

# 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 2008. All of the contents specified herein are subject to change without notice due to technical improvements, etc. Therefore, please check for the latest information carefully before practical application or usage of the Products.

Please note that Taiyo Yuden Co., Ltd. shall not be responsible for any defects in products or equipment incorporating such products, which are caused under the conditions other than those specified in this catalog or individual specification.

- Please contact Taiyo Yuden Co., Ltd. for further details of product specifications as the individual specification is available.
- Please conduct validation and verification of products in actual condition of mounting and operating environment before commercial shipment of the equipment.
- All electronic components or functional modules listed in this catalog are developed, designed and intended for use in general electronics equipment.(for AV, office automation, household, office supply, information service, telecommunications, (such as mobile phone or PC) etc.). Before incorporating the components or devices into any equipment in the field such as transportation,( automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network (telephone exchange, base station) etc. which may have direct influence to harm or injure a human body, please contact Taiyo Yuden Co., Ltd. for more detail in advance.

Do not incorporate the products into any equipment in fields such as aerospace, aviation, nuclear control, submarine system, military, etc. where higher safety and reliability are especially required.

In addition, even electronic components or functional modules that are used for the general electronic equipment, if the equipment or the electric circuit require high safety or reliability function or performances, a sufficient reliability evaluation check for safety shall be performed before commercial shipment and moreover, due consideration to install a protective circuit is strongly recommended at customer's design stage.

- The contents of this catalog are applicable to the products which are purchased from our sales offices or distributors (so called "TAIYO YUDEN' s official sales channel").  
It is only applicable to the products purchased from any of TAIYO YUDEN' s official sales channel.
- Please note that Taiyo Yuden Co., Ltd. shall have no responsibility for any controversies or disputes that may occur in connection with a third party's intellectual property rights and other related rights arising from your usage of products in this catalog. Taiyo Yuden Co., Ltd. grants no license for such rights.
- Caution for export  
Certain items in this catalog may require specific procedures for export according to "Foreign Exchange and Foreign Trade Control Law" of Japan, "U.S. Export Administration Regulations," and other applicable regulations. Should you have any question or inquiry on this matter, please contact our sales staff.  
Should you have any question or inquiry on this matter, please contact our sales staff.

# SMDインダクタ (低背タイプ)

## SMD INDUCTORS LOW PROFILE TYPE



OPERATING TEMP	-25~+120°C (製品自己発熱含む) (Inducting self-generated heat)
----------------	--



### 特長 FEATURES

- ・小型、低背インダクタ
- ・大電流に対応
- ・シンプルで独自の磁気シールド構造
- ・耐落下衝撃に強い構造

- ・ Small and Low profile inductor.
- ・ It corresponds to High current.
- ・ Simple and original magnetic shield structure.
- ・ Structure strong against a shock-proof.

### 用途 APPLICATIONS

- ・ 携帯電話、HDD、DVC、DSC、PDA、液晶ディスプレイ等の小型DC/DCコンバータ用途

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

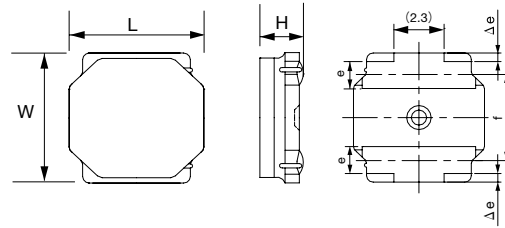
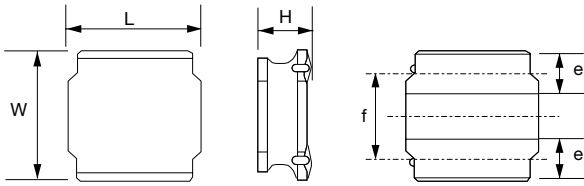
### 形名表記法 ORDERING CODE

<b>1</b>	<b>2</b>	<b>3</b>	<b>5</b>
形式 NR△, NRG      外装樹脂仕様 △=スペース	外径寸法(W×L×H) 例 3010      3.0×3.0×1.0mm 3012      3.0×3.0×1.2mm 3015      3.0×3.0×1.5mm 4010      4.0×4.0×1.0mm 4012      4.0×4.0×1.2mm 4018      4.0×4.0×1.8mm 4026      4.0×4.0×2.6mm 6012      6.0×6.0×1.2mm 6020      6.0×6.0×2.0mm 6028      6.0×6.0×2.8mm 6045      6.0×6.0×4.5mm 8040      8.0×8.0×4.0mm	梱包 T△      テーピング △=スペース	インダクタンス許容差 M      ±20% N      ±30%
		<b>4</b>	<b>6</b>
		公称インダクタンス [μH] 例 2R2      2.2 100      10 101      100	当社管理番号 △      標準品 △=スペース

N R △ 4 0 1 8 T △ 1 0 0 M △

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
Type NR△, NRG      Coating resin specification △=Blank Space	External dimensions(W×L×H) example 3010      3.0×3.0×1.0mm 3012      3.0×3.0×1.2mm 3015      3.0×3.0×1.5mm 4010      4.0×4.0×1.0mm 4012      4.0×4.0×1.2mm 4018      4.0×4.0×1.8mm 4026      4.0×4.0×2.6mm 6012      6.0×6.0×1.2mm 6020      6.0×6.0×2.0mm 6028      6.0×6.0×2.8mm 6045      6.0×6.0×4.5mm 8040      8.0×8.0×4.0mm	Packaging T△      Tape and Reel △=Blank Space	Nominal inductance [μH] example 2R2      2.2 100      10 101      100	Inductance tolerance M      ±20% N      ±30%	Internal code △      Standard product △=Blank Space

# 外形寸法 EXTERNAL DIMENSIONS



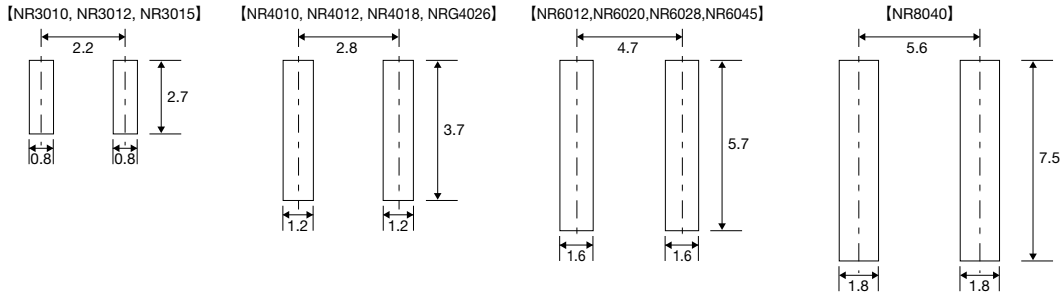
Type	L	W	H	e	f
NR 3010	3.0±0.1 (0.118±0.004)	3.0±0.1 (0.118±0.004)	1.0 max (0.039 max)	0.9±0.2 (0.035±0.008)	1.9±0.2 (0.075±0.008)
NR 3012			1.2 max (0.047 max)		
NR 3015			1.5 max (0.059 max)		
NR 4010	4.0±0.2 (0.157±0.008)	4.0±0.2 (0.157±0.008)	1.0 max (0.039 max)	1.1±0.2 (0.043±0.008)	2.5±0.2 (0.098±0.008)
NR 4012			1.2 max (0.047 max)		
NR 4018			1.8 max (0.071 max)		
NRG4026			2.6 max (0.102 max)		
NR 8040	8.0±0.2 (0.315±0.008)	8.0±0.2 (0.315±0.008)	*1) 4.2max (0.165max) *2) 4.0max (0.157max)	1.6±0.3 (0.063±0.012)	5.6±0.3 (0.220±0.012)

Type	L	W	H	e	Δe	f
NR 6012 (E Type)	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	1.2 max (0.047 max)	1.35±0.2 (0.053±0.008)	0.3±0.2 (0.011±0.008)	4.0±0.2 (0.157±0.008)
NR 6020	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	2.0 max (0.078 max)	1.35±0.2 (0.053±0.008)	0.3±0.2 (0.011±0.008)	4.0±0.2 (0.157±0.008)
NR 6028	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)	0.3±0.2 (0.011±0.008)	4.0±0.2 (0.157±0.008)
NR 6045	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)	0.3±0.2 (0.011±0.008)	4.0±0.2 (0.157±0.008)

Unit mm(inch)

\*1) 0R9~6R8タイプ  
\*2) 100~101タイプ  
Unit mm(inch)

## 推奨ランド Recommended Land Patterns



## 概略バリエーション AVAILABLE INDUCTANCE RANGE

Range	Type	NR3010	NR3012	NR3015	NR4010	NR4012	NR4018	NR6012	NR6020	NR6028	NR6045	NR8040	NRG4026
		$I_{max}$ (mA) Rdc±20%[Q]	$I_{max}$ (mA) Rdc±20%[Q]	$I_{max}$ (mA) Rdc±20%[Q]	$I_{max}$ (mA) Rdc±20%[Q]	$I_{max}$ (mA) Rdc±20%[Q]	$I_{max}$ (mA) Rdc±20%[Q]	$I_{max}$ (mA) Rdc±20%[Q]	$I_{max}$ (mA) Rdc±30%[Q]	$I_{max}$ (mA) Rdc±30%[Q]	$I_{max}$ (mA) Rdc±30%[Q]	$I_{max}$ (mA) Rdc±30%[Q]	$I_{max}$ (mA) Rdc±30%[Q]
0.8		1300	1490	2100	1050	1500	1830		3800	4600	4200	7800	2300
1.0		0.085	0.05	0.030	0.100	0.060	0.030		0.020	0.013	0.014	0.006	0.03
3.3								1730					
10		500	540	700	560	740	840	1000	1400	1900	2500	3100	1300
47		220	250	320	240	350			950	620	700		650
100													
220							170	320				1000	
								2.18		0.600	0.500	0.290	

セレクションガイド  
Selection Guide

アイテム一覧  
Part Numbers

特性図  
Electrical Characteristics

梱包  
Packaging

信頼性  
Reliability Data

使用上の注意  
Precautions



etc

△当社カタログをご使用の際は「当社製品に関するお断り」を必ずお読みください。

TAIYO YUDEN 2009

△Please read the "Notice for TAIYO YUDEN products" before using this catalog.

NR 3010 シールドタイプ Shielded type

形名 Ordering code	EHS (Environmental Hazardous Substances)	公称 インダクタンス Inductance [μH]	インダクタンス 許容差 Inductance Tolerance	自己共振 周波数 Self-resonant frequency [MHz] (min.)	直流抵抗 DC Resistance [Ω] (±20%)	定格電流 ※) Rated current [mA]		測定 周波数 Measuring frequency [kHz]
						直流重畳許容電流 Saturation current Idc1	温度上昇許容電流 Temperature rise current Idc2	
NR 3010T 1R0N	RoHS	1.0	±30%	126	0.065	1,300	1,400	100
NR 3010T 1R5N	RoHS	1.5		98	0.080	1,200	1,300	
NR 3010T 2R2M	RoHS	2.2	±20%	82	0.095	1,100	1,100	
NR 3010T 3R3M	RoHS	3.3		63	0.140	870	940	
NR 3010T 4R7M	RoHS	4.7		56	0.190	750	780	
NR 3010T 6R8M	RoHS	6.8		46	0.300	610	630	
NR 3010T 100M	RoHS	10		35	0.450	500	510	
NR 3010T 150M	RoHS	15		30	0.740	400	400	
NR 3010T 220M	RoHS	22		25	1.03	350	350	
NR 3010T 330M	RoHS	33		20	1.55	260	275	
NR 3010T 470M	RoHS	47	17	2.05	220	235		

NR 3012 シールドタイプ Shielded type

形名 Ordering code	EHS (Environmental Hazardous Substances)	公称 インダクタンス Inductance [μH]	インダクタンス 許容差 Inductance Tolerance	自己共振 周波数 Self-resonant frequency [MHz] (min.)	直流抵抗 DC Resistance [Ω] (±20%)	定格電流 ※) Rated current [mA]		測定 周波数 Measuring frequency [kHz]
						直流重畳許容電流 Saturation current Idc1	温度上昇許容電流 Temperature rise current Idc2	
NR 3012T 1R0N	RoHS	1.0	±30%	110	0.050	1,500	1,490	100
NR 3012T 1R5N	RoHS	1.5		92	0.060	1,360	1,400	
NR 3012T 2R2M	RoHS	2.2	±20%	70	0.080	1,100	1,200	
NR 3012T 3R3M	RoHS	3.3		55	0.100	910	1,050	
NR 3012T 4R7M	RoHS	4.7		48	0.130	770	980	
NR 3012T 6R8M	RoHS	6.8		40	0.190	670	740	
NR 3012T 100M	RoHS	10		32	0.290	540	630	
NR 3012T 150M	RoHS	15		27	0.450	440	485	
NR 3012T 220M	RoHS	22		22	0.630	375	420	
NR 3012T 330M	RoHS	33		19	1.03	310	330	
NR 3012T 470M	RoHS	47	17	1.45	250	280		

NR 3015 シールドタイプ Shielded type

形名 Ordering code	EHS (Environmental Hazardous Substances)	公称 インダクタンス Inductance [μH]	インダクタンス 許容差 Inductance Tolerance	自己共振 周波数 Self-resonant frequency [MHz] (min.)	直流抵抗 DC Resistance [Ω] (±20%)	定格電流 ※) Rated current [mA]		測定 周波数 Measuring frequency [kHz]
						直流重畳許容電流 Saturation current Idc1	温度上昇許容電流 Temperature rise current Idc2	
NR 3015T 1R0N	RoHS	1.0	±30%	100	0.030	2,100	2,100	100
NR 3015T 1R5N	RoHS	1.5		87	0.040	1,800	1,820	
NR 3015T 2R2M	RoHS	2.2	±20%	64	0.060	1,480	1,500	
NR 3015T 3R3M	RoHS	3.3		49	0.080	1,210	1,230	
NR 3015T 4R7M	RoHS	4.7		40	0.120	1,020	1,040	
NR 3015T 6R8M	RoHS	6.8		36	0.160	870	880	
NR 3015T 100M	RoHS	10		28	0.230	700	710	
NR 3015T 150M	RoHS	15		23	0.360	560	560	
NR 3015T 220M	RoHS	22		20	0.520	470	470	
NR 3015T 330M	RoHS	33		18	0.840	390	370	
NR 3015T 470M	RoHS	47	17	1.34	320	300		

※) 直流重畳許容電流 (Idc1) は、直流重畳によるインダクタンス低下が30%以内となる直流電流値 (at 20°C)

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

※) 温度上昇許容電流 (Idc2) は、温度上昇が40°Cとなる直流電流値 (at 20°C)

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

※) 定格電流値は直流重畳許容電流、または温度上昇許容電流をいずれも満足する直流電流値

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

NR 4010 シールドタイプ Shielded type

形名 Ordering code	EHS (Environmental Hazardous Substances)	公称 インダクタンス Inductance [μH]	インダクタンス 許容差 Inductance Tolerance	自己共振 周波数 Self-resonant frequency [MHz] (min.)	直流抵抗 DC Resistance [Ω] (±20%)	定格電流 ※) Rated current [mA]		測定 周波数 Measuring frequency [kHz]
						直流重量許容電流 Saturation current Idc1	温度上昇許容電流 Temperature rise current Idc2	
NR 4010T 1R0N	RoHS	1.0	±30%	116	0.100	1,800	1,050	100
NR 4010T 2R2N	RoHS	2.2		73	0.150	1,150	890	
NR 4010T 3R3M	RoHS	3.3		58	0.180	1,100	820	
NR 4010T 4R7M	RoHS	4.7	±20%	47	0.210	900	750	
NR 4010T 6R8M	RoHS	6.8		38	0.300	740	620	
NR 4010T 100M	RoHS	10		31	0.380	560	600	
NR 4010T 150M	RoHS	15		24	0.510	470	510	
NR 4010T 220M	RoHS	22		19	0.870	360	400	
NR 4010T 330M	RoHS	33		15	1.54	280	300	
NR 4010T 470M	RoHS	47		13	1.81	240	280	

NR 4012 シールドタイプ Shielded type

形名 Ordering code	EHS (Environmental Hazardous Substances)	公称 インダクタンス Inductance [μH]	インダクタンス 許容差 Inductance Tolerance	自己共振 周波数 Self-resonant frequency [MHz] (min.)	直流抵抗 DC Resistance [Ω] (±20%)	定格電流 ※) Rated current [mA]		測定 周波数 Measuring frequency [kHz]	
						直流重量許容電流 Saturation current Idc1	温度上昇許容電流 Temperature rise current Idc2		
NR 4012T 1R0N	RoHS	1.0	±30%	131	0.060	2,500	1,500	100	
NR 4012T 2R2M	RoHS	2.2		66	0.090	1,650	1,200		
NR 4012T 3R3M	RoHS	3.3		50	0.130	1,200	980		
NR 4012T 4R7M	RoHS	4.7		45	0.140	1,050	960		
NR 4012T 6R8M	RoHS	6.8		±20%	35	0.180	900		840
NR 4012T 100M	RoHS	10			28	0.240	740		770
NR 4012T 150M	RoHS	15			23	0.400	560		600
NR 4012T 220M	RoHS	22			18	0.480	510		540
NR 4012T 330M	RoHS	33			15	0.810	400		420
NR 4012T 470M	RoHS	47			12	1.00	350		370

NR 4018 シールドタイプ Shielded type

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

※) 直流重量許容電流 (Idc1) は、直流重量によるインダクタンス低下が 30% 以内となる直流電流値 (at 20°C)  
 ※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)  
 ※) 温度上昇許容電流 (Idc2) は、温度上昇が 40°C となる直流電流値 (at 20°C)  
 ※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)  
 ※) 定格電流値は直流重量許容電流、または温度上昇許容電流をいずれも満足する直流電流値  
 ※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

NR 6012 シールドタイプ Shielded type

形名 Ordering code	EHS (Environmental Hazardous Substances)	公称 インダクタンス Inductance [μH]	インダクタンス 許容差 Inductance Tolerance	自己共振 周波数 Self-resonant frequency [MHz] (min.)	直流抵抗 DC Resistance [Ω] (±20%)	定格電流 ※) Rated current [mA]		測定 周波数 Measuring frequency [kHz]
						直流重畳許容電流 Saturation current Idc1	温度上昇許容電流 Temperature rise current Idc2	
NR 6012T 2R5NE	RoHS	2.5	±30%	45	0.090	2,100	1,730	100
NR 6012T 4R0NE	RoHS	4.0		39	0.105	1,800	1,570	
NR 6012T 5R3ME	RoHS	5.3	±20%	34	0.110	1,500	1,400	
NR 6012T 6R8ME	RoHS	6.8		30	0.165	1,300	1,180	
NR 6012T 100ME	RoHS	10		22	0.235	1,000	1,000	
NR 6012T 150ME	RoHS	15		18	0.330	800	790	
NR 6012T 220ME	RoHS	22		12	0.530	760	630	
NR 6012T 330ME	RoHS	33		8	0.700	590	530	
NR 6012T 470ME	RoHS	47		6	1.05	520	460	
NR 6012T 680ME	RoHS	68		3	1.35	440	410	
NR 6012T 101ME	RoHS	100	1	2.18	350	320		

NR 6020 シールドタイプ Shielded type

形名 Ordering code	EHS (Environmental Hazardous Substances)	公称 インダクタンス Inductance [μH]	インダクタンス 許容差 Inductance Tolerance	自己共振 周波数 Self-resonant frequency [MHz] min	直流抵抗 DC Resistance [Ω] (±30%)	定格電流 ※) Rated current [mA]		測定 周波数 Measuring frequency [kHz]
						直流重畳飽和電流 Saturation current (Idc1)	温度上昇電流 Temperature rise current (Idc2)	
NR 6020T 0R8N	RoHS	0.8	±30%	110	0.020	5,500	3,800	100
NR 6020T 1R5N	RoHS	1.5		93	0.026	4,000	3,200	
NR 6020T 2R2N	RoHS	2.2		73	0.034	3,200	2,700	
NR 6020T 3R3N	RoHS	3.3		55	0.040	2,800	2,600	
NR 6020T 4R7N	RoHS	4.7		43	0.058	2,400	2,000	
NR 6020T 6R8N	RoHS	6.8		30	0.085	2,000	1,800	
NR 6020T 100M	RoHS	10	±20%	18	0.125	1,700	1,400	
NR 6020T 220M	RoHS	22		11	0.290	1,050	950	

NR 6028 シールドタイプ Shielded type

形名 Ordering code	EHS (Environmental Hazardous Substances)	公称 インダクタンス Inductance [μH]	インダクタンス 許容差 Inductance Tolerance	自己共振 周波数 Self-resonant frequency [MHz] (min.)	直流抵抗 DC Resistance [Ω] (±30%)	定格電流 ※) Rated current [mA]		測定 周波数 Measuring frequency [kHz]
						直流重畳許容電流 Saturation current (ΔL/L≤-30%)	温度上昇許容電流 Temperature rise current (ΔT≤40°C)	
NR 6028T 0R9N	RoHS	0.9	±30%	90	0.013	6,600	4,600	100
NR 6028T 1R5N	RoHS	1.5		78	0.016	5,000	4,200	
NR 6028T 2R2N	RoHS	2.2		68	0.020	4,200	3,700	
NR 6028T 3R0N	RoHS	3.0		55	0.023	3,600	3,400	
NR 6028T 4R7M	RoHS	4.7	±20%	39	0.031	2,700	3,000	
NR 6028T 6R0M	RoHS	6.0		30	0.040	2,500	2,500	
NR 6028T 100M	RoHS	10		20	0.065	1,900	1,900	
NR 6028T 150M	RoHS	15		17	0.095	1,600	1,800	
NR 6028T 220M	RoHS	22		12	0.135	1,300	1,400	
NR 6028T 330M	RoHS	33		10	0.220	1,100	1,100	
NR 6028T 470M	RoHS	47		8	0.300	950	920	
NR 6028T 680M	RoHS	68		5	0.420	760	770	
NR 6028T 101M	RoHS	100	3	0.600	620	660		

※) 直流重畳許容電流 (Idc1) は、直流重畳によるインダクタンス低下が 30% 以内となる直流電流値 (at 20°C)  
 ※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)  
 ※) 温度上昇許容電流 (Idc2) は、温度上昇が 40°C となる直流電流値 (at 20°C)  
 ※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)  
 ※) 定格電流値は直流重畳許容電流、または温度上昇許容電流をいずれも満足する直流電流値  
 ※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

NR 6045 シールドタイプ Shielded type

形名 Ordering code	EHS (Environmental Hazardous Substances)	公称 インダクタンス Inductance [μH]	インダクタンス 許容差 Inductance Tolerance	自己共振 周波数 Self-resonant frequency [MHz] min	直流抵抗 DC Resistance [Ω] (±30%)	定格電流 ※) Rated current [mA]		測定 周波数 Measuring frequency [kHz]
						直流重量飽和電流 Saturation current (Idc1)	温度上昇電流 Temperature rise current (Idc2)	
NR 6045T 1R0N	RoHS	1.0	±30%	110	0.014	8,500	4,200	100
NR 6045T 1R3N	RoHS	1.3		95	0.016	8,000	4,000	
NR 6045T 1R8N	RoHS	1.8		80	0.018	7,000	3,700	
NR 6045T 2R3N	RoHS	2.3		60	0.021	6,000	3,500	
NR 6045T 3R0N	RoHS	3.0		45	0.024	5,000	3,200	
NR 6045T 4R5M	RoHS	4.5	±20%	25	0.031	4,000	3,000	
NR 6045T 6R3M	RoHS	6.3		15	0.038	3,800	2,800	
NR 6045T 100M	RoHS	10		12	0.047	3,000	2,500	
NR 6045T 150M	RoHS	15		10	0.077	2,300	1,900	
NR 6045T 220M	RoHS	22		7	0.115	1,900	1,500	
NR 6045T 330M	RoHS	33		6	0.145	1,500	1,400	
NR 6045T 470M	RoHS	47		5	0.220	1,300	1,100	
NR 6045T 680M	RoHS	68		4	0.330	1,000	900	
NR 6045T 101M	RoHS	100		3	0.500	800	700	

NR 8040 シールドタイプ Shielded type

形名 Ordering code	EHS (Environmental Hazardous Substances)	公称 インダクタンス Inductance [μH]	インダクタンス 許容差 Inductance Tolerance	自己共振 周波数 Self-resonant frequency [MHz] (min.)	直流抵抗 DC Resistance [Ω] (±30%)	定格電流 ※) Rated current [mA]		測定 周波数 Measuring frequency [kHz]
						直流重量許容電流 Saturation current Idc1	温度上昇許容電流 Temperature rise current Idc2	
NR 8040T 0R9N	RoHS	0.9	±30%	85	0.006	11,000	7,800	100
NR 8040T 1R4N	RoHS	1.4		63	0.007	9,000	7,000	
NR 8040T 2R0N	RoHS	2.0		50	0.009	7,400	6,300	
NR 8040T 3R6N	RoHS	3.6		34	0.015	5,300	4,900	
NR 8040T 4R7N	RoHS	4.7		30	0.018	4,700	4,100	
NR 8040T 6R8N	RoHS	6.8	±20%	24	0.025	4,000	3,700	
NR 8040T 100M	RoHS	10		22	0.034	3,400	3,100	
NR 8040T 150M	RoHS	15		16	0.050	2,700	2,400	
NR 8040T 220M	RoHS	22		13	0.066	2,200	2,200	
NR 8040T 330M	RoHS	33		12	0.100	1,900	1,700	
NR 8040T 470M	RoHS	47		8	0.150	1,500	1,400	
NR 8040T 680M	RoHS	68		7	0.230	1,200	1,100	
NR 8040T 101M	RoHS	100		6	0.290	1,000	1,000	

NRG4026 シールドタイプ Shielded type

形名 Ordering code	公称 インダクタンス Inductance [μH]	インダクタンス 許容差 Inductance Tolerance	自己共振 周波数 Self-resonant frequency [MHz] min	直流抵抗 DC Resistance [Ω] (±30%)	定格電流 ※) Rated current [mA]		測定 周波数 Measuring frequency [kHz]
					直流重量飽和電流 Saturation current (Idc1)	温度上昇電流 Temperature rise current (Idc2)	
NRG4026 T 1R2N	1.2	±30%	120	0.030	3,100	2,300	100
NRG4026 T 2R3N	2.3		96	0.040	2,100	1,970	
NRG4026 T 3R5M	3.5		58	0.050	1,800	1,700	
NRG4026 T 4R7M	4.7	±20%	46	0.055	1,450	1,600	
NRG4026 T 6R6M	6.6		33	0.065	1,300	1,500	
NRG4026 T 100M	10		26	0.085	1,000	1,300	
NRG4026 T 150M	15		19	0.110	900	1,100	
NRG4026 T 220M	22		13	0.165	610	900	
NRG4026 T 330M	33		9	0.200	540	800	
NRG4026 T 470M	47		6	0.300	410	650	

※) 直流電流許容電流 (Idc1) は、直流重量によるインダクタンス低下が 30% 以内となる直流電流値 (at 20°C)  
 ※) The saturation current (Idc1) is DC current value Inductance decrease down to 30%. (at 20°C)  
 ※) 温度上昇許容電流 (Idc2) は、温度上昇が 40°C となる直流電流値 (at 20°C)  
 ※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)  
 ※) 定格電流は Idc2 です。  
 ※) The rated current is Idc2.

直流量特性例 DC Bias characteristics (Measured by HP4285A)

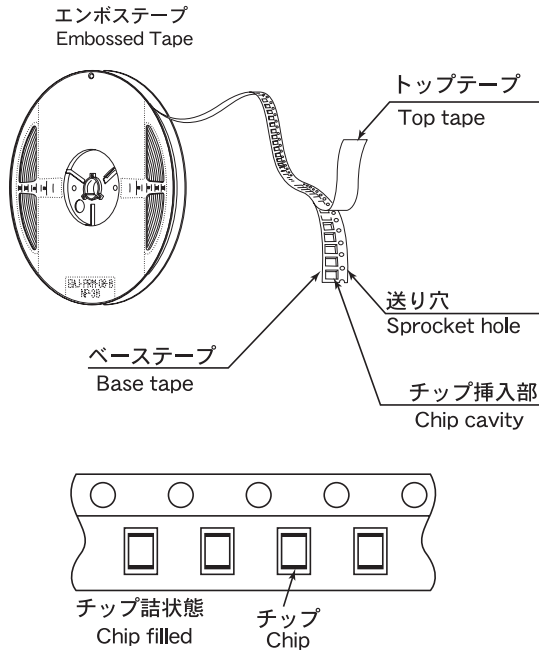




①最小受注単位数 Minimum Quantity

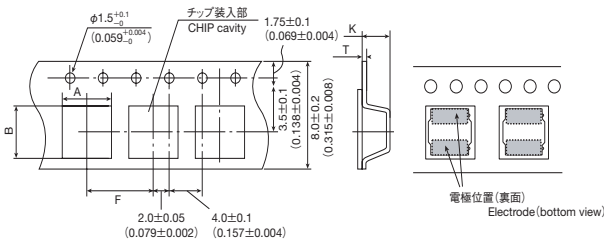
形式 Type	標準数量[個] Standard Quantity [pcs]
	テーピング Tape & Reel
NR 3012	2000
NR 3015	2000
NR 4010	5000
NR 4012	4500
NR 4018	3500
NR 6012	1000
NR 6020	2500
NR6028	2000
NR 6045	1500
NR 8040	1000

②テーピング材質 Tape Material



③テーピング寸法 Taping dimensions

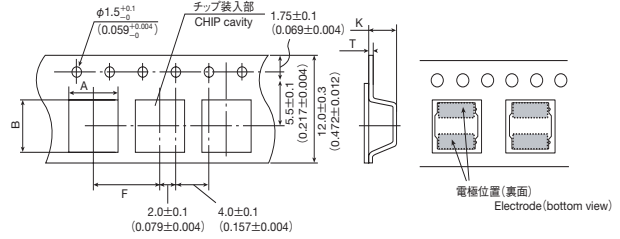
(1) エンボステープ (8mm 幅) Embossed tape (0.315 inches wide)



形式 Type	チップ挿入部 Chip cavity		挿入ピッチ Insertion pitch	テープ厚み Tape thickness	
	A	B		T	K
NR 3010	3.2 ± 0.1 (0.126 ± 0.004)	3.2 ± 0.1 (0.126 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	0.3 ± 0.05 (0.012 ± 0.002)	1.4 ± 0.1 (0.055 ± 0.004)
NR 3012	3.2 ± 0.1 (0.126 ± 0.004)	3.2 ± 0.1 (0.126 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	0.3 ± 0.05 (0.012 ± 0.002)	1.6 ± 0.1 (0.063 ± 0.004)
NR 3015	3.2 ± 0.1 (0.126 ± 0.004)	3.2 ± 0.1 (0.126 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	0.3 ± 0.05 (0.012 ± 0.002)	1.9 ± 0.1 (0.075 ± 0.004)

Unit : mm (inch)

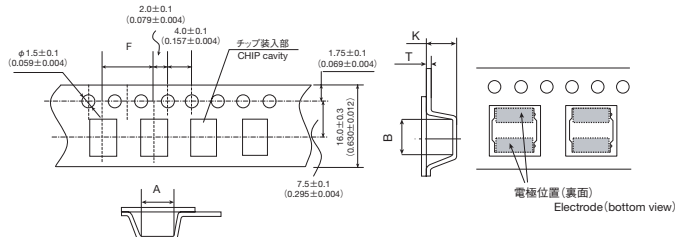
(2) エンボステープ (12mm 幅) Embossed tape (0.47 inches wide)



形式 Type	チップ挿入部 Chip cavity		挿入ピッチ Insertion pitch	テープ厚み 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 ± 0.05 (0.012 ± 0.002)	1.4 ± 0.1 (0.055 ± 0.004)
NR 4012	4.3 ± 0.1 (0.169 ± 0.004)	4.3 ± 0.1 (0.169 ± 0.004)	8.0 ± 0.1 (0.315 ± 0.004)	0.3 ± 0.05 (0.012 ± 0.002)	1.6 ± 0.1 (0.063 ± 0.004)
NR 4018	4.3 ± 0.1 (0.169 ± 0.004)	4.3 ± 0.1 (0.169 ± 0.004)	8.0 ± 0.1 (0.315 ± 0.004)	0.3 ± 0.05 (0.012 ± 0.002)	2.1 ± 0.1 (0.083 ± 0.004)
NRG 4026	4.3 ± 0.1 (0.169 ± 0.004)	4.3 ± 0.1 (0.169 ± 0.004)	8.0 ± 0.1 (0.315 ± 0.004)	0.3 ± 0.05 (0.012 ± 0.002)	3.1 ± 0.1 (0.122 ± 0.004)
NR 6012	6.3 ± 0.1 (0.248 ± 0.004)	6.3 ± 0.1 (0.248 ± 0.004)	8.0 ± 0.1 (0.315 ± 0.004)	0.4 ± 0.1 (0.016 ± 0.004)	1.6 ± 0.1 (0.063 ± 0.004)
NR 6020	6.3 ± 0.1 (0.248 ± 0.004)	6.3 ± 0.1 (0.248 ± 0.004)	8.0 ± 0.1 (0.315 ± 0.004)	0.4 ± 0.1 (0.016 ± 0.004)	2.3 ± 0.1 (0.090 ± 0.004)
NR 6028	6.3 ± 0.1 (0.248 ± 0.004)	6.3 ± 0.1 (0.248 ± 0.004)	8.0 ± 0.1 (0.315 ± 0.004)	0.4 ± 0.1 (0.016 ± 0.004)	3.1 ± 0.1 (0.122 ± 0.004)
NR 6045	6.3 ± 0.1 (0.248 ± 0.004)	6.3 ± 0.1 (0.248 ± 0.004)	8.0 ± 0.1 (0.315 ± 0.004)	0.4 ± 0.1 (0.016 ± 0.004)	4.7 ± 0.1 (0.185 ± 0.004)

Unit : mm (inch)

(3) エンボステープ (16mm 幅) Embossed tape (0.63 inches wide)

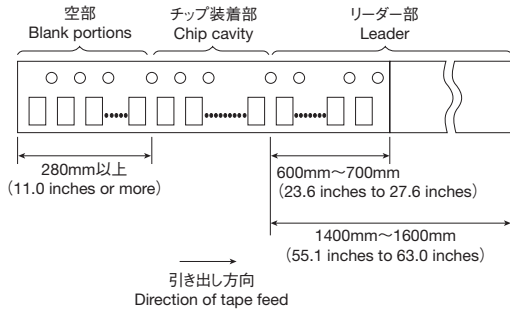


形式 Type	チップ挿入部 Chip cavity		挿入ピッチ Insertion pitch	テープ厚み Tape thickness	
	A	B		T	K
NR 8040	8.3 ± 0.1 (0.327 ± 0.004)	8.3 ± 0.1 (0.327 ± 0.004)	12.0 ± 0.1 (0.472 ± 0.004)	0.5 ± 0.1 (0.020 ± 0.004)	4.5 ± 0.1 (0.177 ± 0.004)

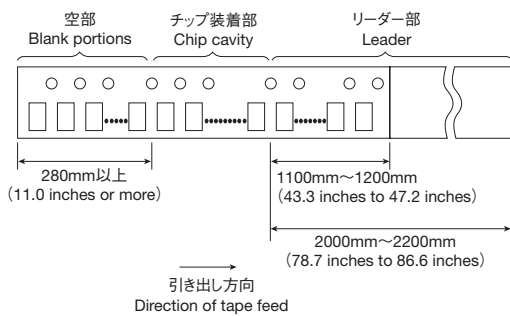
Unit : mm (inch)

④リーダー部・空部 Leader and Blank portion

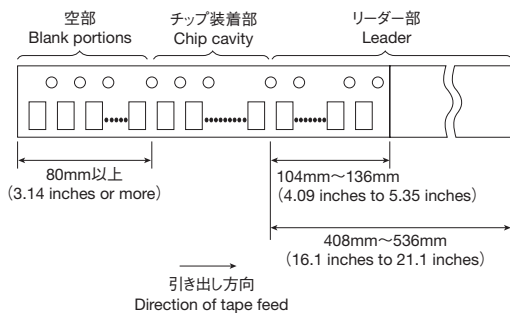
(1) NR 3010, NR 3012, NR 3015



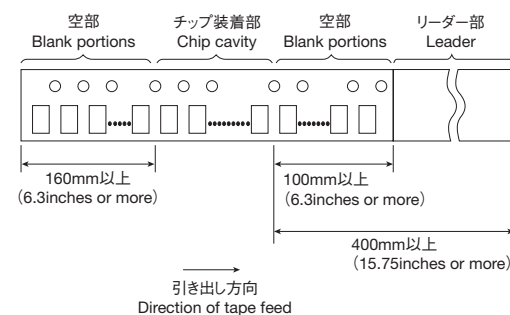
(2) NR 4010, NR 4012, NR 4018



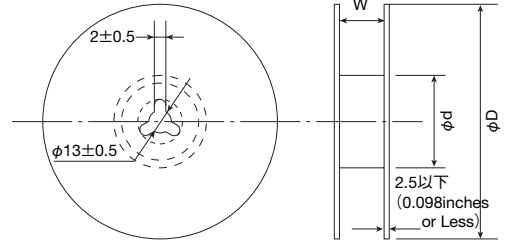
(3) NR 6012



(4) NR 6020, NR 6028, NR 6045, NR 8040

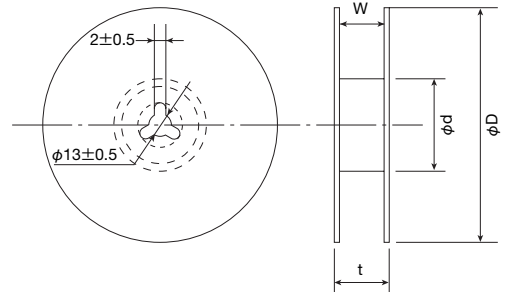


⑤リール寸法 Reel size



形式 Type	リール寸法 Reel size [mm] (参考値 Reference values)		
	φD	φd	w
NR 3010	180±0.5 (7.087±0.019)	60±1.0 (2.36±0.04)	10.0±1.5 (0.394±0.059)
NR 3012	180±0.5 (7.087±0.019)	60±1.0 (2.36±0.04)	10.0±1.5 (0.394±0.059)
NR 3015	180±0.5 (7.087±0.019)	60±1.0 (2.36±0.04)	10.0±1.5 (0.394±0.059)
NR6012	180±3.0 (7.087±0.019)	60±2.0 (2.36±0.08)	14.0±1.5 (0.551±0.059)

Unit : mm (inch)

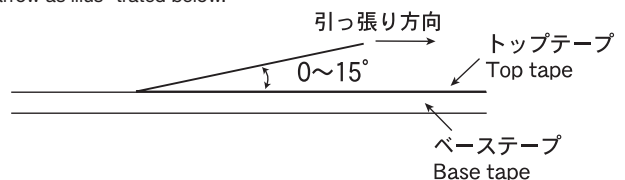


形式 Type	リール寸法 Reel size [mm] (参考値 Reference values)			
	φD	φd	t (max)	w
NR4010	330±3.0 (12.99±0.118)	80±2.0 (3.15±0.078)	18.5 (0.72)	13.5±1.0 (0.531±0.04)
NR4012	330±3.0 (12.99±0.118)	80±2.0 (3.15±0.078)	18.5 (0.72)	13.5±1.0 (0.531±0.04)
NR4018	330±3.0 (12.99±0.118)	80±2.0 (3.15±0.078)	18.5 (0.72)	13.5±1.0 (0.531±0.04)
NRG4026	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)
NR6020	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)
NR6028	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)
NR6045	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)
NR8040	330±3.0 (12.99±0.118)	80±2.0 (3.15±0.078)	22.5 (0.89)	17.5±1.0 (0.689±0.04)


Unit : mm (inch)

⑥トップテープ強度 Top Tape Strength

トップテープのはがし力は、下図矢印方向にて0.1~0.7Nとなります。  
The top tape requires a peel-off force of 0.1 to 0.7N in the direction of the arrow as illustrated below.



Item	Specified Value			Test Method and Remarks										
	BRC1608, BRL2012, BRC2016, BRL2518, BRL3225 Type	NRH24, NR30/40/60/80, NRG40 Type	NR10050 Type											
1. Operating Temperature Range	-25°C ~ +105°C	-25°C ~ +120°C	-25°C ~ +105°C	Including self-generated heat										
2. Storage Temperature Range	-40°C ~ +85°C			BRC1608, BRL2012, BRC2016, BRL2518, BRL3225 Type, NRH24, NR30/40/60/80, NRG4026 Type : 0 to 40°C for the product with taping. NR10050 Type : 0 ~ 40°C for the product with taping.										
3. Rated current	Within the specified tolerance			The maximum DC value having inductance decrease within specified value and temperature increase within 40°C by the application of DC bias. Inductance decrease BRC1608, BRL2012, BRC2016, BRL2518, BRL3225 Type, NRH24, NR30/40/60/80, NRG40 Type, NR10050 Type 30%										
4. Inductance	Within the specified tolerance			BRC1608, BRL2012, BRC2016, BRL2518, BRL3225 Type LCR Meter : HP 4285A or equivalent, Measuring frequency: Specified frequency NRH24, NR30/40/60/80, NRG4026 Type : LCR Meter : HP 4285A or equivalent, 100KHz, 1V NR10050 Type : LCR Meter : HP 4263A or equivalent, 100KHz, 1V										
5. DC Resistance	Within the specified tolerance			DC ohmmeter : HIOKI 3227 or equivalent										
6. Self resonance frequency	Within the specification			BRC1608, BRL2012, BRC2016, BRL2518, BRL3225 Type, NRH24, NR30/40/60/80 Type, NR10050 Type : Impedance analyzer/material analyzer : HP4291A or equivalent HP4191A, 4192A or equivalent										
7. Temperature characteristic	BRL2012, BRC2016, BRL2518, BRL3225 Inductance change : Within ± 15%  BRC1608 Inductance change : Within ± 20%	Inductance change : Within ± 20%		BRC1608, BRL2012, BRC2016, BRL2518, BRL3225 Type, NRH24, NR30/40/60/80, NRG4026 Type, NR10050 Type : Measurement of inductance shall be taken at temperature range within -25°C ~ +85°C. With reference to inductance value at +20°C., change rate shall be calculated. Change of maximum inductance deviation in step 1 to 5 <table border="1"> <tr> <td>Temperature at step 1</td> <td>20°C</td> </tr> <tr> <td>Temperature at step 2</td> <td>Minimum operating temperature</td> </tr> <tr> <td>Temperature at step 3</td> <td>20°C (Standard temperature)</td> </tr> <tr> <td>Temperature at step 4</td> <td>Maximum operating temperature</td> </tr> <tr> <td>Temperature at step 5</td> <td>20°C</td> </tr> </table>	Temperature at step 1	20°C	Temperature at step 2	Minimum operating temperature	Temperature at step 3	20°C (Standard temperature)	Temperature at step 4	Maximum operating temperature	Temperature at step 5	20°C
Temperature at step 1	20°C													
Temperature at step 2	Minimum operating temperature													
Temperature at step 3	20°C (Standard temperature)													
Temperature at step 4	Maximum operating temperature													
Temperature at step 5	20°C													
8. Resistance to flexure of substrate	No damage.			BRC1608, BRL2012, BRC2016, BRL2518, BRL3225 Type, NRH24, NR30/40/60/80, NRG4026 Type : The test samples shall be soldered to the test board by the reflow . As illustrated below, apply force in the direction of the arrow indicating until deflection of the test board reaches to 2 mm. Test board size : 100×40×1.0 Test board material : glass epoxy-resin Solder cream thickness : 0.15(BR Series) 0.10(NR Series) 										
9. Insulation resistance : between wires														
10. Insulation resistance : between wire and core														
11. Withstanding voltage : between wires and core														

12. Adhesion of terminal Item electrode	Specified Value			Test Method and Remarks														
	BRC1608, BRL2012, BRC2016, BRL2518, BRL3225 Type	NRH24, NR30/40/60/80, NRG40 Type	NR10050 Type															
	Shall not come off PC board.			BRC1608, BRL2012, BRC2016, BRL2518, BRL3225 Type, NRH24, NR30/40/60/80, NRG40 Type : The test samples shall be soldered to the test board by the reflow. Applied force : 10N to X and Y directions. Duration : 5s. Solder cream thickness : 0.15mm.  NR10050 Type : Applied force : 5N to X and Y directions. Duration : 5s.														
13. Resistance to vibration	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.			BRC1608, BRL2012, BRC2016, BRL2518, BRL3225 Type, NRH24, NR30/40/60/80, NRG40 Type, NR10050 Type : The test samples shall be soldered to the test board by the reflow. Then it shall be submitted to below test conditions. <table border="1" data-bbox="1085 928 1460 1124"> <tr> <td>Frequency Range</td> <td colspan="2">10~55Hz</td> </tr> <tr> <td>Total Amplitude</td> <td colspan="2">1.5mm (May not exceed acceleration 196 m/S<sup>2</sup>)</td> </tr> <tr> <td>Sweeping Method</td> <td colspan="2">10Hz to 55Hz to 10 Hz for 1 min.</td> </tr> <tr> <td rowspan="3">Time</td> <td>X</td> <td rowspan="3">For 2 hours on each X, Y, and Z axis.</td> </tr> <tr> <td>Y</td> </tr> <tr> <td>Z</td> </tr> </table> Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.	Frequency Range	10~55Hz		Total Amplitude	1.5mm (May not exceed acceleration 196 m/S <sup>2</sup> )		Sweeping Method	10Hz to 55Hz to 10 Hz for 1 min.		Time	X	For 2 hours on each X, Y, and Z axis.	Y	Z
Frequency Range	10~55Hz																	
Total Amplitude	1.5mm (May not exceed acceleration 196 m/S <sup>2</sup> )																	
Sweeping Method	10Hz to 55Hz to 10 Hz for 1 min.																	
Time	X	For 2 hours on each X, Y, and Z axis.																
	Y																	
	Z																	
14. Solderability	At least 90% of surface of terminal electrode is covered by new solder.			BRC1608, BRL2012, BRC2016, BRL2518, BRL3225 Type, NRH24, NR30/40/60/80, NRG40 Type, NR10050 Type : The test samples shall be dipped in flux, and then immersed in molten solder as shown in below table Flux : Methanol solution containing rosin 25%. NRH24, NR30/40/60/80 Type, NR10050 Type : <table border="1" data-bbox="1085 1528 1340 1594"> <tr> <td>Solder Temperature</td> <td>245 <math>\pm</math> 5°C</td> </tr> <tr> <td>Time</td> <td>5 <math>\pm</math> 1.0sec</td> </tr> </table> BRC1608, BRL2012, BRC2016, BRL2518, BRL3225 Type : <table border="1" data-bbox="1085 1638 1340 1703"> <tr> <td>Solder Temperature</td> <td>245 <math>\pm</math> 5°C</td> </tr> <tr> <td>Time</td> <td>5 <math>\pm</math> 0.5sec</td> </tr> </table> ※Immersion depth : All sides of mounting terminal shall be immersed.	Solder Temperature	245 $\pm$ 5°C	Time	5 $\pm$ 1.0sec	Solder Temperature	245 $\pm$ 5°C	Time	5 $\pm$ 0.5sec						
Solder Temperature	245 $\pm$ 5°C																	
Time	5 $\pm$ 1.0sec																	
Solder Temperature	245 $\pm$ 5°C																	
Time	5 $\pm$ 0.5sec																	

Item	Specified Value			Test Method and Remarks																		
	BRC1608, BRL2012, BRC2016, BRL2518, BRL3225 Type	NRH24, NR30/40/60/80, NRG40 Type	NR10050 Type																			
15. Resistance to soldering heat	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.			BRC1608, BRL2012, BRC2016, BRL2518, BRL3225 Type : 3 times of reflow oven at 230°C MIN for 40 sec. with peak temperature at 260 $^{+0}_{-5}$ °C for 5 sec.  NRH24, NR30/40/60/80, NRG40 Type, NR10050 Type : The test sample shall be exposed to reflow oven at 230 $\pm 5$ °C for 40 seconds, with peak temperature at 260 $\pm 5$ °C for 5 seconds, 2 times.  NR6020 Type : The test sample shall be exposed to reflow oven at 230 $\pm 5$ °C for 40 seconds, with peak temperature at 250 $^{+5}_{-0}$ °C for 5 seconds, 2 times.  Test board thickness : 1.0 mm Test board material : glass epoxy-resin																		
16. Thermal shock	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.			BRC1608, BRL2012, BRC2016, BRL2518, BRL3225 Type, NRH24, NR30/40/60/80, NRG40 Type, NR10050 Type : The test samples shall be soldered to the test board by the reflow. The test samples shall be placed at specified temperature for specified time by step 1 to step 4 as shown in below table in sequence. The temperature cycle shall be repeated 100 cycles.  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="3">Conditions of 1 cycle</th> </tr> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Duration (min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40 <math>\pm 3</math></td> <td>30 <math>\pm 3</math></td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>Within 3</td> </tr> <tr> <td>3</td> <td>+85 <math>\pm 2</math></td> <td>30 <math>\pm 3</math></td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>Within 3</td> </tr> </tbody> </table>	Conditions of 1 cycle			Step	Temperature (°C)	Duration (min)	1	-40 $\pm 3$	30 $\pm 3$	2	Room temperature	Within 3	3	+85 $\pm 2$	30 $\pm 3$	4	Room temperature	Within 3
Conditions of 1 cycle																						
Step	Temperature (°C)	Duration (min)																				
1	-40 $\pm 3$	30 $\pm 3$																				
2	Room temperature	Within 3																				
3	+85 $\pm 2$	30 $\pm 3$																				
4	Room temperature	Within 3																				
17. Damp heat	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.			BRC1608, BRL2012, BRC2016, BRL2518, BRL3225 Type : <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>Temperature</td> <td>60 <math>\pm 2</math> °C</td> </tr> <tr> <td>Humidity</td> <td>90 ~ 95% RH</td> </tr> <tr> <td>Time</td> <td>1000 hours.</td> </tr> </tbody> </table> Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.  NRH24, NR30/40/60/80, NRG40 Type : The test samples shall be soldered to the test board by the reflow. The test samples shall be placed in thermostatic oven set at specified temperature and humidity as shown in below table. <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>Temperature</td> <td>60 <math>\pm 2</math> °C</td> </tr> <tr> <td>Humidity</td> <td>90 ~ 95% RH</td> </tr> <tr> <td>Time</td> <td>500 <math>\pm 24</math> hour</td> </tr> </tbody> </table>	Temperature	60 $\pm 2$ °C	Humidity	90 ~ 95% RH	Time	1000 hours.	Temperature	60 $\pm 2$ °C	Humidity	90 ~ 95% RH	Time	500 $\pm 24$ hour						
Temperature	60 $\pm 2$ °C																					
Humidity	90 ~ 95% RH																					
Time	1000 hours.																					
Temperature	60 $\pm 2$ °C																					
Humidity	90 ~ 95% RH																					
Time	500 $\pm 24$ hour																					

Item	Specified Value			Test Method and Remarks																
	BRC1608, BRL2012, BRC2016, BRL2518, BRL3225 Type	NRH24, NR30/40/60/80, NRG40 Type	NR10050 Type																	
18.Loading under damp heat	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.			BRC1608,BRL2012,BRC2016,BRL2518,BRL3225Type : <table border="1"> <tr><td>Temperature</td><td>60<math>\pm</math>2<math>^{\circ}</math>C</td></tr> <tr><td>Humidity</td><td>90~95%RH</td></tr> <tr><td>Applied current</td><td>Rated current</td></tr> <tr><td>Time</td><td>1000hours.</td></tr> </table> Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.  NRH24, NR30/40/60/80, NRG40Type, NR10050 Type : The test samples shall be soldered to the test board by the reflow. The test samples shall be placed in thermostatic oven set at specified temperature and humidity and applied the rated current continuously as shown in below table. <table border="1"> <tr><td>Temperature</td><td>60<math>\pm</math>2<math>^{\circ}</math>C</td></tr> <tr><td>Humidity</td><td>90~95%RH</td></tr> <tr><td>Applied current</td><td>Rated current</td></tr> <tr><td>Time</td><td>500<math>\pm</math>2hour</td></tr> </table>	Temperature	60 $\pm$ 2 $^{\circ}$ C	Humidity	90~95%RH	Applied current	Rated current	Time	1000hours.	Temperature	60 $\pm$ 2 $^{\circ}$ C	Humidity	90~95%RH	Applied current	Rated current	Time	500 $\pm$ 2hour
Temperature	60 $\pm$ 2 $^{\circ}$ C																			
Humidity	90~95%RH																			
Applied current	Rated current																			
Time	1000hours.																			
Temperature	60 $\pm$ 2 $^{\circ}$ C																			
Humidity	90~95%RH																			
Applied current	Rated current																			
Time	500 $\pm$ 2hour																			
19.Low temperature life test	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.			BRC1608,BRL2012,BRC2016,BRL2518,BRL3225Type : <table border="1"> <tr><td>Temperature</td><td>-40<math>\pm</math>2<math>^{\circ}</math>C</td></tr> <tr><td>Duration</td><td>1000hours</td></tr> </table> Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.  NRH24, NR30/40/60/80, NRG40Type, NR10050 Type : The test samples shall be soldered to the test board by the reflow. After that, the test samples shall be placed at test conditions as shown in below table. <table border="1"> <tr><td>Temperature</td><td>-40<math>\pm</math>3<math>^{\circ}</math>C</td></tr> <tr><td>Time</td><td>500<math>\pm</math>24hour</td></tr> </table>	Temperature	-40 $\pm$ 2 $^{\circ}$ C	Duration	1000hours	Temperature	-40 $\pm$ 3 $^{\circ}$ C	Time	500 $\pm$ 24hour								
Temperature	-40 $\pm$ 2 $^{\circ}$ C																			
Duration	1000hours																			
Temperature	-40 $\pm$ 3 $^{\circ}$ C																			
Time	500 $\pm$ 24hour																			
20.High temperature life test	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.	/	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.	BRC1608,BRL2012,BRC2016,BRL2518,BRL3225Type : <table border="1"> <tr><td>Temperature</td><td>85<math>\pm</math>2<math>^{\circ}</math>C</td></tr> <tr><td>Duration</td><td>1000hours</td></tr> </table> Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.  NR10050 Type : <table border="1"> <tr><td>Temperature</td><td>105<math>\pm</math>3<math>^{\circ}</math>C</td></tr> <tr><td>Time</td><td>500<math>\pm</math>24hour</td></tr> </table> Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48 hrs.	Temperature	85 $\pm$ 2 $^{\circ}$ C	Duration	1000hours	Temperature	105 $\pm$ 3 $^{\circ}$ C	Time	500 $\pm$ 24hour								
Temperature	85 $\pm$ 2 $^{\circ}$ C																			
Duration	1000hours																			
Temperature	105 $\pm$ 3 $^{\circ}$ C																			
Time	500 $\pm$ 24hour																			
21.Loading at high temperature life test	/	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.	/	NRH24, NR30/40/60/80, NRG40Type : The test samples shall be soldered to the test board by the reflow soldering <table border="1"> <tr><td>Temperature</td><td>85<math>\pm</math>2<math>^{\circ}</math>C</td></tr> <tr><td>Applied current</td><td>Rated current</td></tr> <tr><td>Time</td><td>500<math>\pm</math>24hour</td></tr> </table>	Temperature	85 $\pm$ 2 $^{\circ}$ C	Applied current	Rated current	Time	500 $\pm$ 24hour										
Temperature	85 $\pm$ 2 $^{\circ}$ C																			
Applied current	Rated current																			
Time	500 $\pm$ 24hour																			
22.Standard condition	Standard test condition : Unless otherwise specified, temperature is 20 $\pm$ 15% and 65 $\pm$ 20% of relative humidity. When there are question concerning measurement result : In order to provide correlation date, the test shall be condition of 20 $\pm$ 2 $^{\circ}$ C of temperature, 65 $\pm$ 5% relative humidity. Inductance is in accordance with our measured value.																			

SMD Inductors

Stages	Precautions	Technical considerations
1.Circuit Design	<p>Operating environment,</p> <p>1.The products described in this specification are intended for use in general electronic equipment,(office supply equipment, telecommunications systems, measuring equipment, and household equipment). They are not intended for use in mission-critical equipment or systems requiring special quality and high reliability (traffic systems, safety equipment, aerospace systems, nuclear control systems and medical equipment including life-support systems,) where product failure might result in loss of life, injury or damage. For such uses, contact TAIYO YUDEN Sales Department in advance.</p>	
2.PCB Design	<p>Land pattern design</p> <p>1.Please refer to a recommended land pattern.</p>	<p>Surface Mounting</p> <ul style="list-style-type: none"> <li>Mounting and soldering conditions should be checked beforehand.</li> <li>Applicable soldering process to this products is reflow soldering only.</li> </ul>
3.Considerations for automatic placement	<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>	<p>1. When installing products, care should be taken not to apply distortion stress as it may deform the products.</p>
4.Soldering	<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.This products is 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 of adhesion, temperature of resistance to soldering heat, soldering etc sufficiently.</p> <p>Recommended conditions for using a soldering iron: ( NR10050 type)</p> <p>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.</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> <p><b>[BRC1608, BRL2012, BRL2518, BRC2016, BRL3225Type]</b></p> <p>Recommended reflow condition (Pb free solder)</p> <p><b>[NRH24, NR30/40/60/80Type]</b></p> <p>Recommended reflow condition (Pb free solder)</p> <p><b>[NR10050Type]</b></p> <p>Recommended reflow condition (Pb free solder)</p>
5.Cleaning	<p>Cleaning conditions</p> <p>1.Washing by supersonic waves shall be avoided.</p>	<p>1.If washing by supersonic waves, supersonic waves may cause broken products.</p>
6.Handling	<p>Handling</p> <p>1.Keep the product away from all magnets and magnetic objects. Breakaway PC boards (splitting along perforations)</p> <p>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.</p> <p>2.Board separation should not be done manually, but by using the appropriate devices.</p> <p>Mechanical considerations</p> <p>1.Please do not give the product any excessive mechanical shocks.</p> <p>2.Please do not add any shock and power to a product in transportation.</p> <p>Pick-up pressure</p> <p>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.</p> <p>Packing</p> <p>1.Please avoid accumulation of a packing box as much as possible.</p>	<p>1.Planning pattern configurations and the position of products should be carefully performed to minimize stress.</p> <p>1.There is a case to be damaged by a mechanical shock.</p> <p>2.There is a case to be broken by the handling in transportation.</p> <p>1.Damage and a characteristic can vary with an excessive shock or stress.</p> <p>1.There is a case that transformation and a product of tape are damaged by accumulation of a packing box.</p>
7.Storage conditions	<p>Storage</p> <p>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.</p> <p>•Recommended conditions</p> <p>Ambient temperature 0~40°C Humidity Below 70% RH</p> <p>The ambient temperature must be kept below 30°C. Even under ideal storage conditions, solderability of products electrodes may decrease as time passes. For this reason, product should be used within 6 months from the time of delivery. In case of storage over 6 months, solderability shall be checked before actual usage.</p>	<p>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.</p>