

1. WTI-1608M Series (Ceramic Type)

1. SCOPE

This specification applies to the WTI-1608M 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:

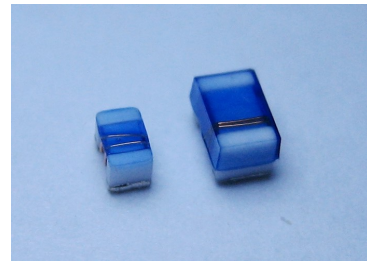
Ambient temperature : 20±15°C

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. Operating Temperature Range : -55 . ~ +125 .

4. RATINGS

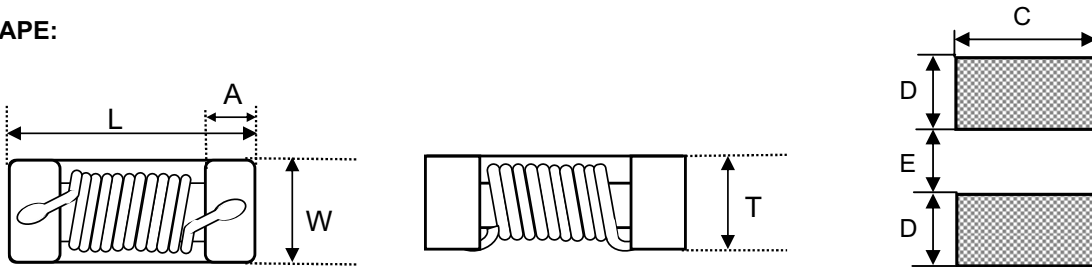
PART NO.	INDUCTANCE (nH)	※Tolerance	Q	DC RESISTANCE	Rated current	S.R.F
			Min (Frequency)	(Ω) Max	(mA)max	Min(MHz)
WTI-1608M-1N6	1.6@250MHz	±0.2nH,±0.3nH	24 (250MHz)	0.03	700	12500
WTI-1608M-1N8	1.8@250MHz	±0.2nH,±0.3nH	16 (250MHz)	0.045	700	12500
WTI-1608M-2N0	2.0@250MHz	±0.2nH,±0.3nH	16 (250MHz)	0.08	700	6900
WTI-1608M-3N9	3.9@250MHz	±0.2nH,±0.3nH	22 (250MHz)	0.08	700	6900
WTI-1608M-4N3	4.3@250MHz	±0.2nH,±0.3nH	22 (250MHz)	0.08	700	5900
WTI-1608M-4N7	4.7@250MHz	±0.2nH,±0.3nH	20 (250MHz)	0.13	700	5800
WTI-1608M-5N1	5.1@250MHz	±5%,±10%	20 (250MHz)	0.14	700	5700
WTI-1608M-5N6	5.6@250MHz	±5%,±10%	16 (250MHz)	0.15	700	5500
WTI-1608M-6N8	6.8@250MHz	±0.2nH,±5%,±10%	30 (250MHz)	0.11	700	5800
WTI-1608M-7N5	7.5@250MHz	±0.2nH,±5%,±10%	28 (250MHz)	0.106	700	4800
WTI-1608M-8N2	8.2@250MHz	±0.2nH,±5%,±10%	30 (250MHz)	0.1	700	4600
WTI-1608M-8N7	8.7@250MHz	±5%,±10%	28 (250MHz)	0.109	700	4600
WTI-1608M-9N1	9.1@250MHz	±5%,±10%	28 (250MHz)	0.135	700	4000
WTI-1608M-9N5	9.5@250MHz	±5%,±10%	28 (250MHz)	0.135	700	4500
WTI-1608M-10N	10@250MHz	±2%,±5%,±10%	30 (250MHz)	0.13	700	3800
WTI-1608M-11N	11@250MHz	±5%,±10%	33 (250MHz)	0.09	700	4000
WTI-1608M-12N	12@250MHz	±2%,±5%,±10%	35 (250MHz)	0.13	700	4000
WTI-1608M-13N	13@250MHz	±5%,±10%	38 (250MHz)	0.106	700	4000
WTI-1608M-15N	15@250MHz	±2%,±5%,±10%	35 (250MHz)	0.17	700	4000
WTI-1608M-16N	16@250MHz	±5%,±10%	34 (250MHz)	0.17	700	3300
WTI-1608M-18N	18@250MHz	±2%,±5%,±10%	35 (250MHz)	0.17	700	3100
WTI-1608M-20N	20@250MHz	±5%,±10%	38 (250MHz)	0.22	700	3000
WTI-1608M-22N	22@250MHz	±2%,±5%,±10%	38 (250MHz)	0.19	700	3000
WTI-1608M-24N	24@250MHz	±5%,±10%	36 (250MHz)	0.19	700	2650

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			Min (Frequency)	(Ω) Max	(mA)max	Min(MHz)
WTI-1608M-27N	27@250MHz	$\pm 2\%, \pm 5\%, \pm 10\%$	40 (250MHz)	0.22	600	2800
WTI-1608M-30N	30@250MHz	$\pm 5\%, \pm 10\%$	45 (250MHz)	0.22	600	2300
WTI-1608M-33N	33@250MHz	$\pm 2\%, \pm 5\%, \pm 10\%$	43 (250MHz)	0.22	600	2300
WTI-1608M-36N	36@250MHz	$\pm 5\%, \pm 10\%$	43 (250MHz)	0.25	600	2200
WTI-1608M-39N	39@250MHz	$\pm 2\%, \pm 5\%, \pm 10\%$	43 (250MHz)	0.25	600	2200
WTI-1608M-43N	43@250MHz	$\pm 5\%, \pm 10\%$	38 (250MHz)	0.28	600	2000
WTI-1608M-47N	47@200MHz	$\pm 2\%, \pm 5\%, \pm 10\%$	40 (200MHz)	0.28	600	2000
WTI-1608M-51N	51@200MHz	$\pm 5\%, \pm 10\%$	35 (200MHz)	0.27	600	1900
WTI-1608M-56N	56@200MHz	$\pm 2\%, \pm 5\%, \pm 10\%$	40 (200MHz)	0.31	600	1900
WTI-1608M-62N	62@200MHz	$\pm 5\%, \pm 10\%$	40 (200MHz)	0.34	600	1700
WTI-1608M-68N	68@200MHz	$\pm 2\%, \pm 5\%, \pm 10\%$	40 (200MHz)	0.34	600	1700
WTI-1608M-72N	72@150MHz	$\pm 2\%, \pm 5\%, \pm 10\%$	35 (150MHz)	0.49	400	1700
WTI-1608M-82N	82@150MHz	$\pm 2\%, \pm 5\%, \pm 10\%$	35 (150MHz)	0.54	400	1700
WTI-1608M-90N	90@150MHz	$\pm 5\%, \pm 10\%$	35 (150MHz)	0.54	400	1700
WTI-1608M-R10	100@150MHz	$\pm 2\%, \pm 5\%, \pm 10\%$	35 (150MHz)	0.63	400	1400
WTI-1608M-R11	110@150MHz	$\pm 2\%, \pm 5\%, \pm 10\%$	35 (150MHz)	0.63	400	1400
WTI-1608M-R12	120@150MHz	$\pm 2\%, \pm 5\%, \pm 10\%$	35 (150MHz)	0.65	300	1300
WTI-1608M-R13	130@150MHz	$\pm 5\%, \pm 10\%$	35 (150MHz)	0.92	280	1000
WTI-1608M-R15	150@150MHz	$\pm 2\%, \pm 5\%, \pm 10\%$	35 (150MHz)	0.92	280	1000
WTI-1608M-R16	160@100MHz	$\pm 2\%, \pm 5\%, \pm 10\%$	30 (100MHz)	1	250	1000
WTI-1608M-R18	180@100MHz	$\pm 2\%, \pm 5\%, \pm 10\%$	30 (100MHz)	1.25	240	1000
WTI-1608M-R20	200@100MHz	$\pm 5\%, \pm 10\%$	30 (100MHz)	1.25	240	1000
WTI-1608M-R21	210@100MHz	$\pm 5\%, \pm 10\%$	27 (100MHz)	1.7	200	1000
WTI-1608M-R22	220@100MHz	$\pm 2\%, \pm 5\%, \pm 10\%$	30 (100MHz)	1.7	200	1000
WTI-1608M-R24	240@100MHz	$\pm 5\%, \pm 10\%$	30 (100MHz)	1.7	200	1000
WTI-1608M-R27	270@100MHz	$\pm 2\%, \pm 5\%, \pm 10\%$	30 (100MHz)	1.8	170	1000
WTI-1608M-R33	330@100MHz	$\pm 5\%, \pm 10\%$	25 (100MHz)	2	150	450
WTI-1608M-R39	390@100MHz	$\pm 5\%, \pm 10\%$	20 (100MHz)	2	170	350

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SHAPE:



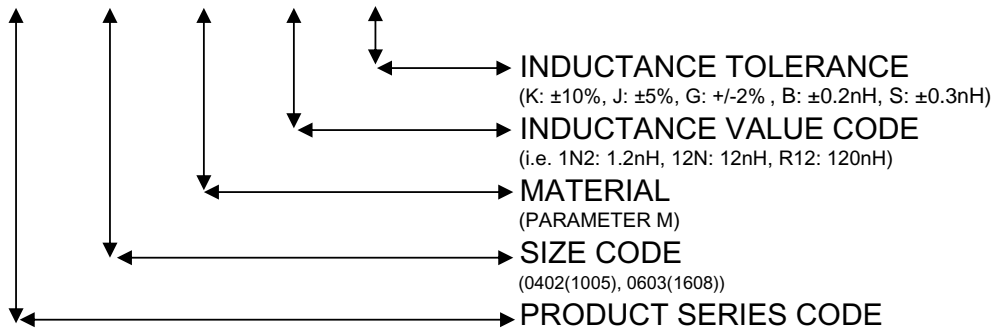
Recommended land pattern

DIMENSIONS:

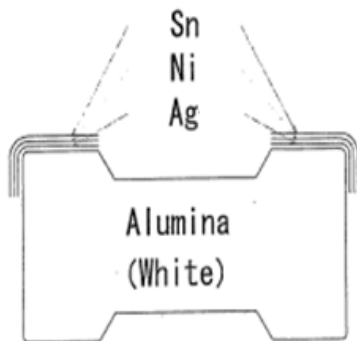
SERIES	L (m/m) (Max.)	W (m/m) (Max.)	T (m/m) (Max.)	A (m/m)	C (m/m)	D (m/m)	E (m/m)
WTI-1005M	1.10	0.66	0.60	0.1~0.3	0.65	0.375	0.45
WTI-1608M	1.80	1.07	1.25	0.25~0.45	1.00	0.625	0.65

Part Numbering Systems

WTI- 1608 M - 12N J



Ingredient of terminals electrode



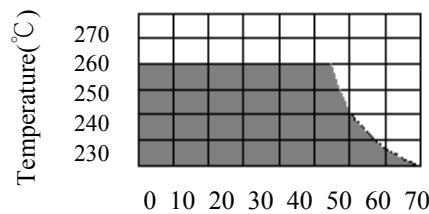
Ceramic Type

- Sn
- Nickel
- Ag

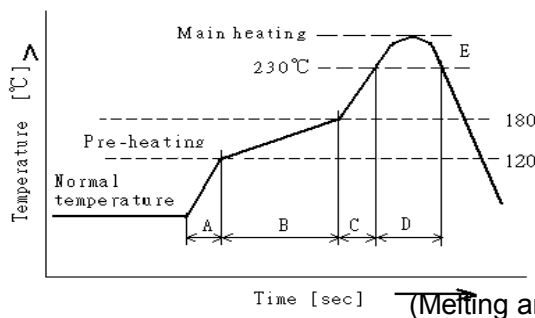
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Reflow soldering conditions

- 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

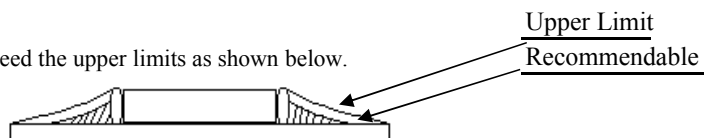
Preheating	150°C, 1 minute		
Tip temperature	280°C max.		
Soldering time	3 seconds max.		
Soldering iron output	30w max.		
End of soldering iron	φ 3mm max.		

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.



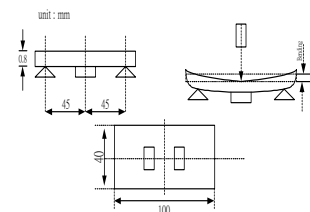
When the amount of solder volume increased, mechanical stress increased as well. Exceeding amount of solder volume may lead to failure of mechanical or electrical characteristics.

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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 dynameter force gauge shall be applied to any side of the component.	0402 series - ≥350g 0603 series - ≥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.	