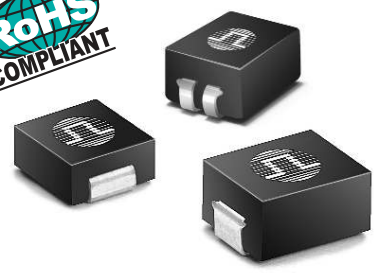
# SMT POWER INDUCTORS
## Power Beads - Volta 1 & 2 Series

Pulse® A TECHNITROL COMPANY

RoHS COMPLIANT



- **Height:** 3.2mm and 4.5mm Max
- **Footprint:** 7.0 x 6.4mm Max and 8.9 x 6.4mm Max
- **Current Rating:** up to 16A
- **Inductance Range:** 0.1µH to 0.6µH
- **Frequency Range:** up to 2MHz

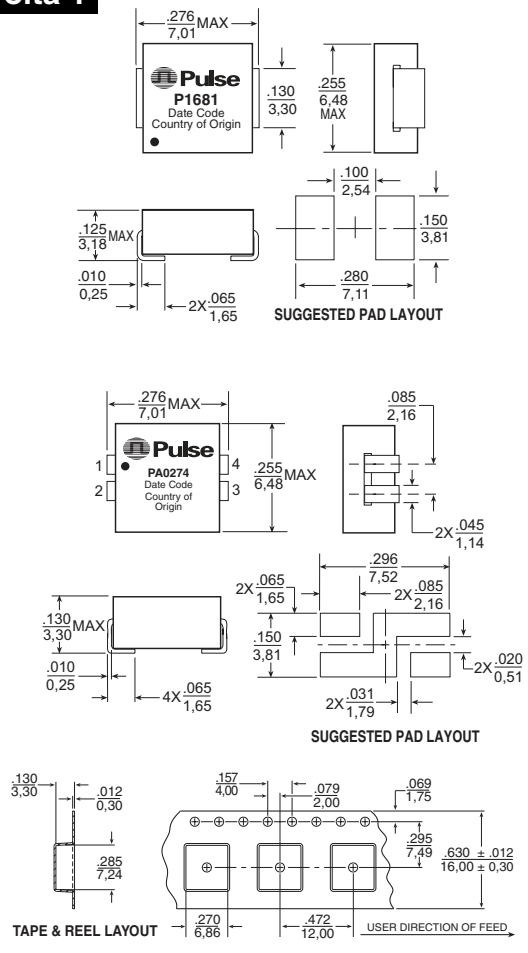
**Electrical Specifications @ 25°C — Operating Temperature -40°C to +130°C**

| Part[5,6] Number | Inductance @Irated (nH ± 20%) | Irated[1] (ADC) | DCR (mΩ) TYP | DCR (mΩ) MAX | Inductance @0ADC (nH ± 20%) | Saturation Current[2] (ADC) 25°C | Saturation Current[2] (ADC) 100°C | Heating[3] Current (A) | Trise[4] Factor K0 | Core Loss Factor[4] K1 | Core Loss Factor[4] K2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLTA 1** | | | | | | | | | | | |
| **P1681** | 95 | 15 | 0.31 | 0.39 | 100 | 18 | 16.2 | 15 | 1.0032 | .00319 | .07381 |
| **PA0274** | 475* | 6.0 | 1.60 | 1.8* | 700 | 7 | 4.8 | 12 | 1.4000 | .00638 | .24632 |
| **VOLTA 2** | | | | | | | | | | | |
| **PA0229** | 92 | 16 | 0.68 | 0.80 | 100 | 36 | 30 | 16 | 2.2458 | .00638 | .03975 |
| **P2005** | 142.5 | 15 | 0.45 | 0.56 | 150 | 18 | 16.2 | 15 | 2.2458 | .00638 | .05961 |
| **P2004** | 190 | 15 | 0.45 | 0.56 | 200 | 16.8 | 15.1 | 15 | 2.2458 | .00638 | .07949 |
| **PA0277** | 600* | 10.7 | 2.3 | 2.53* | 700 | 12.6 | 8.0 | 10.7 | 2.0400 | .01276 | .13196 |

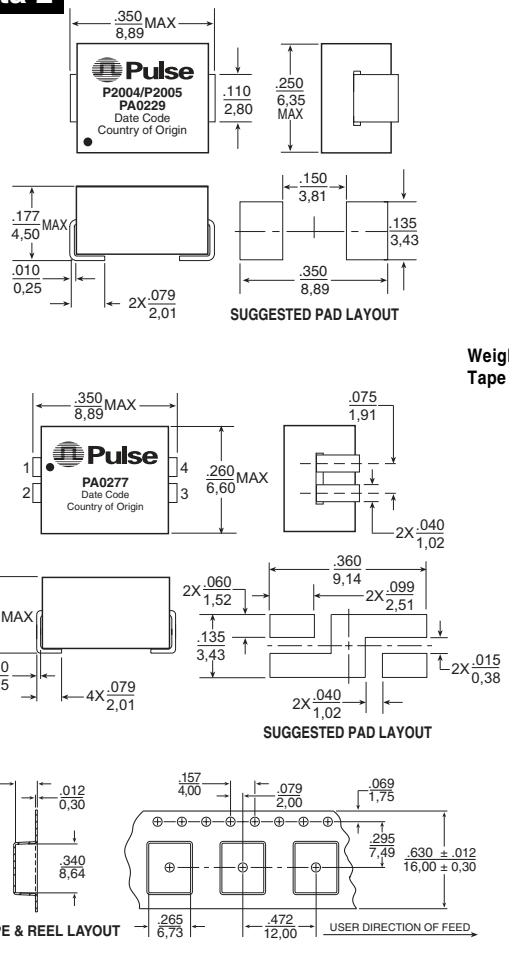
* DCR and Inductance rating for indicated parts is for both windings tied in series.

## Mechanicals

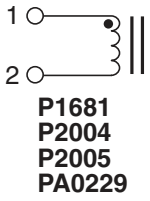
### Volta 1




### Volta 2

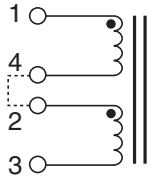



## Schematic




**P1681**
**P2004**
**P2005**
**PA0229**

| | Volta 1 | Volta 2 |
|---|---|---|
| **Weight** | 0.464 grams | 0.945 grams |
| **Tape & Reel** | 1500/reel | 1000/reel |




**PA0274**
**PA0277**

**Dimensions:** Inches / mm

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


USA 858 674 8100 • UK 44 1483 401 700 • France 33 3 84 35 04 04 • Singapore 65 6287 8998 • Shanghai 86 21 32181071 • China 86 769 5538070 • Taiwan 886 2 26980228

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## Notes from Tables

1. The rated current as listed is either the saturation current or the heating current depending on which value is lower.
2. The saturation current is the current which causes the inductance to drop by 10% at the stated ambient temperatures (-40°C, 25°C, 125°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.
3. The heating current is the DC current which causes the temperature of the part to increase by approximately 30°C. This current is determined by mounting the component on a PCB with .25" wide, 3 oz. equivalent copper traces, and applying the current to the device for 30 minutes.
4. In high volt*time applications, additional heating in the component can occur due to core losses in the inductor which may neccessitate derating the current in order to limit the temperature rise of the component. In order to determine the approximate total losses (or temperature rise) for a given application both copper losses and core losses should be taken into account.
5. Optional Tape & Reel packaging can be ordered by adding a "**T**" suffix to the part number, (i.e. PA0274**T**).
6. To order RoHS compliant part, add the suffix "**NL**" to the part number (i.e. PA0274 becomes PA0274**NL** and PA0274T becomes PA0274**NL**T).

**Estimated Temperature Rise:**

$$Trise = \left[\frac{Coreloss\ (mW) + Copper\ Loss\ (mW)}{K0}\right]^{.833} (°C)$$

$$Coreloss = K1 * (Fsw(kHz))^{1.6688} * (K2 * dI)^{2.17} (mW)$$

$$Copper\ Loss = Irms^2 * DCR(m\Omega)\ (mW)$$

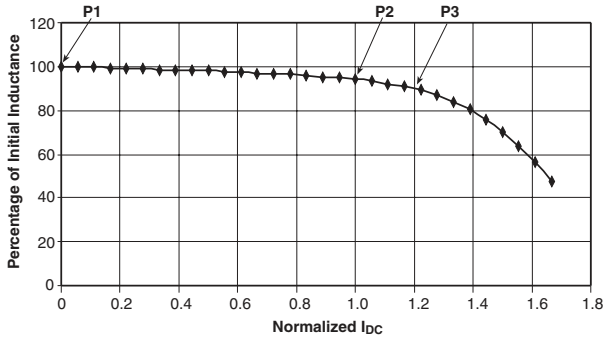
$$Irms = \left[IDC^2 + \left[\frac{dI}{12}\right]^2\right]^{1/2} (Arms)$$

$$Fsw(kHz) = switching\ frequency\ (kHz)$$

$$dI = delta\ I\ across\ the\ component\ (A)$$

The temperature of the component (ambient temperature + temperature rise) should be within the listed operating temperature range.

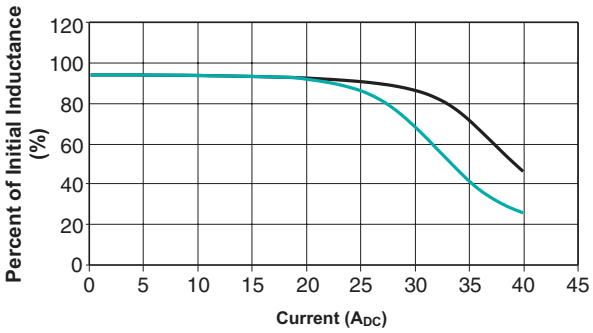
**Inductance vs Current Characteristics**
**P1681, P2005, P2004**



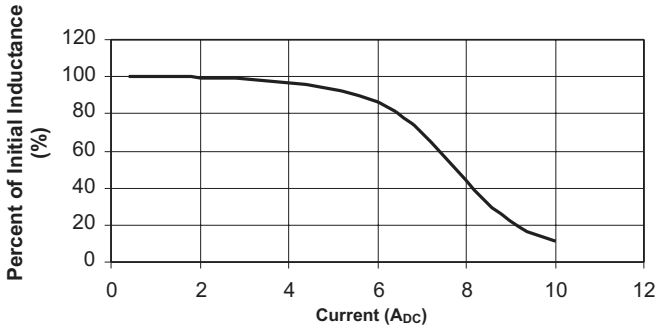

**P1** - Initial Inductance, Lo (.1$V_{RMS}$, 1MHz, 0$A_{DC}$, 25°C)
**P2** - Inductance (typically 95% $L_O$) at Rated $I_{DC}$.
**P3** - Inductance (typically 90% $L_O$) at $I_{PK}$.

Normalized Inductance

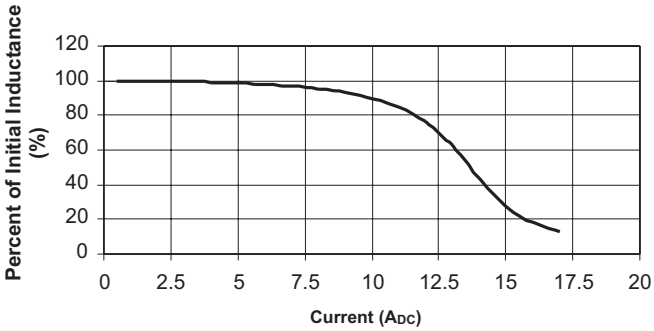
**PA0229 Inductance vs. DC Current at 25°C**




**PA0274 Inductance vs. DC Current at 25°C**




**PA0277 Inductance vs. DC Current at 25°C**

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