

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 2009. 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.
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SMD INDUCTORS COMPACT TYPE



REFLOW

FEATURES

- BR C2518/BRFL2518 (NEW PRODUCTS)
The best efficiency design is achieved by adopting bottom-surface electrode structure. Small and low-profile Wound Chip Inductors that are suitable for module design which needs high electric current like DC/DC converters.

APPLICATIONS

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

ORDERING CODE

B R \triangle 2 5 1 8 T 2 R 2 M \triangle \triangle \triangle

1 Type

BR	SMD Inductors
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2 Characteristic Spec

\triangle	Low Rdc
L	Low profile
C	High Current
FL	Low profile

3 External Dimensions (W×L) : mm (inch)

1608 (0603)	1.6×0.8mm
2012 (0805)	2.0×1.2mm
2016 (0806)	2.0×1.6mm
2518 (1007)	2.5×1.8mm
3225 (1210)	3.2×2.5mm

4 Packaging

T	Tape & Reel
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5 Nominal Inductance [μ H]

example	
R20	0.2
1R0	1.0
2R2	2.2
4R7	4.7

*R=decimal point

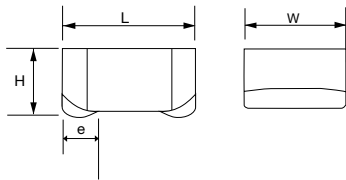
6 Inductance tolerance

M	$\pm 20\%$
K	$\pm 10\%$

7 Internal code

$\triangle\triangle\triangle$	Standard product
\triangle	Blank Space

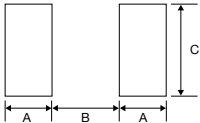
EXTERNAL DIMENSIONS/STANDARD QUANTITY



Type	L	W	H	e	Standard Quantity [pcs]	
					Paper Tape	Embossed Tape
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	2.0±0.2 (0.078±0.008)	1.25±0.2 (0.049±0.008)	1.0 max. (0.040 max.)	0.5±0.2 (0.020±0.008)	—	3000
BR C2016	2.0±0.2 (0.078±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
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 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
BRFL2518	2.5±0.2 (0.098±0.008)	1.8±0.2 (0.071±0.008)	1.0 max. (0.040 max.)	0.5±0.2 (0.020±0.008)	—	3000
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 (0.030±0.008)	—	2000

Unit : mm (inch)

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



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

Unit : mm

AVAILABLE INDUCTANCE RANGE

Range	Type	BR L3225		BRFL2518		BR L2518		BR C2518		BR C2016		BR L2012		BR C1608												
		I _{max} [mA]	R _{dc} ±30% [Ω]	I _{max} [mA]	R _{dc} ±30% [Ω]	I _{max} [mA]	R _{dc} ±30% [Ω]	I _{max} [mA]	R _{dc} ±30% [Ω]	I _{max} [mA]	R _{dc} ±30% [Ω]	I _{max} [mA]	R _{dc} ±30% [Ω]	I _{max} [mA]	R _{dc} ±30% [Ω]											
Inductance [μ H]	1.0	2,200	1 μ H	0.043	1,200	1 μ H	0.080	1,000	1 μ H	0.080	1,650	1 μ H	0.050	1,100	1 μ H	0.085	1,050	0.47 μ H	0.090	980	0.2 μ H	0.060	520	0.180		
	2.2				850		0.135	850		0.135				850		0.135	850			280	2.2 μ H	0.550				
	4.7				650	4.7 μ H	0.330	470	4.7 μ H	0.400							270	0.850								
	10								610	0.350	520															
	22																									
47																										
100																										
220																										

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PART NUMBERS

● BR C1608 type

Ordering code	EHS (Environmental Hazardous Substances)	Inductance [μ H]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (\pm 30%)	Rated current ※) [mA]		Measuring frequency [MHz]
						Saturation current Idc1	Temperature rise current Idc2	
BR C1608TR20M	RoHS	0.20	\pm 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	

● BR L2012 type

Ordering code	EHS (Environmental Hazardous Substances)	Inductance [μ H]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (\pm 30%)	Rated current ※) [mA]		Measuring frequency [MHz]
						Saturation current Idc1	Temperature rise current Idc2	
BR L2012TR47M	RoHS	0.47	\pm 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	
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	

● BR C2016 type

Ordering code	EHS (Environmental Hazardous Substances)	Inductance [μ H]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (\pm 30%)	Rated current ※) [mA]		Measuring frequency [MHz]
						Saturation current Idc1	Temperature rise current Idc2	
BR C2016T1R0M	RoHS	1.0	\pm 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	\pm 20% \pm 10%	35	0.400	450	520	
BR C2016T150□	RoHS	15		28	0.600	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		

● BR C2518 type

Ordering code	EHS (Environmental Hazardous Substances)	Inductance [μ H]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (\pm 30%)	Rated current ※) [mA]		Measuring frequency [MHz]
						Saturation current Idc1	Temperature rise current Idc2	
BR C2518T1R0M	RoHS	1.0	\pm 20%	280	0.050	2,550	1,650	1.00
BR C2518T1R5M	RoHS	1.5		230	0.080	2,100	1,300	
BR C2518T2R2M	RoHS	2.2		200	0.120	1,800	1,000	
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	1,050	680	
BR C2518T100□	RoHS	10	\pm 20% \pm 10%	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		

• 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°C)

※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) The rated current is the DC current value that satisfies both of DC saturation current value and temperature rise current value.

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PART NUMBERS

BR L2518 type

Ordering code	EHS (Environmental Hazardous Substances)	Inductance [μ H]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 30\%$)	Rated current ※) [mA]		Measuring frequency [MHz]
						Saturation current Idc1	Temperature rise current Idc2	
BR L2518T1R0M	RoHS	1.0	$\pm 20\%$	130	0.080	1,300	1,000	7.96
BR L2518T1R5M	RoHS	1.5		100	0.100	1,200	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	

BRFL2518 type

Ordering code	EHS (Environmental Hazardous Substances)	Inductance [μ H]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 30\%$)	Rated current ※) [mA]		Measuring frequency [MHz]
						Saturation current Idc1	Temperature rise current Idc2	
BRFL2518T1R0M	RoHS	1.0	$\pm 20\%$	130	0.090	1,200	1,200	1.00
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	

BR L3225 type

Ordering code	EHS (Environmental Hazardous Substances)	Inductance [μ H]	Inductance Tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 30\%$)	Rated current ※) [mA]		Measuring frequency [MHz]
						Saturation current Idc1	Temperature rise current Idc2	
BR L3225T1R0M	RoHS	1.0	$\pm 20\%$	220	0.043	2,400	2,200	0.10
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	$\pm 20\%$ $\pm 10\%$	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)

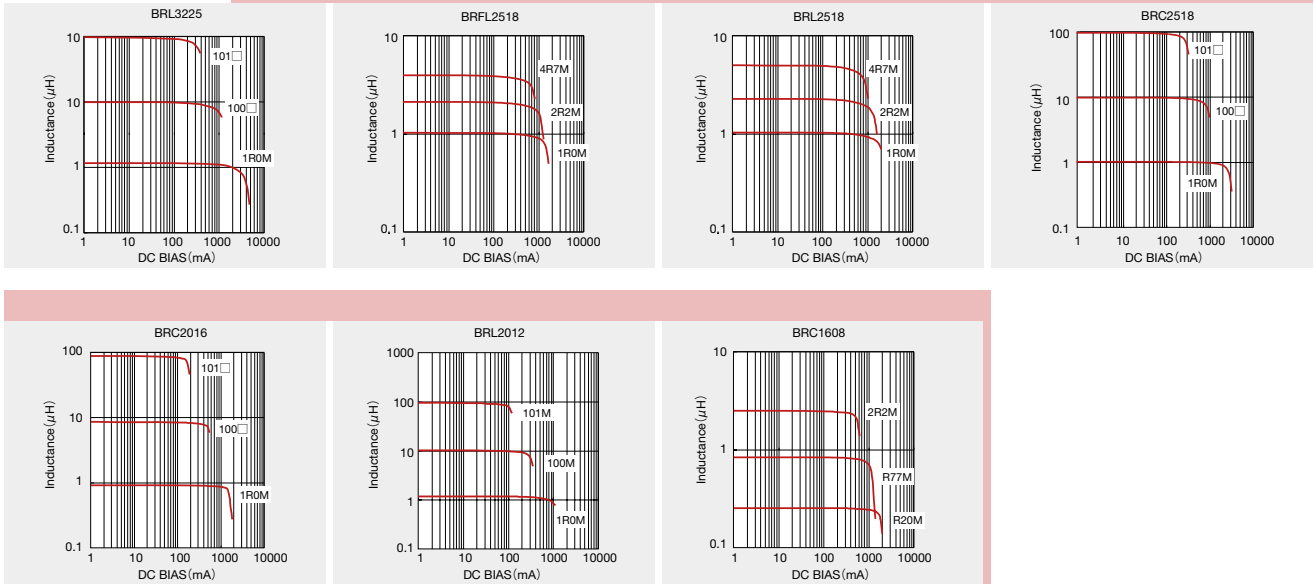
※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)

※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) The rated current is the DC current value that satisfies both of DC saturation current value and temperature rise current value.

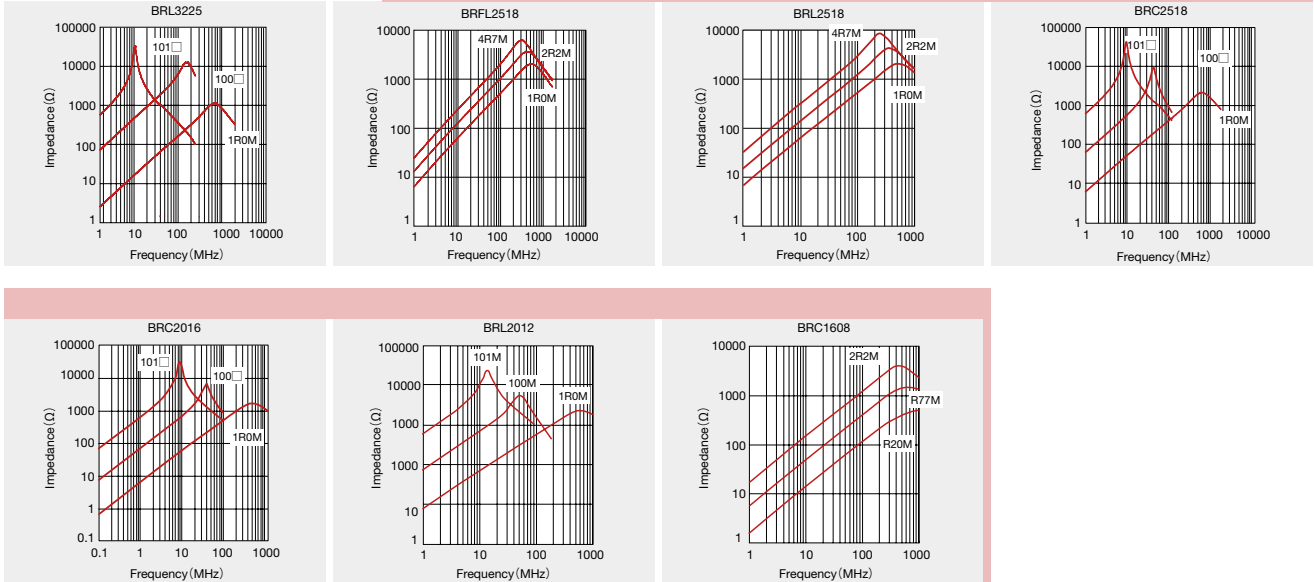
DC Bias characteristics

(Measured by HP4285A)



Impedance-vs-Frequency characteristics

(Measured by HP4291A)



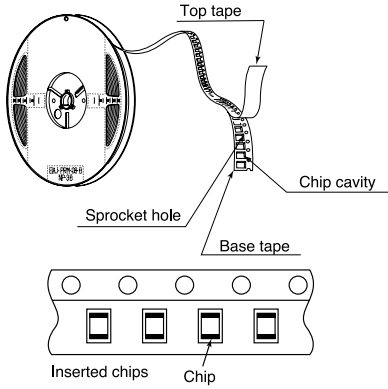
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① Minimum Quantity

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

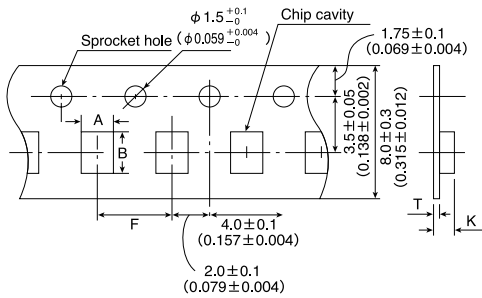
② Tape Material

Embossed tape
Card board carrier tape



③ Taping dimensions

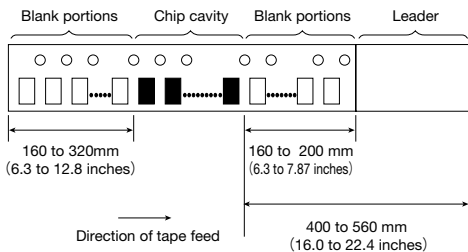
- Embossed Tape 8mm wide (0.315 inches wide)
- Card board carrier tape 8mm wide (0.315 inches wide)



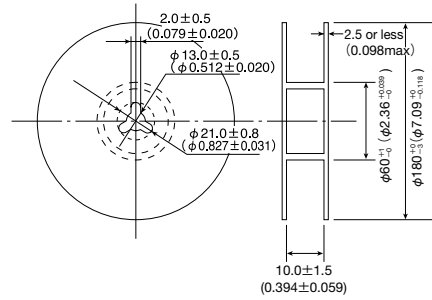
Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
BR C1608	1.0±0.10 (0.04±0.004)	1.9±1.0 (0.076±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.01±0.002)	1.2 max. (0.047)
BR L2012	1.40±0.1 (0.056±0.004)	2.2±0.1 (0.088±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.01±0.002)	1.2 max. (0.048)
BR C2016	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)	1.9 max. (0.074)
BR C2518	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)	2.2 max. (0.086)
BR L2518	2.3±0.1 (0.092±0.004)	2.8±0.1 (0.112±0.004)	4.0±0.1 (0.157±0.004)	0.3±0.05 (0.012±0.002)	1.45 max. (0.057)
BRFL2518	2.15±0.1 (0.085±0.004)	2.8±0.1 (0.112±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.01±0.002)	1.25 max. (0.049)
BR L3225	2.8±0.1 (0.112±0.004)	3.5±0.1 (0.140±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.01±0.002)	1.9 max. (0.074)

Unit : mm (inch)

④ Leader and Blank portion

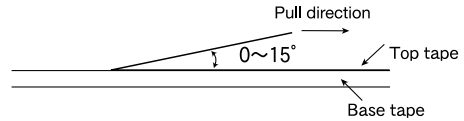


⑤ Reel size



⑥ Top 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

1. Operating Temperature Range	
BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type	-25~+105°C
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type	-25~+120°C
NR10050 Type	-25~+105°C
【Test Method and Remarks】 Including self-generated heat	

2. Storage Temperature Range	
BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type	-40~+85°C
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type	
NR10050 Type	
【Test Method and Remarks】 BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type, NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type : 0 to 40°C for the product with taping. NR10050 Type : 0~40°C for the product with taping.	

3. Rated current	
BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type	Within the specified tolerance
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type	
NR10050 Type	

4. Inductance	
BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type	Within the specified tolerance
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type	
NR10050 Type	
【Test Method and Remarks】 BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type : LCR Meter : HP 4285A or equivalent, Measuring frequency : Specified frequency NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type : LCR Meter : HP 4285A or equivalent, 100KHz, 1V NR10050 Type : LCR Meter : HP 4263A or equivalent, 100KHz, 1V	

5. DC Resistance	
BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type	Within the specified tolerance
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type	
NR10050 Type	
【Test Method and Remarks】 DC ohmmeter : HIOKI 3227 or equivalent	

6. Self resonance frequency	
BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type	Within the specification
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type	
NR10050 Type	
【Test Method and Remarks】 BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type, NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type, NR10050 Type : Impedance analyzer/material analyzer : HP4291A or equivalent HP4191A, 4192A or equivalent	

7. Temperature characteristic	
BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type	BRL2012, BRC2016, BRL2518, BRL3225, BRC2518, BRFL2518 Inductance change : Within $\pm 15\%$
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type	BRC1608 Inductance change : Within $\pm 20\%$
NR10050 Type	Inductance change : Within $\pm 20\%$
【Test Method and Remarks】 BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type, NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type, NR10050 Type : Measurement of inductance shall be taken at temperature range within -25°C~+85°C. With reference to inductance value at +20°C., change rate shall be calculated.	

Change of maximum inductance deviation in step 1 to 5

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

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RELIABILITY DATA

8. Resistance to flexure of substrate

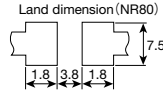
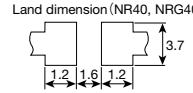
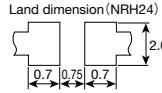
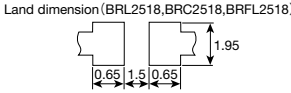
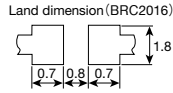
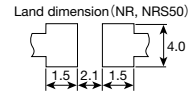
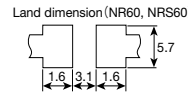
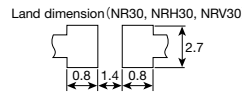
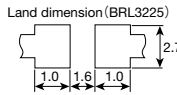
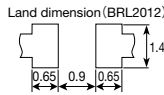
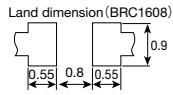
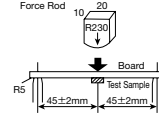
BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type	No damage.
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type	
NR10050 Type	

[Test Method and Remarks]

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type, NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type :

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 : 0.12 (BR Series)
 0.10 (NR30/40, NRV30, NRH24/30, NRG40)
 0.15 (NR50/60/80, NRS50/60)



Printed board thickness : 1.0mm
 Unit : mm

9. Insulation resistance : between wires

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type	
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type	
NR10050 Type	

10. Insulation resistance : between wire and core

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type	
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type	
NR10050 Type	

11. Withstanding voltage : between wires and core

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type	
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type	
NR10050 Type	

12. Adhesion of terminal electrode

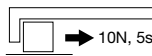
BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type	Shall not come off PC board.
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type	
NR10050 Type	

[Test Method and Remarks]

BRC2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type, NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 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.



BRC1608, NR10050 Type :

- Applied force : 5N to X and Y directions.
- Duration : 5s.

13. Resistance to vibration

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type	Inductance change : Within ±10% No significant abnormality in appearance.
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type	
NR10050 Type	

[Test Method and Remarks]

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type, NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type, NR10050 Type :

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.

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RELIABILITY DATA

14. Solderability

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type
NR10050 Type

At least 90% of surface of terminal electrode is covered by new solder.

[Test Method and Remarks]

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type, NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type, NR10050 Type :
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, NRG40, NRH24/30, NRS50/60 Type :

Solder Temperature	245±5°C
Time	5±1.0 sec.

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type :

Solder Temperature	245±5°C
Time	5±0.5 sec.

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

15. Resistance to soldering heat

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type
NR10050 Type

Inductance change : Within ±10%
No significant abnormality in appearance.

[Test Method and Remarks]

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type :
3 times of reflow oven at 230°C MIN. for 40sec. with peak temperature at 260⁺⁰₋₅°C for 5sec.

NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type, NR10050 Type :

The test sample shall be exposed to reflow oven at 230±5°C for 40 seconds, with peak temperature at 260±5°C for 5 seconds, 2 times.

NR6020 Type :

The test sample shall be exposed to reflow oven at 230±5°C for 40 seconds, with peak temperature at 250⁺⁰₋₅°C for 5 seconds, 2 times.

Test board thickness : 1.0mm

Test board material : glass epoxy-resin

16. Thermal shock

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type
NR10050 Type

Inductance change : Within ±10%
No significant abnormality in appearance.

[Test Method and Remarks]

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type, NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type, NR10050 Type :
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 (°C)	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

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type
NR10050 Type

Inductance change : Within ±10%
No significant abnormality in appearance.

[Test Method and Remarks]

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type :

Temperature	60±2°C
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.

NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type :

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°C
Humidity	90~95%RH
Time	500±24hour

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RELIABILITY DATA

18. Loading under damp heat

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type	
NR10050 Type	

[Test Method and Remarks]

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type :

Temperature	60 \pm 2 $^{\circ}$ C
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.

NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type, NR10050 Type :

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 \pm 2 $^{\circ}$ C
Humidity	90~95%RH
Applied current	Rated current
Time	500 \pm 2hour

19. Low temperature life test

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type	
NR10050 Type	

[Test Method and Remarks]

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type :

Temperature	-40 \pm 2 $^{\circ}$ C
Duration	1000hours

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

NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type, NR10050 Type :

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 \pm 3 $^{\circ}$ C
Time	500 \pm 24hour

20. High temperature life test

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type	
NR10050 Type	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.

[Test Method and Remarks]

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type :

Temperature	85 \pm 2 $^{\circ}$ C
Duration	1000hours

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

NR10050 Type :

Temperature	105 \pm 3 $^{\circ}$ C
Time	500 \pm 24hour

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

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type	
NR10050 Type	

[Test Method and Remarks]

NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type :

The test samples shall be soldered to the test board by the reflow soldering.

Temperature	85 \pm 2 $^{\circ}$ C
Applied current	Rated current
Time	500 \pm 24hour

22. Standard condition

BRC1608, BRL2012, BRC2016, BRC2518, BRFL2518, BRL2518, BRL3225 Type	Standard test condition : Unless otherwise specified, temperature is 20 \pm 15% and 65 \pm 20% of relative humidity. When there are question concerning measurement result : In order to provide correlation date, the test shall be condition of 20 \pm 2 $^{\circ}$ C of temperature, 65 \pm 5% relative humidity. Inductance is in accordance with our measured value.
NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type	
NR10050 Type	

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PRECAUTIONS

SMD Inductors

1. Circuit Design

Precautions	<ul style="list-style-type: none"> ◆ Operating environment <ol style="list-style-type: none"> 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.
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2. PCB Design

Precautions	<ul style="list-style-type: none"> ◆ Land pattern design <ol style="list-style-type: none"> 1. Please refer to a recommended land pattern.
Technical considerations	<ul style="list-style-type: none"> ◆ Land pattern design <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> ◆ Adjustment of mounting machine <ol style="list-style-type: none"> 1. Excessive impact load should not be imposed on the products when mounting onto the PC boards. 2. Mounting and soldering conditions should be checked beforehand.
Technical considerations	<ul style="list-style-type: none"> ◆ Adjustment of mounting machine <ol style="list-style-type: none"> 1. When installing products, care should be taken not to apply distortion stress as it may deform the products.

4. Soldering

Precautions	<ul style="list-style-type: none"> ◆ Reflow soldering <ol style="list-style-type: none"> 1. Please contact any of our offices for a reflow soldering, and refer to the recommended condition specified. 2. This products is 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 <ol style="list-style-type: none"> 1. When using products with lead free soldering, we request to use them after confirming of adhesion, temperature of resistance to soldering heat, soldering etc sufficiently. ◆ Recommended conditions for using a soldering iron (NR10050 Type) <ul style="list-style-type: none"> • Put the soldering iron on the land-pattern. • Soldering iron's temperature - Below 350°C • Duration - 3 seconds or less • The soldering iron should not directly touch the inductor. 		
Technical considerations	<ul style="list-style-type: none"> ◆ Reflow soldering <ol style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> • BRC1608, BRL2012, BRL2518, BRC2016, BRL3225 Type BRC2518, BRFL2518 Recommended reflow condition (Pb free solder) 	<ul style="list-style-type: none"> • NR30/40/50/60/80, NRV30, NRG40, NRH24/30, NRS50/60 Type Recommended reflow condition (Pb free solder)
			<ul style="list-style-type: none"> • NR10050 Type Recommended reflow condition (Pb free solder)

5. Cleaning

Precautions	<ul style="list-style-type: none"> ◆ Cleaning conditions <ol style="list-style-type: none"> 1. Washing by supersonic waves shall be avoided.
Technical considerations	<ul style="list-style-type: none"> ◆ Cleaning conditions <ol style="list-style-type: none"> 1. If washing by supersonic waves, supersonic waves may cause broken products.

6. Handling

Precautions	<ul style="list-style-type: none"> ◆ Handling <ol style="list-style-type: none"> 1. Keep the product away from all magnets and magnetic objects. ◆ Breakaway PC boards (splitting along perforations) <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 1. Please avoid accumulation of a packing box as much as possible.
Technical considerations	<ul style="list-style-type: none"> ◆ Breakaway PC boards (splitting along perforations) <ol style="list-style-type: none"> 1. Planning pattern configurations and the position of products should be carefully performed to minimize stress. ◆ Mechanical considerations <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 1. Damage and a characteristic can vary with an excessive shock or stress. ◆ Packing <ol style="list-style-type: none"> 1. There is a case that transformation and a product of tape are damaged by accumulation of a packing box.

7. Storage conditions

Precautions	<ul style="list-style-type: none"> ◆ Storage <ol style="list-style-type: none"> 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. <ul style="list-style-type: none"> • Recommended conditions Ambient temperature: 0~40°C Humidity : Below 70% RH <p>The ambient temperature must be kept below 30°C. Even under ideal storage conditions, solderability of products electrodes may decrease as time passes. For this reason, 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.</p>
Technical considerations	<ul style="list-style-type: none"> ◆ Storage <ol style="list-style-type: none"> 1. Under a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of terminal electrodes and deterioration of taping/packaging materials may take place.

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