SMT POWER INDUCTORS

Shielded Drum Core - P1170NL/P1171NL Series

Pulse
A TECHNITROL COMPANY

RoHS COMPLIANT

- **Height:** 6.0mm Max
- **Footprint:** 12.2mm x 12.2mm Max
- **Current Rating:** up to 13A
- **Inductance Range:** .32µH to 750µH

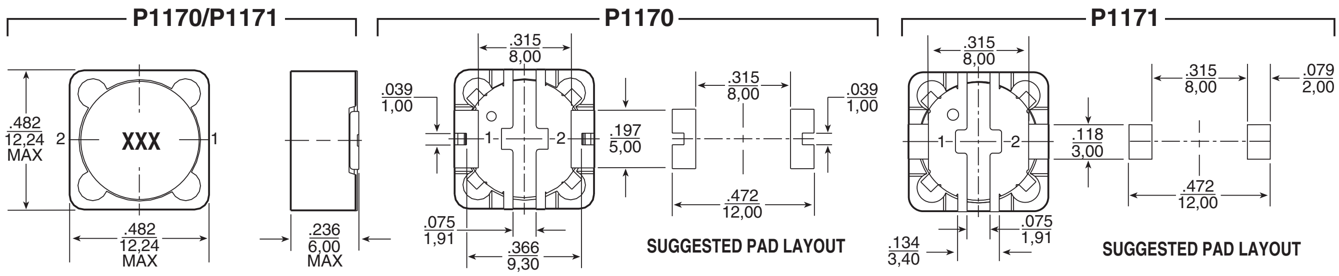
Electrical Specifications @ 25°C — Operating Temperature -40°C to +130°C

Part [2,3] Numbers		Inductance @0ADC (µH)	Inductance @Irated (µH) MIN	Irated [5] (ADC)	DCR (mΩ)		Saturation [6] Current -25% (A)	Heating [7] Current +40°C(A)	Core Loss [8] Factor (K2)	SRF (MHz)
					TYP	MAX				
P1170.901NL	P1171.901NL	0.9*	0.6	13	2.0	2.9	14	13	140	>40
P1170.142NL	P1171.142NL	1.4*	0.9	11	3.0	4.2	13	11	170	>40
P1170.222NL	P1171.222NL	2.2*	1.5	9.6	4.0	5.7	9.7	9.6	210	>40
P1170.302NL	P1171.302NL	3.0*	2.0	8.3	5.4	7.7	8.3	8.3	250	38
P1170.392NL	P1171.392NL	3.9*	2.5	7.0	7.4	10	7.0	7.1	280	34
P1170.502NL	P1171.502NL	5.0*	3.3	6.4	8.5	12	6.4	6.6	310	30
P1170.642NL	P1171.642NL	6.4*	4.2	5.3	13	18	5.8	5.3	360	26
P1170.103NL	P1171.103NL	10	7.5	4.4	19	25	4.6	4.4	430	24
P1170.123NL	P1171.123NL	12	9.0	4.2	21	27	4.3	4.2	470	18
P1170.153NL	P1171.153NL	15	11.3	4.0	22	30	4.0	4.1	550	16
P1170.183NL	P1171.183NL	18	13.5	3.4	32	40	3.4	3.4	580	14
P1170.223NL	P1171.223NL	22	16.5	3.0	36	45	3.0	3.2	670	14
P1170.273NL	P1171.273NL	27	20.3	2.7	41	51	2.7	3.0	740	12
P1170.333NL	P1171.333NL	33	24.8	2.6	56	70	2.6	2.6	820	11
P1170.393NL	P1171.393NL	39	29.3	2.4	60	75	2.4	2.5	880	10
P1170.473NL	P1171.473NL	47	35.3	2.2	79	100	2.2	2.2	980	9.0
P1170.563NL	P1171.563NL	56	42	2.0	85	110	2.0	2.1	1000	8.0
P1170.683NL	P1171.683NL	68	51	1.8	97	120	1.8	1.9	1100	6.9
P1170.823NL	P1171.823NL	82	61.5	1.7	127	158	1.7	1.7	1300	6.3
P1170.104NL	P1171.104NL	100	75	1.4	182	230	1.4	1.4	1400	5.5
P1170.124NL	P1171.124NL	120	90	1.3	201	253	1.3	1.4	1500	5.0
P1170.154NL	P1171.154NL	150	113	1.2	225	280	1.2	1.3	1700	4.6
P1170.184NL	P1171.184NL	180	135	1.1	249	310	1.1	1.2	1900	3.8
P1170.224NL	P1171.224NL	220	165	1.0	319	400	1.0	1.1	2100	3.5
P1170.274NL	P1171.274NL	270	203	0.91	363	460	0.91	1.0	2300	3.2
P1170.334NL	P1171.334NL	330	248	0.82	539	620	0.82	0.82	2600	3.0
P1170.394NL	P1171.394NL	390	293	0.72	561	690	0.72	0.81	2800	2.7
P1170.474NL	P1171.474NL	470	353	0.68	629	770	0.68	0.77	3100	2.6
P1170.564NL	P1171.564NL	560	420	0.63	851	1060	0.63	0.66	3300	2.3
P1170.684NL	P1171.684NL	680	510	0.57	950	1200	0.57	0.62	3700	2.0
P1170.824NL	P1171.824NL	820	615	0.52	1241	1550	0.52	0.54	4000	2.0
P1170.105NL	P1171.105NL	1000	750	0.46	1398	1750	0.46	0.51	4500	1.5

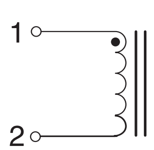
*Inductance at 0ADC tolerance on indicated part numbers is ±30%; tolerance is ±20% on all other parts.

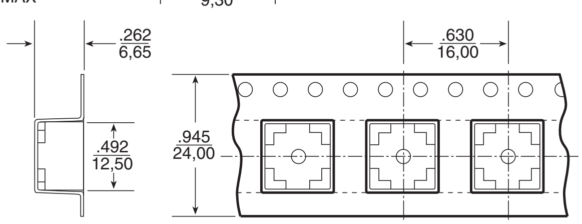
***NOTES FROM TABLE:** (See page 43)*

Mechanical



Schematic:





TAPE & REEL LAYOUT

Weight . . . . 3.2 grams
Tape & Reel. 500/reel

Dimensions: Inches / mm

Unless otherwise specified, all tolerances are ± .010 / 0,25

USA 858 674 8100 • Germany 49 7032 7806 0 • Singapore 65 6287 8998 • Shanghai 86 21 54643211 / 2 • China 86 755 33966678 • Taiwan 886 3 4641811

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 P1166.102NL**T**). 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 (Irated) as listed is either the saturation current or the heating current depending on which value is lower.
6. The saturation current, Isat, 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, Idc, 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:

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

Total loss = Copper loss + Core loss (mW)

Copper loss = I_{RMS}^2 x DCR (Typical) (mW)

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

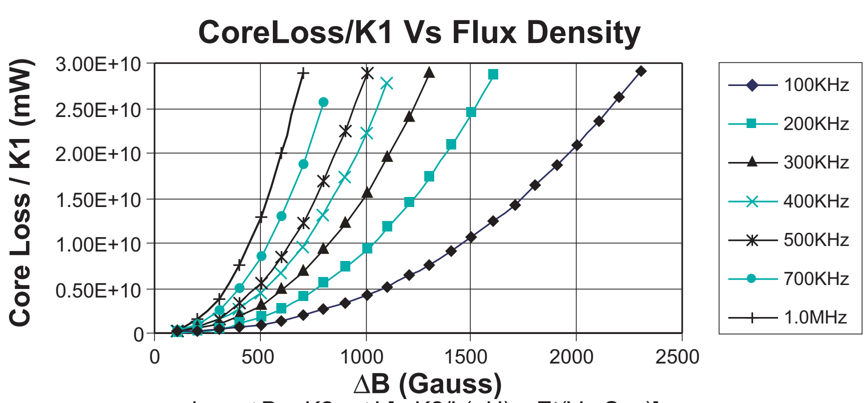
Core loss = K1 x f (kHz)$^{1.23}$ x Bac(Ga)$^{2.38}$ (mW)

Bac (peak to peak flux density) = K2 x ΔI (Ga)
[= K2/L(μH) x Et(V-μSec) (Ga)]

where f varies between 25kHz and 1MHz, and Bac 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



where ΔB = K2 x ΔI [= K2/L(μH) x Et(V-μSec)]

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.