

# CHIP FERRITE BEADS ARRAY

## Features

1. Available in a wide range of impedance values and providing excellent EMI suppression characteristics for various types of noise.
2. Line(3,4) is achievable with a single chip, it can be very usefully adopted in high density circuit designs.
3. Heat generation and crosstalk between adjacent circuits are minimized.
4. Excellent solderability.

## Applications

1. Waveform correction in personal computers, electric equipment, communication equipment, OA equipment, and provides radiated noise countermeasures in interfaces and harness connecting parts.
2. Prevents noise intrusion in video, LCD module, etc.
3. Parallel signal line.

## Ordering Information

$\frac{HB-3}{(1)}$   $\frac{M}{(2)}$   $\frac{3216}{(4)}$   $\frac{\text{§}}{(5)}$   $\frac{-121}{(6)}$   $\frac{J}{(7)}$   $\frac{T}{(8)}$

### (1) Series

HB : For signal line

### (2) Type

3 : 3 Array

4 : 4 Array

### (3) Material & Design

H : For general purpose

S : For high speed

M : For high impedance type

T, V : For Low speed

### (4) Diminsions

The first two digits : length(mm)

The last two digits : width(mm)

### (5) Thickness

A : 0.9mm max

B : 0.7mm max

C : 1.2mm max

### (6) Impedance(at 100MHz)

The first two digit are significant.

The last digits is the number of zeros following.

### (7) Termination

J : Nickel barrier

### (8) Packing

B : Bulk Pack

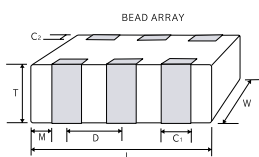
T : Tape & Reel ( ' " 178mm [ 7 inches ] )

L : Tape & Reel ( ' " 254mm [ 10 inches ] )

## Shape and Dimensions

### 3 Array

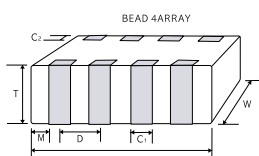
unit ; mm[inches]



Type		L	W	T	C' §	C'	D	M
HB-3 3216-	A	3.20±0.2 [.126±.008]	1.60±0.2 [.063±.008]	0.80±0.1 [.031±.004]	1.50±0.15 [.020±.006]	0.20~0.45 [.008~.018]	1.0±0.2 [.039±.008]	0.30±0.2 [.012±.008]
	B	3.20±0.2 [.126±.008]	1.60±0.2 [.063±.008]	0.60±0.1 [.024±.004]	0.50±0.15 [.020±.006]	0.20~0.45 [.008~.018]	1.0±0.2 [.039±.008]	0.30±0.2 [.012±.008]

unit ; mm[inches]

### 4 Array



Type		L	W	T	C' §	C'	D	M
HB-4 3216-	A	3.20±0.2 [.126±.008]	1.60±0.2 [.063±.008]	0.80±0.1 [.031±.004]	0.40±0.15 [.016±.006]	0.20~0.45 [.008~.018]	0.80±0.1 [.031±.004]	0.20±0.1 [.008±.004]
	B	3.20±0.2 [.126±.008]	1.60±0.2 [.063±.008]	0.60±0.1 [.024±.004]	0.40±0.15 [.016±.006]	0.20~0.45 [.008~.018]	0.80±0.1 [.031±.004]	0.20±0.1 [.008±.004]
	C	3.20±0.2 [.126±.008]	1.60±0.2 [.063±.008]	1.10±0.1 [.043±.004]	0.40±0.15 [.016±.006]	0.20~0.45 [.008~.018]	0.80±0.1 [.031±.004]	0.20±0.1 [.008±.004]

unit ; mm[inches]

Type		L	W	T	C' §	C'	D	M
HB-4 2010-	B	2.00±0.15 [.079±.006]	1.00±0.15 [.039±.006]	0.60±0.1 [.024±.004]	0.25±0.10 [.010±.004]	0.3 max [.012 max]	0.40±0.10 [.016±.004]	0.2 max [.008 max]

## Specifications

Part No.	Z  at 100s ( ¥ )		DC Resistance (s ) max.	Rated Current (mA) max.
	typ.	min.		
HB-3H3216 -300	30	22	0.10	200
HB-3M3216 -121	120	90	0.20	100
HB-3M3216 -201	200	150	0.30	100
HB-3M3216 -301	300	225	0.45	100
HB-3M3216 -601	600	450	0.50	100
HB-3M3216 -102	1000	750	0.80	100
HB-4H3216 -300	30	22	0.10	200
HB-4M3216 -600	60	45	0.12	200
HB-4M3216 -800	80	60	0.15	150
HB-4M3216 -121	120	90	0.20	100
HB-4M3216 -201	200	150	0.30	100
HB-4M3216 -301	300	225	0.45	100
HB-4M3216 -471	470	353	0.45	100
HB-4M3216 -601	600	450	0.50	100
HB-4M3216 -102	1000	750	0.80	100
HB-4T3216 -600	60	45	0.12	200
HB-4T3216 -121	120	90	0.20	200
HB-4T3216 -201	200	150	0.30	150
HB-4T3216 -301	300	225	0.45	150
HB-4T3216 -601	600	450	0.50	100
HB-4T3216 -102	1000	750	0.80	50
HB-4S3216 -500	50	37	0.20	200
HB-4S3216 -800	80	60	0.25	200
HB-4S3216 -121	120	90	0.25	200
HB-4S3216 -201	200	150	0.30	200
HB-4S3216 -301	300	225	0.40	200
HB-4V3216 -400	40	30	0.15	200
HB-4V3216 -600	60	45	0.20	200
HB-4V3216 -800	80	60	0.20	200
HB-4V3216 -121	120	90	0.30	150
HB-4V3216 -201	200	150	0.40	100
HB-4V3216 -301	300	225	0.50	100
HB-4M2010 -100	10	7.5	0.10	200
HB-4M2010 -400	40	30	0.15	200
HB-4M2010 -600	60	45	0.30	200
HB-4M2010 -800	80	60	0.30	200
HB-4M2010 -121	120	90	0.40	150
HB-4M2010 -201	200	150	0.60	100
HB-4M2010 -301	300	225	0.80	50
HB-4T2010 -100	10	7.5	0.10	200
HB-4T2010 -400	40	30	0.15	200
HB-4T2010 -600	60	45	0.30	200
HB-4T2010 -800	80	60	0.30	200
HB-4T2010 -121	120	90	0.40	150
HB-4T2010 -201	200	150	0.60	100
HB-4T2010 -301	300	225	0.80	50
HB-4S2010 -100	10	7.5	0.20	200
HB-4S2010 -300	30	23	0.30	200
HB-4S2010 -600	60	45	0.40	150
HB-4S2010 -101	100	75	0.50	150

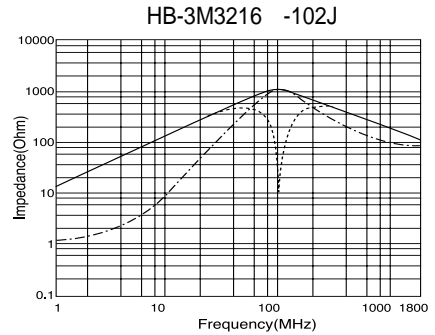
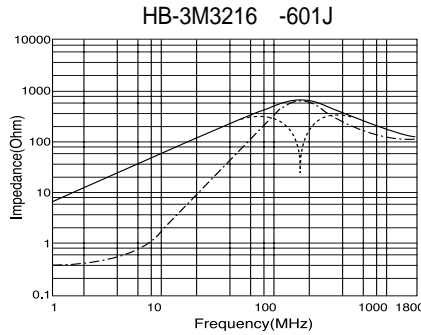
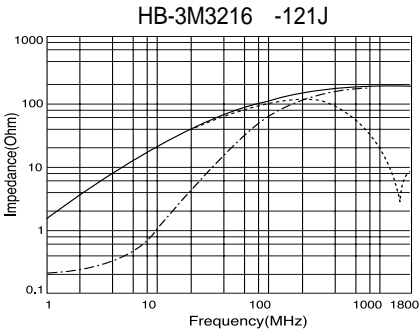
; Parts with other electrical characteristics can be provided upon customer ;\$request.

; Test equipment : HP4291A + HP16192A

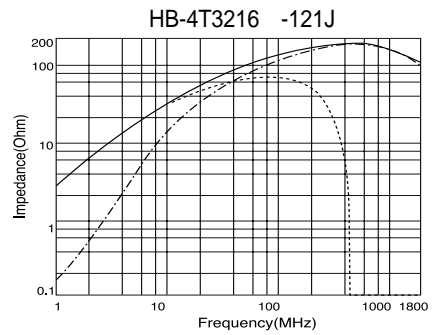
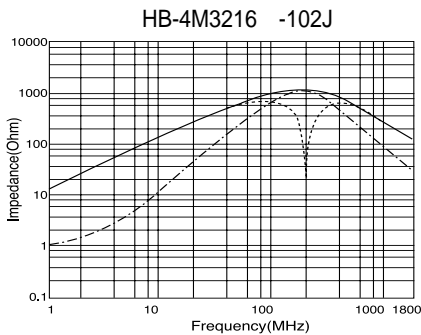
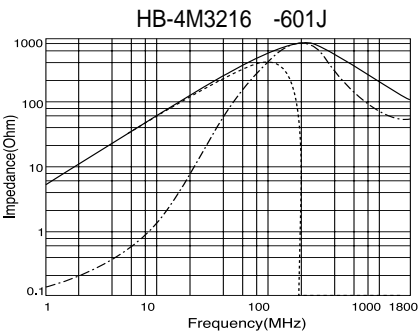
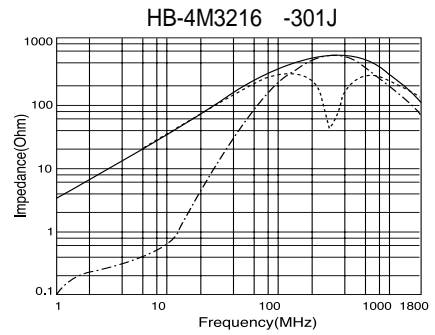
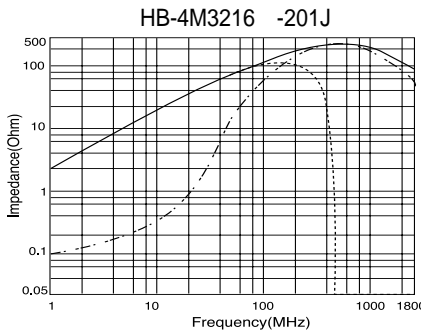
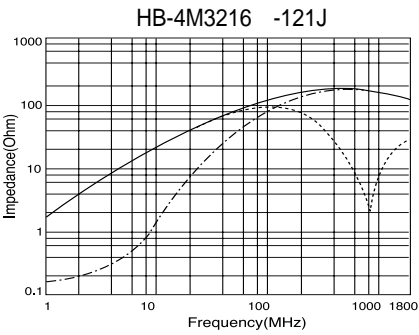
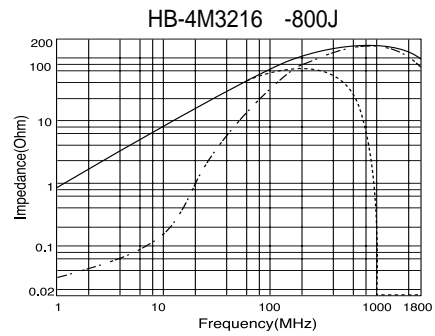
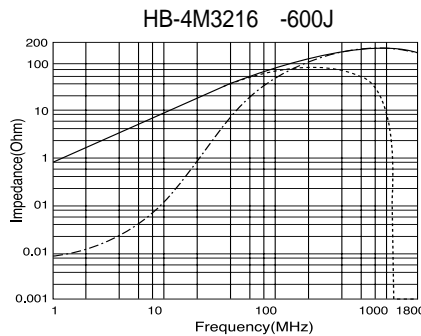
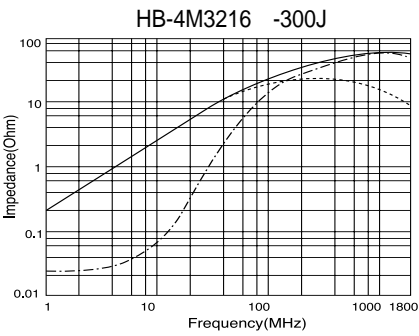
Electrical Characteristics

i / 3 Array

—Z— R— X---



i / 4 Array (3216 Series)

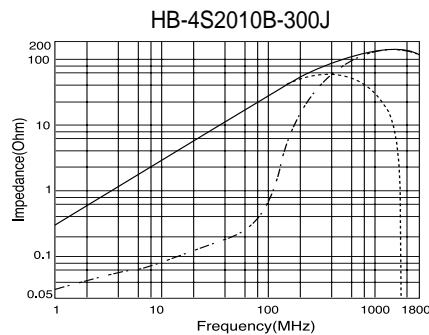
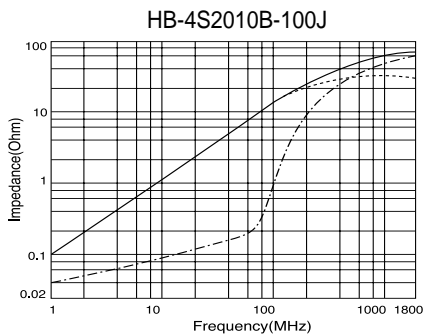
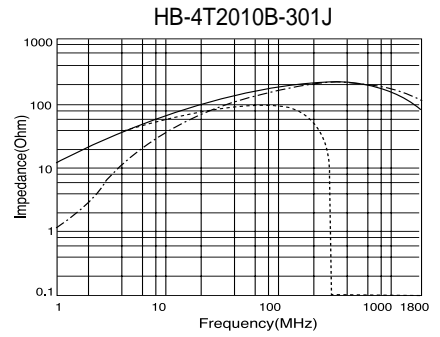
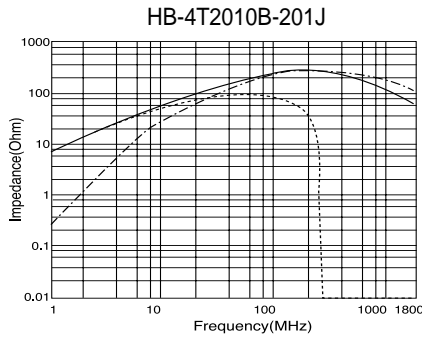
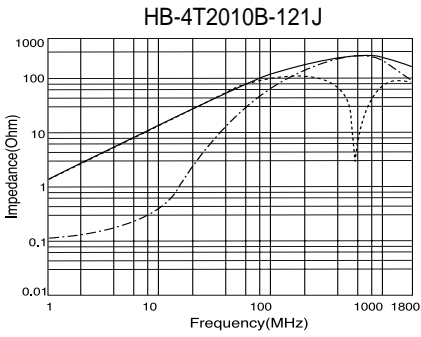
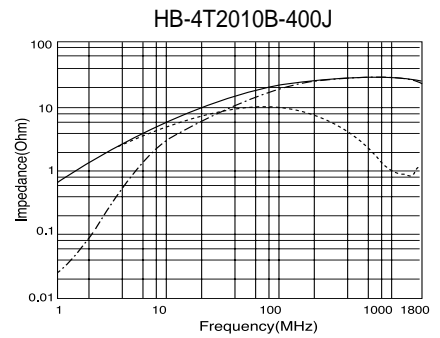
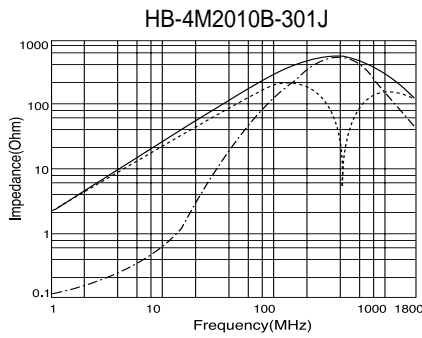
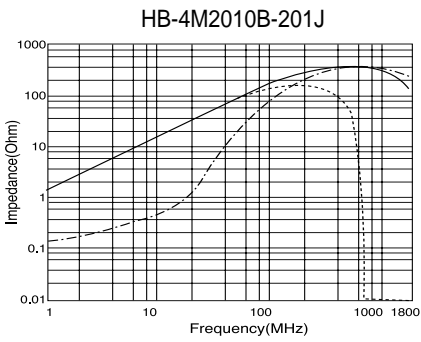
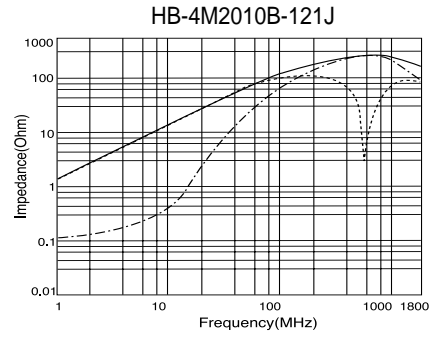
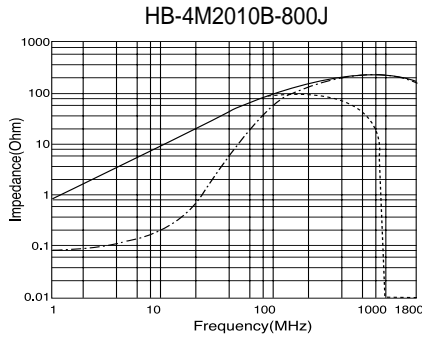
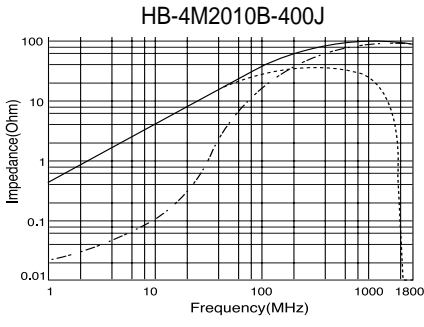




**Features**

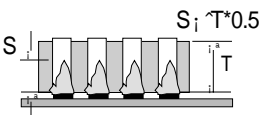
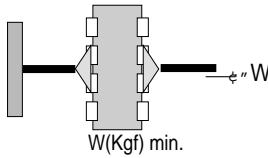
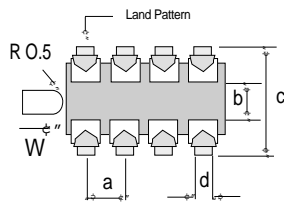
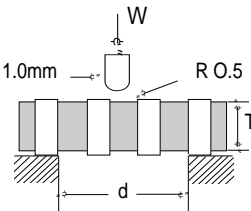
i /4 Array (2010 Series)

—Z R— X---



# RELIABILITY AND TEST CONDITIONS

## CHIP FERRITE BEADS ARRAY

ITEM	REQUIREMENTS				TEST CONDITION	
	3 array	4 array	2010 4 array			
Operating temp. range	-55 ; ~+125 ;				—	
Storage temp. & humidity range	40 ; 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. Impedance change : ; within 30%				Preheat temperature : 100 to 150 ; Preheat time : 1min. Solder temperature : 260 ; 10 ; Dipping time : 10 ; 0.5sec.	
Solderability	1. More than 90% of the terminal electrode shall be covered with new solder. 2. Impedance change : ; within 30%				Preheat temperature : 100 to 150 ; Preheat time : 1min. Solder temperature : 230 ; 10 ; Dipping time : 3 ; 1sec.	
Reflow soldering	1. More than 50% of the terminal electrode shall be covered with new solder. <div style="text-align: center; margin-top: 10px;">  </div>				Preheat temperature : 150 ; Preheat time : 1min. Solder temperature : 230 ; Soldering time : 10 sec. max. (Reflow soldering profile)	
Tensile strength (Terminal strength)	1. No mechanical damage <div style="text-align: right; margin-top: 10px;">             unit:Kgf (W)              ( ) ; T<sub>i</sub> max. 0.7mm           </div>					
	W	1.2(1.0)	1.2(1.0)	0.6		W(Kgf) min.
Adhesion of terminal electrode (Flexure strength)	1. No mechanical damage <div style="text-align: right; margin-top: 10px;">             unit: mm (a,b,c) , Kgf (W)           </div>					
	a	1.0	0.8	0.5		-
	b	0.8	0.8	0.5		-
	c	3.0	3.0	2.0		-
	d	0.5	0.4	0.25		-
	W	5.0	5.0	2.0		-
Body strength (Bending strength)	1. The body shall not be damaged by forces applied on the right. <div style="text-align: right; margin-top: 10px;">             unit: mm (d) , Kgf (W)           </div>					
	d	2.0	2.0	1.3		-
	W	3.0	3.0	2.0		-

## CHIP FERRITE BEADS ARRAY

ITEM	REQUIREMENTS			TEST CONDITION
	3 array	4 array	2010 4 array	
Drop	1. No mechanical damage 2. Impedance change : $\pm$ within 30%			Drop 10 times on a concrete floor from a height of 91cm.
Vibration	1. No mechanical damage 2. Impedance change : $\pm$ within 30%			Frequency : 10-55-10Hz Amplitude : 1.52 mm Direction and time : X,Y,Z directions for 2 hours
Thermal shock (Temperature cycle)	1. No mechanical damage 2. Impedance change : $\pm$ within 30%			Step1. -40 $\pm$ 3 ; 30 $\pm$ 3min. Step2. 85 $\pm$ 3 ; 30 $\pm$ 3min. Number of cycle : 100 times
Heat load resistance	1. No mechanical damage 2. Impedance change : $\pm$ within 30%			Temperature : 85 $\pm$ 2 ; 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. Impedance change : $\pm$ within 30%			Temperature : -40 $\pm$ 5 ; Time : 1,000 hours Measured at room ambient temperature after placing for 24 hours
Humidity resistance	1. No mechanical damage 2. Impedance change : $\pm$ within 30%			Temperature : 40 $\pm$ 2 ; 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. Impedance change : $\pm$ within 30%			Temperature : 40 $\pm$ 2 ; Humidity : 90-95% RH Applied current : rated current Time : 500 hours Measured at room ambient temperature after placing for 24 hours
Cross talk	1. Cross talk : Max - 30dB $\pm$ /Cross talk=20 log(Vx/Vin)			Drop voltage : 5 V Pulse Width : 100 ns Pulse duration: 16.6 ms Test diagram : Fig.1

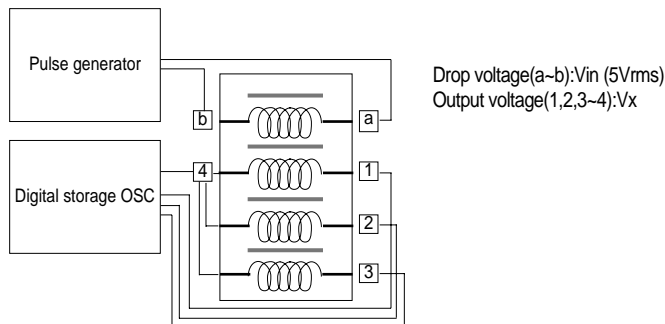


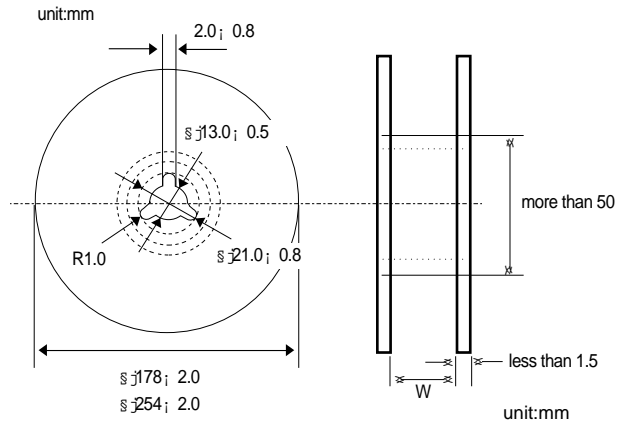
Fig.1 Cross talk test diagram

# PACKING

## STANDARD QUANTITY

Type	Q <sub>i</sub> (PCS)	REMARKS
0603	15,000	
	10,000	
1005	50,000	BULK CASSETTE
	10,000	
1608	4,000	4mm pitch
	8,000	
2012	3,000	
	7,000	254mm
3216	3,000	
	7,000	254mm
4516	3,000	
4532	1,500	
5750	1,000	

## REEL DIMENSION

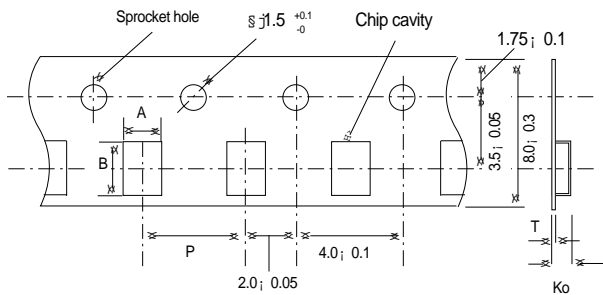


Type	W[mm]
0603, 1005, 1608, 2012, 3216 Array	9.0 ± 0.3
4516, 4532, 5750	13.0 ± 0.3

## TAPING DIMENSION / 8mm wide

Embossing Tape

unit:mm

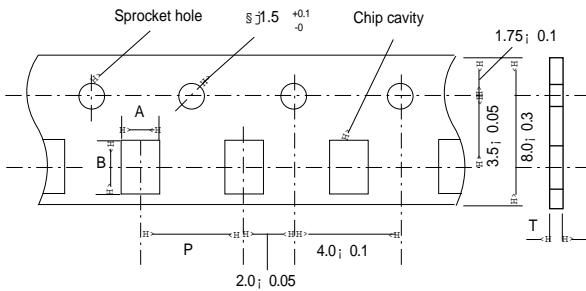


PRODUCT	Type	A <sub>i</sub> 0.1	B <sub>i</sub> 0.1	P <sub>i</sub> 0.1	Ko <sub>i</sub> 0.1	T(max.)
CHIP BEADS	1608	1.00	1.80	4.0	0.95	0.3
CHIP BEADS ARRAY						
CHIP FERRITE INDUCTOR	2012	1.45	2.25	4.0	0.08	0.3
CHIP EMI SUPPRESSION FILTER					1.00	
CHIP EMI FILTER ARRAY	2012	1.90	2.25	4.0	1.35	0.3
CHIP LC FILTER						
CHIP COMMON MODE FILTER	3216	1.90	3.60	4.0	1.00	0.3
CHIP FEEDTHRU						
CHIP VARISTOR	3216	1.90	3.60	4.0	1.35	0.3
CHIP VARISTOR ARRAY						
CHIP SURGE ABSORBER						



; Paper Tape

unit:mm

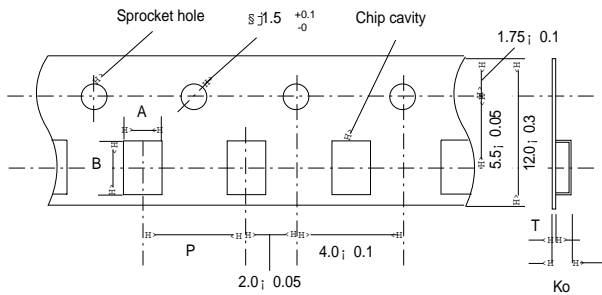


PRODUCT	Type	A <sub>i</sub> 0.1	B <sub>i</sub> 0.1	P <sub>i</sub> 0.1	T(max.)
MICRO INDUCTOR CHIP BEADS CHIP INDUCTOR CHIP VARISTOR CHIP SURGE ARRAY	0603	0.37 ± 0.02	0.67 ± 0.02	4.0 ± 0.1	0.45
	1005	0.65 ± 0.1	1.15 ± 0.1	2.0 ± 0.1	0.8
	1608	1.00 ± 0.1	1.8 ± 0.1	2.0 ± 0.1	1.1

TAPING DIMENSION / 12mm wide

; Embossing Tape

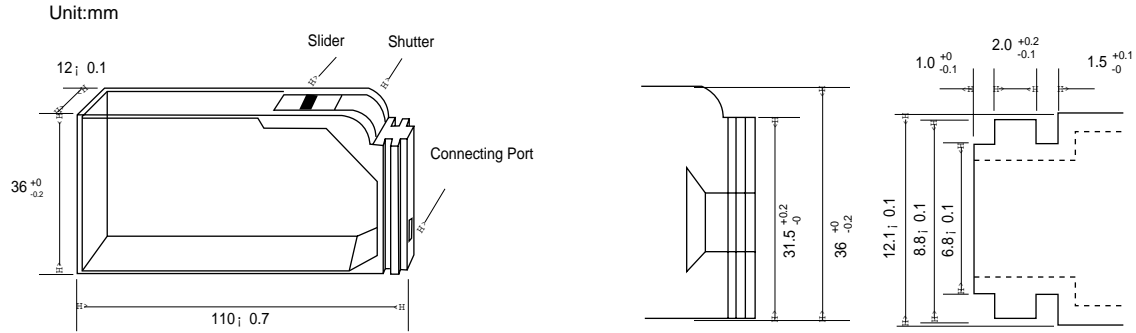
unit:mm



unit ; mm

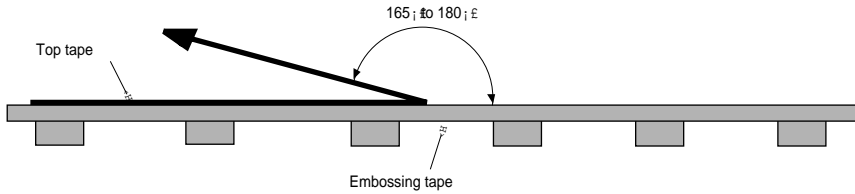
PRODUCT	Type	A <sub>i</sub> 0.1	B <sub>i</sub> 0.1	P <sub>i</sub> 0.1	Ko <sub>i</sub> 0.1	T(max.)
CHIP BEADS CHIP FEEDTHRU	4516	1.90	4.90	4.0	1.00	0.3
	4516	1.90	4.90	4.0	1.35	0.3
	4532	3.60	4.90	8.0	1.40	0.3
	5750	5.20	6.10	8.0	2.05	0.3

## § 1005 BULK CASSETTE DIMENSION



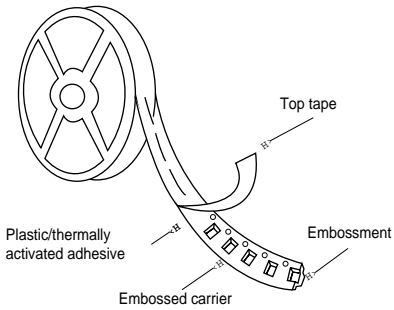
## § TOP TAPE STRENGTH

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

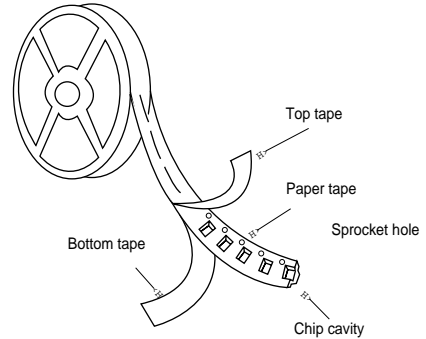


## § TAPING MATERIAL

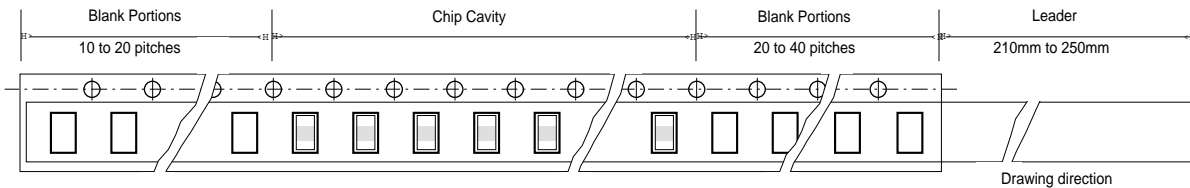
⌋ Embossed Tape



⌋ Paper Tape



## § LEADER AND BLANK PORTION

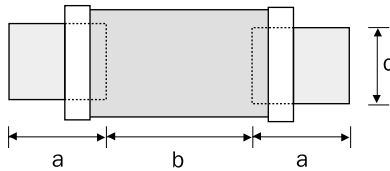


⌋ The pitch holes shift within  $\pm 0.3$ mm for cumulative 10 pitches.

# LAND PATTERN DESIGN

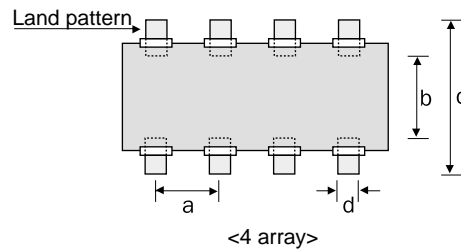
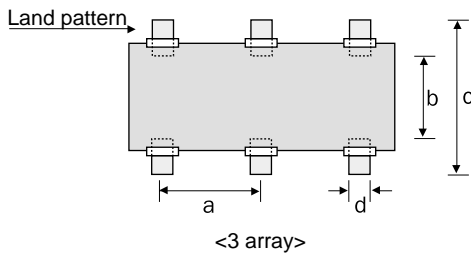
## BEAD, INDUCTOR, VARISTOR, SURGE ABSORBER

unit ; mm



SIZE	a	b	c
0603	0.22	0.25	0.32
1005	0.7	0.4	0.5
1608	1.0	0.6	0.8
2012	1.0	1.0	1.0
3216	1.1	2.2	1.4
4516	1.5	3.0	1.4
4532	1.8	3.0	3.0
5750	2.0	4.0	5.8

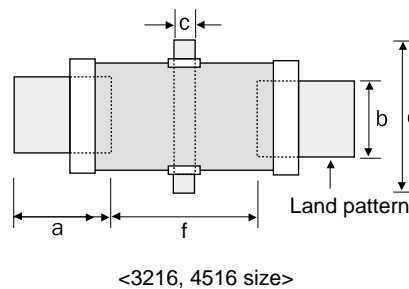
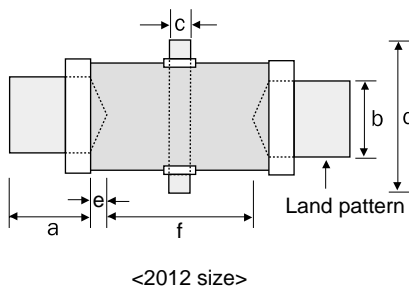
## ARRAY



unit ; mm

SIZE	array	a	b	c	d
3216	3 array	1.0	0.8	3.0	0.5
3216	4 array	0.8	0.8	3.0	0.4

## EMI SUPPRESSION FILTER, LC FILTER, FEEDTHRU CAPACITOR

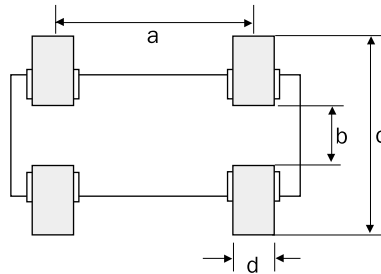


unit ; mm

SIZE	a	b	c	d	e	f
2012	1.0	1.0	0.4	2.0	0.1	1.4
3216	1.1	1.4	0.6	2.4	-	2.4
4516	1.5	1.4	0.8	2.4	-	3.4

# LAND PATTERN DESIGN

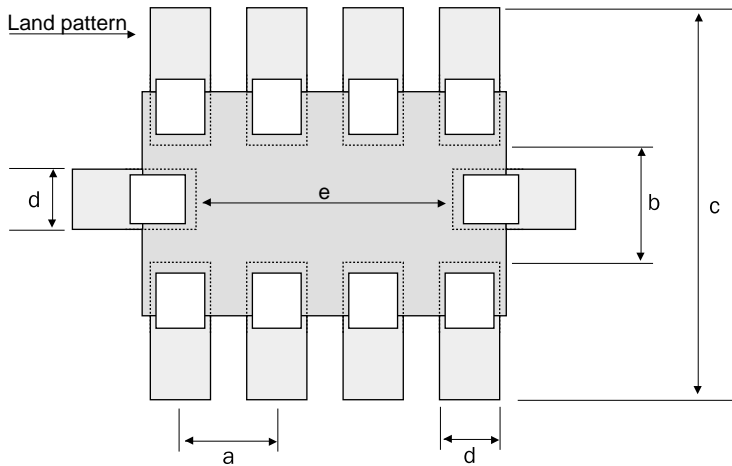
## COMMON MODE FILTER, VARISTOR ARRAY



unit ; mm

SIZE	POLE(Array)	a	b	c	d
2012	2 POLE	1.20	0.60	2.60	0.40
2012	2 Array	0.76	0.38	2.16	0.46
3216	2 POLE	2.10	0.80	3.00	0.60
3216	2 Array	1.96	0.76	2.54	0.90

## EMI FILTER ARRAY

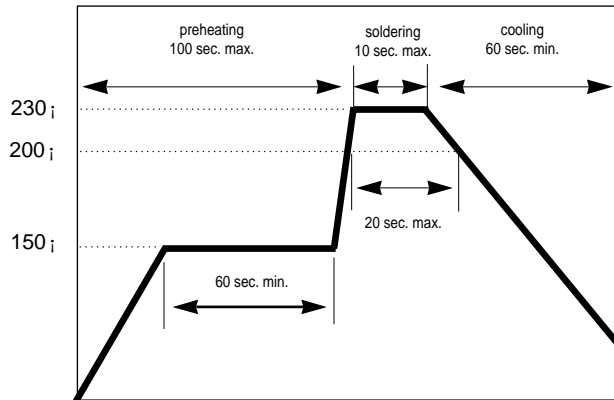


unit ; mm

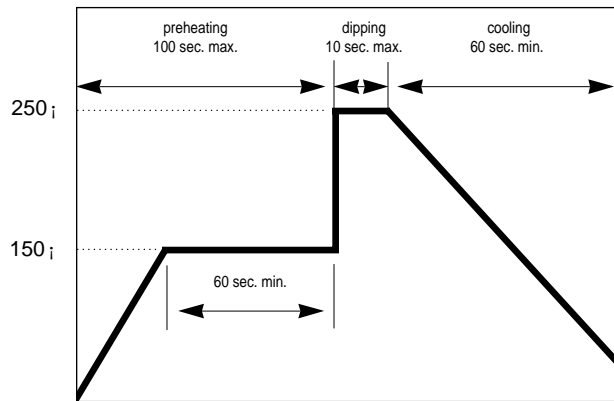
SIZE	POLE(Array)	a	b	c	d	e
3216	4 Array	0.8	0.8	3.0	0.4	2.4

# SOLDERING PROFILE

## REFLOW SOLERING PROFILE



## FLOW SOLDERING PROFILE



## MANUAL SOLDERING

