

HIGH FREQUENCY PLANAR TRANSFORMERS

Industrial Grade



- ⊗ Power Rating: up to 250W
- ⊗ Height: 9.1mm to 10.4mm max
- ⊗ Footprint: 29.5mm x 26.7mm Max
- ⊗ Frequency Range: 200kHz to 700kHz
- ⊗ Isolation (Primary to Secondary): 1750V_{DC}

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

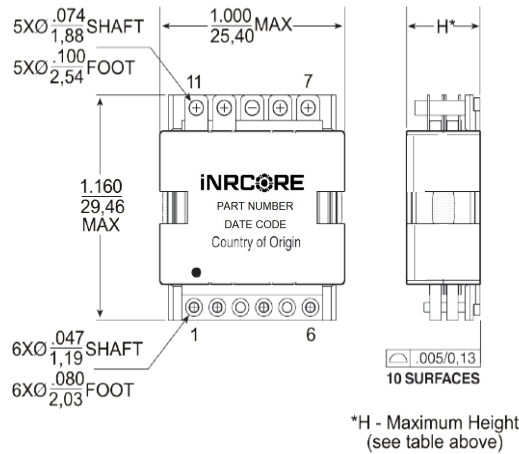
| Part Number | Turns Ratio | | Schematic | Primary* Inductance (µH MIN) | Leakage** Inductance (µH MAX) | DCR (mΩ MAX) | | | | Height MAX (mm) |
|---|--------------------|---------------------|-----------|------------------------------|-------------------------------|--------------|-----------|--------------|-------------|-----------------|
| | Primary | Secondary | | | | Primary A | Primary B | Primary Aux. | Secondary | |
| DOUBLE INTERLEAVE DESIGNS (HIGHER EFFICIENCY, LOWER DCR AND LOWER LEAKAGE) | | | | | | | | | | |
| R8201NL | 4T & 4T | 4T (1T:1T:1T:1T) | A1 | 216 | 0.3 | 13 | 13 | — | 4.5 | 10.2 |
| R8203NL | 5T & 5T (w/5T aux) | | | 340 | 0.2 | 15 | 15 | 235 | | |
| R8205NL | 6T & 6T (w/2T aux) | | | 480 | 0.35 | 21 | 21 | 78 | | |
| R8207NL | 7T & 7T (w/3T aux) | | | 660 | 0.45 | 50 | 50 | 100 | | |
| R8209NL | 8T & 8T | | | 860 | 0.5 | 45 | 45 | — | | |
| R8208NL | 4T & 4T | 1T & 1T | A2 | 216 | 0.2 | 13 | 13 | — | 0.56 & 0.56 | 10.2 |
| R8210NL | 5T & 5T (w/5T aux) | | | 340 | 0.3 | 15 | 15 | 235 | | |
| R8212NL | 6T & 6T (w/2T aux) | | | 480 | 0.35 | 21 | 21 | 78 | | |
| R8214NL | 7T & 7T (w/3T aux) | | | 660 | 0.45 | 50 | 50 | 100 | | |
| R8216NL | 8T & 8T | | | 860 | 0.5 | 45 | 45 | — | | |
| SINGLE INTERLEAVE DESIGNS | | | | | | | | | | |
| R8230NL | 4T | 4T (1T:1T:1T:1T) | B1 | 54 | 0.2 | 13 | — | — | 4.5 | 9.1 |
| R8231NL | 5T (w/5T aux) | | | 85 | 0.3 | 15 | — | 470 | | |
| R8232NL | 6T (w/2T aux) | | | 120 | 0.35 | 21 | — | 160 | | |
| R8233NL | 7T (w/3T aux) | | | 165 | 0.45 | 50 | — | 200 | | |
| R8246NL | 8T | | | 215 | 0.5 | 45 | — | — | | |
| R8234NL | 4T | 7T & 7T | B2 | 54 | 0.2 | 13 | — | — | 40 & 40 | 9.1 |
| R8235NL | 5T (w/5T aux) | | | 85 | 0.3 | 15 | — | 470 | | |
| R8236NL | 6T (w/2T aux) | | | 120 | 0.35 | 21 | — | 160 | | |
| R8237NL | 7T (w/3T aux) | | | 165 | 0.45 | 50 | — | 200 | | |
| R8247NL | 8T | | | 215 | 0.5 | 45 | — | — | | |
| R8238NL | 4T | 1T & 1T | B2 | 54 | 0.2 | 13 | — | — | 1.12 & 1.12 | 9.1 |
| R8239NL | 5T (w/5T aux) | | | 85 | 0.3 | 15 | — | 470 | | |
| R8240NL | 6T (w/2T aux) | | | 120 | 0.35 | 21 | — | 160 | | |
| R8241NL | 7T (w/3T aux) | | | 165 | 0.45 | 50 | — | 200 | | |
| R8248NL | 8T | | | 215 | 0.5 | 45 | — | — | | |
| R8242NL | 4T | 2T & 1T | B3 | 54 | 0.2 | 13 | — | — | 1.8 & 0.6 | 9.1 |
| R8243NL | 5T (w/5T aux) | | | 85 | 0.3 | 15 | — | 470 | | |
| R8244NL | 6T (w/2T aux) | | | 120 | 0.35 | 21 | — | 160 | | |
| R8245NL | 7T (w/3T aux) | | | 165 | 0.45 | 50 | — | 200 | | |
| R8249NL | 8T | | | 215 | 0.5 | 45 | — | — | | |

Notes: 1. Option Tape & Reel packaging can be ordered by adding a "T" suffix at the end of the part number (i.e. R8235NLT).

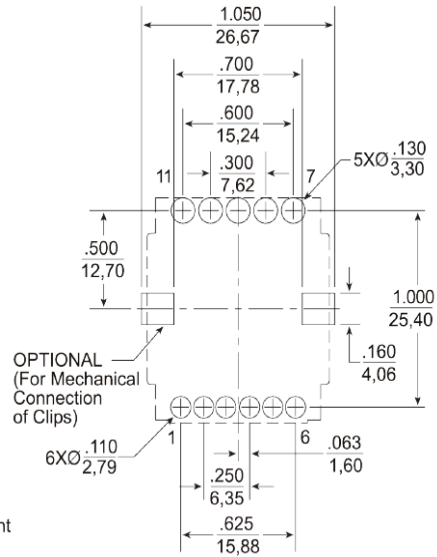


Mechanicals

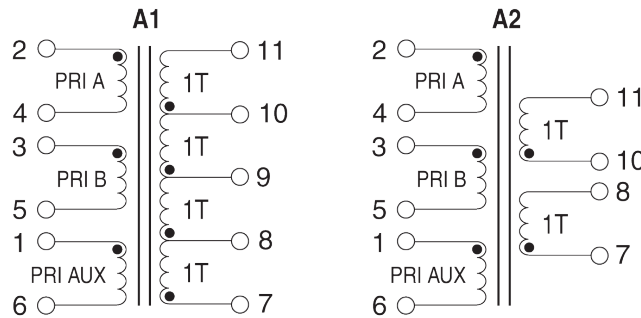
NOTE: The below is a universal footprint for a component that has all 11 pins populated. For a given part number it is only necessary to provide pads for the terminations shown



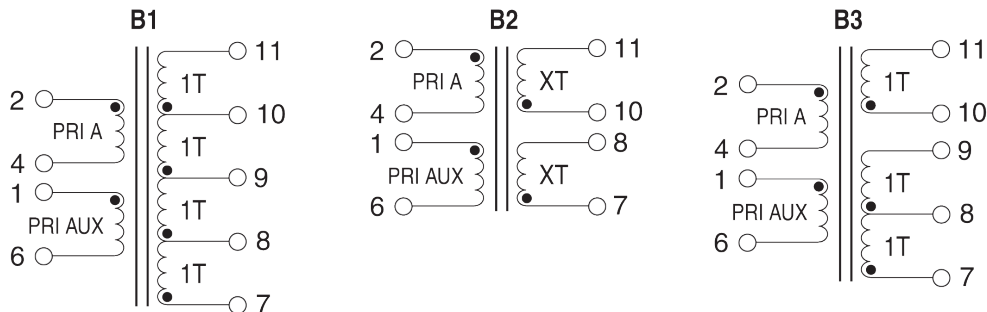
SUGGESTED PAD LAYOUT



Electrical Schematics



— SINGLE INTERLEAVE SCHEMATICS —



R82XXNL Transformer Winding Configuration Matrix

The following is a matrix of the winding configurations that are possible with the iNRCORE R82XXNL Planar Transformer Platform. The package is typically capable of handling between 150-250W 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 Efficiency Double Interleaved Designs | | | | | | | | | | |
|--|----------------|---------|--------------------|---------|---------|----------------|----------|---------|--------------|---------|
| | | | SECONDARY WINDINGS | | | | | | | |
| | | | Single Winding | | | Tapped Winding | | | Dual Winding | |
| | | | Turns | 1T | 2T | 4T | 1:1 | 1:3 | 2:2 | 1T & 1T |
| | | | DCR (mΩ) | 0.28 | 1.12 | 4.5 | 1.12 | 4.5 | 4.5 | 1.12 |
| PRIMARY WINDINGS | Single Winding | 4T | 5 | R8208NL | R8208NL | R8201NL | R8208NL | R8201NL | R8201NL | R8208NL |
| | | 5T | 7.5 | R8210NL | R8210NL | R8203NL | R8210NL | R8203NL | R8203NL | R8210NL |
| | | 6T | 12 | R8212NL | R8212NL | R8205NL | R8212NL | R8205NL | R8205NL | R8212NL |
| | | 7T | 30 | R8214NL | R8214NL | R8207NL | R8214NL | R8207NL | R8207NL | R8214NL |
| | | 8T | 20 | R8208NL | R8208NL | R8201NL | R8208 NL | R8201NL | R8201NL | R8208NL |
| | | 10T | 30 | R8210NL | R8210NL | R8203NL | R8210NL | R8203NL | R8203NL | R8210NL |
| | | 12T | 48 | R8212NL | R8212NL | R8205NL | R8212NL | R8205NL | R8205NL | R8212NL |
| | | 14T | 120 | R8214NL | R8214NL | R8207NL | R8214NL | R8207NL | R8207NL | R8214NL |
| | 16T | 140 | R8216NL | R8216NL | R8209NL | R8216NL | R8209NL | R8209NL | R8216NL | |
| | Dual Winding | 4T & 4T | 20 | R8208NL | R8208NL | R8201NL | R8208NL | R8201NL | R8201NL | R8208NL |
| | | 5T & 5T | 30 | R8210NL | R8210NL | R8203NL | R8210NL | R8203NL | R8203NL | R8210NL |
| | | 6T & 6T | 48 | R8212NL | R8212NL | R8205NL | R8212NL | R8205NL | R8205NL | R8212NL |
| | | 7T & 7T | 120 | R8214NL | R8214NL | R8207NL | R8214NL | R8207NL | R8207NL | R8214NL |
| | | 8T & 8T | 140 | R8216NL | R8216NL | R8209NL | R8216NL | R8209NL | R8209NL | R8216NL |

| Lower Cost Single Interleaved Designs | | | | | | | | | | | | | | | | |
|---------------------------------------|----------------|----|--------------------|---------|---------|----------|----------|----------------|---------|---------|---------|----------|--------------|---------|---------|---------|
| | | | SECONDARY WINDINGS | | | | | | | | | | | | | |
| | | | Single Winding | | | | | Tapped Winding | | | | | Dual Winding | | | |
| | | | Turns | 1T | 2T | 3T | 4T | 7T | 1:1 | 1:2 | 1:3 | 2:2 | 7:7 | 1T & 1T | 1T & 2T | 7T & 7T |
| | | | DCR (mΩ) | 0.56 | 2.24 | 3.4 | 4.5 | 20 | 2.24 | 3.4 | 4.5 | 4.5 | 80 | 2.24 | 4.5 | 80 |
| PRIMARY WINDINGS | Single Winding | 4T | 10 | R8238NL | R8238NL | R8242NL | R8230NL | R8234NL | R8238NL | R8242NL | R8230NL | R8230NL | R8234NL | R8238NL | R8242NL | R8234NL |
| | | 5T | 15 | R8239NL | R8239NL | R8243NL | R8231NL | R8235NL | R8239NL | R8243NL | R8231NL | R8231NL | R8235NL | R8239NL | R8243NL | R8235NL |
| | | 6T | 24 | R8240NL | R8240NL | R8244 NL | R8232NL | R8236NL | R8240NL | R8244NL | R8232NL | R8232NL | R8236NL | R8240NL | R8244NL | R8236NL |
| | | 7T | 60 | R8241NL | R8241NL | R8245NL | R8233NL | R8237NL | R8241NL | R8245NL | R8233NL | PR8233NL | R8237NL | R8241NL | R8245NL | R8237NL |
| | | 8T | 70 | R8248NL | R8248NL | R8249NL | PR8246NL | R8247NL | R8248NL | R8249NL | R8246NL | R8246NL | R8247NL | R8248NL | R8249NL | R8247NL |

NOTES: 1. The base PN (ie: R8201NL) uses an ungapped core. The minimum primary inductance for any configuration can be calculated as:

$$\text{Primary Inductance } (\mu\text{H Min}) = 3.4 * (\text{Primary Turns})^2$$

2. The above base part numbers (R82XXNL) 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 (ie: **R8201GNL**). The nominal inductance with a gap can be calculated as:

$$\text{Primary Inductance } (\mu\text{H Nominal}) = 2.2 * (\text{Primary Turns})^2$$

