Isolation Power Transformers
Toroid Platform SMD PH9085.XXXNL and PM2180.XXXNL

Push Pull Converter Transformer
- Functional insulation for isolated power supply driver
- 2.5KVRms isolation (380Vrms continuous)

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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Inductance (1-3) (µH ±35%)</th>
<th>Leakage Inductance (1-3) with (4-6) shorted (µH MAX)</th>
<th>Capacitance (1, 2, 3) to (4, 5, 6) (pF MAX)</th>
<th>DCR (1-3) (Ω MAX)</th>
<th>DCR (4-6) (Ω MAX)</th>
<th>ET MAX (1-3)</th>
<th>Turns Ratio (1:3) (6:4)</th>
<th>Isolated Voltage (Vrms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH9085.011NL PM2180.011NL</td>
<td>1020</td>
<td>0.8</td>
<td>30</td>
<td>0.60</td>
<td>0.65</td>
<td>22</td>
<td>1CT : 1CT</td>
<td>2500</td>
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<tr>
<td>PH9085.012NL PM2180.012NL</td>
<td>1020</td>
<td>0.6</td>
<td>40</td>
<td>0.85</td>
<td>1.60</td>
<td>22</td>
<td>1CT : 2CT</td>
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<tr>
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<td>20</td>
<td>0.60</td>
<td>0.35</td>
<td>23.6</td>
<td>2CT : 1CT</td>
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<td>0.75</td>
<td>22</td>
<td>3CT : 1CT</td>
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<td>0.6</td>
<td>40</td>
<td>0.80</td>
<td>1.20</td>
<td>22</td>
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<td>0.85</td>
<td>2.00</td>
<td>22</td>
<td>3CT : 8CT</td>
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<td>30</td>
<td>0.60</td>
<td>0.50</td>
<td>23.6</td>
<td>4CT : 3CT</td>
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<td>2.0</td>
<td>15</td>
<td>0.60</td>
<td>0.30</td>
<td>23.6</td>
<td>8CT : 3CT</td>
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<tr>
<td>PH9085.089NL PM2180.089NL</td>
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<td>0.6</td>
<td>40</td>
<td>0.60</td>
<td>0.70</td>
<td>23.6</td>
<td>8CT : 9CT</td>
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</tbody>
</table>

**Notes:**
1. The ET Max is calculated to limit the core loss and temperature rise at 100KHz based on a bipolar flux swing of 210mT Peak.
2. 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.
3. 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
   A. To calculate total copper loss (W), use the following formula:
   Copper Loss (W) = Irms_Pairmary * DCR_Pairmary + Irms_Secondary * DCR_Secondary
   B. To calculate total core loss (W), use the following formula:
   Core Loss (W) = 7.70E-13 * (Frequency in kHz)^2.43 * (210 * ET/ET Max)^2.5
   Where ET is the applied Volt Second, ET Max is the rated Volt Second for 210mT flux swing
   C. To calculate temperature rise, use the following formula: Temperature Rise (°C) = 340 * (Core Loss (W) + Copper Loss (W))
4. The AEC-Q200 temperature and humidity operational life testing was completed using a dielectric strength test of 2750Vdc.
5. Continuous isolation voltage confirmed by 125°C/1000hrs accelerated aging with the bias voltage applied between primary and secondary windings.
6. The PM2180.XXXNL part numbers are AEC-Q200 and IATF16949 certified. The mechanical dimensions are 100% tested in production but do not necessarily meet a product capability index (Cpk) >1.33 and therefore may not strictly conform to PPAP.

**PH9085.XXXNL and PM2185.XXXNL**

**Mechanical**

**Schematic**

- **Weight** 0.365 grams
- **Tape & Reel** 700/reel
- **Tray** 55/tray

**Dimensions:** mm

Unless otherwise specified, all tolerances are ±0.25
Isolation Power Transformers
Toroid Platform SMD PH9085.XXXNL and PM2180.XXXNL

PH9085.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 2W) 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.

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For More Information

PH9085.XXXNL/PM2180.XXXNL

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>REEL SIZE (mm)</th>
<th>TAPE SIZE (mm)</th>
<th>QTY</th>
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<tbody>
<tr>
<td>PH9085.XXXNL/PM2180.XXXNL</td>
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<td>16.4</td>
<td>12</td>
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</table>

Direction of tape

**APPLICATION**

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