

Isolation Power Transformers

Toroid Platform SMD - PH9385.XXXNLT and PM2155.XXXNLT



- Ⓟ Push Pull Converter Transformer
- Ⓟ Basic insulation for isolated power supply driver
- Ⓟ 13mm creepage and clearance
- Ⓟ 4KVRms isolation (600Vpk rated voltage)⁶
- Ⓟ **Patented:** US Patent 9,646,755

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

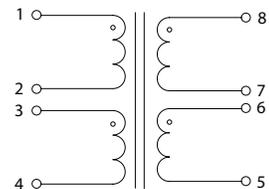
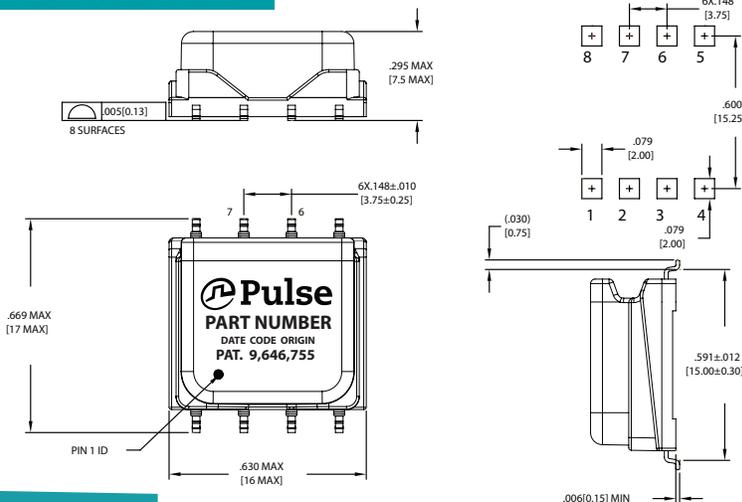
| Part Number | | Inductance (1-4) | Leakage Inductance (1-4) with (5-8) shorted | Capacitance (1, 4) to (5, 8) | DCR (1-4) | DCR (5-8) | ET (1-4) ¹ | Turns Ratio (1:4) (8:5) | Isolated Voltage ² |
|--------------|-------------------------|------------------|---|------------------------------|-----------|-----------|-----------------------|-------------------------|-------------------------------|
| Commerical | Automotive ⁸ | (μH ±35%) | (μH MAX) | (pF MAX) | (Ω MAX) | (Ω MAX) | (V-μsec Max) | | (Vrms) |
| PH9385.011NL | PM2155.011NL | 3200 | 6.0 | 36 | 1.10 | 1.00 | 109 | 1CT : 1CT | 4000 |
| PH9385.045NL | PM2155.045NL | 3200 | 4.0 | 36 | 1.10 | 1.25 | 109 | 4CT : 5CT | |
| PH9385.034NL | PM2155.034NL | 2600 | 3.0 | 36 | 1.00 | 1.50 | 98 | 3CT : 4CT | |
| PH9385.012NL | PM2155.012NL | 2600 | 3.0 | 40 | 1.00 | 1.90 | 98 | 1CT : 2CT | |
| PH9385.038NL | PM2155.038NL | 2600 | 3.0 | 40 | 1.00 | 2.20 | 98 | 3CT : 8CT | |
| PH9385.013NL | PM2155.013NL | 2600 | 3.0 | 40 | 1.00 | 2.75 | 98 | 1CT : 3CT | |
| PH9385.027NL | PM2155.027NL | 2600 | 3.0 | 40 | 1.00 | 3.00 | 98 | 2CT : 7CT | |
| PH9385.015NL | PM2155.015NL | 1350 | 3.0 | 30 | 0.80 | 3.20 | 70 | 1CT : 5CT | |

- Notes:**
- The ET Max is calculated to limit the core loss and temperature rise at 200KHz 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:
Copper Loss (W) = I_{rms_Primary}² * DCR_Primary + I_{rms_Secondary}² * DCR_Secondary.
 - To calculate total core loss (W), use the following formula:
Core Loss (W) = 3.93E-10 * (Frequency in kHz)^{1.7} * (180 * [ET/ET Max])^{2.17}
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:
Temperature Rise (°C) = 100 * (Core Loss(W) + Copper Loss (W))
 - The AEC-Q200 temperature and humidity operational life testing was completed using a dielectric strength test of 4000Vdc.
 - Creepage and clearance is in accordance with IEC 61558-1 and IEC61558-2-16 for basic insulation to a working voltage of 750Vpk, based on material group III, pollution degree 2, OVC II and 5000m altitude.
 - 600Vpk rated voltage is based on a positive partial discharge test (discharge < 10pC), in accordance with IEC60664 for basic insulation.
 - The PM2155.XXXNLT 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.

Mechanical

Schematic

PH9385.0XXNLT and PM2155.0XXNLT



Weight2.5/grams
Tray80/tray

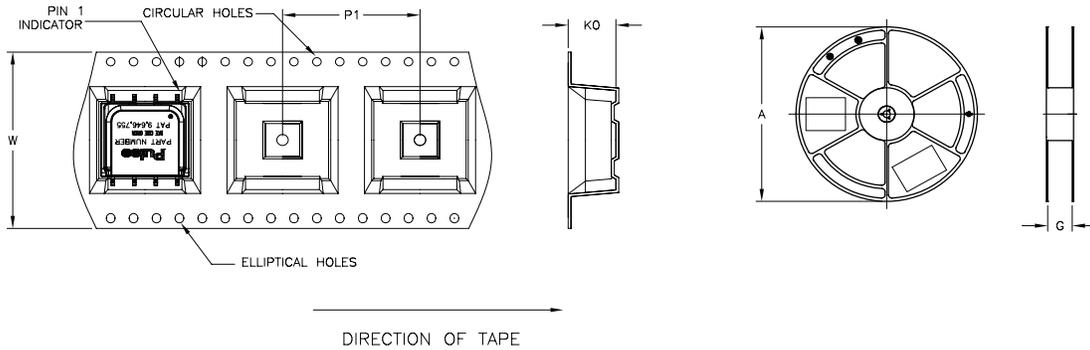
Dimensions: $\frac{\text{Inches}}{\text{mm}}$

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

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TAPE & REEL INFO

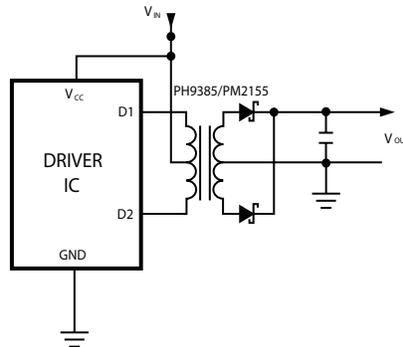


SURFACE MOUNTING TYPE, REEL/TAPE LIST

| PART NUMBER | REEL SIZE (mm) | | TAPE SIZE (mm) | | | QTY |
|-----------------------------|----------------|------|----------------|----|----------------|----------|
| | A | G | P ₁ | W | K ₀ | PCS/REEL |
| PH9385.XXXNLT/PM2155.XXXNLT | Ø330 | 32.4 | 24 | 32 | 8.3 | 300 |

APPLICATION

PH9385.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 2.5W) from a low voltage source. A typical implementation would be an isolated RS-485 power supply driver circuit, the design is compatible with the MAXIM™ MAX253 IC. Other IC's include Texas SN6501 UCC2808, Analog ADuM4070, ADuM447x. 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 range can be extended by implementing different topologies such as forward or bridge and can be used with controllers offered by different IC vendors for a number of different applications.

For More Information:

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