

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(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%

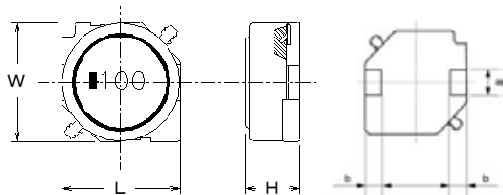
⑥Special code

Code	Special code
N△	Standard

⑦Internal code

Code	Internal code
V	Inductor for Industrial and Automotive

STANDARD EXTERNAL DIMENSIONS / MINIMUM QUANTITY



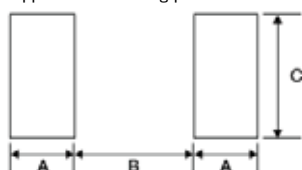
Type	L	W	H	a	b	Minimum quantity [pcs]
NS 10145	10.1±0.3 (0.398±0.012)	10.1±0.3 (0.398±0.012)	4.5±0.35 (0.177±0.014)	2.8±0.1 (0.110±0.004)	2.0±0.15 (0.079±0.006)	2000
NS 10155	10.1±0.3 (0.398±0.012)	10.1±0.3 (0.398±0.012)	5.5±0.35 (0.217±0.014)	2.8±0.1 (0.110±0.004)	2.0±0.15 (0.079±0.006)	2000
NS 10165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

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)

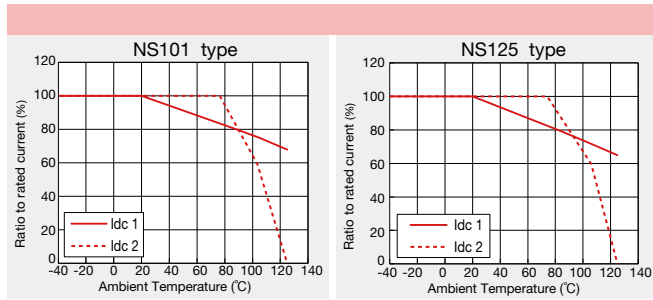
※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) 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.



SMD POWER INDUCTORS (NS SERIES)

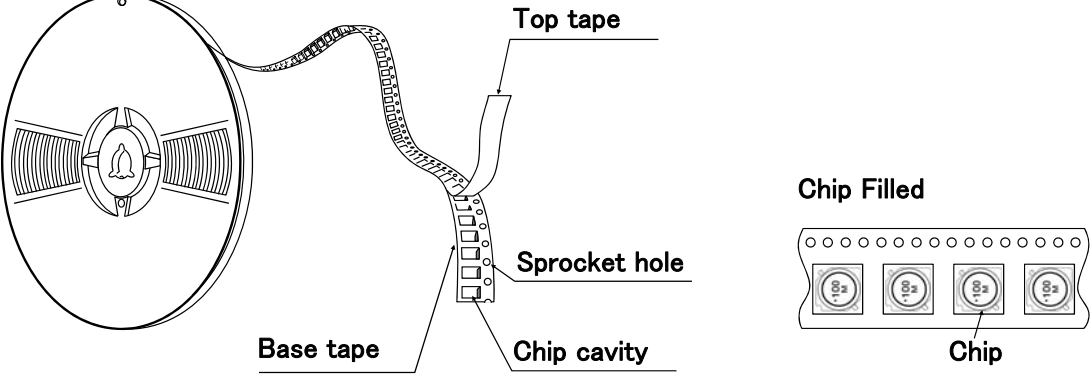
PACKAGING

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

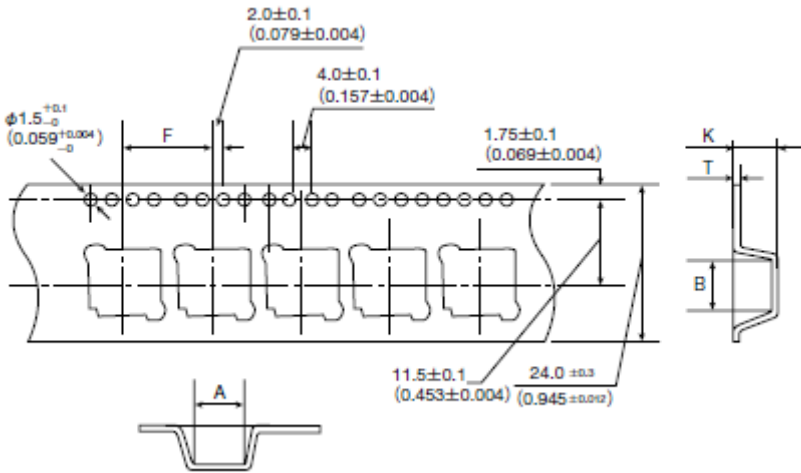
② Tape Material

● Embossed Tape



③ Taping dimensions

● Embossed tape 24mm wide (0.945 inches wide)

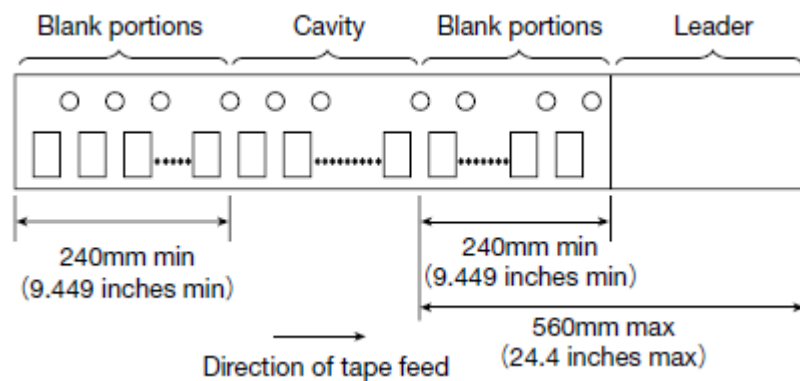


Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
NS10145	10.5±0.1 (0.413±0.004)	10.5±0.1 (0.413±0.004)	16.0±0.1 (0.630±0.004)	0.4±0.1 (0.016±0.004)	5.0±0.1 (0.197±0.004)
NS10155	10.5±0.1 (0.413±0.004)	10.5±0.1 (0.413±0.004)	16.0±0.1 (0.630±0.004)	0.4±0.1 (0.016±0.004)	6.0±0.1 (0.236±0.004)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

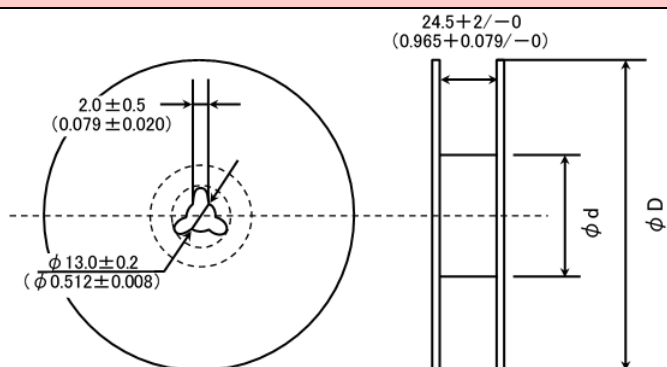
Unit : mm (inch)

▶ 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/>) .

④ Leader and Blank portion



⑤ Reel size

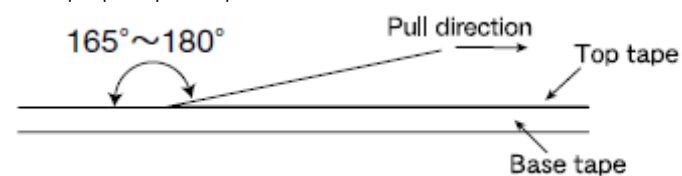


Type	Reel size (Reference values)	
	ϕD	ϕd
NS10145	330 ± 2 (12.99 ± 0.079)	100 ± 1 (3.937 ± 0.039)
NS10155		
NS10165		
NS12555		
NS12565		
NS12575		

Unit: mm (inch)

⑥ Top Tape Strength

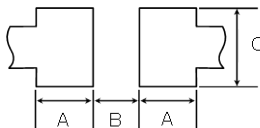
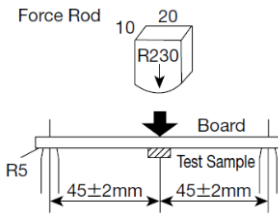
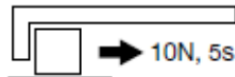
The top tape requires a peel-off force of 0.1 to 1.3N in the direction of the arrow as illustrated below.



SMD INDUCTOR (NS SERIES)

RELIABILITY DATA

1. Operating Temperature Range		
Specified Value	NS101, NS125 Type	−40~+125℃(Including self-generated heat)
Test Methods and Remarks	Including self-generated heat	
2. Storage Temperature Range		
Specified Value	NS101, NS125 Type	−40~+85℃
Test Methods and Remarks	−5 to 40℃ 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 ±15%
Test Methods and Remarks	NS101, NS125 Type : Measurement of inductance shall be taken at temperature range within −40℃~+125℃. With reference to inductance value at +20℃., change rate shall be calculated. Change of maximum inductance deviation in step 1 to 5	
	Step	Temperature(℃)
	1	20
	2	Minimum operating temperature
	3	20 (Standard temperature)
	4	Maximum operating temperature
	5	20

8. Resistance to flexure of substrate																
Specified Value	NS101, NS125 Type	No damage														
Test Methods and Remarks	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)															
	<div><div><div>Land dimension</div><div></div></div><table><thead><tr><th>Type</th><th>A</th><th>B</th><th>C</th></tr></thead><tbody><tr><td>NS101</td><td>2.5</td><td>5.6</td><td>3.2</td></tr><tr><td>NS125</td><td>2.5</td><td>8.6</td><td>3.2</td></tr></tbody></table></div> <div></div>		Type	A	B	C	NS101	2.5	5.6	3.2	NS125	2.5	8.6	3.2		
	Type	A	B	C												
NS101	2.5	5.6	3.2													
NS125	2.5	8.6	3.2													
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														
Test Methods and Remarks	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)															
																
13. Resistance to vibration																
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. Then it shall be submitted to below test conditions.															
	<table><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 196m/s²)</td></tr><tr><td>Sweeping Method</td><td colspan="2">10Hz to 55Hz to 10Hz for 1min.</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>		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
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	Time	X	For 2 hours on each X, Y, and Z axis.													
Y																
Z																
Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.																

14. Solderability			
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℃	
	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℃ for 40 seconds, with peak temperature at 260±5℃ 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 (℃)	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℃	
	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℃	
	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	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><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> Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.		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	The test samples shall be soldered to the test board by the reflow soldering. <table><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> Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.		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	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	<ul style="list-style-type: none">◆ Operating environment1. 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.
2. PCB Design	
Precautions	<ul style="list-style-type: none">◆ Land pattern design1. Please refer to a recommended land pattern.
Technical considerations	<ul style="list-style-type: none">◆ Land pattern designSurface Mounting▪ Mounting and soldering conditions should be checked beforehand.▪ Applicable soldering process to this products is reflow soldering only.
3. Considerations for automatic placement	
Precautions	<ul style="list-style-type: none">◆ Adjustment of mounting machine1. Excessive impact load should not be imposed on the products when mounting onto the PC boards.2. Mounting and soldering conditions should be checked beforehand.
Technical considerations	<ul style="list-style-type: none">◆ Adjustment of mounting machine1. When installing products, care should be taken not to apply distortion stress as it may deform the products.
4. Soldering	
Precautions	<ul style="list-style-type: none">◆ Reflow soldering1. Please contact any of our offices for a reflow soldering, and refer to the recommended condition specified.2. The product shall be used reflow soldering only.3. Please do not add any stress to a product until it returns in normal temperature after reflow soldering.◆ Lead free soldering1. When using products with lead free soldering, we request to use them after confirming adhesion, temperature of resistance to soldering heat, soldering etc sufficiently.◆ Recommended conditions for using a soldering iron▪ Put the soldering iron on the land-pattern.▪ Soldering iron's temperature – Below 350°C▪ Duration – 3 seconds or less▪ The soldering iron should not directly touch the inductor.
Technical considerations	<ul style="list-style-type: none">◆ Reflow soldering1. 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.▪ NRV20/30, NRH24/30, NRS20/30/40/50/60/80 Type, NS101/125 TypeRecommended reflow condition (Pb free solder) <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>Peak: 250±5/-0°C</p> <p>5sec max</p>
5. Cleaning	
Precautions	<ul style="list-style-type: none">◆ Cleaning conditions1. Washing by supersonic waves shall be avoided.
Technical considerations	<ul style="list-style-type: none">◆ Cleaning conditions1. If washed by supersonic waves, the products might be broken.

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 <div style="margin-left: 20px;">Ambient temperature : $-5\sim 40^{\circ}\text{C}$</div> <div style="margin-left: 20px;">Humidity : Below 70% RH</div> ▪ 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.
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.