

# SMT POWER INDUCTORS

## Shielded Drum Core - P1170/P1171 Series



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

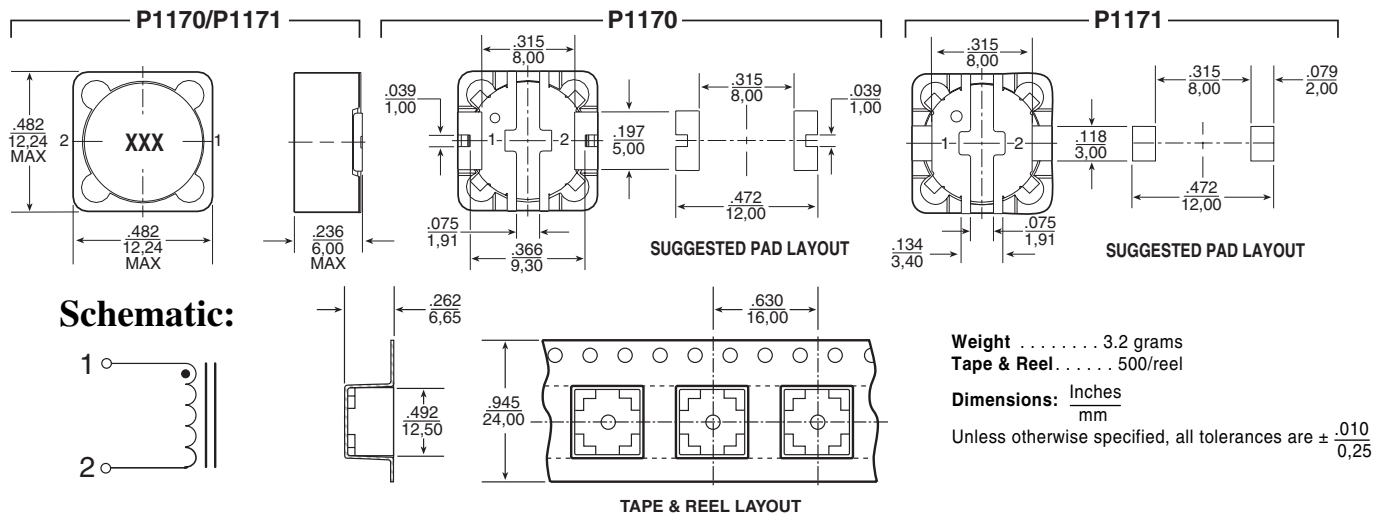
### Electrical Specifications @ 25°C — Operating Temperature -40°C to +130°C

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

\*Inductance at 0A<sub>DC</sub> tolerance on indicated part numbers is ±30%; tolerance is ±20% on all other parts.

NOTES FROM TABLE: (See page 43)

### Mechanical



# 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. P1166.102 becomes P1166.102T). Pulse complies with industry standard Tape and Tape & Reel specification EIA481.
3. To order RoHS compliant part, add the suffix "NL" to the part number (i.e. P1166.102 becomes P1166.102NL and P1166.102T becomes P1166.102NLT).
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:

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

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

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

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

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

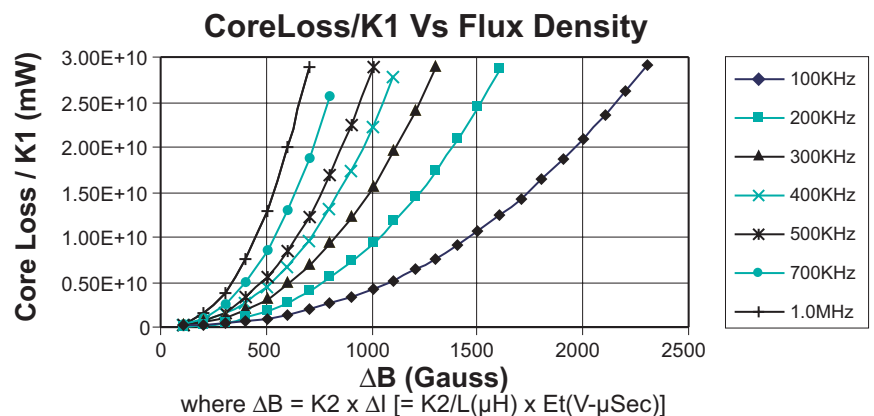
$$\text{Bac (peak to peak flux density)} = K2 \times \Delta I \text{ (Ga)}$$

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

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



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.