

# HIGH FREQUENCY PLANAR TRANSFORMERS

## Spyglass Series (up to 140W)



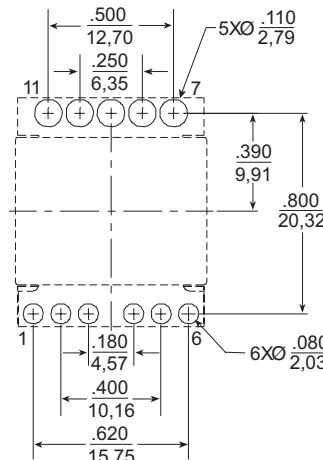
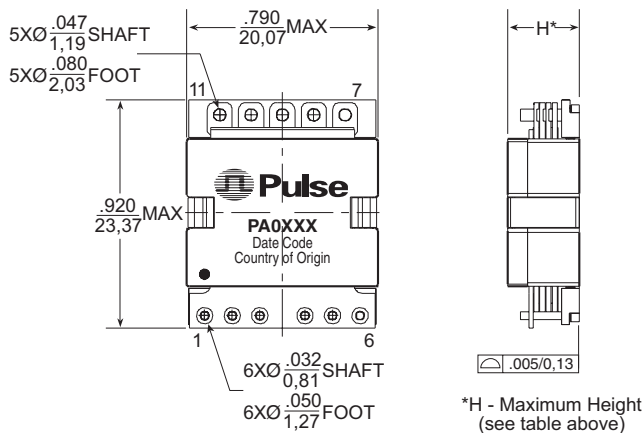
-  **Power Rating:** up to 140W
-  **Height:** 8.6mm Max
-  **Footprint:** 23.4mm x 20.1mm Max
-  **Frequency Range:** 200kHz to 700kHz

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

| Part Number | Power Rating <sup>1,4</sup> | Turns Ratio (Pri:Sec)    | Primary Secondary Isolation <sup>3</sup> | Primary Inductance (μH MIN) | Leakage Inductance <sup>2</sup> (μH MAX) | DCR (mΩ MAX) |              |           | Maximum Height (mm) |
|-------------|-----------------------------|--------------------------|------------------------------------------|-----------------------------|------------------------------------------|--------------|--------------|-----------|---------------------|
|             |                             |                          |                                          |                             |                                          | Primary      | Primary Aux. | Secondary |                     |
| PA0369      | 100W<br>48v to 3.3v/30A     | 6:1                      | 1500 Vdc Basic                           | 65                          | 0.25                                     | 15           | N/A          | 0.40      | 8.6                 |
| PA0168      | 100W<br>48v to 3.3v/30A     | 12:2                     | 1500 Vdc Basic                           | 320                         | 0.75                                     | 45           | N/A          | 1.25      | 8.6                 |
| PA0463      | 50W<br>48v to 3.3v/15A      | 10:2<br>(w/9T Pri. Aux.) | 1500 Vdc Basic                           | 200                         | 1.00                                     | 40           | 2750         | 2.50      | 8.6                 |
| PA0491      | 100W<br>48v to 5.0v/20A     | 8:2                      | 1500 Vdc Basic                           | 140                         | 0.25                                     | 35           | N/A          | 1.25      | 8.6                 |
| PA0423      | 140W<br>48v to 12v/11.7A    | 8:4<br>(w/4T Pri. Aux.)  | 1500 Vdc Basic                           | 140                         | 0.30                                     | 35           | 500          | 7.00      | 8.6                 |

## Mechanicals

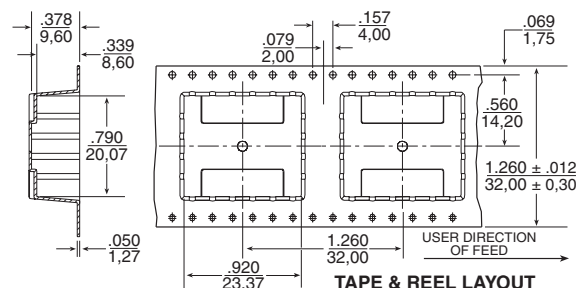
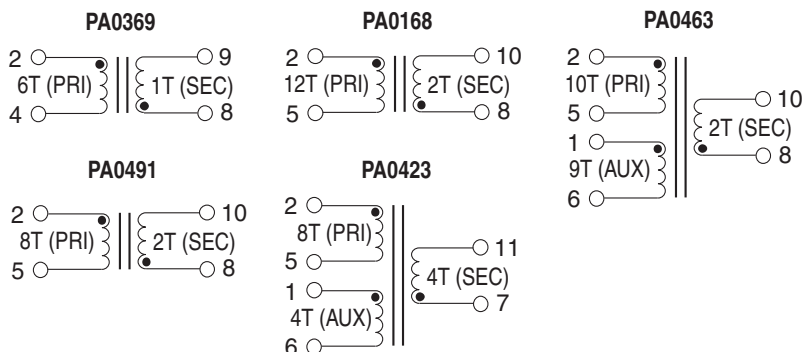
### SUGGESTED PAD LAYOUT



Weight .....11.0 grams  
Tape & Reel .....180/reel  
Tray .....40/tray

Dimensions: Inches  
mm  
Unless otherwise specified,  
all tolerances are  $\pm .010$   
 $0.25$

## Schematics



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### Notes from Tables

1. This series of transformers was designed for (but not limited to) single and two switch forward converter applications. The power levels stated are for actual demo boards typically operating between 200-400kHz with 100-200LFM of airflow. Other turns ratios and auxiliary windings may be available. Please contact Pulse Power Applications Engineering for details.
2. The leakage inductance is measured at the primary terminals with all other windings shorted.
3. The listed transformers are designed to meet basic insulation (1.4mm creepage and clearance with 1500Vdc isolation). Lower cost transformers with operational insulation (1500Vdc isolation with no creepage and clearance spacings) are available. Please contact Pulse Power Applications Engineering for details.
4. To determine if the transformer is suitable for your application, it is necessary to ensure that the temperature rise of the component (ambient plus temperature 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:  
 $P_{cu}(W) = .001 * DCR(m\Omega) * (I_{rms})^2$   
 Core Losses (Pcore(W))

#### To calculate core loss, use the following formula:

$$CoreLoss (W) = 1.589E^{-13} (\Delta B)^{2.5} * (Freq \text{ kHz})^{1.8}$$

#### where:

$$\Delta B = 179211.46 * V_{in \text{ min}} * \text{Dutycycle max} / (Freq \text{ kHz} * \text{Primary Turns})$$

#### Total Losses:

$$P \text{ total} = P_{cu \text{ total}} + CoreLoss$$

#### Temperature Rise:

The approximate temperature rise can be found by looking up the calculated total losses in the temperature rise vs. power dissipation curve.

