

COMPONENT SPECIFICATION

版次：第1.5版

MAX ECHO

NAME	SMD WIRE WOUND CHIP INDUCTOR	COMPONENT SPECIFICATION		1/10
	HBWS-1005	SPEC#	HBWS1005-SERIES	

1. SCOPE

This specification applies to the HBWS-1005 series SMD Wound Chip Inductor.

2. STANDARD ATMOSPHERIC CONDITIONS

Unless otherwise specified the standard range of atmospheric conditions for making measurements and tests is as follows:

Ambient temperature : 20±15°C

Relative humidity : 65±20%

If there may be any doubt on the results, measurements shall be made within the following limits :

Ambient temperature : 25±5°C

Relative humidity : 75±10%

3. RATINGS

PART NO.	INDUCTANCE (nH)	※Tolerance	Q	DC RESISTANCE	Rated current	S.R.F
			Min (Frequency)	(Ω) Max	(mA) Max	(MHz) Min
HBWS1005-1N0	1.0@250MHz	±0.2nH,±0.3nH	13 (250MHz)	0.045	1360	6000
HBWS1005-1N9	1.9@250MHz	±0.2nH,±0.3nH	16 (250MHz)	0.070	1040	6000
HBWS1005-2N0	2.0@250MHz	±0.2nH,±0.3nH	16 (250MHz)	0.070	1040	6000
HBWS1005-2N2	2.2@250MHz	±0.2nH,±0.3nH	18 (250MHz)	0.070	960	6000
HBWS1005-2N4	2.4@250MHz	±0.2nH,±0.3nH	16 (250MHz)	0.068	790	6000
HBWS1005-2N7	2.7@250MHz	±0.2nH,±0.3nH	16 (250MHz)	0.120	860	6000
HBWS1005-3N3	3.3@250MHz	±0.2nH,±0.3nH	20 (250MHz)	0.066	840	6000
HBWS1005-3N6	3.6@250MHz	±0.2nH,±0.3nH	20 (250MHz)	0.066	840	6000
HBWS1005-3N9	3.9@250MHz	±0.2nH,±0.3nH	20 (250MHz)	0.066	840	5800
HBWS1005-4N3	4.3@250MHz	±0.2nH,±0.3nH	18 (250MHz)	0.091	700	6000
HBWS1005-4N7	4.7@250MHz	±0.2nH,±0.3nH	15 (250MHz)	0.130	640	4775
HBWS1005-5N1	5.1@250MHz	±0.2nH,±0.3nH	23 (250MHz)	0.083	800	5800
HBWS1005-5N6	5.6@250MHz	±0.2nH,±0.3nH	23 (250MHz)	0.083	760	5800
HBWS1005-6N2	6.2@250MHz	±0.2nH,±5%,±10%	23 (250MHz)	0.083	760	5800
HBWS1005-6N8	6.8@250MHz	±0.2nH,±5%,±10%	20 (250MHz)	0.083	680	4800
HBWS1005-7N5	7.5@250MHz	±0.2nH,±5%,±10%	25 (250MHz)	0.104	680	5800
HBWS1005-8N2	8.2@250MHz	±0.2nH,±5%,±10%	25 (250MHz)	0.104	680	4400
HBWS1005-8N7	8.7@250MHz	±0.2nH,±5%,±10%	18 (250MHz)	0.200	480	4100
HBWS1005-9N0	9.0@250MHz	±0.2nH,±5%,±10%	25 (250MHz)	0.104	680	4160
HBWS1005-9N5	9.5@250MHz	±0.2nH,±5%,±10%	18 (250MHz)	0.200	680	4000
HBWS1005-10N	10@250MHz	±2%,±5%,±10%	23 (250MHz)	0.195	480	3900
HBWS1005-11N	11@250MHz	±2%,±5%,±10%	26 (250MHz)	0.120	640	3680
HBWS1005-12N	12@250MHz	±2%,±5%,±10%	26 (250MHz)	0.120	640	3600
HBWS1005-13N	13@250MHz	±2%,±5%,±10%	24 (250MHz)	0.210	560	3450

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			Min (Frequency)	(Ω) Max	(mA) Max	(MHz) Min
HBWS1005-15N	15@250MHz	±2%,±5%,±10%	26 (250MHz)	0.172	560	3280
HBWS1005-16N	16@250MHz	±2%,±5%,±10%	24 (250MHz)	0.22	560	3100
HBWS1005-18N	18@250MHz	±2%,±5%,±10%	25 (250MHz)	0.23	520	3100
HBWS1005-19N	19@250MHz	±2%,±5%,±10%	26 (250MHz)	0.202	480	3040
HBWS1005-20N	20@250MHz	±2%,±5%,±10%	25(250MHz)	0.25	420	3000
HBWS1005-22N	22@250MHz	±2%,±5%,±10%	25(250MHz)	0.3	400	2800
HBWS1005-23N	23@250MHz	±2%,±5%,±10%	26 (250MHz)	0.214	400	2720
HBWS1005-24N	24@250MHz	±2%,±5%,±10%	25 (250MHz)	0.3	400	2700
HBWS1005-27N	27@250MHz	±2%,±5%,±10%	26 (250MHz)	0.298	400	2480
HBWS1005-30N	30@250MHz	±2%,±5%,±10%	25 (250MHz)	0.3	400	2350
HBWS1005-33N	33@250MHz	±2%,±5%,±10%	24 (250MHz)	0.35	400	2350
HBWS1005-36N	36@250MHz	±2%,±5%,±10%	26 (250MHz)	0.403	320	2320
HBWS1005-39N	39@250MHz	±2%,±5%,±10%	25 (250MHz)	0.55	320	2100
HBWS1005-40N	40@250MHz	±2%,±5%,±10%	26 (250MHz)	0.438	320	2240
HBWS1005-43N	43@250MHz	±2%,±5%,±10%	25 (250MHz)	0.81	240	2030
HBWS1005-47N	47@200MHz	±2%,±5%,±10%	26 (200MHz)	0.83	210	2100
HBWS1005-51N	51@200MHz	±5%,±10%	25 (200MHz)	0.82	210	1750
HBWS1005-56N	56@200MHz	±5%,±10%	22 (200MHz)	0.97	200	1760
HBWS1005-68N	68@200MHz	±5%,±10%	22 (200MHz)	1.12	180	1620
HBWS1005-75N	75@150MHz	±5%,±10%	20 (150MHz)	1.2	160	1550
HBWS1005-82N	82@150MHz	±5%,±10%	20 (150MHz)	1.25	150	1500
HBWS1005-91N	91@150MHz	±5%,±10%	20 (150MHz)	2.3	120	1350
HBWS1005-R10	100@150MHz	±5%,±10%	20 (150MHz)	2.52	120	1300
HBWS1005-R12	120@150MHz	±5%,±10%	20 (150MHz)	2.66	110	1100

※ B:±0.2nH S:±0.3nH K:±10% J:±5% G:±2%

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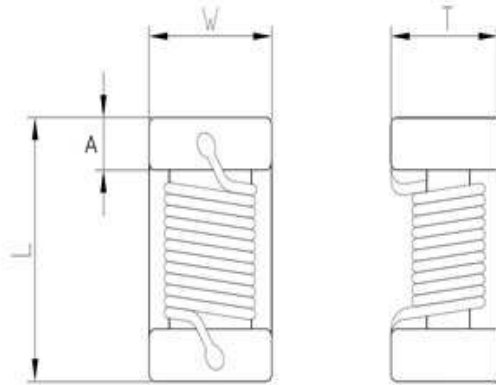
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4. DIMENSION



OPERATING TEMP. RANGE : -40°C ~ +125°C

STORAGE TEMP. RANGE : -40°C ~ +85°C

TYPE	L	W	T	A
HBWS-1005	1.0±0.10 (.039±.004)	0.55±0.10 (.022±.004)	0.50±0.10 (.020±.004)	0.1~0.3 (0.004~0.012)

5. The place of origin :
Taichung, Taiwan

HISTORY	DATE	REVISION	SIGN.	SIGN.
PLANNED BY	CHECKED BY	APPROVED BY	鈺鎧文件中心 發行章	
Marco	LUN	Tina Hsu		

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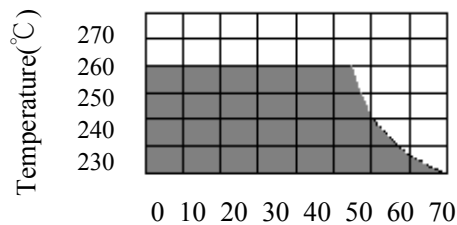
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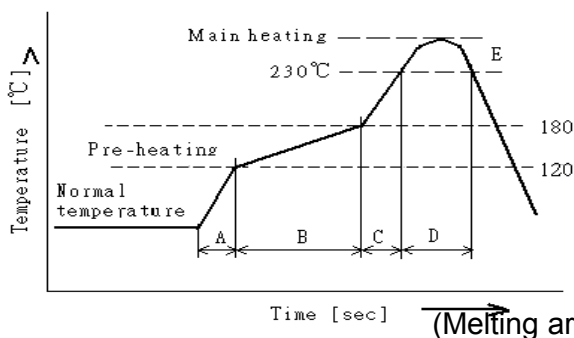
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Reflow soldering conditions

- Pre-heating should be in such a way that the temperature difference between solder and ceramic surface is limited to 150°C max. Also cooling into solvent after soldering should be in such a way that the temperature difference is limited to 100°C max. Insufficient pre-heating may cause cracks on the ceramic, resulting in the deterioration of product quality.
- Products should be soldered within the following allowable range indicated by the slanted line. The excessive soldering conditions may cause the corrosion of the electrode, when soldering is repeated, allowable time is the accumulated time.



Temperature Profile



A	Slope of temp. rise	1 to 5	°C/sec
B	Heat time	50 to 150	sec
	Heat temperature	120 to 180	°C
C	Slope of temp. rise	1 to 5	°C/sec
D	Time over 230°C	90~120	sec
E	Peak temperature	255~260	°C
	Peak hold time	10 max.	sec
No. of mounting		3	times

Reworking with soldering iron

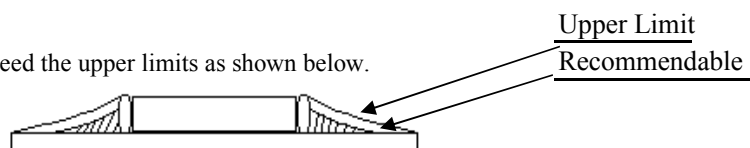
Preheating	150°C, 1 minute
Tip temperature	280°C max.
Soldering time	3 seconds max.
Soldering iron output	30w max.
End of soldering iron	f 3mm max.

Reworking should be limited to only one time.

Note : Do not directly touch the products with the tip of the soldering iron in order to prevent the crack on the ferrite material due to the thermal shock.

Solder Volume

Solder shall be used not to be exceed the upper limits as shown below.



When the amount of solder volume increased, mechanical stress increased as well. Exceeding amount of solder volume may lead to failure of mechanical or electrical characteristics.

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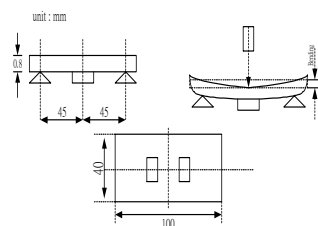
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Mechanical Characteristics

ITEM	CONDITION	SPECIFICATION
Inductance and Tolerance	Measuring Frequency : As shown in Product Table	Within Specified Tolerance
Quality Factor	Measuring Temperature : + 25 °C	
Insulation Resistance	Measured at 100V DC between inductor terminals and center of case.	1000 mega ohms minimum

Electrical Characteristics

ITEM	CONDITION	SPECIFICATION
Component Adhesion (Push Test)	The component shall be reflow soldered onto a P. C. Board (240 °C ± 5°C for 20 seconds). Then a dynamometer force gauge shall be applied to any side of the component.	0402 series - $\geq 350g$ 0603 series - $\geq 1.0Kg$ Other series - 2012 ~ 3225 Minimum 1Kg for Pd/Ag termination and 2Kg for Mo/Mn
Drop Test	The inductor shall be dropped two times on the concrete floor or the vinyl tile from 1M naturally.	Change In Inductance: No more than 5%
Thermal Shock Test	Each cycle shall consist of 30 minutes at -40 °C followed by 30 minutes at +85 °C with a 20-second maximum transition time between temperature extremes. Test duration is 10 cycles.	Change In Q: No more than 10% Change In Appearance: Without distinct damage
Substrate Bending Test	SPEC substrate bending test DC resistance shall meet specifications.	After soldering a chip to a test substrate, bend the substrate by 3mm hold for 10s and then return. Soldering shall be done in accordance with the recommended PC board pattern and reflow soldering. 

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Endurance Characteristics

ITEM	CONDITION	SPECIFICATION
Solderability	Dip pads in flux and dip in solder pot containing lead free solder at 240 °C ± 5°C for 5 seconds.	A minimum of 80% of the metalized area must be covered with solder.
Resistance to Soldering Heat	Dip the components into flux and dip into solder pot containing lead free solder at 260 °C ± 5 °C for 5 ± 2 seconds.	Change In Inductance: No more than 5%
Vibration (Random)	Inductors shall be randomly vibrated at amplitude of 1.5mm and frequency of 10 - 55 Hz: 0.04 G / Hz for a minimum of 15 minutes per axis for each of the three axes.	Change In Q: No more than 10%
Cold Temperature Storage	Inductors shall be stored at temperature of -40 °C ± 2 °C for 1000hrs (+ 48 -0hrs.) Then inductors shall be subjected to standard atmospheric conditions for 1 hour After that, measurement shall be made.	Change In Appearance : Without distinct damage
High Temperature Storage	Inductors shall be stored at temperature of 85 °C ± 2 °C for 1000hrs (+48 - 0hrs.) Then inductors shall be subjected to standard atmospheric conditions for 1 hour. After that, measurement shall be made.	
Moisture Resistance	Inductors shall be stored in the chamber at 45 °C at 90 - 95 R. H. for 1000 hours. Then inductors are to be tested after 2 hours at room temperature.	Inductors shall not have a shorted or open winding.
High Temperature with Loaded	Inductors shall be stored in the chamber at +85 °C for 1000 hours with rated current applied. Inductors shall be tested at the beginning of test at 500 hours and 1000 hours. Then inductors are to be tested after 1 hour at room temperature.	

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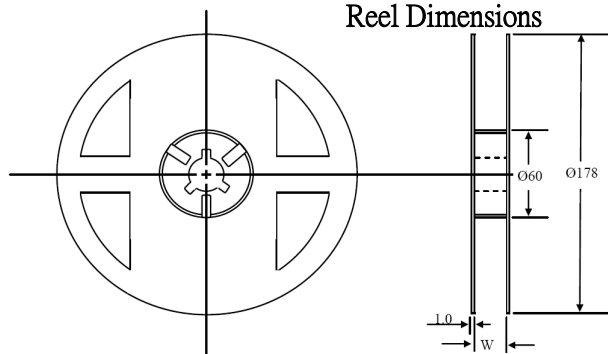
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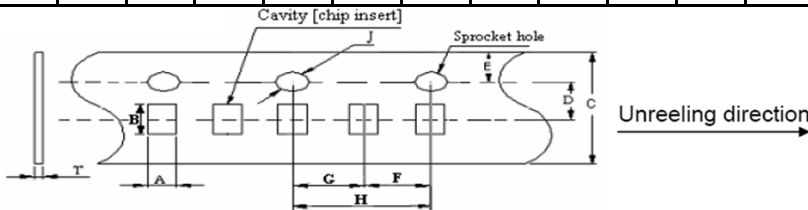
Packaging Information

TYPE	PCS / REEL
HBWS 1005	10,000
HBWS 1608	3,000
HBWS 2012	2,000
HBWS 2520	2,000

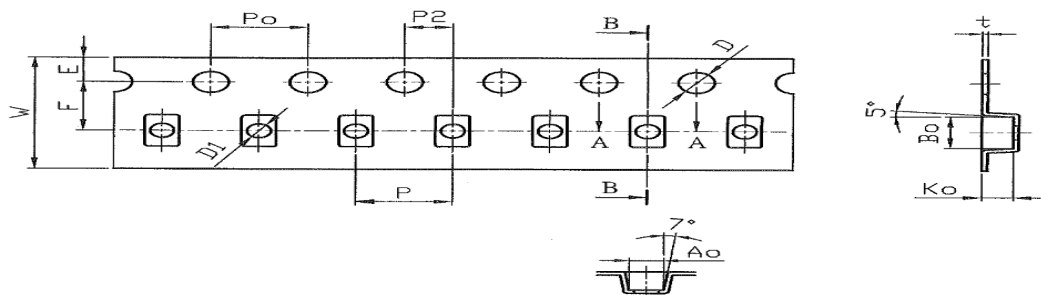


Tape Dimensions (unit:m/m)

Size	CARRIER											Unit
	A	B	C	D	E	F	G	H	J	T		
1005	0.62±0.05	1.12±0.05	8.00±0.10	3.50±0.05	1.75±0.10	2.00±0.05	2.00±0.05	4.00±0.10	1.55±0.05	0.60±0.05		mm

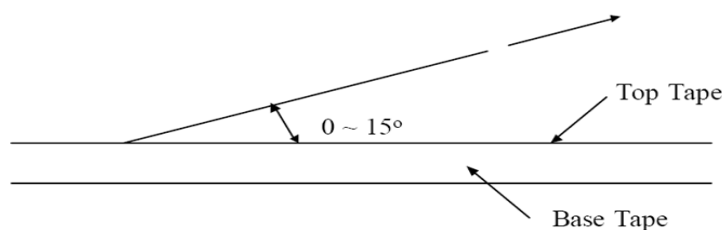


Size	CARRIER												Unit
	Ao	Bo	Ko	t	D	D1	E	F	P	Po	P2	W	
1608	1.40±0.1	1.90±0.1	1.15±0.1	0.23±0.05	1.50+0.10/-0.00	0.60±0.10	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	8.00±0.10	mm
2012	1.42±0.1	2.26±0.1	1.30±0.1	0.23±0.05	1.50+0.10/-0.00	0.70±0.10	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	8.00±0.10	mm
2520	2.20±0.1	2.83±0.1	1.75±0.1	0.22±0.05	1.50+0.10/-0.00	1.00±0.10	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	8.00±0.10	mm



Top Tape Strength

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



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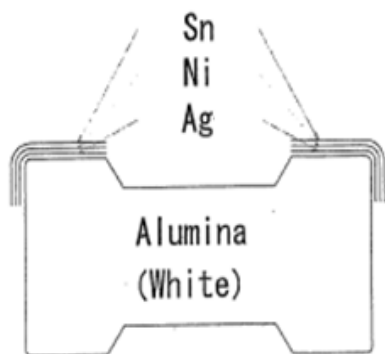
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Ingredient of terminals electrode.



Ceramic Type

Sn
Nickel
Ag

Operation Environment

Do not use this product under the following environmental conditions, on deterioration of performance, such as insulation resistance may result from the use.

1. In corrosive gases (acidic gases, alkaline gases, chlorine, sulfur gases, organic gases and etc.)
2. In the atmosphere where liquid such as organic solvent, may splash on the products.

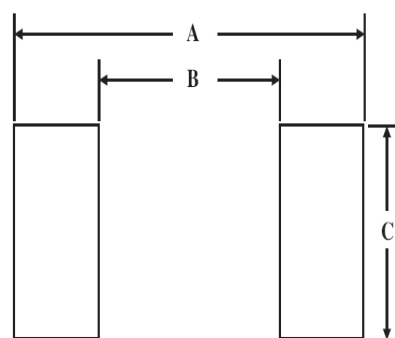
Delivery

Care should be taken when transporting or handling product to avoid excessive vibration or mechanical shock.

Pattern Dimensions (unit:m/m)

Metric (EIA)	A mm (inches)	B mm (inches)	C mm (inches)
1005 (0402)	1.20 (0.047)	0.45 (0.018)	0.65 (0.026)
1608 (0603)	1.90 (0.075)	0.65 (0.026)	1.00 (0.039)
2012 (0805)	2.60 (0.102)	0.75 (0.030)	1.30 (0.051)
2520 (1008)	3.00 (0.118)	1.20 (0.047)	2.20 (0.087)

Recommended Pattern



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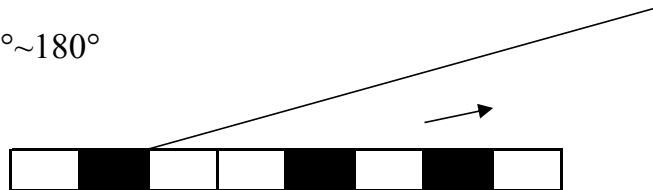
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Peeling Strength Of Cover Tape

Cover tape	(10g~100g)
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165°~180°



Test condition

1. peel angle : 165°~180° vs carrier tape
2. peel speed : 300mm/min

Packaging

- 1) Tape & Reel packaging in component specification 5/8
- 2) Reel and a bag of desiccant shall be packed in Nylon or plastic bag
- 3) Maximum of 5 reels shall be packaged in a inner box
- 4) Maximum of 6 inner box shall be packaged in a outer box

Reel Label

Producing the goods label needs to indicate (1) Pb Free (2) RoHS Compliant

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Storage

1. The solderability of the external electrode may be deteriorated if packages are stored where they are exposed to high humidity. Packages must be stored at 40°C or less and 70% RH or less.
2. The solderability of the external electrode may be deteriorated if packages are stored where they are exposed to dust or harmful gas (hydrogen chloride, sulfurous acid gas or hydrogen sulfide).
3. Packaging material may be deformed if packages are stored where they are exposed to heat or direct sun—light.
4. Minimum packages, such as polyvinyl heat—seal packages shall not be opened until just before they are used. If opened, use the reels as soon as possible.
5. Solderability specified in component specification 4/8 shall be for 12 months from the date of delivery on condition that they are stored at the environment specified clause 13-1 & 13-2.
For those parts which passed more than 12 months shall be checked solderability before it is used.

Quality System

- ISO/IATF16949
- IECQ QC 080000