

# High Frequency Wire Wound Transformers

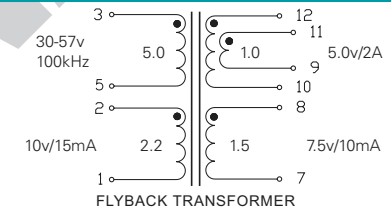
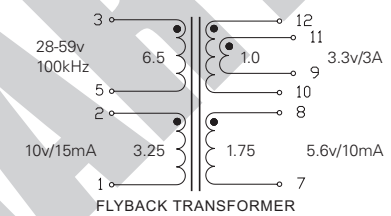
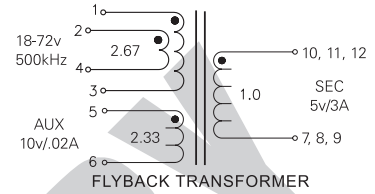
EFD15 Platforms - SMT



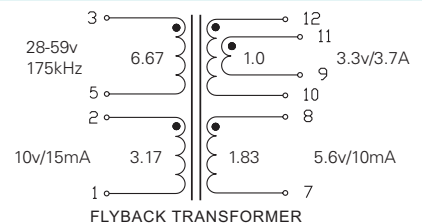
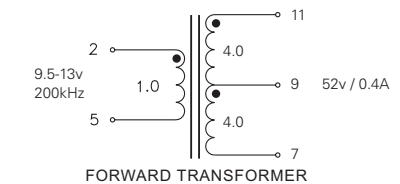
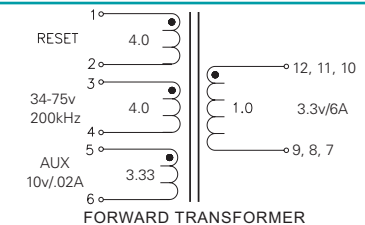
- Power Range:** Up to 40W
- Height:** 8.4mm Max
- Footprint:** 22.2mm x 17.2mm Max
- Topology:** Forward and Flyback

## Electrical Specifications @ 25°C — Operating Temperature -40°C to 130°C<sup>5</sup>

| Part Number | Parameter       | Value                                       | Notes        |
|-------------|-----------------|---|--------------|
| PA0476NL    | Pri. Inductance | (1,2-3,4)                                   | 9.85μH ±10%  |
|             | Lk. Inductance  | (1,2-3,4) with (5,6,7,8,9,10,11,12) shorted | 0.15μH MAX   |
|             | DCR             | (1-3)                                       | 47mΩ MAX     |
|             |                 | (2-4)                                       | 47mΩ MAX     |
|             |                 | (5-6)                                       | 87mΩ MAX     |
|             |                 | (12,11,10-7,8,9)                            | 8mΩ MAX      |
|             | Hi-Pot          | Pri-Sec                                     | 1500Vrms     |
| K1 Factor   | 820.8           |   |              |
| PA0691NL    | Pri. Inductance | (3-5)                                       | 170.3μH ±12% |
|             | Lk. Inductance  | (3-5) with (7,8,9,10,11,12) shorted         | 2.4μH MAX    |
|             | DCR             | (3-5)                                       | 600mΩ MAX    |
|             |                 | (2-1)                                       | 2000mΩ MAX   |
|             |                 | (12,11-10,9)                                | 20mΩ MAX     |
|             |                 | (8-7)                                       | 720mΩ MAX    |
|             | Hi-Pot          | Pri-Sec                                     | 1500Vrms     |
| K1 Factor   | 2183.3          |   |              |
| PA1039NL    | Pri. Inductance | (3-5)                                       | 157.5μH ±10% |
|             | Lk. Inductance  | (3-5) with (7,8,9,10,11,12) shorted         | 2μH MAX      |
|             | DCR             | (3-5)                                       | 500mΩ MAX    |
|             |                 | (2-1)                                       | 1300mΩ MAX   |
|             |                 | (12,11-10,9)                                | 25mΩ MAX     |
|             |                 | (8-7)                                       | 760mΩ MAX    |
|             | Hi-Pot          | Pri-Sec                                     | 1500Vrms     |
| K1 Factor   | 2100.0          |   |              |
| PA1067NL    | Pri. Inductance | (3-4)                                       | 113μH ±30%   |
|             | Lk. Inductance  | (3-4) with (12,11,10,9,8,7) shorted         | 1μH MAX      |
|             | DCR             | (1-2)                                       | 70mΩ MAX     |
|             |                 | (3-4)                                       | 70mΩ MAX     |
|             |                 | (5-6)                                       | 70mΩ MAX     |
|             |                 | (12,11,10-9,8,7)                            | 6mΩ MAX      |
|             | Hi-Pot          | Pri-Sec                                     | 500Vrms      |
| K1 Factor   | 55.6            |   |              |
| PA1169NL    | Pri. Inductance | (2-5)                                       | 38.2μH ±30%  |
|             | Lk. Inductance  | (2-5) with (11,9,7) shorted                 | 0.5μH MAX    |
|             | DCR             | (2-5)                                       | 27mΩ MAX     |
|             |                 | (11-7)                                      | 850mΩ MAX    |
|             | Hi-Pot          | Pri-Sec                                     | 1500Vrms     |
| K1 Factor   | 95.2            |   |              |
| PA1275NL    | Pri. Inductance | (3-5)                                       | 100.7μH ±10% |
|             | Lk. Inductance  | (3-5) with (7,8,9,10,11,12) shorted         | 2μH MAX      |
|             | DCR             | (3-5)                                       | 485mΩ MAX    |
|             |                 | (2-1)                                       | 1500mΩ MAX   |
|             |                 | (12,11-10,9)                                | 16mΩ MAX     |
|             |                 | (8-7)                                       | 575mΩ MAX    |
|             | Hi-Pot          | Pri-Sec                                     | 1800Vdc      |
| K1 Factor   | 1678.3          |   |              |



(Note: Height of PA1039NL is 8.9mm Max)



# High Frequency Wire Wound Transformers

EFD15 Platforms - SMT



## Electrical Specifications @ 25°C — Operating Temperature -40°C to 130°C<sup>5</sup>

|           |                 |                                     |              |  |
|-----------|-----------------|-------------------------------------|--------------|--|
| PA1424NL  | Pri. Inductance | (3-4)                               | 62µH ±12%    |  |
|           | Lk. Inductance  | (3-4) with (10,9,8,7) shorted       | 1µH MAX      |  |
|           | DCR             | (3-4)                               | 250mΩ MAX    |  |
|           |                 | (10-9)                              | 30mΩ MAX     |  |
|           |                 | (7-8)                               | 20mΩ MAX     |  |
|           |                 | (2-1)                               | 400mΩ MAX    |  |
|           | Hi-Pot          | Pri-Sec                             | 1500Vrms     |  |
| K1 Factor | 1878.8          |                                     |              |  |
| PA1627NL  | Pri. Inductance | (3-5)                               | 100.7µH ±12% |  |
|           | Lk. Inductance  | (3-5) with (7,8,9,10,11,12) shorted | 3µH MAX      |  |
|           | DCR             | (3-5)                               | 485mΩ MAX    |  |
|           |                 | (2-1)                               | 1850mΩ MAX   |  |
|           |                 | (12,11-10,9)                        | 16mΩ MAX     |  |
|           | Hi-Pot          | Pri-Sec                             | 2150Vdc      |  |
| K1 Factor | 1678.3          |                                     |              |  |
| PA1646NL  | Pri. Inductance | (3-5)                               | 100.7µH ±5%  |  |
|           | Lk. Inductance  | (3-5) with (7,8,9,10,11,12) shorted | 3µH MAX      |  |
|           | DCR             | (3-5)                               | 485mΩ MAX    |  |
|           |                 | (2-1)                               | 1150mΩ MAX   |  |
|           | Hi-Pot          | Pri-Sec                             | 1500Vrms     |  |
| K1 Factor | 1678.3          |                                     |              |  |
| PA1706NL  | Pri. Inductance | (3-5)                               | 170.1µH ±12% |  |
|           | Lk. Inductance  | (3-5) with (12,11,10,9,8,7) shorted | 3.5µH MAX    |  |
|           | DCR             | (3-5)                               | 643mΩ MAX    |  |
|           |                 | (12,11-10,9)                        | 6mΩ MAX      |  |
|           |                 | (8-7)                               | 60mΩ MAX     |  |
|           | (2-1)           | 123mΩ MAX                           |              |  |
| Hi-Pot    | Pri-Sec         | 1500Vrms                            |              |  |
| K1 Factor | 2520.0          |                                     |              |  |
| PA1741NL  | Pri. Inductance | (1-3)                               | 144µH ±10%   |  |
|           | Lk. Inductance  | (1-3) with (12,11,10,9,8,7) shorted | 1µH MAX      |  |
|           | DCR             | (1-3)                               | 150mΩ MAX    |  |
|           |                 | (12,11-10,9)                        | 18mΩ MAX     |  |
|           | (8-7)           | 60mΩ MAX                            |              |  |
| Hi-Pot    | Pri-Sec         | 1800Vrms                            |              |  |
| K1 Factor | 27.8            |                                     |              |  |
| PA1745NL  | Pri. Inductance | (2-5)                               | 37.1µH ±10%  |  |
|           | Lk. Inductance  | (2-5) with (8,9,10,11) shorted      | 1µH MAX      |  |
|           | DCR             | (2-5)                               | 78mΩ MAX     |  |
|           |                 | (11-10)                             | 34mΩ MAX     |  |
|           | (8-7)           | 38mΩ MAX                            |              |  |
| Hi-Pot    | Pri-Sec         | 600Vrms                             |              |  |
| K1 Factor | 1177.8          |                                     |              |  |

# High Frequency Wire Wound Transformers

EFD15 Platforms - SMT



## Electrical Specifications @ 25°C — Operating Temperature -40°C to 130°C<sup>5</sup>

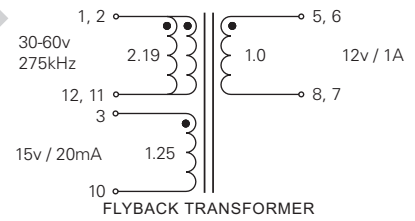
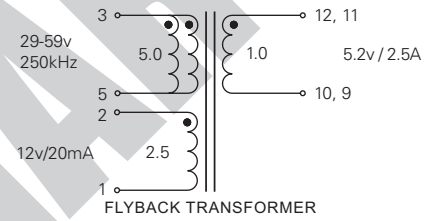
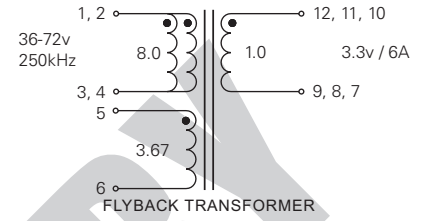
| Part Number | Parameter       | Value                               | Diagram |           |
|-------------|-----------------|-------------------------------------|---------|-----------|
| PA1994NL    | Pri. Inductance | (3-5)                               |         |           |
|             | Lk. Inductance  | (3-5) with (7,8,9,10,11,12) shorted |         |           |
|             | DCR             | (3-5)                               |         | 850mΩ MAX |
|             |                 | (2-1)                               |         | 145mΩ MAX |
|             |                 | (12,11-10,9)                        |         | 75mΩ MAX  |
|             |                 | (8-7)                               |         | 55mΩ MAX  |
|             | Hi-Pot          | Pri-Sec                             |         | 1500Vrms  |
| K1 Factor   | 2520.0          |                                     |         |           |
| PA1995NL    | Pri. Inductance | (3-5)                               |         |           |
|             | Lk. Inductance  | (3-5) with (7,8,9,10,11,12) shorted |         |           |
|             | DCR             | (3-5)                               |         | 850mΩ MAX |
|             |                 | (2-1)                               |         | 145mΩ MAX |
|             |                 | (12,11-10,9)                        |         | 70mΩ MAX  |
|             |                 | (8-7)                               |         | 55mΩ MAX  |
|             | Hi-Pot          | Pri-Sec                             |         | 1500Vrms  |
| K1 Factor   | 2520.0          |                                     |         |           |
| PA1996NL    | Pri. Inductance | (3-5)                               |         |           |
|             | Lk. Inductance  | (3-5) with (7,8,9,10,11,12) shorted |         |           |
|             | DCR             | (3-5)                               |         | 850mΩ MAX |
|             |                 | (2-1)                               |         | 145mΩ MAX |
|             |                 | (12,11-10,9)                        |         | 37mΩ MAX  |
|             |                 | (8-7)                               |         | 55mΩ MAX  |
|             | Hi-Pot          | Pri-Sec                             |         | 1500Vrms  |
| K1 Factor   | 2520.0          |                                     |         |           |
| PA1997NL    | Pri. Inductance | (3-5)                               |         |           |
|             | Lk. Inductance  | (3-5) with (7,8,9,10,11,12) shorted |         |           |
|             | DCR             | (3-5)                               |         | 850mΩ MAX |
|             |                 | (2-1)                               |         | 150mΩ MAX |
|             |                 | (12,11-10,9)                        |         | 15mΩ MAX  |
|             |                 | (8-7)                               |         | 65mΩ MAX  |
|             | Hi-Pot          | Pri-Sec                             |         | 1500Vrms  |
| K1 Factor   | 2520.0          |                                     |         |           |
| PA2026NL    | Pri. Inductance | (3-5)                               |         |           |
|             | Lk. Inductance  | (3-5) with (7,9,10,12) shorted      |         |           |
|             | DCR             | (3-5)                               |         | 150mΩ MAX |
|             |                 | (12-10)                             |         | 26mΩ MAX  |
|             |                 | (9-7)                               |         | 28mΩ MAX  |
|             |                 | (2-1)                               |         | 245mΩ MAX |
|             | Hi-Pot          | Pri-Sec                             |         | 1500Vrms  |
| K1 Factor   | 840.0           |                                     |         |           |

# High Frequency Wire Wound Transf

EFD15 Platforms - SMT

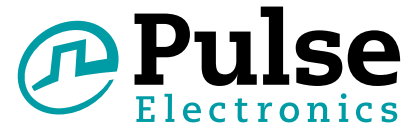
## Electrical Specifications @ 25°C — Operating Temperature -40°C to 130°C<sup>5</sup>

| Part Number | Parameter       | Value        | Notes                                       |
|-------------|-----------------|--------------|---|
| PA2069NL    | Pri. Inductance | 40µH ±13%    | (1,2-3,4)                                   |
|             | Lk. Inductance  | 0.825µH MAX  | (1,2-3,4) with (5,6,7,8,9,10,11,12) shorted |
|             | DCR             | 130mΩ MAX    | (1,2-3,4)                                   |
|             |                 | 315mΩ MAX    | (5-6)                                       |
|             |                 | 3.5mΩ MAX    | (12,11,10-9,8,7)                            |
|             | Hi-Pot          | 1650Vrms     | Pri-Sec                                     |
| K1 Factor   | 1111.1          |              |   |
| PA2196NL    | Pri. Inductance | 70µH ±10%    | (3-5)                                       |
|             | Lk. Inductance  | 1.2µH MAX    | (3-5) with (7,8,9,10,11,12) shorted         |
|             | DCR             | 183mΩ MAX    | (3-5)                                       |
|             |                 | 1100mΩ MAX   | (2-1)                                       |
|             |                 | 14mΩ MAX     | (12,11-10,9)                                |
|             | Hi-Pot          | 1500Vrms     | Pri-Sec                                     |
| K1 Factor   | 1555.6          |              |   |
| PA2265NL    | Pri. Inductance | 122.5µH ±10% | (1,2-12,11)                                 |
|             | Lk. Inductance  | 2µH MAX      | (1,2-12,11) with (5,6,8,7,3,10) shorted     |
|             | DCR             | 270mΩ MAX    | (1,2-12,11)                                 |
|             |                 | 63mΩ MAX     | (7,8,9-10,11,12)                            |
|             |                 | 310mΩ MAX    | (5,6-8,7)                                   |
|             | Hi-Pot          | 1500Vrms     | Pri-Sec                                     |
| K1 Factor   | 2333.3          |              |   |



# High Frequency Wire Wound Transformers

EFD15 Platforms - SMT



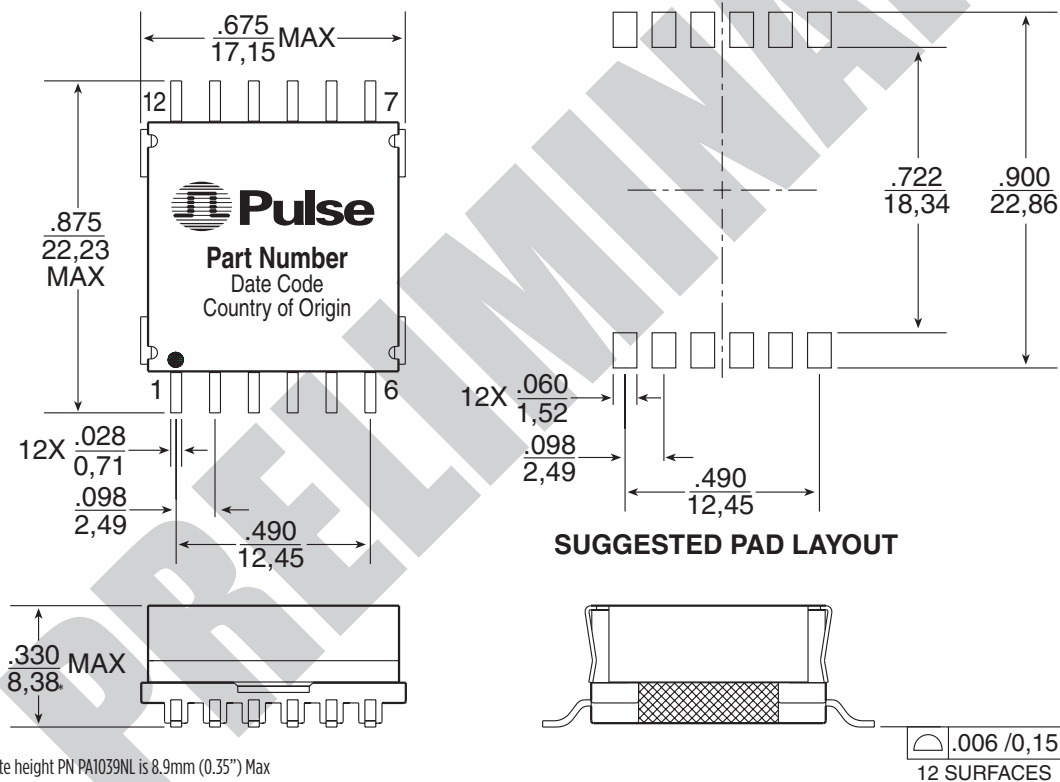
## Notes

- The temperature of the component (ambient plus temperature rise) must be within the stated operating temperature range.
- The above transformers and inductors have been tested and approved by Pulse's power IC partners and are sited in the appropriate datasheet or evaluation board documentation at these companies. To determine which IC and IC partners are matched with the above Pulse part numbers please consult the IC Cross Reference on the Pulse website.
- For flyback topology applications, it is necessary to ensure that the transformer will not saturate in the application. The peak flux density (Bpk) should remain below 2700Gauss. To calculate the peak flux density use the following formula:  

$$Bpk \text{ (Gauss)} = K1\_Factor * Ip(A)$$
- In high volt- $\mu$ sec applications, it is important to calculate the core loss of the transformer. Approximate transformer core loss can be calculated as:  

$$CoreLoss (W) = 4.6E-14 * (Freq\_kHz)^{1.63} * (\Delta B\_Gauss)^{2.63}$$
 where  $\Delta B$  can be calculated as:  
 For Flyback Topology:  $\Delta B = K1\_Factor * \Delta(A)$   
 For Forward Topology:  $\Delta B = K1\_Factor * Volt-\mu sec$
- Optional Tape & Reel packaging can be ordered by adding a "T" suffix to the part number (i.e. PA0476NL becomes PA0476NLT). Pulse complies with industry standard tape and reel specification EIA481. The tape and reel for this product has a width (W=44mm), pitch (Po=32mm) and depth (Ko=11.78mm).
- 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.

## Mechanical



## For More Information

### Pulse Worldwide Headquarters

12220 World Trade Drive  
San Diego, CA 92128  
U.S.A.

Tel: 858 674 8100  
Fax: 858 674 8262

### Pulse Europe

Zeppelinstrasse 15  
71083 Herrenberg  
Germany

Tel: 49 7032 7806 0  
Fax: 49 7032 7806 12

### Pulse China Headquarters

B402, Shenzhen Academy of  
Aerospace Technology Bldg.  
10th Kejinan Road  
High-Tech Zone  
Nanshan District  
Shenzhen, PR China 518057

Tel: 86 755 33966678  
Fax: 86 755 33966700

### Pulse North China

Room 2704/2705  
Super Ocean Finance Ctr.  
2067 Yan An Road West  
Shanghai 200336  
China

Tel: 86 21 62787060  
Fax: 86 2162786973

### Pulse South Asia

135 Joo Seng Road  
#03-02  
PM Industrial Bldg.  
Singapore 368363

Tel: 65 6287 8998  
Fax: 65 6287 8998

### Pulse North Asia

3F No. 198, Zhongyuan Road  
Zhongli City  
Taoyuan County (32068)  
Taiwan

Tel: 886 3 4356768  
Fax: 886 3 4356823

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, 2013. Pulse Electronics, Inc. All rights reserved.