

High Isolation Power Transformers

EP7 Platform SMD



- Push Pull Transformer
- Reinforced insulation for isolated power supply driver
- 8mm creepage
- 5KVrms isolation (600Vrms continuous)
- UL and TUV certified

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

| Part Number | Inductance (1-3) ($\mu\text{H} \pm 45\%$) | Leakage Inductance ($\mu\text{H} \text{ MAX}$) | DCR (1-3) ($\Omega \text{ MAX}$) | DCR (4-6) ($\Omega \text{ MAX}$) | ET MAX (1-3) ¹ (V- $\mu\text{sec} \text{ MAX}$) | CAP (pF MAX) | Turns Ratio (1:3) (6:4) | Isolated Voltage ² (Vrms) |
|--------------|--|---|---------------------------------------|---------------------------------------|--|-----------------|----------------------------|---|
| PH9185.011NL | 750 | 1.2 | 0.50 | 0.55 | 66 | 10.0 | 1CT : 1CT | 5000 |
| PH9185.012NL | 450 | 0.9 | 0.40 | 0.80 | 52 | 10.0 | 1CT : 2CT | |
| PH9185.013NL | 200 | 0.6 | 0.35 | 0.95 | 36 | 8.0 | 1CT : 3CT | |
| PH9185.021NL | 1800 | 3.0 | 0.75 | 0.45 | 100 | 10.0 | 2CT : 1CT | |
| PH9185.034NL | 750 | 1.2 | 0.50 | 0.75 | 66 | 10.0 | 3CT : 4CT | |
| PH9185.038NL | 310 | 0.9 | 0.44 | 1.00 | 44 | 8.0 | 3CT : 8CT | |
| PH9185.043NL | 1260 | 1.5 | 0.70 | 0.56 | 89 | 12.0 | 4CT : 3CT | |
| PH9185.083NL | 2350 | 6.0 | 0.90 | 0.40 | 110 | 8.0 | 8CT : 3CT | |

- Notes:**
- The ET Max is calculated to limit the core loss and temperature rise at 100KHz based on a bipolar flux swing of 180mT Peak.
 - For Push-Pull topology, where the voltage is applied across half the primary winding turns, the ET needs to be derated by 50% for the same flux swing.
 - The applied ET may need to be further derated for higher frequencies based on the temperature rise which results from the core and copper losses
 - To calculate total copper loss (W), use the following formula:

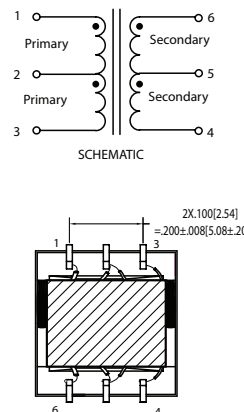
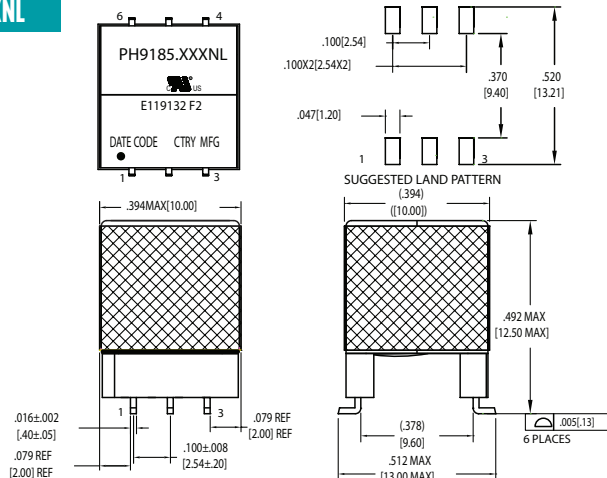
$$\text{Copper Loss (W)} = \text{Irms_Primary}^2 * \text{DCR_Primary} + \text{Irms_Secondary}^2 * \text{DCR_Secondary}$$
 - To calculate total core loss (W), use the following formula:

$$\text{Core Loss (W)} = 4.40\text{E-}10 * (\text{Frequency in kHz})^{1.67} * (180 * [\text{ET/ET Max}])^{2.53}$$
 Where ET is the applied Volt Second, ET Max is the rated Volt Second for 180mT flux swing
 - To calculate temperature rise, use the following formula: $\text{Temperature Rise } (^\circ\text{C}) = 90 * (\text{Core Loss (W)} + \text{Copper Loss (W)})$
 - The AEC-Q200 temperature and humidity operational life testing was completed using a dielectric strength test of 5000Vdc.
 - Optional Tape & Reel packing can be ordered by adding a "T" suffix to the part number (i.e. PH9185.012NL becomes PH9185.012NLT). Pulse complies to industry standard tape and reel specification EIA481.
 - The "NL" suffix indicates an RoHS-compliant part number.
 - Continuous isolation voltage confirmed by 125°C/1000hrs accelerated aging with the bias voltage applied between primary and secondary windings.

Mechanical

Schematic

PH9185.XXXNL



Weight2.6grams
 Tape & Reel150/reel
 Tray80/tray

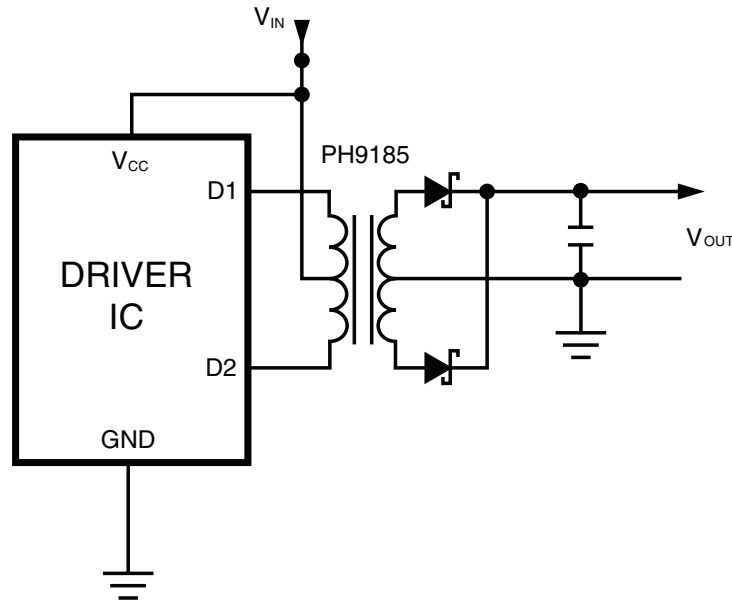
Dimensions: $\frac{\text{Inches}}{\text{mm}}$

Unless otherwise specified,
 all tolerances are $\pm \frac{.010}{0.25}$

Application

PH9185.XXXNL is a series of high isolation power supply transformer drivers. Intended to operate in a fixed duty cycle Push Pull topology, it is a part of a low cost solution for delivering lower power (up to 3W) from a low voltage source. A typical implementation would be an isolated RS-485/RS-232 power supply driver circuit, the design is compatible with the MAXIM™ MAX253 IC.

A schematic diagram for the Push Pull converter topology is given below.



For a fixed 50% duty cycle mode of operation, the output voltage is simply determined by the input voltage and turns ratio. So, with the available turns ratios, a variety of output voltages can be selected.

This transformer design has been certified by UL to comply with UL60950-1 2nd edition, and CAN/CSA C22.2 NO. 60950-1-07 2nd edition; and by TUV to comply with EN61558-1 and EN61558-2-16 with reinforced insulation for a working voltage up to 400Vac 8mm creepage and 5000Vrms isolation voltage is guaranteed to meet this requirement. The design also complies with the Pulse's class F insulation system. PH9185.013NL was not included in the original UL/TUV certification but is compliant. Cost reduced versions without UL/TUV certification available, please contact Pulse Electronics for more information.

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