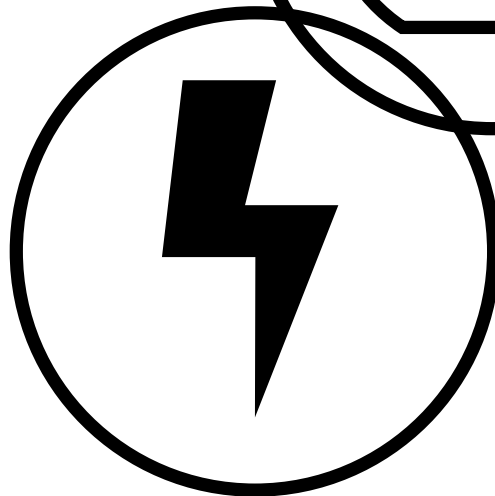
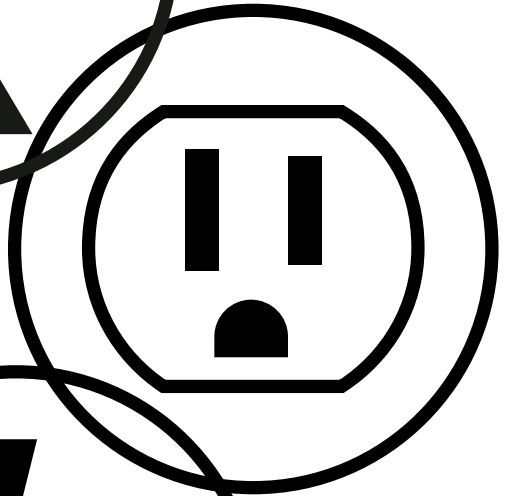
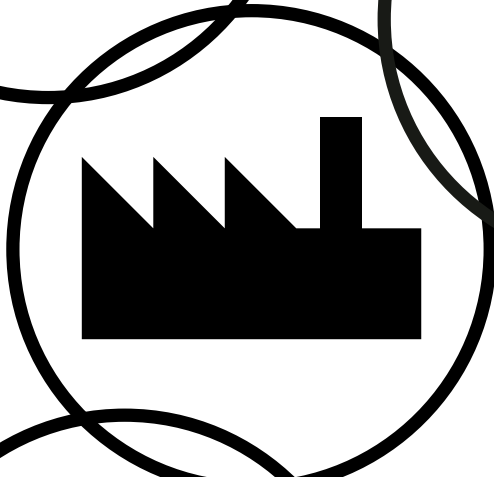
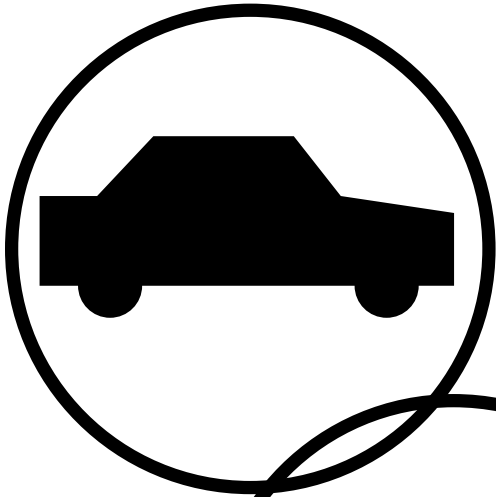




**WORLD PRODUCTS INC.**  
ELECTRONIC COMPONENT SOLUTIONS



# FERRITE INDUCTORS



# FERRITE INDUCTORS

# FERRITE INDUCTORS

## Features

1. Perfect for high density surface mount applications since magnetic shield eliminates crosstalk.
2. Highly reliable in wide temperature and humidity range. Superior Q characteristics in wide frequency.
3. Terminal electrode has excellent solder heat resistance.
4. 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. Prevention of electromagnetic interference to signals on the secondary side of electronic equipment.

## Ordering Information

**WPF** - **1608** - **680** **K** **T**  
 (1) (2) (3) (4) (5)

**(1) Series**

**WPF:** Ferrite Inductors

**(2) Dimensions\***

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

**(3) Inductance**

**(4) Tolerance**

**K:** ±10%  
**M:** ±20%

**(5) Packaging**

**B:** Bulk Package

**T:** Tape & Reel (Φ 178mm [ 7 inch ])

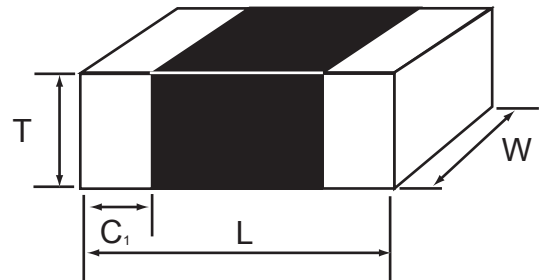
**L:** Tape & Reel (Φ 254mm [10 inch ])

\*1608(mm) is equivalent to 0603(inches).  
 2012(mm) is equivalent to 0805 (inches).  
 3216(mm) is equivalent to 1206 (inches).

## Shape & Dimensions

Unit : mm [inches]

Type	L	W	T	C <sub>1</sub>
WPF-1608	1.6±0.15 [.063±.006]	0.8±0.15 [.031±.006]	0.8±0.15 [.031±.006]	0.30±0.20 [.012±.008]
WPF-2012	2.0±0.2 [.079±.008]	1.25±0.2 [.049±.008]	0.85±0.2 [.033±.008]	0.50±0.30 [.020±.012]
	2.0±0.2 [.079±.008]	1.25±0.2 [.049±.008]	1.25±0.2 [.049±.008]	0.50±0.30 [.020±.012]
WPF-3216	3.2±0.2 [.126±.008]	1.6±0.2 [.063±.008]	1.3±0.2 [.051±.008]	0.50±0.30 [.020±.012]



# FERRITE INDUCTORS

## Specifications

### 1608 SERIES

Part No.	Inductance		Q		L, Q test frequency (MHz)	SRF(MHz)		DCR(mΩ)		Rated current (mA) max.
	μH	Tolerance	min.	typ.		min.	typ.	max.	typ.	
WPF-1608-270□□	0.027	±10% ±20%	10	45	50	260	350	90	60	200
WPF-1608-470□□	0.047		10	45	50	260	320	150	100	200
WPF-1608-560□□	0.056		10	45	50	255	300	200	90	200
WPF-1608-680□□	0.068		10	45	50	250	290	200	90	200
WPF-1608-820□□	0.082		10	45	50	245	280	250	120	200
WPF-1608-101□□	0.10		15	30	25	240	270	250	140	200
WPF-1608-121□□	0.12		15	30	25	205	260	300	150	200
WPF-1608-151□□	0.15		15	30	25	180	250	350	180	200
WPF-1608-181□□	0.18		15	30	25	165	220	400	190	200
WPF-1608-221□□	0.22		15	30	25	150	200	400	190	200
WPF-1608-271□□	0.27		15	30	25	136	190	500	270	200
WPF-1608-331□□	0.33		15	30	25	125	180	550	280	150
WPF-1608-391□□	0.39		15	30	25	110	170	600	300	150
WPF-1608-471□□	0.47		15	30	25	105	160	700	390	150
WPF-1608-561□□	0.56		15	30	25	95	150	900	500	150
WPF-1608-681□□	0.68		15	30	25	80	140	900	500	150
WPF-1608-821□□	0.82		15	30	25	75	130	1600	800	100
WPF-1608-102□□	1.0		35	50	10	70	95	500	250	100
WPF-1608-122□□	1.2		35	50	10	60	80	600	250	100
WPF-1608-152□□	1.5		35	50	10	55	70	650	300	50
WPF-1608-182□□	1.8	35	50	10	50	70	750	350	50	
WPF-1608-222□□	2.2	35	50	10	45	60	900	450	50	
WPF-1608-272□□	2.7	35	50	10	40	55	1000	600	50	

\* SRF : Self-Resonant Frequency.      \* DCR : DC Resistance

\* Parts with other Inductance Tolerance('J' ± 5%) can be provided upon request.

# FERRITE INDUCTORS

## Specifications

2012 SERIES

Part No.	Inductance		Q		L, Q test frequency (MHz)	SRF(MHz)		DCR(mΩ)		Rated current (mA) max.
	μH	Tolerance	min.	typ.		min.	typ.	max.	typ.	
WPF-2012-470□□	0.047	±10% ±20%	20	60	50	320	400	100	50	300
WPF-2012-560□□	0.056		20	60	50	300	380	150	80	300
WPF-2012-680□□	0.068		20	60	50	280	350	200	80	300
WPF-2012-820□□	0.082		20	60	50	255	320	200	80	300
WPF-2012-101□□	0.10		25	50	25	235	300	200	90	250
WPF-2012-121□□	0.12		25	50	25	220	280	200	65	250
WPF-2012-151□□	0.15		25	50	25	200	250	200	60	250
WPF-2012-181□□	0.18		25	50	25	185	230	200	100	250
WPF-2012-221□□	0.22		25	50	25	170	220	250	100	250
WPF-2012-271□□	0.27		25	50	25	150	200	300	150	250
WPF-2012-331□□	0.33		25	50	25	145	180	300	150	250
WPF-2012-391□□	0.39		30	50	25	135	170	400	190	200
WPF-2012-471□□	0.47		30	50	25	125	160	400	190	200
WPF-2012-561□□	0.56		30	50	25	115	150	400	280	150
WPF-2012-681□□	0.68		30	50	25	105	135	500	300	150
WPF-2012-821□□	0.82		30	50	25	100	125	600	350	150
WPF-2012-102□□	1.0		45	75	10	75	105	300	120	100
WPF-2012-122□□	1.2		45	75	10	65	95	400	140	100
WPF-2012-152□□	1.5		45	75	10	60	85	400	140	100
WPF-2012-182□□	1.8		45	75	10	55	75	400	160	100
WPF-2012-222□□	2.2		45	80	10	50	70	400	200	50
WPF-2012-272□□	2.7		45	80	10	45	65	500	250	50
WPF-2012-332□□	3.3		45	80	10	40	55	500	270	50
WPF-2012-392□□	3.9		45	80	10	38	50	1000	500	50
WPF-2012-472□□	4.7		45	80	10	35	48	1400	700	50
WPF-2012-562□□	5.6		50	60	4	32	45	500	250	50
WPF-2012-682□□	6.8		50	60	4	29	40	600	330	25
WPF-2012-822□□	8.2		50	60	4	26	36	700	380	25
WPF-2012-103□□	10.0		50	60	2	24	33	800	450	25
WPF-2012-123□□	12.0		50	60	2	22	30	800	470	25
WPF-2012-153□□	15.0		30	40	1	19	27	1500	750	15
WPF-2012-183□□	18.0		30	40	1	18	25	1500	810	15
WPF-2012-223□□	22.0		30	40	1	16	22	700	350	5
WPF-2012-273□□	27.0	30	40	1	14	20	800	450	5	
WPF-2012-333□□	33.0	30	40	0.4	13	18	1000	600	5	

\* SRF: Self-Resonant Frequency.

\* DCR: DC Resistance

\* Parts with other Inductance Tolerance('J' ± 5%) can be provided upon request.

# FERRITE INDUCTORS

## Specifications

### 3216 SERIES

Part No.	Inductance		Q		L, Q test frequency (MHz)	SRF(MHz)		DCR(mΩ)		Rated current (mA) max.
	μH	Tolerance	min.	typ.		min.	typ.	max.	typ.	
WPF-3216-470□□	0.047	± 10% ± 20%	20	60	50	320	400	150	80	300
WPF-3216-560□□	0.056		20	60	50	300	360	150	80	300
WPF-3216-680□□	0.068		20	60	50	280	330	150	100	300
WPF-3216-820□□	0.082		20	60	50	255	300	150	100	300
WPF-3216-101□□	0.10		25	50	25	235	280	200	100	250
WPF-3216-121□□	0.12		25	50	25	220	260	200	100	250
WPF-3216-151□□	0.15		25	50	25	200	240	200	100	250
WPF-3216-181□□	0.18		25	50	25	185	220	200	100	250
WPF-3216-221□□	0.22		25	50	25	170	200	250	120	250
WPF-3216-271□□	0.27		25	50	25	150	180	250	120	250
WPF-3216-331□□	0.33		25	50	25	145	170	300	130	250
WPF-3216-391□□	0.39		30	50	25	135	160	300	150	200
WPF-3216-471□□	0.47		30	50	25	125	145	300	150	200
WPF-3216-561□□	0.56		30	50	25	115	135	350	170	150
WPF-3216-681□□	0.68		30	50	25	105	125	350	250	150
WPF-3216-821□□	0.82		30	50	25	100	115	400	300	150
WPF-3216-102□□	1.0		45	80	10	75	90	250	130	100
WPF-3216-122□□	1.2		45	80	10	65	80	300	150	100
WPF-3216-152□□	1.5		45	80	10	60	70	300	170	50
WPF-3216-182□□	1.8		45	80	10	55	66	500	250	50
WPF-3216-222□□	2.2		45	80	10	50	58	600	300	50
WPF-3216-272□□	2.7		45	80	10	45	53	600	300	50
WPF-3216-332□□	3.3		45	85	10	41	49	700	350	50
WPF-3216-392□□	3.9		45	85	10	38	45	800	400	50
WPF-3216-472□□	4.7		45	85	10	35	41	800	400	50
WPF-3216-562□□	5.6		50	65	4	32	38	600	300	50
WPF-3216-682□□	6.8		50	65	4	29	34	600	300	50
WPF-3216-822□□	8.2		50	65	4	26	31	600	330	50
WPF-3216-103□□	10.0		50	65	2	24	28	700	380	50
WPF-3216-123□□	12.0		50	65	2	22	26	900	450	25
WPF-3216-153□□	15.0		35	45	1	19	23	1100	550	25
WPF-3216-183□□	18.0		35	45	1	18	21	1500	800	25
WPF-3216-223□□	22.0		35	45	1	16	19	1500	800	25
WPF-3216-273□□	27.0	35	45	1	14	17	1500	800	25	
WPF-3216-333□□	33.0	35	45	0.4	13	16	1600	850	25	

\* SRF: Self-Resonant Frequency. \* DCR: DC Resistance  
 \* Test equipment : HP4291A + HP16192A  
 : HP4295A + HP16334A

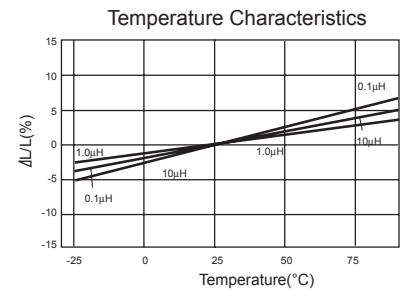
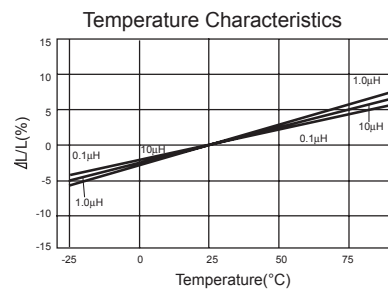
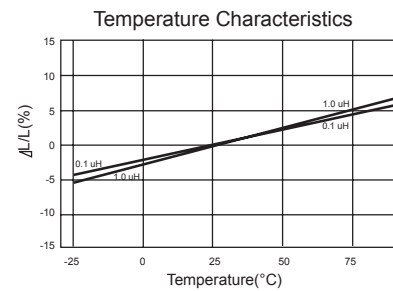
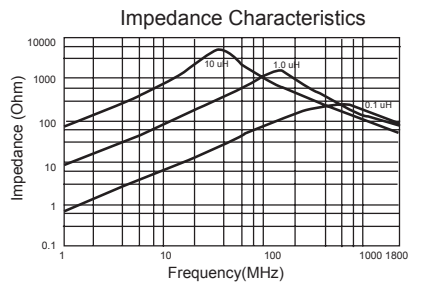
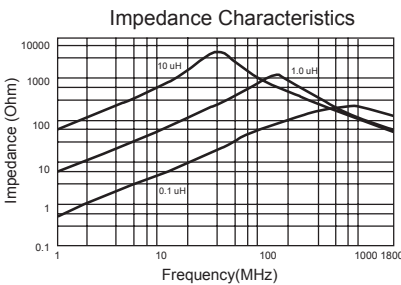
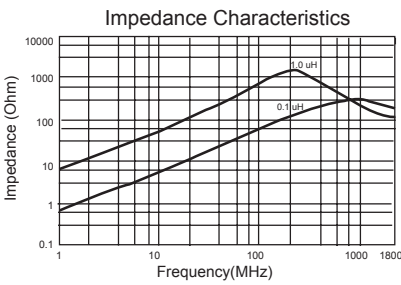
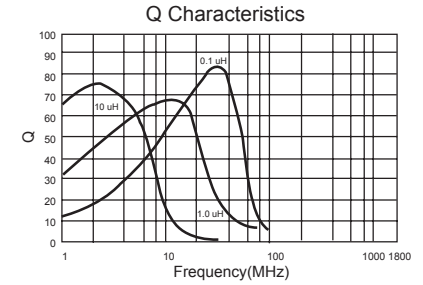
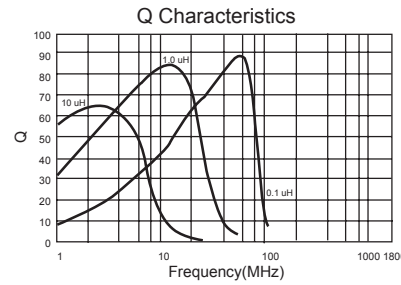
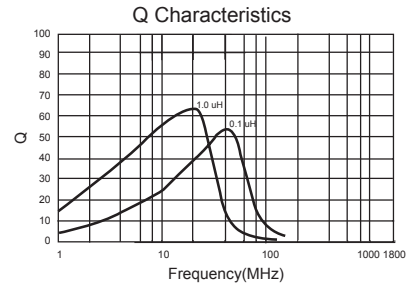
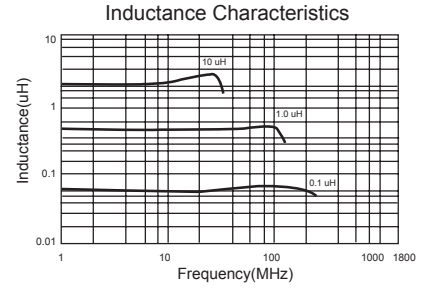
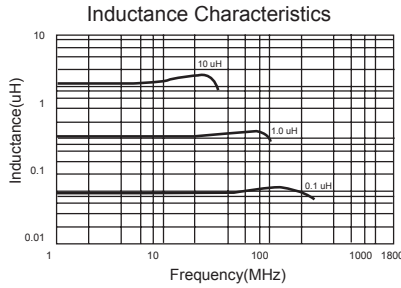
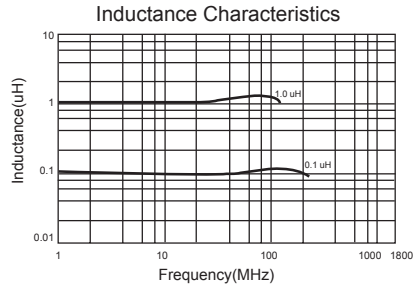
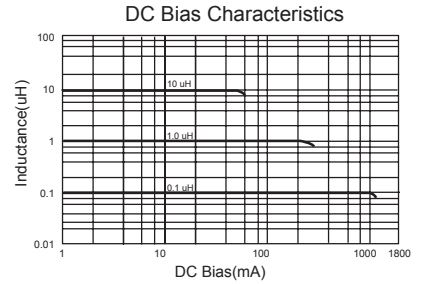
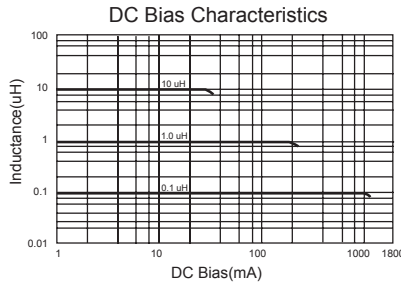
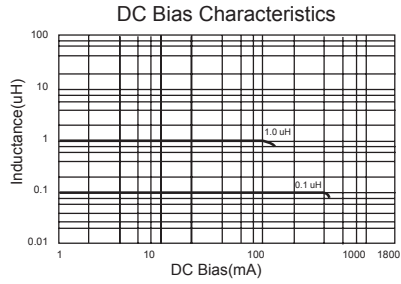
# FERRITE INDUCTORS

## Electrical Characteristics

### 1608


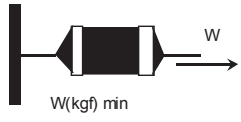
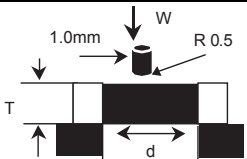
### 2012

### 3216



# FERRITE INDUCTORS

## Reliability and Test Conditions

ITEM	REQUIREMENTS			TEST CONDITION
	1608	2012	3216	
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)			
Adhesion of Terminal electrode (Flexure strength)	W	1.0	2.0	2.5
	Unit : mm (a,b,c), Kgf(W)			
	a	1.0	1.0	1.3
	b	0.8	1.0	1.5
	c	1.3	1.3	3.0
W	2.0	4.0	5.0	
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	2.0
	W	2.0	3.0	4.0

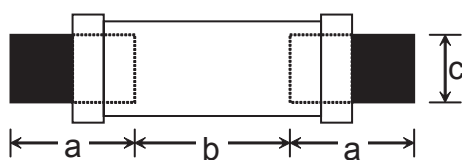


# FERRITE INDUCTORS

## Reliability and Test Conditions

ITEM	REQUIREMENTS			TEST CONDITION
	1608	2012	3216	
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
1608	1.0	0.6	0.8
2012	1.0	1.0	1.0
3216	1.1	2.2	1.4

## Labeling

### Label

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

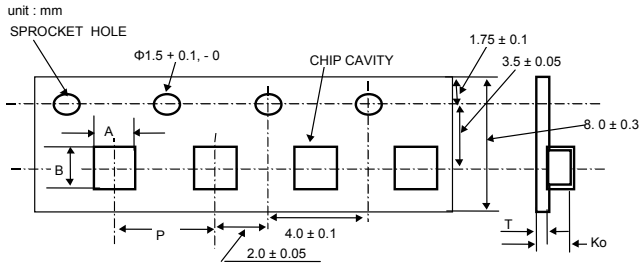
### Standard quantity for packing

Packing Type(EIA)	Tape & reel			Bulk
	Reel	Inner box	Carton box	Vinyl or Cassette
1608	4,000	40,000	160,000	
2012	4,000	30,000	120,000	
3216	3,000	30,000	120,000	As requested
	7,000	70,000	280,000	

\*Packing method can be changed upon request.

## Tape Dimensions

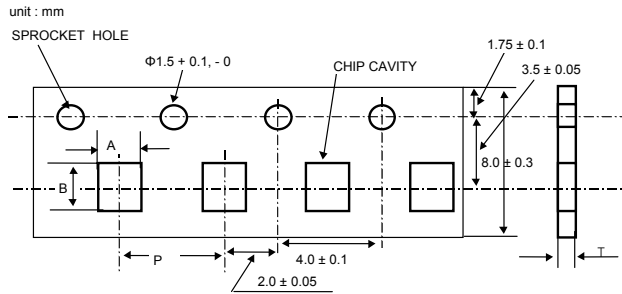
### Embossing 8mm



unit: mm

Type	A ± 0.1	B ± 0.1	P ± 0.1	K <sub>0</sub> ± 0.1	T (max.)
1608	1.00	1.80	4.0	0.95	0.3
2012	1.45	2.25	4.0	1.42	0.3
3216	1.90	3.60	4.0	1.35	0.3

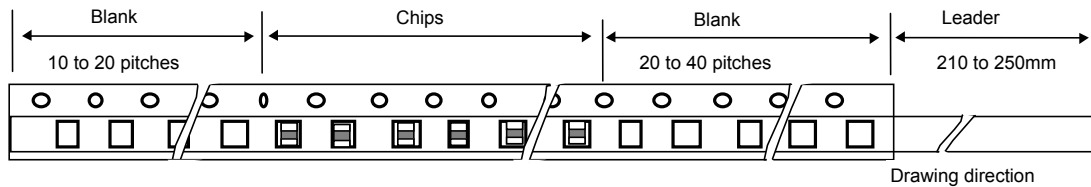
### Paper



unit: mm

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

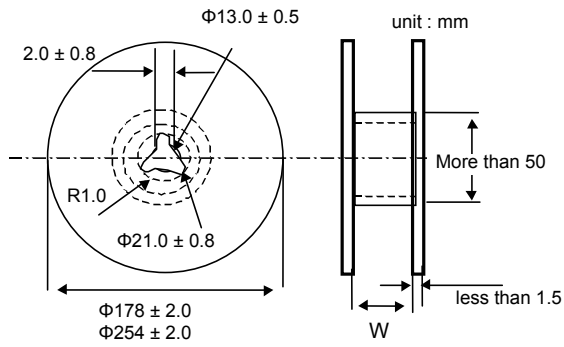
### Leader and Blank Portion



The pitch holes shift within  $\pm 0.3\text{mm}$  for cumulative 10 pitches.

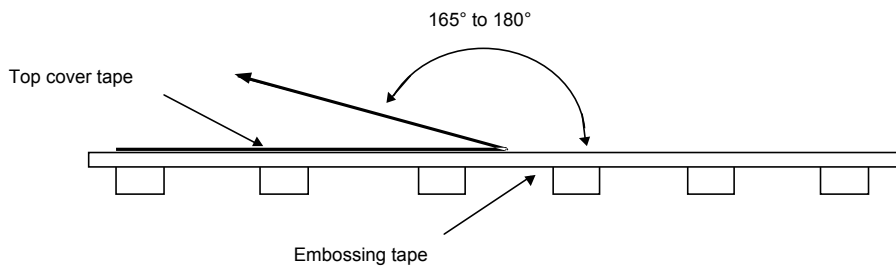
# FERRITE INDUCTORS

## Reel Dimensions



Type	W (mm)
1608, 2012, 3216	$9.0 \pm 0.3$

## Top Cover Tape Strength

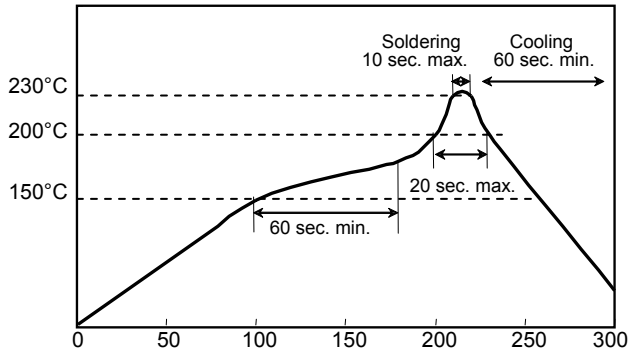


The force for tearing off top cover tape is 20 to 70 grams in the arrow direction.

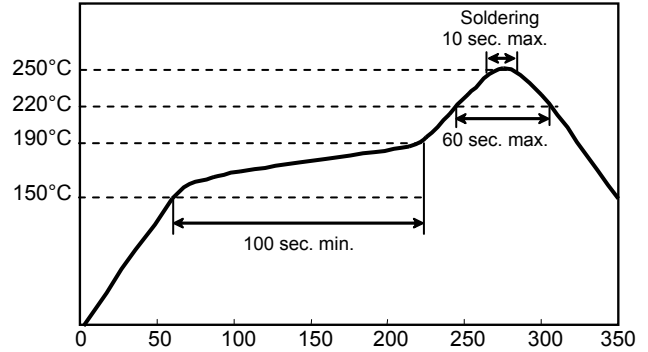
# FERRITE INDUCTORS

## Soldering Profile

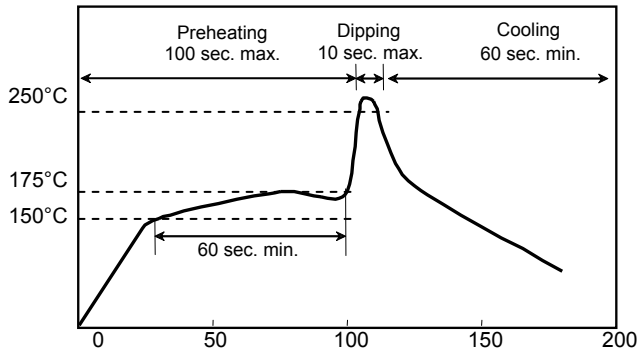
**REFLOW SOLDERING(Peak 230°C)**



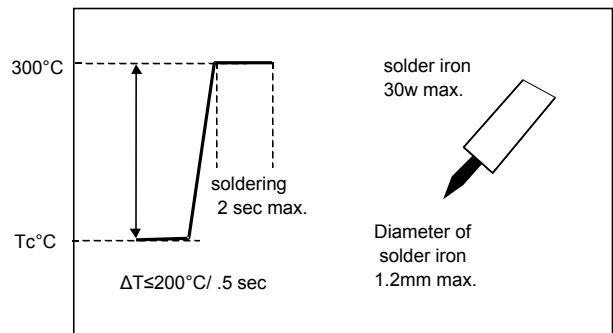
**REFLOW SOLDERING (Peak 250°C)**



**FLOW SOLDERING**



**MANUAL SOLDERING**



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