High Frequency Planar Transforms

PA08XXNL Series (up to 140W)

- **Power Rating:** up to 140W
- **Height:** 8.6mm to 9.7mm Max
- **Footprint:** 23.4mm x 21.6mm Max
- **Frequency Range:** 200kHz to 700kHz
- **Isolation (Primary to Secondary & Core):** 1750V DC

## Electrical Specifications @ 25°C - Operating Temperature -40°C to +125°C

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Turns Ratio</th>
<th>Schematic</th>
<th>Primary Inductance (µH MIN)</th>
<th>Leakage Inductance (µH MAX)</th>
<th>DCR (mΩ MAX)</th>
<th>Maximum Height (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA0801NL</td>
<td>4T 4T</td>
<td>A1</td>
<td>153</td>
<td>0.45</td>
<td>17.5</td>
<td>7</td>
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<tr>
<td>PA0802NL</td>
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<td></td>
<td>194</td>
<td>0.45</td>
<td>17.5</td>
<td>20</td>
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<tr>
<td>PA0803NL</td>
<td>5T 5T</td>
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<td>0.55</td>
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<td>20</td>
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<tr>
<td>PA0804NL</td>
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<td>4T</td>
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<td>0.60</td>
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<td>25</td>
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<tr>
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<td></td>
<td>345</td>
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<td>25</td>
<td>25</td>
</tr>
<tr>
<td>PA0806NL</td>
<td>4T 4T</td>
<td>1T &amp; 1T</td>
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<td>0.45</td>
<td>17.5</td>
<td>17.5</td>
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<tr>
<td>PA0807NL</td>
<td>4T 5T</td>
<td></td>
<td>194</td>
<td>0.45</td>
<td>17.5</td>
<td>20</td>
</tr>
<tr>
<td>PA0808NL</td>
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<td>20</td>
<td>20</td>
</tr>
<tr>
<td>PA0809NL</td>
<td>5T 6T</td>
<td>1T &amp; 1T</td>
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<td>20</td>
<td>25</td>
</tr>
<tr>
<td>PA0810NL</td>
<td>6T 6T</td>
<td></td>
<td>345</td>
<td>0.65</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>PA0811NL</td>
<td>4T 4T</td>
<td>2T &amp; 1T</td>
<td>153</td>
<td>0.45</td>
<td>17.5</td>
<td>17.5</td>
</tr>
<tr>
<td>PA0812NL</td>
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<tr>
<td>PA0813NL</td>
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<td>240</td>
<td>0.45</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>PA0814NL</td>
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<td>290</td>
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<tr>
<td>PA0815NL</td>
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<td></td>
<td>345</td>
<td>0.55</td>
<td>25</td>
<td>25</td>
</tr>
</tbody>
</table>

**Notes:**

1. Inductance is measure, where applicable, with both primary windings connected in series (2 to 5, with 3 and 4 shorted).
2. Leakage inductance is measured on winding (2-5) with (3,4) and (7, 8, 9, 10, 11) shorted.
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” suffix, but an RoHS compliant version is required, please contact Pulse for availability.
4. Basic insulated parts can be made available. Please contact Pulse for availability.

* Contact Pulse for availability
High Frequency Planar Transforms
PA0XXXNL Series (up to 140W)

**Mechanical**

### PA0XXXNL

**Suggested Pad Layout**

- **Dimensions:**
  - 1.050
  - 26.67
  - 17.78
  - 6.00
  - 15.24
  - 3.00
  - 7.62
  - 5XØ 0.130
  - 3.30

**NOTE:** The above is a universal footprint for a component that has all 11 pins populated. For a given number, it is only necessary to provide pads for the termination shown in the schematics on the next page.

### Schematics

**PA0XXXNL**

**Weight** ........................................ 11.0 grams

**Tape & Reel** ..................................... 180/reel

**Tray** ............................................. 40/tray

**Dimensions:**
- **Inches:**
- **Millimeters:** ± 0.010

**NOTE:** Unless otherwise specified, all tolerances are ± 0.010.

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**Core Loss vs. Flux Density**

- **100kHz**
- **200kHz**
- **300kHz**
- **400kHz**
- **500kHz**
- **600kHz**
- **700kHz**

**Equation:**

\[
L = \frac{2.53E-13 \Delta B^2 (\text{Freq. [kHz]})^2}{s_s}
\]

- **Core Loss (W)**
- **Core Loss (mW)**
Notes:
1. The above transformers have been tested and approved by Pulse’s IC partners and are cited in the appropriate datasheet or evaluation board documentation at these companies. To determine which IC and IC companies are matched with the above transformers, please refer to the IC cross reference on the Pulse web page. See the Spy glass transformer matrix on the next page for other winding configurations that can be made available.

2. To determine if the transformer is suitable for your application, it is necessary to ensure that the temperature rise of the component (ambient plus temperature rise) does not exceed its operating temperature. To determine the approximate temperature rise of the transformer, refer to the graphs below.

```
ΔB = 180E3 * Vin_min * Dutycycle_max / (Freq_kHz * Pri_Turns)
```

**PA08XX Transformer Winding Configuration Matrix**

The following is a matrix of the winding configurations that are possible with the Pulse PA08XX Planar Transformer Platform. The package is typically capable of handling between 80-140W of power depending on the application, ambient conditions and available cooling. Once a configuration is selected, the formulae and charts can be used to determine the approximate power dissipation and temperature rise of the component in a given application.
### High Frequency Planar Transforms

**PA08XXNL Series (up to 140W)**

<table>
<thead>
<tr>
<th>PRIMARY WINDINGS</th>
<th>SINGLE WINDING</th>
<th>TAPPED WINDING</th>
<th>DUAL WINDING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turns</td>
<td>1T</td>
<td>2T</td>
<td>4T</td>
</tr>
<tr>
<td></td>
<td>DCR (mΩ)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Notes:

1. The primary inductance for any configuration can be calculated as:
   
   \[
   \text{Primary Inductance (µH MIN) = 2.4 x (Primary Turns)}^2
   \]

2. The above base part numbers (PA08XXNL) are available from stock.

3. It is possible to add a small gap to the transformer. Gapped transformers are non-standard and can be made available upon request, but are not typically available from stock. To request a gapped version of the transformer, add a suffix “G” to the base number (i.e. PA0801NL or PA0801.004NL etc.). The nominal inductance with the a gap can be calculated as:

   \[
   \text{Primary Inductance (µH nominal) = 0.69 x (Primary Turns)}^2
   \]

4. It is possible to add a primary side aux. winding to any of the above configurations as shown in the schematics. Transformers with primary size aux. windings are non-standard and can be made available upon request, but are not typically available from stock. The primary aux. winding can be between 2 and 16 turns. To add a primary aux. winding to a given base, use the extension .XXX. For example, to add a 4T aux. winding to the base part number PA0801NL, use the part number PA0801.004NL.

5. Optional Tape & Reel packaging can be ordered by adding a “T” suffix to the complete part number (i.e. PA0801 becomes PA0801T for no AUX - PA0801.009NL becomes PA0801T.009NL.T for 9T AUX). Pulse complies to industry standard tape and reel specification EIA481.

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