

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.

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: $\pm 10\%$

M: $\pm 20\%$

(5) **Packaging**

B: Bulk Package

T: Tape & Reel (_ 178_ [7 inch])

L: Tape & Reel (_ 254_ [10 inch])

*1608(mm) is equivalent to 0603(inches).

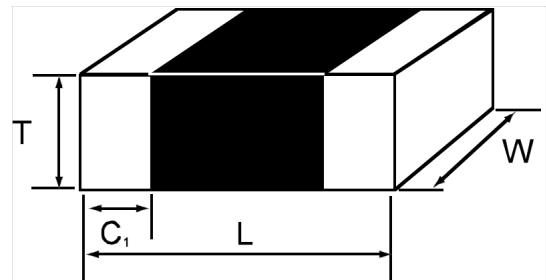
2012(mm) is equivalent to 0805 (inches).

3216(mm) is equivalent to 1206 (inches).

Shape & Dimensions

Unit : mm [inches]

Type	L	W	T	C ₁
WPF-1608	1.6 $\pm$ 0.15 [.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]
WPF-2012	2.0 $\pm$ 0.2 [.079 $\pm$.008]	1.25 $\pm$ 0.2 [.049 $\pm$.008]	1.25 $\pm$ 0.2 [.049 $\pm$.008]	0.50 $\pm$ 0.30 [.020 $\pm$.012]
WPF-3216	3.2 $\pm$ 0.2 [.126 $\pm$.008]	1.6 $\pm$ 0.2 [.063 $\pm$.008]	1.3 $\pm$ 0.2 [.051 $\pm$.008]	0.50 $\pm$ 0.30 [.020 $\pm$.012]



FERRITE INDUCTORS

Specifications

1608 SERIES

Part No.	Inductance		Q		L, Q test frequency (MHz)	SRF(MHz)		DCR(mΩ)		Rated current (mA) max.
	_H	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(m Ω)		Rated current (mA) max.
	μ H	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' $\pm$ 5%) can be provided upon request.

FERRITE INDUCTORS

Specifications

3216 SERIES

Part No.	Inductance		Q		L, Q test frequency (MHz)	SRF(MHz)		DCR(m Ω)		Rated current (mA) max.
	_H	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

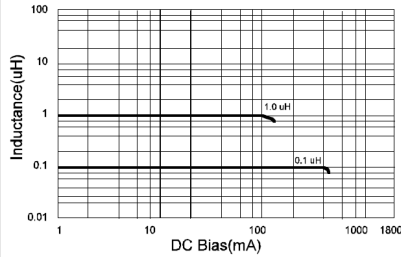
* Test equipment : HP4291A + HP16192A
: HP4295A + HP16334A

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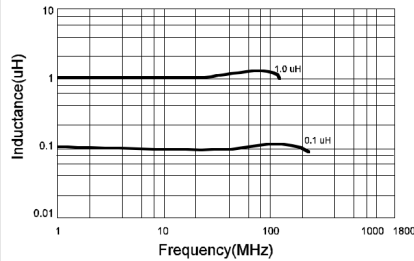
Electrical Characteristics

1608

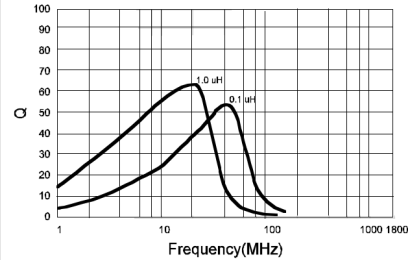
DC Bias Characteristics



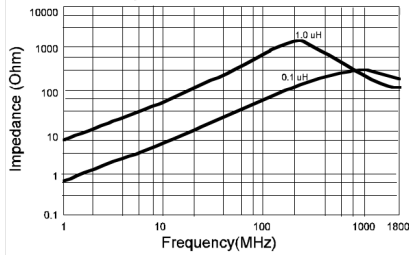
Inductance Characteristics



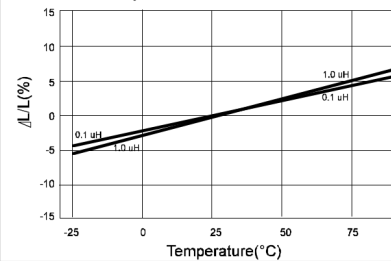
Q Characteristics



Impedance Characteristics

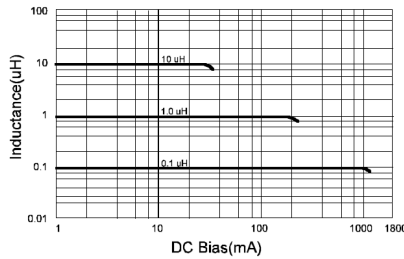


Temperature Characteristics

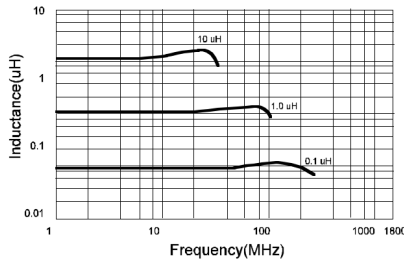


2012

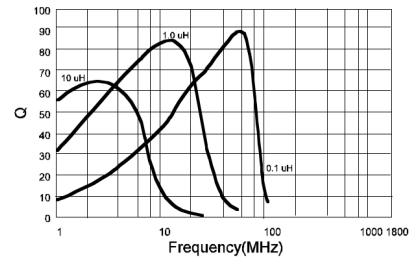
DC Bias Characteristics



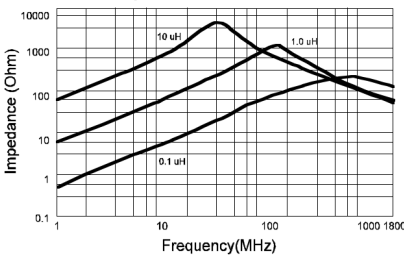
Inductance Characteristics



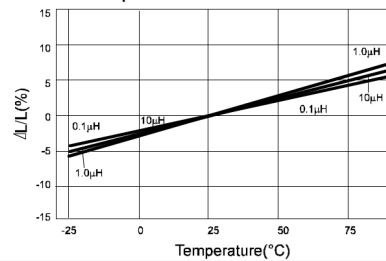
Q Characteristics



Impedance Characteristics

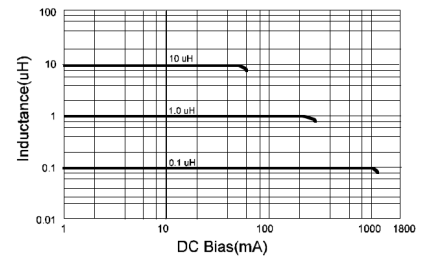


Temperature Characteristics

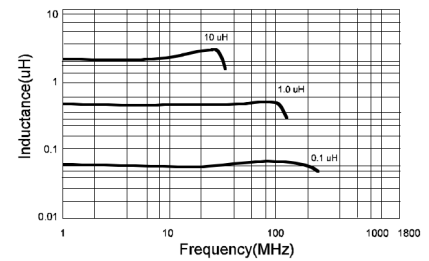


3216

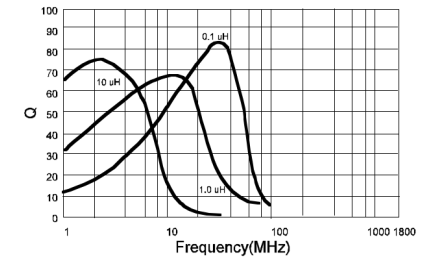
DC Bias Characteristics



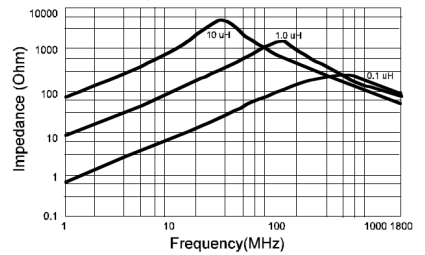
Inductance Characteristics



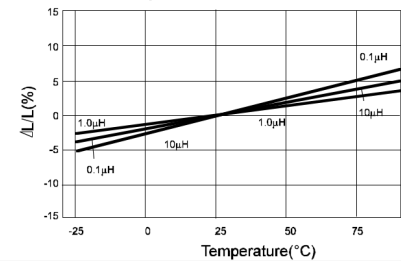
Q Characteristics



Impedance Characteristics

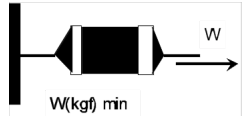
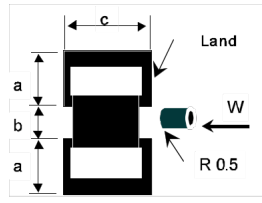
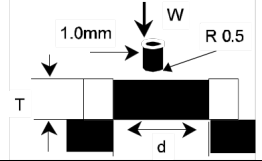


Temperature Characteristics



FERRITE INDUCTORS

Reliability and Test Conditions

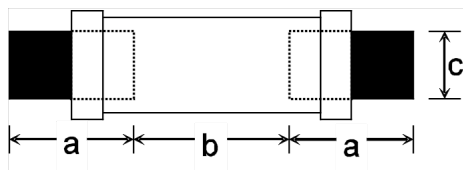
ITEM	REQUIREMENTS			TEST CONDITION
	1608	2012	3216	
Operating temp.range	-55°C~+125°C			-
Storage temp. & humidity range	40°C max. , 70% RH max.			at packing condition
Resistance to solder heat	1. No damage such as cracks should be caused in chip element. 2. More than 75% of the terminal electrode shall be covered with new solder. 3. Inductance change: $\pm$ within 5% 4. Quality factor change: $\pm$ within 30%			Preheat temperature: 100 to 150°C Preheat time: 1min Solder temperature: $260 \pm 10^\circ\text{C}$ Dipping time: $10 \pm 0.5\text{sec.}$
Solderability	1. More than 90% of the terminal electrode shall be covered with new solder. 2. Inductance change : $\pm$ within 5% 3. Quality factor change : $\pm$ within 30%			Preheat temperature: 100 to 150°C Preheat time: 1min Solder temperature: $230 \pm 10^\circ\text{C}$ Dipping time: $3 \pm 1\text{sec.}$
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	2.5
Adhesion of Terminal electrode (Flexure strength)	1. No mechanical damage 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.

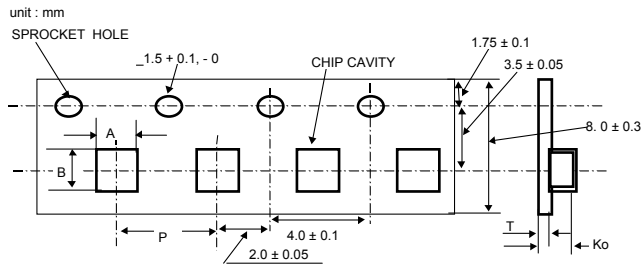
Standard quantity for packing

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

*Packing method can be changed upon request.

Tape Dimensions

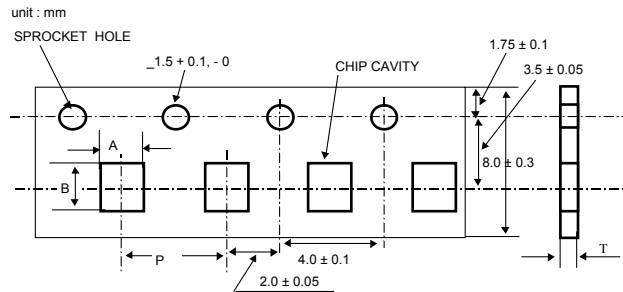
Embossing 8mm



unit: mm

Type	A ± 0.1	B ± 0.1	P ± 0.1	K ₀ ± 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

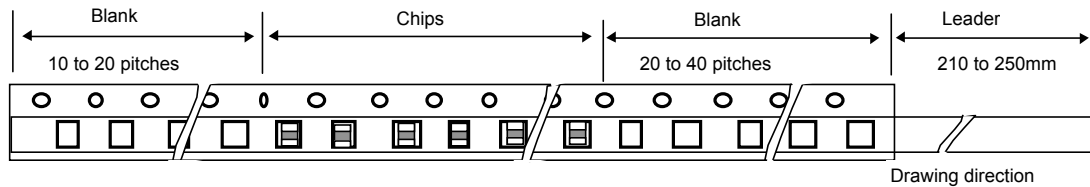
Paper



unit: mm

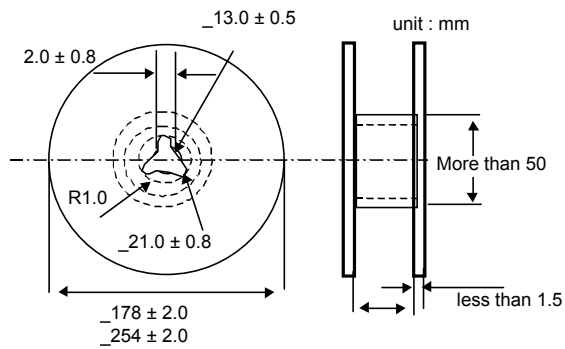
Type	A ± 0.1	B ± 0.1	P ± 0.1	T (max.)
1608	1.00	1.80	2.0	1.1

Leader and Blank Portion



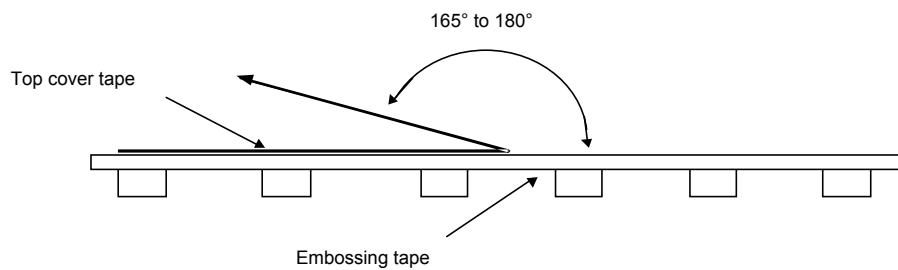
The pitch holes shift within ± 0.3 for cumulative 10 pitches.

Reel Dimensions



Type	W (mm)
1608, 2012, 3216	9.0 ± 0.3

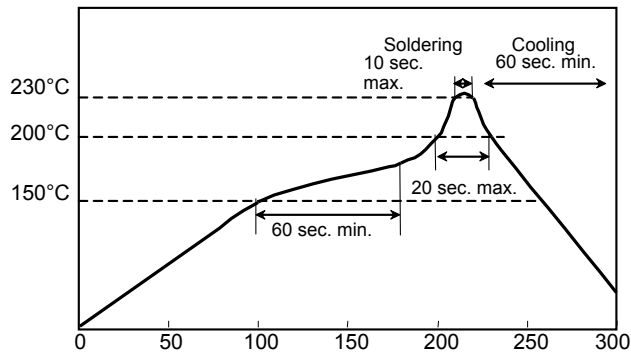
Top Cover Tape Strength



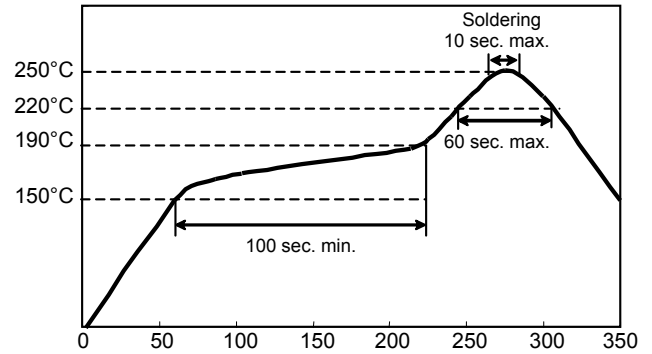
The force for tearing off top cover tape is 20 to 70 grams in the arrow direction.

Soldering Profile

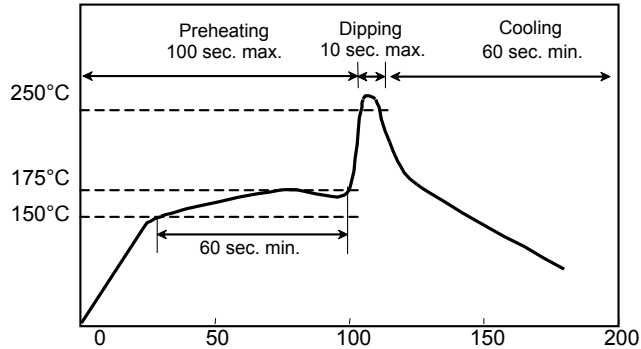
REFLOW SOLDERING(Peak 230°C)



REFLOW SOLDERING (Peak 250°C)



FLOW SOLDERING



MANUAL SOLDERING

