

# SMT POWER INDUCTORS

## Toroid - Polecat Series



-  **Height:** 5.5mm Max
-  **Footprint:** 12.7mm x 12.7mm Max
-  **Current Rating:** up to 8.3A
-  **Inductance Range:** 2.0μH to 364μH

### Electrical Specifications @ 25°C — Operating Temperature -40°C to +130°C <sup>11</sup>

| Part Number <sup>9,10</sup> | Inductance @ I <sub>rated</sub> (μH MIN) | I <sub>rated</sub> (A) | DCR (MAX) (mΩ) | ET (V-μsec) | Inductance @ 0A <sub>DC</sub> (μH ±10%) | 100 Gauss ET <sub>100</sub> (V-μsec) | 1 Amp DC H <sub>1</sub> (Orsted) | Connection |
|-----------------------------|------------------------------------------|------------------------|----------------|-------------|-----------------------------------------|--------------------------------------|----------------------------------|------------|
| P0174NL                     | 2.0                                      | 8.30                   | 7.6            | 7.31        | 2.2                                     | 1.20                                 | 5.43                             | Parallel   |
| P0175NL                     | 2.4                                      | 7.20                   | 10.9           | 7.81        | 2.6                                     | 1.33                                 | 5.97                             | Parallel   |
| P0176NL                     | 5.0                                      | 5.20                   | 19.0           | 11.72       | 5.5                                     | 1.93                                 | 8.69                             | Parallel   |
| P0174NL                     | 7.0                                      | 4.16                   | 32.0           | 14.61       | 8.75                                    | 2.41                                 | 10.86                            | Series     |
| P0177NL                     | 9.3                                      | 3.80                   | 29.8           | 16.12       | 10.4                                    | 2.65                                 | 11.95                            | Parallel   |
| P0175NL                     | 8.4                                      | 3.78                   | 43.6           | 15.62       | 10.4                                    | 2.65                                 | 11.95                            | Series     |
| P0178NL                     | 14.1                                     | 3.10                   | 45.3           | 19.73       | 15.7                                    | 3.25                                 | 14.66                            | Parallel   |
| P0179NL                     | 19.8                                     | 2.60                   | 66.3           | 23.45       | 22.1                                    | 3.86                                 | 17.38                            | Parallel   |
| P0176NL                     | 17.9                                     | 2.60                   | 76.0           | 23.43       | 22.45                                   | 3.86                                 | 17.38                            | Series     |
| P0180NL                     | 29.3                                     | 2.20                   | 106            | 28.50       | 32.8                                    | 4.70                                 | 21.18                            | Parallel   |
| P0177NL                     | 33.8                                     | 1.89                   | 120            | 32.25       | 41.7                                    | 5.30                                 | 23.89                            | Series     |
| P0181NL                     | 42.6                                     | 1.80                   | 151            | 34.49       | 47.6                                    | 5.66                                 | 25.52                            | Parallel   |
| P0178NL                     | 50.9                                     | 1.54                   | 182            | 39.46       | 62.8                                    | 6.51                                 | 29.32                            | Series     |
| P0182NL                     | 61.3                                     | 1.50                   | 224            | 40.85       | 67.5                                    | 6.75                                 | 30.41                            | Parallel   |
| P0179NL                     | 71.5                                     | 1.30                   | 266            | 46.90       | 88.2                                    | 7.71                                 | 34.75                            | Series     |
| P0183NL                     | 84.2                                     | 1.20                   | 324            | 46.22       | 91.0                                    | 7.83                                 | 35.30                            | Parallel   |
| P0180NL                     | 106.1                                    | 1.07                   | 404            | 57.00       | 131.0                                   | 9.40                                 | 42.36                            | Series     |
| P0181NL                     | 154.2                                    | 0.89                   | 604            | 68.99       | 190.3                                   | 11.33                                | 51.05                            | Series     |
| P0182NL                     | 218.9                                    | 0.74                   | 888            | 81.70       | 270.2                                   | 13.50                                | 60.82                            | Series     |
| P0183NL                     | 295.0                                    | 0.64                   | 1272           | 92.43       | 364.0                                   | 15.66                                | 70.59                            | Series     |

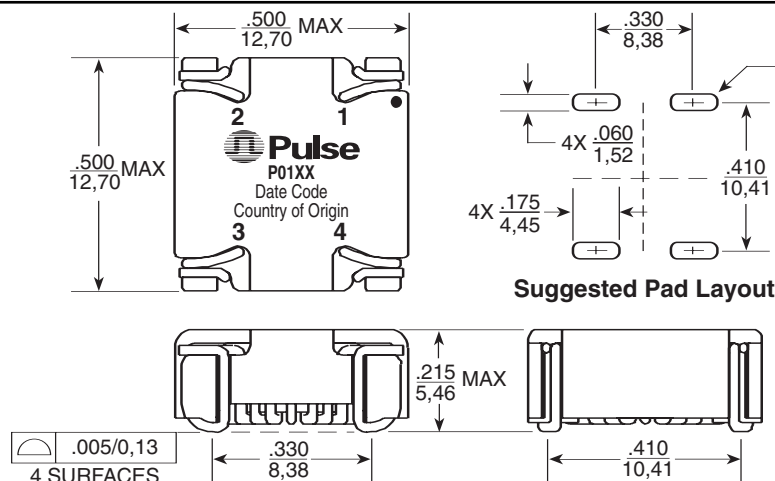
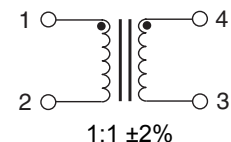
#### NOTES:

- Temperature rise is 50°C in typical buck or boost circuits at 250kHz and with the reference ET applied to the inductor.
- Total loss in the inductor is 380mW for a 50°C temperature rise above ambient.
- To estimate temperature rise in a given application, determine copper and core losses, divide by 380 and multiply by 50.
- For the copper loss (mW), calculate  $I_{DC}^2 \times R_{DC}$ .
- For core loss (mW), using frequency (f in Hertz) and operating flux density (B in Gauss), calculate  $6.11 \times 10^{-18} \times B^{2.7} \times f^{2.04}$ .
- For flux density (B in Gauss), calculate ET (V-μsec) for the application, divide by ET<sub>100</sub> from the table, and multiply by 100.

- Limit the DC bias (H) to 46 orsted. Calculate H by multiplying H<sub>1</sub> from the table by I<sub>DC</sub> of the application.
- The maximum DCR listed is approximately 17% over the nominal DCR.
- Optional Tape & Reel packaging can be ordered by adding a "T" suffix to the part number (i.e. P0174NL becomes P0174NLT). Pulse complies to industry standard tape and reel specification EIA481.
- 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.
- The temperature of the component (ambient plus temperature rise) must be within the stated operating temperature range.

## Mechanical

## Schematic



Weight . . . . . 1.5 grams  
Tape & Reel . . . . . 500/reel  
Tube . . . . . 35/tube

Dimensions: Inches  
mm  
Unless otherwise specified,  
all tolerances are ± .010  
0,25