RoHS	68		5.5	2.40	340	230	
BR C2518T101□		RoHS	100		4.5	3.60	300	190	

●3225(1210)TYPE

Ordering code		EMS	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz](min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [MHz]
							Saturation current Idc1	Temperture rise current Idc2	
BR L3225TR27M		RoHS	0.27	±20%	390	0.022	4,500	2,850	7.96
BR L3225TR36M		RoHS	0.36		350	0.025	4,300	2,750	
BR L3225TR51M		RoHS	0.51		270	0.029	3,600	2,550	

Ordering code		EMS	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz](min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [MHz]
							Saturation current Idc1	Temperture rise current Idc2	
BR L3225T1R0M		RoHS	1.0	±20%	220	0.043	2,400	2,200	0.1
BR L3225T1R5M		RoHS	1.5		170	0.045	2,200	1,750	
BR L3225T2R2M		RoHS	2.2		150	0.065	1,850	1,600	
BR L3225T3R3M		RoHS	3.3		140	0.120	1,450	1,200	
BR L3225T4R7M		RoHS	4.7		120	0.180	1,300	1,000	
BR L3225T6R8M		RoHS	6.8		90	0.270	1,050	770	
BR L3225T100□		RoHS	10	±10% ±20%	70	0.350	900	700	
BR L3225T150□		RoHS	15		20	0.570	700	530	
BR L3225T220□		RoHS	22		13	0.690	550	470	
BR L3225T330□		RoHS	33		9	0.840	470	420	
BR L3225T470□		RoHS	47		7	1.00	420	390	
BR L3225T680□		RoHS	68		6	1.40	330	300	
BR L3225T101□		RoHS	100		5	2.50	270	250	

・Please specify the inductance tolerance code. (M or K)

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20℃)
※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40℃. (at 20℃)

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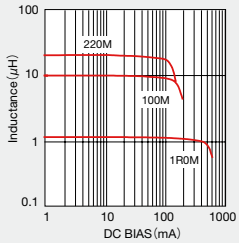
ELECTRICAL CHARACTERISTICS

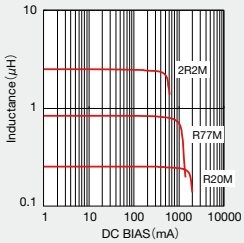
DC Bias characteristics

Measured by HP4285A

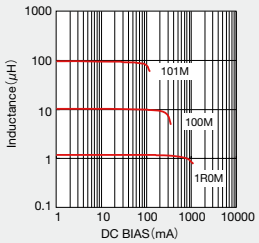
BRL1608



BRC1608



BRL2012



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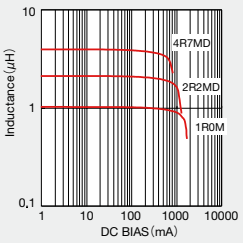
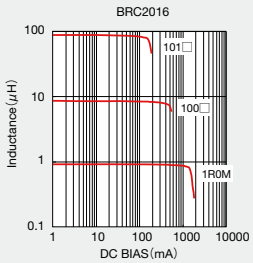
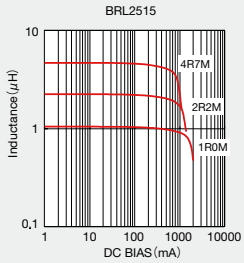


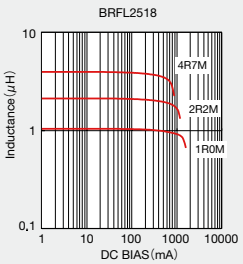
BRC2016



BRL2515



BRFL2518



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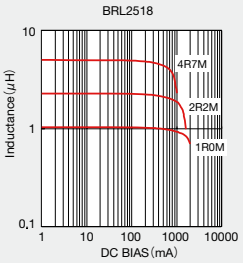
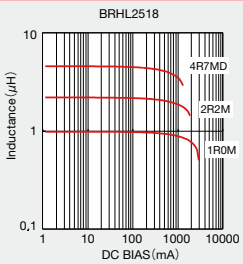
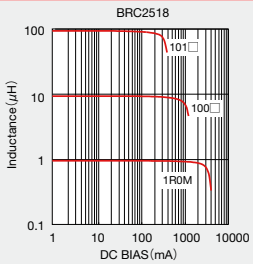


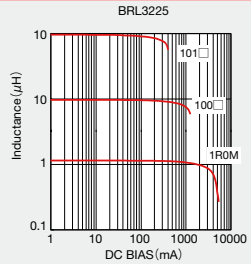
BRHL2518



BRC2518



BRL3225



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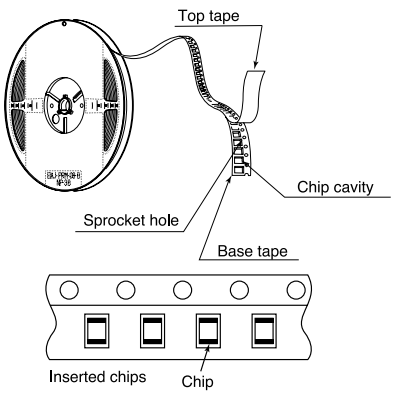
PACKAGING

①Minimum Quantity

Type	Standard Quantity [pcs]	
	Paper Tape	Embossed Tape
BR C1608	—	3,000
BR L1608	—	3,000
BR L2012	—	3,000
BR C2012	—	2,000
BR C2016	—	2,000
BR L2515	—	2,000
BR C2518	—	2,000
BRHL2518	—	2,000
BR L2518	—	3,000
BRFL2518	—	3,000
BR L3225	—	2,000

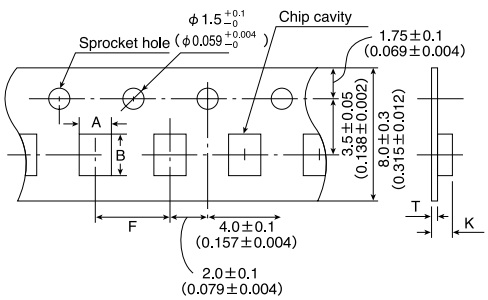
②Tape Material

Embossed tape
Card board carrier tape



③Taping dimensions

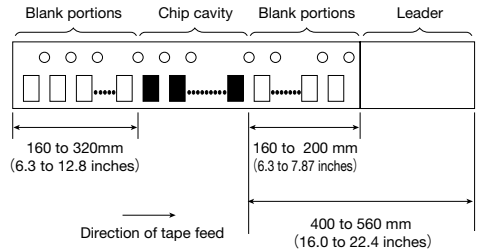
- Embossed Tape 8mm wide (0.315 inches wide)
- Card board carrier tape 8mm wide (0.315 inches wide)



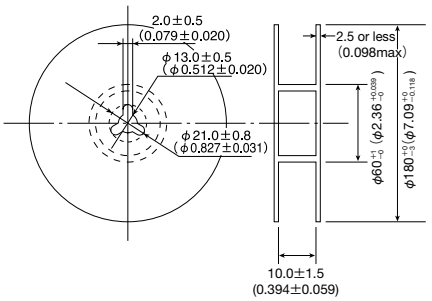
形式	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
BR L1608	1.10±0.05 (0.044±0.002)	1.90±0.05 (0.076±0.002)	4.0±0.1 (0.157±0.004)	0.20±0.05 (0.008±0.002)	0.85MAX (0.034MAX)
BR C1608	1.10±0.05 (0.044±0.002)	1.90±0.05 (0.076±0.002)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.01±0.002)	1.35MAX (0.054MAX)
BR L2012	1.45±0.10 (0.058±0.004)	2.20±0.10 (0.088±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.01±0.002)	1.2MAX (0.048MAX)
BR C2012	1.45±0.10 (0.058±0.004)	2.37±0.1 (0.095±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.01±0.002)	1.59MAX (0.064MAX)
BR C2016	1.9±0.20 (0.075±0.008)	2.2±0.20 (0.087±0.008)	4.0±0.1 (0.157±0.004)	0.3±0.05 (0.012±0.002)	2.15MAX (0.085MAX)
BR L2515	1.80±0.20 (0.072±0.008)	2.80±0.20 (0.112±0.008)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.01±0.002)	1.45MAX (0.058MAX)
BRFL2518	2.15±0.2 (0.085±0.008)	2.8±0.10 (0.112±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.01±0.002)	1.25MAX (0.05MAX)
BR L2518	2.3±0.1 (0.092±0.004)	2.8±0.10 (0.112±0.004)	4.0±0.1 (0.157±0.004)	0.3±0.05 (0.012±0.002)	1.5 MAX (0.060)
BRHL2518	2.10±0.1 (0.084±0.04)	2.80±0.1 (0.112±0.004)	4.0±0.1 (0.157±0.004)	0.3±0.05 (0.012±0.002)	1.70MAX (0.068MAX)
BR C2518	2.15±0.2 (0.085±0.008)	2.7±0.2 (0.107±0.008)	4.0±0.1 (0.157±0.004)	0.3±0.05 (0.012±0.002)	2.10MAX (0.083MAX)
BR L3225	2.80±0.10 (0.112±0.004)	3.5±0.10 (0.140±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.01±0.002)	1.75MAX (0.075)

Unit : mm (inch)

④Leader and Blank portion

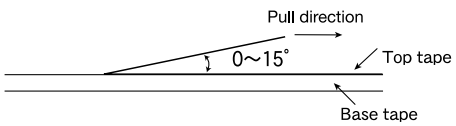


⑤Reel size



⑥Top Tape Strength

The top tape requires a peel-off force of 0.2 to 0.7N in the direction of the arrow as illustrated below.



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RELIABILITY DATA

Wound Chip power inductor(BR-series)

1. Operating Temperature Range	
All of BR-series	−40～+105℃

【Test Method and Remarks】
Including self-generated heat

2. Storage Temperature Range(after soldering)	
All of BR-series	−40～+85℃

【Test Method and Remarks】
Please refer the term of "7.Storage conditions" in Precautions.

3. Rated current	
All of BR-series	Within the specified tolerance

4. Inductance	
All of BR-series	Within the specified tolerance

【Test Method and Remarks】
LCR Meter ： HP 4285A or equivalent, Measuring frequency ： Specified frequency

5. DC Resistance	
All of BR-series	Within the specified tolerance

【Test Method and Remarks】
DC ohmmeter ： HIOKI 3227 or equivalent

6. Self resonance frequency	
All of BR-series	Within the specified tolerance

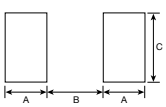
【Test Method and Remarks】
Inpedance analyzer/material analyzer : HP4291A or equivalent HP4191A, 4192A or equivalent

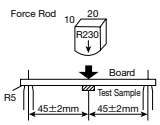
7. Temperature characteristic	
All of BR-series	Inductance change ： Within ±15%

【Test Method and Remarks】
Based on the inductance at 20℃ and Measured at the ambient of −40℃～+85℃.

8. Resistance to the bendability	
All of BR-series	No damage.

【Test Method and Remarks】
The given sample is soldered on the board and then the back side of the board is pushed until it bends 2mm like the figure.
Dimension of the board : 100×40×1.0mm (0.8mm thickness for 1608(0603) inductors)
Material of the board : Glass-epoxy
Thickness of soldering paste : 0.12mm





Type	A	B	C
1608	0.55	0.80	1.00
2012	0.65	0.90	1.40
2016	0.70	0.60	1.80
2518	0.65	1.50	1.95
3225	1.00	1.60	2.70

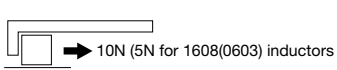
Unit : mm

9. Temperature characteristic	
All of BR-series	No damage.

【Test Method and Remarks】
2012～ Appiled force ： 10N
Duration ： 10sec.
1608size Appiled force ： 5N
Duration ： 10sec.

10. Adhesion of terminal electrodes	
All of BR-series	Not to removed from the board.

【Test Method and Remarks】
The given sample is soldered to the board and then it is kept for 5sec with 10N stress (5N for 1608(0603) inductors) like the figure.



11. Resistance to vibration	
All of BR-series	Inductance change ： Within ±10% No significant abnormality in appearance.

【Test Method and Remarks】
The given sample is soldered to the board and then it is tested depending on the conditions of the following table.

Vibration Frequency	10～55Hz	
Total Amplitude	1.5mm (May not exceed acceleration 196m/s^2)	
Sweeping Method	10Hz to 55Hz to 10Hz for 1min.	
Time	X	For 2 hours on each X, Y, and Z axis.
	Y	
	Z	

Recovery ： At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

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RELIABILITY DATA

Wound Chip power inductor (BR-series)

12. Solderability

All of BR-series	At least 90% area of the electrodes is covered by new solder.

【Test Method and Remarks】
The given sample is dipped into the flux and then it is tested depending on the conditions of the following table.
Flux : Methanol solution containing rosin 25%.

Solder Temperature	245±5℃
Time	5±0.5 sec.

13. Resistance to soldering heat

All of BR-series	Inductance change : Within ±10% No significant abnormality in appearance.

【Test Method and Remarks】
3 times reflow having the temparature profile of 5sec of 260$^{+0}_{-5}$℃ and 40sec of more than 230℃.

Test board thickness : 1.0mm
Test board material : glass epoxy-resin

14. Thermal shock

All of BR-series	Inductance change : Within ±10% No significant abnormality in appearance.

【Test Method and Remarks】
The given sample is soldered to the board and then its Inductance is measured after 100cycles of the following conditions.

Conditions of 1 cycle		
Step	Temperature (℃)	Duration (min)
1	−40±3	30±3
2	Room temperature	Within 3
3	+85±2	30±3
4	Room temperature	Within 3

15. Damp heat

All of BR-series	Inductance change : Within ±10% No significant abnormality in appearance.

【Test Method and Remarks】
The given sample is soldered to the board and then it is kept at the following conditions.

Temperature	60±2℃
Humidity	90～95%RH
Time	1000 hours.

Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.

16. Loading under damp heat

All of BR-series	Inductance change : Within ±10% No significant abnormality in appearance.

【Test Method and Remarks】
The given sample is soldered to the board and then it is kept at the following conditions.

Temperature	60±2℃
Humidity	90～95%RH
Applied current	Rated current
Time	1000hours.

Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.

17. Low temperature life test

All of BR-series	Inductance change : Within ±10% No significant abnormality in appearance.

【Test Method and Remarks】
The given sample is soldered to the board and then it is kept at the following conditions.

Temperature	−40±2℃
Duration	1000hours

Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.

18. High temperature life test

All of BR-series	Inductance change : Within ±10% No significant abnormality in appearance.

【Test Method and Remarks】
The given sample is soldered to the board and then it is kept at the following conditions.

Temperature	85±2℃
Duration	1000hours

Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.

19. Standard conditions

All of BR-series	Standard test condition : Unless otherwise specified, temperature is 20±15℃ and 65±20%of relative humidity. When there is any question concerning measurement result: In order to provide correlation data, the test shall be condition of 20±2℃ of temperature, 65±5% relative humidity. Inductance is in accordance with our measured value.

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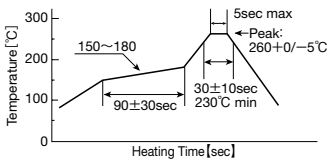
PRECAUTIONS

Wound Chip power inductor(BR-series)

1. Circuit Design	
Precautions	◆Operationg Ambient The products are premised on the usage for the general equipments like the office supply equipment, the telecommunications systems, the measuring equipment, the household equipment and so on. Please ask to TAIYO YUDEN's sales person in advance, if you need to apply them to the equipments or the systems which might have any influences for the human body, the property, like the traffic systems, the safety equipment, the aerospace systems, the nuclear control systems, the medical equipment and so on.

2. PCB Design	
Precautions	◆Land pattern design 1. Please refer to a recommended land pattern.
Technical consider-ations	◆Land pattern design Surface Mounting 1. The conditions of the picking and placing should be checked in advence. 2. The products are only for reflow soldering.

3. Considerations for automatic placement	
Precautions	◆Adjustment of mounting machine 1. Excessive fisical impact should not be imposed on the products for picking and placing onto the PC boards. 2. Mounting and soldering conditions should be checked in advance.
Technical consider-ations	◆Adjustment of mounting machine The products might be broken if too much stress is given for the picking and placing.

4. Soldering	
Precautions	◆Reflow soldering 1. Please apply our recommended soldering conditions on the specification as much as possible. 2. The products are only for reflow soldering. 3. Please do not give any stress to a product until it returns in room temperature after reflow soldering. ◆Lead free soldering 1. Please check the adhesion, the solder temperature, the solderability and the shape of solder filet if the solder that is not in the specification is used. ◆Recommended conditions for using a soldering iron (NR10050 Type) Touch a soldering iron to the land pattern not to the product directly. The temperature of a soldering iron is less than 350degC. The soldering is for 3 seconds or less.
Technical consider-ations	◆Reflow soldering 1. The product might break or might make the tombstoning, if the soldering conditions are too far from our recommended conditions. 

5. Cleaning	
Precautions	◆Cleaning conditions 1. Please don't wash by the ultra-sonic waves.
Technical consider-ations	◆Cleaning conditions 1. Washing by the ultra-sonic waves might break the product.

6. Handling	
Precautions	◆Handling 1. Keep the product away from any magnets. ◆Cutting the PC boards 1. Please don't give any stress of the bending or the twisting for the cutting process of PC boards. 2. Please don't give any shock and stress to the products in transportation. ◆Mechanical considerations 1. Please don't give too much shock to the product. 2. Please don't give any shock and stress to the products in transportation. ◆The stress for picking and placing 1. Please don't give any shock into an exposed ferrite core. ◆Packing 1. Please don't pile the packing boxes up as much as possible.
Technical consider-ations	◆Cutting the PC boards 1. Please don't give the bending stress or the twisting stress to the products because they might break in such cases. ◆Mechanical considerations 1. The mechnical shock might break the products. 2. The products might break depending on the handling in transportation. ◆Pick-up pressure 1. The electrical characteristics of the products might be shifted by too much ficical shock and stress. ◆Packing 1. The products and the tape might break, if the packing boxes are piled up.

7. Storage conditions	
Precautions	◆Storage 1. The packing boxes can be kept at the ambient which the temperature is from 0 to 40degC and the humidity is less than 70%. 2. Tthe ambient temperature of less than 30degC is recommended not to get the tape and the solderability worse. 3. Please solder the products by a half year after they have been shipped. Otherwise please use them after checking the solderability in advance.
Technical consider-ations	◆Storage 1. The ambient of high temperature or high humidity might accelerate to make the solderability and the tape worse.

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SMD INDUCTORS LOW PROFILE TYPE

REFLOW

FEATURES

- Small and Low profile inductor.
- It corresponds to High current.
- Simple and original magnetic shield structure.
- Durable structure against dropping impact.

APPLICATIONS

- For small DC/DC converter
  (cellular Phone, HDD, DVC, DSC, PDA, LCD display etc).

OPERATING TEMP.

- −25℃～120℃ (Including self-generated heat)

ORDERING CODE

N R △ 4 0 1 8 T △ 1 0 0 M △

❶Type	
NR△	Coating resin specification

△=Blank Space

❷External dimensions (W×L×H)			
3010	3.0×3.0×1.0mm	5040	5.0×5.0×4.0mm
3012	3.0×3.0×1.2mm	6012	6.0×6.0×1.2mm
3015	3.0×3.0×1.5mm	6020	6.0×6.0×2.0mm
4010	4.0×4.0×1.0mm	6028	6.0×6.0×2.8mm
4012	4.0×4.0×1.2mm	6045	6.0×6.0×4.5mm
4018	4.0×4.0×1.8mm	8040	8.0×8.0×4.0mm

❸Packaging	
T△	Tape & Reel

△=Blank Space

❹Nominal inductance (μH)	
example	
2R2	2.2
100	10
101	100

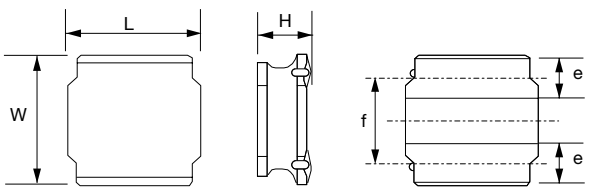
※R=decimal point

❺Inductance tolerance	
M	±20%
N	±30%

❻Internal code	
△	Standard product

△=Blank Space

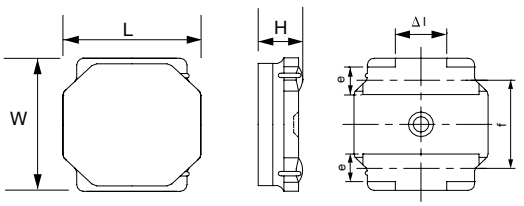
EXTERNAL DIMENSIONS/STANDARD QUANTITY



Type	L	W	H	e	f	Standard Quantity [pcs] Tape & Reel
NR3010	3.0±0.1 (0.118±0.004)	3.0±0.1 (0.118±0.004)	1.0 max (0.039 max)	0.9±0.2 (0.035±0.008)	1.9±0.2 (0.075±0.008)	2000
NR3012			1.2 max (0.047 max)			2000
NR3015			1.5 max (0.059 max)			2000
NR4010	4.0±0.2 (0.157± 0.008)	4.0±0.2 (0.157± 0.008)	1.0 max (0.039 max)	1.1±0.2 (0.043±0.008)	2.5±0.2 (0.098±0.008)	5000
NR4012			1.2 max (0.047 max)			4500
NR4018			1.8 max (0.071 max)			3500
NR8040	8.0±0.2 (0.315±0.008)	8.0±0.2 (0.315±0.008)	*1) 4.2max (0.165max) *2) 4.0max (0.157max)	1.6±0.3 (0.063±0.012)	5.6±0.3 (0.220±0.012)	1000

*1) 0R9～6R8 Type
*2) 100～101 Type

Unit : mm (inch)



Type	L	W	H	e	f	ΔI	Standard Quantity [pcs] Tape & Reel
NR5040	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	*3) 4.1max (0.161max) *4) 4.0max (0.157max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3±0.3 (0.051±0.011)	1500
NR6012 (E Type)	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	1.2 max (0.047 max)	1.35±0.2 (0.053±0.008)	4.0±0.2 (0.157±0.008)	2.3±0.3 (0.091±0.011)	1000
NR6020	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	2.0 max (0.078 max)	1.35±0.2 (0.053±0.008)	4.0±0.2 (0.157±0.008)		2500
NR6028	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	2.8 max (0.110 max)	1.35±0.2 (0.053±0.008)	4.0±0.2 (0.157±0.008)		2000
NR6045	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	4.5 max (0.177 max)	1.35±0.2 (0.053±0.008)	4.0±0.2 (0.157±0.008)		1500

*3) 1R5～100Type
*4) 150～470Type

Unit : mm (inch)

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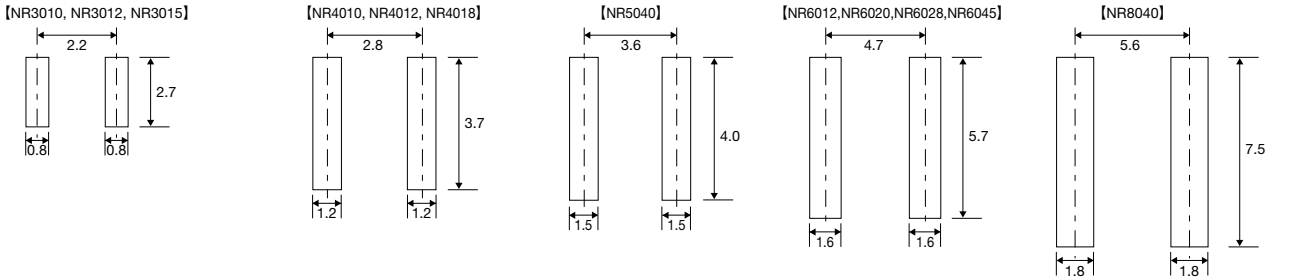
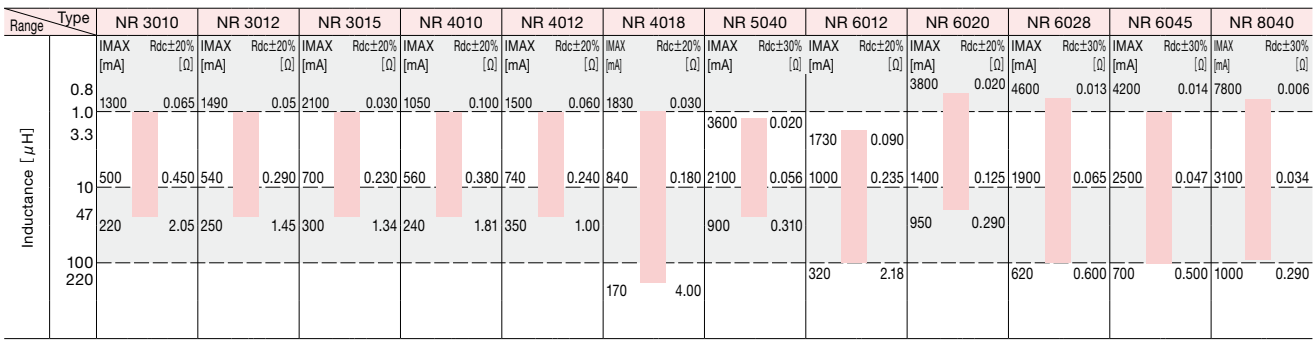
Recommended Land Patterns



Unit : mm

AVAILABLE INDUCTANCE RANGE



PART NUMBERS

NR 3010 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency (MHz) (min.)	DC Resistance [Ω] (±20%)	Rated current ※) (mA)		Measuring frequency (kHz)
							Saturation current Idc1	Temperature rise current Idc2	
NR 3010T 1R0N		RoHS	1.0	±30%	126	0.065	1,300	1,400	100
NR 3010T 1R5N		RoHS	1.5		98	0.080	1,200	1,300	
NR 3010T 2R2M		RoHS	2.2	±20%	82	0.095	1,100	1,100	
NR 3010T 3R3M		RoHS	3.3		63	0.140	870	940	
NR 3010T 4R7M		RoHS	4.7		56	0.190	750	780	
NR 3010T 6R8M		RoHS	6.8		46	0.300	610	630	
NR 3010T 100M		RoHS	10		35	0.450	500	510	
NR 3010T 150M		RoHS	15		30	0.740	400	400	
NR 3010T 220M		RoHS	22		25	1.03	350	350	
NR 3010T 330M		RoHS	33		20	1.55	260	275	
NR 3010T 470M		RoHS	47		17	2.05	220	235	

NR 3012 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency (MHz) (min.)	DC Resistance [Ω] (±20%)	Rated current ※) (mA)		Measuring frequency (kHz)
							Saturation current Idc1	Temperature rise current Idc2	
NR 3012T 1R0N		RoHS	1.0	±30%	110	0.050	1,500	1,490	100
NR 3012T 1R5N		RoHS	1.5		92	0.060	1,360	1,400	
NR 3012T 2R2M		RoHS	2.2	±20%	70	0.080	1,100	1,200	
NR 3012T 3R3M		RoHS	3.3		55	0.100	910	1,050	
NR 3012T 4R7M		RoHS	4.7		48	0.130	770	980	
NR 3012T 6R8M		RoHS	6.8		40	0.190	670	740	
NR 3012T 100M		RoHS	10		32	0.290	540	630	
NR 3012T 150M		RoHS	15		27	0.450	440	485	
NR 3012T 220M		RoHS	22		22	0.630	375	420	
NR 3012T 330M		RoHS	33		19	1.03	310	330	
NR 3012T 470M		RoHS	47		17	1.45	250	280	

NR 3015 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency (MHz) (min.)	DC Resistance [Ω] (±20%)	Rated current ※) (mA)		Measuring frequency (kHz)
							Saturation current Idc1	Temperature rise current Idc2	
NR 3015T 1R0N		RoHS	1.0	±30%	100	0.030	2,100	2,100	100
NR 3015T 1R5N		RoHS	1.5		87	0.040	1,800	1,820	
NR 3015T 2R2M		RoHS	2.2	±20%	64	0.060	1,480	1,500	
NR 3015T 3R3M		RoHS	3.3		49	0.080	1,210	1,230	
NR 3015T 4R7M		RoHS	4.7		40	0.120	1,020	1,040	
NR 3015T 6R8M		RoHS	6.8		36	0.160	870	880	
NR 3015T 100M		RoHS	10		28	0.230	700	710	
NR 3015T 150M		RoHS	15		23	0.360	560	560	
NR 3015T 220M		RoHS	22		20	0.520	470	470	
NR 3015T 330M		RoHS	33		18	0.840	390	370	
NR 3015T 470M		RoHS	47		17	1.34	320	300	

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (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.

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PART NUMBERS

NR 4010 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
							Saturation current Idc1	Temperature rise current Idc2	
NR 4010T 1R0N		RoHS	1.0	±30%	116	0.100	1,800	1,050	100
NR 4010T 2R2N		RoHS	2.2		73	0.150	1,150	890	
NR 4010T 3R3M		RoHS	3.3	±20%	58	0.180	1,100	820	
NR 4010T 4R7M		RoHS	4.7		47	0.210	900	750	
NR 4010T 6R8M		RoHS	6.8		38	0.300	740	620	
NR 4010T 100M		RoHS	10		31	0.380	560	600	
NR 4010T 150M		RoHS	15		24	0.510	470	510	
NR 4010T 220M		RoHS	22		19	0.870	360	400	
NR 4010T 330M		RoHS	33		15	1.54	280	300	
NR 4010T 470M		RoHS	47		13	1.81	240	280	

NR 4012 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
							Saturation current Idc1	Temperature rise current Idc2	
NR 4012T 1R0N		RoHS	1.0	±30%	131	0.060	2,500	1,500	100
NR 4012T 2R2M		RoHS	2.2	±20%	66	0.090	1,650	1,200	
NR 4012T 3R3M		RoHS	3.3		50	0.130	1,200	980	
NR 4012T 4R7M		RoHS	4.7		45	0.140	1,050	960	
NR 4012T 6R8M		RoHS	6.8		35	0.180	900	840	
NR 4012T 100M		RoHS	10		28	0.240	740	770	
NR 4012T 150M		RoHS	15		23	0.400	560	600	
NR 4012T 220M		RoHS	22		18	0.480	510	540	
NR 4012T 330M		RoHS	33		15	0.810	400	420	
NR 4012T 470M		RoHS	47		12	1.00	350	370	

NR 4018 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
							Saturation current Idc1	Temperature rise current Idc2	
NR 4018T 1R0N		RoHS	1.0	±30%	80	0.030	4,000	1,830	100
NR 4018T 2R2M		RoHS	2.2	±20%	52	0.060	2,700	1,440	
NR 4018T 3R3M		RoHS	3.3		44	0.070	2,000	1,230	
NR 4018T 4R7M		RoHS	4.7		34	0.090	1,700	1,200	
NR 4018T 6R8M		RoHS	6.8		29	0.110	1,450	1,060	
NR 4018T 100M		RoHS	10		24	0.180	1,200	840	
NR 4018T 150M		RoHS	15		19	0.250	940	650	
NR 4018T 220M		RoHS	22		16	0.360	800	590	
NR 4018T 330M		RoHS	33		12	0.530	650	490	
NR 4018T 470M		RoHS	47		10	0.650	570	420	
NR 4018T 680M		RoHS	68		8.3	1.00	470	320	
NR 4018T 101M		RoHS	100		6.5	1.50	400	270	
NR 4018T 151M		RoHS	150		5.5	2.50	310	220	
NR 4018T 221M		RoHS	220		4.0	4.00	270	170	

NR 5040 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [kHz]
							Saturation current Idc1	Temperature rise current Idc2	
NR 5040T 1R5N		RoHS	1.5	±30%	60	0.020	6,000	3,600	100
NR 5040T 2R2N		RoHS	2.2		42	0.022	4,600	3,500	
NR 5040T 3R3N		RoHS	3.3		32	0.027	3,800	3,300	
NR 5040T 4R7N		RoHS	4.7		28	0.029	3,300	3,100	
NR 5040T 6R8M		RoHS	6.8	±20%	21	0.049	2,600	2,300	
NR 5040T 100M		RoHS	10		18	0.056	2,300	2,100	
NR 5040T 150M		RoHS	15		13	0.080	2,000	1,800	
NR 5040T 220M		RoHS	22		9	0.126	1,600	1,400	
NR 5040T 330M		RoHS	33		7	0.180	1,300	1,200	
NR 5040T 470M		RoHS	47		6	0.310	1,100	900	

NR 6012 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
							Saturation current Idc1	Temperature rise current Idc2	
NR 6012T 2R5NE		RoHS	2.5	±30%	45	0.090	2,100	1,730	100
NR 6012T 4R0NE		RoHS	4.0		39	0.105	1,800	1,570	
NR 6012T 5R3ME		RoHS	5.3	±20%	34	0.125	1,500	1,400	
NR 6012T 6R8ME		RoHS	6.8		30	0.165	1,300	1,180	
NR 6012T 100ME		RoHS	10		22	0.235	1,000	1,000	
NR 6012T 150ME		RoHS	15		18	0.330	800	790	
NR 6012T 220ME		RoHS	22		12	0.530	760	630	
NR 6012T 330ME		RoHS	33		8	0.700	590	530	
NR 6012T 470ME		RoHS	47		6	1.05	520	460	
NR 6012T 680ME		RoHS	68		3	1.35	440	410	
NR 6012T 101ME		RoHS	100		1	2.18	350	320	

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (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.

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PART NUMBERS

NR 6020 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency (MHz) (min.)	DC Resistance [Ω] (±20%)	Rated current ※) (mA)		Measuring frequency (kHz)
							Saturation current Idc1	Temperature rise current Idc2	
NR 6020T 0R8N		RoHS	0.8	±30%	110	0.020	5,500	3,800	100
NR 6020T 1R5N		RoHS	1.5		93	0.026	4,000	3,200	
NR 6020T 2R2N		RoHS	2.2		73	0.034	3,200	2,700	
NR 6020T 3R3N		RoHS	3.3		55	0.040	2,800	2,600	
NR 6020T 4R7N		RoHS	4.7		43	0.058	2,400	2,000	
NR 6020T 6R8N		RoHS	6.8		30	0.085	2,000	1,800	
NR 6020T 100M		RoHS	10	±20%	18	0.125	1,700	1,400	
NR 6020T 220M		RoHS	22		11	0.290	1,050	950	

NR 6028 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency (MHz) (min.)	DC Resistance [Ω] (±30%)	Rated current ※) (mA)		Measuring frequency (kHz)
							Saturation current Idc1	Temperature rise current Idc2	
NR 6028T 0R9N		RoHS	0.9	±30%	90	0.013	6,600	4,600	100
NR 6028T 1R5N		RoHS	1.5		78	0.016	5,000	4,200	
NR 6028T 2R2N		RoHS	2.2		68	0.020	4,200	3,700	
NR 6028T 3R0N		RoHS	3.0		55	0.023	3,600	3,400	
NR 6028T 4R7M		RoHS	4.7	±20%	39	0.031	2,700	3,000	
NR 6028T 6R0M		RoHS	6.0		30	0.040	2,500	2,500	
NR 6028T 100M		RoHS	10		20	0.065	1,900	1,900	
NR 6028T 150M		RoHS	15		17	0.095	1,600	1,800	
NR 6028T 220M		RoHS	22		12	0.135	1,300	1,400	
NR 6028T 330M		RoHS	33		10	0.220	1,100	1,100	
NR 6028T 470M		RoHS	47		8	0.300	950	920	
NR 6028T 680M		RoHS	68		5	0.420	760	770	
NR 6028T 101M		RoHS	100		3	0.600	620	660	

NR 6045 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency (MHz) (min.)	DC Resistance [Ω] (±30%)	Rated current ※) (mA)		Measuring frequency (kHz)
							Saturation current Idc1	Temperature rise current Idc2	
NR 6045T 1R0N		RoHS	1.0	±30%	110	0.014	8,500	4,200	100
NR 6045T 1R3N		RoHS	1.3		95	0.016	8,000	4,000	
NR 6045T 1R8N		RoHS	1.8		80	0.018	7,000	3,700	
NR 6045T 2R3N		RoHS	2.3		60	0.021	6,000	3,500	
NR 6045T 3R0N		RoHS	3.0		45	0.024	5,000	3,200	
NR 6045T 4R5M		RoHS	4.5	±20%	25	0.031	4,000	3,000	
NR 6045T 6R3M		RoHS	6.3		15	0.038	3,800	2,800	
NR 6045T 100M		RoHS	10		12	0.047	3,000	2,500	
NR 6045T 150M		RoHS	15		10	0.077	2,300	1,900	
NR 6045T 220M		RoHS	22		7	0.115	1,900	1,500	
NR 6045T 330M		RoHS	33		6	0.145	1,500	1,400	
NR 6045T 470M		RoHS	47		5	0.220	1,300	1,100	
NR 6045T 680M		RoHS	68		4	0.330	1,000	900	
NR 6045T 101M		RoHS	100		3	0.500	800	700	

NR 8040 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency (MHz) (min.)	DC Resistance [Ω] (±30%)	Rated current ※) (mA)		Measuring frequency (kHz)
							Saturation current Idc1	Temperature rise current Idc2	
NR 8040T 0R9N		RoHS	0.9	±30%	85	0.006	11,000	7,800	100
NR 8040T 1R4N		RoHS	1.4		63	0.007	9,000	7,000	
NR 8040T 2R0N		RoHS	2.0		50	0.009	7,400	6,300	
NR 8040T 3R6N		RoHS	3.6		34	0.015	5,300	4,900	
NR 8040T 4R7N		RoHS	4.7		30	0.018	4,700	4,100	
NR 8040T 6R8N		RoHS	6.8		24	0.025	4,000	3,700	
NR 8040T 100M		RoHS	10	±20%	22	0.034	3,400	3,100	
NR 8040T 150M		RoHS	15		16	0.050	2,700	2,400	
NR 8040T 220M		RoHS	22		13	0.066	2,200	2,200	
NR 8040T 330M		RoHS	33		12	0.100	1,900	1,700	
NR 8040T 470M		RoHS	47		8	0.150	1,500	1,400	
NR 8040T 680M		RoHS	68		7	0.230	1,200	1,100	
NR 8040T 101M		RoHS	100		6	0.290	1,000	1,000	

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (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.

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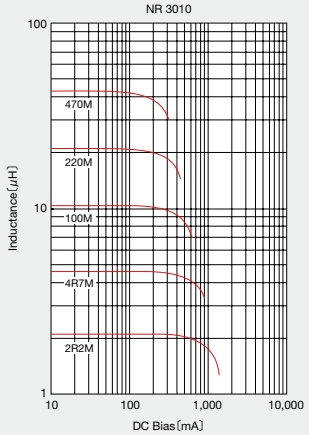
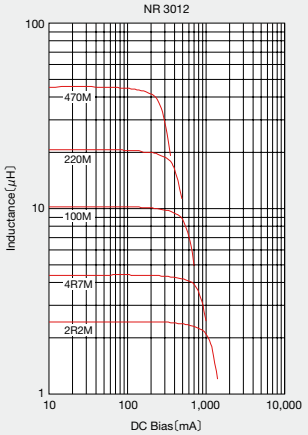
DC Bias characteristics

(Measured by HP4285A)

NR 3010



NR 3012



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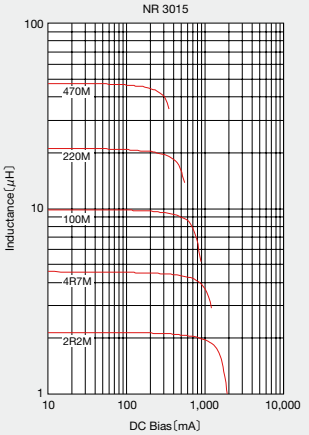
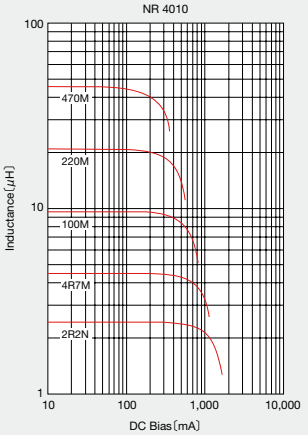
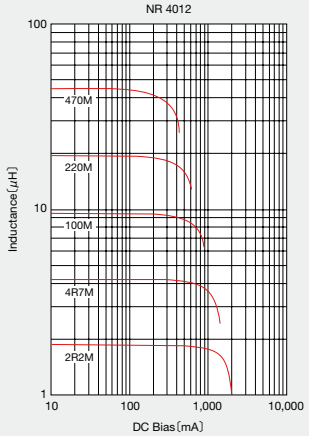


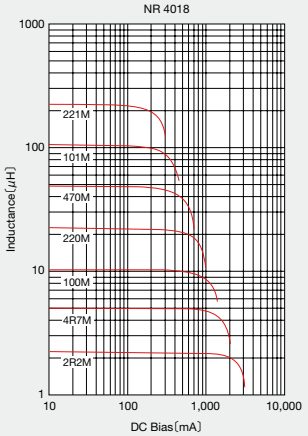
NR 4010



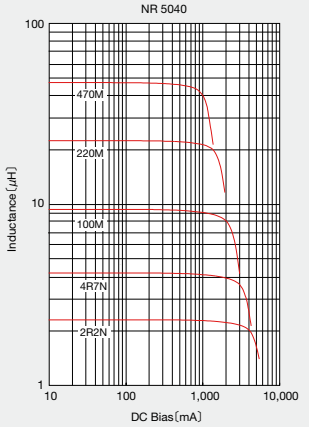
NR 4012



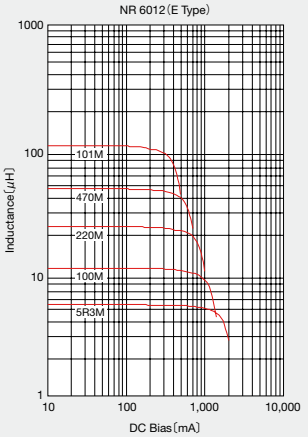
NR 4018



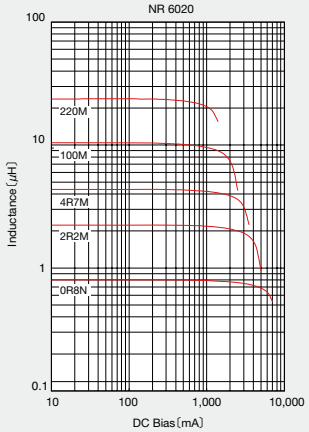
NR 5040



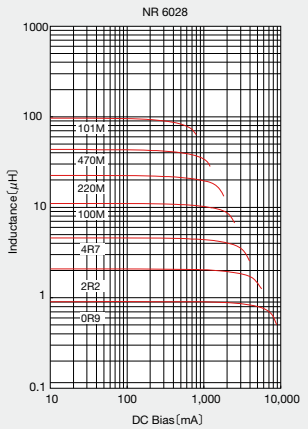
NR 6012(E Type)



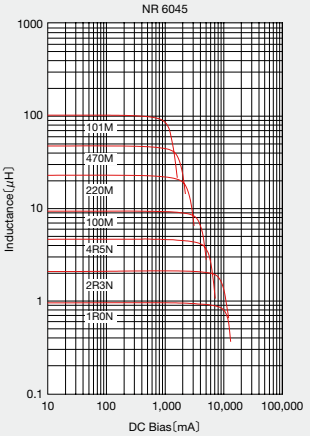
NR 6020



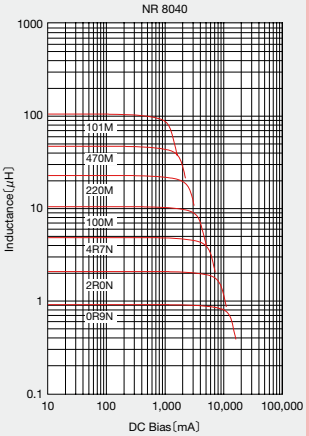
NR 6028



NR 6045



NR 8040



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SMD INDUCTORS SMALL AND LARGE CURRENT TYPE

REFLOW

FEATURES

- Small and Low profile inductor.
- It corresponds to High current.
- Simple and original magnetic shield structure.
- Durable structure against dropping impact.

APPLICATIONS

- For small DC/DC converter
  (cellular Phone, HDD, DVC, DSC, PDA, LCD display etc).

OPERATING TEMP.

- −25℃～120℃ (Including self-generated heat)

ORDERING CODE

N R H 2 4 1 0 T △ 1 0 0 M ○ ○ ○

❶Type	
NRH NRS NRV	Coating resin specification

❷External dimensions (W×L×H)			
2410	2.4×2.4×1.0mm	5020	4.9×4.9×1.4mm
3010	3.0×3.0×1.0mm	6010	6.0×6.0×1.0mm
3012	3.0×3.0×1.2mm	6012	6.0×6.0×1.2mm
4010	4.0×4.0×1.0mm	6020	6.0×6.0×2.0mm
4012	4.0×4.0×1.2mm	6028	6.0×6.0×2.8mm
4018	4.0×4.0×1.2mm	6045	6.0×6.0×4.5mm
5012	4.9×4.9×1.2mm	8030	8.0×8.0×3.0mm
5014	4.9×4.9×1.4mm	8040	8.0×8.0×4.0mm

❸Packaging	
T△	Tape & Reel

△=Blank Space

❹Nominal inductance (μH)	
example	
2R2	2.2
100	10
101	100

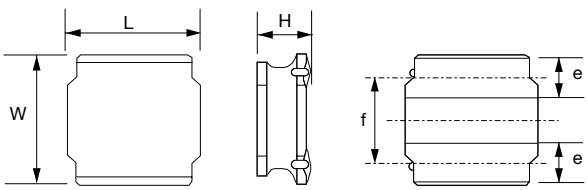
※R=decimal point

❺Inductance tolerance	
M	±20%
N	±30%

❻Internal code	
○○○	Standard products

○=Blank Space

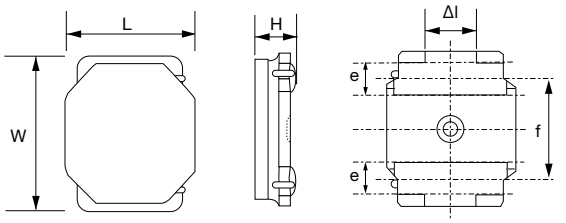
EXTERNAL DIMENSIONS/STANDARD QUANTITY



Type	L	W	H	e	f	Standard Quantity [pcs] Tape & Reel
NRH2410	2.4±0.1 (0.095±0.004)	2.4±0.1 (0.095±0.004)	1.0 max (0.039 max)	0.6±0.2 (0.024±0.008)	1.45±0.2 (0.057±0.008)	2500
NRH3010	3.0±0.1 (0.118±0.004)	3.0±0.1 (0.118±0.004)	1.0 max (0.039 max)	0.9±0.2 (0.035±0.008)	1.9±0.2 (0.075±0.008)	2000
NRH3012 NRV3012			1.2 max (0.047 max)			2000
NRS4010	4.0±0.1 (0.157±0.004)	4.0±0.1 (0.157±0.004)	1.0 max (0.039 max)	1.2±0.2 (0.047±0.008)	2.8±0.2 (0.110±0.008)	5000
NRS4012			1.2 max (0.047 max)			4500
NRS4018			1.8 max (0.071 max)			3500
NRS8030	8.0±0.2 (0.315±0.008)	8.0±0.2 (0.315±0.008)	3.0max (0.118max)	1.60±0.2 (0.053±0.008)	5.6±0.2 (0.22±0.008)	1000
NRS8040			*1) 4.2max (0.165max) *2) 4.0max (0.157max)			1000

*1) 0R9～6R8
*2) 100～101

Unit : mm (inch)

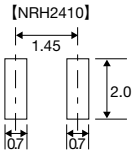


Type	L	W	H	e	f	ΔI	Standard Quantity [pcs] Tape & Reel
NRS5012	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	1.2 max (0.047 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3±0.3 (0.051±0.011)	1000
NRS5014			1.4 max (0.055 max)				1000
NRS5020			2.0 max (0.079 max)				800
NRS6010	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	1.0 max (0.039 max)	1.35±0.2 (0.053±0.008)	4.0±0.2 (0.157±0.008)	2.3±0.3 (0.091±0.011)	1000
NRS6012			1.2 max (0.047 max)				1000
NRS6020			2.0 max (0.079 max)				2500
NRS6028			2.8 max (0.110 max)				2000
NRS6045			4.5 max (0.177 max)				1500

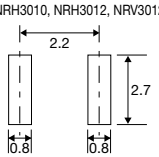
Unit : mm(inch)

Recommended Land Patterns

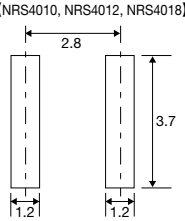
【NRH2410】



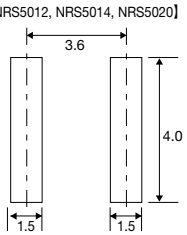
【NRH3010, NRH3012, NRV3012】



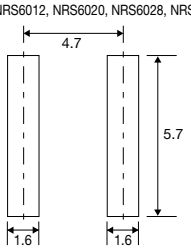
【NRS4010, NRS4012, NRS4018】



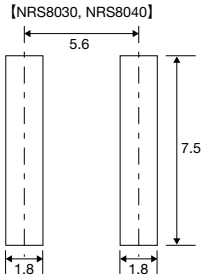
【NRS5012, NRS5014, NRS5020】



【NRS6010, NRS6012, NRS6020, NRS6028, NRS6045】



【NRS8030, NRS8040】



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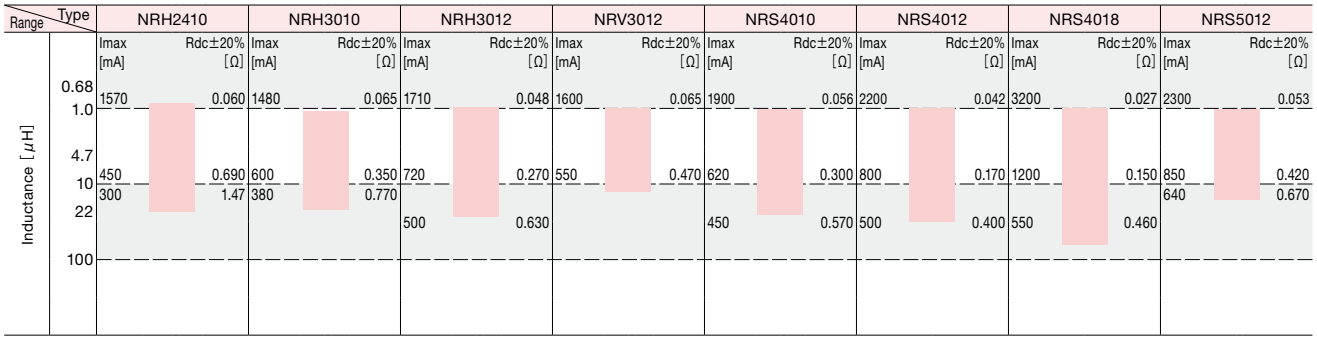
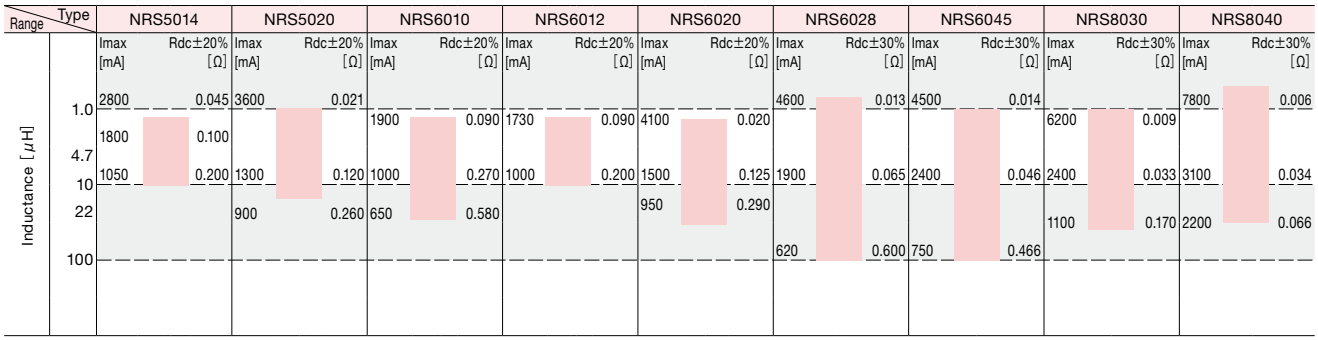
AVAILABLE INDUCTANCE RANGE





PART NUMBERS

●NRH2410 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency (MHz) (min.)	DC Resistance [Ω] (±20%)	Rated current ※) (mA)		Measuring frequency (kHz)
							Saturation current Idc1	Temperature rise current Idc2	
NRH2410T R68NN 4		RoHS	0.68	±30%	120	0.060	2,200	1,570	100
NRH2410T 1R0NN 4		RoHS	1.0		106	0.070	1,800	1,410	
NRH2410T 1R5MN		RoHS	1.5	±20%	94	0.110	1,550	1,160	
NRH2410T 2R2MN		RoHS	2.2		77	0.150	1,290	970	
NRH2410T 3R3MN		RoHS	3.3		56	0.220	1,000	770	
NRH2410T 4R7MN		RoHS	4.7		50	0.290	880	670	
NRH2410T 6R8MN		RoHS	6.8		43	0.410	750	570	
NRH2410T 100MN		RoHS	10		32	0.690	550	450	
NRH2410T 150MN		RoHS	15		27	1.02	470	370	
NRH2410T 220MN		RoHS	22		22	1.47	390	300	

●NRH3010 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency (MHz) (min.)	DC Resistance [Ω] (±20%)	Rated current ※) (mA)		Measuring frequency (kHz)
							Saturation current Idc1	Temperature rise current Idc2	
NRH3010T 1R2NN		RoHS	1.2	±30%	120	0.065	1,700	1,480	100
NRH3010T 1R5NN		RoHS	1.5		99	0.075	1,440	1,370	
NRH3010T 2R2MN		RoHS	2.2	±20%	86	0.083	1,300	1,300	
NRH3010T 3R3MN		RoHS	3.3		64	0.130	1,000	1,030	
NRH3010T 4R7MN		RoHS	4.7		50	0.170	850	900	
NRH3010T 6R8MN		RoHS	6.8		44	0.250	700	745	
NRH3010T 100MN		RoHS	10		34	0.350	600	620	
NRH3010T 150MN		RoHS	15		25	0.550	450	480	
NRH3010T 220MN		RoHS	22		22	0.770	380	410	

●NRH3012 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency (MHz) (min.)	DC Resistance [Ω] (±20%)	Rated current ※) (mA)		Measuring frequency (kHz)
							Saturation current Idc1	Temperature rise current Idc2	
NRH3012T 1R0NN		RoHS	1.0	±30%	111	0.048	2,200	1,710	100
NRH3012T 1R5NN		RoHS	1.5		95	0.055	1,700	1,600	
NRH3012T 2R2MN		RoHS	2.2	±20%	78	0.075	1,500	1,370	
NRH3012T 3R3MN		RoHS	3.3		61	0.100	1,200	1,210	
NRH3012T 4R7MN		RoHS	4.7		50	0.130	1,000	1,060	
NRH3012T 6R8MN		RoHS	6.8		43	0.190	850	890	
NRH3012T 100MN		RoHS	10		32	0.270	730	720	
NRH3012T 150MN		RoHS	15		26	0.450	530	570	
NRH3012T 220MN		RoHS	22		22	0.630	500	500	

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (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.

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PART NUMBERS

●NRV3012 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
							Saturation current Idc1	Temperature rise current Idc2	
NRV3012T 1R0N		RoHS	1.0	±30%	110	0.065	2,500	1,600	100
NRV3012T 1R5N		RoHS	1.5		92	0.075	2,100	1,400	
NRV3012T 2R2M		RoHS	2.2	±20%	70	0.120	1,800	1,100	
NRV3012T 3R3M		RoHS	3.3		55	0.150	1,600	1,000	
NRV3012T 4R7M		RoHS	4.7		48	0.190	1,250	850	
NRV3012T 6R8M		RoHS	6.8		40	0.300	950	650	
NRV3012T 100M		RoHS	10		32	0.470	800	550	

●NRS4010 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
							Saturation current Idc1	Temperature rise current Idc2	
NRS4010T 1R0NDGG		RoHS	1.0	±30%	116	0.056	2,000	1,900	100
NRS4010T 2R2MDGG		RoHS	2.2	±20%	73	0.085	1,200	1,500	
NRS4010T 3R3MDGG		RoHS	3.3		58	0.100	1,100	1,400	
NRS4010T 4R7MDGG		RoHS	4.7		47	0.140	950	1,200	
NRS4010T 6R8MDGG		RoHS	6.8		38	0.200	800	1,000	
NRS4010T 100MDGG		RoHS	10		31	0.300	620	750	
NRS4010T 150MDGG		RoHS	15		24	0.430	540	600	
NRS4010T 220MDGG		RoHS	22		19	0.570	450	500	

●NRS4012 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
							Saturation current Idc1	Temperature rise current Idc2	
NRS4012T 1R0NDGG		RoHS	1.0	±30%	100	0.042	2,800	2,200	100
NRS4012T 2R2MDGJ		RoHS	2.2	±20%	70	0.060	1,650	1,900	
NRS4012T 3R3MDGJ		RoHS	3.3		60	0.070	1,400	1,700	
NRS4012T 4R7MDGJ		RoHS	4.7		45	0.095	1,200	1,500	
NRS4012T 6R8MDGJ		RoHS	6.8		35	0.125	900	1,300	
NRS4012T 100MDGJ		RoHS	10		30	0.170	800	1,100	
NRS4012T 150MDGJ		RoHS	15		24	0.260	650	750	
NRS4012T 220MDGJ		RoHS	22		18	0.400	500	620	

●NRS4018 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
							Saturation current Idc1	Temperature rise current Idc2	
NRS4018T 1R0NDGJ		RoHS	1.0	±30%	90	0.027	4,000	3,200	100
NRS4018T 2R2MDGJ		RoHS	2.2	±20%	60	0.042	3,000	2,200	
NRS4018T 3R3MDGJ		RoHS	3.3		45	0.055	2,300	2,000	
NRS4018T 4R7MDGJ		RoHS	4.7		35	0.070	2,000	1,700	
NRS4018T 6R8MDGJ		RoHS	6.8		30	0.098	1,600	1,450	
NRS4018T 100MDGJ		RoHS	10		25	0.150	1,300	1,200	
NRS4018T 150MDGJ		RoHS	15		18	0.210	1100	850	
NRS4018T 220MDGJ		RoHS	22		15	0.290	900	720	
NRS4018T 330MDGJ		RoHS	33		12	0.460	700	550	

●NRS5012 Type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
							Saturation current Idc1	Temperature rise current Idc2	
NRS5012T 1R0NMGF		RoHS	1.0	±30%	100	0.053	4,500	2,300	100
NRS5012T 1R5NMGF		RoHS	1.5		86	0.070	3,800	2,200	
NRS5012T 2R2MMGF		RoHS	2.2	±20%	70	0.085	3,100	2,000	
NRS5012T 3R3MMGF		RoHS	3.3		48	0.160	2,400	1,450	
NRS5012T 4R7MMGF		RoHS	4.7		40	0.180	2,200	1,400	
NRS5012T 6R8MMGF		RoHS	6.8		36	0.260	1,700	1,100	
NRS5012T 100MMGF		RoHS	10		26	0.420	1,400	850	
NRS5012T 150MMGF		RoHS	15		22	0.670	1,200	640	

●NRS5014 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
							Saturation current Idc1	Temperature rise current Idc2	
NRS5014T 1R2NMGG		RoHS	1.2	±30%	86	0.045	3,800	2,400	100
NRS5014T 2R2NMGG		RoHS	2.2		56	0.065	2,800	2,000	
NRS5014T 3R3NMGG		RoHS	3.3		48	0.080	2,350	1,700	
NRS5014T 4R7NMGG		RoHS	4.7		41	0.100	2,050	1,400	
NRS5014T 6R8MMGG		RoHS	6.8	±20%	33	0.150	1600	1,200	
NRS5014T 100MMGG		RoHS	10		27	0.200	1400	1,050	

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (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.

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PART NUMBERS

NRS5020 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency (MHz) (min.)	DC Resistance [Ω] (±20%)	Rated current ※) (mA)		Measuring frequency (kHz)
							Saturation current Idc1	Temperature rise current Idc2	
NRS5020T 1R0NMGJ		RoHS	1.0	±30%	81	0.021	4,000	3,600	100
NRS5020T 1R5NMGJ		RoHS	1.5		68	0.026	3,350	3,200	
NRS5020T 2R2NMGJ		RoHS	2.2		57	0.035	2,900	2,900	
NRS5020T 3R3NMGJ		RoHS	3.3		46	0.048	2,400	2,400	
NRS5020T 4R7MMGJ		RoHS	4.7	±20%	37	0.060	2,000	2,000	
NRS5020T 6R8MMGJ		RoHS	6.8		30	0.090	1,600	1,650	
NRS5020T 100MMGJ		RoHS	10		24	0.120	1,300	1,450	
NRS5020T 150MMGJ		RoHS	15		20	0.165	1,100	1,200	
NRS5020T 220MMGJ		RoHS	22		17	0.260	900	1,000	

NRS6010 Type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency (MHz) (min.)	DC Resistance [Ω] (±20%)	Rated current ※) (mA)		Measuring frequency (kHz)
							Saturation current Idc1	Temperature rise current Idc2	
NRS6010T 1R5MMGF		RoHS	1.5	±20%	77	0.090	2,400	1,900	100
NRS6010T 2R2MMGF		RoHS	2.2		56	0.110	1,900	1,700	
NRS6010T 3R3MMGF		RoHS	3.3		42	0.135	1,600	1,500	
NRS6010T 4R7MMGF		RoHS	4.7		36	0.165	1,300	1,400	
NRS6010T 6R8MMGF		RoHS	6.8		30	0.220	1,200	1,200	
NRS6010T 100MMGF		RoHS	10		25	0.270	1,000	1,100	
NRS6010T 220MMGF		RoHS	22		12	0.580	650	700	

NRS6012 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency (MHz) (min.)	DC Resistance [Ω] (±20%)	Rated current ※) (mA)		Measuring frequency (kHz)
							Saturation current Idc1	Temperature rise current Idc2	
NRS6012T 2R5NMGG		RoHS	2.5	±30	45	0.090	2,100	1,800	100
NRS6012T 3R3NMGG		RoHS	3.3		42	0.105	1,800	1,700	
NRS6012T 4R7MMGG		RoHS	4.7	±20	36	0.125	1,600	1,550	
NRS6012T 5R3MMGJ		RoHS	5.3		34	0.125	1,500	1,550	
NRS6012T 6R8MMGJ		RoHS	6.8		30	0.165	1,300	1,350	
NRS6012T 100MMGJ		RoHS	10		22	0.200	1,000	1,200	
NRS6012T 150MMGJ		RoHS	15		18	0.295	800	800	
NRS6012T 220MMGJ		RoHS	22		12	0.465	760	650	
NRS6012T 330MMGJ		RoHS	33		8	0.580	590	550	
NRS6012T 470MMGJ		RoHS	47		6	0.965	520	460	
NRS6012T 680MMGJ		RoHS	68		3	1.160	440	410	
NRS6012T 101MMGJ		RoHS	100		1	1.670	350	320	

NRS6020 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency (MHz) (min.)	DC Resistance [Ω] (±20%)	Rated current ※) (mA)		Measuring frequency (kHz)
							Saturation current Idc1	Temperature rise current Idc2	
NRS6020T 0R8NMGG		RoHS	0.8	±30%	110	0.020	6,400	4,100	100
NRS6020T 1R5NMGJ		RoHS	1.5		93	0.026	4,300	3,600	
NRS6020T 2R2NMGJ		RoHS	2.2		73	0.034	3,200	2,900	
NRS6020T 3R3NMGJ		RoHS	3.3		55	0.040	2,800	2,750	
NRS6020T 4R7NMGJ		RoHS	4.7		43	0.058	2,400	2,150	
NRS6020T 6R8NMGJ		RoHS	6.8		30	0.085	2,000	1,800	
NRS6020T 100MMGG		RoHS	10	±20%	18	0.125	1,900	1,500	
NRS6020T 220MMGG		RoHS	22		11	0.290	1,250	950	

NRS6028 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency (MHz) (min.)	DC Resistance [Ω] (±30%)	Rated current ※) (mA)		Measuring frequency (kHz)
							Saturation current Idc1	Temperature rise current Idc2	
NRS6028T 0R9NMGJ		RoHS	0.9	±30%	90	0.013	6,700	4,600	100
NRS6028T 1R5NMGJ		RoHS	1.5		78	0.016	5,100	4,200	
NRS6028T 2R2NMGJ		RoHS	2.2		68	0.020	4,200	3,700	
NRS6028T 3R0NMGJ		RoHS	3.0		55	0.023	3,600	3,400	
NRS6028T 4R7MMGK		RoHS	4.7	±20%	39	0.031	2,700	3,000	
NRS6028T 6R0MMGK		RoHS	6.0		30	0.040	2,500	2,500	
NRS6028T 100MMGK		RoHS	10		20	0.065	1,900	1,900	
NRS6028T 150MMGJ		RoHS	15		17	0.095	1,600	1,800	
NRS6028T 220MMGJ		RoHS	22		12	0.135	1,300	1,400	
NRS6028T 330MMGJ		RoHS	33		10	0.220	1,100	1,100	
NRS6028T 470MMGJ		RoHS	47		8	0.300	1,000	920	
NRS6028T 680MMGJ		RoHS	68		5	0.420	800	770	
NRS6028T 101MMGJ		RoHS	100		3	0.600	650	660	

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (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.

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PART NUMBERS

●NRS6045 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [kHz]
							Saturation current Idc1	Temperature rise current Idc2	
NRS6045T 1R0NMGK		RoHS	1.0	±30%	110	0.014	9,800	4,500	100
NRS6045T 1R3NMGK		RoHS	1.3		95	0.016	8,200	4,200	
NRS6045T 1R8NMGK		RoHS	1.8		80	0.019	7,200	3,900	
NRS6045T 2R3NMGK		RoHS	2.3		60	0.022	6,400	3,600	
NRS6045T 3R0NMGK		RoHS	3.0		45	0.024	5,600	3,300	
NRS6045T 4R5MMGK		RoHS	4.5	±20%	25	0.030	4,400	3,100	
NRS6045T 6R3MMGK		RoHS	6.3		15	0.036	3,600	3,000	
NRS6045T 100MMGK		RoHS	10		12	0.046	3,100	2,400	
NRS6045T 150MMGK		RoHS	15		10	0.070	2,500	1,900	
NRS6045T 220MMGK		RoHS	22		7	0.107	2,000	1,600	
NRS6045T 330MMGK		RoHS	33		6	0.141	1,650	1,400	
NRS6045T 470MMGK		RoHS	47		5	0.211	1,400	1,150	
NRS6045T 680MMGK		RoHS	68		4	0.304	1,100	950	
NRS6045T 101MMGK		RoHS	100		3	0.466	900	750	

●NRS8030 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [kHz]
							Saturation current Idc1	Temperature rise current Idc2	
NRS8030T 1R0NJGJ		RoHS	1.0	±30%	120	0.009	7,800	6,200	100
NRS8030T 1R5NJGJ		RoHS	1.5		80	0.012	6,200	5,300	
NRS8030T 2R2NJGJ		RoHS	2.2		60	0.015	4,900	4,800	
NRS8030T 3R3MJGJ		RoHS	3.3	±20%	50	0.019	4,200	4,300	
NRS8030T 4R7MJGJ		RoHS	4.7		40	0.022	3,600	4,000	
NRS8030T 6R8MJGJ		RoHS	6.8		32	0.029	3,000	3,400	
NRS8030T 100MJGJ		RoHS	10		27	0.033	2,400	3,000	
NRS8030T 150MJGJ		RoHS	15		20	0.060	2,000	2,200	
NRS8030T 220MJGJ		RoHS	22		16	0.070	1,750	1,900	
NRS8030T 330MJGJ		RoHS	33		13	0.120	1,300	1,500	
NRS8030T 470MJGJ		RoHS	47		11	0.170	1,100	1,300	

●NRS8040 Shielded type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [kHz]
							Saturation current Idc1	Temperature rise current Idc2	
NRS8040T 0R9NJGJ		RoHS	0.9	±30%	85	0.006	13,000	7,800	100
NRS8040T 1R4NJGJ		RoHS	1.4		63	0.007	10,000	7,000	
NRS8040T 2R0NJGJ		RoHS	2.0		50	0.009	8,100	6,300	
NRS8040T 3R6NJGJ		RoHS	3.6		34	0.015	6,400	4,900	
NRS8040T 4R7NJGJ		RoHS	4.7		30	0.018	5,400	4,100	
NRS8040T 6R8NJGJ		RoHS	6.8		24	0.025	4,400	3,700	
NRS8040T 100MJGJ		RoHS	10	±20%	22	0.034	3,800	3,100	
NRS8040T 150MJGJ		RoHS	15		16	0.050	2,900	2,400	
NRS8040T 220MJGJ		RoHS	22		13	0.066	2,400	2,200	

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (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.

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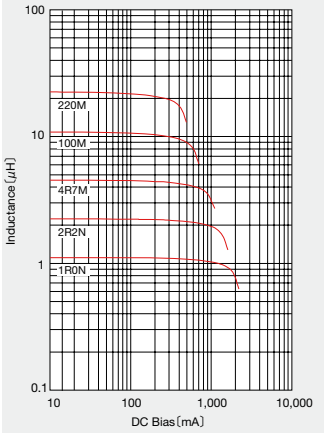
ELECTRICAL CHARACTERISTICS

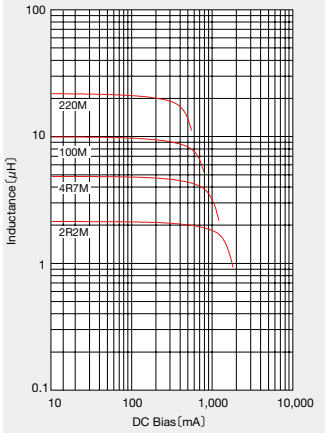
DC Bias characteristics

(Measured by HP4285A)

NRH 2410



NRH 3010



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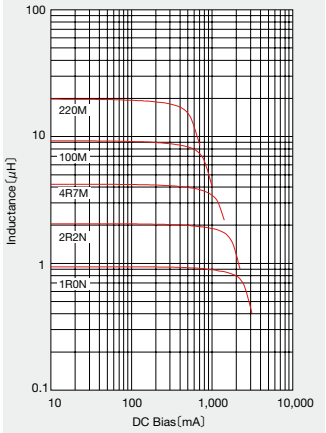

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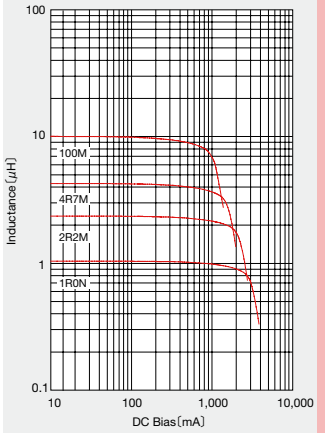
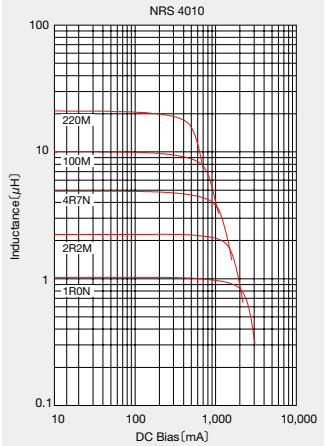


NRS 4010



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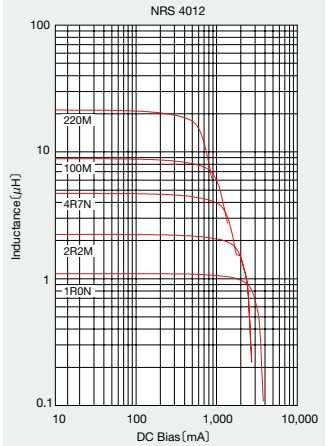
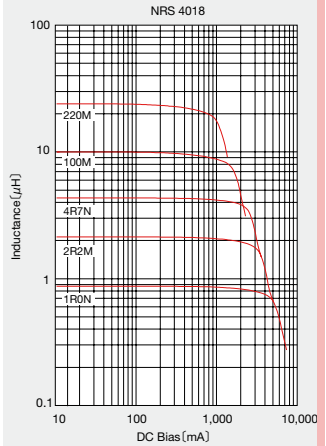
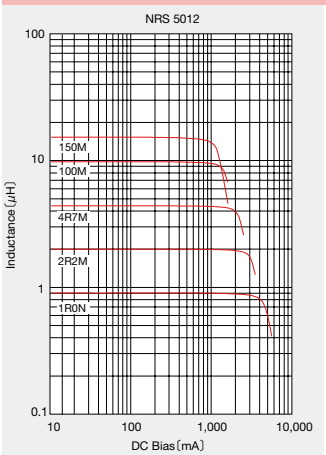


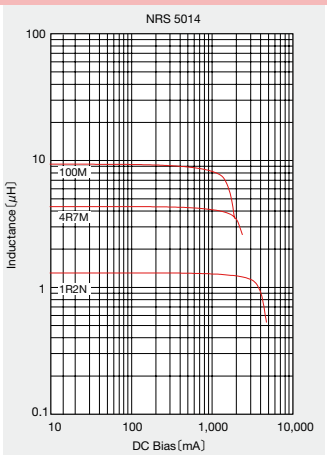
NRS 4018



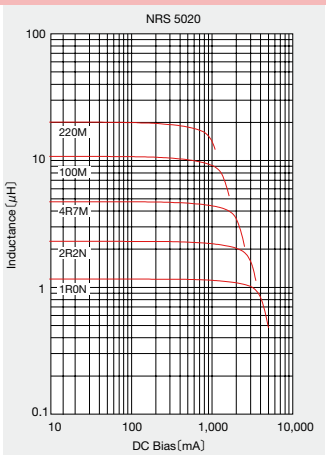
NRS 5012



NRS 5014



NRS 5020



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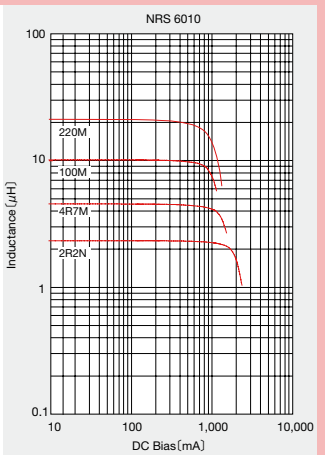

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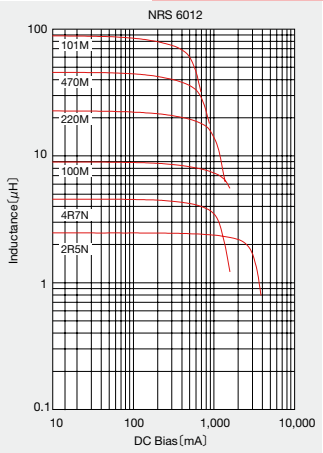
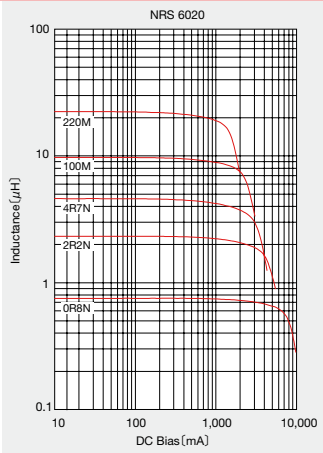
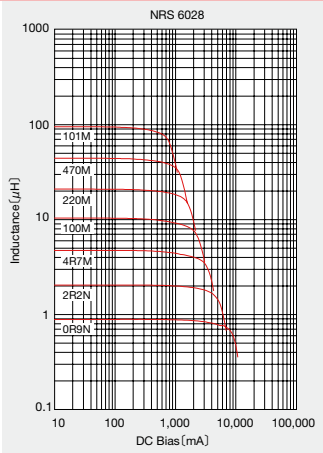
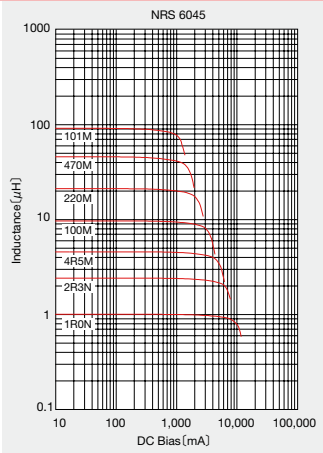
ELECTRICAL CHARACTERISTICS

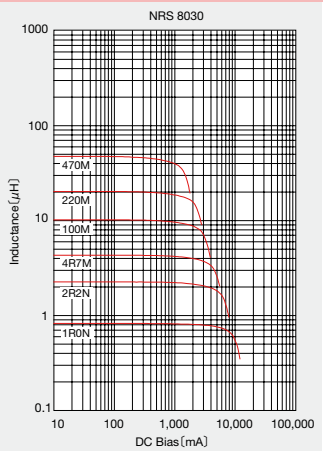
DC Bias characteristics

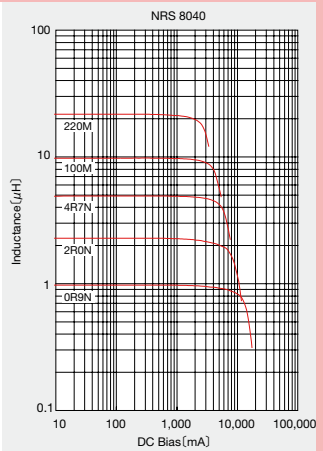












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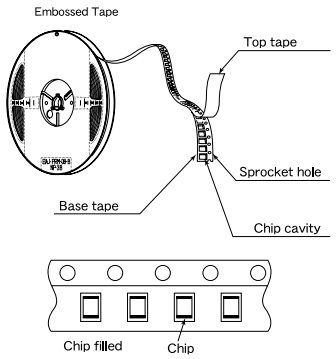
PACKAGING

①Minimum Quantity

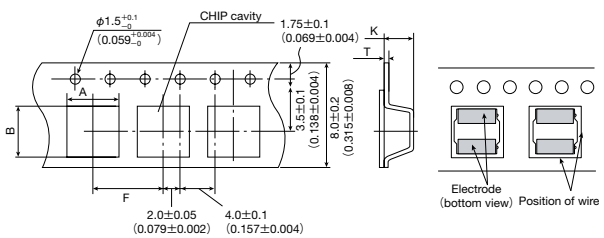
Type	Standard Quantity [pcs]
	Tape & Reel
NRH2410	2500
NR 3010/NRH3010	2000
NR 3012/NRH3012/NRV3012	2000
NR 3015	2000
NR 4010/NRS4010	5000
NR 4012/NRS4012	4500
NR 4018/NRS4018	3500
NRG4026	2000
NRS5012	1000
NRS5014	1000
NRS5020	800
NR 5040	1500
NRS6010	1000
NR 6012/NRS6012	1000
NR 6020/NRS6020	2500
NR 6028/NRS6028	2000
NR 6045/NRS6045	1500
NRS8030	1000
NR 8040/NRS8040	1000

②Tape Material



③Taping dimensions

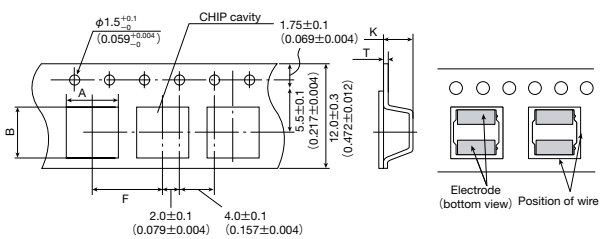
● Embossed tape 8mm wide (0.315 inches wide)



Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
NRH 2410	2.6±0.1 (0.102±0.004)	2.6±0.1 (0.102±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.009±0.002)	1.3±0.1 (0.051±0.004)
NR 3010 NRH 3010	3.2±0.1 (0.126±0.004)	3.2±0.1 (0.126±0.004)		0.3±0.05 (0.012±0.002)	1.4±0.1 (0.055±0.004)
NR 3012 NRH 3012 NRV3012					1.6±0.1 (0.063±0.004)
NR 3015					1.9±0.1 (0.075±0.004)

Unit : mm (inch)

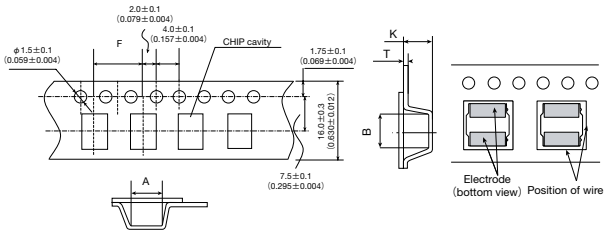
● Embossed tape 12mm wide (0.47 inches wide)



Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
NR 4010 NRS 4010	4.3±0.1 (0.169±0.004)	4.3±0.1 (0.169±0.004)	8.0±0.1 (0.315±0.004)	0.3±0.05 (0.012±0.002)	1.4±0.1 (0.055±0.004)
NR 4012 NRS 4012					1.6±0.1 (0.063±0.004)
NR 4018 NRS 4018					2.1±0.1 (0.083±0.004)
NRG 4026					3.1±0.1 (0.122±0.004)
NRS 5012	5.25±0.1 (0.207±0.004)	5.25±0.1 (0.207±0.004)			1.4±0.1 (0.055±0.004)
NRS 5014					1.6±0.1 (0.063±0.004)
NRS 5020					2.3±0.1 (0.091±0.004)
NR 5040	5.15±0.1 (0.203±0.004)	5.15±0.1 (0.203±0.004)		0.4±0.1 (0.016±0.004)	4.2±0.1 (0.165±0.004)
NRS 6010	6.3±0.1 (0.248±0.004)	6.3±0.1 (0.248±0.004)			1.4±0.1 (0.055±0.004)
NR 6012 NRS 6012					1.6±0.1 (0.063±0.004)
NR 6020 NRS 6020					2.3±0.1 (0.090±0.004)
NR 6028 NRS 6028					3.1±0.1 (0.122±0.004)
NR 6045 NRS 6045					4.7±0.1 (0.185±0.004)

Unit : mm (inch)

● Embossed tape 16mm wide (0.63 inches wide)

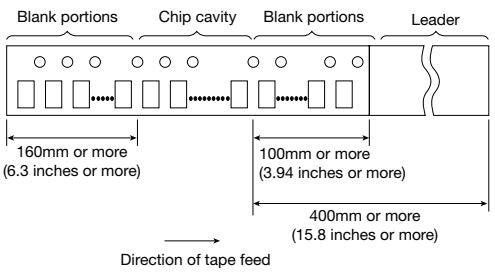


Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
NRS 8030	8.3±0.1 (0.327±0.004)	8.3±0.1 (0.327±0.004)	12.0±0.1 (0.472±0.004)	0.5±0.1 (0.020±0.004)	3.4±0.1 (0.134±0.004)
NR 8040 NRS 8040					4.5±0.1 (0.177±0.004)

Unit : mm (inch)

④Leader and Blank portion

● NR, NRH, NRS, NRG, NRV



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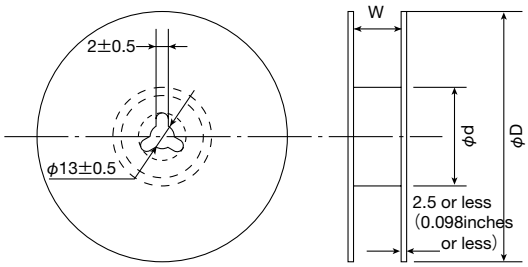
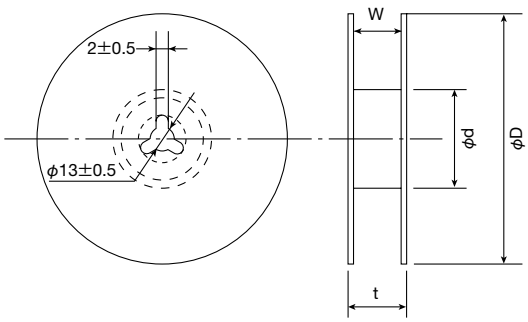
⑤Reel size



Type	Reel size (Reference values)		
	ϕD	ϕd	W
NRH2410	180±0.5 (7.087±0.019)	60±1.0 (2.36±0.04)	10.0±1.5 (0.394±0.059)
NR 3010 NRH 3010			
NR 3012 NRH 3012 NRV 3012			
NR 3015			
NRS 5012	180±3.0 (7.087±0.118)	60±2.0 (2.36±0.08)	14.0±1.5 (0.551±0.059)
NRS 5014			
NRS 5020			
NRS 6010			
NR 6012 NRS 6012			

Unit : mm (inch)

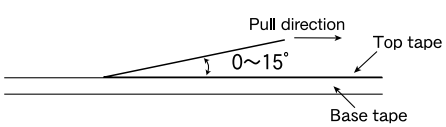


Type	Reel size (Reference values)			
	ϕD	ϕd	t (max.)	W
NR 4010 NRS 4010	330±3.0 (12.99±0.118)	80±2.0 (3.15±0.078)	18.5 (0.72)	13.5±1.0 (0.531±0.04)
NR 4012 NRS 4012				
NR 4018 NRS 4018				
NRG 4026				
NR 5040				
NR 6020 NRS 6020				
NR 6028 NRS 6028				
NR 6045 NRS 6045				
NRS 8030			22.5 (0.89)	17.5±1.0 (0.689±0.04)
NR 8040 NRS 8040				

Unit : mm (inch)

⑥Top Tape Strength

The top tape requires a peel-off force of 0.1 to 1.3N in the direction of the arrow as illustrated below.



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SMD INDUCTORS LARGE CURRENT TYPE

REFLOW

FEATURES

- SMD inductor.
- It corresponds to High current.
- Simple and original magnetic shield structure.

APPLICATIONS

- Power supply circuits / DC-DC converters in a variety of applications such as PDP TV, LCD TV, HDD, PC, etc.

OPERATING TEMPERATURE RANGE

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

ORDERING CODE

N R △ 1 0 0 5 0 T △ 1 0 0 M △

❶Type	
NR△	Coating resin specification

△=Blank Space

❷External dimensions (W×H)	
example	
10050	10.0×5.0mm

❸Packaging	
T△	Tape & Reel

△=Blank Space

❹Nominal inductance (μH)	
example	
1R3	1.3
100	10
101	100

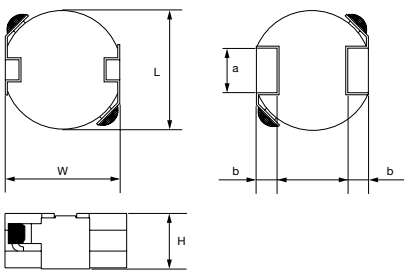
※R=decimal point

❺Inductance tolerance	
M	±20%
N	±30%

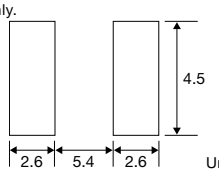
❻Internal code	
△	Standard product

△=Blank Space

EXTERNAL DIMENSIONS/STANDARD QUANTITY



Recommended Land Patterns
Surface Mounting
・Mounting and soldering conditions should be checked beforehand.
・Applicable soldering process to these products is reflow soldering only.

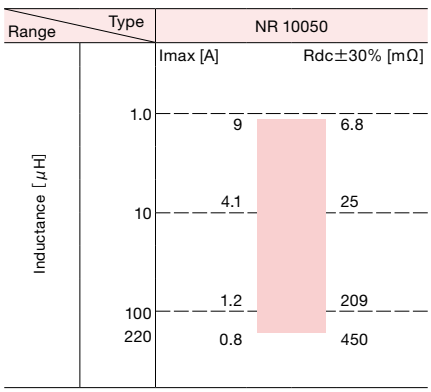


Unit : mm

Type	L	W	H	a	b	Standard Quantity [pcs] Tape & Reel
NR 10050	10.0±0.3 (0.394±0.012)	9.8±0.5 (0.386±0.020)	5.0 max (0.197 max)	4.0 (0.16)	1.75 (0.07)	500

Unit : mm (inch)

AVAILABLE INDUCTANCE RANGE



PART NUMBERS

●NR 10050 type

Ordering code		EHS (Environmental Hazardous Substances)	Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [kHz]
							Saturation current Idc1	Temperature rise current Idc2	
NR10050T1R3N		RoHS	1.3	±30%	53	0.0068	11000	9000	100
NR10050T2R1N		RoHS	2.1		37	0.008	10000	8300	
NR10050T2R9N		RoHS	2.9		29	0.0093	8200	7300	
NR10050T3R8N		RoHS	3.8		26	0.013	7300	6800	
NR10050T4R9N		RoHS	4.9		23	0.015	6600	6000	
NR10050T6R5N		RoHS	6.5		19	0.018	6000	5200	
NR10050T100M		RoHS	10	±20%	15	0.025	4700	4100	
NR10050T150M		RoHS	15		11	0.035	3600	3200	
NR10050T220M		RoHS	22		10	0.045	2600	2500	
NR10050T330M		RoHS	33		8.2	0.066	2500	2100	
NR10050T470M		RoHS	47		7.0	0.092	2000	1800	
NR10050T680M		RoHS	68		5.6	0.144	1700	1500	
NR10050T101M		RoHS	100		4.6	0.209	1300	1200	
NR10050T221M		RoHS	220		3.0	0.450	1000	800	

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20℃)
※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40℃. (at 20℃)
※) The maximum rated current is the DC current value that satisfies both of current value Saturation current value and temperature rise current value. (at 20℃)

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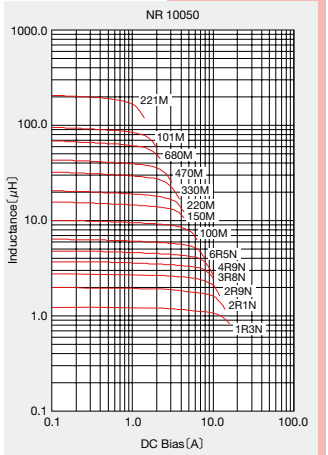
ELECTRICAL CHARACTERISTICS

DC Bias characteristics (Measured by HP4285A)



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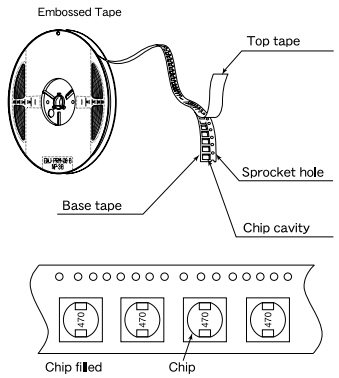
PACKAGING

①Minimum Quantity

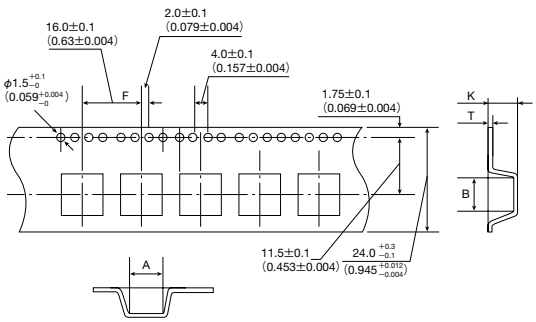
Type	Standard Quantity [pcs]
	Tape & Reel
NR 10050	500

②Tape Material



③Taping dimensions

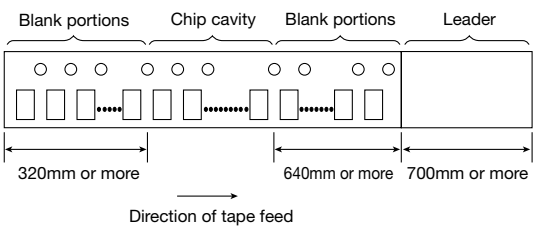
● Embossed tape 24mm wide (0.945 inches wide)



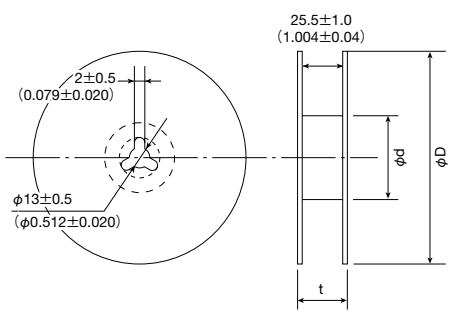
Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
NR 10050	10.4±0.1 (0.409±0.004)	9.9±0.1 (0.390±0.004)	16.0±0.1 (0.630±0.004)	0.5±0.05 (0.020±0.002)	5.7±0.1 (0.224±0.004)

Unit : mm (inch)

④Leader and Blank portion



⑤Reel size

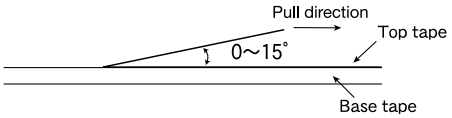


Type	Reel size (Reference values)		
	φD	φd	t (max.)
NR 10050	330±3 (12.99±0.118)	80±2 (3.15±0.078)	30.5 (1.201)

Unit : mm (inch)

⑥Top Tape Strength

The top tape requires a peel-off force of 0.1 to 1.3N in the direction of the arrow as illustrated below.



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SMD INDUCTORS LARGE CURRENT SHIELD TYPE

REFLOW

FEATURES

- SMD inductor.
- Low Rdc and high current
- Magnetic shield structure

APPLICATIONS

- Power supply circuits / DC-DC converters in a variety of applications such as PDP TV, LCD TV, HDD, PC, etc.

OPERATING TEMPERATURE RANGE

- −40℃～125℃ (Including self-generated heat)

ORDERING CODE

N S △ 1 2 5 5 5 T △ 1 R 2 M N

❶Type	
NS△	SMD Inductors

❷External Dimensions (W×L×H)	
12555	12.5×12.5×5.5mm
12565	12.5×12.5×6.5mm
12575	12.5×12.5×7.5mm

❸Packaging	
T△	Tape & Reel

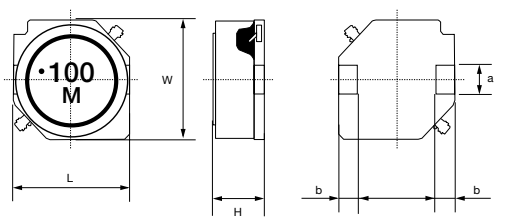
❹Nominal Inductance (μH)	
Ex.	
R20	0.2
1R0	1
100	10
101	100

※R=decimal point

❺Inductance Tolerance	
M	±20%
N	±30%

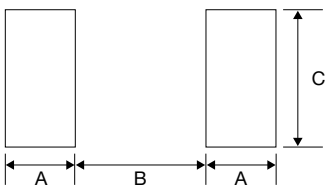
❻Internal code	
N	Marking

EXTERNAL DIMENSIONS/STANDARD QUANTITY



Recommended Land Patterns
Surface Mounting
・Mounting and soldering conditions should be checked beforehand.
・Applicable soldering process to these products is reflow soldering only.

Unit : mm



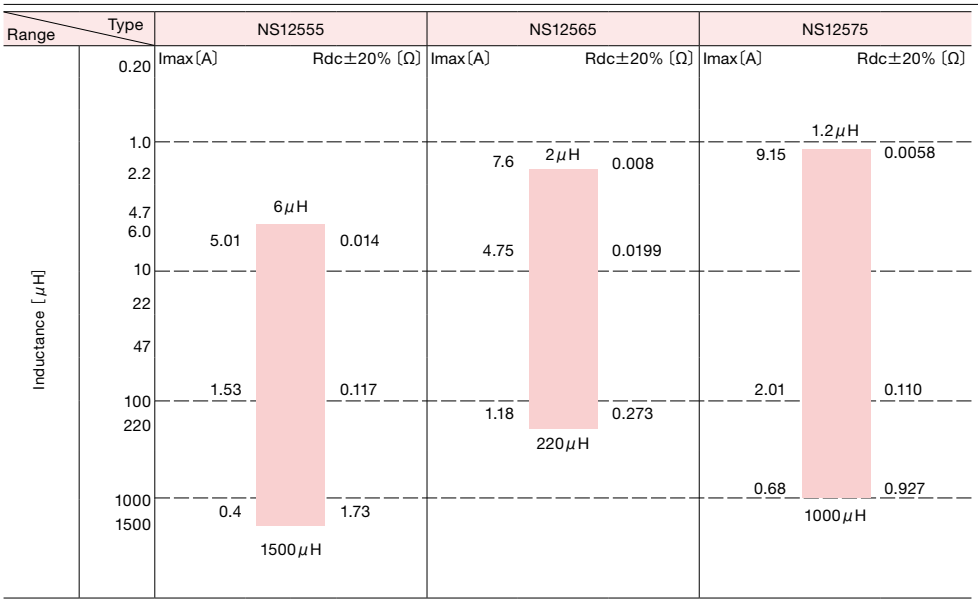
Type	L	W	H	a	b	Standard Quantity [pcs] Tape & Reel
NS12555	12.5±0.3 (0.492±0.012)	12.5±0.3 (0.492±0.012)	5.5±0.35 (0.217±0.014)	3.0±0.1 (0.118±0.004)	2.0±0.15 (0.079±0.006)	500
NS12565	12.5±0.3 (0.492±0.012)	12.5±0.3 (0.492±0.012)	6.5±0.35 (0.256±0.014)	3.0±0.1 (0.118±0.004)	2.0±0.15 (0.079±0.006)	
NS12575	12.5±0.3 (0.492±0.012)	12.5±0.3 (0.492±0.012)	7.5±0.35 (0.295±0.014)	3.0±0.1 (0.118±0.004)	2.0±0.15 (0.079±0.006)	

Unit : mm(inch)

Type	A	B	C
NS12555	2.5	8.6	3.2
NS12565	2.5	8.6	3.2
NS12575	2.5	8.6	3.2

Unit : mm

AVAILABLE INDUCTANCE RANGE



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PART NUMBERS

NS12555 type

Ordering code		Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [A]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
NS12555T6R0NN		6.0	±30%	26.4	0.0140	5.01	5.60	100
NS12555T100MN		10	±20%	21.8	0.0175	4.73	5.04	
NS12555T150MN		15		16.6	0.0233	3.89	4.18	
NS12555T220MN		22		13.2	0.0297	3.20	3.81	
NS12555T330MN		33		10.8	0.0415	2.64	3.16	
NS12555T470MN		47		9.3	0.0551	2.23	2.70	
NS12555T680MN		68		7.9	0.0797	1.81	2.14	
NS12555T101MN		100		6.7	0.117	1.53	1.86	
NS12555T151MN		150		5.1	0.176	1.22	1.43	
NS12555T221MN		220		4.4	0.270	1.00	1.18	
NS12555T331MN		330		3.4	0.410	0.82	0.96	
NS12555T471MN		470		2.8	0.520	0.68	0.80	
NS12555T681MN		680		2.5	0.760	0.60	0.72	
NS12555T102MN		1000		2.0	1.120	0.47	0.59	
NS12555T152MN		1500		1.7	1.730	0.40	0.44	

NS12565 type

Ordering code		Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [A]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
NS12565T2R0NN		2.0	±30%	82.3	0.0080	13.91	7.60	100
NS12565T4R2NN		4.2		41.5	0.0126	10.15	5.91	
NS12565T7R0NN		7.0		24.6	0.0162	7.93	5.21	
NS12565T100MN		10	±20%	15.8	0.0199	6.96	4.75	
NS12565T150MN		15		14.4	0.0237	5.84	4.33	
NS12565T220MN		22		12.5	0.0310	4.87	3.91	
NS12565T330MN		33		9.1	0.0390	3.89	3.22	
NS12565T470MN		47		7.2	0.0575	3.34	2.78	
NS12565T680MN		68		6.7	0.0775	2.78	2.30	
NS12565T101MN		100		5.5	0.1230	2.23	1.81	
NS12565T151MN		150		4.8	0.1730	1.84	1.54	
NS12565T221MN		220		3.6	0.2730	1.39	1.18	

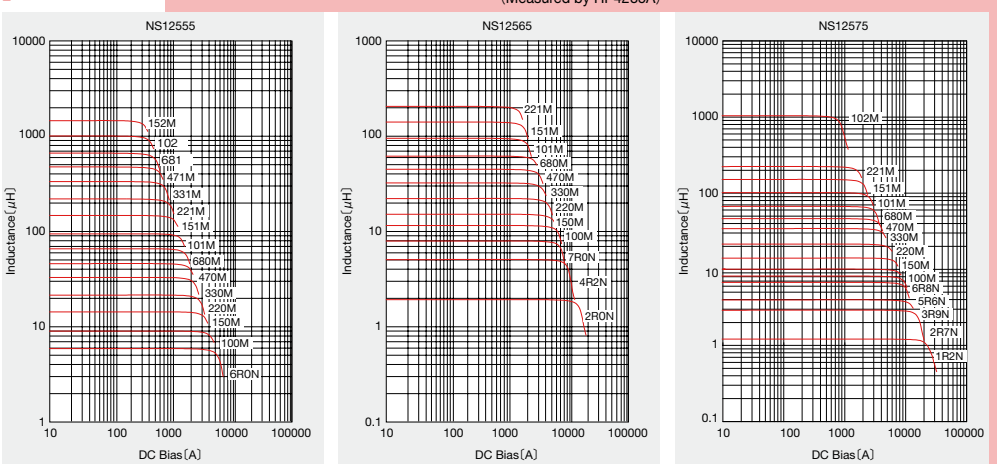
NS12575 type

Ordering code		Inductance [μH]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [A]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
NS12575T1R2NN		1.2	±30%	101.7	0.0058	18.08	9.15	100
NS12575T2R7NN		2.7		55.9	0.0085	13.91	7.69	
NS12575T3R9NN		3.9		41.7	0.0099	12.52	7.38	
NS12575T5R6NN		5.6		26.2	0.0116	10.85	6.36	
NS12575T6R8NN		6.8		24.0	0.0131	10.02	5.84	
NS12575T100MN		10	±20%	21.5	0.0156	7.65	5.55	
NS12575T150MN		15		14.0	0.0184	6.54	5.22	
NS12575T220MN		22		9.7	0.0260	5.56	4.05	
NS12575T330MN		33		8.2	0.0390	4.45	3.48	
NS12575T470MN		47		6.5	0.0515	3.76	2.95	
NS12575T680MN		68		5.3	0.0720	2.78	2.49	
NS12575T101MN		100		3.9	0.1100	2.64	2.01	
NS12575T151MN		150		3.4	0.1610	2.09	1.51	
NS12575T221MN		220		2.9	0.2450	1.81	1.35	
NS12575T102MN		1000		1.4	0.9270	0.80	0.68	

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (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.

ELECTRICAL CHARACTERISTICS

DC Bias characteristics (Measured by HP4285A)



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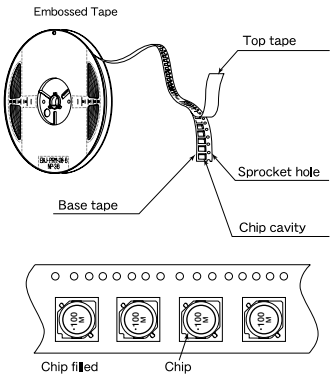
PACKAGING

①Packing Quantity

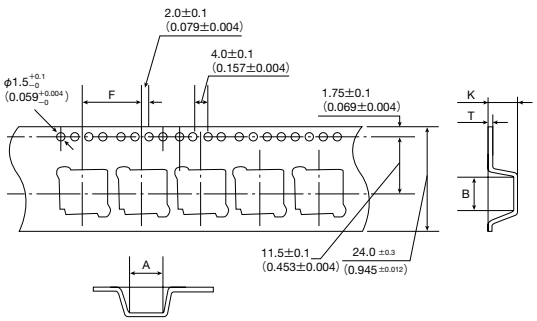
Type	Standard Quantity [pcs]	
	Paper Tape	Embossed Tape
NS12555	—	500
NS12565	—	500
NS12575	—	500

②Tape Material



③Taping dimensions

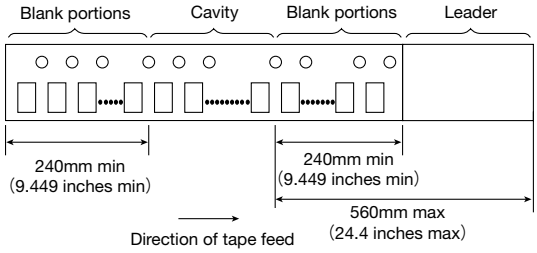
● Embossed tape 24mm wide (0.945 inches wide)



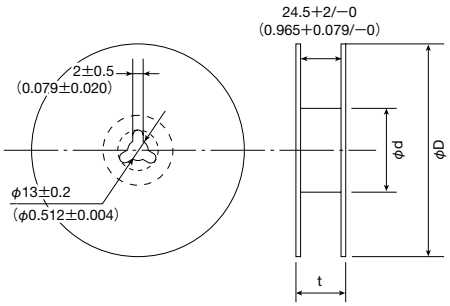
Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
NS12555	13.0±0.1 (0.512±0.004)	13.0±0.1 (0.512±0.004)	16.0±0.1 (0.630±0.004)	0.4±0.1 (0.016±0.004)	6.1±0.1 (0.240±0.004)
NS12565	13.0±0.1 (0.512±0.004)	13.0±0.1 (0.512±0.004)	16.0±0.1 (0.630±0.004)	0.4±0.1 (0.016±0.004)	7.1±0.1 (0.280±0.004)
NS12575	13.0±0.1 (0.512±0.004)	13.0±0.1 (0.512±0.004)	16.0±0.1 (0.630±0.004)	0.4±0.1 (0.016±0.004)	8.0±0.1 (0.315±0.004)

Unit : mm (inch)

④Leader and Blank portion



⑤Reel size

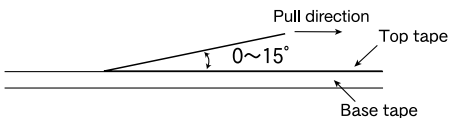


Type	Reel size (Reference values)		
	φD	φd	t (max.)
NS12555/ NS12565/ NS12575	330±2 (12.99±0.079)	100±1 (3.937±0.039)	30.5 (1.201)

Unit : mm (inch)

⑥Top Tape Strength

The top tape requires a peel-off force of 0.1 to 1.3N in the direction of the arrow as illustrated below.



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RELIABILITY DATA

Wound Chip power inductor (NR, NS-series)

1. Operating Temperature Range	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	−25～+120℃
NR10050 Type	−25～+105℃
NS12555, NS12565, NS12575Type	−40～+125℃

【Test Method and Remarks】
Including self-generated heat

2. Storage Temperature Range	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	−40～+85℃
NR10050 Type	
NS12555, NS12565, NS12575Type	

【Test Method and Remarks】
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type, NR10050 Type, NS12555, NS12565, NS12575Type : −5 to 40℃ for the product with taping.

3. Rated current	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	Within the specified tolerance
NR10050 Type	
NS12555, NS12565, NS12575Type	

4. Inductance	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	Within the specified tolerance
NR10050 Type	
NS12555, NS12565, NS12575Type	

【Test Method and Remarks】
LCR Meter : HP 4285A or equivalent, Measuring frequency : Specified frequency
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type, NS12555, NS12565, NS12575Type : LCR Meter : HP 4285A or equivalent, 100KHz, 1V
NR10050 Type : LCR Meter : HP 4263A or equivalent, 100KHz, 1V

5. DC Resistance	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	Within the specified tolerance
NR10050 Type	
NS12555, NS12565, NS12575Type	

【Test Method and Remarks】
DC ohmmeter : HIOKI 3227 or equivalent

6. Self resonance frequency	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	Within the specification
NR10050 Type	
NS12555, NS12565, NS12575Type	

【Test Method and Remarks】
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type, NR10050 Type, NS12555, NS12565, NS12575Type :
Inpedance analyzer/material analyzer : HP4291A or equivalent HP4191A, 4192A or equivalent

7. Temperature characteristic	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	Inductance change : Within ±20%
NR10050 Type	
NS12555, NS12565, NS12575Type	Inductance change : Within ±15%

【Test Method and Remarks】
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type, NR10050 Type : Measurement of inductance shall be taken at temperature range within −25℃～+85℃.
With reference to inductance value at +20℃., change rate shall be calculated.

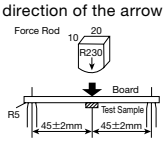
NS12555, NS12565, NS12575Type : Measurement of inductance shall be taken at temperature range within −40℃～+125℃.
With reference to inductance value at +20℃., change rate shall be calculated.

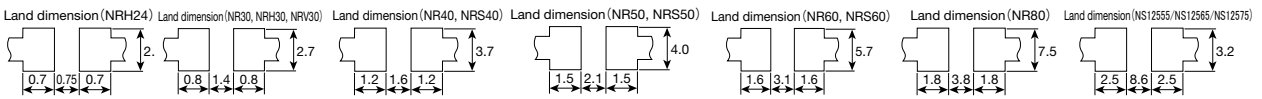
Change of maximum inductance deviation in step 1 to 5

Temperature at step 1	20℃
Temperature at step 2	Minimum operating temperature
Temperature at step 3	20℃ (Standard temperature)
Temperature at step 4	Maximum oparating temperature
Temperature at step 5	20℃

8. Resistance to flexure of substrate	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	No damage
NR10050 Type	
NS12555, NS12565, NS12575Type	No damage

【Test Method and Remarks】
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type, NS12555, NS12565, NS12575Type :
The test samples shall be soldered to the test board by the reflow. As illustrated below, apply force in the direction of the arrow indicating until deflection of the test board reaches to 2 mm.
Test board size : 100×40×1.0
Test board material : glass epoxy-resin
Solder cream thickness : 0.10 (NR30/40, NRS40, NRH24/30, NRV30)
0.15 (NR50/60/80, NRS40/50/60, NS12555, NS12565, NS12575Type)





Unit : mm

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RELIABILITY DATA

Wound Chip power inductor (NR, NS-series)

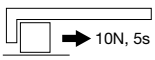
9. Insulation resistance : between wires	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	
NR10050 Type	
NS12555, NS12565, NS12575Type	

10. Insulation resistance : between wire and core	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	
NR10050 Type	
NS12555, NS12565, NS12575Type	

11. Withstanding voltage : between wire and core	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	
NR10050 Type	
NS12555, NS12565, NS12575Type	

12. Adhesion of terminal electrode	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	Shall not come off PC board
NR10050 Type	
NS12555, NS12565, NS12575Type	

【Test Method and Remarks】
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type, NS12555, NS12565, NS12575 Type :
The test samples shall be soldered to the test board by the reflow.
・Applied force : 10N to X and Y directions.
・Duration : 5s.
・Solder cream thickness : 0.15mm.



NR10050 Type :
・Applied force : 5N to X and Y directions.
・Duration : 5s.

13. Resistance to vibration	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	Inductance change : Within ±10% No significant abnormality in appearance.
NR10050 Type	
NS12555, NS12565, NS12575Type	

【Test Method and Remarks】
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type, NR10050 Type, NS12555, NS12565, NS12575Type :
The test samples shall be soldered to the test board by the reflow.
Then it shall be submitted to below test conditions.

Frequency Range	10～55Hz	
Total Amplitude	1.5mm (May not exceed acceleration 196m/s^2)	
Sweeping Method	10Hz to 55Hz to 10Hz for 1min.	
Time	X	For 2 hours on each X, Y, and Z axis.
	Y	
	Z	

Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

14. Solderability	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	At least 90% of surface of terminal electrode is covered by new solder.
NR10050 Type	
NS12555, NS12565, NS12575Type	

【Test Method and Remarks】
The test samples shall be dipped in flux, and then immersed in molten solder as shown in below table.
Flux : Methanol solution containing rosin 25%.

NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type, NS12555, NS12565, NS12575 Type :

Solder Temperature	245±5℃
Time	5±1.0 sec.

※Immersion depth : All sides of mounting terminal shall be immersed.

15. Resistance to soldering heat	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	Inductance change : Within ±10% No significant abnormality in appearance.
NR10050 Type	
NS12555, NS12565, NS12575Type	

【Test Method and Remarks】
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type, NR10050 Type, NS12555, NS12565, NS12575 Type :
The test sample shall be exposed to reflow oven at 230±5℃ for 40 seconds, with peak temperature at 260±5℃ for 5 seconds, 2 times.

NR6020 Type :
The test sample shall be exposed to reflow oven at 230±5℃ for 40 seconds, with peak temperature at 250^{+5}_{0}℃ for 5 seconds, 2 times.

Test board thickness : 1.0mm (NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type, NS12555, NS12565, NS12575 Type)
1.6mm (NR10050 Type)
Test board material : glass epoxy-resin

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RELIABILITY DATA

Wound Chip power inductor（NR, NS-series）

16. Thermal shock	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	Inductance change : Within ±10% No significant abnormality in appearance.
NR10050 Type	
NS12555, NS12565, NS12575Type	

【Test Method and Remarks】
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type, NR10050 Type , NS12555, NS12565, NS12575Type :
The test samples shall be soldered to the test board by the reflow. The test samples shall be placed at specified temperature for specified time by step 1 to step 4 as shown in below table in sequence. The temperature cycle shall be repeated 100 cycles.

Conditions of 1 cycle		
Step	Temperature (℃)	Duration (min)
1	−40±3	30±3
2	Room temperature	Within 3
3	+85±2	30±3
4	Room temperature	Within 3

17. Damp heat	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	Inductance change : Within ±10% No significant abnormality in appearance.
NR10050 Type	
NS12555, NS12565, NS12575Type	Inductance change : Within ±10% No significant abnormality in appearance.

【Test Method and Remarks】
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type, NS12555, NS12565, NS12575Type :
The test samples shall be soldered to the test board by the reflow.
The test samples shall be placed in thermostatic oven set at specified temperature and humidity as shown in below table.

Temperature	60±2℃
Humidity	90～95%RH
Time	500+24/−0 hour

18. Loading under damp heat	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	Inductance change : Within ±10% No significant abnormality in appearance.
NR10050 Type	
NS12555, NS12565, NS12575Type	

【Test Method and Remarks】
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type, NR10050 Type, NS12555, NS12565, NS12575Type :
The test samples shall be soldered to the test board by the reflow.
The test samples shall be placed in thermostatic oven set at specified temperature and humidity and applied the rated current continuously as shown in below table.

Temperature	60±2℃
Humidity	90～95%RH
Applied current	Rated current
Time	500+24/−0 hour

19. Low temperature life test	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	Inductance change : Within ±10% No significant abnormality in appearance.
NR10050 Type	
NS12555, NS12565, NS12575Type	

【Test Method and Remarks】
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type, NR10050 Type, NS12555, NS12565, NS12575Type :
The test samples shall be soldered to the test board by the reflow.
After that, the test samples shall be placed at test conditions as shown in below table.

Temperature	−40±2℃
Time	500+24/−0 hour

20. High temperature life test	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	
NR10050 Type	Inductance change : Within ±10% No significant abnormality in appearance.
NS12555, NS12565, NS12575Type	

【Test Method and Remarks】
NR10050 Type :

Temperature	105±3℃
Time	500+24/−0 hour

Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.

21. Loading at high temperature life test	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	Inductance change : Within ±10% No significant abnormality in appearance.
NR10050 Type	
NS12555, NS12565, NS12575Type	Inductance change : Within ±10% No significant abnormality in appearance.

【Test Method and Remarks】
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type, NS12555, NS12565, NS12575Type :
The test samples shall be soldered to the test board by the reflow soldering.

Temperature	85±2℃
Applied current	Rated current
Time	500+24/−0 hour

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RELIABILITY DATA

Wound Chip power inductor（NR, NS-series）

22. Standard condition	
NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type	Standard test condition ： Unless otherwise specified, temperature is 20±15℃ and 65±20%of relative humidity. When there is any question concerning measurement result: In order to provide correlation data, the test shall be condition of 20±2℃ of temperature, 65±5% relative humidity. Inductance is in accordance with our measured value.
NR10050 Type	
NS12555, NS12565, NS12575Type	

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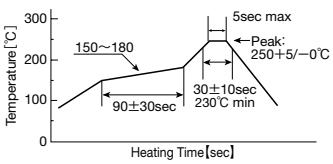
PRECAUTIONS

Wound Chip power inductor（NR, NS-series）

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	◆Land pattern design 1. Please refer to a recommended land pattern.
Technical consider-ations	◆Land pattern design Surface Mounting ・Mounting and soldering conditions should be checked beforehand. ・Applicable soldering process to this products is reflow soldering only.

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	◆Reflow soldering 1. Please contact any of our offices for a reflow soldering, and refer to the recommended condition specified. 2. The product shall be used reflow soldering only. 3. Please do not add any stress to a product until it returns in normal temperature after reflow soldering. ◆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 (NR10050 Type) ・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.
Technical consider-ations	◆Reflow 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. ・NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type, NR10050, NS12555, NS12565, NS12575 Type Recommended reflow condition (Pb free solder) 

5. Cleaning	
Precautions	◆Cleaning conditions 1. Washing by supersonic waves shall be avoided.
Technical consider-ations	◆Cleaning conditions 1. if washed by supersonic waves, the products might be broken.

6. Handling	
Precautions	◆Handling 1. Keep the product away from all magnets and magnetic objects. ◆Breakaway PC boards (splitting along perforations) 1. When splitting the PC board after mounting product, care should be taken not to give any stresses of deflection or twisting to the board. 2. Board separation should not be done manually, but by using the appropriate devices. ◆Mechanical considerations 1. Please do not give the product any excessive mechanical shocks. 2. Please do not add any shock and power to a product in transportation. ◆Pick-up pressure 1. Please do not push to add any pressure to a winding part. Please do not give any shock and push into a ferrite core exposure part. ◆Packing 1. Please avoid accumulation of a packing box as much as possible.
Technical consider-ations	◆Breakaway PC boards (splitting along perforations) 1. The position of the product on PCBs shall be carefully considereed to minimize the stress caused from splitting of the PCBs. ◆Mechanical considerations 1. There is a case to be damaged by a mechanical shock. 2. There is a case to be broken by the handling in transportation. ◆Pick-up pressure 1. Damage and a characteristic can vary with an excessive shock or stress. ◆Packing 1. If packing boxes are accumulated, that could cause a deformation on packing tapes or a damage on the products.

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: −5～40℃ 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, product should be used within 6 months 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.