

# Power Inductor



## BDAA Series



### Overview

The BDAA Series is designed specifically to enhance both PFM and PWM application performance. Q (Rac) value at light load and the RDC value at heavy load are both exceptional. Furthermore, the saturated current performance is also optimal, helping to reduce the ripple current and enhance the efficiency.

### Benefits

1. High Efficiency
2. Excellent Q, RDC and saturation current
3. Low profile and miniature size down to 2.0\*1.6\*1.0mm

### Applications

1. Consumer Electronics: Smartphones, laptops, tablets, wearable devices, and gaming consoles.
2. Network server
3. DC-DC converters, inverters, and battery management systems.
4. HDD, SSD and PC peripheral devices

### Product Information

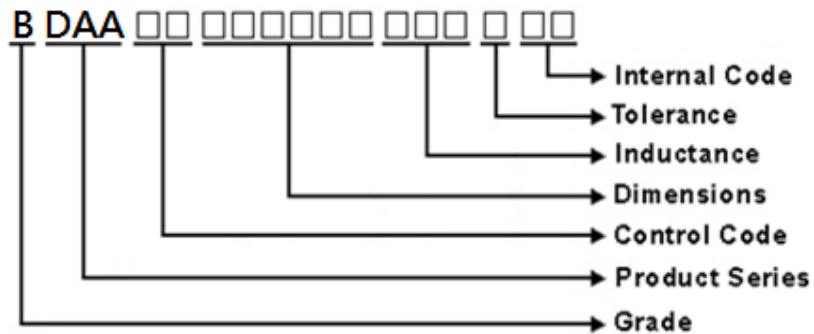
| Series | L (mm) | W(mm) | T (mm) | Inductance (μH) |
|--------|--------|-------|--------|-----------------|
| BDAA   | 2      | 1.6   | 1.0    | 0.24 ~ 2.2      |
|        | 2.0    | 1.6   | 1.0    |                 |
|        | 2.0    | 1.6   | 1.2    |                 |
|        | 2.5    | 2.0   | 1.0    |                 |
|        | 2.5    | 2     | 1.2    |                 |
|        | 3.2    | 2.5   | 1.0    |                 |
|        | 3.2    | 2.5   | 1.2    |                 |
|        |        |       |        |                 |



## BDAA00201610 Series Specification

**1 Scope:** This specification applies to Molding power inductors

**2 Part Numbering:**



**3 Rating:**

Operating Temperature: - 40°C ~125°C(Including self-temperature rise)

**4 Marking:**

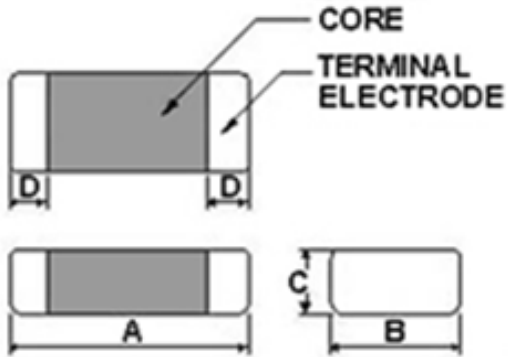
No Marking

**5 Standard Testing Condition**

|             | Unless otherwise specified       | In case of doubt |
|-------------|----------------------------------|------------------|
| Temperature | Ordinary Temperature(15 to 35°C) | 20 to 30°C       |
| Humidity    | Ordinary Humidity(25 to 85% RH)  | 50 to 80 %RH     |

## BDAA00201610 Series Specification

### 6 Configuration and Dimensions:



Dimensions in mm

| TYPE | 201610   |
|------|----------|
| A    | 2.0±0.2  |
| B    | 1.6±0.2  |
| C    | 1.0 Max. |
| D    | 0.6±0.3  |

Net Weight (grms)

| Size Code | Net Weight (grms) |
|-----------|-------------------|
| 201610    | ≒ 0.019           |

### 7 Electrical Characteristics:

| Part No.           | Inductance<br>( $\mu$ H) | Tolerance<br>( $\pm$ %) | Test Freq. | Irms(A)<br>Max.(Typ) | Isat(A)<br>Max.(Typ) | RDC(m $\Omega$ )<br>Max.(Typ) |
|--------------------|--------------------------|-------------------------|------------|----------------------|----------------------|-------------------------------|
| BDAA00201610R24MC1 | 0.24                     | 20                      | 2MHz,1V    | 4.6(5.3)             | 5.6(7.0)             | 27(21)                        |
| BDAA00201610R47MC1 | 0.47                     | 20                      | 2MHz,1V    | 4.5(5.0)             | 5.1(5.8)             | 34(28)                        |
| BDAA00201610R68MC1 | 0.68                     | 20                      | 2MHz,1V    | 3.1(3.7)             | 4.0(4.5)             | 43(38)                        |
| BDAA002016101R0MC1 | 1.00                     | 20                      | 2MHz,1V    | 2.7(3.4)             | 3.0(3.8)             | 62(53)                        |
| BDAA002016101R5MC1 | 1.50                     | 20                      | 2MHz,1V    | 2.3(2.7)             | 2.5(2.8)             | 85(75)                        |
| BDAA002016102R2MC1 | 2.20                     | 20                      | 2MHz,1V    | 1.8(2.2)             | 2.4(2.7)             | 135(112)                      |

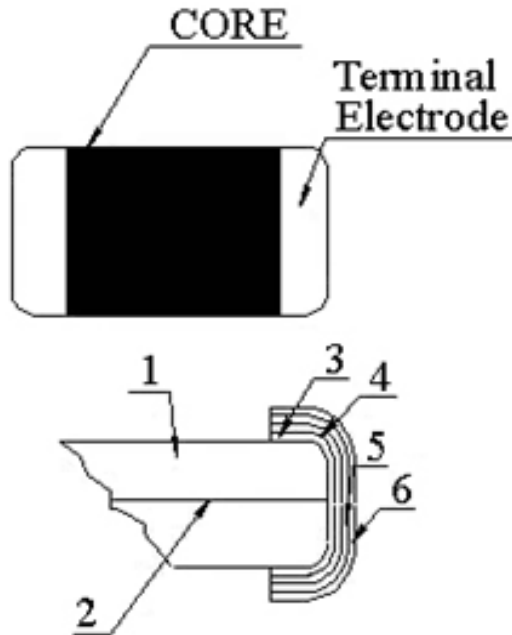
#### NOTE:

- Operating temperature range - 40 °C ~ 125 °C(Including self - temperature rise)
- Isat for Inductance drop 30% from its value without current.
- Irms for a 40°C temperature rise from 25°C ambient.
- All test data is referenced to 25°C ambient
- Absolute maximum voltage 20VDC
- Rated current: Isat or Irms, whichever is smaller

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### 8 BDAA00201610 Series

#### 8.1 Construction:



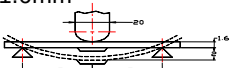
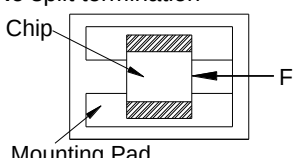
#### 8.2 Material List:

| Item | Part             | Description  |
|------|------------------|--------------|
| 1    | Core             | Metal Powder |
| 2    | Wire             | Copper wire  |
| 3    | Sputter/Plating  | Cu           |
| 4    | Silver Electrode | Ag           |
| 5    | Plating          | Ni           |
| 6    | Plating          | Sn           |

## BDAA00201610 Series Specification

### 9 Reliability Of Molding power inductors

#### 1-1.Mechanical Performance

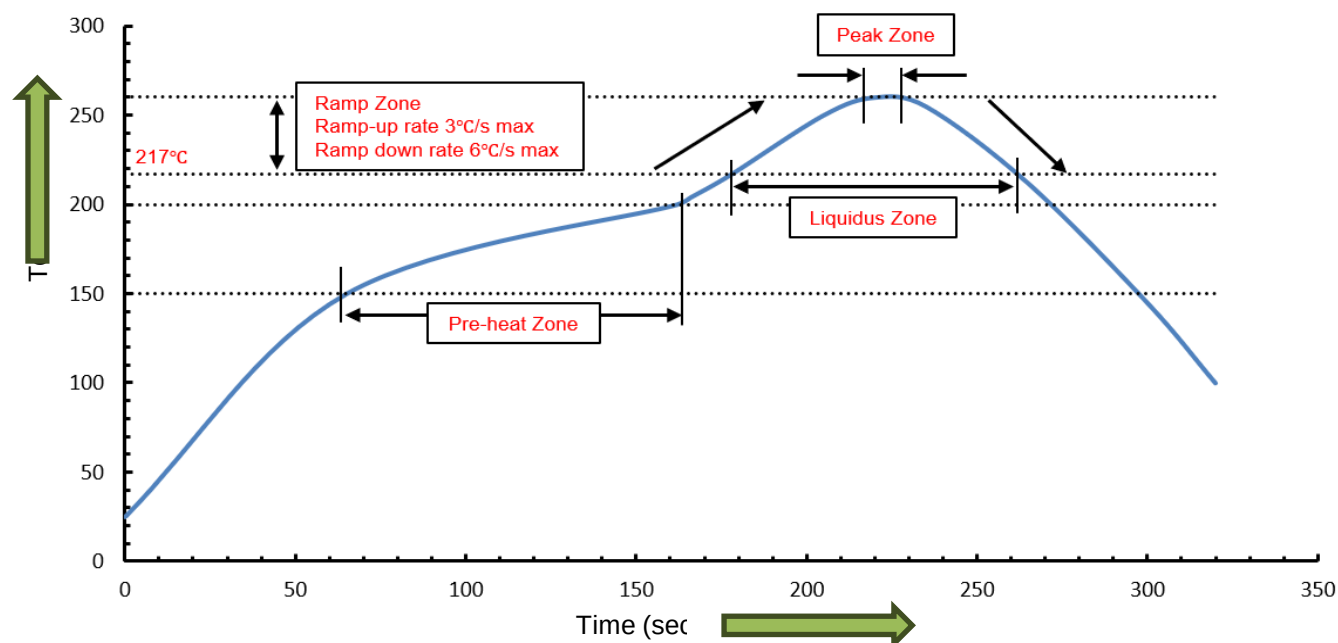
| No    | Item                         | Specification                                                                                                                                     | Test Method                                                                                                                                                                                                            |
|-------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-1-1 | Flexure Strength             | The forces applied on the right conditions must not damage the terminal electrode and the metal body                                              | Test device shall be soldered on the substrate<br>Substrate Dimension: 100x40x1.6mm<br>Deflection: 2.0mm<br>Keeping Time: 30sec<br> |
| 1-1-2 | Vibration                    | Appearance: No damage (for microscope of CASTOR MZ-45 20X)<br>Inductance change shall be within $\pm 20\%$                                        | Test device shall be soldered on the substrate<br>Oscillation Frequency: 10 to 55 to 10Hz for 1min<br>Amplitude: 1.5mm<br>Time: 2hrs for each axis (X, Y & Z), total 6hrs                                              |
| 1-1-3 | Resistance to Soldering Heat | Appearance: No damage<br>More than 75% of the terminal electrode should be covered with solder.<br>Inductance: within $\pm 20\%$ of initial value | Pre-heating: 150°C, 1min<br>Solder Composition: Sn/Ag3.0/Cu0.5(Pb-Free)<br>Solder Temperature: 260 $\pm 5$ °C<br>Immersion Time: 10 $\pm 1$ sec                                                                        |
| 1-1-4 | Solder ability               | The electrodes shall be at least 95% covered with new solder coating                                                                              | Pre-heating: 150°C, 1min<br>Solder Composition: Sn/Ag3.0/Cu0.5(Pb-Free)<br>Solder Temperature: 245 $\pm 5$ °C<br>Immersion Time: 4 $\pm 1$ sec                                                                         |
| 1-1-5 | Terminal Strength Test       | No split termination<br><br>Chip<br>Mounting Pad               | Test device shall be soldered on the substrate, then apply a force in the direction of the arrow.<br>Force : 5N<br>Keeping Time: 10 $\pm 1$ sec                                                                        |

#### 1-2.Environmental Performance

| No    | Item                        | Specification                                                   | Test Method                                                                                                                  |                 |            |
|-------|-----------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-----------------|------------|
| 1-2-1 | Temperature Cycle           | Appearance: No damage<br>Inductance:within±20% of initial value | One cycle:                                                                                                                   |                 |            |
|       |                             |                                                                 | Step                                                                                                                         | Temperature (℃) | Time (min) |
|       |                             |                                                                 | 1                                                                                                                            | -40±3           | 30         |
|       |                             |                                                                 | 2                                                                                                                            | 25±2            | 3          |
|       |                             |                                                                 | 3                                                                                                                            | 125±3           | 30         |
|       |                             |                                                                 | 4                                                                                                                            | 25±2            | 3          |
|       |                             |                                                                 | Total: 100cycles<br>Measured after exposure in the room condition for 24hrs                                                  |                 |            |
| 1-2-2 | Humidity Resistance         |                                                                 | Temperature: 60±2℃<br>Relative Humidity: 90 ~ 95% / Time: 1000hrs<br>Measured after exposure in the room condition for 24hrs |                 |            |
| 1-2-3 | High Temperature Resistance |                                                                 | Temperature: 125±3℃<br>Relative Humidity: 0% / Time: 1000hrs<br>Measured after exposure in the room condition for 24hrs      |                 |            |
| 1-2-4 | Low Temperature Resistance  |                                                                 | Temperature: -40±3℃<br>Relative Humidity: 0% / Time: 1000hrs<br>Measured after exposure in the room condition for 24hrs      |                 |            |

## BDAA00201610 Series Specification

Reflow Profile



Refer to J-STD-020F

| Profile Feature | Pre-heat Zone | Ramp-up Zone | Liquidus Zone | Peak Zone   | Ramp-down Zone |
|-----------------|---------------|--------------|---------------|-------------|----------------|
| Temperature     | 150~200°C     | 217°C~Tp     | above 217°C   | above 255°C | Tp~217°C       |
| Time            | 60~120sec     | ---          | 60~150sec     | <30sec      | ---            |
| Rate            | ---           | < 3°C/sec    | ---           | ---         | < 6°C/sec      |

Note:

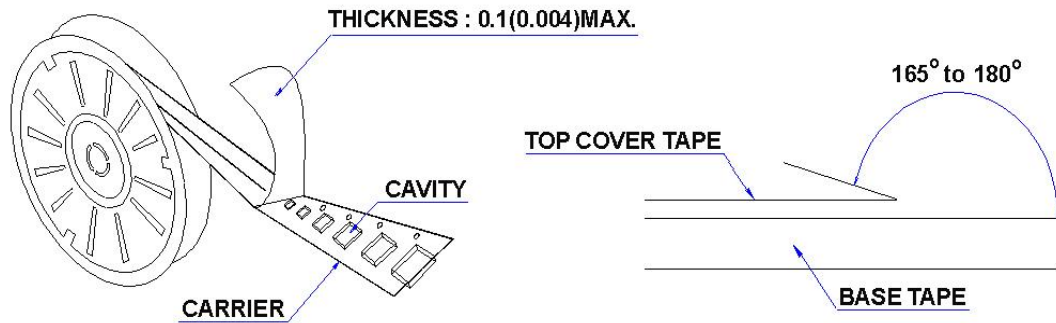
1.  $T_p < 260^\circ\text{C}$
2. Time [25°C to peak temperature] < 8 minutes
3. Reflow soldering must not be performed more than 3 times.
4. For superior solder joint connectivity results, soldering under standard nitrogen atmosphere is recommended.

## BDAA00201610 Series Specification

### 10 Packaging:

#### 10.1 Packaging -Cover Tape

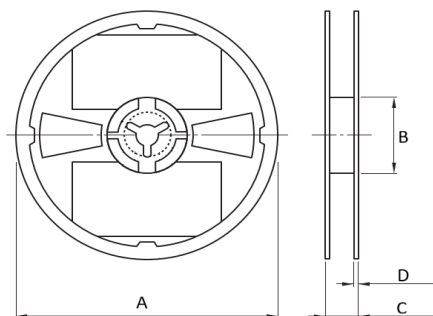
The force for tearing off cover tape is 10 to 100 grams in the arrow direction.



#### 10.2 Packaging Quantity

| TYPE   | PCS/REEL |
|--------|----------|
| 201610 | 3000     |

#### 10.3 Reel Dimensions



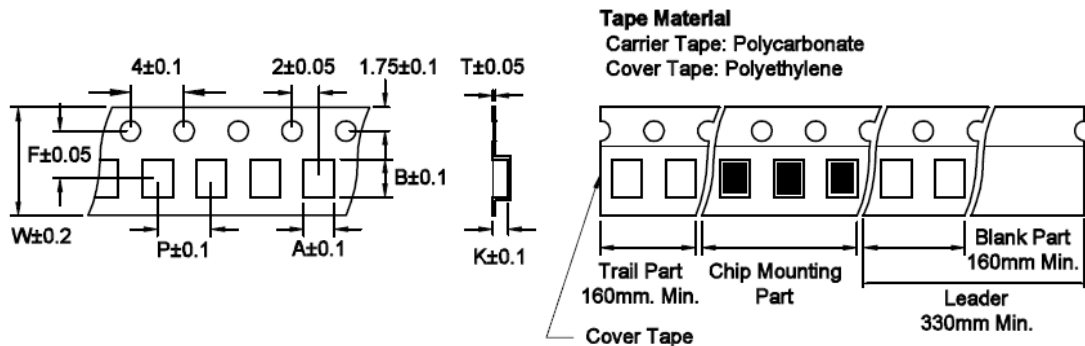
Dimensions in mm

| TYPE   | A   | B  | C  | D   |
|--------|-----|----|----|-----|
| 201610 | 178 | 60 | 12 | 1.5 |

## BDAA00201610 Series Specification

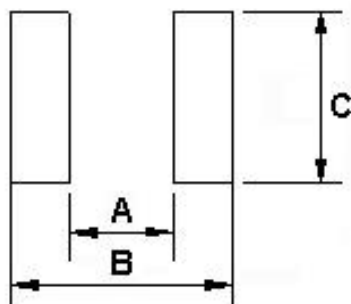
### 10 Packaging:

#### 10.4 Tape Dimensions in mm



| TYPE   | A    | B    | T    | W | P | F   | K    |
|--------|------|------|------|---|---|-----|------|
| 201610 | 1.90 | 2.30 | 0.22 | 8 | 4 | 3.5 | 1.15 |

### 11 Recommended Land Pattern:



Dimensions in mm

| TYPE   | A   | B   | C   |
|--------|-----|-----|-----|
| 201610 | 0.7 | 2.3 | 1.8 |

### 12 Note:

- The storage period is within 12 months. Products should be stored in the warehouse on the following condition: (Temperature: 5~40°C; Humidity: 20%~75%RH). Solderability should be checked if the period is exceeded.
- Please make sure that your product has been evaluated and confirmed against your specifications when our product is mounted to your product.
- Do not knock nor drop.
- All the items and parameters in this product specification have been prescribed on the premise that our product is used for the purpose, under the condition and in the environment agreed upon between you and us. You are requested not to use our product deviating from such agreement.
- Please keep the distance between transformer/coil and other components (refer to the standard IEC 950)



## BDAA00201610 Series Specification

### 13 Graph:

