SMT POWER INDUCTORS

Shielded Drum Core - PG0087NL Series

Pulse
A TECHNITROL COMPANY

RoHS COMPLIANT

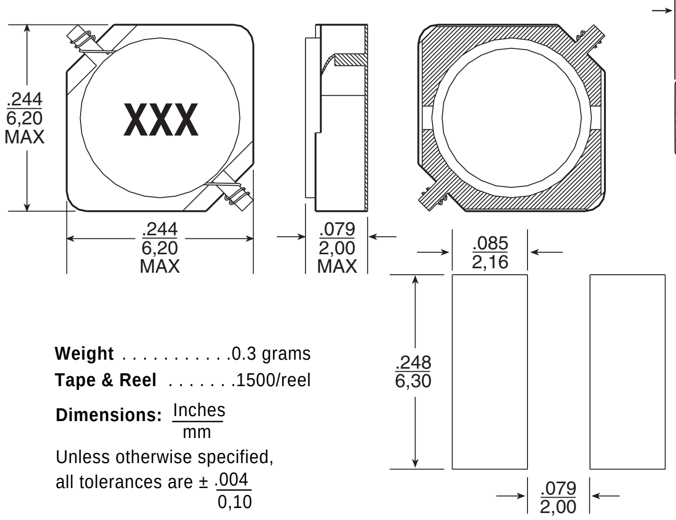
- **All Inductors are RoHS Compliant**
- **Height:** 2.0mm Max
- **Small Size:** 6.2mm x 6.2mm Max
- **Current Rating:** up to 3.5A
- **Inductance Range:** 0.9µH to 4.5mH

Electrical Specifications @ 25°C — Operating Temperature -40°C to +130°C [1]

Part [2,3] Number	Inductance @0ADC (µH ±20%)	Inductance @Irated (µH TYP)	Irated [5] (A)	DCR (mΩ) TYP	DCR (mΩ) MAX	Saturation [6] Current ISAT -10% (A)	Heating [7] Current IDC +40°C (A)	Core Loss [8] Factor (K2)	SRF (MHz)
PG0087.102NL	1.0	0.9	3.5	29	33	3.5	5.5	710	>40
PG0087.152NL	1.5	1.3	3.0	23	34	3.0	4.9	870	>40
PG0087.222NL	2.2	1.9	2.2	40	45	2.2	4.2	1100	>40
PG0087.332NL	3.3	2.9	2.0	47	55	2.0	3.3	1200	>40
PG0087.472NL	4.7	4.2	1.75	64	70	1.75	2.8	1600	>40
PG0087.682NL	6.8	6.1	1.50	97	105	1.50	2.4	1700	37
PG0087.103NL	10	9.0	1.20	111	124	1.20	2.2	2200	34
PG0087.153NL	15	13	0.94	198	205	0.94	1.6	2700	28
PG0087.223NL	22	19	0.80	248	280	0.80	1.5	3400	22
PG0087.333NL	33	29	0.65	342	386	0.65	1.2	4000	17
PG0087.473NL	47	42	0.54	525	594	0.54	0.95	4900	15
PG0087.683NL	68	61	0.43	656	710	0.43	0.80	6100	13
PG0087.104NL	100	90	0.36	1180	1200	0.36	0.65	7000	10
PG0087.154NL	150	130	0.30	1740	1850	0.30	0.52	8200	9.0
PG0087.224NL	220	190	0.25	2600	2700	0.25	0.42	10000	7.0
PG0087.334NL	330	290	0.20	3810	3950	0.20	0.36	13000	5.4
PG0087.474NL	470	420	0.15	6147	6240	0.15	0.28	15000	4.3
PG0087.604NL	600	540	0.13	6716	7160	0.13	0.26	17000	4.1
PG0087.684NL	680	610	0.10	8947	9190	0.10	0.22	18000	3.9
PG0087.824NL	820	730	0.08	10800	11440	0.08	0.20	19000	3.5
PG0087.105NL	1000	900	0.06	11655	12570	0.06	0.18	21000	2.7
PG0087.205NL	2000	1800	0.05	23200	24900	0.05	0.14	30000	1.9
PG0087.305NL	3000	2700	0.038	30660	31530	0.038	0.12	37000	1.6
PG0087.505NL	5000	4500	0.025	57560	64200	0.025	0.09	48000	1.1

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

Mechanical

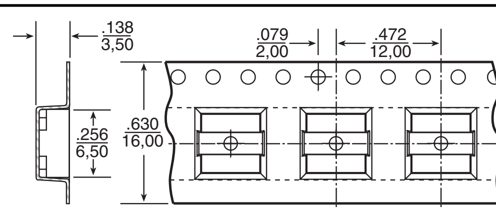


Weight . . . . .0.3 grams

Tape & Reel 1500/reel

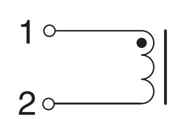
Dimensions: Inches / mm

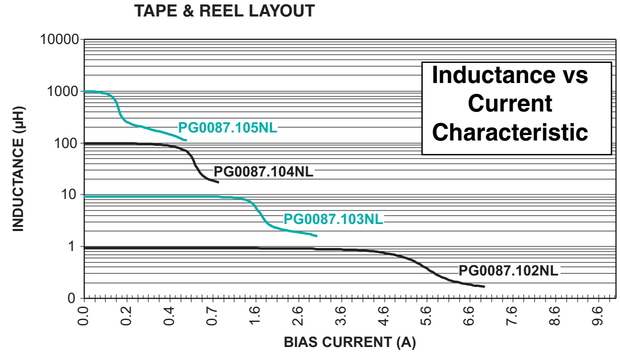
Unless otherwise specified, all tolerances are ± .004 / 0,10



TAPE & REEL LAYOUT

Schematic





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 P1166.102**NL** and P1166.102T becomes P1166.102**NL**T).
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 = $[\text{Total loss (mW)} / K0]^{.833}$ (°C)

Total loss = Copper loss + Core loss (mW)

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

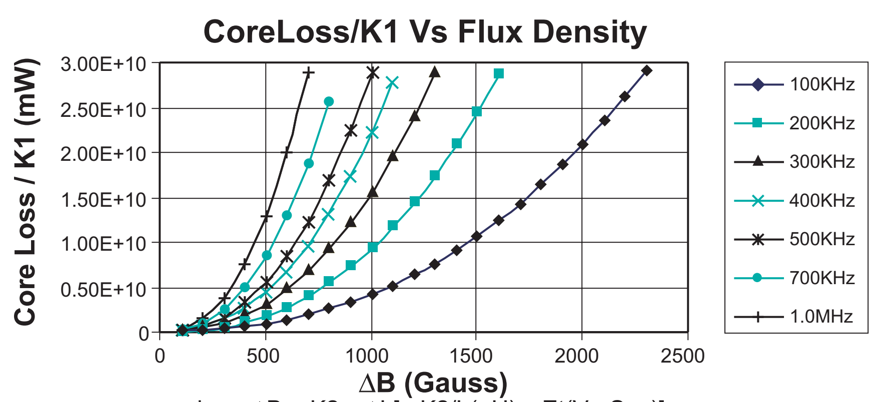
Irms = $[I_{DC}^2 + \Delta I^2/12]^{1/2}$ (A)

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