

# Ferrite Chip EMI Suppressors

## ACB Series

The ferrite chip EMI suppressor is a chip type ferrite bead for use as a measure to prevent EMI interference noises between electronic circuits. The ACB series is high density SMD type.

### FEATURES

- Three materials and four shapes are available, covering wide frequency bands. Any of the series, when properly selected, provides EMI prevention in a wide variety of circuits.
- Small type having a higher impedance per volume because of its structure based on our unique device. Highly effective in designing a higher density circuit.
- The form and size are in accordance with the EIAJ standard. This facilitates surface mounting by an existing automatic mounter.
- Excellent in physical properties, such as terminal strength, flexure strength, bending strength, solder heat resistance, and solderability.
- Applicable to both of reflow and flow soldering processes.

### PRODUCT IDENTIFICATION

HF70 ACB 201209 – □  
 (1) (2) (3) (4)

#### (1) Material name

Material name	HF70	HF50	HF30
$\mu_i$	1500	250	45
Temperature coefficient $\alpha\mu_i (\times 10^{-6}/^{\circ}\text{C})$	1 to 3	9 to 15	5 to 15
Bms (mT) at H [A/m]	280 [1600]	290 [1600]	320 [4000]
Tc ( $^{\circ}\text{C}$ ) min.	100	125	300
$\delta (\Omega\text{-m})$	$10^5$	$10^5$	$10^5$

• 1 (mT) = 10 (G), 1 (A/m) = 0.012566 (Oe)

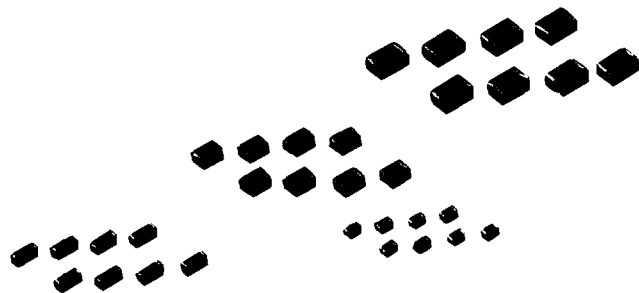
#### (2) Series name

#### (3) Dimensions L × W × T (mm) [inches]

201209	2.0 × 1.25 × 0.9 [.079 × .049 × .035]
321611	3.2 × 1.6 × 1.1 [.126 × .063 × .043]
322513	3.2 × 2.5 × 1.3 [.126 × .098 × .051]
453215	4.5 × 3.2 × 1.5 [.177 × .126 × .059]

#### (4) Packaging style

T	Taping ( $\phi$ 178 mm [7.008 inches] reel)
TL	Taping ( $\phi$ 330 mm [12.992 inches] reel)
B	Bulk

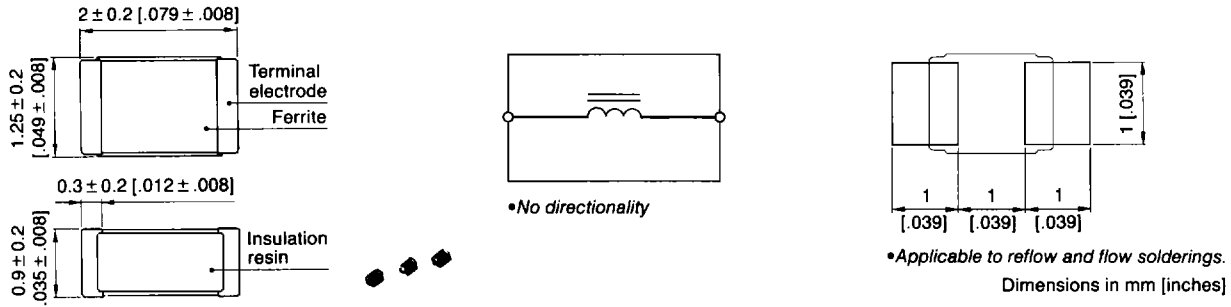


# Ferrite Chip EMI Suppressors

## ACB Series

### ACB201209 TYPE

#### SHAPES AND DIMENSIONS/CIRCUIT/RECOMMENDED PC BOARD PATTERN

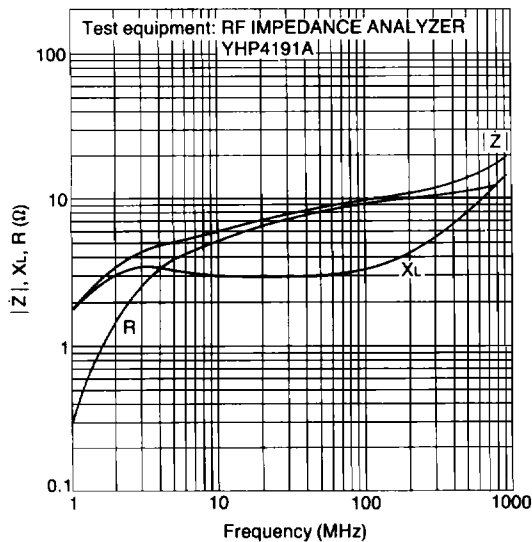


#### ELECTRICAL CHARACTERISTICS

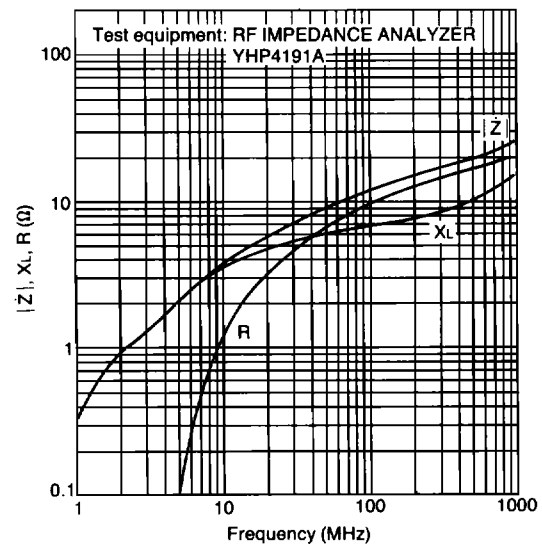
Part No.	Impedance (Ω) [100MHz]	DC resistance (Ω) max.	Rated current (mA) max.
HF70ACB201209-□*	10 ± 25%	0.1	600
HF50ACB201209-□	11 ± 25%	0.1	600
HF30ACB201209-□	7 ± 25%	0.1	600

\*□: Please specify the packaging style (T: φ178 mm [7.008 inches] reel taping, TL: φ330 mm [12.992 inches] reel taping, B: Bulk)

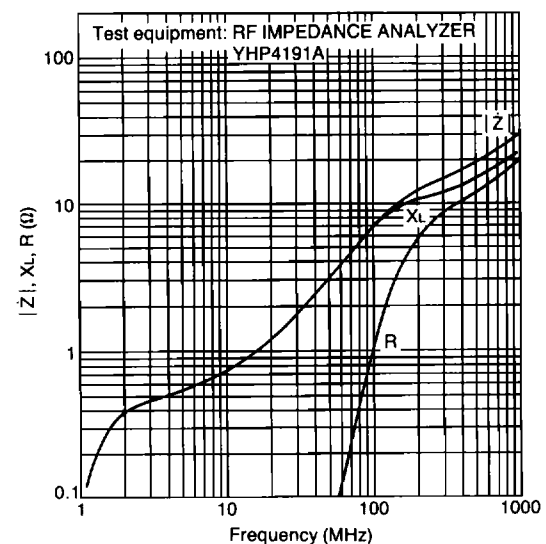
#### TYPICAL ELECTRICAL CHARACTERISTICS |Z|, XL, R vs. FREQUENCY CHARACTERISTICS HF70ACB201209



#### HF50ACB201209



#### HF30ACB201209

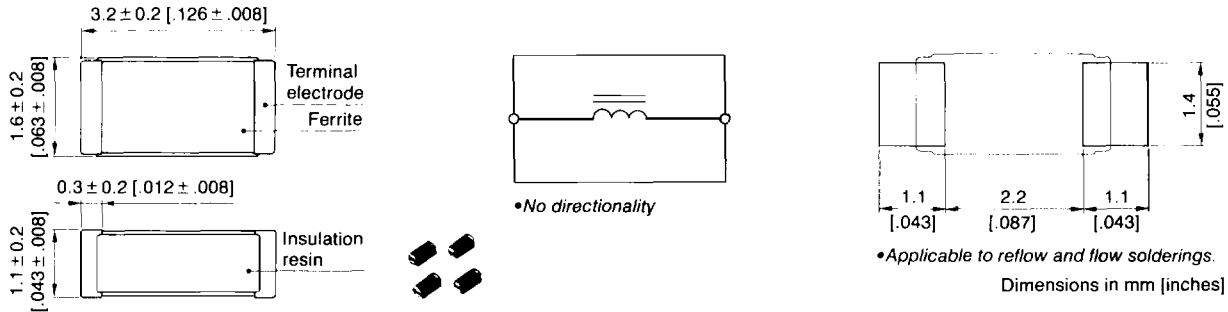


# Ferrite Chip EMI Suppressors

ACB Series

## ACB321611 TYPE

### SHAPES AND DIMENSIONS/CIRCUIT/RECOMMENDED PC BOARD PATTERNS

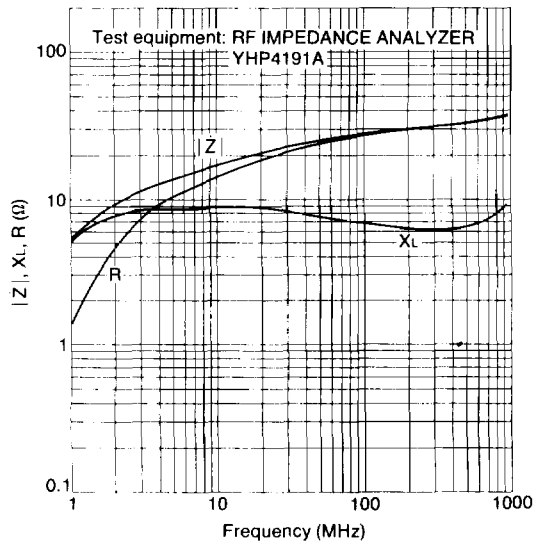


### ELECTRICAL CHARACTERISTICS

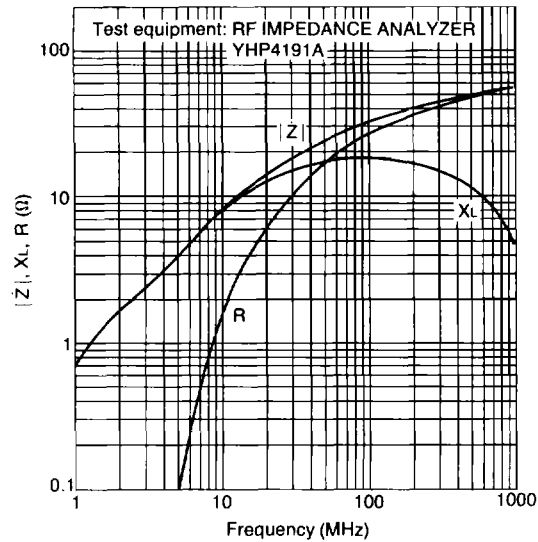
Part No.	Impedance (Ω) [100MHz]	DC resistance (Ω) max.	Rated current (mA) max.
HF70ACB321611-[T]	26 ± 25%	0.2	500
HF50ACB321611-[T]	31 ± 25%	0.2	500
HF30ACB321611-[T]	19 ± 25%	0.2	500

\* [T]: Please specify the packaging style (T: φ178 mm [7.008 inches] reel taping, TL: φ330 mm [12.992 inches] reel taping, B: Bulk)

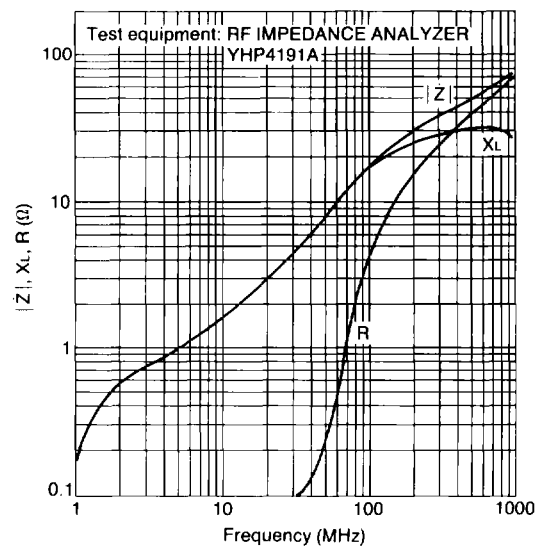
### TYPICAL ELECTRICAL CHARACTERISTICS |Z|, X<sub>L</sub>, R vs. FREQUENCY CHARACTERISTICS HF70ACB321611



### HF50ACB321611



### HF30ACB321611

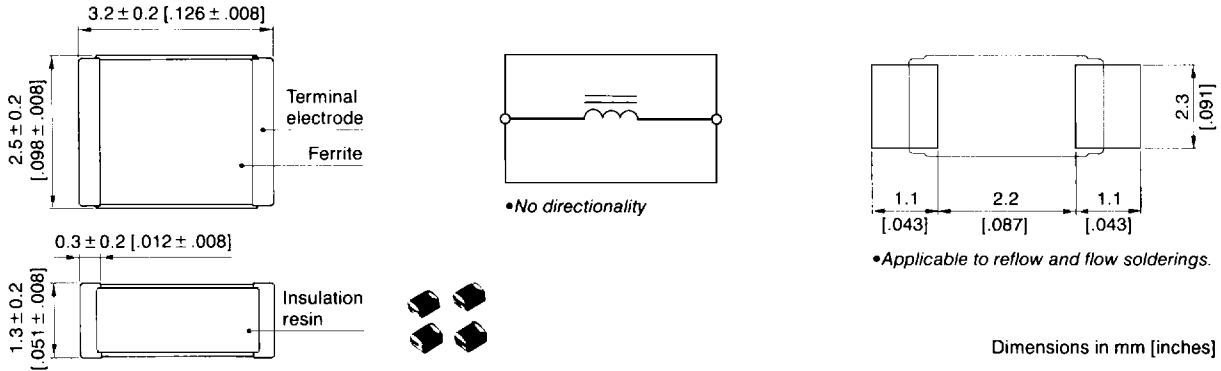


# Ferrite Chip EMI Suppressors

## ACB Series

### ACB322513 TYPE

#### SHAPES AND DIMENSIONS/CIRCUIT/RECOMMENDED PC BOARD PATTERNS

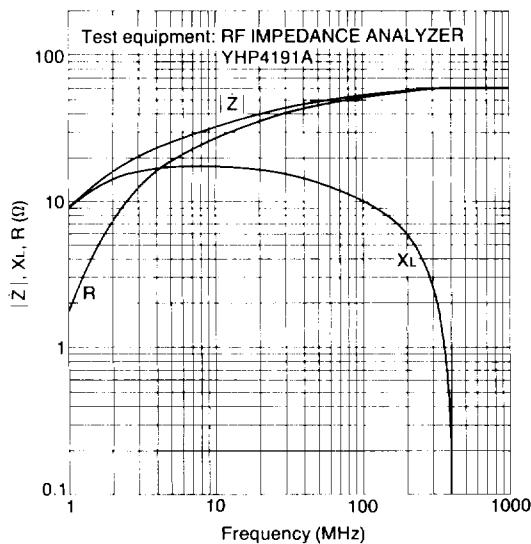


#### ELECTRICAL CHARACTERISTICS

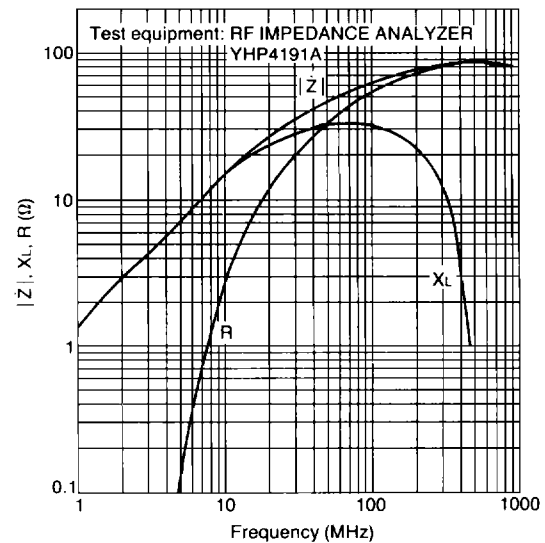
Part No.	Impedance (Ω) [100MHz]	DC resistance (Ω) max.	Rated current (mA) max.
HF70ACB322513-*	52 ± 25%	0.3	400
HF50ACB322513-	60 ± 25%	0.3	400
HF30ACB322513-	31 ± 25%	0.3	400

\* 1: Please specify the packaging style (T: φ178 mm [7.008 inches] reel taping, TL: φ330 mm [12.992 inches] reel taping, B: Bulk)

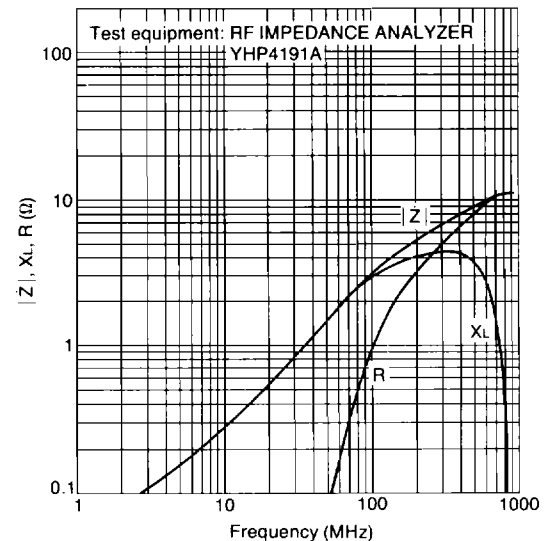
#### TYPICAL ELECTRICAL CHARACTERISTICS |Z|, XL, R vs. FREQUENCY CHARACTERISTICS HF70ACB322513



#### HF50ACB322513



#### HF30ACB322513

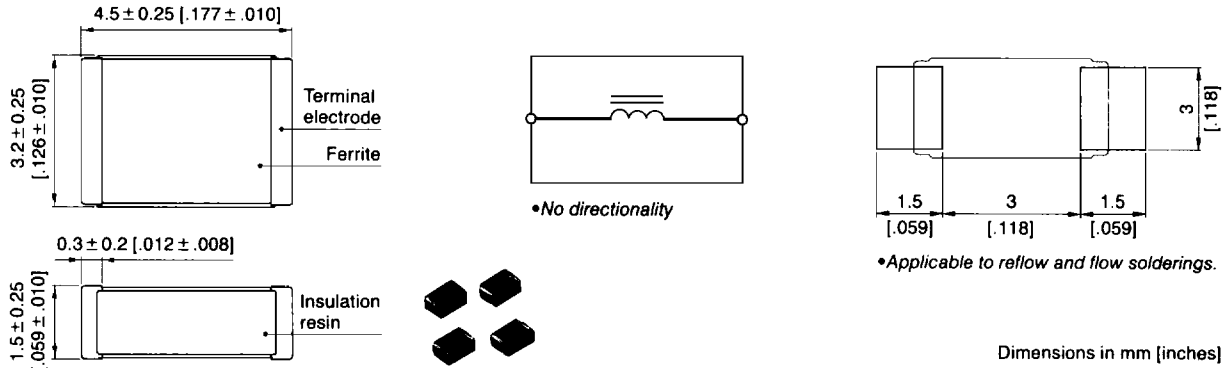


# Ferrite Chip EMI Suppressors

## ACB Series

### ACB453215 TYPE

#### SHAPES AND DIMENSIONS/CIRCUIT/RECOMMENDED PC BOARD PATTERNS



#### ELECTRICAL CHARACTERISTICS

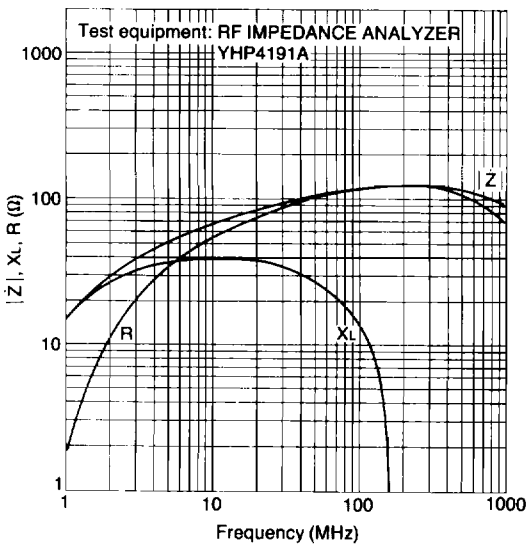
Part No.	Impedance (Ω) [100MHz]	DC resistance (Ω) max.	Rated current (mA) max.
HF70ACB453215-□*	120 ± 25%	0.4	300
HF50ACB453215-□	125 ± 25%	0.4	300
HF30ACB453215-□	70 ± 25%	0.4	300

\*[□]: Please specify the packaging style (T: φ178 mm [7.008 inches] reel taping, TL: φ330 mm [12.992 inches] reel taping, B: Bulk)

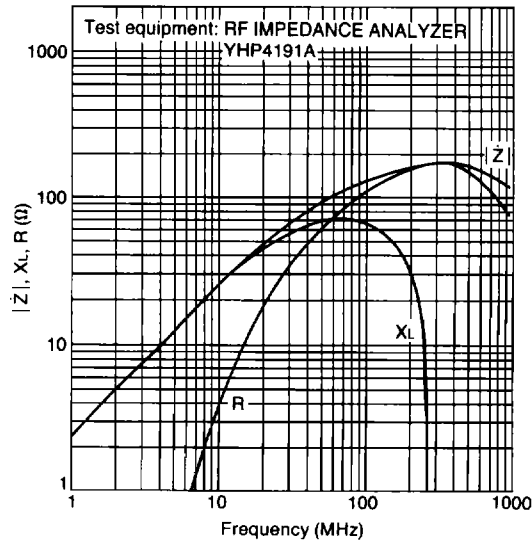
#### TYPICAL ELECTRICAL CHARACTERISTICS

##### |Z|, X<sub>L</sub>, R vs. FREQUENCY CHARACTERISTICS

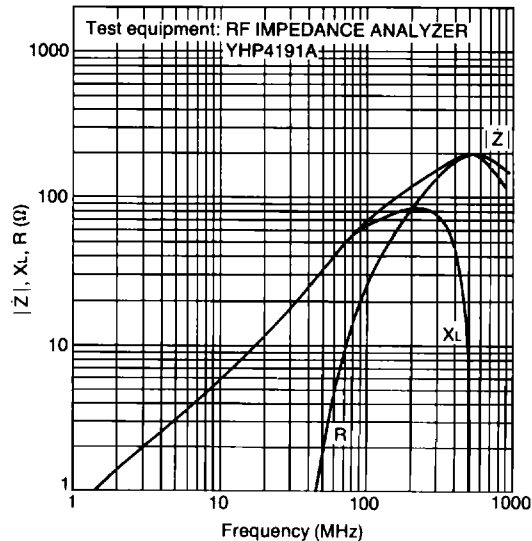
###### HF70ACB453215



###### HF50ACB453215



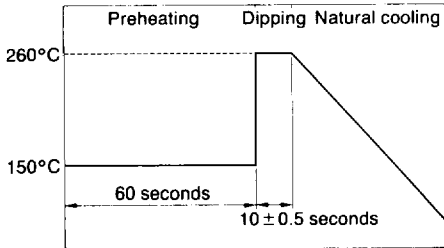
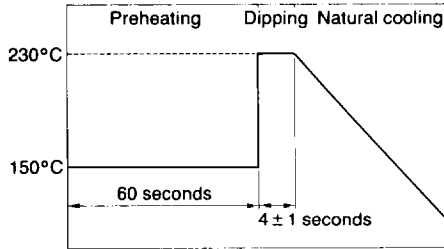
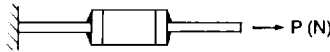
###### HF30ACB453215



# Ferrite Chip EMI Suppressors

## ACB Series

### RELIABILITY AND TEST CONDITIONS

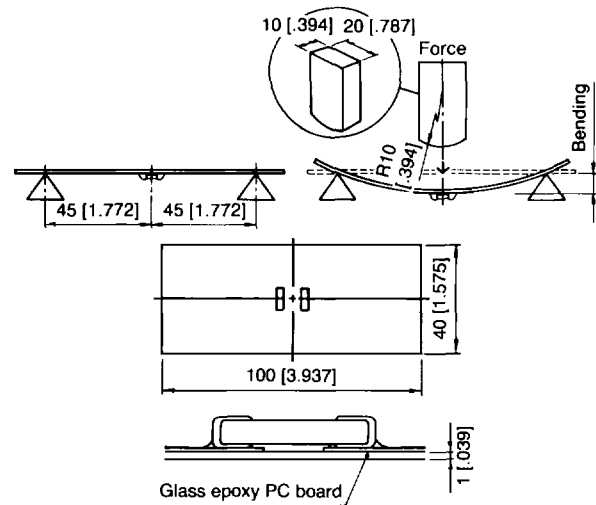
Item	Performance	Test condition										
Operating temperature range	-25 to +85°C											
Storage temperature and humidity ranges	40°C max., 70%RH max.											
Soldering heat resistance	The chip must have no cracks. More than 75% of the terminal electrode must be covered with solder. Impedance: Within $\pm 20\%$ of the initial value	Preheat: 150°C, 60 seconds Solder: H63A Solder temperature: $260 \pm 5^\circ\text{C}$ Flux: Rosin Dip time: $10 \pm 0.5$ seconds 										
Solderability	More than 90% of the terminal electrode must be covered with new solder.	Preheat: 150°C, 60 seconds Solder: H63A Solder temperature: $230 \pm 5^\circ\text{C}$ Flux: Rosin Dip time: $4 \pm 1$ seconds 										
Terminal strength	The terminal electrode and the ferrite must not be damaged by the forces applied on the right conditions.	After soldering a lead wire to a terminal electrode, and then apply a load P in the arrow direction.  <table border="1" data-bbox="1338 1417 1547 1564"> <thead> <tr> <th>Type</th> <th>P (N)</th> </tr> </thead> <tbody> <tr> <td>ACB201209</td> <td>5.9</td> </tr> <tr> <td>ACB321611</td> <td>9.8</td> </tr> <tr> <td>ACB322513</td> <td>9.8</td> </tr> <tr> <td>ACB453215</td> <td>14.7</td> </tr> </tbody> </table>	Type	P (N)	ACB201209	5.9	ACB321611	9.8	ACB322513	9.8	ACB453215	14.7
Type	P (N)											
ACB201209	5.9											
ACB321611	9.8											
ACB322513	9.8											
ACB453215	14.7											

# Ferrite Chip EMI Suppressors

## ACB Series

### RELIABILITY AND TEST CONDITIONS

Item	Performance	Test condition
Flexure strength	The terminal electrode and the ferrite must not be damaged by the forces applied on the right conditions.	After soldering a chip to a test substrate, bend the substrate by 2mm [.079 inches] and then return. Soldering shall be done in accordance with the recommended PC board pattern and reflow soldering.

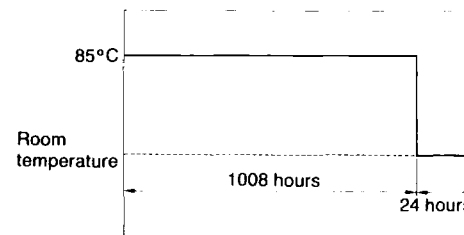


Dimensions in mm [inches]

High temperature resistance

Appearance: Ferrite shall not be damaged.  
Impedance: Within  $\pm 20\%$  of the initial value

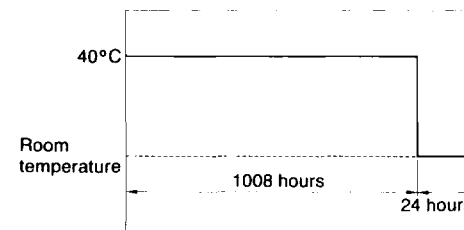
Temperature:  $85 \pm 2^\circ\text{C}$   
Applied current: Rated current (maximum value)  
Testing time:  $1008 \pm 12$  hours  
Measurement: After placing for 24 hours min.



Humidity resistance

Appearance: Ferrite shall not be damaged.  
Impedance: Within  $\pm 20\%$  of the initial value

Humidity: 90 to 95%RH  
Temperature:  $40 \pm 2^\circ\text{C}$   
Applied current: Rated current (maximum value)  
Testing time:  $1008 \pm 12$  hours  
Measurement: After placing for 24 hours min.

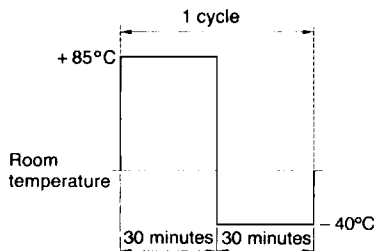


# Ferrite Chip EMI Suppressors

## ACB Series

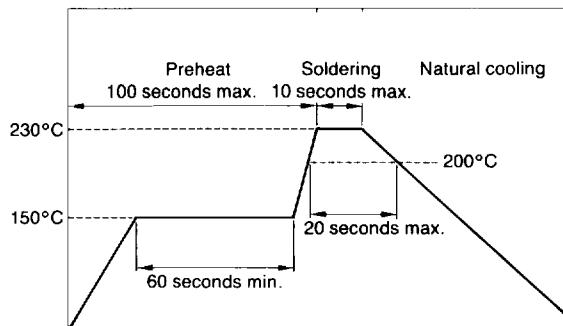
### RELIABILITY AND TEST CONDITIONS

Item	Performance	Test condition
Thermal shock	Appearance: Cracking, chipping or any other defects harmful to the characteristics shall not be allowed. Impedance: Within 20% of the initial value	Temperature: $-40^{\circ}\text{C}$ , $+85^{\circ}\text{C}$ , kept stabilized for 30 minutes each Cycle: 100 cycles Measurement: After placing for 24 hours min.
Low temperature storage life test	Appearance: Cracking, chipping or any other defects harmful to the characteristics shall not be allowed. Impedance: Within 20% of the initial value	Temperature: $-40 \pm 2^{\circ}\text{C}$ Testing time: $1008 \pm 12$ hours Measurement: After placing for 24 hours min.



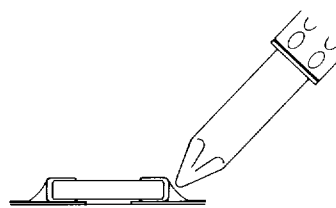
### RECOMMENDED SOLDERING CONDITIONS

#### REFLOW SOLDERING



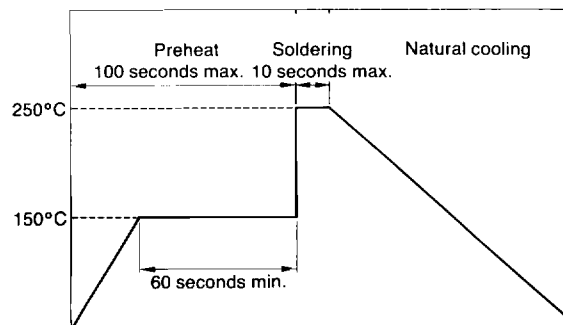
#### IRON SOLDERING

Perform soldering at  $280^{\circ}\text{C}$  on 30Wmax. within 5 seconds.  
Take care not to apply the tip of the soldering iron to the terminal electrodes.



#### FLOW SOLDERING

$6 \times 4$  solder should be used.



#### FLUX AND CLEANING

Rosin-based flux is recommended.

#### Cleaning Conditions

Solvent	Chlorine-based solvent (Do not use acid or alkali solvents.)
Time	1 minute min.
Ultrasonic output power	20W/l max.



# Ferrite Chip EMI Suppressors

## ACB Series

### PACKAGINGS

#### PACKAGING QUANTITIES

Type	T ( $\phi 178$ mm [7.008 inches] reel)	TL ( $\phi 330$ mm [12.992 inches] reel)
ACB201209	2000 pcs./reel	10000 pcs./reel
ACB321611	2000 pcs./reel	10000 pcs./reel
ACB322513	2000 pcs./reel	10000 pcs./reel
ACB453215	1000 pcs./reel	5000 pcs./reel

#### TAPE DIMENSIONS

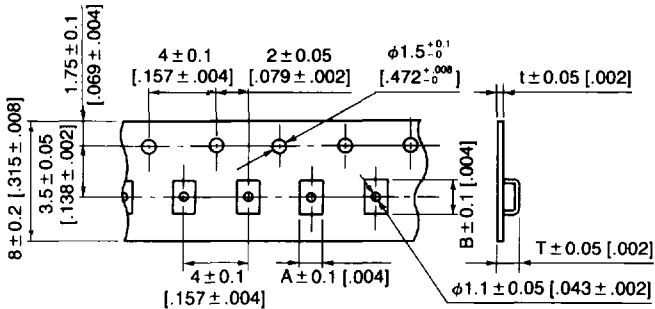


Fig. 1

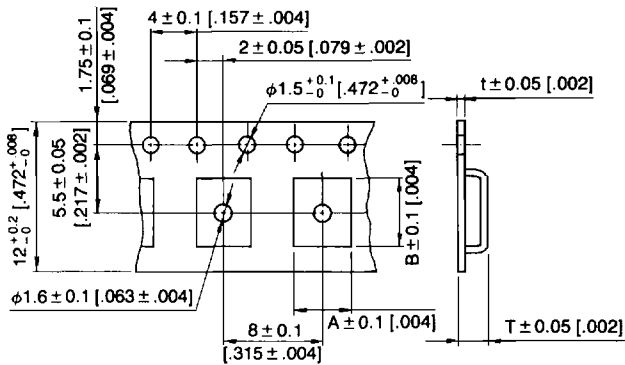
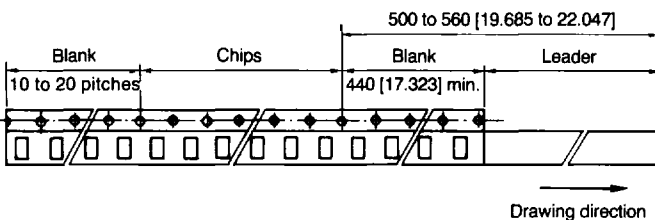


Fig. 2

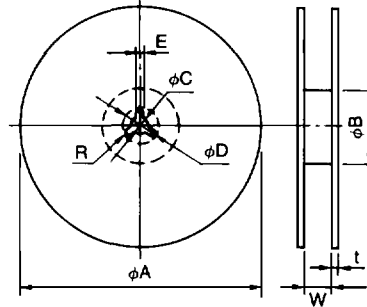
Dimensions in mm [inches]

Type	A	B	T	t	Fig.
ACB201209	1.55 [.061]	2.3 [.091]	1.2 [.047]	0.2 [.008]	1
ACB321611	1.9 [.075]	3.5 [.138]	1.4 [.055]	0.2 [.008]	1
ACB322513	2.9 [.114]	3.6 [.142]	1.7 [.067]	0.25 [.010]	1
ACB453215	3.6 [.142]	4.9 [.193]	2.05 [.081]	0.3 [.012]	2



#### REEL DIMENSIONS

Material: Plastic



Dimensions in mm [inches]

Symbol	T ( $\phi 178$ mm [7.008 inches] reel)	TL ( $\phi 330$ mm [12.992 inches] reel)
A	$\phi 178 \pm 2$ [7.008 ± .079]	$\phi 330 \pm 2$ [12.992 ± .079]
B	$\phi 60 \pm 1$ [2.362 ± .039]	$\phi 100 \pm 2$ [3.937 ± .079]
C	$\phi 13 \pm 0.8$ [.512 ± .031]	$\phi 13 \pm 0.8$ [.512 ± .031]
D	$\phi 21 \pm 0.8$ [.827 ± .031]	$\phi 21 \pm 0.8$ [.827 ± .031]
E	2 [.079]	2 [.079]
W	8 [.315]	10 ± 1.5 [.394 ± .059]
	12 [.472]	14.5 ± 1.5 [.571 ± .059]
t	2 ± 0.5 [.079 ± .020]	2 ± 0.5 [.079 ± .020]
R	1 [.039]	1 [.039]

#### TAPING FIGURE

Carrier tape material: Polystyrene

Cover tape material: Polyethylene

