

SMT Power Inductors

Shielded Drum Core - PF0464NL/PF0465NL Series



- Height:** PF0464: 3mm Max - PF0465: 4mm Max
- Footprint:** 7.2mm x 7.2mm Max
- Current Rating:** PF0464: up to 4.5A - PF0465: up to 3.5A
- Inductance Range:** 1.5μH to 100μH

Electrical Specifications @ 25°C - Operating Temperature -40°C to +125°C^{1, 6}

| Part ^{2, 3} Number | Inductance @OADC (μH ±20%) | Inductance @ Irated (μH TYP) | Irated ⁵ (A) | DCR (mΩ) | | Saturation ⁶ Current Isat -20% (A) | Heating ⁷ Current IDC +40°C (A) | Core Loss ⁸ Factor (K2) | SFR (MHz) |
|--------------------------------|----------------------------------|------------------------------------|----------------------------|----------|-----|---|--|--|--------------|
| | | | | TYP | MAX | | | | |
| PF0464NL Series | | | | | | | | | |
| PF0464.152NL | 1.5 | 1.2 | 4.50 | 9 | 12 | 4.50 | 5.50 | 660 | >40 |
| PF0464.302NL | 3.0 | 2.4 | 3.00 | 17 | 22 | 3.00 | 4.25 | 850 | >40 |
| PF0464.392NL * | 3.9 | 3.1 | 2.60 | 19 | 25 | 2.60 | 3.80 | 990 | >40 |
| PF0464.502NL | 5.0 | 4.0 | 2.40 | 24 | 30 | 2.40 | 3.55 | 1100 | >40 |
| PF0464.602NL | 6.0 | 4.8 | 2.25 | 26 | 33 | 2.25 | 3.20 | 1300 | >40 |
| PF0464.732NL | 7.3 | 5.8 | 2.10 | 36 | 45 | 2.10 | 3.10 | 1400 | >40 |
| PF0464.862NL * | 8.6 | 6.9 | 1.85 | 38 | 48 | 1.85 | 2.95 | 1500 | 35 |
| PF0464.103NL | 10 | 8.0 | 1.70 | 41 | 52 | 1.70 | 2.90 | 1700 | 32 |
| PF0464.123NL * | 12 | 9.6 | 1.55 | 52 | 66 | 1.55 | 2.40 | 1800 | 26 |
| PF0464.153NL | 15 | 12.0 | 1.40 | 55 | 75 | 1.40 | 2.35 | 2000 | 24 |
| PF0464.183NL | 18 | 14.4 | 1.32 | 69 | 90 | 1.32 | 2.10 | 2200 | 22 |
| PF0464.223NL | 22 | 17.6 | 1.20 | 85 | 113 | 1.20 | 1.85 | 2500 | 21 |
| PF0464.273NL * | 27 | 21.6 | 1.05 | 104 | 132 | 1.05 | 1.70 | 2800 | 19 |
| PF0464.333NL * | 33 | 26.4 | 0.97 | 132 | 165 | 0.97 | 1.50 | 3000 | 18 |
| PF0464.393NL * | 39 | 31.2 | 0.86 | 142 | 180 | 0.86 | 1.45 | 3300 | 14 |
| PF0464.473NL * | 47 | 37.6 | 0.80 | 197 | 238 | 0.80 | 1.25 | 3600 | 14 |
| PF0464.563NL * | 56 | 44.8 | 0.73 | 216 | 270 | 0.73 | 1.15 | 3900 | 13 |
| PF0464.683NL | 68 | 54.4 | 0.65 | 235 | 300 | 0.65 | 1.10 | 4400 | 12 |
| PF0464.823NL * | 82 | 65.6 | 0.60 | 291 | 370 | 0.60 | 1.00 | 4800 | 11 |
| PF0464.104NL * | 100 | 80.0 | 0.54 | 401 | 505 | 0.54 | 0.85 | 5300 | 10.5 |

Notes:

1. Inductance is measure, where applicable, with both primary windings connected in series (2 to 5, with 3 and 4 shorted).
 2. Leakage inductance is measured with both primary windings connected in series (where applicable) with all other windings shorted.
- *Contact Pulse for availability

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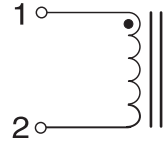
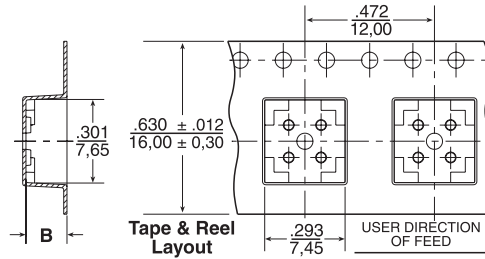
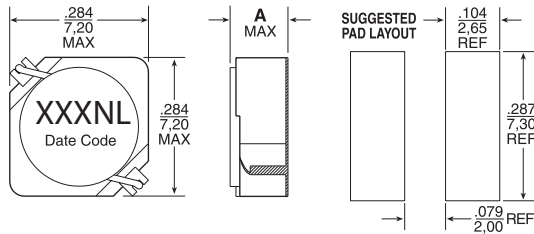
Electrical Specifications @ 25°C - Operating Temperature -40°C to +125°C^{1,6}

| Part ^{2,3} Number | Inductance @OADC ($\mu\text{H} \pm 20\%$) | Inductance @ Irated (μH TYP) | Irated ⁵ (A) | DCR (m Ω) | | Saturation ⁶ Current I _{SAT} -20% (A) | Heating ⁷ Current IDC +40°C (A) | Core Loss ⁸ Factor (K2) | SFR (MHz) |
|-------------------------------|---|--|----------------------------|-------------------|-----|---|--|--|--------------|
| | | | | TYP | MAX | | | | |
| PF0465NL Series | | | | | | | | | |
| PF0465.332NL | 3.3 | 2.6 | 3.50 | 16 | 20 | 3.50 | 4.65 | 790 | >40 |
| PF0465.502NL | 5.0 | 4.0 | 2.90 | 19 | 24 | 2.90 | 4.10 | 970 | >40 |
| PF0465.622NL | 6.2 | 5.0 | 2.50 | 21 | 26 | 2.50 | 3.90 | 1100 | >40 |
| PF0465.732NL | 7.3 | 5.8 | 2.30 | 25 | 31 | 2.30 | 3.50 | 1200 | >40 |
| PF0465.862NL * | 8.6 | 6.9 | 2.20 | 27 | 34 | 2.20 | 3.30 | 1300 | 35 |
| PF0465.103NL | 10 | 8.0 | 2.00 | 29 | 37 | 2.00 | 3.20 | 1400 | 32 |
| PF0465.123NL | 12 | 9.6 | 1.70 | 39 | 50 | 1.70 | 2.80 | 1600 | 26 |
| PF0465.153NL | 15 | 12.0 | 1.60 | 44 | 55 | 1.60 | 2.60 | 1700 | 24 |
| PF0465.183NL * | 18 | 14.4 | 1.50 | 62 | 78 | 1.50 | 2.25 | 1900 | 22 |
| PF0465.223NL | 22 | 17.6 | 1.30 | 68 | 86 | 1.30 | 2.10 | 2100 | 21 |
| PF0465.273NL | 27 | 21.6 | 1.20 | 75 | 95 | 1.20 | 2.00 | 2300 | 19 |
| PF0465.333NL * | 33 | 26.4 | 1.10 | 94 | 118 | 1.10 | 1.75 | 2500 | 18 |
| PF0465.393NL | 39 | 31.2 | 1.00 | 101 | 128 | 1.00 | 1.70 | 2800 | 17 |
| PF0465.473NL | 47 | 37.6 | 0.95 | 112 | 140 | 0.95 | 1.60 | 3000 | 14 |
| PF0465.563NL * | 56 | 44.8 | 0.85 | 154 | 195 | 0.85 | 1.35 | 3300 | 13 |
| PF0465.683NL | 68 | 54.4 | 0.75 | 188 | 234 | 0.75 | 1.25 | 3700 | 12 |
| PF0465.823NL * | 82 | 65.6 | 0.70 | 261 | 324 | 0.70 | 1.05 | 4000 | 11 |
| PF0465.104NL | 100 | 80.0 | 0.65 | 286 | 350 | 0.65 | 1.00 | 4500 | 10.5 |

Mechanicals

Schematic

PF046X.XXXNL



| | PF0464 | PF0465 |
|------------------------------------|------------|------------|
| Weight: | 0.5 grams | 0.7 grams |
| Tape & Reel | 1200/reel | 900/reel |
| “A” (height - in./mm) | 0.118/3.00 | 0.158/4.00 |

| | PF0464 | PF0465 |
|-------------------------------------|-----------|-----------|
| “B” height: - (in./mm) | 0.5 grams | 0.7 grams |

Dimensions: $\frac{\text{Inches}}{\text{mm}}$

Unless otherwise specified, all tolerances are $\pm \frac{.010}{0,25}$

Notes from Tables:

1. Unless otherwise specified, all testing is made at 100kHz, 0.1VAC.
2. Optional Tape & Reel packaging can be ordered by adding a “T” suffix to the part number (i.e PF0464.103NL becomes PF0464.103NLT). Pulse complies with industry standard Tape and Tape & Reel specification EIA481.
3. 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” version, but an RoHS compliant version is required, please contact Pulse for availability.
4. Temperature of the component (ambient plus temperature rise) must be within specified operating temperature range.
5. The rated current (I_{rated}) as listed is either the saturation current or the heating current depending on which value is lower.
6. The saturation current, I_{sat}, is the current at which the component inductance drops by the indicated percentage (typical) at an ambient temperature of 25C. This current is determined by placing the component in the specified ambient environment and applying a short duration pulse current (to eliminate self-heating effects) to the component.
7. The heating current, I_{dc}, is the DC current required to raise the component temperature by the indicated delta (approximately). The heating current is determined by mounting the component on a typical PCB and applying current for 30 minutes. The temperature is measured by placing the thermocouple on top of the unit under test.

8. In high volt*time (Et) or ripple current 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 the component. In order to determine the approximate total loss (or temperature rise) for a given application, both copper losses and core losses should be taken into account.

Estimated Temperature Rise:

$$\text{Trise} = [\text{Total loss (mW)} / K0]^{.833} \text{ (}^\circ\text{C)}$$

$$\text{Total Loss} = \text{Copper loss} + \text{Core loss (mW)}$$

$$\text{Copper loss} = I_{\text{RMS}}^2 \times \text{DCR (Typical)} \text{ (mW)}$$

$$I_{\text{rms}} = [I_{\text{dc}}^2 + \Delta I^2 / 12]^{1/2} \text{ (A)}$$

$$\text{Core loss} = K1 \times f \text{ (kHz)}^{1.23} \times \text{Bac (Ga)}^{2.38} \text{ (mW)}$$

$$\text{Bac (peak to peak flux density)} = K2 \times \Delta I \text{ (Ga)}$$

$$[= K2/L (\mu\text{H}) \times \text{Et (V-}\mu\text{Sec)} \text{ (Ga)}]$$

where f varies between 25kHz and 1MHz, and Bac is less than 2500 Gauss.

K2 is a core size and winding dependent value and is given for each p/n in the preceding datasheets. K0 & K1 are platform and material dependant constants and are given in the table below for each platform.

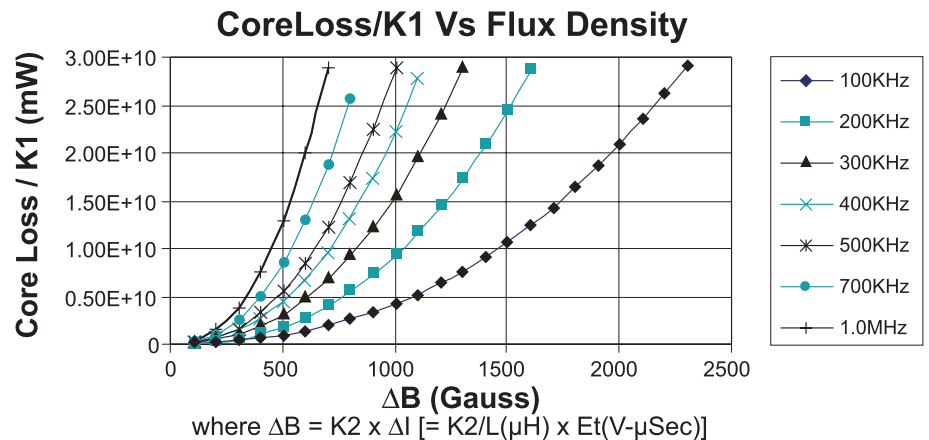
* Contact Pulse for availability

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| Part No. | Trise Factor (K0) | Core Loss Factor (K1) |
|-----------|-------------------|-----------------------|
| PG0085/86 | 2.3 | 5.29E-10 |
| PG0087 | 5.8 | 15.2E-10 |
| PG0040/41 | 0.8 | 2.80E-10 |
| P1174 | 0.8 | 6.47E-10 |
| PF0601 | 4.6 | 14.0E-10 |
| PF0464 | 3.6 | 24.7E-10 |
| PF0465 | 3.6 | 33.4E-10 |
| P1166 | 1.9 | 29.6E-10 |
| P1167 | 2.1 | 42.2E-10 |
| PF0560NL | 5.5 | 136E-10 |
| P1168/69 | 4.8 | 184E-10 |
| P1170/71 | 4.3 | 201E-10 |
| P1172/73 | 5.6 | 411E-10 |
| PF0552NL | 8.3 | 201E-10 |
| PF0553NL | 7.1 | 411E-10 |



Take note that the component's temperature rise varies depending on the system condition. It is suggested that the component be tested at the system level, to verify the temperature rise of the component during system operation.

For More Information

Pulse Worldwide Headquarters

15255 Innovation Drive Ste 100
San Diego, CA 92128
U.S.A.

Pulse Europe

Pulse Electronics GmbH
Am Rottland 12
58540 Meinerzhagen
Germany

Pulse China Headquarters

Pulse Electronics (ShenZhen) CO., LTD
D708, Shenzhen Academy of
Aerospace Technology,
The 10th Keji South Road,
Nanshan District, Shenzhen, P.R.
China 518057

Pulse North China

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

Pulse South Asia

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

Pulse North Asia

1F., No.111 Xiyuan Rd
Zhongli City
Taoyuan City 32057
Taiwan (R.O.C)

Tel: 858 674 8100
Fax: 858 674 8262

Tel: 49 2354 777 100
Fax: 49 2354 777 168

Tel: 86 755 33966678
Fax: 86 755 33966700

Tel: 86 21 62787060
Fax: 86 21 62786973

Tel: 65 6287 8998
Fax: 65 6280 0080

Tel: 886 3 4356768
Fax: 886 3 4356820

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