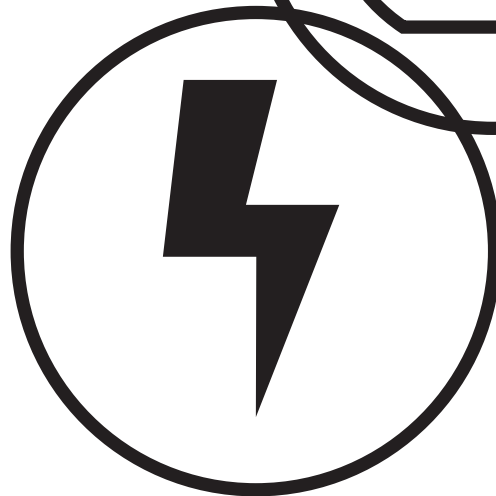
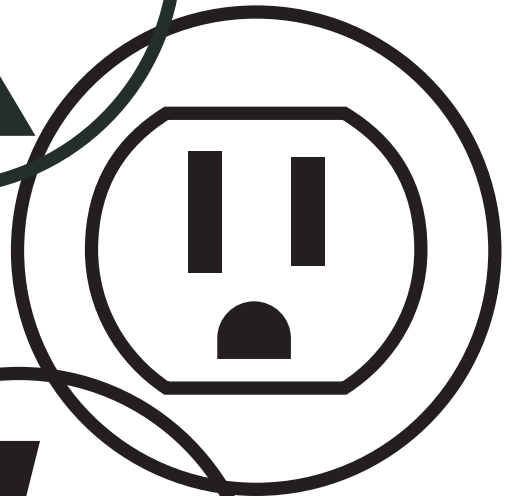
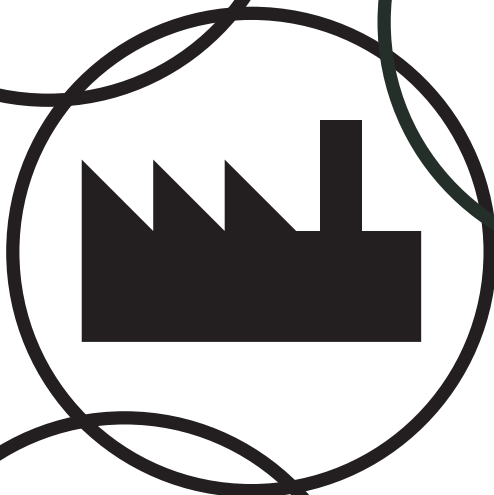




WORLD PRODUCTS INC.
ELECTRONIC COMPONENT SOLUTIONS



CERAMIC INDUCTORS



CHIP CERAMIC INDUCTORS

Features

1. SMD type chip inductors utilizing monolithic structure provide highly reliable surface mount application.
2. Superior Q characteristics is guaranteed over the wide frequency range for high frequency applications.
3. Terminal electrode has excellent solder heat resistance for soldering.
4. Nickel barrier termination standard.
5. RoHS compliant with Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS Directive) and comply to a maximum concentration value of 0.1% by weight in homogeneous materials for lead (Pb), mercury, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE) and of 0.01% weight in homogeneous materials for cadmium.

Applications

1. RF module of telecommunication products.
- Cellular phone, Cordless telephone, Pagers etc.
2. GSM Phone, PCS Phone.
3. Computer communications, Radar detectors.
4. Automotive electronics, Keyless remote.

Ordering Information

WPC - 1608 - 12 K T
(1) (2) (3) (4) (5)

(1) Series

(2) Dimensions*

The first two digits: length (mm)
The last two digits: width (mm)

(3) Inductance

nH value

(4) Tolerance

S: $\pm 0.3nH$
J: $\pm 5\%$
K: $\pm 10\%$

(5) Packaging

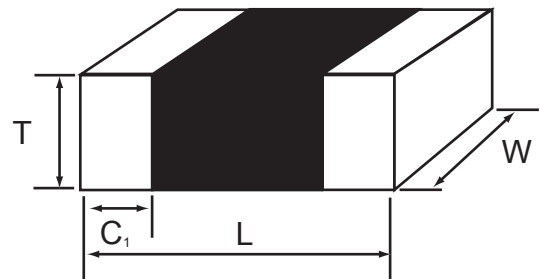
B: Bulk Package
T: Tape & Reel (Φ 178mm [7 inches])
L: Tape & Reel (Φ 254mm [10 inches])

*1005(mm) is equivalent to 0402(inches).
1608(mm) is equivalent to 0603(inches).
2012(mm) is equivalent to 0805 (inches).

Shape & Dimensions

Unit : mm [inches]

Type	L	W	T	C ₁
WPC-1005	1.0 \pm 0.10 [.039 \pm .004]	0.5 \pm 0.10 [.020 \pm .004]	0.5 \pm 0.10 [.020 \pm .004]	0.20 \pm 0.10 [.008 \pm .004]
WPC-1608	1.6 \pm 1.5 [.063 \pm .006]	0.8 \pm 0.15 [.031 \pm .006]	0.8 \pm 0.15 [.031 \pm .006]	0.30 \pm 0.20 [.012 \pm .008]
WPC-2012	2.0 \pm 0.2 [.079 \pm .008]	1.25 \pm 0.2 [.049 \pm .008]	1.0 \pm 0.2 [.039 \pm .008]	0.50 \pm 0.30 [.020 \pm .012]



CHIP CERAMIC INDUCTORS

Specifications

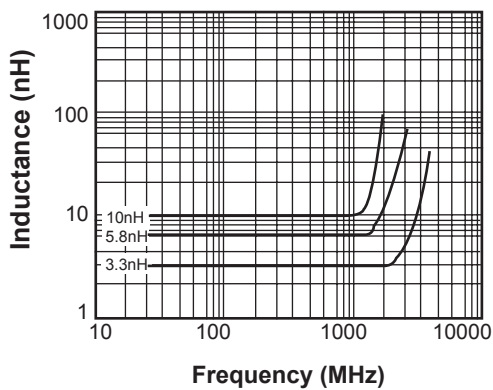
1005 SERIES

Part No.	Inductance		Q		Q	SRF(MHz)		DCR (mΩ) max.	Rated current (mA) max.
	nH	Tolerance	100 MHz min.	800 MHz min.	1.8GHz Min.	min.	typ.		
WPC-1005-1.0S□	1.0	±0.3nH	8	20	26	6000	13000	100	300
WPC-1005-1.2S□	1.2		8	20	26	6000	10000	120	300
WPC-1005-1.5S□	1.5		8	20	30	6000	10000	120	300
WPC-1005-1.8S□	1.8		8	22	35	6000	9500	140	300
WPC-1005-2.2S□	2.2		8	22	35	6000	9000	160	300
WPC-1005-2.7S□	2.7		8	22	35	6000	9000	200	300
WPC-1005-3.3S□	3.3		8	22	35	6000	8000	220	300
WPC-1005-3.9S□	3.9		8	22	30	4000	6500	250	300
WPC-1005-4.7S□	4.7		8	22	30	4000	5000	280	300
WPC-1005-5.6S□	5.6		8	22	28	4000	5000	300	300
WPC-1005-6.8J□	6.8	±5%	8	22	28	3900	4400	350	300
WPC-1005-8.2J□	8.2		8	20	28	3600	4000	400	250
WPC-1005-10J□	10		8	20	24	3200	3500	450	250
WPC-1005-12J□	12		8	20	24	2700	3500	500	200
WPC-1005-15J□	15		8	20	20	2300	3000	550	200
WPC-1005-18J□	18		8	20	15	2100	2600	650	200
WPC-1005-22J□	22		8	20	13	1900	2200	800	200
WPC-1005-27J□	27		8	17	-	1600	1900	900	200
WPC-1005-33J□	33		8	16	-	1300	1700	1100	200
WPC-1005-39J□	39		8	16	-	1200	1600	1200	100
WPC-1005-47J□	47		8	10	-	1000	1300	1300	100
WPC-1005-56J□	56		8	-	-	750	900	1400	100
WPC-1005-68J□	68		8	-	-	700	800	1400	100
WPC-1005-82J□	82		8	-	-	600	700	1600	100
WPC-1005-100J□	100		8	-	-	350	650	2000	100

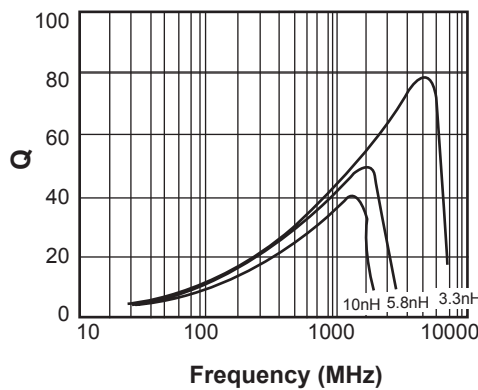
* SRF : Self-Resonant Frequency. * DCR : DC Resistance
 * Test Equipment : HP4291B + 16193A

Electrical Characteristics

Inductance Characteristics



Q Characteristics



CHIP CERAMIC INDUCTORS

Specifications

1608 SERIES

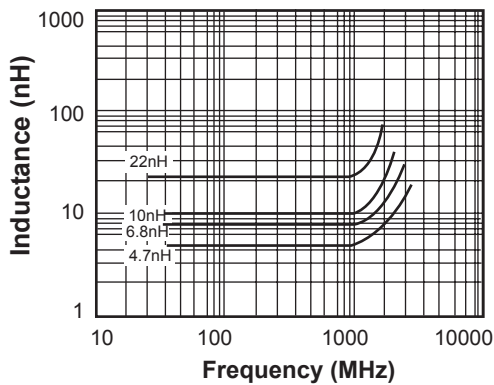
Part No.	Inductance		Q	L, Q test frequency (MHz)	SRF(MHz)		DCR (mΩ) max.	Rated current (mA) max.
	nH	Tolerance			min.	typ.		
WPC-1608-1.0S□	1.0	±0.3nH	8	100	4000	13000	100	300
WPC-1608-1.2S□	1.2		8	100	4000	13000	100	300
WPC-1608-1.5S□	1.5		8	100	4000	10000	100	300
WPC-1608-1.8S□	1.8		8	100	3800	10000	120	300
WPC-1608-2.2S□	2.2		8	100	3600	10000	160	300
WPC-1608-2.7S□	2.7		8	100	3400	8000	200	300
WPC-1608-3.3S□	3.3		10	100	3200	6000	220	300
WPC-1608-3.9S□	3.9		10	100	3000	6000	250	300
WPC-1608-4.7S□	4.7		10	100	2800	5000	280	300
WPC-1608-5.6S□	5.6		10	100	2700	5000	290	300
WPC-1608-6.8□□	6.8	±5% ±10%	10	100	2600	4000	300	300
WPC-1608-8.2□□	8.2		10	100	2200	4000	330	300
WPC-1608-10□□	10		10	100	1800	3000	350	300
WPC-1608-12□□	12		10	100	1650	2500	400	300
WPC-1608-15□□	15		10	100	1350	2000	450	300
WPC-1608-18□□	18		10	100	1350	2000	500	300
WPC-1608-22□□	22		10	100	1100	1800	550	300
WPC-1608-27□□	27		10	100	1100	1600	600	300
WPC-1608-33□□	33		10	100	1000	1400	650	300
WPC-1608-39□□	39		10	100	900	1300	700	300
WPC-1608-47□□	47		10	100	800	1300	900	300
WPC-1608-56□□	56		10	100	750	1100	1000	300
WPC-1608-68□□	68		10	100	700	1000	1200	300
WPC-1608-82□□	82		10	100	600	850	1500	300
WPC-1608-100□□	100		10	100	600	750	1700	300
WPC-1608-120□□	120		8	50	500	650	2000	250
WPC-1608-150□□	150		8	50	500	600	2400	200
WPC-1608-180□□	180		8	50	400	500	2700	200
WPC-1608-220□□	220		8	50	350	500	2800	200
WPC-1608-270□□	270		8	50	300	450	3100	200

* SRF : Self-Resonant Frequency.

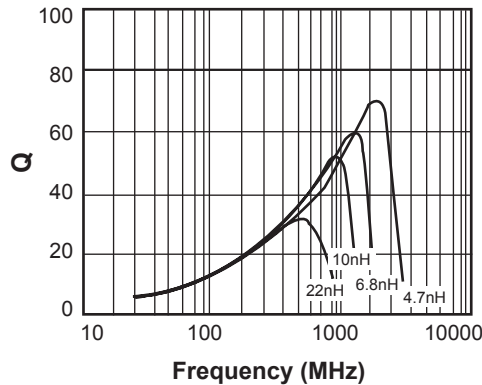
* DCR : DC Resistance

Electrical Characteristics

Inductance Characteristics



Q Characteristics



CHIP CERAMIC INDUCTORS

Specifications

2012 SERIES

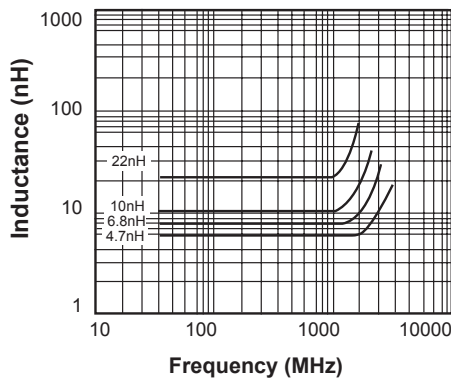
Part No.	Inductance		Q min.	L, Q test frequency (MHz)	SRF(MHz)		DCR (mΩ) max.	Rated current (mA) max.
	nH	Tolerance			min.	typ.		
WPC-2012-1.0S□	1.0	±0.3nH	10	100	4000	12000	100	300
WPC-2012-1.2S□	1.2		10	100	4000	10000	100	300
WPC-2012-1.5S□	1.5		10	100	4000	10000	100	300
WPC-2012-1.8S□	1.8		10	100	4000	8000	100	300
WPC-2012-2.2S□	2.2		10	100	3800	8000	100	300
WPC-2012-2.7S□	2.7		10	100	3600	6000	100	300
WPC-2012-3.3S□	3.3		10	100	3400	6000	130	300
WPC-2012-3.9S□	3.9		10	100	3200	5400	150	300
WPC-2012-4.7S□	4.7		10	100	3000	4500	200	300
WPC-2012-5.6S□	5.6	±5% ±10%	10	100	2800	4000	230	300
WPC-2012-6.8□□	6.8		10	100	2600	3650	250	300
WPC-2012-8.2□□	8.2		10	100	2200	3000	280	300
WPC-2012-10□□	10		10	100	1800	2500	300	300
WPC-2012-12□□	12		10	100	1650	2450	350	300
WPC-2012-15□□	15		10	100	1350	2000	400	300
WPC-2012-18□□	18		10	100	1350	1750	450	300
WPC-2012-22□□	22		15	100	1100	1500	500	300
WPC-2012-27□□	27		15	100	1100	1500	550	300
WPC-2012-33□□	33		15	100	900	1200	600	300
WPC-2012-39□□	39		15	100	900	1300	650	300
WPC-2012-47□□	47		15	100	850	1150	700	300
WPC-2012-56□□	56		15	100	750	1050	750	300
WPC-2012-68□□	68		15	100	700	1000	800	300
WPC-2012-82□□	82		15	100	600	950	900	300
WPC-2012-100□□	100		15	100	500	850	1000	300
WPC-2012-120□□	120		15	50	450	730	1300	250
WPC-2012-150□□	150		15	50	400	570	1500	250
WPC-2012-180□□	180		15	50	350	510	1800	250
WPC-2012-220□□	220		10	50	330	450	2000	250
WPC-2012-270□□	270	10	50	300	410	2500	250	
WPC-2012-330□□	330	10	50	270	370	3000	250	
WPC-2012-390□□	390	10	50	220	330	3500	250	
WPC-2012-470□□	470	10	50	180	280	4000	250	

* SRF : Self-Resonant Frequency.

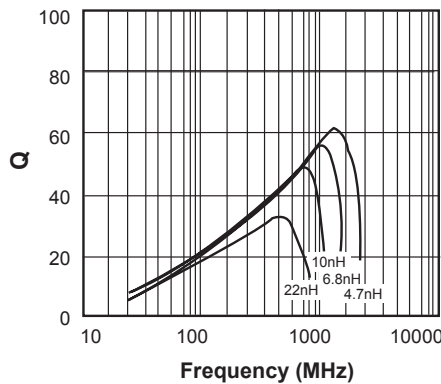
* DCR : DC Resistance

Electrical Characteristics

Inductance Characteristics


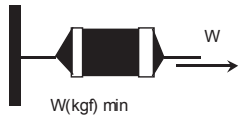
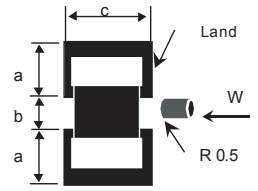
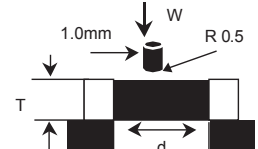


Q Characteristics



CHIP CERAMIC INDUCTORS

Reliability and Test Conditions

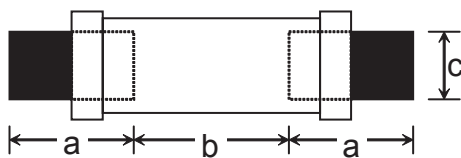
ITEM	REQUIREMENTS			TEST CONDITION	
	1005	1608	2012		
Operating temp.range	-55°C~+125°C			-	
Storage temp. & humidity range	40°C max. , 70% RH max.			at packing condition	
Resistance to solder heat	1. No damage such as cracks should be caused in chip element. 2. More than 75% of the terminal electrode shall be covered with new solder. 3. Inductance change: ±within 5% 4. Quality factor change: ±within 30%			Preheat temperature: 100 to 150°C Preheat time: 1min Solder temperature: 260 ± 10°C Dipping time: 10 ± 0.5sec.	
Solderability	1. More than 90% of the terminal electrode shall be covered with new solder. 2. Inductance change : ± within 5% 3. Quality factor change : ± within 30%			Preheat temperature: 100 to 150°C Preheat time: 1min Solder temperature: 230 ± 10°C Dipping time: 3 ± 1sec.	
Reflow soldering	1. More than 50% of the terminal electrode shall be covered with new solder. 			Preheat temperature: 150°C Preheat time: 1min Solder temperature: 230°C Soldering time: 10 sec. Max. (Reflow soldering profile)	
Tensile strength (Terminal strength)	1. No mechanical damage.			 Unit : Kgf(W)	
	W	-	1.0		2.0
Adhesion of Terminal electrode (Flexure strength)	1. No mechanical damage			 Unit : mm (a,b,c), Kgf(W)	
	a	-	1.0		1.0
	b	-	0.8		1.0
	c	-	1.3		1.3
	W	-	2.0		4.0
Body strength (Bending strength)	1. The body shall not be damaged by forces applied (see illustration.)			 Unit : mm (d), Kgf(W)	
	d	-	1.3		1.3
	W	-	2.0		3.0

CHIP CERAMIC INDUCTORS

Reliability and Test Conditions

ITEM	REQUIREMENTS			TEST CONDITION
	1005	1608	2012	
Drop	1. No mechanical damage			Drop 10 times on a concrete Floor from a height of 91cm
Vibration	1. No mechanical damage			Frequency: 10~55~10Hz Amplitude: 1.52mm Direction and time: X,Y,Z directions for 2 hours
Thermal shock (Temperature cycle)	1. No mechanical damage 2. Inductance change: \pm within 5% 3. Quality factor change: \pm within 30%			Step1. $-40 \pm 3^{\circ}\text{C}$ 30 \pm 3min. Step2. $85 \pm 3^{\circ}\text{C}$ 30 \pm 3min. Number of cycle: 100 times
Heat load resistance	1. No mechanical damage 2. Inductance change: \pm within 5% 3. Quality factor change: \pm within 30%			Temperature: $85 \pm 2^{\circ}\text{C}$ Applied current: rated current Time: 1,000 hours Measured at room ambient temperature after placing for 24 hours
Low temp. resistance	1. No mechanical damage 2. Inductance change: \pm within 5% 3. Quality factor change: \pm within 30%			Temperature: $-40 \pm 5^{\circ}\text{C}$ Time: 1,000 hours Measured at room ambient temperature after placing for 24 hours
Humidity resistance	1. No mechanical damage 2. Inductance change : \pm within 5% 3. Quality factor change : \pm within 30%			Temperature: $40 \pm 2^{\circ}\text{C}$ Humidity: 90~95% RH Time: 500 hours Measured at room ambient temperature after placing for 24 hours
Humidity load resistance	1. No mechanical damage 2. Inductance change : \pm within 5% 3. Quality factor change : \pm within 30%			Temperature: $40 \pm 2^{\circ}\text{C}$ Humidity: 90~95% RH Applied current: rated current Time: 500 hours Measured at room ambient temperature after placing for 24 hours

Land Pattern Design



unit: mm

Size	a	b	c
1005	0.7	0.4	0.5
1608	1.0	0.6	0.8
2012	1.0	1.0	1.0

Labeling

Label

- 1) Part name.
- 2) Lot No.
- 3) Quantity.

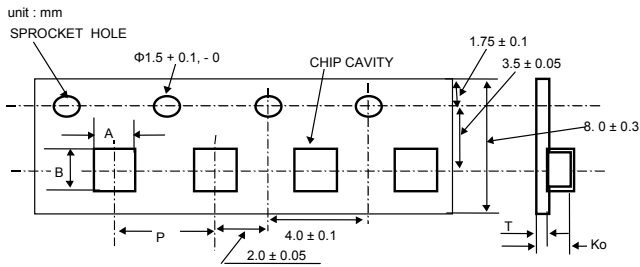
Standard quantity for packing

Packing Type(EIA)	Tape & reel			Bulk
	Reel	Inner box	Carton box	Vinyl or Cassette
1005	10,000	100,000	400,000	As requested
1608	4,000	40,000	160,000	
2012	3,000	30,000	120,000	

*Packing method can be changed upon request.

Tape Dimensions

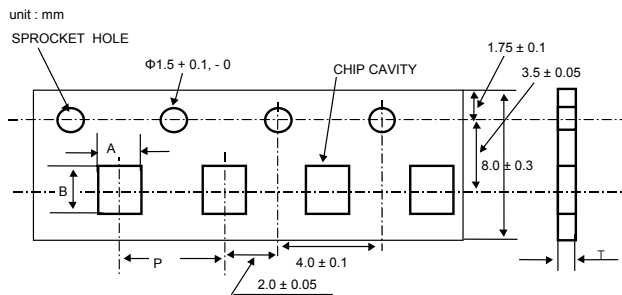
Embossing 8mm



unit: mm

Type	A ± 0.1	B ± 0.1	P ± 0.1	K ₀ ± 0.1	T (max.)
1608	1.00	1.80	4.0	0.95	0.3
2012	1.45	2.25	4.0	1.00	0.3

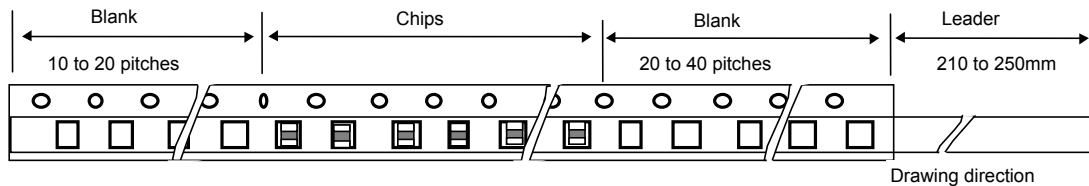
Paper



unit: mm

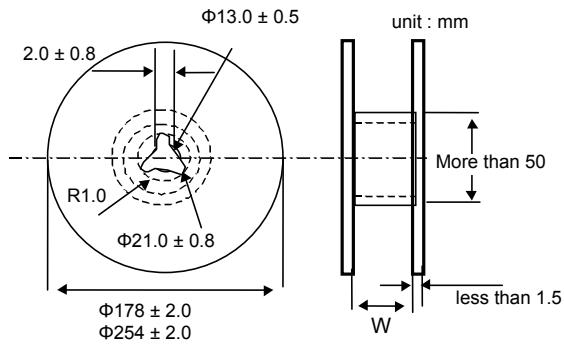
Type	A ± 0.1	B ± 0.1	P ± 0.1	T (max.)
1005	0.65	1.15	2.0	0.8
1608	1.00	1.80	2.0	1.1

Leader and Blank Portion



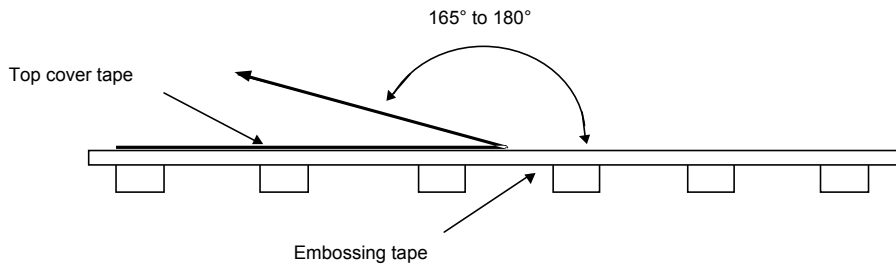
The pitch holes shift within ±0.3mm for cumulative 10 pitches.

Reel Dimensions



Type	W (mm)
1005, 1608, 2012	9.0 ± 0.3

Top Cover Tape Strength

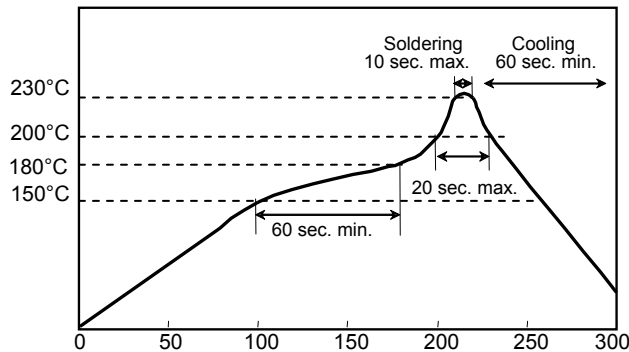


The force for tearing off top cover tape is 20 to 70 grams in the arrow direction.

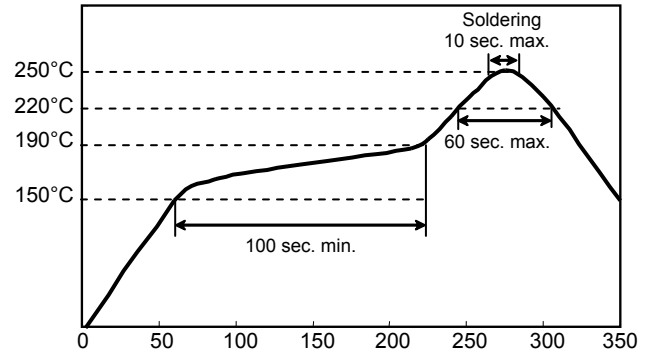
CHIP CERAMIC INDUCTORS

Soldering Profile

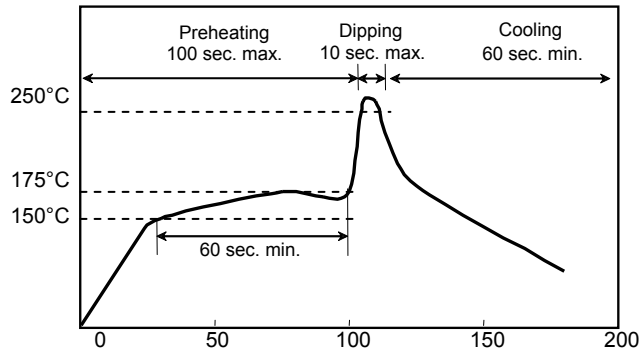
REFLOW SOLDERING(Peak 230°C)



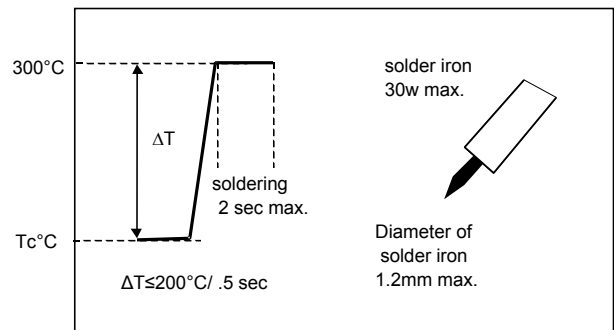
REFLOW SOLDERING (Peak 250°C)



FLOW SOLDERING



MANUAL SOLDERING



Precaution for Storage

Electrical characteristics of product will not change when stored under typical environmental conditions. However, it is possible that the solderability of terminal electrodes and the characteristics of the tape packaging can change during storage. For this reason, the following storage guidelines should be followed.

1. Storage Environment: The tape packaging material is designed to withstand long-term storage but they will degrade more rapidly in the presence of high temperature or high humidity. Therefore, product shall be stored in an ambient temperature of less than 40°C with a relative humidity of less than 70%. The products should be used within 6 months of receipt. To achieve best solderability, product should be used as soon as possible after unpacking. Leftover product must be stored in dry condition with desiccant.
2. Corrosive gases: Since sulfur and chlorine may degrade the solderability of the terminal electrodes, it is important to store the product in an environment free of such gases.
3. Temperature fluctuations: Dew condensation may occur when the product is taken out of storage due to variation of temperature. It is important to maintain a temperature-controlled environment.

DISCLAIMER: The names of the products and the specifications in this catalog are subject to change without notice for the sake of improvement. World Products Inc. also reserves the right to discontinue any of these products. The products in this catalog are intended for use in ordinary electronic products. If any of these products are to be used in special applications requiring extremely high reliability, where product defects might pose a safety risk, please consult World Products Inc. Though World Products Inc. has taken all possible precautions to ensure the quality and reliability of its products, improper use of products may result in bodily injury, fire, or similar accident. If you have any questions regarding the use of the products in question, please consult World Products Inc. Please be advised that World Products Inc. accepts no responsibility for any infraction by users of World Products Inc. products on third party patents or industrial copyrights.