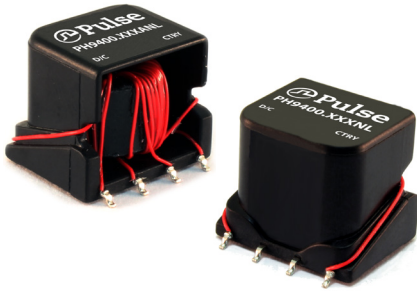






# High Isolation Gate Drive Transformers

PH9400.XXXNL and PH9400.XXXANL - SMT



-  Basic and Reinforced Insulation
-  Patent Pending Sidecar package with 12mm creepage
-  Up to 5000Vrms gate to drive isolation
-  600Vrms Voltage rating

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

Part Number	Turns Ratio	ET (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)
<b>PH9400.XXXNL - Basic Insulation</b>										
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
<b>PH9400.XXXANL - Reinforced Insulation</b>										
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) =  $71 * (\text{Core Loss}(W) + \text{Copper Loss}(W))$
  - 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<sub>AC</sub>.
  - 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.

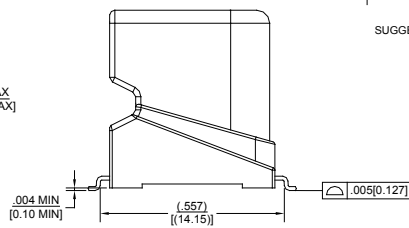
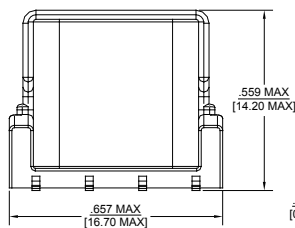
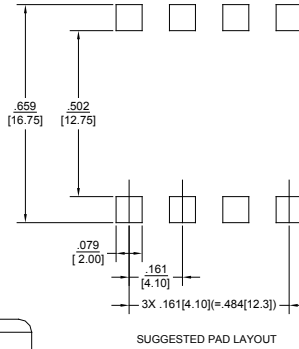
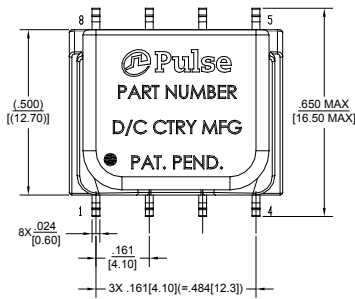
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PH9400.XXXNL and PH9400.XXXANL - SMT

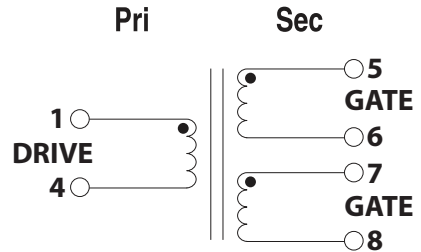
## Mechanicals

## Schematics

### PH9400.XXXNL and PH9400.XXXANL



### PH9400.XXXNL/PH9400.XXXANL



Weight .....2.5 grams  
Tape & Reel .....150/Reel  
Tray .....80/tray

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

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