140W SMT PLANAR TRANSFORMER AND INDUCTOR

For use with Linear Technology's LT1725®

Pulse
A TECHNITROL COMPANY

PLANAR TRANSFORMER – PA0423

- **Power Rating:** 140W (48v to 12v/11.7A)
- **Height:** 8.4mm Max
- **Footprint:** 23.4mm x 20.1mm Max

PLANAR INDUCTOR – PA0465 and PA0480

- **Energy Storage:** up to 340μJ (4.2μH/12.8A)
- **Height:** 7.4mm Max
- **Footprint:** 23.4mm x 20.1mm Max

Electrical Specifications @ 25°C — Operating Temperature -40°C to 125°C

Part Number	Power Rating [2]	Turns Ratio (Pri:Sec:Aux)	Primary Secondary Isolation	Primary Inductance (μH MIN)	Leakage Inductance (μH MAX)	DCR Primary (mΩ MAX)	DCR Primary Aux. (mΩ MAX)	DCR Secondary (mΩ MAX)
PA0423	140 W (12v/11.7A)	8:4:4	1500 Vdc Basic	140	0.1	55	500	7.0

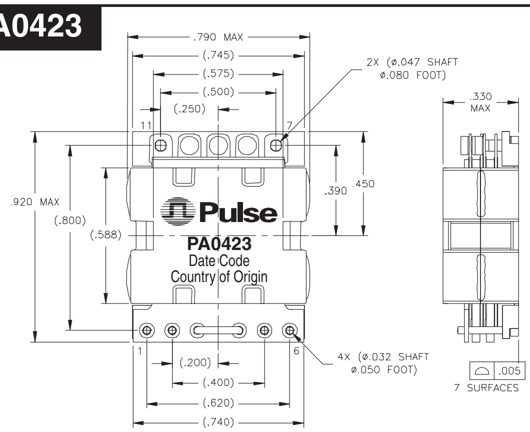
Electrical Specifications @ 25°C — Operating Temperature -40°C to 125°C

Part Number	Inductance @Irated (7-11) (μH ±12%)	Irated [3] (A_{DC})	Turns Ratio (Main Winding to Aux.)	DCR (mΩ MAX) Main Winding (7-11)	DCR (mΩ MAX) Aux. Winding (1-6)	Inductance @ 0 A_{DC} (μH ±12%)	Saturation Current [4] (A) @ 25°C	Saturation Current [4] (A) @ 100°C	Heating Current [5] (A)
PA0465	4.2	12.8	4:5	2.8	460	4.4	16	15	37
PA0480	5.8	8.5	4:5	2.8	460	6.2	11	10	37

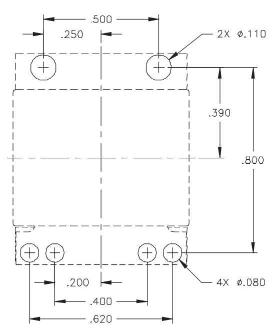
Mechanicals

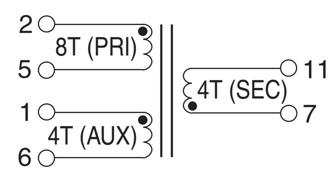
Schematics

PA0423

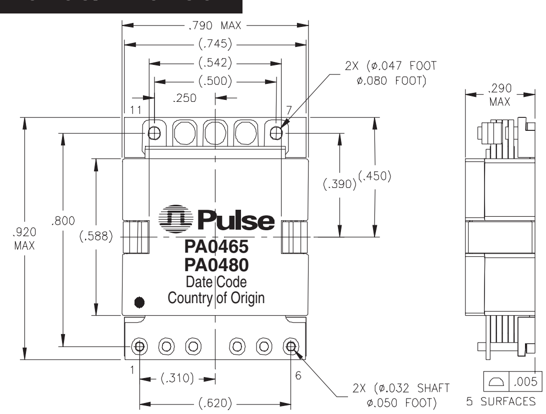


SUGGESTED PAD LAYOUT





PA0465/PA0480



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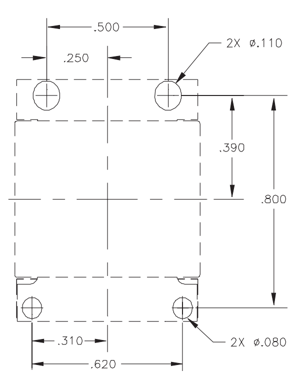
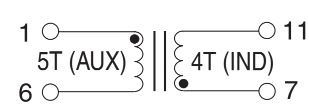




	PA0423	PA0465/PA0480
Weight	11.0 grams	11.0 grams
Tape & Reel	180/reel	250/reel
Tray	40/tray	90/tray

Dimensions: $\frac{\text{Inches}}{\text{mm}}$

Unless otherwise specified, all tolerances are ± $\frac{.010}{0,25}$

100W SMT PLANAR TRANSFORMER AND INDUCTOR

For use with Linear Technology's LT1725®

Notes from Tables

1. The **PA0423** transformer and **PA0465/PA04680** inductor were designed for use with Linear Technology's LT1725® and LTC1693® IC's and form the foundation of a low cost, discrete component alternative to telecom power modules. The **PA0423** transformer and **PA0465/PA04680** inductor were designed for (but not limited to) the following applications:
   - **Topology:** Single switch Forward
   - **Frequency:** 230kHz
   - **Pri./Sec. Isolation:** Basic Insulation (1500Vdc)
   - **Input Voltage:** 36-75v telecom input
   - **Output Voltage:** 12v / 11.7A output

For PA0423: Basic Insulated Planar Transformer:

2. To determine if the transformer is suitable for your application, it is necessary to ensure that the temperature rise of the component (ambieint plus temp. rise) does not exceed its operating temperature. To determine the temperature rise of the component it is necessary to calculate the total power losses (core and copper) in the application.

   Total Copper Losses (Pcu total(W)):
   Pcu total(W) = sum of the losses in each winding
   The losses in each winding can be calculated by:
   Pcu(W) = .001* DCR(mΩ) * ($Irms^2$)
   Core Losses (Pcore(W))
   To calculate core loss, use the following formula:
   CoreLoss (W) = $1.92 * 10^{-13} (\Delta B)^{2.5} * (\text{Freq kHz})^{1.8}$
   where:
   ΔB = 22653.1 * Vin min * Dutycycle max / Freq kHz
   Total Losses:
   P total = Pcu total + CoreLoss
   Temperature Rise:
   The approximate temperature rise can be found by looking up the calculated total losses in the temperature rise vs. power dissipation curve.

For P0465 and P0480: Planar Inductor

3. The rated current as listed is either 85% of the saturation current or the heating current depending on which value is lower.

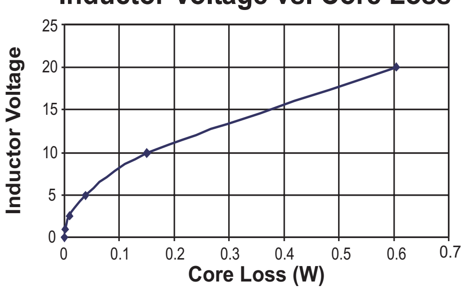
4. The saturation current is the current which causes the inductance to drop by 15% at the stated ambient temperatures (25°C, 100°C). This current is determined by placing the component in the specified ambient environment and applying a short duration pulse current (to eliminate self-heating effects) to the component.

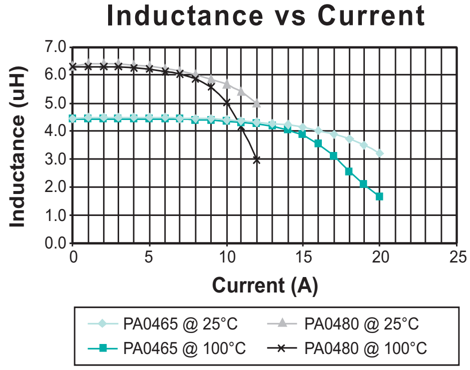
5. The heating current is the dc current which causes the temperature of the part to increase by approximately 45°C. This current is determined by mounting the component on a PCB with a .25" wide, 2oz. Equivalent copper traces, and applying the current to the device for 30 minutes with no force air cooling.

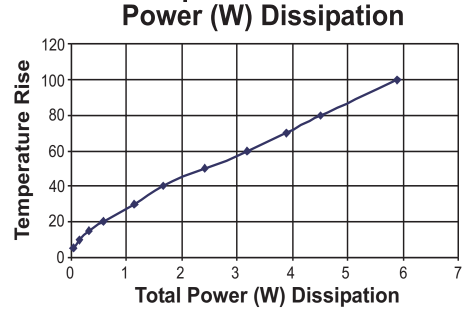
6. In high volt*time applications additional heating in the component can occur due to core losses in the inductor which may neccessitate derating the current in order to limit the temperature rise of the component. In order to determine the approximate total losses (or temperature rise) for a given application both copper an core losses should be taken into account

   Total Copper Losses (Pcu_total(W)):
   Pcu(W)= .001* DCR(mΩ) * ($Irms^2$)
   where:
   Irms = $(Idc^2 + (\Delta 1/2)^2)^{.5}$
   Δ1 = ripple current through inductor
   Core Losses (Pcore(W)):
   Use the Inductor Voltage versus CoreLoss table to determine the approximate core losses
   Total Losses:
   P total = Pcu total + CoreLoss
   Temperature Rise:
   The approximate temperature rise can be found by looking up the calculated total losses in the temperature rise vs. power dissipation curve.

7. LT1725® and LTC1693® are registered trademarks of Linear Technology Corporation.







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