SMT Power Inductors

Shielded Drum Core - P1168NL/P1169NL Series

Pulse
A YAGEO Company

- ***Height:*** *4.5mm Max*
- ***Footprint:*** *12.2mm x 12.2mm Max*
- ***Current Rating:*** *up to 14A*
- ***Inductance Range:*** *.32μH to 750μH*

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

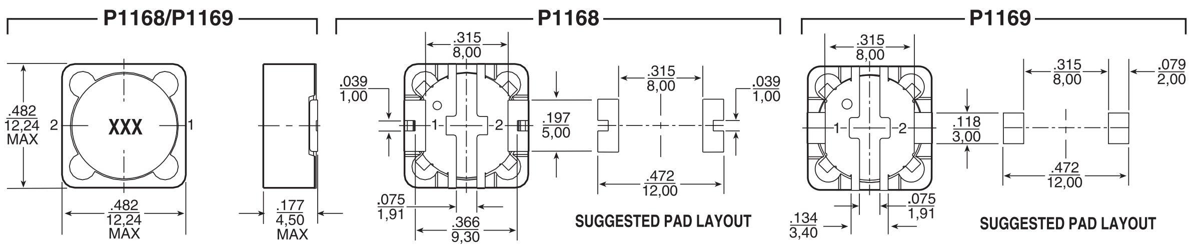
Part[2,3] Numbers		Inductance @ 0ADC (μH ±20%)	Inductance @ Irated (μH) MIN	Irated[5] (ADC)	DCR (mΩ) TYP	DCR (mΩ) MAX	Saturation[6] Current -25% (A)	Heating[7] Current +40°C (A)	Core Loss[8] Factor (K2)	SRF (MHz)
P1168.501NL	P1169.501NL	0.5*	0.32	14	1.9	2.3	18	14	100	>40
P1168.102NL	P1169.102NL **	1.0*	0.65	11	3.0	3.7	14	11	150	>40
P1168.162NL	P1169.162NL	1.6*	1.0	8.5	5.4	6.3	10	8.5	180	>40
P1168.242NL	P1169.242NL **	2.4*	1.6	7.5	6.9	8.1	8.1	7.5	220	>40
P1168.332NL	P1169.332NL	3.3*	2.2	6.4	9.5	11	7.3	6.4	260	>40
P1168.452NL	P1169.452NL **	4.5*	2.9	6.0	11	13	6.4	6.0	310	35
P1168.562NL	P1169.562NL	5.6*	3.6	5.5	13	15	5.7	5.5	340	30
P1168.682NL	P1169.682NL	6.8*	4.4	4.6	18	22	5.2	4.6	370	27
P1168.103NL	P1169.103NL **	10	7.5	3.6	29	35	4.1	3.6	440	21
P1168.123NL	P1169.123NL **	12	9.0	3.5	32	37	3.8	3.5	490	19
P1168.153NL	P1169.153NL **	15	11.3	3.1	40	47	3.3	3.1	570	17
P1168.183NL	P1169.183NL	18	13.5	2.8	48	58	2.9	2.8	590	15
P1168.223NL **	P1169.223NL **	22	16.5	2.6	55	67	2.7	2.6	640	13
P1168.273NL	P1169.273NL **	27	20.3	2.4	67	79	2.4	2.4	740	12
P1168.333NL **	P1169.333NL **	33	24.8	2.2	76	94	2.2	2.2	820	11
P1168.393NL **	P1169.393NL **	39	29.3	1.9	101	126	2.0	1.9	880	10
P1168.473NL	P1169.473NL	47	35.3	1.8	112	140	1.9	1.8	980	9.0
P1168.563NL	P1169.563NL **	56	42.0	1.7	129	157	1.7	1.7	1000	8.0
P1168.683NL	P1169.683NL	68	51.0	1.5	169	202	1.5	1.6	1200	7.0
P1168.823NL	P1169.823NL **	82	61.5	1.4	191	232	1.4	1.5	1300	6.0
P1168.104NL	P1169.104NL **	100	75.0	1.2	222	270	1.2	1.4	1400	6.0
P1168.124NL	P1169.124NL **	120	90.0	1.1	252	316	1.1	1.3	1500	5.5
P1168.154NL	P1169.154NL **	150	113	1.0	346	456	1.0	1.1	1700	4.9
P1168.184NL	P1169.184NL **	180	135	0.90	385	497	0.90	1.1	1900	4.4
P1168.224NL **	P1169.224NL	220	165	0.80	506	681	0.80	0.93	2100	3.7
P1168.274NL **	P1169.274NL **	270	203	0.70	596	775	0.70	0.85	2300	3.3
P1168.334NL	P1169.334NL	330	248	0.66	764	955	0.66	0.75	2600	2.8
P1168.394NL **	P1169.394NL **	390	293	0.62	870	1087	0.62	0.71	2800	2.6
P1168.474NL	P1169.474NL	470	353	0.57	1150	1403	0.57	0.61	3100	2.4
P1168.564NL	P1169.564NL **	560	420	0.53	1283	1623	0.53	0.58	3300	2.2
P1168.684NL	P1169.684NL **	680	510	0.50	1493	1824	0.50	0.54	3700	2.1
P1168.824NL **	P1169.824NL **	820	615	0.44	1924	2355	0.44	0.47	4000	1.7
P1168.105NL	P1169.105NL **	1000	750	0.40	2174	2850	0.40	0.45	4500	1.5

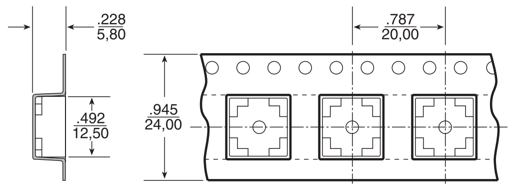
* Inductance is at 0ADC tolerance on indicated part numbers is ±30%; tolerance is ±20% on all other parts.

Mechanical

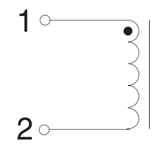
Schematic

PXXXX.XXXNL





TAPE & REEL LAYOUT



Weight ....0.7 grams

Tape & Reel 1200/reel

Dimensions: Inches/mm

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

Notes:

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 numer. 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 (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 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, Idc, is the DC current required to raise the component temperature by the indicated delta (approximately). The heating current isdetermined 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)

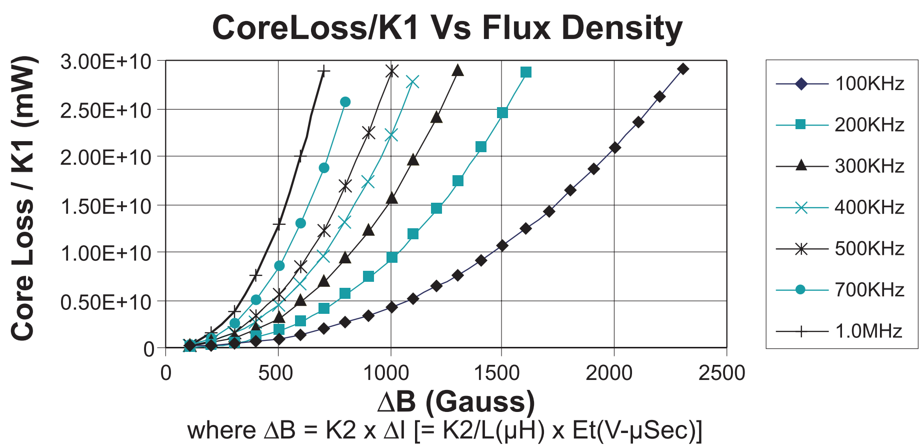
[= K2/L (μH) x Et (V-μSec) (Ga)]

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

K2 is a core size and winding dependent 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.

** Contact Pulse for availability

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.

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