

# HIGH FREQUENCY PLANAR TRANSFORMERS

Industrial Grade



- ⚙ Power Rating up to 140 W
- ⚙ 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<sub>DC</sub>
- ⚙ Moisture Sensitivity Level: 1

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

Part <sup>3,4</sup> Number	Turns Ratio		Secondary	Schematic	Primary 1 Inductance ( $\mu$ H MIN)	Leakage Inductance ( $\mu$ H MAX)	DCR (m $\Omega$ MAX)			Maximum Height (mm)
	Primary A	Primary B					Primary A	Primary B	Secondary	
R8301NL	4T	4T	4T	A1	153	0.45	17.5	17.5	7	8.6
R8302NL	4T	5T			194	0.45	17.5	20	7	8.6
R8303NL	5T	5T			240	0.55	20	20	7	8.6
R8304NL	5T	6T			290	0.60	20	25	7	8.6
R8305NL	6T	6T			345	0.65	25	25	7	8.6
R8306NL	4T	4T	1T & 1T	A2	153	0.45	17.5	17.5	.875 & .875	8.6
R8307NL	4T	5T			194	0.45	17.5	20	.875 & .875	8.6
R8308NL	5T	5T			240	0.55	20	20	.875 & .875	8.6
R8309NL	5T	6T			290	0.60	20	25	.875 & .875	8.6
R8310NL	6T	6T			345	0.65	25	25	.875 & .875	8.6
R8311NL	4T	4T	2T & 1T	A3	153	0.45	17.5	17.5	1.75 & 1.75	8.6
R8312NL	4T	5T			194	0.45	17.5	20	1.75 & 1.75	8.6
R8313NL	5T	5T			240	0.50	20	20	1.75 & 1.75	8.6
R8314NL	5T	6T			290	0.50	20	25	1.75 & 1.75	9.7
R8315NL	6T	6T			345	0.55	25	25	1.75 & 1.75	9.7

- Notes:
1. Inductance is measured where applicable, with north primary windings connected in series (2 to 5, with 3 and 4 shorted).
  2. Leakage inductance is measured on windings (2-5) with (3-4) and (7, 8, 9, 10, 11) shorted.
  3. Optional Tape & Reel packaging can be ordered by adding a "T" suffix at the end of the part number (i.e. R8301NLT)

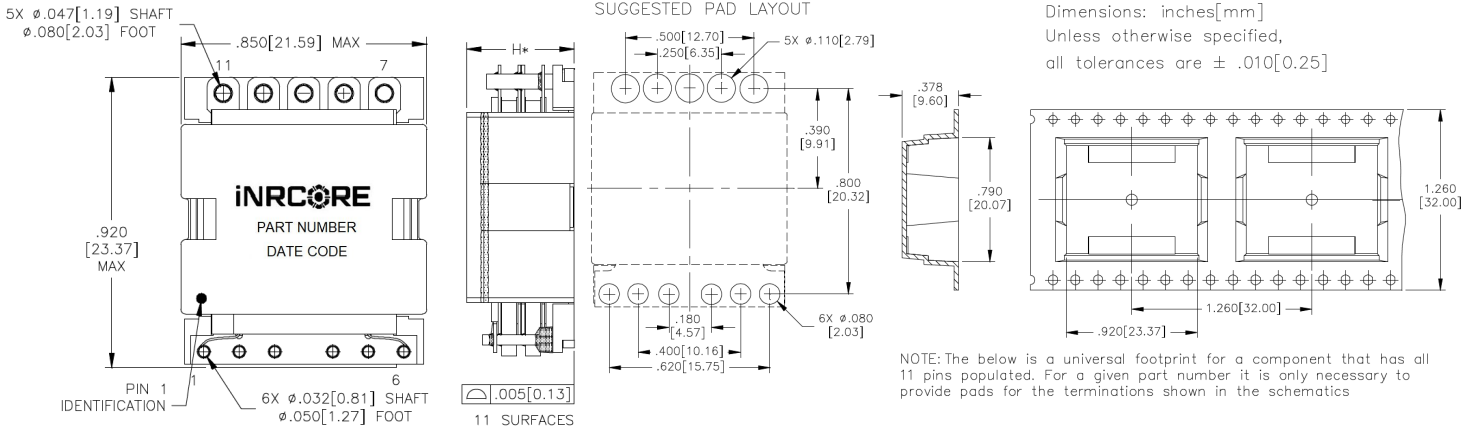


# HIGH FREQUENCY PLANAR TRANSFORMERS

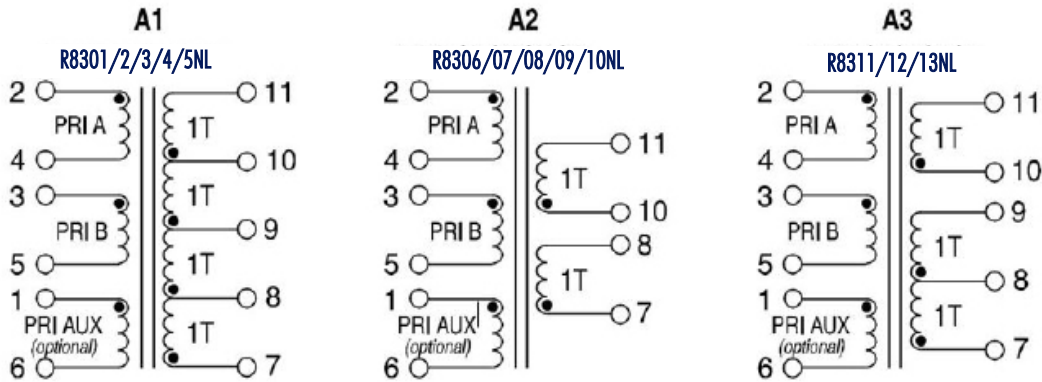
Industrial Grade



## Mechanics



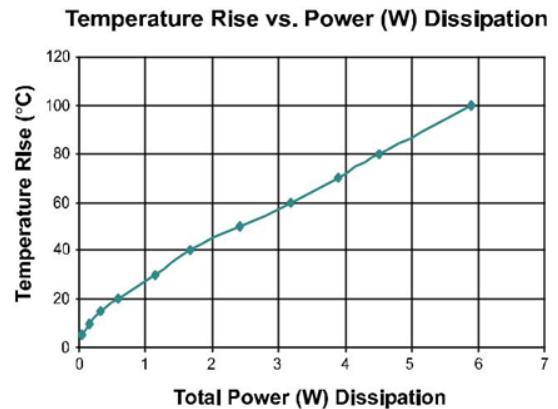
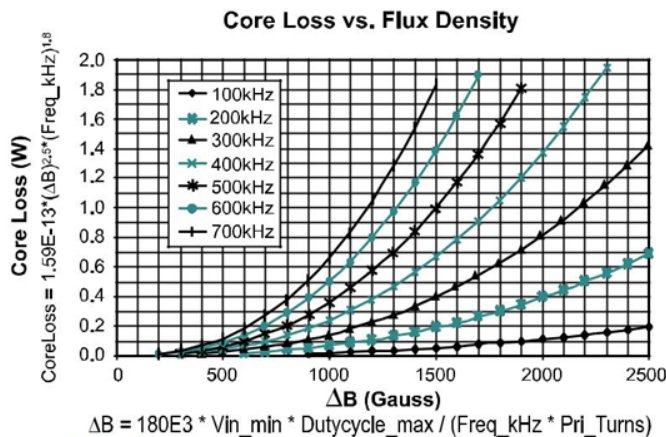
## Electrical Schematics



Notes:

1. The above transformers have been tested and approved by iNRCORE's IC partners and are cited in the appropriate datasheet or evaluation board documentation at these companies. See Spy glass transformer matrix on the next page for the other winding configuration 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.



## R83XX NL Transformer Winding Configuration Matrix

The following is a matrix of the winding configurations that are possible with the iNRCORE R83XXNL Planar Transformer platform. The package is typically capable of handling between 80-140w of power depending on the application, ambient conditions 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	3T	4T	1:1	1:2	1:3	2:2	1T & 1T	1T & 2T
DCR (mΩ)		0.44	1.3	3.6	7	1.3	3.5	7	7	1.3	3.5		
PRIMARY WINDINGS	Single Winding	4T	10	R8306NL	R8306NL	R8311NL	R8301NL	R8306NL	R8311NL	R8301NL	R8301NL	R8306NL	R8311NL
		5T	12.5	R8308NL	R8308NL	R8313NL	R8303NL	R8308NL	R8313NL	R8303NL	R8303NL	R8308NL	R8313NL
		6T	15	R8310NL	R8310NL	R8315NL	R8305NL	R8310NL	R8315NL	R8305NL	R8305NL	R8310NL	R8315NL
		8T	40	R8306NL	R8306NL	R8311NL	R8301NL	R8306NL	R8311NL	R8301NL	R8301NL	R8306NL	R8311NL
		9T	45	R8307NL	R8307NL	R8312NL	R8302NL	R8307NL	R8312NL	R8302NL	R8302NL	R8307NL	R8312NL
		10T	50	R8308NL	R8308NL	R8313NL	R8303NL	R8308NL	R8313NL	R8303NL	R8303NL	R8308NL	R8313NL
		11T	55	R8309NL	R8309NL	R8314NL	R8304NL	R8309NL	R8314NL	R8304NL	R8304NL	R8309NL	R8314NL
		12T	60	R8310NL	R8310NL	R8315NL	R8305NL	R8310NL	R8315NL	R8305NL	R8305NL	R8310NL	R8315NL
	Dual Winding	4T & 4T	20/20	R8306NL	R8306NL	R8311NL	R8301NL	R8306NL	R8311NL	R8301NL	R8301NL	R8306NL	R8311NL
		4T & 5T	20/25	R8307NL	R8307NL	R8312NL	R8302NL	R8307NL	R8312NL	R8302NL	R8302NL	R8307NL	R8312NL
		5T & 5T	25/25	R8308NL	R8308NL	R8313NL	R8303NL	R8308NL	R8313NL	R8303NL	R8303NL	R8308NL	R8313NL
		5T & 6T	25/30	R8309NL	R8309NL	R8314NL	R8304NL	R8309NL	R8314NL	R8304NL	R8304NL	R8309NL	R8314NL
		6T & 6T	30/30	R8310NL	R8310NL	R8315NL	R8305NL	R8310NL	R8315NL	R8305NL	R8305NL	R8310NL	R8315NL

**NOTES:**

- The primary inductance for any configuration can be calculated as:  $\text{Primary Inductance } (\mu\text{H Min}) = 2.4 * (\text{Primary Turns})^2$
- The above base part numbers (R83XXNL) are available from stock.
- 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: **R8301GNL**).  
The nominal inductance with a gap can be calculated as:  $\text{Primary Inductance } (\mu\text{H Nominal}) = 0.69 (\text{Primary Turns})^2$
- 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 .OXX. For example, to add a 4T aux. winding to the base part number R8301NL, use the part number **R8301.004NL**. To add a 16T aux. winding, use the part number **R8301.016NL**.
- Optional Tape & Reel packaging can be ordered by adding a "T" suffix to the complete part number (i.e. R8301NL becomes **R8301NLT** for no AUX- R8301.009NL becomes **R8301.009NLT** for 9T AUX).

