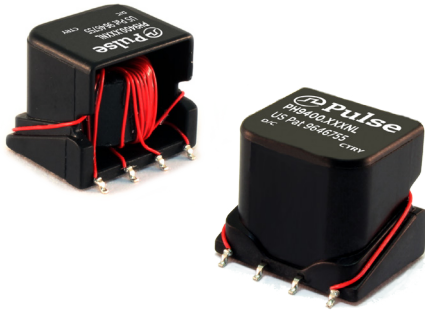


High Isolation Gate Drive Transformers

PH9400.XXXNL and PH9400.XXXANL - SMT



- Basic and Reinforced Insulation
- Sidecar package with 12mm creepage
- Up to 5000Vrms gate to drive isolation
- 1000Vrms continuous isolation between windings
- Up to 8W of Driver Power
- Patented:** US Patent 9,646,755

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

| Part Number | Turns Ratio | ET (1-4) (V * μsec MAX) | Core Loss Factor K1 | Primary Inductance (1-4) (mH +/-35%) | Leakage Inductance Drive to Gate (μH MAX) | Parasitic Capacitance Drive to Gate (pF MAX) | DCR Drive (1-4) (Ω MAX) | DCR Gates (5-6) (7-8) (Ω MAX) | Hi-Pot | |
|--|-------------|----------------------------|---------------------|---|--|---|----------------------------|-------------------------------------|-------------------|------------------|
| | | | | | | | | | Drive-Gate (Vrms) | Gate-Gate (Vrms) |
| PH9400.XXXNL - Basic Insulation 600Vrms continuous isolation | | | | | | | | | | |
| PH9400.111NL | 1:1:1 | 315 | 0.67 | 4.5 | 5.0 | 60 | 1.8 | 2.5 | 4000 | 1500 |
| PH9400.566NL | 5:6:6 | 315 | 0.67 | 4.5 | 3.5 | 60 | 1.8 | 3.0 | 4000 | 1500 |
| PH9400.122NL | 1:2:2 | 250 | 0.84 | 2.88 | 3.5 | 60 | 1.5 | 4.2 | 4000 | 1500 |
| PH9400.655NL | 6:5:5 | 375 | 0.56 | 6.48 | 5.3 | 60 | 2.2 | 2.5 | 4000 | 1500 |
| PH9400.211NL | 2:1:1 | 375 | 0.56 | 6.48 | 8.0 | 60 | 2.2 | 1.6 | 4000 | 1500 |
| PH9400.XXXANL - Reinforced Insulation 1000Vrms continuous isolation | | | | | | | | | | |
| PH9400.111ANL | 1:1:1 | 160 | 1.32 | 1.21 | 2.5 | 45 | 0.9 | 0.9 | 5000 | 2000 |
| PH9400.566ANL | 5:6:6 | 155 | 1.36 | 1.12 | 3.0 | 45 | 0.9 | 1.0 | 5000 | 2000 |
| PH9400.233ANL | 2:3:3 | 125 | 1.68 | 0.72 | 2.0 | 45 | 0.7 | 1.0 | 5000 | 2000 |
| PH9400.655ANL | 6:5:5 | 185 | 1.14 | 1.62 | 3.0 | 45 | 1.0 | 0.9 | 5000 | 2000 |
| PH9400.211ANL | 2:1:1 | 185 | 1.14 | 1.62 | 3.5 | 45 | 1.0 | 0.55 | 5000 | 2000 |

Notes:

- The max ET is calculated to limit the core loss and temperature rise at 100kHz based on a bipolar flux swing of 2100Ga Peak. This value needs to be derated for higher frequencies using the temperature rise calculation.
- The temperature rise of the component is calculated based on the total core loss and copper loss:
 - To calculate total copper loss (W), use the following formula:
Copper Loss (W) = $I_{rms}^2 * (DCR_Drive + (\# \text{ of Gates}) * DCR_Gates)$
 - To calculate total core loss (W), use the following formula:
Copper Loss (W) = $5.1E-10 * (\text{Frequency in kHz})^{1.42} * (K1 * ET)^{2.5}$
Where ET = $(V * \text{Duty Cycle}) / \text{Frequency}$
 - To calculate temperature rise, use the following formula:
Temperature Rise (°C) = $71 * (\text{Core Loss}(W) + \text{Copper Loss}(W))$
- Continuous isolation voltage confirmed by 125°C/1000hrs accelerated aging with the bias voltage applied between gate and drive windings.
- ANL versions, which use triple insulated wire on both the drive and gate windings, are compliant with IEC 60950, IEC 61558, IEC 61010 & IEC 60601 for reinforced insulation.
NL versions, which use triple insulated wire on just the drive winding, comply with basic insulation requirements.
- 12mm package creepage distance satisfies IEC60950-1 & IEC61558-1/-2-16 reinforced insulation requirements for working voltage to 600Vrms max, OVC II, Pollution Degree 2 and altitude up to 2000m.
- Unless otherwise specified, all testing is made at 100kHz, 0.1V_{ac}.
- Optional Tape & Reel packaging can be ordered by adding a "T" suffix to the part number (i.e. PH9400.111NL becomes PH9400.111NLT). Pulse complies to industry standard tape and reel specification EIA481.

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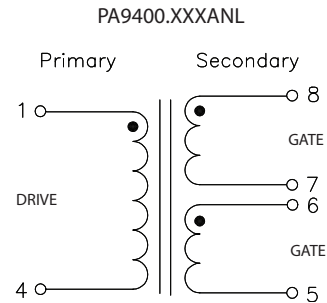
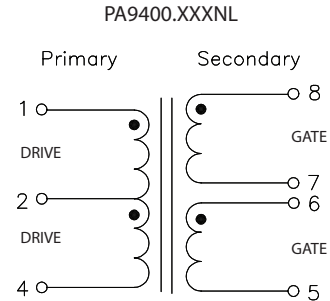
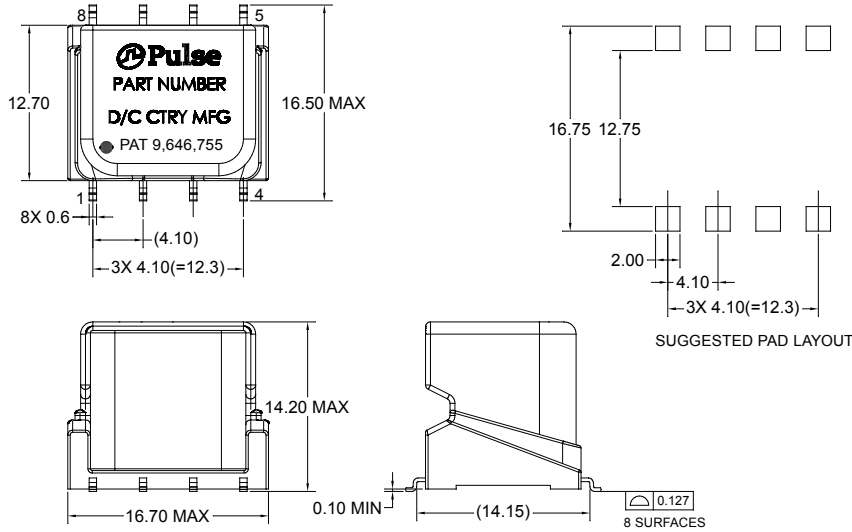
PH9400.XXXNL and PH9400.XXXANL - SMT



Mechanicals

Schematics

PH9400.XXXNL and PH9400.XXXANL



Weight2.5 grams
Tape & Reel150/Reel
Tray80/tray

Dimension: $\frac{\text{Inches}}{\text{mm}}$
 Unless otherwise specified, all tolerances are $\pm \frac{.010}{0,25}$

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