

■ 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 2015. 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 listed in this catalogue are intended for use in general electronic equipment such as AV/OA equipment, home electrical appliances, office equipment, information-communication equipment, general medical equipment, industrial equipment, and automotive applications.

Please be sure to contact TAIYO YUDEN CO., LTD. for further information before using the components for any equipment which might have a negative impact directly on human life, such as specially controlled medical equipment, transportation equipment (automotive powertrain/train/ship control systems, etc.) and traffic signal system.

Please do not incorporate the components into any equipment requiring a high degree of safety and reliability, such as aerospace equipment, avionics, nuclear control equipment, submarine system, and military equipment.

For use in high safety and reliability-required devices/circuits of general electronic equipment, thorough safety evaluation prior to use is strongly recommended, and a protective circuit should be designed and installed as necessary.

- 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.

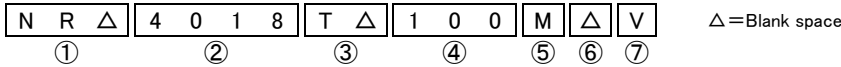
SMD POWER INDUCTORS(NR SERIES H TYPE/S TYPE/V TYPE)



REFLOW
AEC-Q200

■ PART NUMBER

*Operating Temp. : -40~125°C (Including self-generated heat)



① Series name

Code	Series name
NRH	Coating resin specification
NRS	
NRV	

② Dimensions (L × W × H)

Code	Dimensions (L × W × H) [mm]
2010	2.0 × 2.0 × 1.0
2012	2.0 × 2.0 × 1.2
2410	2.4 × 2.4 × 1.0
2412	2.4 × 2.4 × 1.2
3010	3.0 × 3.0 × 1.0
3012	3.0 × 3.0 × 1.2
3015	3.0 × 3.0 × 1.5
4010	4.0 × 4.0 × 1.0
4012	4.0 × 4.0 × 1.2
4018	4.0 × 4.0 × 1.8
5010	4.9 × 4.9 × 1.0
5012	4.9 × 4.9 × 1.2
5014	4.9 × 4.9 × 1.4
5020	4.9 × 4.9 × 2.0
5024	4.9 × 4.9 × 2.4
5030	4.9 × 4.9 × 3.0
5040	4.9 × 4.9 × 4.0
6010	6.0 × 6.0 × 1.0
6012	6.0 × 6.0 × 1.2
6014	6.0 × 6.0 × 1.4
6020	6.0 × 6.0 × 2.0
6028	6.0 × 6.0 × 2.8
6045	6.0 × 6.0 × 4.5
8030	8.0 × 8.0 × 3.0
8040	8.0 × 8.0 × 4.0

③ Packaging

Code	Packaging
T△	Taping

④ Nominal inductance

Code (example)	Nominal inductance [μH]
2R2	2.2
100	10
101	100

※R=Decimal point

⑤ Inductance tolerance

Code	Inductance tolerance
M	±20%
N	±30%

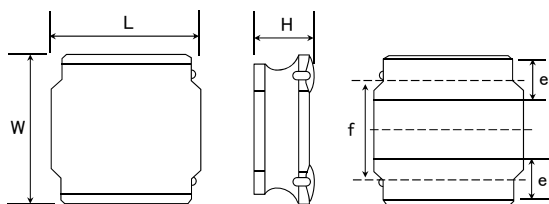
⑥ Special code

Code	Special code
△	Standard

⑦ Internal code

Code	Internal code
V	Inductor for Industrial and Automotive

■ STANDARD EXTERNAL DIMENSIONS / STANDARD QUANTITY



Recommended Land Patterns

Type	A	B	C
NRV2010	0.65	1.35	2.0
NRV2012, NRS2012			
NRH2410	0.7	1.45	2.0 (2.4)*
NRH2412			
NRH3010	0.8	2.2	2.7 (3.1)*
NRH3012, NRV3012			
NRS3015			
NRS4010	1.2	2.8	3.7 (4.1)*
NRS4012			
NRS4018			
NRS8030			
NRS8040	1.8	5.6	7.5 (7.9)*

Unit: mm

(*) : It is a pattern for confirmation of the solder fillet

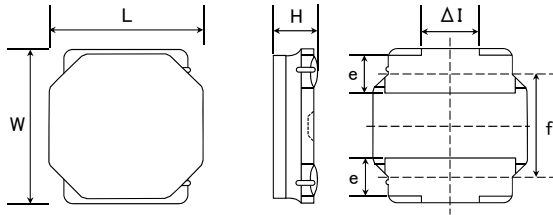
Type	L	W	H	e	f	Standard quantity [pcs] Taping
NRV2010	2.0 ± 0.1 (0.079 ± 0.004)	2.0 ± 0.1 (0.079 ± 0.004)	1.0 max (0.039 max)	0.5 ± 0.2 (0.024 ± 0.008)	1.25 ± 0.2 (0.050 ± 0.008)	2500
NRV2012 NRS2012	2.0 ± 0.1 (0.079 ± 0.004)	2.0 ± 0.1 (0.079 ± 0.004)	1.2 max (0.047 max)	0.5 ± 0.2 (0.024 ± 0.008)	1.25 ± 0.2 (0.050 ± 0.008)	2500
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
NRH2412	2.4 ± 0.1 (0.095 ± 0.004)	2.4 ± 0.1 (0.095 ± 0.004)	1.2 max (0.047 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

▶ 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/>).

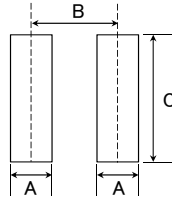
NRH3012	3.0±0.1 (0.118±0.004)	3.0±0.1 (0.118±0.004)	1.2 max (0.047 max)	0.9±0.2 (0.035±0.008)	1.9±0.2 (0.075±0.008)	2000
NRV3012	3.0±0.1 (0.118±0.004)	3.0±0.1 (0.118±0.004)	1.5 max (0.059 max)	0.9±0.2 (0.035±0.008)	1.9±0.2 (0.075±0.008)	2000
NRS3015	4.0±0.2 (0.157±0.008)	4.0±0.2 (0.157±0.008)	1.0 max (0.039 max)	1.1±0.2 (0.043±0.008)	2.5±0.2 (0.098±0.008)	5000
NRS4010	4.0±0.2 (0.157±0.008)	4.0±0.2 (0.157±0.008)	1.2 max (0.047 max)	1.1±0.2 (0.043±0.008)	2.5±0.2 (0.098±0.008)	4500
NRS4012	4.0±0.2 (0.157±0.008)	4.0±0.2 (0.157±0.008)	1.8 max (0.071 max)	1.1±0.2 (0.043±0.008)	2.5±0.2 (0.098±0.008)	3500
NRS4018	8.0±0.2 (0.315±0.008)	8.0±0.2 (0.315±0.008)	3.0 max (0.118 max)	1.60±0.3 (0.063±0.012)	5.6±0.3 (0.22±0.012)	1000
NRS8030	8.0±0.2 (0.315±0.008)	8.0±0.2 (0.315±0.008)	*1) 4.2 max (0.165 max) *2) 4.0 max (0.157 max)	1.60±0.3 (0.063±0.012)	5.6±0.3 (0.22±0.012)	1000

*1) 0R9~6R8 type, *2) 100~101type

Unit: mm (inch)



Recommended Land Patterns



Type	A	B	C
NRS5010	1.5	3.6	4.0 (4.4)*
NRS5012			
NRS5014			
NRS5020			
NRS5024			
NRS5030			
NRS5040	1.6	4.7	5.7 (6.1)*
NRS6010			
NRS6012			
NRS6014			
NRS6020			
NRS6028			
NRS6045			

Unit: mm

(*)*: It is a pattern for confirmation of the solder fillet

Type	L	W	H	e	f	ΔI	Standard quantity [pcs] Taping
NRS5010	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	1.0 max (0.039 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	1000
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)	1.3typ (0.051typ)	1000
NRS5014	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	1.4 max (0.055 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	1000
NRS5020	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	2.0 max (0.079 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	800
NRS5024	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	*3) 2.5 max (0.098 max) *4) 2.4 max (0.094 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	2500
NRS5030	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	*5) 3.1 max (0.122 max) *6) 3.0 max (0.118 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	500
NRS5040	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	*7) 4.1 max (0.161 max) *8) 4.0 max (0.157 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	1500
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)	2.3typ (0.091typ)	1000
NRS6012	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)	2.3typ (0.091typ)	1000
NRS6014	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	1.4 max (0.055 max)	1.35±0.2 (0.053±0.008)	4.0±0.2 (0.157±0.008)	2.3typ (0.091typ)	1000
NRS6020	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	2.0 max (0.079 max)	1.35±0.2 (0.053±0.008)	4.0±0.2 (0.157±0.008)	2.3typ (0.091typ)	2500
NRS6028	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)	2.3typ (0.091typ)	2000
NRS6045	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)	2.3typ (0.091typ)	1500

*3) 1R0~1R5 type, *4) 2R2~330 type
*5) R47~100 type, *6) 150~470 type
*7) 1R5~100 type, *8) 150~470 type

Unit: mm (inch)

PART NUMBER

• All the SMD Power Inductors of Catalog Lineup are Compliance RoHS.

Note)

• Information about usage environment or condition is necessary depending on the application and circuit condition. Please contact TAIYO YUDEN sales channels.

• *1: Automotive (AEC-Q200 Qualified) products

< **AEC-Q200** : AEC-Q200 qualified >

All the SMD Power Inductors of *1 marks are tested based on the test conditions and methods defined in AEC-Q200 by family item.

Please consult with TAIYO YUDEN's official sales channel for the details of the product specification and AEC-Q200 test results, etc.,

and please review and approve TAIYO YUDEN's product specification before ordering.

• *2: Industrial products and Medical products

NRV2010 type

Part number	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRV2010T R47N GFV	0.47	$\pm 30\%$	-	0.052	2,100	2,000	100	*1, *2
NRV2010T R68N GFV	0.68	$\pm 30\%$	-	0.060	1,850	1,850	100	*1, *2
NRV2010T 1R0N GFV	1.0	$\pm 30\%$	-	0.080	1,550	1,600	100	*1, *2
NRV2010T 1R5M GFV	1.5	$\pm 20\%$	-	0.100	1,350	1,450	100	*1, *2
NRV2010T 2R2M GFV	2.2	$\pm 20\%$	-	0.175	1,100	1,100	100	*1, *2
NRV2010T 3R3M GFV	3.3	$\pm 20\%$	-	0.250	880	1,000	100	*1, *2
NRV2010T 4R7M GFV	4.7	$\pm 20\%$	-	0.320	760	820	100	*1, *2

NRV2012 type

Part number	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRV2012T 1R0N GFV	1.0	$\pm 30\%$	-	0.073	2,200	1,650	100	*1, *2
NRV2012T 1R5N GFV	1.5	$\pm 30\%$	-	0.100	1,800	1,400	100	*1, *2
NRV2012T 2R2M GFV	2.2	$\pm 20\%$	-	0.129	1,600	1,200	100	*1, *2
NRV2012T 3R3M GFV	3.3	$\pm 20\%$	-	0.227	1,250	900	100	*1, *2
NRV2012T 4R7M GFV	4.7	$\pm 20\%$	-	0.325	1,100	750	100	*1, *2

NRS2012 Shielded type

Part number	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRS2012T 1R0N GJV	1.0	$\pm 30\%$	-	0.070	1,900	1,700	100	*1, *2
NRS2012T 1R5N GJV	1.5	$\pm 30\%$	-	0.090	1,650	1,500	100	*1, *2
NRS2012T 2R2M GJV	2.2	$\pm 20\%$	-	0.107	1,350	1,370	100	*1, *2
NRS2012T 3R3M GJV	3.3	$\pm 20\%$	-	0.190	1,000	1,020	100	*1, *2
NRS2012T 4R7M GJV	4.7	$\pm 20\%$	-	0.241	900	910	100	*1, *2

NRH2410 Shielded type

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

NRH2412 Shielded type

Part number	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRH2412T R47NNGJV	0.47	$\pm 30\%$	180	0.050	2,900	2,100	100	*1, *2
NRH2412T 1R0NNGHV	1.0	$\pm 30\%$	101	0.077	2,350	1,300	100	*1, *2
NRH2412T 1R5NNGHV	1.5	$\pm 30\%$	89	0.100	2,100	1,150	100	*1, *2
NRH2412T 2R2MNGHV	2.2	$\pm 20\%$	72	0.140	1,700	1,000	100	*1, *2
NRH2412T 3R3MNGHV	3.3	$\pm 20\%$	56	0.225	1,400	750	100	*1, *2
NRH2412T 4R7MNGHV	4.7	$\pm 20\%$	45	0.300	1,150	650	100	*1, *2
NRH2412T 6R8MNGHV	6.8	$\pm 20\%$	34	0.420	950	550	100	*1, *2
NRH2412T 100MNGHV	10	$\pm 20\%$	29	0.600	810	450	100	*1, *2

※) 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 current value saturation current value and temperature rise current value.

PART NUMBER

● NRH3010 Shielded type

Part number	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency[kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRH3010T 1R2NN V	1.2	$\pm 30\%$	120	0.065	1,700	1,480	100	*1,*2
NRH3010T 1R5NN V	1.5	$\pm 30\%$	99	0.075	1,440	1,370	100	*1,*2
NRH3010T 2R2MN V	2.2	$\pm 20\%$	86	0.083	1,300	1,300	100	*1,*2
NRH3010T 3R3MN V	3.3	$\pm 20\%$	64	0.130	1,000	1,030	100	*1,*2
NRH3010T 4R7MN V	4.7	$\pm 20\%$	50	0.170	850	900	100	*1,*2
NRH3010T 6R8MN V	6.8	$\pm 20\%$	44	0.250	700	745	100	*1,*2
NRH3010T 100MN V	10	$\pm 20\%$	34	0.350	600	620	100	*1,*2
NRH3010T 150MN V	15	$\pm 20\%$	25	0.550	450	480	100	*1,*2
NRH3010T 220MN V	22	$\pm 20\%$	22	0.770	380	410	100	*1,*2
NRH3010T 470MN V	47	$\pm 20\%$	17	2.05	250	285	100	*1,*2

● NRH3012 Shielded type

Part number	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency[kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRH3012T R47NN V	0.47	$\pm 30\%$	160	0.033	2,600	1,900	100	*1,*2
NRH3012T 1R0NN V	1.0	$\pm 30\%$	111	0.048	2,200	1,710	100	*1,*2
NRH3012T 1R5NN V	1.5	$\pm 30\%$	95	0.055	1,700	1,600	100	*1,*2
NRH3012T 2R2MN V	2.2	$\pm 20\%$	78	0.075	1,500	1,370	100	*1,*2
NRH3012T 3R3MN V	3.3	$\pm 20\%$	61	0.100	1,200	1,210	100	*1,*2
NRH3012T 4R7MN V	4.7	$\pm 20\%$	50	0.130	1,000	1,060	100	*1,*2
NRH3012T 6R8MN V	6.8	$\pm 20\%$	43	0.190	850	890	100	*1,*2
NRH3012T 100MN V	10	$\pm 20\%$	32	0.270	730	720	100	*1,*2
NRH3012T 150MN V	15	$\pm 20\%$	26	0.450	530	570	100	*1,*2
NRH3012T 220MN V	22	$\pm 20\%$	22	0.630	500	500	100	*1,*2

● NRV3012 Shielded type

Part number	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency[kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRV3012T 1R0N V	1.0	$\pm 30\%$	110	0.065	2,500	1,600	100	*1,*2
NRV3012T 1R5N V	1.5	$\pm 30\%$	92	0.075	2,100	1,400	100	*1,*2
NRV3012T 2R2M V	2.2	$\pm 20\%$	70	0.120	1,800	1,100	100	*1,*2
NRV3012T 3R3M V	3.3	$\pm 20\%$	55	0.150	1,600	1,000	100	*1,*2
NRV3012T 4R7M V	4.7	$\pm 20\%$	48	0.190	1,250	850	100	*1,*2
NRV3012T 6R8M V	6.8	$\pm 20\%$	40	0.300	950	650	100	*1,*2
NRV3012T 100M V	10	$\pm 20\%$	32	0.470	800	550	100	*1,*2

● NRS3015 Shielded type

Part number	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency[kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRS3015T 1R0NNGHV	1.0	$\pm 30\%$	100	0.030	2,100	2,100	100	*1,*2
NRS3015T 1R5NNGHV	1.5	$\pm 30\%$	87	0.038	1,800	1,820	100	*1,*2
NRS3015T 2R2MNGHV	2.2	$\pm 20\%$	64	0.058	1,480	1,500	100	*1,*2
NRS3015T 3R3MNGHV	3.3	$\pm 20\%$	49	0.078	1,210	1,230	100	*1,*2
NRS3015T 4R7MNGHV	4.7	$\pm 20\%$	40	0.120	1,020	1,040	100	*1,*2
NRS3015T 6R8MNGHV	6.8	$\pm 20\%$	36	0.160	870	880	100	*1,*2
NRS3015T 100MNGHV	10	$\pm 20\%$	28	0.220	700	710	100	*1,*2
NRS3015T 220MNGHV	22	$\pm 20\%$	20	0.520	470	470	100	*1,*2

● NRS4010 Shielded type

Part number	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency[kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRS4010T 1R0NDGGV	1.0	$\pm 30\%$	116	0.056	2,000	1,900	100	*1,*2
NRS4010T 2R2MDGGV	2.2	$\pm 20\%$	73	0.085	1,200	1,500	100	*1,*2
NRS4010T 3R3MDGGV	3.3	$\pm 20\%$	58	0.100	1,100	1,400	100	*1,*2
NRS4010T 4R7MDGGV	4.7	$\pm 20\%$	47	0.140	950	1,200	100	*1,*2
NRS4010T 6R8MDGGV	6.8	$\pm 20\%$	38	0.200	800	1,000	100	*1,*2
NRS4010T 100MDGGV	10	$\pm 20\%$	31	0.300	620	750	100	*1,*2
NRS4010T 150MDGGV	15	$\pm 20\%$	24	0.430	540	600	100	*1,*2
NRS4010T 220MDGGV	22	$\pm 20\%$	19	0.570	450	500	100	*1,*2

● NRS4012 Shielded type

Part number	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency[kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRS4012T 1R0NDGGV	1.0	$\pm 30\%$	100	0.042	2,800	2,200	100	*1,*2
NRS4012T 2R2MDGJV	2.2	$\pm 20\%$	70	0.060	1,650	1,900	100	*1,*2
NRS4012T 3R3MDGJV	3.3	$\pm 20\%$	60	0.070	1,400	1,700	100	*1,*2
NRS4012T 4R7MDGJV	4.7	$\pm 20\%$	45	0.095	1,200	1,500	100	*1,*2
NRS4012T 6R8MDGJV	6.8	$\pm 20\%$	35	0.125	900	1,300	100	*1,*2
NRS4012T 100MDGJV	10	$\pm 20\%$	30	0.170	800	1,100	100	*1,*2
NRS4012T 150MDGJV	15	$\pm 20\%$	24	0.260	650	750	100	*1,*2
NRS4012T 220MDGJV	22	$\pm 20\%$	18	0.400	500	620	100	*1,*2

※) 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 current value saturation current value and temperature rise current value.

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■ PART NUMBER

● NRS4018 Shielded type

Part number	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency[kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRS4018T 1R0NDGJV	1.0	$\pm 30\%$	90	0.027	4,000	3,200	100	*1 *2
NRS4018T 2R2MDGJV	2.2	$\pm 20\%$	60	0.042	3,000	2,200	100	*1 *2
NRS4018T 3R3MDGJV	3.3	$\pm 20\%$	45	0.055	2,300	2,000	100	*1 *2
NRS4018T 4R7MDGJV	4.7	$\pm 20\%$	35	0.070	2,000	1,700	100	*1 *2
NRS4018T 6R8MDGJV	6.8	$\pm 20\%$	30	0.098	1,600	1,450	100	*1 *2
NRS4018T 100MDGJV	10	$\pm 20\%$	25	0.150	1,300	1,200	100	*1 *2
NRS4018T 150MDGJV	15	$\pm 20\%$	18	0.210	1,100	850	100	*1 *2
NRS4018T 220MDGJV	22	$\pm 20\%$	15	0.290	900	720	100	*1 *2
NRS4018T 330MDGJV	33	$\pm 20\%$	12	0.460	700	550	100	*1 *2
NRS4018T 470MDGJV	47	$\pm 20\%$	10	0.650	600	440	100	*1 *2
NRS4018T 680MDGJV	68	$\pm 20\%$	8.3	1.00	520	320	100	*1 *2
NRS4018T 101MDGJV	100	$\pm 20\%$	6.5	1.45	420	280	100	*1 *2
NRS4018T 151MDGJV	150	$\pm 20\%$	5.5	2.30	340	220	100	*1 *2
NRS4018T 221MDGJV	220	$\pm 20\%$	4.0	3.80	275	170	100	*1 *2

● NRS5010 type

Part number	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency[kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRS5010T 1R0NMGFV	1.0	$\pm 30\%$	95	0.070	2,350	1,750	100	*1 *2
NRS5010T 2R2NMGFV	2.2	$\pm 30\%$	65	0.105	1,500	1,400	100	*1 *2
NRS5010T 3R3MMGFV	3.3	$\pm 20\%$	42	0.125	1,400	1,250	100	*1 *2
NRS5010T 4R7MMGFV	4.7	$\pm 20\%$	37	0.145	1,200	1,150	100	*1 *2
NRS5010T 6R8MMGFV	6.8	$\pm 20\%$	33	0.185	1,000	1,000	100	*1 *2
NRS5010T 100MMGFV	10	$\pm 20\%$	23	0.250	850	900	100	*1 *2
NRS5010T 150MMGFV	15	$\pm 20\%$	19	0.400	680	650	100	*1 *2
NRS5010T 220MMGFV	22	$\pm 20\%$	15	0.600	550	450	100	*1 *2

● NRS5012 type

Part number	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency[kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRS5012T 1R0NMGFV	1.0	$\pm 30\%$	100	0.053	4,500	2,300	100	*1 *2
NRS5012T 1R5NMGFV	1.5	$\pm 30\%$	86	0.070	3,800	2,200	100	*1 *2
NRS5012T 2R2MMGFV	2.2	$\pm 20\%$	70	0.085	3,100	2,000	100	*1 *2
NRS5012T 3R3MMGFV	3.3	$\pm 20\%$	48	0.160	2,400	1,450	100	*1 *2
NRS5012T 4R7MMGFV	4.7	$\pm 20\%$	40	0.180	2,200	1,400	100	*1 *2
NRS5012T 6R8MMGFV	6.8	$\pm 20\%$	36	0.260	1,700	1,100	100	*1 *2
NRS5012T 100MMGFV	10	$\pm 20\%$	26	0.420	1,400	850	100	*1 *2
NRS5012T 150MMGFV	15	$\pm 20\%$	22	0.670	1,200	640	100	*1 *2

● NRS5014 Shielded type

Part number	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency[kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRS5014T R47NMGV	0.47	$\pm 30\%$	185	0.025	5,800	3,300	100	*1 *2
NRS5014T 1R2NMGV	1.2	$\pm 30\%$	86	0.045	3,800	2,400	100	*1 *2
NRS5014T 2R2NMGV	2.2	$\pm 30\%$	56	0.065	2,800	2,000	100	*1 *2
NRS5014T 3R3NMGV	3.3	$\pm 30\%$	48	0.080	2,350	1,700	100	*1 *2
NRS5014T 4R7NMGV	4.7	$\pm 30\%$	41	0.100	2,050	1,400	100	*1 *2
NRS5014T 6R8NMGV	6.8	$\pm 20\%$	33	0.150	1,600	1,200	100	*1 *2
NRS5014T 100MMGV	10	$\pm 20\%$	27	0.200	1,400	1,050	100	*1 *2
NRS5014T 150MMGV	15	$\pm 20\%$	20	0.320	1,100	650	100	*1 *2
NRS5014T 220MMGV	22	$\pm 20\%$	16	0.450	900	550	100	*1 *2

● NRS5020 Shielded type

Part number	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency[kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRS5020T R47NMGJV	0.47	$\pm 30\%$	230	0.012	6,100	5,000	100	*1 *2
NRS5020T 1R0NMGJV	1.0	$\pm 30\%$	81	0.021	4,000	3,600	100	*1 *2
NRS5020T 1R5NMGJV	1.5	$\pm 30\%$	68	0.026	3,350	3,200	100	*1 *2
NRS5020T 2R2NMGJV	2.2	$\pm 30\%$	57	0.035	2,900	2,900	100	*1 *2
NRS5020T 3R3NMGJV	3.3	$\pm 30\%$	46	0.048	2,400	2,400	100	*1 *2
NRS5020T 4R7MMGJV	4.7	$\pm 20\%$	37	0.060	2,000	2,000	100	*1 *2
NRS5020T 6R8MMGJV	6.8	$\pm 20\%$	30	0.090	1,600	1,650	100	*1 *2
NRS5020T 100MMGJV	10	$\pm 20\%$	24	0.120	1,300	1,450	100	*1 *2
NRS5020T 150MMGJV	15	$\pm 20\%$	20	0.165	1,100	1,200	100	*1 *2
NRS5020T 220MMGJV	22	$\pm 20\%$	17	0.260	900	1,000	100	*1 *2

※) 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 current value saturation current value and temperature rise current value.

■ PART NUMBER

● NRS5024 Shielded type

Part number	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency[kHz]	Note
					Saturation current I _{dc1}	Temperature rise current I _{dc2}		
NRS5024T 1R0NMGJV	1.0	±30%	85	0.016	5,800	4,400	100	*1,*2
NRS5024T 1R5NMGJV	1.5	±30%	67	0.022	5,200	3,600	100	*1,*2
NRS5024T 2R2NMGJV	2.2	±30%	51	0.029	4,100	3,100	100	*1,*2
NRS5024T 3R3NMGJV	3.3	±30%	41	0.043	3,100	2,400	100	*1,*2
NRS5024T 4R7MMGJV	4.7	±20%	37	0.055	2,700	2,000	100	*1,*2
NRS5024T 6R8MMGJV	6.8	±20%	28	0.080	2,200	1,600	100	*1,*2
NRS5024T 100MMGJV	10	±20%	21	0.125	1,700	1,200	100	*1,*2
NRS5024T 150MMGJV	15	±20%	18	0.170	1,400	1,000	100	*1,*2
NRS5024T 220MMGJV	22	±20%	15	0.230	1,200	820	100	*1,*2
NRS5024T 330MMGJV	33	±20%	11	0.370	1,000	630	100	*1,*2

● NRS5030 Shielded type

Part number	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency[kHz]	Note
					Saturation current I _{dc1}	Temperature rise current I _{dc2}		
NRS5030T R47NMGJV	0.47	±30%	185	0.010	9,000	5,000	100	*1,*2
NRS5030T 1R0NMGJV	1.0	±30%	110	0.015	6,600	4,000	100	*1,*2
NRS5030T 2R2NMGJV	2.2	±30%	46	0.023	4,200	3,500	100	*1,*2
NRS5030T 3R3MMGJV	3.3	±20%	36	0.030	3,600	3,000	100	*1,*2
NRS5030T 4R7MMGJV	4.7	±20%	31	0.035	3,100	2,600	100	*1,*2
NRS5030T 6R8MMGJV	6.8	±20%	22	0.052	2,500	2,300	100	*1,*2
NRS5030T 100MMGJV	10	±20%	20	0.070	2,100	1,700	100	*1,*2
NRS5030T 150MMGJV	15	±20%	14	0.125	1,600	1,400	100	*1,*2
NRS5030T 220MMGJV	22	±20%	13	0.180	1,400	1,050	100	*1,*2
NRS5030T 330MMGJV	33	±20%	10	0.225	1,150	800	100	*1,*2
NRS5030T 470MMGJV	47	±20%	9	0.325	950	700	100	*1,*2

● NRS5040 Shielded type

Part number	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency[kHz]	Note
					Saturation current I _{dc1}	Temperature rise current I _{dc2}		
NRS5040T 1R5NMGJV	1.5	±30%	60	0.017	6,400	4,500	100	*1,*2
NRS5040T 2R2NMGJV	2.2	±30%	42	0.022	5,000	3,700	100	*1,*2
NRS5040T 3R3NMGJV	3.3	±30%	32	0.027	4,000	3,300	100	*1,*2
NRS5040T 4R7NMGKV	4.7	±30%	28	0.029	3,300	3,100	100	*1,*2
NRS5040T 6R8MMGJV	6.8	±20%	21	0.049	2,800	2,400	100	*1,*2
NRS5040T 100MMGJV	10	±20%	18	0.056	2,300	2,100	100	*1,*2
NRS5040T 150MMGJV	15	±20%	13	0.080	2,000	1,800	100	*1,*2
NRS5040T 220MMGKV	22	±20%	9	0.126	1,500	1,400	100	*1,*2
NRS5040T 330MMGJV	33	±20%	7	0.180	1,300	1,200	100	*1,*2
NRS5040T 470MMGJV	47	±20%	6	0.310	1,100	900	100	*1,*2

● NRS6010

Part number	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency[kHz]	Note
					Saturation current I _{dc1}	Temperature rise current I _{dc2}		
NRS6010T 1R5MMGFV	1.5	±20%	77	0.090	2,400	1,900	100	*1,*2
NRS6010T 2R2MMGFV	2.2	±20%	56	0.110	1,900	1,700	100	*1,*2
NRS6010T 3R3MMGFV	3.3	±20%	42	0.135	1,600	1,500	100	*1,*2
NRS6010T 4R7MMGFV	4.7	±20%	36	0.165	1,300	1,400	100	*1,*2
NRS6010T 6R8MMGFV	6.8	±20%	30	0.220	1,200	1,200	100	*1,*2
NRS6010T 100MMGFV	10	±20%	25	0.270	1,000	1,100	100	*1,*2
NRS6010T 220MMGFV	22	±20%	12	0.580	650	700	100	*1,*2

● NRS6012 Shielded type

Part number	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency[kHz]	Note
					Saturation current I _{dc1}	Temperature rise current I _{dc2}		
NRS6012T 1R0NMGJV	1.0	±30%	95	0.050	3,000	2,400	100	*1,*2
NRS6012T 1R5NMGJV	1.5	±30%	69	0.067	2,600	2,100	100	*1,*2
NRS6012T 2R5NMGJV	2.5	±30%	45	0.090	2,100	1,800	100	*1,*2
NRS6012T 3R3NMGJV	3.3	±30%	42	0.105	1,800	1,700	100	*1,*2
NRS6012T 4R7MMGJV	4.7	±20%	36	0.125	1,600	1,550	100	*1,*2
NRS6012T 5R3MMGJV	5.3	±20%	34	0.125	1,500	1,550	100	*1,*2
NRS6012T 6R8MMGJV	6.8	±20%	30	0.165	1,300	1,350	100	*1,*2
NRS6012T 100MMGJV	10	±20%	22	0.200	1,000	1,200	100	*1,*2
NRS6012T 150MMGJV	15	±20%	18	0.295	800	800	100	*1,*2
NRS6012T 220MMGJV	22	±20%	12	0.465	760	650	100	*1,*2
NRS6012T 330MMGJV	33	±20%	8	0.580	590	550	100	*1,*2
NRS6012T 470MMGJV	47	±20%	6	0.965	520	460	100	*1,*2
NRS6012T 680MMGJV	68	±20%	3	1.16	440	410	100	*1,*2
NRS6012T 101MMGJV	100	±20%	1	1.67	350	320	100	*1,*2

※) The saturation current value (I_{dc1}) is the DC current value having inductance decrease down to 30%. (at 20°C)

※) The temperature rise current value (I_{dc2}) 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 current value saturation current value and temperature rise current value.

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● NRS6014 Shielded type

Part number	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRS6014T 1R2NMGV	1.2	±30%	77	0.042	4,000	2,750	100	*1 *2
NRS6014T 2R2NMGV	2.2	±30%	61	0.055	3,000	2,300	100	*1 *2
NRS6014T 3R3NMGV	3.3	±30%	41	0.075	2,500	2,000	100	*1 *2
NRS6014T 4R7MMGV	4.7	±20%	36	0.090	2,000	1,900	100	*1 *2
NRS6014T 6R8MMGV	6.8	±20%	30	0.115	1,700	1,650	100	*1 *2
NRS6014T 100MMGV	10	±20%	24	0.140	1,400	1,400	100	*1 *2
NRS6014T 150MMGV	15	±20%	20	0.210	1,150	1,200	100	*1 *2
NRS6014T 220MMGV	22	±20%	16	0.300	950	1,000	100	*1 *2

● NRS6020 Shielded type

Part number	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRS6020T 0R8NMGV	0.8	±30%	110	0.020	6,400	4,100	100	*1 *2
NRS6020T 1R5NMGV	1.5	±30%	93	0.026	4,300	3,600	100	*1 *2
NRS6020T 2R2NMGV	2.2	±30%	73	0.034	3,200	2,900	100	*1 *2
NRS6020T 3R3NMGV	3.3	±30%	55	0.040	2,800	2,750	100	*1 *2
NRS6020T 4R7NMGV	4.7	±30%	43	0.058	2,400	2,150	100	*1 *2
NRS6020T 6R8NMGV	6.8	±30%	30	0.085	2,000	1,800	100	*1 *2
NRS6020T 100MMGV	10	±20%	18	0.125	1,900	1,500	100	*1 *2
NRS6020T 220MMGV	22	±20%	11	0.290	1,250	950	100	*1 *2

● NRS6028 Shielded type

Part number	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRS6028T 0R9NMGV	0.9	±30%	90	0.013	6,700	4,600	100	*1 *2
NRS6028T 1R5NMGV	1.5	±30%	78	0.016	5,100	4,200	100	*1 *2
NRS6028T 2R2NMGV	2.2	±30%	68	0.020	4,200	3,700	100	*1 *2
NRS6028T 3R0NMGV	3.0	±30%	55	0.023	3,600	3,400	100	*1 *2
NRS6028T 4R7MMGK	4.7	±20%	39	0.031	2,700	3,000	100	*1 *2
NRS6028T 6R0MMGK	6.0	±20%	30	0.040	2,500	2,500	100	*1 *2
NRS6028T 6R8MMGK	6.8	±20%	25	0.043	2,600	2,500	100	*1 *2
NRS6028T 100MMGK	10	±20%	20	0.065	1,900	1,900	100	*1 *2
NRS6028T 150MMGK	15	±20%	17	0.095	1,600	1,800	100	*1 *2
NRS6028T 220MMGK	22	±20%	12	0.135	1,300	1,400	100	*1 *2
NRS6028T 330MMGK	33	±20%	10	0.220	1,100	1,100	100	*1 *2
NRS6028T 470MMGK	47	±20%	8	0.300	1,000	920	100	*1 *2
NRS6028T 680MMGK	68	±20%	5	0.420	800	770	100	*1 *2
NRS6028T 101MMGK	100	±20%	3	0.600	650	660	100	*1 *2

● NRS6045 Shielded type

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

● NRS8030 Shielded type

Part number	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRS8030T 1R0NJGV	1.0	±30%	120	0.009	7,800	6,200	100	*1 *2
NRS8030T 1R5NJGV	1.5	±30%	80	0.012	6,200	5,300	100	*1 *2
NRS8030T 2R2NJGV	2.2	±30%	60	0.015	4,900	4,800	100	*1 *2
NRS8030T 3R3MJGV	3.3	±20%	50	0.019	4,200	4,300	100	*1 *2
NRS8030T 4R7MJGV	4.7	±20%	40	0.022	3,600	4,000	100	*1 *2
NRS8030T 6R8MJGV	6.8	±20%	32	0.029	3,000	3,400	100	*1 *2
NRS8030T 100MJGV	10	±20%	27	0.033	2,400	3,000	100	*1 *2
NRS8030T 150MJGV	15	±20%	20	0.060	2,000	2,200	100	*1 *2
NRS8030T 220MJGV	22	±20%	16	0.070	1,750	1,900	100	*1 *2
NRS8030T 330MJGV	33	±20%	13	0.120	1,300	1,500	100	*1 *2
NRS8030T 470MJGV	47	±20%	11	0.170	1,100	1,300	100	*1 *2

※) 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 current value saturation current value and temperature rise current value.

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PART NUMBER

● NRS8040 Shielded type

Part number	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 30\%$)	Rated current ※) [mA]		Measuring frequency[kHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
NRS8040T 0R9NJGJV	0.9	$\pm 30\%$	85	0.006	13,000	7,800	100	*1,*2
NRS8040T 1R4NJGJV	1.4	$\pm 30\%$	63	0.007	10,000	7,000	100	*1,*2
NRS8040T 2R0NJGJV	2.0	$\pm 30\%$	50	0.009	8,100	6,300	100	*1,*2
NRS8040T 3R6NJGJV	3.6	$\pm 30\%$	34	0.015	6,400	4,900	100	*1,*2
NRS8040T 4R7NJGJV	4.7	$\pm 30\%$	30	0.018	5,400	4,100	100	*1,*2
NRS8040T 6R8NJGJV	6.8	$\pm 30\%$	24	0.025	4,400	3,700	100	*1,*2
NRS8040T 100MJGJV	10	$\pm 20\%$	22	0.034	3,800	3,100	100	*1,*2
NRS8040T 150MJGJV	15	$\pm 20\%$	16	0.050	2,900	2,400	100	*1,*2
NRS8040T 220MJGJV	22	$\pm 20\%$	13	0.066	2,400	2,200	100	*1,*2
NRS8040T 330MJGKV	33	$\pm 20\%$	12	0.100	2,000	1,700	100	*1,*2
NRS8040T 470MJGKV	47	$\pm 20\%$	8	0.140	1,500	1,500	100	*1,*2
NRS8040T 101MJGKV	100	$\pm 20\%$	6	0.280	1,100	1,000	100	*1,*2

※) 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 current value saturation current value and temperature rise current value.

Derating of Rated Current

NR series H type/S type/V type

Derating of current is necessary for NR-series H type/S type/V type depending on ambient temperature. Please refer to the chart shown below for appropriate derating of current.

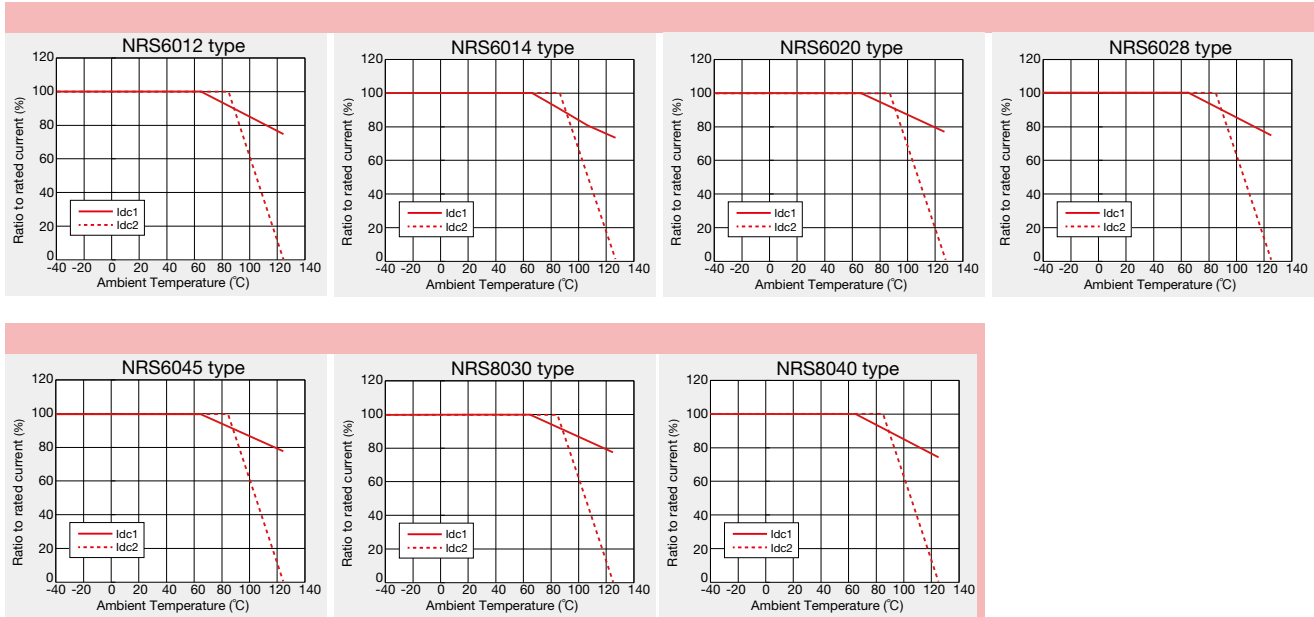


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Derating of Rated Current

NR series H type/S type/V type

Derating of current is necessary for NR-series H type/S type/V type depending on ambient temperature. Please refer to the chart shown below for appropriate derating of current.



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SMD POWER INDUCTORS (NR SERIES/NR SERIES H TYPE/S TYPE/V TYPE)

PACKAGING

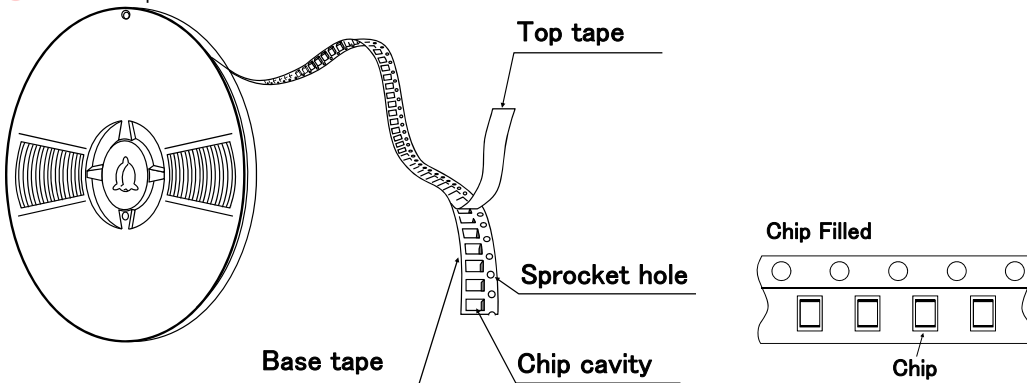
① Minimum Quantity

Type	Standard Quantity [pcs]
	Tape & Reel
NRV2010	2500
NRS2012	2500
NRV2012	2500
NRH2410	2500
NRH2412	2500
NR 3010	2000
NRH3010	2000
NR 3012	2000
NRH3012	2000
NRV3012	2000
NR 3015	2000
NRS3015	2000
NR 4010	5000
NRS4010	5000
NR 4012	4500
NRS4012	4500
NR 4018	3500
NRS4018	3500

Type	Standard Quantity [pcs]
	Tape & Reel
NRS5010	1000
NRS5012	1000
NRS5014	1000
NRS5020	800
NRS5024	2500
NRS5030	500
NR 5040	1500
NRS5040	1500
NRS6010	1000
NR 6012	1000
NRS6012	1000
NRS6014	1000
NR 6020	2500
NRS6020	2500
NR 6028	2000
NRS6028	2000
NR 6045	1500
NRS6045	1500
NRS8030	1000
NR 8040	1000
NRS8040	1000

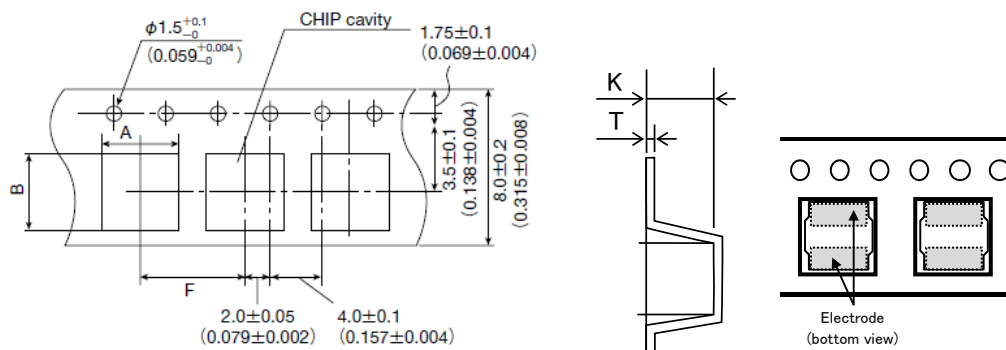
② Tape Material

● Embossed Tape



③ Taping dimensions

● Embossed tape 8mm wide (0.315 inches wide)

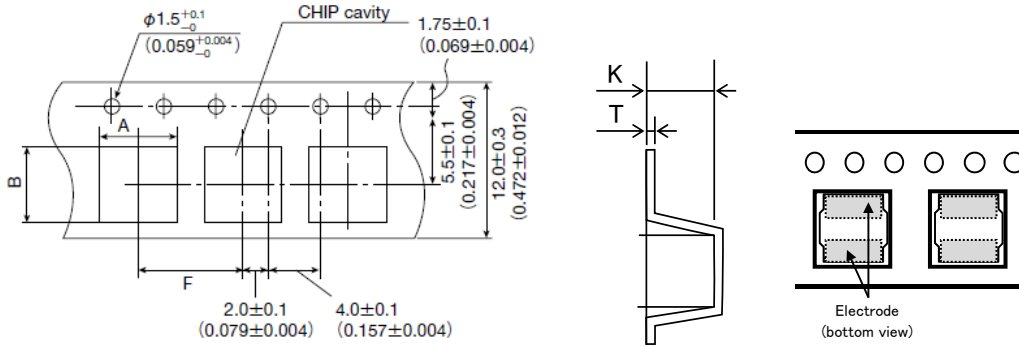


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Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B		T	K
NRV2010	2.2±0.1 (0.102±0.004)	2.2±0.1 (0.102±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.009±0.002)	1.3±0.1 (0.051±0.004)
NRS2012					
NRV2012					
NRH2410	2.6±0.1 (0.087±0.004)	2.6±0.1 (0.102±0.004)		0.25±0.05 (0.009±0.002)	1.3±0.1 (0.051±0.004)
NRH2412					
NR 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)
NRH3010			1.6±0.1 (0.063±0.004)		
NR 3012			1.9±0.1 (0.075±0.004)		
NRH3012					
NRV3012					
NR 3015					
NRS3015					

Unit: mm (inch)

● Embossed tape 12mm wide (0.47 inches wide)

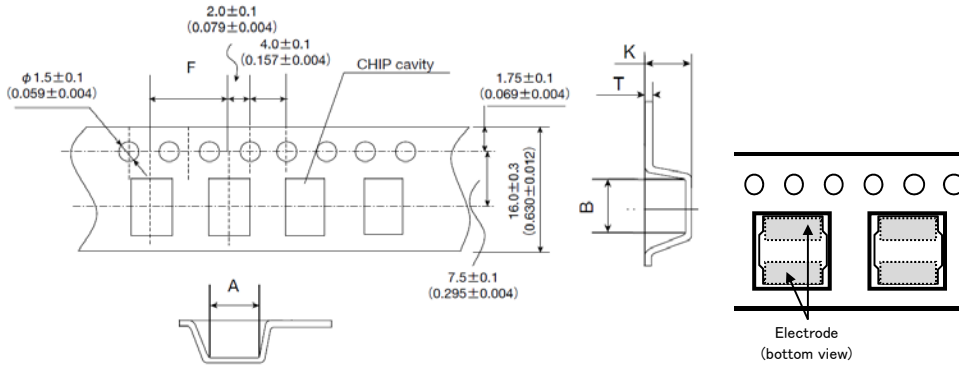


Type	Chip cavity		Insertion pitch	Tape thickness						
	A	B		T	K					
NR 4010	4.3±0.1 (0.169±0.004)	4.3±0.1 (0.169±0.004)	8.0±0.1 (0.315±0.004)	0.3±0.1 (0.012±0.004)	1.4±0.1 (0.055±0.004)					
NRS4010					1.6±0.1 (0.063±0.004)					
NR 4012	5.25±0.1 (0.207±0.004)	5.25±0.1 (0.207±0.004)			1.4±0.1 (0.055±0.004)	1.4±0.1 (0.055±0.004)				
NRS4012							1.6±0.1 (0.063±0.004)			
NR 4018							5.15±0.1 (0.203±0.004)	5.15±0.1 (0.203±0.004)	1.6±0.1 (0.063±0.004)	2.1±0.1 (0.083±0.004)
NRS4018										1.4±0.1 (0.055±0.004)
NRS5010				5.15±0.1 (0.203±0.004)			5.15±0.1 (0.203±0.004)	0.3±0.1 (0.012±0.004)	1.4±0.1 (0.055±0.004)	1.4±0.1 (0.055±0.004)
NRS5012										1.6±0.1 (0.063±0.004)
NRS5014	2.3±0.1 (0.091±0.004)									
NRS5020	2.7±0.1 (0.106±0.004)									
NRS5024	6.3±0.1 (0.248±0.004)	6.3±0.1 (0.248±0.004)		0.4±0.1 (0.016±0.004)	1.4±0.1 (0.055±0.004)	3.2±0.1 (0.126±0.004)				
NRS5030						4.2±0.1 (0.165±0.004)				
NR 5040	6.3±0.1 (0.248±0.004)	6.3±0.1 (0.248±0.004)	1.6±0.1 (0.063±0.004)			1.6±0.1 (0.063±0.004)				
NRS5040							2.3±0.1 (0.090±0.004)			
NRS6010	6.3±0.1 (0.248±0.004)	6.3±0.1 (0.248±0.004)	0.4±0.1 (0.016±0.004)			1.6±0.1 (0.063±0.004)	1.4±0.1 (0.055±0.004)			
NR 6012							1.6±0.1 (0.063±0.004)			
NRS6012							1.6±0.1 (0.063±0.004)			
NRS6014							2.3±0.1 (0.090±0.004)			
NR 6020							3.1±0.1 (0.122±0.004)			
NRS6020							4.7±0.1 (0.185±0.004)			
NR 6028										
NRS6028										
NR 6045										
NRS6045										

Unit: mm (inch)

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● Embossed tape 16mm wide (0.63 inches wide)

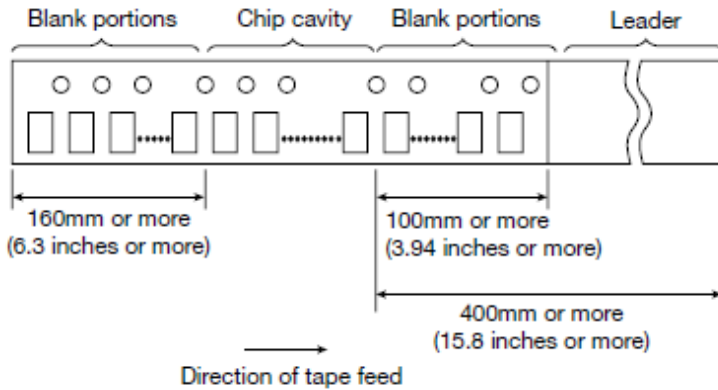


Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
NRS8030	8.3 ± 0.1 (0.327 ± 0.004)	8.3 ± 0.1 (0.327 ± 0.004)	12.0 ± 0.1 (0.472 ± 0.004)	0.5 ± 0.1 (0.020 ± 0.004)	3.4 ± 0.1 (0.134 ± 0.004)
NR 8040 NRS8040					4.5 ± 0.1 (0.177 ± 0.004)

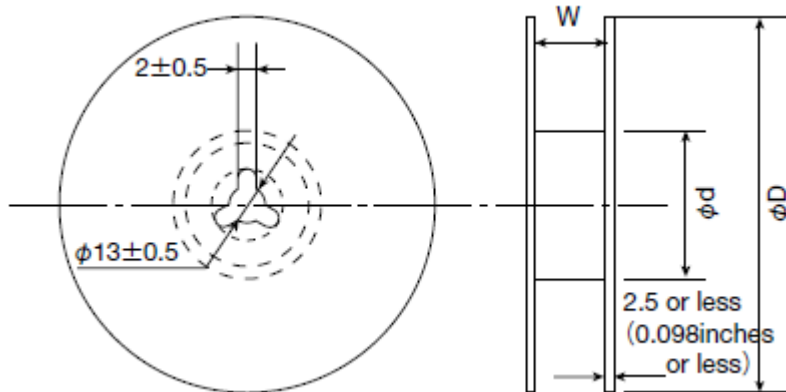
Unit: mm (inch)

④ Leader and Blank portion

● NR, NRH, NRS, NRV



⑤ Reel size

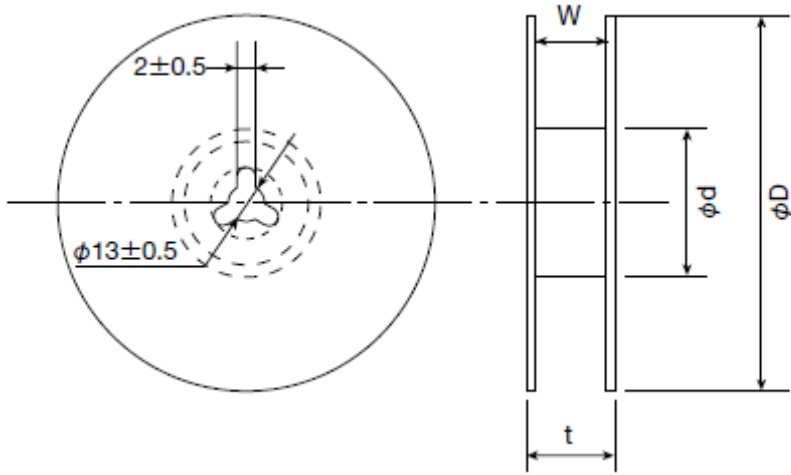


Type	Reel size (Reference values)		
	ϕD	ϕd	W
NRV2010	180 ± 0.5 (7.087 ± 0.019)	60 ± 1.0 (2.36 ± 0.04)	10.0 ± 1.5 (0.394 ± 0.059)
NRS2012			
NRV2012			
NRH2410			
NRH2412			
NR 3010			
NRH3010			
NR 3012			
NRH3012			
NRV3012			
NR 3015			
NRS3015			

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NRS5010	180±3.0 (7.087±0.118)	60±2.0 (2.36±0.08)	14.0±1.5 (0.551±0.059)
NRS5012			
NRS5014			
NRS5020			
NRS5030			
NRS6010			
NR 6012			
NRS6012			
NRS6014			

Unit: mm (inch)

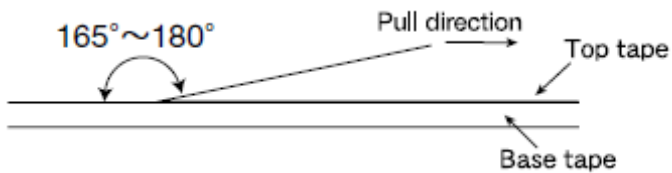


Type	Reel size (Reference values)			
	φD	φd	t (max.)	W
NR 4010	330±3.0 (12.99±0.118)	80±2.0 (3.15±0.078)	18.5 (0.72)	13.5±1.0 (0.531±0.04)
NRS4010				
NR 4012				
NRS4012				
NR 4018				
NRS4018				
NRS5024				
NR 5040				
NRS5040				
NR 6020				
NRS6020				
NR 6028				
NRS6028				
NR 6045				
NRS6045				
NRS8030				
NR 8040				
NRS8040				

Unit: mm (inch)

⑥ Top 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 INDUCTOR (NR□ SERIES)

RELIABILITY DATA

1. Operating Temperature Range		
Specified Value	NRV20/30Type, NRH24/30Type NRS20/30/40/50/60/80Type	-40~+125°C (Including self-generated heat)
Test Methods and Remarks	Including self-generated heat	
2. Storage Temperature Range		
Specified Value	NRV20/30Type, NRH24/30Type NRS20/30/40/50/60/80Type	-40~+85°C
Test Methods and Remarks	-5 to 40°C for the product with taping.	
3. Rated current		
Specified Value	NRV20/30Type, NRH24/30Type NRS20/30/40/50/60/80Type	Within the specified tolerance
4. Inductance		
Specified Value	NRV20/30Type, NRH24/30Type NRS20/30/40/50/60/80Type	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : LCR Meter (HP 4285A or equivalent) Measuring frequency : 100kHz, 1V	
5. DC Resistance		
Specified Value	NRV20/30Type, NRH24/30Type NRS20/30/40/50/60/80Type	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : DC ohmmeter (HIOKI 3227 or equivalent)	
6. Self resonance frequency		
Specified Value	NRV30Type, NRH24/30Type NRS30/40/50/60/80Type	Within the specified tolerance
	NRV20, NRS20	—
Test Methods and Remarks	NRV30, NRH24/30, NRS30/40/50/60/80Type Measuring equipment : Impedance analyzer/material analyzer (HP4291A or equivalent HP4191A, 4192A or equivalent)	
7. Temperature characteristic		
Specified Value	NRV20/30Type, NRH24/30Type NRS20/30/40/50/60/80Type	Inductance change : Within ±20%
Test Methods and Remarks	NRV20/30, NRH24/30, NRS20/30/40/50/60/80 Type, : Measurement of inductance shall be taken at temperature range within -40°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	
	Step	Temperature (°C)
	1	20
	2	Minimum operating temperature
	3	20 (Standard temperature)
4	Maximum operating temperature	
5	20	

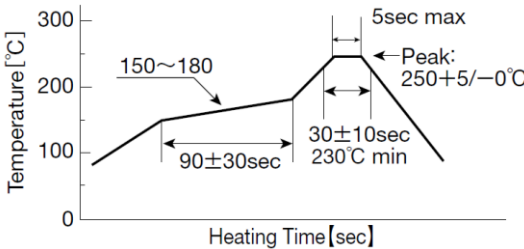
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14. Solderability			
Specified Value	NRV20/30Type,NRH24/30Type NRS20/30/40/50/60/80Type	At least 90% of surface of terminal electrode is covered by new solder.	
Test Methods and Remarks	The test samples shall be dipped in flux, and then immersed in molten solder as shown in below table. Flux : Methanol solution containing rosin 25%.		
	Solder Temperature	245±5°C	
	Time	5±1.0 sec.	
※Immersion depth : All sides of mounting terminal shall be immersed.			
15. Resistance to soldering heat			
Specified Value	NRV20/30Type,NRH24/30Type NRS20/30/40/50/60/80Type	Inductance change : Within ±10% No significant abnormality in appearance.	
Test Methods and Remarks	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.		
	Test board material	: glass epoxy-resin	
	Test board thickness	: 1.0mm	
16. Thermal shock			
Specified Value	NRV20/30Type,NRH24/30Type NRS20/30/40/50/60/80Type	Inductance change : Within ±10% No significant abnormality in appearance.	
Test Methods and Remarks	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 1000 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			
Specified Value	NRV20/30Type,NRH24/30Type NRS20/30/40/50/60/80Type	Inductance change : Within ±10% No significant abnormality in appearance.	
Test Methods and Remarks	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	1000+24/-0 hour	
18. Loading under damp heat			
Specified Value	NRV20/30Type,NRH24/30Type NRS20/30/40/50/60/80Type	Inductance change : Within ±10% No significant abnormality in appearance.	
Test Methods and Remarks	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°C	
	Humidity	90~95%RH	
	Applied current	Rated current	
	Time	1000+24/-0 hour	
19. Low temperature life test			
Specified Value	NRV20/30Type,NRH24/30Type NRS20/30/40/50/60/80Type	Inductance change : Within ±10% No significant abnormality in appearance.	
Test Methods and Remarks	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°C	
	Time	1000+24/-0 hour	

20. High temperature life test		
Specified Value	NRV20/30Type,NRH24/30Type NRS20/30/40/50/60/80Type	—
21. Loading at high temperature life test		
Specified Value	NRV20/30Type,NRH24/30Type NRS20/30/40/50/60/80Type	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow soldering.	
	Temperature	$85 \pm 2^\circ\text{C}$
	Applied current	Rated current
	Time	$1000 + 24 / - 0$ hour
22. Standard condition		
Specified Value	NRV20/30Type,NRH24/30Type NRS20/30/40/50/60/80Type	Standard test condition : Unless otherwise specified, temperature is $20 \pm 15^\circ\text{C}$ and $65 \pm 20\%$ of relative humidity. When there is any question concerning measurement result: In order to provide correlation data, the test shall be condition of $20 \pm 2^\circ\text{C}$ of temperature, $65 \pm 5\%$ relative humidity. Inductance is in accordance with our measured value.

SMD inductor (NR□, NS series)

PRECAUTIONS

1. Circuit Design	
Precautions	<p>◆Operating environment</p> <p>1. All electronic components listed in this catalogue are intended for use in general electronic equipment such as AV/OA equipment, home electrical appliances, office equipment, information-communication equipment, general medical equipment, industrial equipment, and automotive applications.</p> <p>Please be sure to contact TAIYO YUDEN CO., LTD. for further information before using the components for any equipment which might have a negative impact directly on human life, such as specially controlled medical equipment, transportation equipment (automotive powertrain/train/ship control systems, etc.) and traffic signal system.</p> <p>Please do not incorporate the components into any equipment requiring a high degree of safety and reliability, such as aerospace equipment, avionics, nuclear control equipment, submarine system, and military equipment .</p>
2. PCB Design	
Precautions	<p>◆Land pattern design</p> <p>1. Please refer to a recommended land pattern.</p>
Technical considerations	<p>◆Land pattern design</p> <p>Surface Mounting</p> <ul style="list-style-type: none"> • Mounting and soldering conditions should be checked beforehand. • Applicable soldering process to this products is reflow soldering only.
3. Considerations for automatic placement	
Precautions	<p>◆Adjustment of mounting machine</p> <p>1. Excessive impact load should not be imposed on the products when mounting onto the PC boards.</p> <p>2. Mounting and soldering conditions should be checked beforehand.</p>
Technical considerations	<p>◆Adjustment of mounting machine</p> <p>1. When installing products, care should be taken not to apply distortion stress as it may deform the products.</p>
4. Soldering	
Precautions	<p>◆Reflow soldering</p> <p>1. Please contact any of our offices for a reflow soldering, and refer to the recommended condition specified.</p> <p>2. The product shall be used reflow soldering only.</p> <p>3. Please do not add any stress to a product until it returns in normal temperature after reflow soldering.</p> <p>◆Lead free soldering</p> <p>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.</p> <p>◆Recommended conditions for using a soldering iron</p> <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	<p>◆Reflow soldering</p> <p>1. If products are used beyond the range of the recommended conditions, heat stresses may deform the products, and consequently degrade the reliability of the products.</p> <ul style="list-style-type: none"> • NRV20/30, NRH24/30, NRS20/30/40/50/60/80 Type, NS101/125 Type <p>Recommended reflow condition (Pb free solder)</p>  <p>Temperature [°C]</p> <p>Heating Time [sec]</p>
5. Cleaning	
Precautions	<p>◆Cleaning conditions</p> <p>1. Washing by supersonic waves shall be avoided.</p>
Technical considerations	<p>◆Cleaning conditions</p> <p>1. If washed by supersonic waves, the products might be broken.</p>

▶ 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/>)

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"> ◆ Handling <ol style="list-style-type: none"> 1. There is a case that a characteristic varies with magnetic influence. ◆ Breakaway PC boards (splitting along perforations) <ol style="list-style-type: none"> 1. The position of the product on PCBs shall be carefully considered to minimize the stress caused from splitting of the PCBs. ◆ 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. If packing boxes are accumulated, that could cause a deformation on packing tapes or a damage on the products.
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 <ul style="list-style-type: none"> Ambient temperature : $-5\sim 40^{\circ}\text{C}$ Humidity : Below 70% RH ▪ The ambient temperature must be kept below 30°C. Even under ideal storage conditions, solderability of products electrodes may decrease as time passes. <p style="margin-left: 40px;">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.

SMD POWER INDUCTORS(NS SERIES)



REFLOW
AEC-Q200

■ PART NUMBER

*Operating Temp. : -40~125°C(Including self-generated heat)

N	S	△	1	0	1	4	5	T	△	1	0	0	M	N	△	V
①				②				③				④	⑤	⑥	⑦	

△=Blank space

①Series name

Code	Series name
NS△	SMD inductor

②Dimensions (L×W×H)

Code	Dimensions (L×W×H) [mm]
10145	10.1×10.1×4.5
10155	10.1×10.1×5.5
10165	10.1×10.1×6.5
12555	12.5×12.5×5.5
12565	12.5×12.5×6.5
12575	12.5×12.5×7.5

③Packaging

Code	Packaging
T△	Taping

④Nominal inductance

Code (example)	Nominal inductance [μH]
1R0	1.0
100	10
101	100

※R=Decimal point

⑤Inductance tolerance

Code	Inductance tolerance
M	±20%
N	±30%

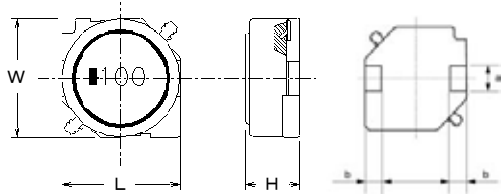
⑥Special code

Code	Special code
N△	Standard

⑦Internal code

Code	Internal code
V	Inductor for Industrial and Automotive

■ STANDARD EXTERNAL DIMENSIONS / MINIMUM QUANTITY



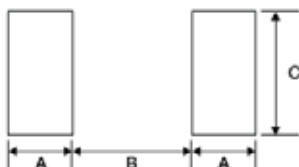
Type	L	W	H	a	b	Minimum quantity [pcs]
NS 10145	10.1±0.3 (0.398±0.012)	10.1±0.3 (0.398±0.012)	4.5±0.35 (0.177±0.014)	2.8±0.1 (0.110±0.004)	2.0±0.15 (0.079±0.006)	2000
NS 10155	10.1±0.3 (0.398±0.012)	10.1±0.3 (0.398±0.012)	5.5±0.35 (0.217±0.014)	2.8±0.1 (0.110±0.004)	2.0±0.15 (0.079±0.006)	2000
NS 10165	10.1±0.3 (0.398±0.012)	10.1±0.3 (0.398±0.012)	6.5±0.35 (0.256±0.014)	2.8±0.1 (0.110±0.004)	2.0±0.15 (0.079±0.006)	2000
NS 12555	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)	2000
NS 12565	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)	2000
NS 12575	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)	2000

Unit: mm (inch)

Recommended Land Patterns

Surface Mounting

- Mounting and soldering conditions should be checked beforehand.
- Applicable soldering process to these products is reflow soldering only.



Type	A	B	C
NS 10145	2.5	5.6	3.2
NS 10155	2.5	5.6	3.2
NS 10165	2.5	5.6	3.2
NS 12555	2.5	8.6	3.2
NS 12565	2.5	8.6	3.2
NS 12575	2.5	8.6	3.2

Unit: mm

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PART NUMBER

• All the SMD Power Inductors of Catalog Lineup are Compliance RoHS.

Note)

• Information about usage environment or condition is necessary depending on the application and circuit condition. Please contact TAIYO YUDEN sales channels.

• *1: Automotive (AEC-Q200 Qualified) products

< AEC-Q200 : AEC-Q200 qualified >

All the SMD Power Inductors of *1 marks are tested based on the test conditions and methods defined in AEC-Q200 by family item.

Please consult with TAIYO YUDEN's official sales channel for the details of the product specification and AEC-Q200 test results, etc.,

and please review and approve TAIYO YUDEN's product specification before ordering.

• *2: Industrial products and Medical products

● NS 10145 type

Part number	Nominal inductance [μ H]	Inductance tolerance	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [A]		Measuring frequency[kHz]	Note
				Saturation current Idc1	Temperature rise current Idc2		
NS 10145T 1R0NN V	1.0	$\pm 30\%$	0.0049	12.54	8.90	100	*1,*2
NS 10145T 1R5NN V	1.5	$\pm 30\%$	0.0060	10.34	7.99	100	*1,*2
NS 10145T 2R2NN V	2.2	$\pm 30\%$	0.0085	8.91	6.64	100	*1,*2
NS 10145T 3R3NN V	3.3	$\pm 30\%$	0.0100	7.33	6.10	100	*1,*2
NS 10145T 4R7NN V	4.7	$\pm 30\%$	0.0144	6.69	5.03	100	*1,*2
NS 10145T 5R6NN V	5.6	$\pm 30\%$	0.0181	5.85	4.45	100	*1,*2
NS 10145T 6R8NN V	6.8	$\pm 30\%$	0.0230	5.05	4.22	100	*1,*2
NS 10145T 100MN V	10	$\pm 20\%$	0.0270	4.22	3.10	100	*1,*2
NS 10145T 150MN V	15	$\pm 20\%$	0.0381	3.44	3.00	100	*1,*2
NS 10145T 220MN V	22	$\pm 20\%$	0.0570	2.87	2.30	100	*1,*2
NS 10145T 330MN V	33	$\pm 20\%$	0.0880	2.36	1.90	100	*1,*2
NS 10145T 470MN V	47	$\pm 20\%$	0.130	2.00	1.50	100	*1,*2
NS 10145T 680MN V	68	$\pm 20\%$	0.150	1.66	1.45	100	*1,*2
NS 10145T 101MN V	100	$\pm 20\%$	0.230	1.40	1.10	100	*1,*2
NS 10145T 151MN V	150	$\pm 20\%$	0.350	1.11	0.86	100	*1,*2
NS 10145T 221MN V	220	$\pm 20\%$	0.510	0.91	0.78	100	*1,*2
NS 10145T 331MN V	330	$\pm 20\%$	0.700	0.71	0.64	100	*1,*2
NS 10145T 471MN V	470	$\pm 20\%$	1.03	0.61	0.52	100	*1,*2
NS 10145T 681MN V	680	$\pm 20\%$	1.57	0.50	0.42	100	*1,*2
NS 10145T 102MN V	1000	$\pm 20\%$	2.58	0.41	0.32	100	*1,*2
NS 10145T 152MN V	1500	$\pm 20\%$	3.70	0.36	0.27	100	*1,*2

● NS 10155 type

Part number	Nominal inductance [μ H]	Inductance tolerance	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [A]		Measuring frequency[kHz]	Note
				Saturation current Idc1	Temperature rise current Idc2		
NS 10155T 1R5NN V	1.5	$\pm 30\%$	0.0060	11.90	8.39	100	*1,*2
NS 10155T 2R2NN V	2.2	$\pm 30\%$	0.0072	10.00	7.61	100	*1,*2
NS 10155T 3R3NN V	3.3	$\pm 30\%$	0.0097	8.50	6.49	100	*1,*2
NS 10155T 4R7NN V	4.7	$\pm 30\%$	0.0112	7.40	6.01	100	*1,*2
NS 10155T 6R8NN V	6.8	$\pm 30\%$	0.0159	6.00	4.98	100	*1,*2
NS 10155T 100MN V	10	$\pm 20\%$	0.0200	4.49	4.40	100	*1,*2
NS 10155T 150MN V	15	$\pm 20\%$	0.0310	4.03	3.40	100	*1,*2
NS 10155T 220MN V	22	$\pm 20\%$	0.0430	3.37	2.80	100	*1,*2

● NS 10165 type

Part number	Nominal inductance [μ H]	Inductance tolerance	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [A]		Measuring frequency[kHz]	Note
				Saturation current Idc1	Temperature rise current Idc2		
NS 10165T 1R5NN V	1.5	$\pm 30\%$	0.0062	13.60	8.04	100	*1,*2
NS 10165T 2R2NN V	2.2	$\pm 30\%$	0.0074	10.80	7.32	100	*1,*2
NS 10165T 3R3NN V	3.3	$\pm 30\%$	0.0086	9.30	6.76	100	*1,*2
NS 10165T 4R7NN V	4.7	$\pm 30\%$	0.0112	7.70	5.88	100	*1,*2
NS 10165T 6R8NN V	6.8	$\pm 30\%$	0.0140	6.00	5.22	100	*1,*2
NS 10165T 100MN V	10	$\pm 20\%$	0.0174	5.20	4.66	100	*1,*2
NS 10165T 150MN V	15	$\pm 20\%$	0.0280	3.60	3.84	100	*1,*2
NS 10165T 220MN V	22	$\pm 20\%$	0.0350	3.10	3.41	100	*1,*2

※) 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 current value saturation current value and temperature rise current value.

PART NUMBER

● NS 12555 type

Part number	Nominal inductance [μ H]	Inductance tolerance	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [A]		Measuring frequency [kHz]	Note
				Saturation current Idc1	Temperature rise current Idc2		
NS 12555T 6R0NN V	6.0	$\pm 30\%$	0.0140	5.01	5.60	100	*1 ,*2
NS 12555T 100MN V	10	$\pm 20\%$	0.0175	4.73	5.04	100	*1 ,*2
NS 12555T 150MN V	15	$\pm 20\%$	0.0233	3.89	4.18	100	*1 ,*2
NS 12555T 220MN V	22	$\pm 20\%$	0.0297	3.20	3.81	100	*1 ,*2
NS 12555T 330MN V	33	$\pm 20\%$	0.0415	2.64	3.16	100	*1 ,*2
NS 12555T 470MN V	47	$\pm 20\%$	0.0618	2.23	2.70	100	*1 ,*2
NS 12555T 680MN V	68	$\pm 20\%$	0.0832	1.81	2.14	100	*1 ,*2
NS 12555T 101MN V	100	$\pm 20\%$	0.117	1.53	1.86	100	*1 ,*2
NS 12555T 151MN V	150	$\pm 20\%$	0.215	1.10	1.30	100	*1 ,*2
NS 12555T 221MN V	220	$\pm 20\%$	0.270	1.00	1.18	100	*1 ,*2
NS 12555T 331MN V	330	$\pm 20\%$	0.410	0.82	0.96	100	*1 ,*2
NS 12555T 471MN V	470	$\pm 20\%$	0.520	0.68	0.80	100	*1 ,*2
NS 12555T 681MN V	680	$\pm 20\%$	0.870	0.48	0.61	100	*1 ,*2
NS 12555T 102MN V	1000	$\pm 20\%$	1.44	0.41	0.46	100	*1 ,*2
NS 12555T 152MN V	1500	$\pm 20\%$	1.73	0.40	0.44	100	*1 ,*2

● NS 12565 type

Part number	Nominal inductance [μ H]	Inductance tolerance	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [A]		Measuring frequency [kHz]	Note
				Saturation current Idc1	Temperature rise current Idc2		
NS 12565T 2R0NN V	2.0	$\pm 30\%$	0.0080	13.91	7.60	100	*1 ,*2
NS 12565T 4R2NN V	4.2	$\pm 30\%$	0.0126	9.40	5.91	100	*1 ,*2
NS 12565T 7R0NN V	7.0	$\pm 30\%$	0.0162	7.80	5.21	100	*1 ,*2
NS 12565T 100MN V	10	$\pm 20\%$	0.0199	6.00	4.75	100	*1 ,*2
NS 12565T 150MN V	15	$\pm 20\%$	0.0237	5.60	4.33	100	*1 ,*2
NS 12565T 220MN V	22	$\pm 20\%$	0.0310	4.20	3.91	100	*1 ,*2
NS 12565T 330MN V	33	$\pm 20\%$	0.0390	3.80	3.22	100	*1 ,*2
NS 12565T 470MN V	47	$\pm 20\%$	0.0575	3.34	2.78	100	*1 ,*2
NS 12565T 680MN V	68	$\pm 20\%$	0.0775	2.70	2.30	100	*1 ,*2
NS 12565T 101MN V	100	$\pm 20\%$	0.123	2.23	1.81	100	*1 ,*2
NS 12565T 151MN V	150	$\pm 20\%$	0.173	1.80	1.54	100	*1 ,*2
NS 12565T 221MN V	220	$\pm 20\%$	0.273	1.39	1.18	100	*1 ,*2

● NS 12575 type

Part number	Nominal inductance [μ H]	Inductance tolerance	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [A]		Measuring frequency [kHz]	Note
				Saturation current Idc1	Temperature rise current Idc2		
NS 12575T 1R2NN V	1.2	$\pm 30\%$	0.0058	18.08	9.15	100	*1 ,*2
NS 12575T 2R7NN V	2.7	$\pm 30\%$	0.0085	13.91	7.69	100	*1 ,*2
NS 12575T 3R9NN V	3.9	$\pm 30\%$	0.0099	12.10	7.38	100	*1 ,*2
NS 12575T 5R6NN V	5.6	$\pm 30\%$	0.0116	10.20	6.36	100	*1 ,*2
NS 12575T 6R8NN V	6.8	$\pm 30\%$	0.0131	9.50	5.84	100	*1 ,*2
NS 12575T 100MN V	10	$\pm 20\%$	0.0156	7.65	5.55	100	*1 ,*2
NS 12575T 150MN V	15	$\pm 20\%$	0.0184	6.30	5.22	100	*1 ,*2
NS 12575T 220MN V	22	$\pm 20\%$	0.0260	5.50	4.05	100	*1 ,*2
NS 12575T 330MN V	33	$\pm 20\%$	0.0390	4.30	3.48	100	*1 ,*2
NS 12575T 470MN V	47	$\pm 20\%$	0.0515	3.60	2.95	100	*1 ,*2
NS 12575T 680MN V	68	$\pm 20\%$	0.0900	2.78	2.10	100	*1 ,*2
NS 12575T 101MN V	100	$\pm 20\%$	0.110	2.50	2.01	100	*1 ,*2
NS 12575T 151MN V	150	$\pm 20\%$	0.161	1.90	1.51	100	*1 ,*2
NS 12575T 221MN V	220	$\pm 20\%$	0.300	1.60	1.10	100	*1 ,*2
NS 12575T 102MN V	1000	$\pm 20\%$	1.170	0.72	0.53	100	*1 ,*2

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

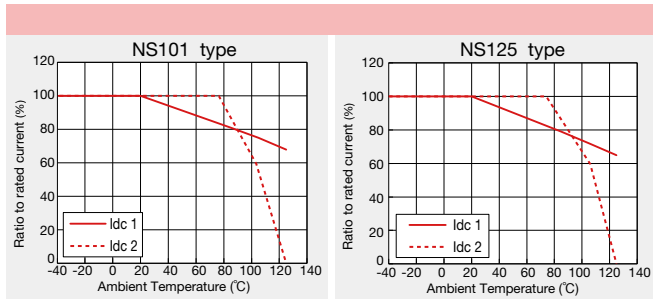
※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

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

Derating of Rated Current

NS series

Derating of current is necessary for NS series depending on ambient temperature. Please refer to the chart shown below for appropriate derating of current.



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SMD POWER INDUCTORS (NS SERIES)

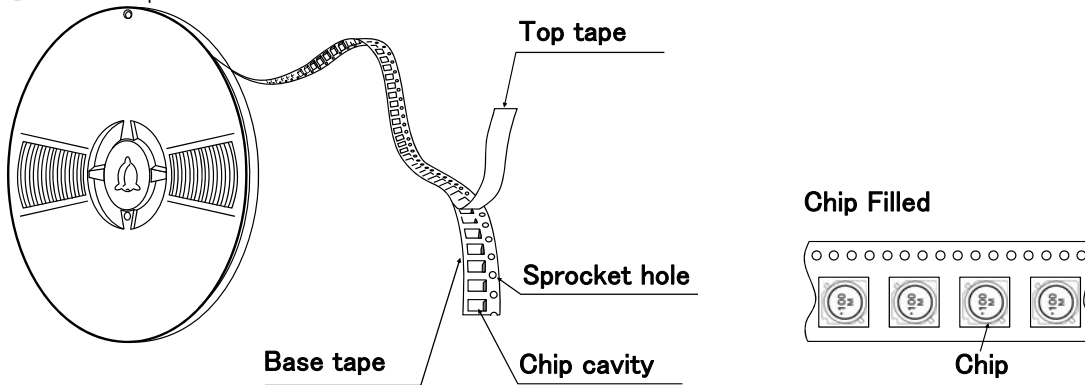
PACKAGING

① Packing Quantity

Type	Standard Quantity (1reel) [pcs]	Minimum Quantity [pcs]
	Embossed Tape	Embossed Tape
NS10145	500	2000
NS10155	500	2000
NS10165	500	2000
NS12555	500	2000
NS12565	500	2000
NS12575	500	2000

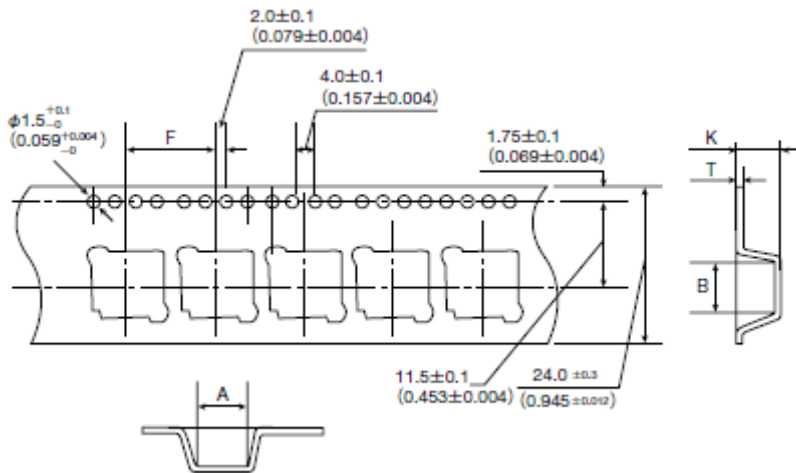
② Tape Material

● Embossed Tape



③ Taping dimensions

● Embossed tape 24mm wide (0.945 inches wide)

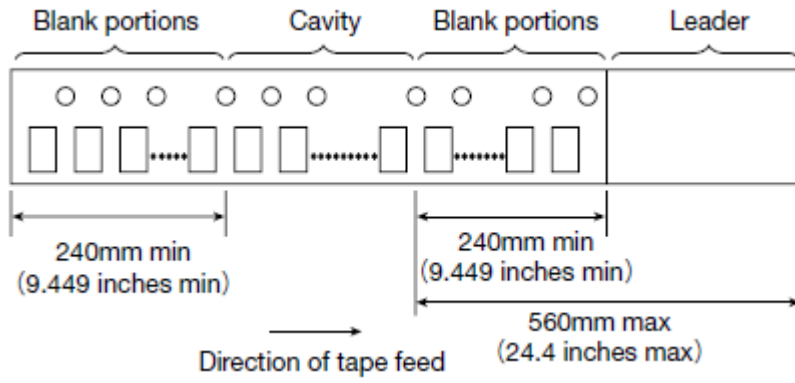


Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
NS10145	10.5 ± 0.1 (0.413 ± 0.004)	10.5 ± 0.1 (0.413 ± 0.004)	16.0 ± 0.1 (0.630 ± 0.004)	0.4 ± 0.1 (0.016 ± 0.004)	5.0 ± 0.1 (0.197 ± 0.004)
NS10155	10.5 ± 0.1 (0.413 ± 0.004)	10.5 ± 0.1 (0.413 ± 0.004)	16.0 ± 0.1 (0.630 ± 0.004)	0.4 ± 0.1 (0.016 ± 0.004)	6.0 ± 0.1 (0.236 ± 0.004)
NS10165	10.5 ± 0.1 (0.413 ± 0.004)	10.5 ± 0.1 (0.413 ± 0.004)	16.0 ± 0.1 (0.630 ± 0.004)	0.4 ± 0.1 (0.016 ± 0.004)	7.0 ± 0.1 (0.276 ± 0.004)
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)

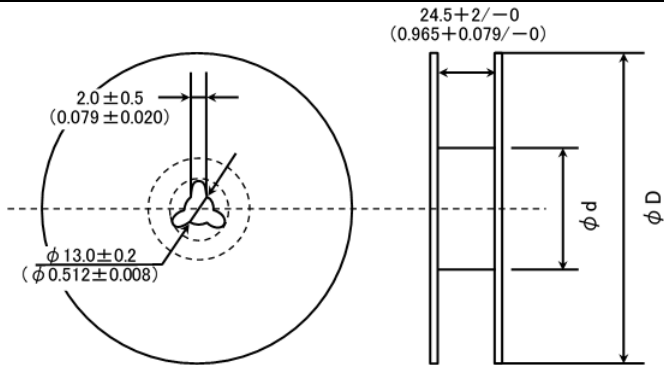
Unit: mm (inch)

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④ Leader and Blank portion



⑤ Reel size

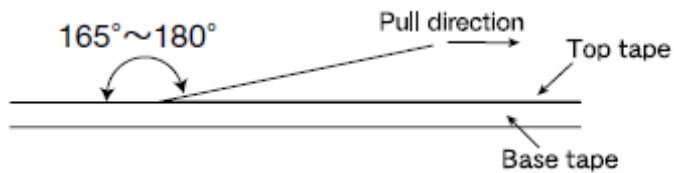


Type	Reel size (Reference values)	
	ϕD	ϕd
NS10145	330 ± 2 (12.99 ± 0.079)	100 ± 1 (3.937 ± 0.039)
NS10155		
NS10165		
NS12555		
NS12565		
NS12575		

Unit: mm (inch)

⑥ Top 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.



SMD INDUCTOR (NS SERIES)

RELIABILITY DATA

1. Operating Temperature Range														
Specified Value	NS101, NS125 Type	-40~+125°C (Including self-generated heat)												
Test Methods and Remarks	Including self-generated heat													
2. Storage Temperature Range														
Specified Value	NS101, NS125 Type	-40~+85°C												
Test Methods and Remarks	-5 to 40°C for the product with taping.													
3. Rated current														
Specified Value	NS101, NS125 Type	Within the specified tolerance												
4. Inductance														
Specified Value	NS101, NS125 Type	Within the specified tolerance												
Test Methods and Remarks	Measuring equipment : LCR Meter (HP 4285A or equivalent) Measuring frequency : 100kHz, 1V													
5. DC Resistance														
Specified Value	NS101, NS125 Type	Within the specified tolerance												
Test Methods and Remarks	Measuring equipment : DC ohmmeter (HIOKI 3227 or equivalent)													
6. Self resonance frequency														
Specified Value	NS101, NS125 Type	-												
7. Temperature characteristic														
Specified Value	NS101, NS125 Type	Inductance change : Within $\pm 15\%$												
Test Methods and Remarks	NS101, NS125 Type : Measurement of inductance shall be taken at temperature range within -40°C~+125°C. With reference to inductance value at +20°C., change rate shall be calculated. Change of maximum inductance deviation in step 1 to 5 <table border="1" data-bbox="279 1326 850 1500"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20</td> </tr> <tr> <td>2</td> <td>Minimum operating temperature</td> </tr> <tr> <td>3</td> <td>20 (Standard temperature)</td> </tr> <tr> <td>4</td> <td>Maximum operating temperature</td> </tr> <tr> <td>5</td> <td>20</td> </tr> </tbody> </table>		Step	Temperature (°C)	1	20	2	Minimum operating temperature	3	20 (Standard temperature)	4	Maximum operating temperature	5	20
Step	Temperature (°C)													
1	20													
2	Minimum operating temperature													
3	20 (Standard temperature)													
4	Maximum operating temperature													
5	20													

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8. Resistance to flexure of substrate

Specified Value	NS101, NS125 Type	No damage
-----------------	-------------------	-----------

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 : 0.15 mm(NS101/125Type)

Force Rod 10 20 R230

Board

Test Sample

45±2mm 45±2mm

R5

Land dimension

Type	A	B	C
NS101	2.5	5.6	3.2
NS125	2.5	8.6	3.2

A B A C

9. Insulation resistance : between wires

Specified Value	NS101, NS125 Type	—
-----------------	-------------------	---

10. Insulation resistance : between wire and core

Specified Value	NS101, NS125 Type	—
-----------------	-------------------	---

11. Withstanding voltage : between wire and core

Specified Value	NS101, NS125 Type	—
-----------------	-------------------	---

12. Adhesion of terminal electrode

Specified Value	NS101, NS125 Type	Shall not come off PC board
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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(NS101/125Type)

Test Methods and Remarks

10N, 5s

13. Resistance to vibration

Specified Value	NS101, NS125 Type	Inductance change : Within ±10% No significant abnormality in appearance.
-----------------	-------------------	--

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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14. Solderability		
Specified Value	NS101, NS125 Type	At least 90% of surface of terminal electrode is covered by new solder.
Test Methods 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%.	
	Solder Temperature	245±5°C
	Time	5±1.0 sec.
※Immersion depth : All sides of mounting terminal shall be immersed.		

15. Resistance to soldering heat		
Specified Value	NS101, NS125 Type	Inductance change : Within ±10% No significant abnormality in appearance.
Test Methods and Remarks	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.	
	Test board material : glass epoxy-resin Test board thickness : 1.0mm Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.	

16. Thermal shock			
Specified Value	NS101, NS125 Type	Inductance change : Within ±10% No significant abnormality in appearance.	
Test Methods and Remarks	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	
Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.			

17. Damp heat		
Specified Value	NS101, NS125 Type	Inductance change : Within ±10% No significant abnormality in appearance.
Test Methods and Remarks	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+24/-0 hour	
Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.		

18. Loading under damp heat		
Specified Value	NS101, NS125 Type	Inductance change : Within ±10% No significant abnormality in appearance.
Test Methods and Remarks	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°C
	Humidity	90~95%RH
	Applied current	Rated current
Time	500+24/-0 hour	
Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.		

19. Low temperature life test								
Specified Value	NS101, NS125 Type	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.						
Test Methods and Remarks	<p>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.</p> <table border="1"> <tr> <td>Temperature</td> <td>$-40 \pm 2^{\circ}\text{C}$</td> </tr> <tr> <td>Time</td> <td>500+24/-0 hour</td> </tr> </table> <p>Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.</p>		Temperature	$-40 \pm 2^{\circ}\text{C}$	Time	500+24/-0 hour		
Temperature	$-40 \pm 2^{\circ}\text{C}$							
Time	500+24/-0 hour							
20. High temperature life test								
Specified Value	NS101, NS125 Type	—						
21. Loading at high temperature life test								
Specified Value	NS101, NS125 Type	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.						
Test Methods and Remarks	<p>The test samples shall be soldered to the test board by the reflow soldering.</p> <table border="1"> <tr> <td>Temperature</td> <td>$85 \pm 2^{\circ}\text{C}$</td> </tr> <tr> <td>Applied current</td> <td>Rated current</td> </tr> <tr> <td>Time</td> <td>500+24/-0 hour</td> </tr> </table> <p>Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.</p>		Temperature	$85 \pm 2^{\circ}\text{C}$	Applied current	Rated current	Time	500+24/-0 hour
Temperature	$85 \pm 2^{\circ}\text{C}$							
Applied current	Rated current							
Time	500+24/-0 hour							
22. Standard condition								
Specified Value	NS101, NS125 Type	<p>Standard test condition :</p> <p>Unless otherwise specified, temperature is $20 \pm 15^{\circ}\text{C}$ and $65 \pm 20\%$ of relative humidity.</p> <p>When there is any question concerning measurement result: In order to provide correlation data, the test shall be condition of $20 \pm 2^{\circ}\text{C}$ of temperature, $65 \pm 5\%$ relative humidity.</p> <p>Inductance is in accordance with our measured value.</p>						

SMD inductor (NR□, NS series)

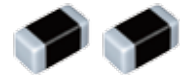
PRECAUTIONS

1. Circuit Design	
Precautions	<p>◆Operating environment</p> <p>1. All electronic components listed in this catalogue are intended for use in general electronic equipment such as AV/OA equipment, home electrical appliances, office equipment, information-communication equipment, general medical equipment, industrial equipment, and automotive applications.</p> <p>Please be sure to contact TAIYO YUDEN CO., LTD. for further information before using the components for any equipment which might have a negative impact directly on human life, such as specially controlled medical equipment, transportation equipment (automotive powertrain/train/ship control systems, etc.) and traffic signal system.</p> <p>Please do not incorporate the components into any equipment requiring a high degree of safety and reliability, such as aerospace equipment, avionics, nuclear control equipment, submarine system, and military equipment .</p>
2. PCB Design	
Precautions	<p>◆Land pattern design</p> <p>1. Please refer to a recommended land pattern.</p>
Technical considerations	<p>◆Land pattern design</p> <p>Surface Mounting</p> <ul style="list-style-type: none"> Mounting and soldering conditions should be checked beforehand. Applicable soldering process to this products is reflow soldering only.
3. Considerations for automatic placement	
Precautions	<p>◆Adjustment of mounting machine</p> <p>1. Excessive impact load should not be imposed on the products when mounting onto the PC boards.</p> <p>2. Mounting and soldering conditions should be checked beforehand.</p>
Technical considerations	<p>◆Adjustment of mounting machine</p> <p>1. When installing products, care should be taken not to apply distortion stress as it may deform the products.</p>
4. Soldering	
Precautions	<p>◆Reflow soldering</p> <p>1. Please contact any of our offices for a reflow soldering, and refer to the recommended condition specified.</p> <p>2. The product shall be used reflow soldering only.</p> <p>3. Please do not add any stress to a product until it returns in normal temperature after reflow soldering.</p> <p>◆Lead free soldering</p> <p>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.</p> <p>◆Recommended conditions for using a soldering iron</p> <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	<p>◆Reflow soldering</p> <p>1. If products are used beyond the range of the recommended conditions, heat stresses may deform the products, and consequently degrade the reliability of the products.</p> <ul style="list-style-type: none"> NRV20/30, NRH24/30, NRS20/30/40/50/60/80 Type, NS101/125 Type <p>Recommended reflow condition (Pb free solder)</p> <p>Temperature [°C]</p> <p>Heating Time [sec]</p> <p>150~180</p> <p>90±30sec</p> <p>30±10sec</p> <p>230°C min</p> <p>5sec max</p> <p>Peak: 250+5/-0°C</p>
5. Cleaning	
Precautions	<p>◆Cleaning conditions</p> <p>1. Washing by supersonic waves shall be avoided.</p>
Technical considerations	<p>◆Cleaning conditions</p> <p>1. If washed by supersonic waves, the products might be broken.</p>

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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"> ◆ Handling <ol style="list-style-type: none"> 1. There is a case that a characteristic varies with magnetic influence. ◆ Breakaway PC boards (splitting along perforations) <ol style="list-style-type: none"> 1. The position of the product on PCBs shall be carefully considered to minimize the stress caused from splitting of the PCBs. ◆ 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. If packing boxes are accumulated, that could cause a deformation on packing tapes or a damage on the products.
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 <ul style="list-style-type: none"> Ambient temperature : $-5\sim 40^{\circ}\text{C}$ Humidity : Below 70% RH ▪ The ambient temperature must be kept below 30°C. Even under ideal storage conditions, solderability of products electrodes may decrease as time passes. <p style="margin-left: 40px;">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.

WIRE-WOUND CHIP POWER INDUCTORS(CB SERIES)



REFLOW

■ PART NUMBER

*Operating Temp. : -40~105°C(Including self-generated heat)

C	B	△	△	2	0	1	2	T	1	0	0	M	△	V
①	②	③	④	⑤	⑥	⑦	⑧							

△=Blank space

① Series name

Code	Series name
CB	Wound chip power inductor

② Characteristics

Code	Characteristics
△△	Standard
△C	High current

③ Dimensions (L × W)

Code	Type (inch)	Dimensions (L × W) [mm]
2012	2012(0805)	2.0 × 1.25
2016	2016(0806)	2.0 × 1.6
2518	2518(1007)	2.5 × 1.8
3225	3225(1210)	3.2 × 2.5

④ Packaging

Code	Packaging
T	Taping

⑤ Nominal inductance

Code (example)	Nominal inductance [μH]
1R0	1.0
100	10
101	100

※R=Decimal point

⑥ Inductance tolerance

Code	Inductance tolerance
K	±10%
M	±20%

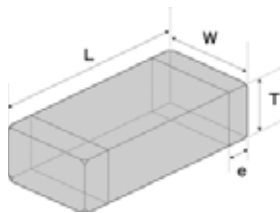
⑦ Special code

Code	Special code
△	Standard
R	Low Rdc type

⑧ Internal code

Code	Internal code
V	Inductor for Industrial and Automotive

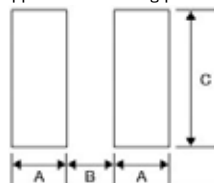
■ STANDARD EXTERNAL DIMENSIONS / STANDARD QUANTITY



Recommended Land Patterns

Surface Mounting

- Mounting and soldering conditions should be checked beforehand.
- Applicable soldering process to these products is reflow soldering only.



Type	A	B	C
2012	0.60	1.0	1.45
2016	0.60	1.0	1.8
2518	0.60	1.5	2.0
3225	0.85	1.7	2.7

Unit : mm

Type	L	W	T	e	Standard quantity [pcs]	
					Paper tape	Embossed tape
CB 2012	2.0±0.2	1.25±0.2	1.25±0.2	0.5±0.2	—	3000
CB C2012	(0.079±0.008)	(0.049±0.008)	(0.049±0.008)	(0.020±0.008)	—	3000
CB 2016	2.0±0.2	1.6±0.2	1.6±0.2	0.5±0.2	—	2000
CB C2016	(0.079±0.008)	(0.063±0.008)	(0.063±0.008)	(0.020±0.008)	—	2000
CB 2518	2.5±0.2	1.8±0.2	1.8±0.2	0.5±0.2	—	2000
CB C2518	(0.098±0.008)	(0.071±0.008)	(0.071±0.008)	(0.020±0.008)	—	2000
CB C3225	3.2±0.2	2.5±0.2	2.5±0.2	0.6±0.3	—	1000
	(0.126±0.008)	(0.098±0.008)	(0.098±0.008)	(0.024±0.012)	—	1000

Unit : mm (inch)

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■ PART NUMBER

• All the Wire-wound Chip Power Inductors of Catalog Lineup are Compliance RoHS.

Note)

- Information about usage environment or condition is necessary depending on the application and circuit condition. Please contact TAIYO YUDEN sales channels.
- *2: Industrial products and Medical products
Please consult with TAIYO YUDEN's official sales channel for the details of the product specification, etc., and please review and approve TAIYO YUDEN's product specification before ordering.
Please be sure to contact us for further information before using the components for Automotive equipment.

● 2012(0805) type

Part number	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [MHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
CB 2012T1R0M V	1.0	±20%	100	0.15	500	700	7.96	*2
CB 2012T2R2M V	2.2	±20%	80	0.23	410	620	7.96	*2
CB 2012T3R3M V	3.3	±20%	55	0.30	330	550	7.96	*2
CB 2012T4R7M V	4.7	±20%	45	0.40	300	430	7.96	*2
CB 2012T6R8M V	6.8	±20%	38	0.47	250	350	7.96	*2
CB 2012T100□ V	10	±10%, ±20%	32	0.70	190	300	2.52	*2
CB 2012T100□RV	10	±10%, ±20%	32	0.50	200	300	2.52	*2
CB 2012T150□ V	15	±10%, ±20%	28	1.3	170	240	2.52	*2
CB 2012T220□ V	22	±10%, ±20%	16	1.7	135	220	2.52	*2
CB 2012T470□ V	47	±10%, ±20%	11	3.7	90	140	2.52	*2
CB 2012T680□ V	68	±10%, ±20%	10	6.0	70	100	2.52	*2
CB 2012T101□ V	100	±10%, ±20%	8	7.0	60	100	0.796	*2

Part number	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [MHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
CB C2012T1R0M V	1.0	±20%	100	0.19	700	640	7.96	*2
CB C2012T2R2M V	2.2	±20%	70	0.33	530	485	7.96	*2
CB C2012T4R7M V	4.7	±20%	45	0.50	360	395	7.96	*2
CB C2012T100□ V	10	±10%, ±20%	40	1.2	240	255	2.52	*2
CB C2012T220□ V	22	±10%, ±20%	16	3.7	170	145	2.52	*2
CB C2012T470□ V	47	±10%, ±20%	11	5.8	120	115	2.52	*2

● 2016(0806) type

Part number	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [MHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
CB 2016T1R0M V	1.0	±20%	100	0.09	600	720	7.96	*2
CB 2016T1R5M V	1.5	±20%	80	0.11	550	650	7.96	*2
CB 2016T2R2M V	2.2	±20%	70	0.13	510	600	7.96	*2
CB 2016T3R3M V	3.3	±20%	55	0.20	400	440	7.96	*2
CB 2016T4R7M V	4.7	±20%	45	0.25	340	410	7.96	*2
CB 2016T6R8M V	6.8	±20%	38	0.35	300	330	7.96	*2
CB 2016T100□ V	10	±10%, ±20%	32	0.50	250	270	2.52	*2
CB 2016T150□ V	15	±10%, ±20%	28	0.70	210	220	2.52	*2
CB 2016T220□ V	22	±10%, ±20%	16	1.0	165	190	2.52	*2
CB 2016T330□ V	33	±10%, ±20%	14	1.7	130	140	2.52	*2
CB 2016T470□ V	47	±10%, ±20%	11	2.4	110	120	2.52	*2
CB 2016T680□ V	68	±10%, ±20%	10	3.0	90	110	2.52	*2
CB 2016T101□ V	100	±10%, ±20%	8	4.5	70	90	0.796	*2

Part number	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [MHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
CB C2016T1R0M V	1.0	±20%	100	0.10	1,100	885	7.96	*2
CB C2016T1R5M V	1.5	±20%	80	0.15	1,000	775	7.96	*2
CB C2016T2R2M V	2.2	±20%	70	0.20	750	625	7.96	*2
CB C2016T3R3M V	3.3	±20%	55	0.27	600	535	7.96	*2
CB C2016T4R7M V	4.7	±20%	45	0.37	550	460	7.96	*2
CB C2016T6R8M V	6.8	±20%	38	0.59	450	360	7.96	*2
CB C2016T100□ V	10	±10%, ±20%	32	0.82	380	305	2.52	*2
CB C2016T150□ V	15	±10%, ±20%	28	1.2	300	255	2.52	*2
CB C2016T220□ V	22	±10%, ±20%	16	1.8	250	205	2.52	*2
CB C2016T330□ V	33	±10%, ±20%	14	2.8	220	165	2.52	*2
CB C2016T470□ V	47	±10%, ±20%	11	4.3	150	130	2.52	*2
CB C2016T680□ V	68	±10%, ±20%	10	7.0	130	105	2.52	*2
CB C2016T101□ V	100	±10%, ±20%	8	8.0	110	95	0.796	*2

□ Please specify the Inductance tolerance code (Kor M)

※) 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 by 20°C. (at 20°C)

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■ PART NUMBER

● 2518(1007) type

Part number	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 30\%$)	Rated current ※) [mA]		Measuring frequency [MHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
CB 2518T1R0M V	1.0	$\pm 20\%$	100	0.06	1,200	1,250	7.96	*2
CB 2518T1R5M V	1.5	$\pm 20\%$	80	0.07	650	1,100	7.96	*2
CB 2518T2R2M V	2.2	$\pm 20\%$	68	0.09	510	1,000	7.96	*2
CB 2518T3R3M V	3.3	$\pm 20\%$	54	0.11	440	900	7.96	*2
CB 2518T4R7MRV	4.7	$\pm 20\%$	46	0.10	310	820	7.96	*2
CB 2518T4R7M V	4.7	$\pm 20\%$	46	0.13	340	820	7.96	*2
CB 2518T6R8M V	6.8	$\pm 20\%$	38	0.15	270	750	7.96	*2
CB 2518T100□ V	10	$\pm 10\%$, $\pm 20\%$	30	0.25	250	600	2.52	*2
CB 2518T150□ V	15	$\pm 10\%$, $\pm 20\%$	23	0.32	180	500	2.52	*2
CB 2518T220□ V	22	$\pm 10\%$, $\pm 20\%$	19	0.50	165	390	2.52	*2
CB 2518T330□ V	33	$\pm 10\%$, $\pm 20\%$	15	0.70	130	320	2.52	*2
CB 2518T470□ V	47	$\pm 10\%$, $\pm 20\%$	12	0.95	110	270	2.52	*2
CB 2518T680□ V	68	$\pm 10\%$, $\pm 20\%$	9.5	1.5	70	210	2.52	*2
CB 2518T101□ V	100	$\pm 10\%$, $\pm 20\%$	9.0	2.1	60	190	0.796	*2
CB 2518T151□ V	150	$\pm 10\%$, $\pm 20\%$	7.0	3.2	55	140	0.796	*2
CB 2518T221□ V	220	$\pm 10\%$, $\pm 20\%$	5.5	4.5	50	110	0.796	*2
CB 2518T331□ V	330	$\pm 10\%$, $\pm 20\%$	4.5	7.0	40	90	0.796	*2
CB 2518T471□ V	470	$\pm 10\%$, $\pm 20\%$	3.5	10	35	70	0.796	*2
CB 2518T681□ V	680	$\pm 10\%$, $\pm 20\%$	3.0	17	30	50	0.796	*2
CB 2518T102□ V	1000	$\pm 10\%$, $\pm 20\%$	2.4	24	25	45	0.252	*2

Part number	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 30\%$)	Rated current ※) [mA]		Measuring frequency [MHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
CB C2518T1R0M V	1.0	$\pm 20\%$	100	0.08	1,000	775	7.96	*2
CB C2518T1R5M V	1.5	$\pm 20\%$	80	0.11	950	730	7.96	*2
CB C2518T2R2M V	2.2	$\pm 20\%$	68	0.13	890	630	7.96	*2
CB C2518T3R3M V	3.3	$\pm 20\%$	54	0.16	730	560	7.96	*2
CB C2518T4R7M V	4.7	$\pm 20\%$	41	0.20	680	510	7.96	*2
CB C2518T6R8M V	6.8	$\pm 20\%$	38	0.30	550	420	7.96	*2
CB C2518T100□ V	10	$\pm 10\%$, $\pm 20\%$	30	0.36	480	375	2.52	*2
CB C2518T150□ V	15	$\pm 10\%$, $\pm 20\%$	23	0.65	350	285	2.52	*2
CB C2518T220□ V	22	$\pm 10\%$, $\pm 20\%$	19	0.77	320	250	2.52	*2
CB C2518T330□ V	33	$\pm 10\%$, $\pm 20\%$	15	1.5	270	185	2.52	*2
CB C2518T470□ V	47	$\pm 10\%$, $\pm 20\%$	12	1.9	240	165	2.52	*2
CB C2518T680□ V	68	$\pm 10\%$, $\pm 20\%$	9.5	2.8	200	140	2.52	*2
CB C2518T101□ V	100	$\pm 10\%$, $\pm 20\%$	9.0	3.7	160	125	0.796	*2
CB C2518T151□ V	150	$\pm 10\%$, $\pm 20\%$	7.0	6.1	140	95	0.796	*2
CB C2518T221□ V	220	$\pm 10\%$, $\pm 20\%$	5.5	8.4	115	80	0.796	*2
CB C2518T331□ V	330	$\pm 10\%$, $\pm 20\%$	4.5	12.3	100	65	0.796	*2
CB C2518T471□ V	470	$\pm 10\%$, $\pm 20\%$	3.5	22	80	50	0.796	*2
CB C2518T681□ V	680	$\pm 10\%$, $\pm 20\%$	3.0	28	65	45	0.796	*2

● 3225(1210) type

Part number	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 30\%$)	Rated current ※) [mA]		Measuring frequency [MHz]	Note
					Saturation current Idc1	Temperature rise current Idc2		
CB C3225T1R0MRV	1.0	$\pm 20\%$	250	0.055	2,000	1,100	0.1	*2
CB C3225T1R5MRV	1.5	$\pm 20\%$	220	0.060	2,000	1,000	0.1	*2
CB C3225T2R2MRV	2.2	$\pm 20\%$	190	0.080	2,000	930	0.1	*2
CB C3225T3R3MRV	3.3	$\pm 20\%$	160	0.095	2,000	850	0.1	*2
CB C3225T4R7MRV	4.7	$\pm 20\%$	70	0.100	1,250	830	0.1	*2
CB C3225T6R8MRV	6.8	$\pm 20\%$	50	0.120	950	760	0.1	*2
CB C3225T100□RV	10	$\pm 10\%$, $\pm 20\%$	23	0.133	900	720	0.1	*2
CB C3225T150□RV	15	$\pm 10\%$, $\pm 20\%$	20	0.195	730	590	0.1	*2
CB C3225T220□RV	22	$\pm 10\%$, $\pm 20\%$	17	0.27	620	500	0.1	*2
CB C3225T330□RV	33	$\pm 10\%$, $\pm 20\%$	13	0.41	500	400	0.1	*2
CB C3225T470□RV	47	$\pm 10\%$, $\pm 20\%$	10	0.67	390	320	0.1	*2
CB C3225T680□RV	68	$\pm 10\%$, $\pm 20\%$	8.0	1.0	320	260	0.1	*2
CB C3225T101□RV	100	$\pm 10\%$, $\pm 20\%$	6.0	1.4	270	220	0.1	*2
CB C3225T221□RV	220	$\pm 10\%$, $\pm 20\%$	3.0	2.5	190	170	0.1	*2
CB C3225T821□RV	820	$\pm 10\%$, $\pm 20\%$	1.8	12	110	80	0.1	*2
CB C3225T102□RV	1000	$\pm 10\%$, $\pm 20\%$	1.6	13	100	75	0.1	*2

* □ Please specify the Inductance tolerance code (Kor M)

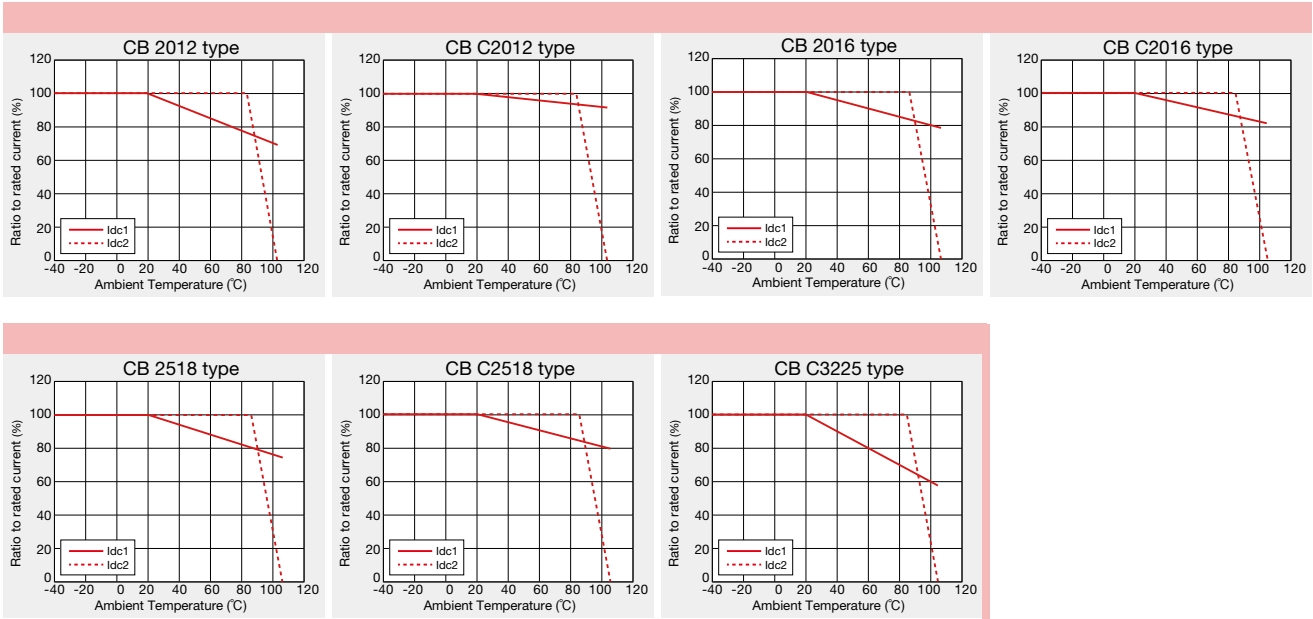
※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)

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

Derating of Rated Current

CB series

Derating of current is necessary for CB series depending on ambient temperature. Please refer to the chart shown below for appropriate derating of current.



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WIRE-WOUND CHIP INDUCTORS (LB SERIES), WIRE-WOUND CHIP POWER INDUCTORS (CB SERIES), WIRE-WOUND CHIP INDUCTORS FOR SIGNAL LINES (LB SERIES M TYPE)

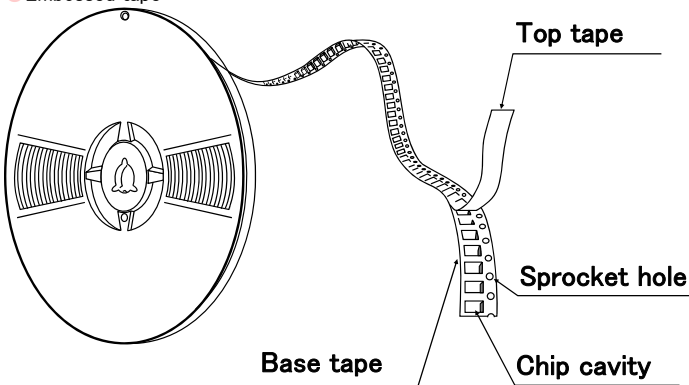
PACKAGING

① Minimum Quantity

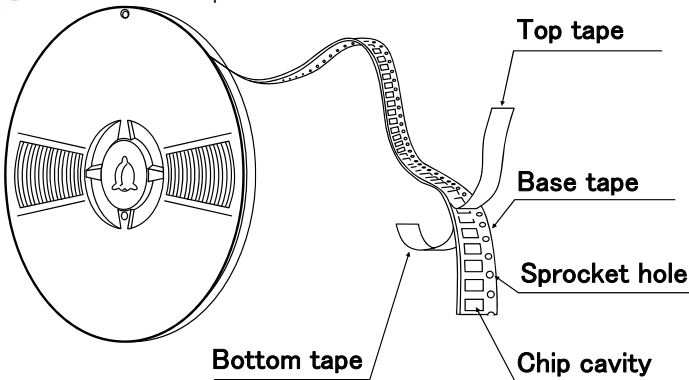
Type	Standard Quantity [pcs]	
	Paper Tape	Embossed Tape
LB C3225	—	1000
CB C3225	—	1000
LB 3218	—	2000
LB R2518	—	2000
LB C2518	—	2000
LB 2518	—	2000
CB 2518	—	2000
CB C2518	—	2000
LBM2016	—	2000
LB C2016	—	2000
LB 2016	—	2000
CB 2016	—	2000
CB C2016	—	2000
LB 2012	—	3000
LB C2012	—	3000
LB R2012	—	3000
CB 2012	—	3000
CB C2012	—	3000
CB L2012	4000	—
LB 1608	4000	—
LBMF1608	—	3000
CBMF1608	—	3000

② Tape material

● Embossed tape



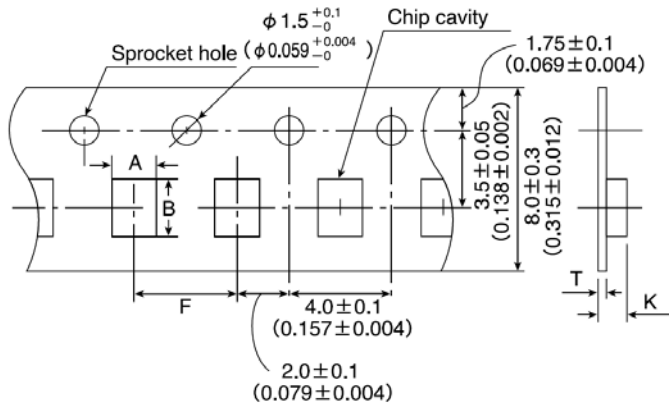
● Card board carrier tape



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③ Taping Dimensions

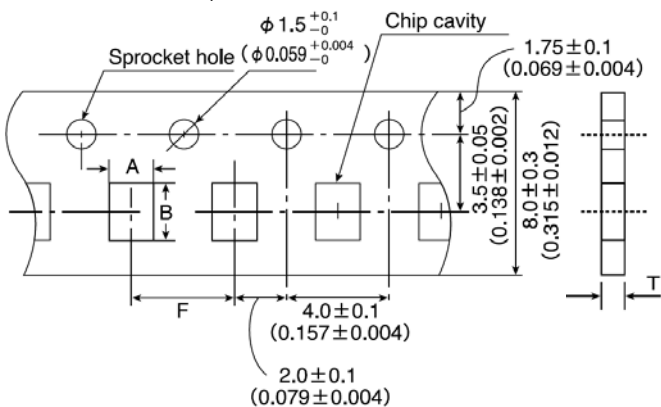
● Embossed Tape (0.315 inches wide)



Type	Chip cavity		Insertion pitch F	Tape thickness	
	A	B		T	K
LBM2016	1.75 ± 0.1 (0.069 \pm 0.004)	2.1 ± 0.1 (0.083 \pm 0.004)	4.0 ± 0.1 (0.157 \pm 0.004)	0.3 ± 0.05 (0.012 \pm 0.002)	1.9max. (0.075max.)
LB C3225 CB C3225	2.8 ± 0.1 (0.110 \pm 0.004)	3.5 ± 0.1 (0.138 \pm 0.004)	4.0 ± 0.1 (0.157 \pm 0.004)	0.3 ± 0.05 (0.012 \pm 0.002)	4.0max. (0.157max.)
LB 3218	2.1 ± 0.1 (0.083 \pm 0.004)	3.5 ± 0.1 (0.138 \pm 0.004)	4.0 ± 0.1 (0.157 \pm 0.004)	0.3 ± 0.05 (0.012 \pm 0.002)	2.2max. (0.087max.)
LB 2518 CB 2518 LB C2518 CB C2518 LB R2518	2.15 ± 0.1 (0.085 \pm 0.004)	2.7 ± 0.1 (0.106 \pm 0.004)	4.0 ± 0.1 (0.157 \pm 0.004)	0.3 ± 0.05 (0.012 \pm 0.002)	2.2max. (0.087max.)
LB 2016 CB 2016 LB C2016 CB C2016	1.75 ± 0.1 (0.069 \pm 0.004)	2.1 ± 0.1 (0.083 \pm 0.004)	4.0 ± 0.1 (0.157 \pm 0.004)	0.3 ± 0.05 (0.012 \pm 0.002)	1.9max. (0.075max.)
LB 2012 CB 2012 LB C2012 CB C2012 LB R2012	1.45 ± 0.1 (0.057 \pm 0.004)	2.25 ± 0.1 (0.089 \pm 0.004)	4.0 ± 0.1 (0.157 \pm 0.004)	0.25 ± 0.05 (0.010 \pm 0.002)	1.45max. (0.057max.)
LBMF1608 CBMF1608	1.1 ± 0.1 (0.043 \pm 0.004)	1.9 ± 0.1 (0.075 \pm 0.004)	4.0 ± 0.1 (0.157 \pm 0.004)	0.25 ± 0.05 (0.010 \pm 0.002)	1.2max. (0.047max.)

Unit: mm (inch)

● Card board carrier tape (0.315 inches wide)

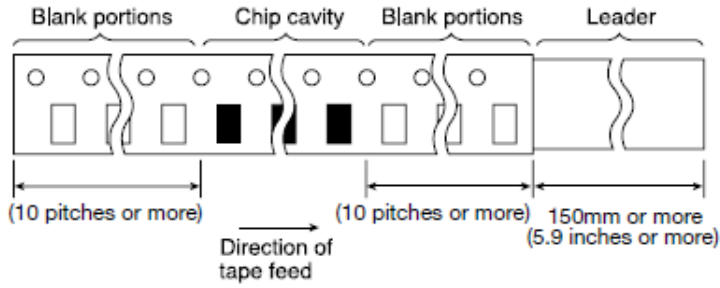


Type	Chip cavity		Insertion pitch F	Tape thickness
	A	B		T
CB L2012	1.55 ± 0.1 (0.061 \pm 0.004)	2.3 ± 0.1 (0.091 \pm 0.004)	4.0 ± 0.1 (0.157 \pm 0.004)	1.1max. (0.043max.)
LB 1608	1.0 ± 0.1 (0.039 \pm 0.004)	1.8 ± 0.1 (0.071 \pm 0.004)	4.0 ± 0.1 (0.157 \pm 0.004)	1.1max. (0.043max.)

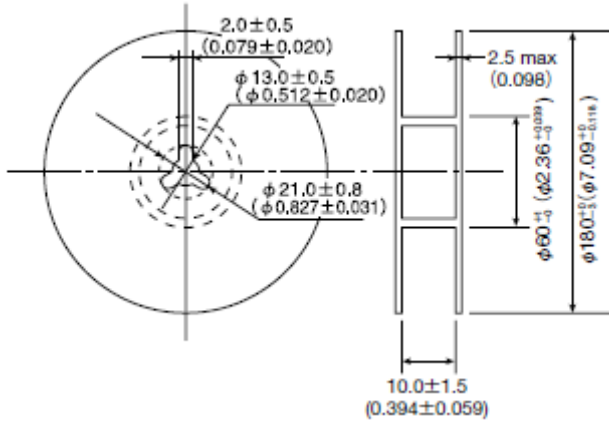
Unit: mm (inch)

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④ Leader and Blank Portion

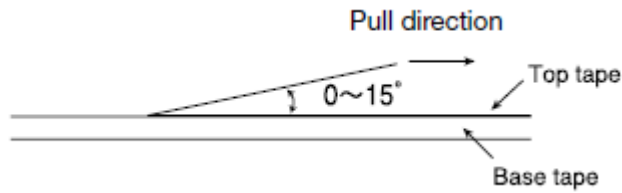


⑤ Reel Size



⑥ Top Tape Strength

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



WIRE-WOUND CHIP INDUCTORS (LB SERIES), WIRE-WOUND CHIP POWER INDUCTORS (CB SERIES), WIRE-WOUND CHIP INDUCTORS FOR SIGNAL LINES (LB SERIES M TYPE)

RELIABILITY DATA

1. Operating temperature Range		
Specified Value	LB, LBC, LBR Series	-40~+105°C (Including self-generated heat)
	CB, CBC Series	
	LBM Series	
Test Methods and Remarks	Including self-generated heat	
2. Storage Temperature Range (after soldering)		
Specified Value	LB, LBC, LBR Series	-40~+85°C
	CB, CBC Series	
	LBM Series	
Test Methods and Remarks	LB, CB Series : Please refer the term of "7. storage conditions" in precautions.	
3. Rated Current		
Specified Value	LB, LBC, LBR Series	Within the specified tolerance
	CB, CBC Series	
	LBM Series	
4. Inductance		
Specified Value	LB, LBC, LBR Series	Within the specified tolerance
	CB, CBC Series	
	LBM Series	
Test Methods and Remarks	LB・LBC・LBR・CB・CBC・LBM Series Measuring equipment : LCR Meter (HP4285A or its equivalent)	
5. Q		
Specified Value	LB, LBC, LBR Series	-
	CB, CBC Series	
	LBM Series	Within the specified tolerance
Test Methods and Remarks	LBM Series Measuring equipment : LCR Meter (HP4285A or its equivalent)	
6. DC Resistance		
Specified Value	LB, LBC, LBR Series	Within the specified tolerance
	CB, CBC Series	
	LBM Series	
Test Methods and Remarks	Measuring equipment : DC Ohmmeter (HIOKI 3227 or its equivalent)	
7. Self-Resonant Frequency		
Specified Value	LB, LBC, LBR Series	Within the specified tolerance
	CB, CBC Series	
	LBM Series	
Test Methods and Remarks	Measuring equipment : Impedance analyzer (HP4291A or its equivalent)	

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8. Temperature Characteristic					
Specified Value	LBM2016				Inductance change : Within $\pm 10\%$
	LB2012	LBR2012	CB2012	LB2016	Inductance change : Within $\pm 20\%$
	CB2016	LB2518	LBR2518	CB2518	
	LBC3225	CBC3225			
	LBC2016	CBC2016	LBC2518	CBC2518	Inductance change : Within $\pm 25\%$
LB3218					
	LBC2012	CBC2012			Inductance change : Within $\pm 35\%$
Test Methods and Remarks	Change of maximum inductance deviation in step 1-5				
	Step	Temperature ($^{\circ}\text{C}$)			
		LB, CB Serie			
	1	20			
	2	-40			
	3	20 (Reference temperature)			
	4	+85 (Maximum operating temperature)			
5	20				

9. Resistance to Flexure of Substrate			
Specified Value	LB, LBC, LBR Series		No damage.
	CB, CBC Series		
	LBM Series		
Test Methods and Remarks	Warp : 2mm (LB·LBC·LBR·CB·CBC·LBM Series) Test substrate : Board according to JIS C0051 Thickness : 1.0mm		
	<p>Pressing jig 10 20 R340 Board R5 45±2mm 45±2mm</p>		

10. Body Strength			
Specified Value	LB, LBC, LBR Series		No damage.
	CB, CBC Series		
	LBM Series		
Test Methods and Remarks	LB·LBC·LBR·CB·CBC·LBM Applied force : 10N Duration : 10sec.		

11. Adhesion of terminal electrode			
Specified Value	LB, LBC, LBR Series		No abnormality.
	CB, CBC Series		
	LBM Series		
Test Methods and Remarks	LB·LBC·LBR·CB·CBC·CBL·LBM Applied force : 10N to X and Y directions Duration : 5 sec. Test substrate : Printed board		

12. Resistance to vibration		
Specified Value	LB, LBC, LBR Series	Inductance change : Within $\pm 20\%$ No significant abnormality in appearance.
	CB, CBC Series	
	LBM Series	Inductance change : Within $\pm 20\%$ No significant abnormality in appearance.
Test Methods and Remarks	LB·LBR·LBC·CB·CBC·LBM : 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.	

13. Drop test		
Specified Value	LB, LBC, LBR Series	—
	CB, CBC Series	
	LBM Series	

14. Solderability		
Specified Value	LB, LBC, LBR Series	At least 90% of surface of terminal electrode is covered by new
	CB, CBC Series	
	LBM Series	
Test Methods and Remarks	LB·LBC·LBR·CB·CBC·CBL·LBM : Solder temperature : $245 \pm 5^\circ\text{C}$ Duration : $5 \pm 0.5\text{sec}$ Flux : Methanol solution with 25% of colophony	

15. Resistance to soldering		
Specified Value	LB, LBC, LBR Series	Inductance change : Within $\pm 20\%$
	CB, CBC Series	
	LBM Series	Inductance change : Within $\pm 20\%$
Test Methods and Remarks	LB·LBC·LBR·CB·CBC·CBL·LBM : 3 times of reflow oven at 230°C MIN for 40sec. with peak temperature at 260°C for 5sec.	

16. Resistance to solvent		
Specified Value	LB, LBC, LBR Series	—
	CB, CBC Series	
	LBM Series	
Test Methods and Remarks	Solvent temperature : Room temperature Type of solvent : Isopropyl alcohol Cleaning conditions : 90s. Immersion and cleaning.	

17. Thermal shock		
Specified Value	LB, LBC, LBR Series	Inductance change : Within $\pm 20\%$ No significant abnormality in appearance.
	CB, CBC Series	
	LBM Series	
Test Methods and Remarks	LB·LBC·LBR·CB·CBC·CBL·LBM : $-40 \sim +85^\circ\text{C}$, 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.	

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18.Damp heat life test		
Specified Value	LB, LBC, LBR Series	Inductance change : Within $\pm 20\%$ No significant abnormality in appearance.
	CB, CBC Series	
	LBM Series	
Test Methods and Remarks	Temperature : $60 \pm 2^\circ\text{C}$ Humidity : $90 \sim 95\% \text{RH}$ Duration : 1000 hrs Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.	
19.Loading under damp heat life test		
Specified Value	LB, LBC, LBR Series	Inductance change : Within $\pm 20\%$ No significant abnormality in appearance.
	CB, CBC Series	
	LBM Series	
Test Methods and Remarks	Temperature : $60 \pm 2^\circ\text{C}$ Humidity : $90 \sim 95\% \text{RH}$ 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.	
20.High temperature life test		
Specified Value	LB, LBC, LBR Series	—
	CB, CBC Series	Inductance change : Within $\pm 20\%$ No significant abnormality in appearance.
	LBM Series	
Test Methods and Remarks	Temperature : $85 \pm 2^\circ\text{C}$ Duration : 1000 hrs Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.	
21.Loading at high temperature life test		
Specified Value	LB, LBC, LBR Series	Inductance change : Within $\pm 20\%$ No significant abnormality in appearance.
	CB, CBC Series	
	LBM Series	—
Test Methods and Remarks	Temperature : $85 \pm 2^\circ\text{C}$ 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		
Specified Value	LB, LBC, LBR Series	Inductance change : Within $\pm 20\%$ No significant abnormality in appearance.
	CB, CBC Series	
	LBM Series	
Test Methods and Remarks	Temperature : $-40 \pm 2^\circ\text{C}$ Duration : 1000 hrs Recovery : At least 2 hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.	
23.Standard condition		
Specified Value	LB, LBC, LBR Series	Standard test conditions Unless specified, Ambient temperature is $20 \pm 15^\circ\text{C}$ and the Relative humidity is $65 \pm 20\%$. If there is any doubt about the test results, further measurement shall be had within the following limits: Ambient Temperature: $20 \pm 2^\circ\text{C}$ Relative humidity: $65 \pm 5\%$ Inductance value is based on our standard measurement systems.
	CB, CBC Series	
	LBM Series	

WIRE-WOUND CHIP INDUCTORS (LB SERIES), WIRE-WOUND CHIP POWER INDUCTORS (CB SERIES), WIRE-WOUND CHIP INDUCTORS FOR SIGNAL LINES (LB SERIES M TYPE)

■ PRECAUTIONS

1. Circuit Design	
Precautions	<p>◆Operating environment</p> <p>1. All electronic components listed in this catalogue are intended for use in general electronic equipment such as AV/OA equipment, home electrical appliances, office equipment, information-communication equipment, general medical equipment, industrial equipment, and automotive applications.</p> <p>Please be sure to contact TAIYO YUDEN CO., LTD. for further information before using the components for any equipment which might have a negative impact directly on human life, such as specially controlled medical equipment, transportation equipment (automotive powertrain/train/ship control systems, etc.) and traffic signal system.</p> <p>Please do not incorporate the components into any equipment requiring a high degree of safety and reliability, such as aerospace equipment, avionics, nuclear control equipment, submarine system, and military equipment .</p>
2. PCB Design	
Precautions	<p>◆Land pattern design</p> <p>1. Please contact any of our offices for a land pattern, and refer to a recommended land pattern of a right figure or specifications.</p>
Technical considerations	<p>PRECAUTIONS 【Recommended Land Patterns】</p> <p>Surface Mounting</p> <ul style="list-style-type: none"> • Mounting and soldering conditions should be checked beforehand. • Applicable soldering process to those products is reflow soldering only.
3. Considerations for automatic placement	
Precautions	<p>◆Adjustment of mounting machine</p> <p>1. Excessive impact load should not be imposed on the products when mounting onto the PC boards.</p> <p>2. Mounting and soldering conditions should be checked beforehand.</p>
Technical considerations	<p>1. When installing products, care should be taken not to apply distortion stress as it may deform the products.</p>
4. Soldering	
Precautions	<p>◆Reflow soldering(LB and CB Types)</p> <p>1. For reflow soldering with either leaded or lead-free solder, the profile specified in "point for controlling" is recommended.</p> <p>◆Recommended conditions for using a soldering iron</p> <p>1. 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 come in contact with inductor directly.</p>
Technical considerations	<p>◆Reflow soldering(LB and CB Types)</p> <p>1. Reflow profile</p> <p>Temperature [°C]</p> <p>Heating Time [sec]</p> <p>150~180</p> <p>90±30sec</p> <p>30±10sec</p> <p>230°C min</p> <p>5sec max</p> <p>Peak: 260+0/-5°C</p> <p>◆Recommended conditions for using a soldering iron</p> <p>1. Components can be damaged by excessive heat where soldering conditions exceed the specified range.</p>
5. Cleaning	
Precautions	<p>◆Cleaning conditions</p> <p>Washing by supersonic waves shall be avoided.</p>
Technical considerations	<p>◆Cleaning conditions</p> <p>If washed by supersonic waves, the products might be broken.</p>

6. Handling

Precautions	<ul style="list-style-type: none">◆ Handling<ul style="list-style-type: none">1. Keep the inductors away from all magnets and magnetic objects.◆ Breakaway PC boards (splitting along perforations)<ul style="list-style-type: none">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<ul style="list-style-type: none">1. Please do not give the inductors any excessive mechanical shocks.
Technical considerations	<ul style="list-style-type: none">◆ Handling<ul style="list-style-type: none">1. There is a case that a characteristic varies with magnetic influence.◆ Breakaway PC boards (splitting along perforations)<ul style="list-style-type: none">1. Planning pattern configurations and the position of products should be carefully performed to minimize stress.◆ Mechanical considerations<ul style="list-style-type: none">1. There is a case to be damaged by a mechanical shock.

7. Storage conditions

Precautions	<ul style="list-style-type: none">◆ Storage<ul 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<ul style="list-style-type: none">Ambient temperature: 0~40°C / Humidity: Below 70% RHThe 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, These series should be used within 6 months from the time of delivery.
Technical considerations	<ul style="list-style-type: none">◆ Storage<ul 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.