

# P1166.681NLT Datasheet

[www.digi-electronics.com](http://www.digi-electronics.com)



<https://www.DiGi-Electronics.com>

|                              |  |
|------------------------------|--|
| DiGi Electronics Part Number | P1166.681NLT-DG  |
| Manufacturer                 | <a href="#">Pulse Electronics</a>                              |
| Manufacturer Product Number  | P1166.681NLT   |
| Description                  | FIXED IND 680NH 5.5A 6 MOHM SMD                                |
| Detailed Description         | 680 nH Shielded Wirewound Inductor 5.5 A 6mOhm Max Nonstandard |



Tel: +00 852-30501935

RFQ Email: [Info@DiGi-Electronics.com](mailto:Info@DiGi-Electronics.com)

DiGi is a global authorized distributor of electronic components.

## Purchase and inquiry

Manufacturer Product Number:

P1166.681NLT

Series:

P1166NL

Type:

Wirewound

Inductance:

680 nH

Current Rating (Amps):

5.5 A

Shielding:

Shielded

Q @ Freq:

-

Ratings:

-

Inductance Frequency - Test:

100 kHz

Mounting Type:

Surface Mount

Supplier Device Package:

-

Height - Seated (Max):

0.138" (3.51mm)

Manufacturer:

Pulse Electronics

Product Status:

Active

Material - Core:

-

Tolerance:

±30%

Current - Saturation (Isat):

5.9A

DC Resistance (DCR):

6mOhm Max

Frequency - Self Resonant:

40MHz

Operating Temperature:

-40°C ~ 130°C

Features:

-

Package / Case:

Nonstandard

Size / Dimension:

0.297" L x 0.297" W (7.54mm x 7.54mm)

## Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8504.50.4000

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

# SMT Power Inductors

Shielded Drum Core - P1166NL Series



**Pulse**  
a YAGEO company

- Ⓜ Height: 3.8mm Max
- Ⓜ Footprint: 7.5mm x 7.5mm Max
- Ⓜ Current Rating: up to 5.5A
- Ⓜ Inductance Range: .44μH to 750μH

## Electrical Specifications @ 25°C - Operating Temperature -40°C to +130°C

| Part <sup>2,3</sup><br>Number | Inductance<br>@ 0A <sub>DC</sub><br>(μH ±20%) | Inductance<br>@ I <sub>rated</sub><br>(μH) MIN | I <sub>rated</sub> <sup>5</sup><br>(A <sub>DC</sub> ) | DCR (mΩ) |      | Saturation <sup>6</sup><br>Current<br>-25% (A) | Heating <sup>7</sup><br>Current<br>+40°C (A) | Core Loss <sup>8</sup><br>Factor<br>(K2) | SRF<br>(MHz) |
|-------------------------------|---|--|---|----------|------|--|--|--|--------------|
|                               |   |  |   | TYP      | MAX  |  |  |  |              |
| P1166.681NL **                | 0.68*   | 0.44   | 5.5   | 5.0      | 6.0  | 5.9  | 5.5  | 380                                      | >40          |
| P1166.102NL                   | 1.00*   | 0.65   | 4.9   | 6.2      | 7.5  | 5.2  | 4.9  | 440                                      | >40          |
| P1166.162NL                   | 1.60*   | 1.0  | 4.0   | 7.8      | 11   | 4.0  | 4.4  | 570                                      | >40          |
| P1166.302NL                   | 3.00*   | 2.0  | 2.8   | 19       | 23   | 3.0  | 2.8  | 780                                      | >40          |
| P1166.482NL                   | 4.80*   | 3.1  | 2.4   | 25       | 31   | 2.4  | 2.5  | 990                                      | >40          |
| P1166.682NL                   | 6.80*   | 4.4  | 2.1   | 32       | 40   | 2.1  | 2.2  | 1200                                     | 38           |
| P1166.103NL                   | 10  | 7.5  | 1.6   | 58       | 70   | 1.8  | 1.6  | 1400                                     | 29           |
| P1166.123NL **                | 12  | 9.0  | 1.5   | 62       | 78   | 1.7  | 1.5  | 1500                                     | 25           |
| P1166.153NL **                | 15  | 11.3   | 1.4   | 74       | 92   | 1.5  | 1.4  | 1700                                     | 22           |
| P1166.183NL **                | 18  | 13.5   | 1.2   | 100      | 124  | 1.4  | 1.2  | 1800                                     | 21           |
| P1166.223NL                   | 22  | 16.5   | 1.2   | 106      | 126  | 1.2  | 1.2  | 2000                                     | 20           |
| P1166.273NL **                | 27  | 20.3   | 1.0   | 146      | 180  | 1.1  | 1.0  | 2300                                     | 17           |
| P1166.333NL **                | 33  | 24.8   | 0.94  | 167      | 205  | 1.0  | 0.94   | 2400                                     | 15           |
| P1166.393NL **                | 39  | 29.3   | 0.86  | 183      | 211  | 0.86   | 0.90   | 2700                                     | 13           |
| P1166.473NL                   | 47  | 35.3   | 0.83  | 206      | 260  | 0.83   | 0.85   | 2900                                     | 12           |
| P1166.563NL **                | 56  | 42.0   | 0.73  | 271      | 340  | 0.73   | 0.74   | 3300                                     | 11           |
| P1166.683NL **                | 68  | 51.0   | 0.67  | 303      | 370  | 0.67   | 0.70   | 3600                                     | 9.5          |
| P1166.823NL **                | 82  | 61.5   | 0.60  | 411      | 500  | 0.61   | 0.60   | 4000                                     | 8.0          |
| P1166.104NL                   | 100   | 75.0   | 0.56  | 464      | 580  | 0.56   | 0.57   | 4300                                     | 7.5          |
| P1166.124NL **                | 120   | 90.0   | 0.53  | 528      | 645  | 0.55   | 0.53   | 4700                                     | 7.0          |
| P1166.154NL                   | 150   | 113  | 0.46  | 695      | 860  | 0.46   | 0.46   | 5300                                     | 6.3          |
| P1166.184NL **                | 180   | 135  | 0.39  | 992      | 1190 | 0.42   | 0.39   | 5800                                     | 5.6          |
| P1166.224NL                   | 220   | 165  | 0.35  | 1210     | 1480 | 0.37   | 0.35   | 6400                                     | 5.1          |
| P1166.274NL **                | 270   | 203  | 0.32  | 1407     | 1750 | 0.32   | 0.33   | 7100                                     | 4.6          |
| P1166.334NL                   | 330   | 248  | 0.31  | 1580     | 1880 | 0.31   | 0.31   | 7800                                     | 4.1          |
| P1166.394NL **                | 390   | 293  | 0.26  | 2178     | 2600 | 0.29   | 0.26   | 8500                                     | 3.9          |
| P1166.474NL **                | 470   | 353  | 0.25  | 2400     | 2910 | 0.26   | 0.25   | 9500                                     | 3.6          |
| P1166.564NL **                | 560   | 420  | 0.23  | 2705     | 3400 | 0.23   | 0.23   | 10000                                    | 3.1          |
| P1166.684NL **                | 680   | 510  | 0.20  | 3658     | 4450 | 0.21   | 0.20   | 11000                                    | 2.7          |
| P1166.824NL                   | 820   | 615  | 0.17  | 5021     | 6200 | 0.20   | 0.17   | 13000                                    | 2.5          |
| P1166.105NL                   | 1000  | 750  | 0.15  | 6720     | 8000 | 0.16   | 0.15   | 14000                                    | 1.3          |

\* Inductance is at 0A<sub>DC</sub> tolerance on indicated part numbers is ±30%; tolerance is ±20% on all other parts.

\*\* Contact Pulse for availability

NOTES FROM TABLE: (See page 43)

# SMT Power Inductors

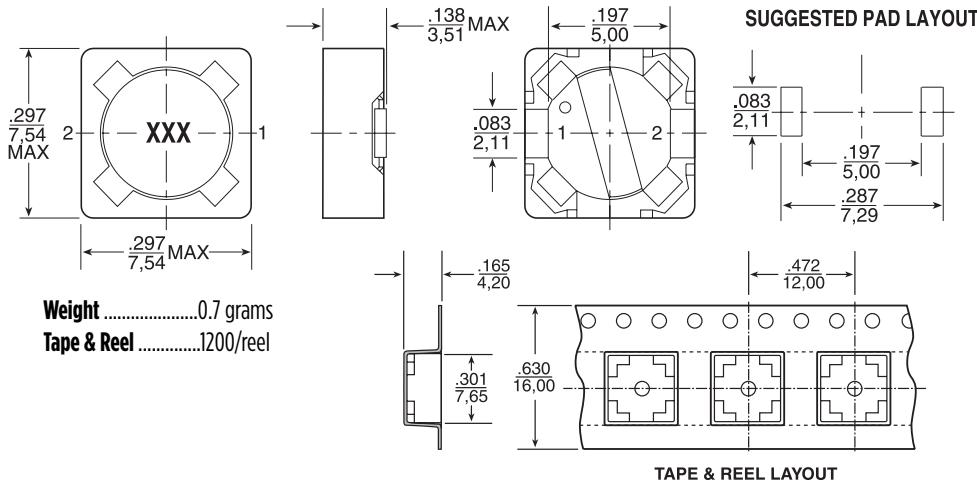
Shielded Drum Core - P1166NL Series



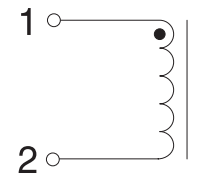
## Mechanical

## Schematic

P1166.XXXNL



Weight .....0.7 grams  
Tape & Reel .....1200/reel



Dimensions:  $\frac{\text{Inches}}{\text{mm}}$   
Unless otherwise specified, all tolerances are  $\pm \frac{.010}{0,25}$

**Notes from Tables:** (pages 27 - 42)

1. Unless otherwise specified, all testing is made at 100kHz, 0.1VAC.
2. Optional Tape & Reel packaging can be ordered by adding a "T" suffix to the part number (i.e P1166.102NL becomes P1166.102NLT). Pulse complies with industry standard Tape and Tape & Reel specification EIA481.
3. The "NL" suffix indicates an RoHS-compliant part number. Non-NL suffixed parts are not necessarily RoHS compliant, but are electrically and mechanically equivalent to NL versions. If a part number does not have the "NL" version, but an RoHS compliant version is required, please contact Pulse for availability.
4. Temperature of the component (ambient plus temperature rise) must be within specified operating temperature range.
5. The rated current (I<sub>rated</sub>) as listed is either the saturation current or the heating current depending on which value is lower.
6. The saturation current, I<sub>sat</sub>, is the current at which the component inductance drops by the indicated percentage (typical) at an ambient temperature of 25C. 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.
7. The heating current, I<sub>dc</sub>, is the DC current required to raise the component temperature by the indicated delta (approximately). The heating current is determined by mounting the component on a typical PCB and applying current for 30 minutes. The temperature is measured by placing the thermocouple on top of the unit under test.

7. In high volt\*time (Et) or ripple current 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. In order to determine the approximate total loss (or temperature rise) for a given application, both copper losses and core losses should be taken into account.

**Estimated Temperature Rise:**

$$\text{Trise} = [\text{Total loss (mW)} / K0]^{.833} \quad (^\circ\text{C})$$

$$\text{Total Loss} = \text{Copper loss} + \text{Core loss (mW)}$$

$$\text{Copper loss} = I_{\text{RMS}}^2 \times \text{DCR (Typical)} \text{ (mW)}$$

$$I_{\text{rms}} = [I_{\text{dc}}^2 + \Delta I^2 / 12]^{1/2} \text{ (A)}$$

$$\text{Core loss} = K1 \times f \text{ (kHz)}^{1.25} \times \text{Bac (Ga)}^{2.38} \text{ (mW)}$$

$$\text{Bac (peak to peak flux density)} = K2 \times \Delta I \text{ (Ga)}$$

$$[= K2 / L (\mu\text{H}) \times \text{Et (V}\cdot\mu\text{Sec)} \text{ (Ga)}]$$

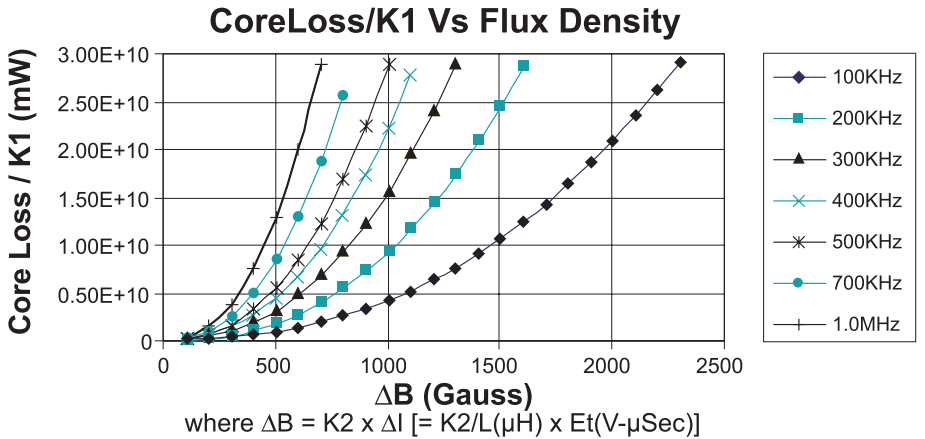
where f varies between 25kHz and 1MHz, and Bac is less than 2500 Gauss.

K2 is a core size and winding dependent value and is given for each p/n in the proceeding datasheets. K0 & K1 are platform and material dependant constants and are given in the table below for each platform.

# SMT Power Inductors

Shielded Drum Core - P1166NL Series

| Part No.  | Trise Factor (K0) | Core Loss Factor (K1) |
|-----------|-------------------|-----------------------|
| PG0085/86 | 2.3               | 5.29E-10              |
| PG0087    | 5.8               | 15.2E-10              |
| PG0040/41 | 0.8               | 2.80E-10              |
| P1174     | 0.8               | 6.47E-10              |
| PF0601    | 4.6               | 14.0E-10              |
| PF0464    | 3.6               | 24.7E-10              |
| PF0465    | 3.6               | 33.4E-10              |
| P1166     | 1.9               | 29.6E-10              |
| P1167     | 2.1               | 42.2E-10              |
| PF0560NL  | 5.5               | 136E-10               |
| P1168/69  | 4.8               | 184E-10               |
| P1170/71  | 4.3               | 201E-10               |
| P1172/73  | 5.6               | 411E-10               |
| PF0552NL  | 8.3               | 201E-10               |
| PF0553NL  | 7.1               | 411E-10               |



Take note that the component's temperature rise varies depending on the system condition. It is suggested that the component be tested at the system level, to verify the temperature rise of the component during system operation.

Americas - [prodinfo\\_power\\_americas@yageo.com](mailto:prodinfo_power_americas@yageo.com) | Europe - [prodinfo\\_power\\_emea@yageo.com](mailto:prodinfo_power_emea@yageo.com) | Asia - [prodinfo\\_power\\_asia@yageo.com](mailto:prodinfo_power_asia@yageo.com)

Performance warranty of products offered on this data sheet is limited to the parameters specified. Data is subject to change without notice. Other brand and product names mentioned herein may be trademarks or registered trademarks of their respective owners. © Copyright, 2023. Pulse Electronics, Inc. All rights reserved.

YAGEO Corporation and its affiliates do not recommend the use of commercial or automotive grade products for high reliability applications or manned space flight.

## OUR CERTIFICATE

DiGi provide top-quality products and perfect service for customer worldwide through standardization, technological innovation and continuous improvement. DiGi through third-party certification, we stricly control the quality of products and services. Welcome your RFQ to

Email: [Info@DiGi-Electronics.com](mailto:Info@DiGi-Electronics.com)



Tel: +00 852-30501935

RFQ Email: [Info@DiGi-Electronics.com](mailto:Info@DiGi-Electronics.com)

DiGi is a global authorized distributor of electronic components.