# HIGH FREQUENCY PLANAR INDUCTORS

Ruggedized

iNRCORE FAMILY OF BRANDS

- Height: 7.4mm MAX
- Footprint: 19.8mm x 19.6mm MAX
- Current Rating: up to 73A
- Inductance Range: 0.405$\mu$H to 6.2$\mu$H
- Operating Temperature: -40°C to +130°C
- Moisture Sensitivity Level: 1

## Electrical Specifications @ 25°C

| Part Number | Inductance @ Irated ($\mu$H ±15%) | Irated [3] (ADC) | DCR (mΩ) | | Inductance @ 0 ADC ($\mu$H ±15%) | Saturation Current [4] | | Heating Current [5] (A) |
|---|---|---|---|---|---|---|---|---|
| | | | TYP | MAX | | 25°C | 100°C | |
| 2-TURN (LOW-LOSS) SERIES | | | | | | | | |
| PL10100 | 0.45 | 73 | 0.38 | 0.48 | 0.45 | 95 | 80 | 73 |
| PL10101 | 0.63 | 54 | 0.38 | 0.48 | 0.65 | 63 | 53 | 73 |
| PL10102 | 0.85 | 39 | 0.38 | 0.48 | 0.91 | 46 | 37 | 73 |
| PL10103 | 1.05 | 30 | 0.38 | 0.48 | 1.10 | 35 | 30 | 73 |
| PL10104 | 1.25 | 25 | 0.38 | 0.48 | 1.30 | 29 | 26 | 73 |
| PL10105 | 1.45 | 21 | 0.38 | 0.48 | 1.50 | 24 | 22 | 73 |
| 2-TURN SERIES | | | | | | | | |
| PL10106 | 0.45 | 52 | 0.78 | 0.98 | 0.45 | 95 | 80 | 52 |
| PL10107 | 0.63 | 52 | 0.78 | 0.98 | 0.65 | 63 | 53 | 52 |
| PL10108 | 0.85 | 39 | 0.78 | 0.98 | 0.91 | 46 | 37 | 52 |
| PL10109 | 1.05 | 30 | 0.78 | 0.98 | 1.10 | 35 | 30 | 52 |
| PL10110 | 1.25 | 25 | 0.78 | 0.98 | 1.30 | 29 | 26 | 52 |
| PL10111 | 1.45 | 21 | 0.78 | 0.98 | 1.50 | 24 | 22 | 52 |
| 3-TURN SERIES | | | | | | | | |
| PL10112 | 0.95 | 42 | 1.15 | 1.43 | 1.00 | 68 | 54 | 42 |
| PL10113 | 1.40 | 36 | 1.15 | 1.43 | 1.50 | 43 | 35 | 42 |
| PL10114 | 1.90 | 25 | 1.15 | 1.43 | 2.00 | 29 | 25 | 42 |
| PL10115 | 2.40 | 20 | 1.15 | 1.43 | 2.50 | 23 | 21 | 42 |
| PL10116 | 2.80 | 15 | 1.15 | 1.43 | 3.00 | 18 | 16 | 42 |
| PL10117 | 3.40 | 12 | 1.15 | 1.43 | 3.50 | 15 | 13 | 42 |
| 4-TURN SERIES | | | | | | | | |
| PL10118 | 1.60 | 37 | 1.44 | 1.80 | 1.60 | 55 | 43 | 37 |
| PL10119 | 2.40 | 30 | 1.44 | 1.80 | 2.42 | 35 | 27 | 37 |
| PL10120 | 3.30 | 17 | 1.44 | 1.80 | 3.60 | 20 | 18 | 37 |
| PL10121 | 4.00 | 14 | 1.44 | 1.80 | 4.40 | 16 | 15 | 37 |
| PL10122 | 4.90 | 11 | 1.44 | 1.80 | 5.34 | 13 | 12 | 37 |
| PL10123 | 5.80 | 9 | 1.44 | 1.80 | 6.20 | 11 | 10 | 37 |

## NOTES:

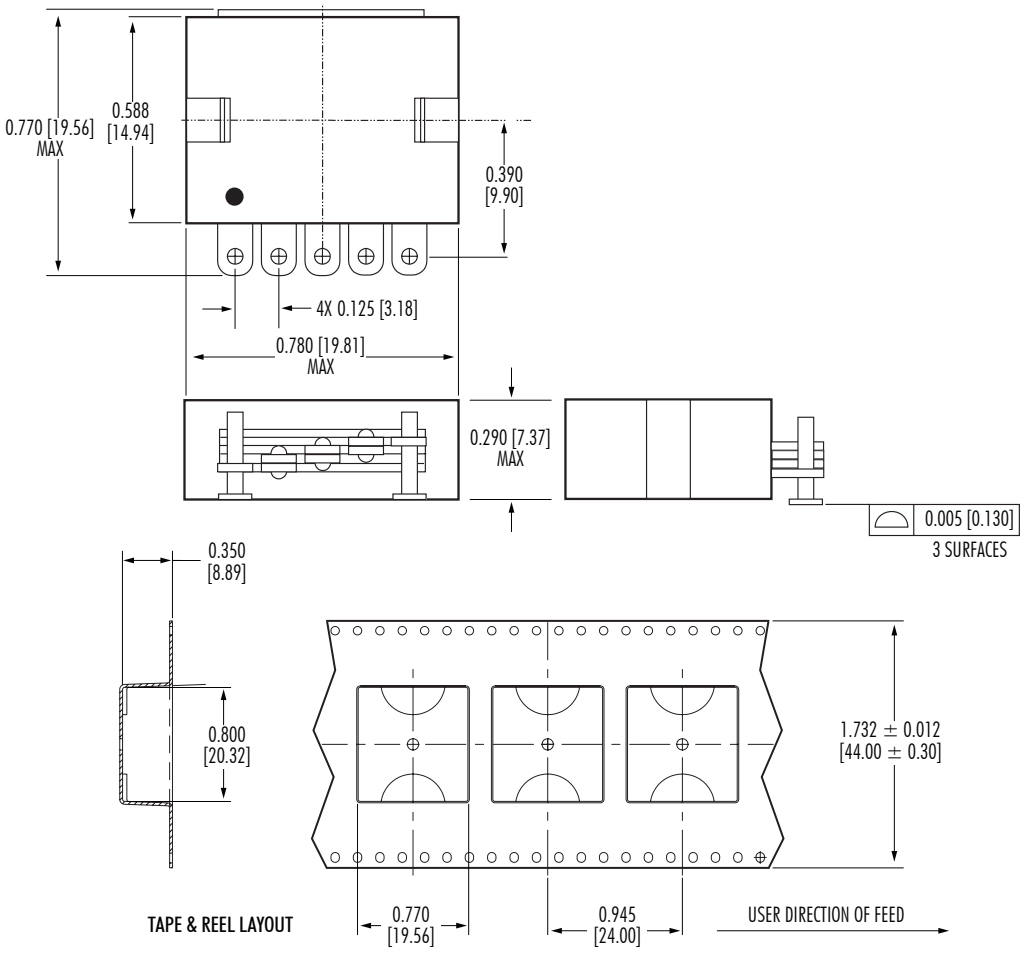
1. Add suffix "NL" for RoHS (Non-Lead) compliant version; i.e. PL10101 becomes **PL10101NL**.
2. For Tape & Reel packaging, add "**T**" suffix at the end of the part number: i.e. **PL10101T**
3. The rated current as listed is either 85% of the saturation current or the heating current, depending on which value is lower.
4. The saturation current is the current which causes the inductance to drop by 15% at the stated ambient temperature (25°C and 100°C). This current is determined by placing the component in the specified ambient environment and applying a short durationg pulse current (to eliminate self-heating effects) to the component.
5. The heating current is the DC current which causes the temperature of the part to increase by approximately 45°C. This current is determined by mounting the component on a PCB with 0.25" wide, 2 oz. equivalent copper traces, and applying the current to the device for 30 minutes with no forced air cooling.
6. In high volt*time 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 teh component. In order to determine the approximate total losses (or temperature rise) for a given application, the total copper and core losses should be taken into account. For approximate value of core losses, in a given application, use the core loss graph on page 24.
7. Meets solerability test per IPC/EIA J-STD-002B using flux type ORL0.

## Mechanicals

### PL101XX

**Dimensions:** inch [mm]
**Tolerance** (unless otherwise specified): ±0.010 [0.25]

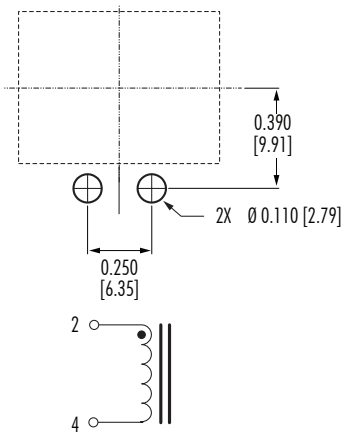
**Weight:** .....TBD
**Tray:**.....TBD



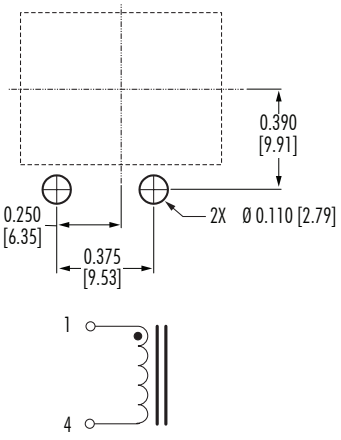

## Suggested Pad Layout and Schematics

### PL101XX

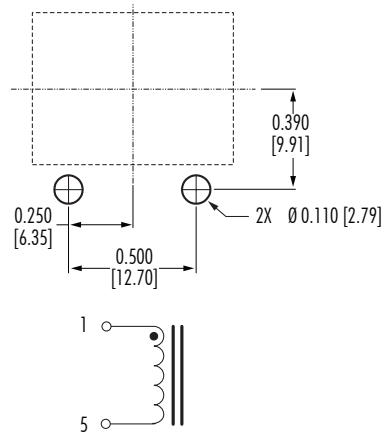
**PL10100 - PL10111**
0.405 to 1.50 µH
21 to 73 ADC




**PL10112 - PL10117**
1.00 to 3.40 µH
12 to 42 ADC



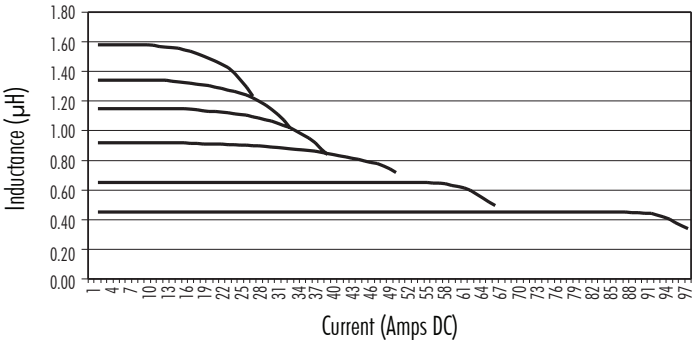

**PL10118 - PL10123**
1.60 to 6.20 µH
9 to 37 ADC



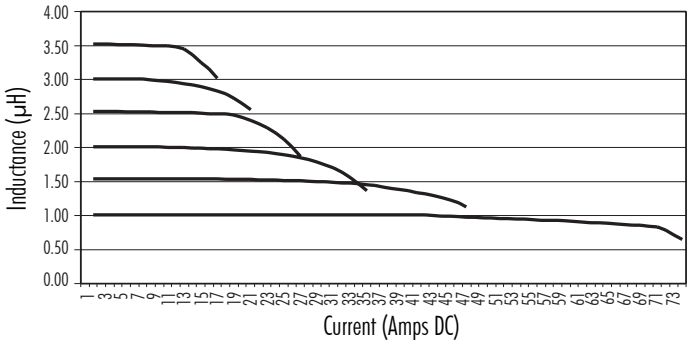
## Inductance vs. Current Characteristics (25°C)

### PL101XX

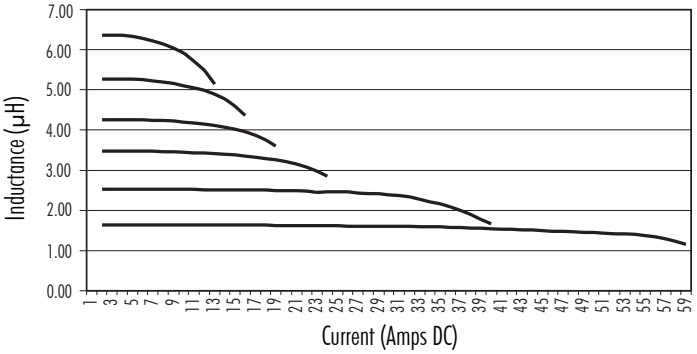
PL10110 - PL10111




PL10112 - PL10117



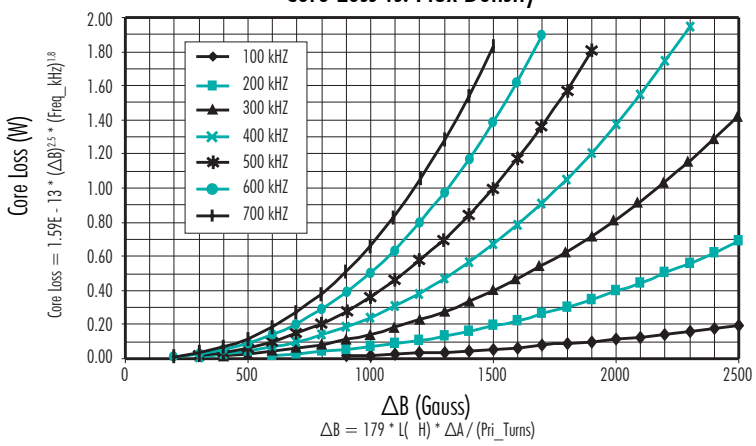

PL10118 - PL10123



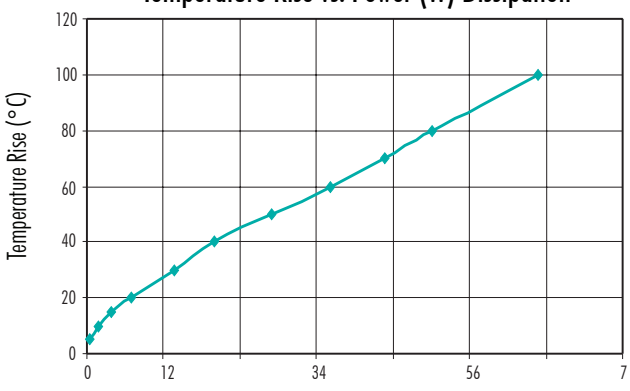

## Measurement Charts

### PL101XX

Core Loss vs. Flux Density



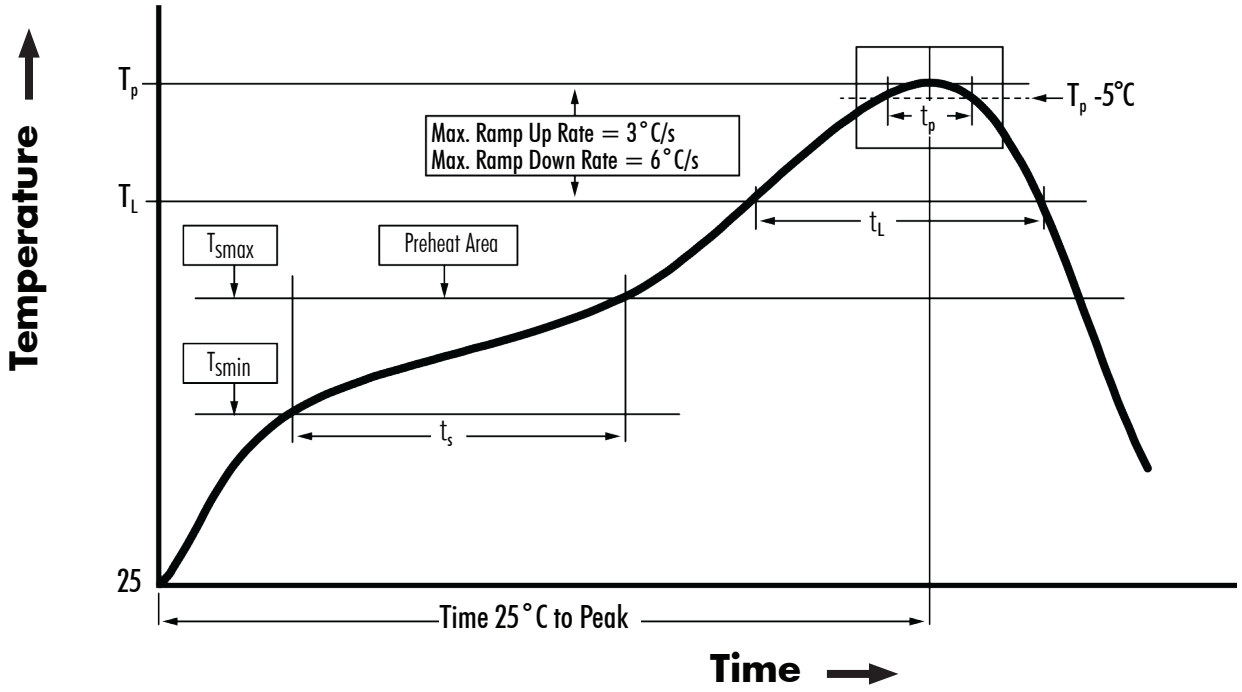

Temperature Rise vs. Power (W) Dissipation




Total Power Dissipation = Copper Loss (W) + Core Loss (W)

Copper Loss (W) = Current (rms)2 * DCR (mΩ) / 1000
Core Loss (W) = per table

## Recommended Reflow Profile (Based on J-STD-020D)




| $T_{SMIN}$ (°C) | $T_{SMAX}$ (°C) | $T_L$ (°C) | $T_P$ (°C MAX) | $t_S$ (s) | $t_L$ (s) | $t_P$ (s MAX) | Ramp-up rate ($T_L$ to $T_P$) | Ramp-down rate ($T_P$ to $T_L$) | Time 25°C to peak temperature (s MAX) |
|---|---|---|---|---|---|---|---|---|---|
| Tin/Lead Profile | | | | | | | | | |
| 100 | 150 | 183 | 235 | 60 - 120 | 60 - 150 | 20 | 3°C/s MAX | 6°C/s MAX | 360 |
| Non-Lead Profile | | | | | | | | | |
| 150 | 200 | 217 | 245 | 60 - 120 | 60 - 150 | 30 | 3°C/s MAX | 6°C/s MAX | 480 |

NOTES:

1. All temperatures measured on the package leads.
2. Maximum number of reflow cycles not to exceed 2.
3. Reflow cycle applies only to surface mount parts.



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