

# **SMT POWER INDUCTORS**

## **Power Beads - Volta 1 & 2 Series**



- **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:** 0.1 $\mu$ H to 0.6 $\mu$ H
  - **Frequency Range:** up to 2MHz

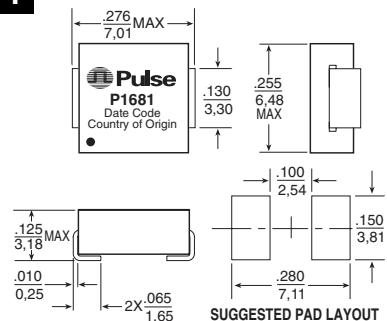
## **Electrical Specifications @ 25°C – Operating Temperature -40°C to +130°C**

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

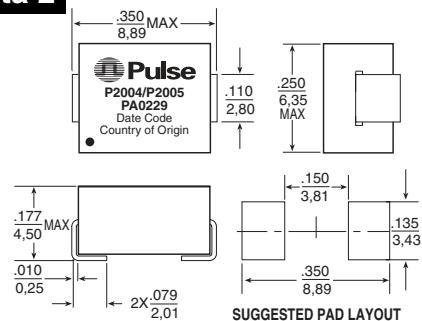
## Mechanicals

## Schematic

Volta 1



Volta 2



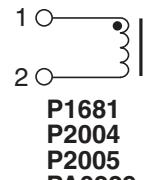
**TAPE & REEL LAYOUT**

The diagram illustrates the layout of three components on a tape. The first component has a width of .012 and a height of .30. The second component has a width of .079 and a height of .20. The third component has a width of .069 and a height of .175. The total width of the layout is 1.57 inches, and the total height is 1.25 inches. The layout is centered on a reel with a diameter of 4.00 inches. The user direction of feed is indicated as moving from right to left.

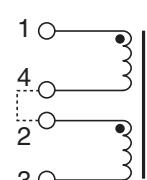
The technical drawing illustrates the suggested pad layout for the PA0277 component. It features a central rectangular body with a circular logo containing the word "Pulse". Below the logo, the part number "PA0277" and descriptive text "Date Code Country of Origin" are printed. The drawing shows various lead and body dimensions: top width is .350 with a tolerance of 8.89 MAX; bottom width is .075 with a tolerance of 1.91; height from top to bottom lead is .260 MAX with a tolerance of 6.60; height from bottom lead to bottom edge is .040 with a tolerance of 1.02; height from top lead to top edge is .177 MAX with a tolerance of 4.50; height from bottom lead to bottom edge is .010 with a tolerance of 0.25; and a total length dimension of 4X .079 with a tolerance of 2.01. A detailed cross-sectional view on the right shows internal structures and dimensions like .360, .914, .099, .251, .040, .013, and .036.

The diagram illustrates the layout of a tape and reel assembly. It features a central rectangular reel with two rectangular cutouts. A vertical tape is wound around the reel, with its width indicated as .340 and its height as 8.64. The reel has a total width of 4.00, a height of 16.00 ± .012, and a thickness of .069. The distance from the center of the reel to the outer edge of the tape is .295. The reel is positioned at a height of .630 ± .012 above a horizontal line labeled "USER DIRECTION OF FEED". Various dimensions are also provided for the reel's internal structure and mounting holes.

**Volta 1**      **Volta 2**



P1681  
P2004  
P2005  
PA0229



PA0274  
PA0277

**Dimensions:** Inches

mm  
Unless otherwise specified,  
all tolerances are  $\pm \frac{.010}{.025}$

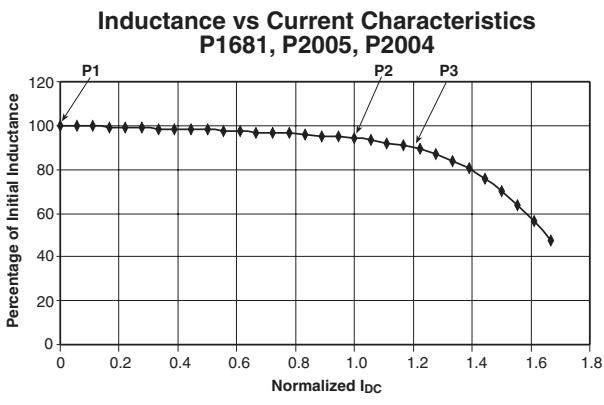
# SMT POWER INDUCTORS

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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 necessitate 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. PA0274T).
6. To order RoHS compliant part, add the suffix "NL" to the part number (i.e. PA0274 becomes PA0274NL and PA0274T becomes PA0274NLT).

### Estimated Temperature Rise:

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

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

$$\text{Copper Loss} = I_{rms}^2 * DCR(m\Omega) \text{ (mW)}$$

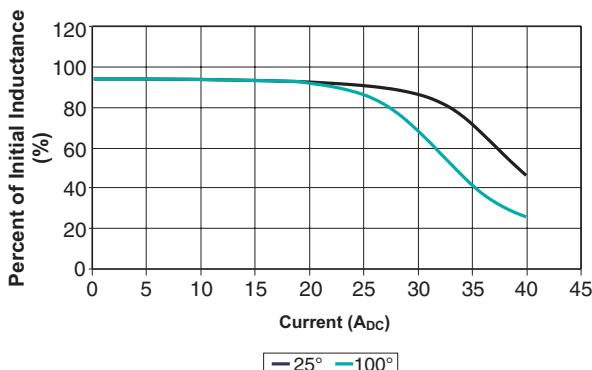
$$I_{rms} = \left[ IDC^2 + \left[ \frac{dI}{12} \right]^2 \right]^{1/2} \text{ (Arms)}$$

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

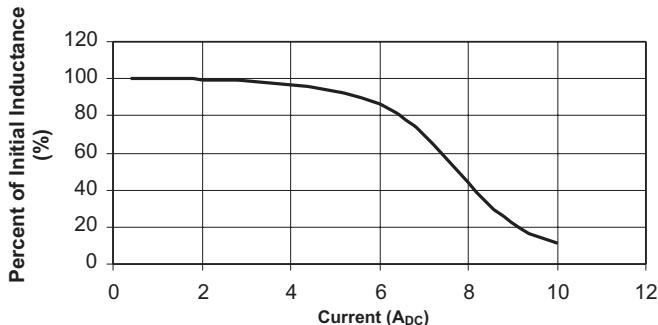
$dI$  = delta  $I$  across the component (A)

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

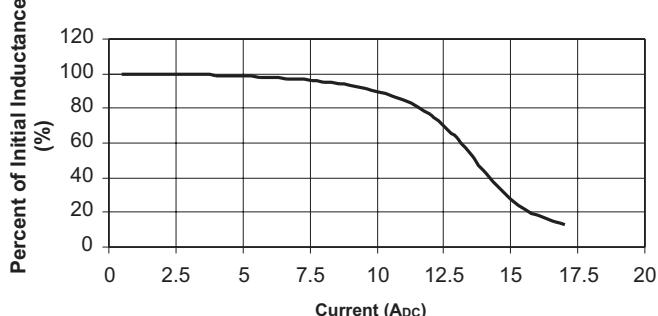
### PA0229 Inductance vs. DC Current at 25°C



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



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



### For More Information:

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