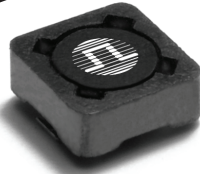


# SMT POWER INDUCTORS

## Shielded Drum Core - P1166NL Series



- Height:** 3.8mm Max
- Footprint:** 7.5mm x 7.5mm Max
- Current Rating:** up to 5.5A
- Inductance Range:** .44μH to 750μH

### Electrical Specifications @ 25°C — Operating Temperature -40°C to +130°C

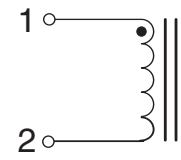
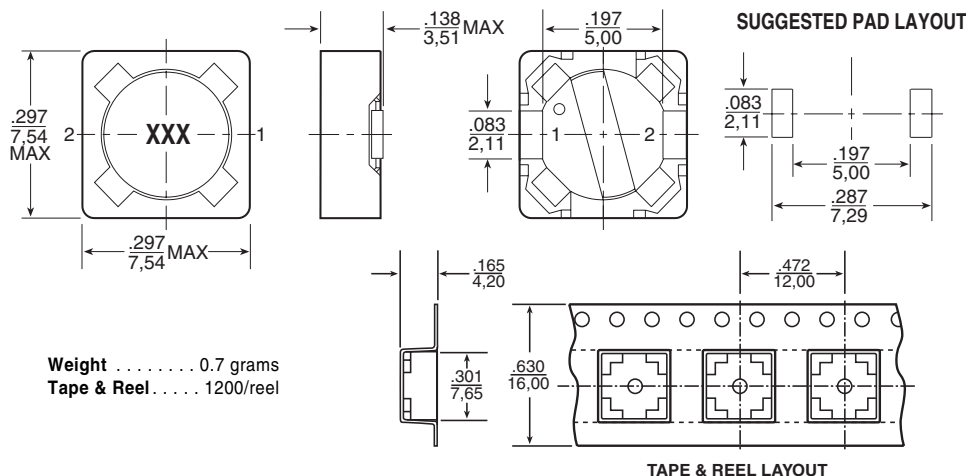
Part <sup>2,3</sup> Number	Inductance @0Abc (μH ±20%)	Inductance @Irated (μH) MIN	Irated <sup>5</sup> (Abc)	DCR (mΩ)		Saturation Current -25% (A)	Heating Current <sup>7</sup> +40°C(A)	Core Loss <sup>8</sup> Factor (K2)	SRF (MHz)
				TYP	MAX				
P1166.681NL	0.68*	0.44	5.5	5.0	6.0	5.9	5.5	380	>40
P1166.102NL	1.00*	0.65	4.9	6.2	7.5	5.2	4.9	440	>40
P1166.162NL	1.60*	1.0	4.0	7.8	11	4.0	4.4	570	>40
P1166.302NL	3.00*	2.0	2.8	19	23	3.0	2.8	780	>40
P1166.482NL	4.80*	3.1	2.4	25	31	2.4	2.5	990	>40
P1166.682NL	6.80*	4.4	2.1	32	40	2.1	2.2	1200	38
P1166.103NL	10	7.5	1.6	58	70	1.8	1.6	1400	29
P1166.123NL	12	9.0	1.5	62	78	1.7	1.5	1500	25
P1166.153NL	15	11.3	1.4	74	92	1.5	1.4	1700	22
P1166.183NL	18	13.5	1.2	100	124	1.4	1.2	1800	21
P1166.223NL	22	16.5	1.2	106	126	1.2	1.2	2000	20
P1166.273NL	27	20.3	1.0	146	180	1.1	1.0	2300	17
P1166.333NL	33	24.8	0.94	167	205	1.0	0.94	2400	15
P1166.393NL	39	29.3	0.86	183	211	0.86	0.90	2700	13
P1166.473NL	47	35.3	0.83	206	260	0.83	0.85	2900	12
P1166.563NL	56	42.0	0.73	271	340	0.73	0.74	3300	11
P1166.683NL	68	51.0	0.67	303	370	0.67	0.70	3600	9.5
P1166.823NL	82	61.5	0.60	411	500	0.61	0.60	4000	8.0
P1166.104NL	100	75.0	0.56	464	580	0.56	0.57	4300	7.5
P1166.124NL	120	90.0	0.53	528	645	0.55	0.53	4700	7.0
P1166.154NL	150	113	0.46	695	860	0.46	0.46	5300	6.3
P1166.184NL	180	135	0.39	992	1190	0.42	0.39	5800	5.6
P1166.224NL	220	165	0.35	1210	1480	0.37	0.35	6400	5.1
P1166.274NL	270	203	0.32	1407	1750	0.32	0.33	7100	4.6
P1166.334NL	330	248	0.31	1580	1880	0.31	0.31	7800	4.1
P1166.394NL	390	293	0.26	2178	2600	0.29	0.26	8500	3.9
P1166.474NL	470	353	0.25	2400	2910	0.26	0.25	9500	3.6
P1166.564NL	560	420	0.23	2705	3400	0.23	0.23	10000	3.1
P1166.684NL	680	510	0.20	3658	4450	0.21	0.20	11000	2.7
P1166.824NL	820	615	0.17	5021	6200	0.20	0.17	13000	2.5
P1166.105NL	1000	750	0.15	6720	8000	0.16	0.15	14000	1.3

\*Inductance at 0Abc tolerance on indicated part numbers is ±30%; tolerance is ±20% on all other parts.

NOTES FROM TABLE: (See page 43)

### Mechanical

### Schematic



**Dimensions:** Inches  
mm  
 Unless otherwise specified,  
 all tolerances are ±  $\frac{.010}{0.25}$

# SMT POWER INDUCTORS

## Shielded Drum Core Series



### Notes from Tables (pages 27 - 42)

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. P1166.102NL becomes P1166.102NLT). 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" suffix, 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<sub>rated</sub>) as listed is either the saturation current or the heating current depending on which value is lower.
6. The saturation current, I<sub>sat</sub>, is the current at which the component inductance drops by the indicated percentage (typical) at an ambient temperature of 25°C. 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<sub>dc</sub>, 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:

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

$$Total\ loss = Copper\ loss + Core\ loss\ (mW)$$

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

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

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

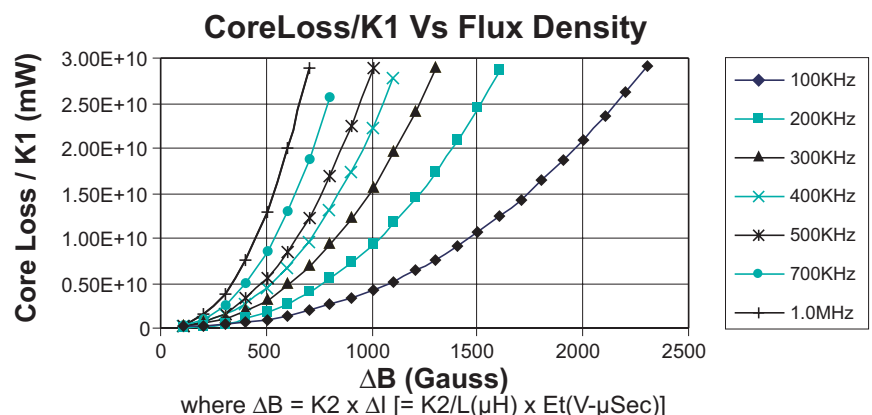
$$B_{ac}\ (peak\ to\ peak\ flux\ density) = K2 \times \Delta I\ (Ga)$$

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

where f varies between 25kHz and 1MHz, and B<sub>ac</sub> is less than 2500 Gauss.

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

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.