

# SMT Power Inductors

Power Beads - PA051XNL, PA121XNL, PA151XNL Series



- ⚙️ **Current Rating:** Over 70A<sub>pk</sub>
- ⚙️ **Inductance Range:** 72nH to 470nH
- ⚙️ **Four Package Sizes:**

**PA0512/PA1212:** 7.0 x 7.0 x 4.96mm Max  
**PA0511/PA1211:** 10.2 x 7.0 x 4.96mm Max  
**PA0515:** 11.2 x 11.2 x 9.0mm Max  
**PA0513/PA1513:** 13.5 x 13.0 x 8.0mm Max

Electrical Specifications @ 25°C - Operating Temperature -40°C to +130°C <sup>7,8</sup>

| Part Number  | Inductance @ 0A <sub>DC</sub> (nH ±20%) | Inductance @ I <sub>rated</sub> (nH TYP) | I <sub>rated</sub> <sup>1</sup> (A <sub>DC</sub> ) | DCR <sup>2</sup> (mΩ) | Saturation Current <sup>3</sup> (TYP) |       | Heating <sup>4</sup> Current (A TYP) |
|--|---|--|--|-----------------------|---------------------------------------|-------|--------------------------------------|
|  |   |  |  |                       | 25°C                                  | 100°C |                                      |
| <b>PA0512NL and PA1212NL - 7.0mm x 7.0mm x 4.96mm Max</b>  |   |  |  |                       |                                       |       |                                      |
| PA0512.700NLT  | 72                                      | 72                                       | 31   | 0.32 ±9.4%            | 58                                    | 45    | 31                                   |
| PA0512.101NLT  | 105                                     | 102                                      | 31   |                       | 46                                    | 38    |                                      |
| PA0512.151NLT  | 150                                     | 134                                      | 24   |                       | 30                                    | 24    |                                      |
| PA1212.700NLT  | 72                                      | 72                                       | 31   | 0.46 ±6.5%            | 58                                    | 45    | 31                                   |
| PA1212.101NLT  | 105                                     | 102                                      | 31   |                       | 46                                    | 38    |                                      |
| PA1212.151NLT  | 150                                     | 134                                      | 24   |                       | 30                                    | 24    |                                      |
| <b>PA0511NL and PA1211NL - 10.2mm x 7.0mm x 4.96mm Max</b> |   |  |  |                       |                                       |       |                                      |
| PA0511.850NLT  | 85                                      | 85                                       | 31   | 0.39 ±7.7%            | 70+                                   | 70    | 31                                   |
| PA0511.900NLT  | 100                                     | 100                                      | 31   |                       | 70                                    | 65    |                                      |
| PA0511.101NLT  | 120                                     | 120                                      | 31   |                       | 52                                    | 42    |                                      |
| PA0511.151NLT  | 155                                     | 150                                      | 31   |                       | 40                                    | 36    |                                      |
| PA0511.221NLT  | 220                                     | 176                                      | 25   |                       | 33                                    | 25    |                                      |
| PA1211.850NLT *  | 85                                      | 85                                       | 31   | 0.55 ±7.3%            | 70+                                   | 70    | 31                                   |
| PA1211.900NLT *  | 100                                     | 100                                      | 31   |                       | 70                                    | 65    |                                      |
| PA1211.101NLT  | 120                                     | 120                                      | 31   |                       | 52                                    | 42    |                                      |
| PA1211.151NLT  | 155                                     | 150                                      | 31   |                       | 40                                    | 36    |                                      |
| PA1211.221NLT  | 220                                     | 176                                      | 25   |                       | 33                                    | 25    |                                      |
| <b>PA0515NL - 11.2mm x 11.2mm x 9.0mm Max</b>              |   |  |  |                       |                                       |       |                                      |
| PA0515.221NLT  | 225                                     | 225                                      | 35   | 0.63 ±9.5%            | 68                                    | 59    | 35                                   |
| PA0515.271NLT  | 270                                     | 280                                      | 35   |                       | 50                                    | 44    |                                      |
| PA0515.321NLT  | 325                                     | 325                                      | 35   |                       | 43                                    | 36    |                                      |
| PA0515.471NLT  | 470                                     | 380                                      | 23   |                       | 30                                    | 23    |                                      |

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## Electrical Specifications @ 25°C - Operating Temperature -40°C to +130°C <sup>7,8</sup>

| Part Number   | Inductance @ $0A_{DC}$ (nH $\pm 20\%$ ) | Inductance @ $I_{rated}$ (nH TYP) | $I_{rated}^1$ ( $A_{DC}$ ) | DCR <sup>2</sup> (m $\Omega$ ) | Saturation Current <sup>3</sup> (TYP) |       | Heating <sup>4</sup> Current (A TYP) |
|---|---|-----------------------------------|----------------------------|--------------------------------|---------------------------------------|-------|--------------------------------------|
|   |   |                                   |                            |                                | 25°C                                  | 100°C |                                      |
| PA0513NL and PA1513NL - 13.5mm x 13.0mm x 8.0mm Max |   |                                   |                            |                                |                                       |       |                                      |
| PA0513.211NLT                                       | 210                                     | 210                               | 45                         | 0.32 $\pm 9.4\%$               | 71                                    | 64    | 45                                   |
| PA0513.261NLT                                       | 260                                     | 260                               | 45                         |                                | 60                                    | 55    |                                      |
| PA0513.321NLT                                       | 320                                     | 285                               | 41                         |                                | 50                                    | 45    |                                      |
| PA0513.441NLT                                       | 440                                     | 363                               | 30                         |                                | 35                                    | 30    |                                      |
| PA1513.211NLT                                       | 210                                     | 210                               | 45                         | 0.53 $\pm 11.3\%$              | 71                                    | 64    | 45                                   |
| PA1513.261NLT                                       | 260                                     | 260                               | 45                         |                                | 60                                    | 55    |                                      |
| PA1513.321NLT                                       | 320                                     | 285                               | 41                         |                                | 50                                    | 45    |                                      |
| PA1513.441NLT                                       | 440                                     | 363                               | 30                         |                                | 35                                    | 30    |                                      |

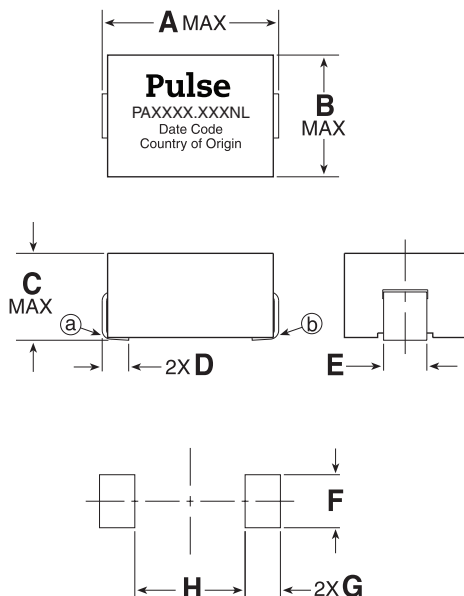
### Notes:

- The rated current as listed is either the saturation current or the heating current depending on which value is lower.
  - The nominal DCR tolerance is by design. The nominal DCR is measured from point (a) to point (b), as shown below on the mechanical drawing.
  - The saturation current is the typical current which causes the inductance to drop by 20% at the stated ambient temperatures (25°C and 100°C). This current is determined by placing the component in the specified ambient environment and applying a short duration pulse current (to eliminate self-heating effects) to the component.
  - The heating current is the DC current which causes the part temperature to increase by approximately 40°C. This current is determined by soldering the component on a typical application PCB, and then applying the current to the device for 30 minutes without any forced air cooling.
  - In high volt\*time applications, additional heating in the component can occur due to core losses in the inductor which may necessitate derating the current in order to limit the temperature rise of the component. To determine the approximate total losses (or temperature rise) for a given application, the coreloss and temperature rise curves can be used.
  - Pulse complies to industry standard tape and reel specification EIA481.
  - The temperature of the component (ambient plus temperature rise) must be within the stated operating temperature range.
  - For part marking only the PA0513 series has the name 'Pulse' marked on the part. Due to component size, the remaining series' of parts are marked only with the Pulse PN, Date Code and Country of Origin.
- \* Contact Pulse for availability

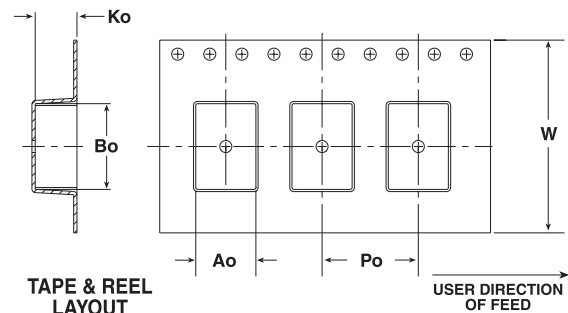
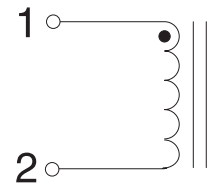
### Mechanical

### Schematic

PAXXXX.XXXNLT



Dimensions: Inches  
mm  
Unless otherwise specified,  
all tolerances are:  $\pm \begin{matrix} .010 \\ .25 \end{matrix}$



### SUGGESTED PAD LAYOUT

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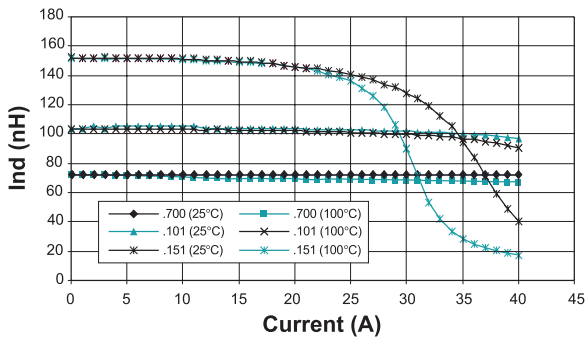


## Dimensions (inches/mm)

| Part Number   | A (MAX)       | B (MAX)       | C (MAX)      | D (NOM)      | E (NOM)      | F (NOM)      | G (NOM)      | H (NOM)      | Ao            | Bo            | Ko           | Po            | W             | Parts/Reel | Weight (grams) |
|---------------|---------------|---------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|---------------|--------------|---------------|---------------|------------|----------------|
| PA0512/PA1212 | .276<br>7,00  | .276<br>7,00  | .195<br>4,96 | .060<br>1,52 | .098<br>2,49 | .120<br>3,05 | .080<br>2,03 | .130<br>3,30 | .295<br>7,49  | .300<br>7,62  | .205<br>5,21 | .472<br>12,00 | .630<br>16,00 | 1000       | 0.94           |
| PA0511/PA1211 | .400<br>10,20 | .276<br>7,00  | .195<br>4,96 | .060<br>1,52 | .098<br>2,49 | .120<br>3,05 | .080<br>2,03 | .250<br>6,35 | .295<br>7,49  | .420<br>10,67 | .205<br>5,21 | .472<br>12,00 | .945<br>24,00 | 1000       | 1.35           |
| PA0515        | .400<br>11,18 | .440<br>11,18 | .354<br>9,00 | .100<br>2,54 | .080<br>2,03 | .100<br>2,54 | .120<br>3,05 | .210<br>5,33 | .453<br>11,50 | .453<br>11,50 | .378<br>9,60 | .945<br>24,00 | .945<br>24,00 | 250        | 4.5            |
| PA0513/PA1513 | .530<br>13,46 | .510<br>12,95 | .315<br>8,00 | .100<br>2,54 | .200<br>5,08 | .300<br>7,62 | .125<br>3,18 | .280<br>7,11 | .525<br>13,34 | .525<br>13,34 | .320<br>8,13 | .630<br>16,00 | .945<br>24,00 | 400        | 5.7            |

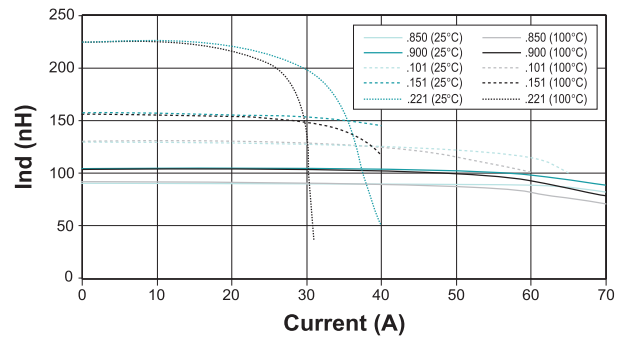
### PA0512NL & PA1212NL

Inductance vs Current

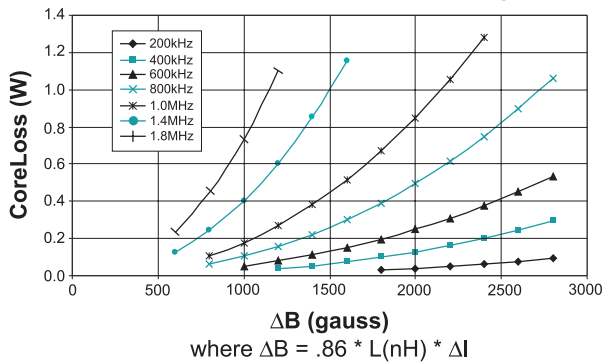


### PA0511NL & PA1211NL

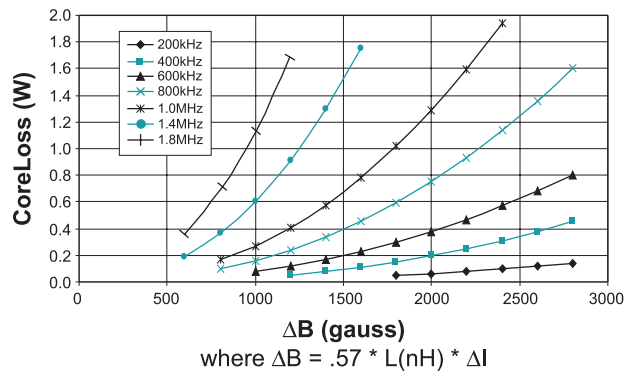
Inductance vs Current



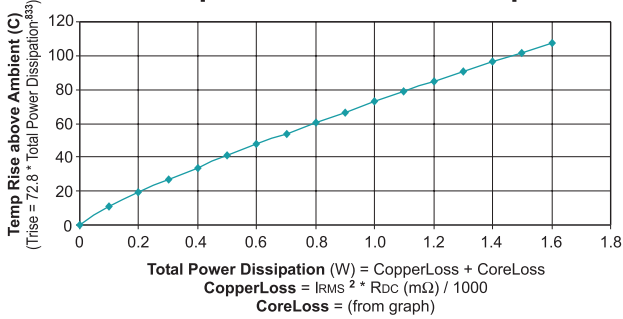
CoreLoss vs Flux Density



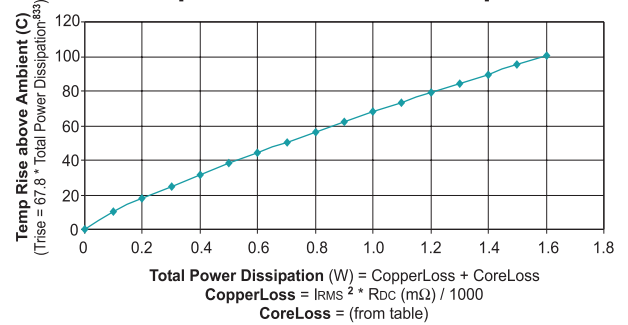
CoreLoss vs Flux Density



### Temp Rise vs Power Dissipation

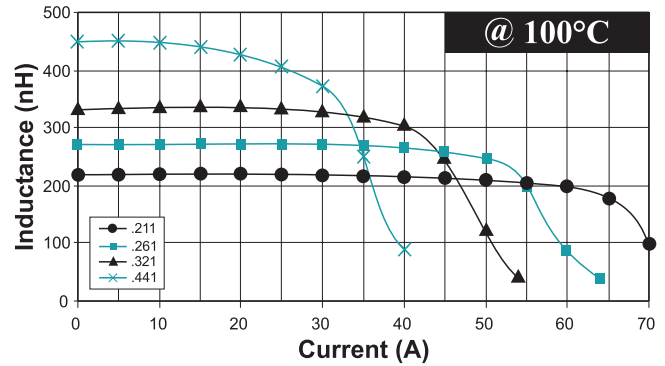
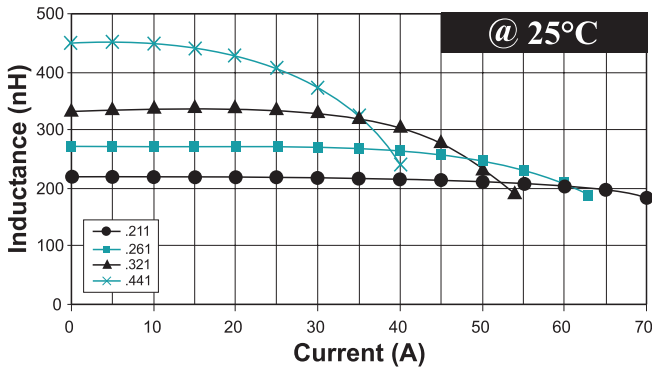


### Temp Rise vs Power Dissipation

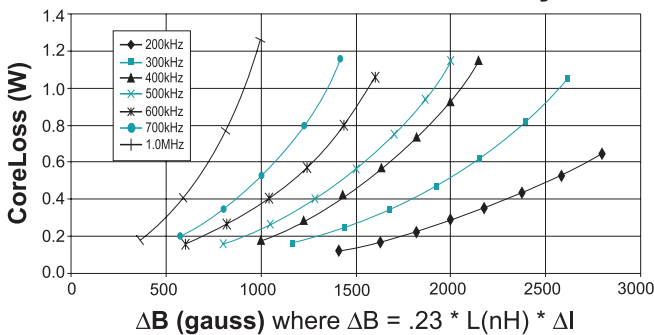


## Typical Inductance vs Current

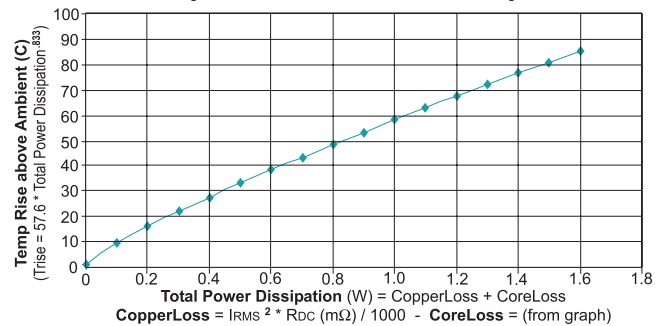
### PA0513NL / PA1513NL



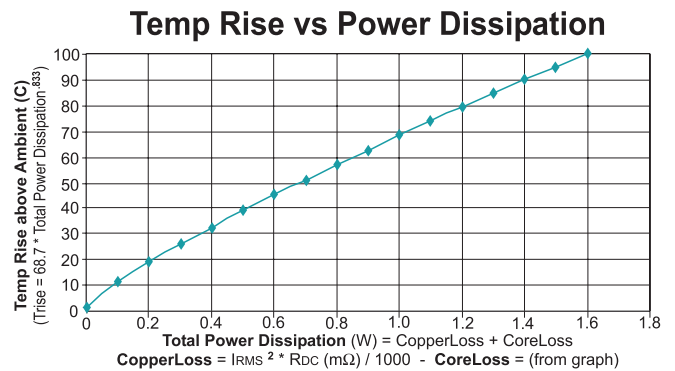
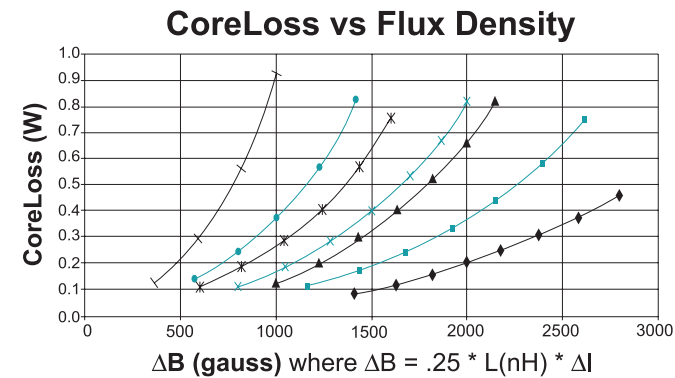
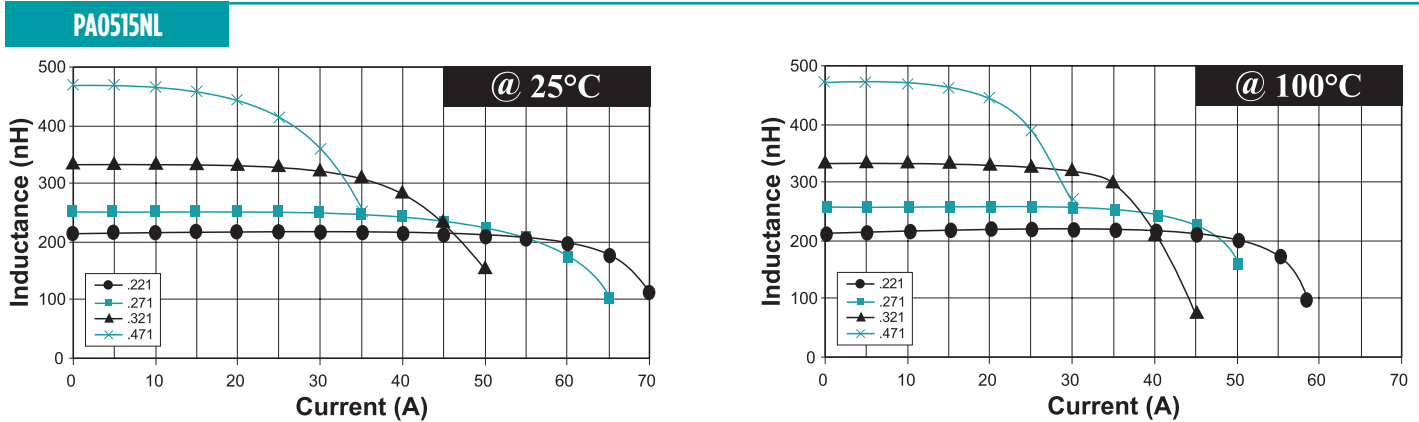
### CoreLoss vs Flux Density



### Temp Rise vs Power Dissipation



## Typical Inductance vs Current



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