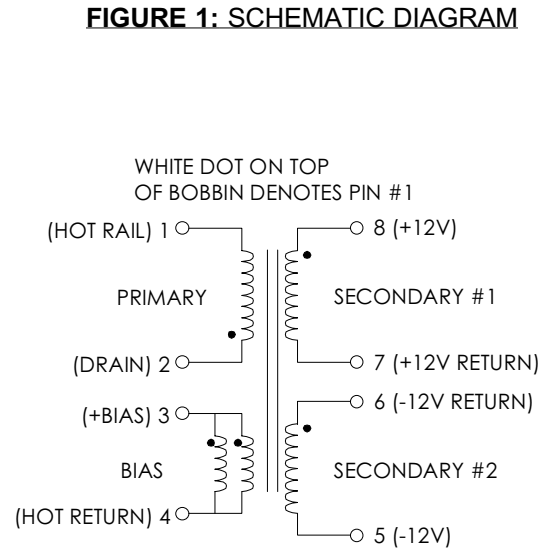


**TABLE 1: ELECTRICAL SPECIFICATIONS AT 25 °C**  
SWITCHING TRANSFORMER DESIGNED FOR USE WITH POWER INTEGRATIONS  
TOP224P. REFER TO APPLICATION CIRCUIT OF FIGURE 3.

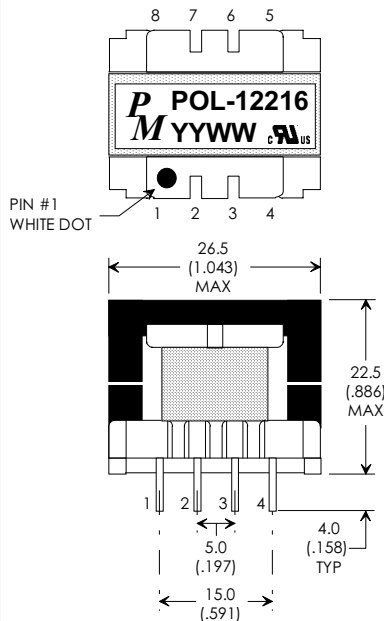
| PARAMETER                                                                                                                                                                                                                                                                  | SPEC LIMITS                                                 |                                                                            |                                                                          | UNITS                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------|
|                                                                                                                                                                                                                                                                            | MIN.                                                        | TYP.                                                                       | MAX.                                                                     |                                                          |
| PRIMARY INDUCTANCE (2-1)<br>VOLTAGE = 0.250Vrms<br>FREQUENCY = 100 KHZ                                                                                                                                                                                                     | 585                                                         | 650                                                                        | 715                                                                      | μHY                                                      |
| TURN RATIO'S:<br>BIAS (3-4) : PRIMARY (2-1)<br>SEC #1 (8-7) : PRIMARY (2-1)<br>SEC #2 (6-5) : PRIMARY (2-1)                                                                                                                                                                | -----                                                       | 1: 8.375                                                                   | -----                                                                    | ± 4%                                                     |
|                                                                                                                                                                                                                                                                            | -----                                                       | 1: 8.375                                                                   | -----                                                                    | ± 4%                                                     |
|                                                                                                                                                                                                                                                                            | -----                                                       | 1: 8.375                                                                   | -----                                                                    | ± 4%                                                     |
| PRI LEAKAGE IND. (SEC SHORTED)<br>VOLTAGE = 0.250Vrms<br>FREQUENCY = 100 KHZ                                                                                                                                                                                               | -----                                                       | -----                                                                      | 36.0                                                                     | μHY                                                      |
| HIPOT:<br>PRIMARY & BIAS TO SECONDARIES                                                                                                                                                                                                                                    | 3000                                                        | -----                                                                      | -----                                                                    | Vrms                                                     |
| APP CIRCUIT PARAMETERS: (1)<br>AC LINE VOLTAGE 47/400 Hz<br>SEC #1 OUTPUT VOLTAGE<br>OUTPUT CURRENT CONTINUOUS<br>SEC #1 OUTPUT VOLTAGE<br>OUTPUT CURRENT CONTINUOUS<br>PEAK CURRENT OUT, EACH SEC.<br>LINE REGULATION (85 TO 265Vac)<br>LOAD REGULATION 10-100%<br>RIPPLE | 85<br>50<br>50<br>-----<br>-----<br>-----<br>-----<br>----- | -----<br>+12.0<br>-----<br>-12.0<br>-----<br>-----<br>0.20<br>0.20<br>50.0 | 265<br>-----<br>+800<br>-----<br>-800<br>+920<br>-----<br>-----<br>----- | Vac<br>Vdc<br>mA<br>Vdc<br>mA<br>Amps<br>±%<br>±%<br>±mV |



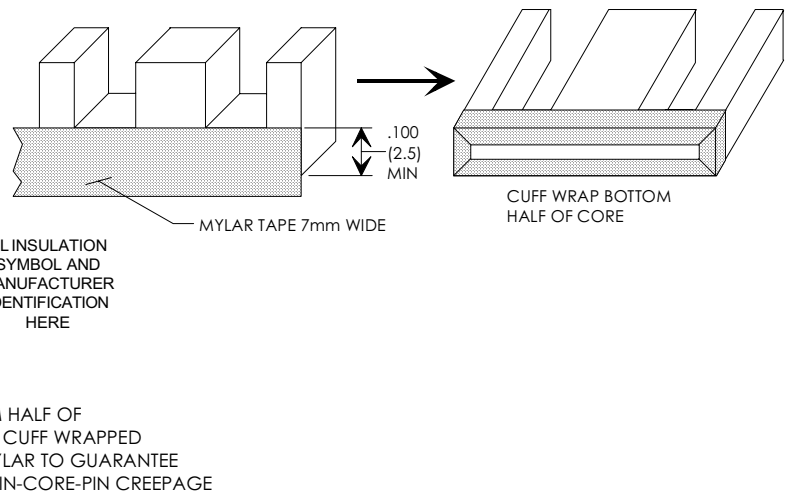
**NOTE1:**  
**REINFORCED INSULATION SYSTEM, UL1950, IEC950, CSA-950:**  
A) ALL MATERIALS MEET "UL", "CSA" & "IEC" REQUIREMENTS  
B) TRIPLE BASIC INSULATED SECONDARY.  
C) DESIGNED TO MEET ≥6.2mm CREEPAGE REQUIREMENTS.  
D) VARNISH FINISHED ASSEMBLY.  
E) UL1950 & CSA-950 CERTIFIED: FILE #E162344.  
F) UL CLASS (B) 130 INSULATION SYSTEM PM130-R1, PM130-H1, PM130-H1A (UL FILE #E177139) OR ANY UL AUTHORIZED CLASS (B) INSULATION SYSTEM.

(1) REFER TO RD5 APPLICATION CIRCUIT OF FIGURE 3.

**FIGURE 2: PHYSICAL DIMENSIONS mm (INCHES)**



**NOTE2:**  
A) BOTTOM HALF OF CORE IS CUFF WRAPPED PRIOR TO ASSEMBLY. THIS GUARANTEES ≥6.2mm CREEPAGE PIN-CORE-PIN



FEI25, 8-PIN VERTICAL BOBBIN

| REV.     | DESCRIPTION OF CHANGES                                    | BY |
|----------|-----------------------------------------------------------|----|
| 06/26/97 | ORIGINAL RELEASE                                          | TO |
| 03/23/98 | CORRECTED APP. CIRCUIT C4 & C5 POLARITY, NO OTHER CHANGES | TO |
| 07/07/98 | CORRECTED HEIGHT DIMENSION, NOT OTHER CHANGES             | TO |
| 05/07/99 | UPDATED TO UL CLASS (B) 130 INSULATION SYSTEM             | MD |
| 10/25/01 | UPDATED MAX DIMENSION TO 26.5mm WAS 26.0 mm               | LL |

**FLYBACK TRANSFORMER CONTROL DRAWING**

|                        |                    |
|------------------------|--------------------|
| PREMIER P/N: POL-12216 | REVISION: 10/25/01 |
| DRAWN BY: TOM O'NEIL   | REF: TOP224P       |
| SCALE: NONE            | SHEET: 1 OF 6      |



UNLESS OTHERWISE SPECIFIED  
DIMENSIONS ARE IN MM  
DIMENSIONAL TOLERANCES ARE:  
DECIMALS ANGLES  
.X ± .25 ±0° 30'  
.XX ± .15  
DO NOT SCALE DRAWING

## APPLICATION NOTES

Premier Magnetics' POL-12216 Switch Mode Transformer was designed for use with Power Integrations, Inc. PWR-TOP224P three terminal off-line PWM switching regulator in the Flyback Buck-Boost circuit configuration. This conversion topology can provide isolated multiple outputs with efficiencies up to 90%. Premiers' POL-12216 transformer has been optimized to provide maximum power throughput.

The TOPSwitch-II series from Power Integrations, Inc. are self contained 100KHz three terminal voltage controlled PWM switching regulators. This series contains all necessary functions for an off-line switched mode control DC power source. These switching regulators provide a very simple solution to off-line designs. The inductors and transformer used with the TOPXXX are critical to the performance of the circuit. They define the overall efficiency, output power and overall physical size.

Below is a universal input high precision 20 watt application circuit utilizing Power Integrations TOP224 switching regulator in the flyback buck-boost configuration. The component values listed are intended for reference purposes only.

### **FIGURE 3: TYPICAL APPLICATION CIRCUIT**

PREMIER MAGNETICS PART NUMBERS:  
(REQUEST DATA SHEETS BY PART#)

L1 = PMCU-0330 33mHy EMI/RFI CMC

T1 = POL-12216 MAIN SWITCHING TRANSFORMER

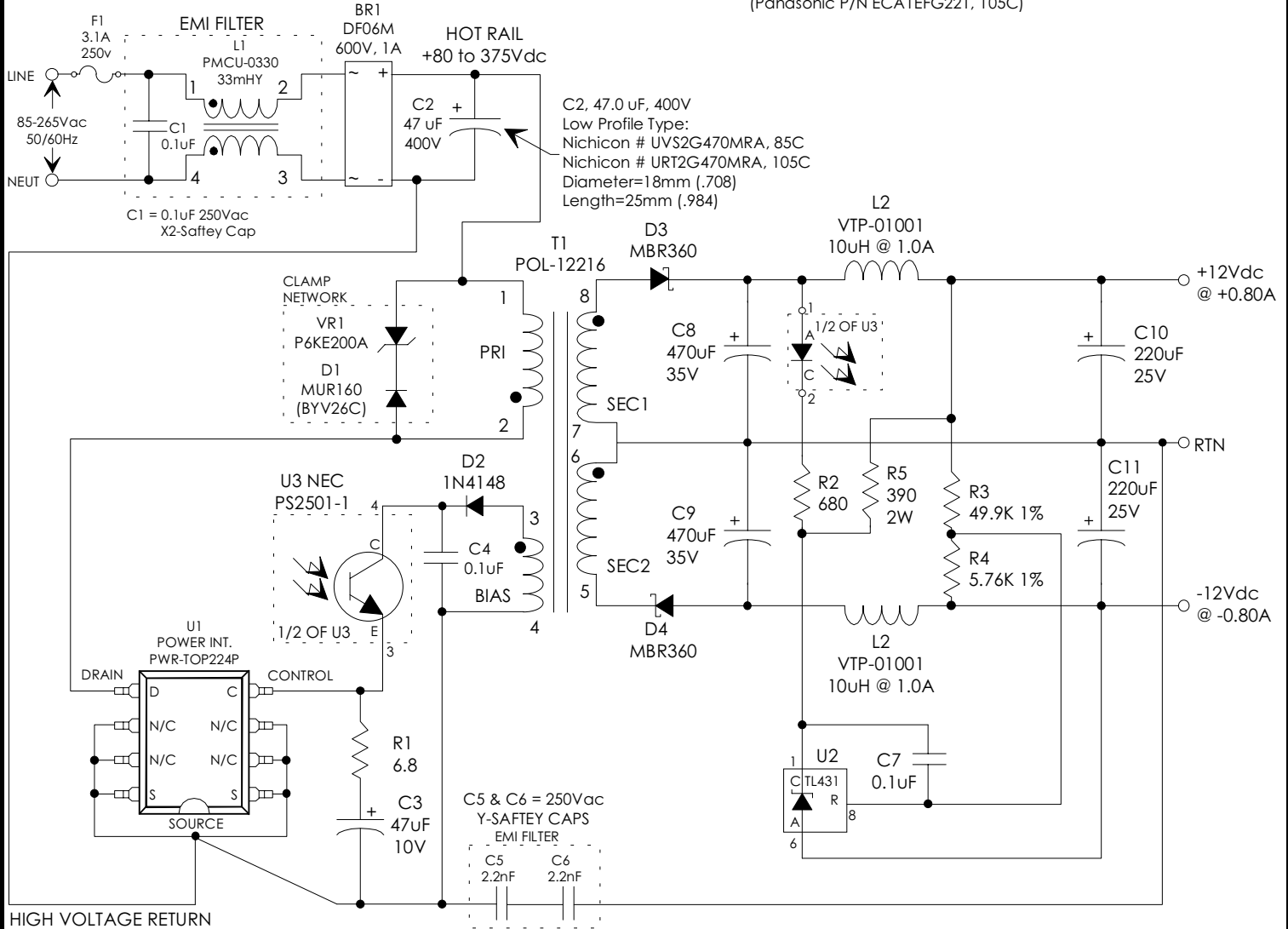
L2 = VTP-01001 10uHy, 1.0Amp INDUCTOR

### ALUMINUM ELECTROLYTIC FILTER CAPACITOR RATINGS:

C2 :  $\geq 400V$ , Ripple Rated  $\geq 233mA$  @ 120Hz @ Max. Operating Temp.  
(Nichicon P/N URTSG470MRA, 105C)

C8, C9 :  $\geq 16V$ , Ripple Rated  $\geq 1000mA$  @ 100KHz @ Max. Op. Temp.  
(Panasonic P/N ECA1VFG471, 105C)

C10, C11 :  $\geq 16V$  GOOD QUALITY LOW ESR TYPE  
(Panasonic P/N ECA1EFG221, 105C)



UNLESS OTHERWISE SPECIFIED  
DIMENSIONS ARE IN MM  
DIMENSIONAL TOLERANCES ARE:

| DECIMALS      | ANGLES              |
|---------------|---------------------|
| .X $\pm$ .25  | $\pm 0^{\circ} 30'$ |
| .XX $\pm$ .15 |                     |

DO NOT SCALE DRAWING

### FLYBACK TRANSFORMER CONTROL DRAWING

PREMIER P/N: POL-12216

REVISION: 10/25/01

DRAWN BY: TOM O'NEIL

REF: TOP224P

SCALE: NONE

SHEET: 2 OF 6