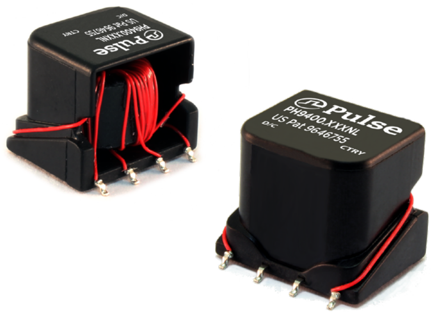
High Isolation Gate Drive Transformers

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

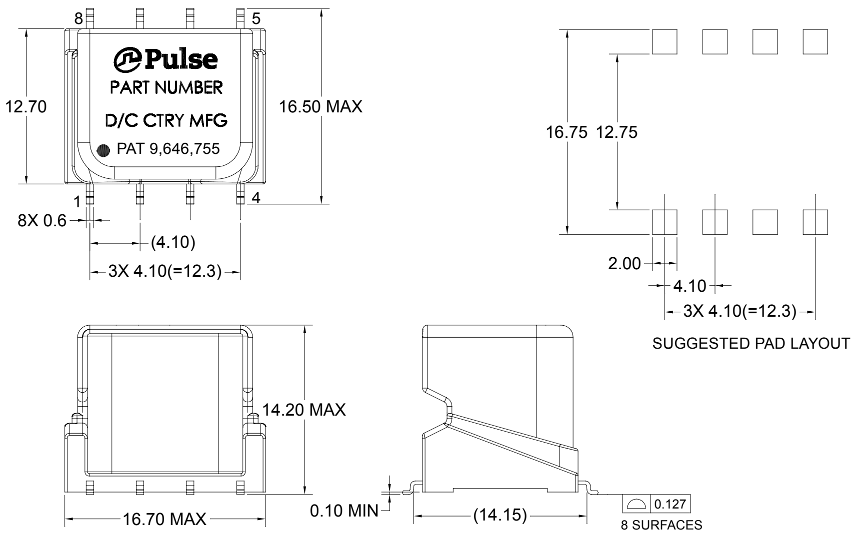
Notes:

1. 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.
2. The temperature rise of the component is calculated based on the total core loss and copper loss:
   A. To calculate total copper loss (W), use the following formula:
      Copper Loss (W) = $Irms^2$ * (DCR_Drive + (# of Gates) * DCR_Gates)
   B. To calculate total core loss (W), use the following formula:
      Core Loss (W) = 5.1E-10 * $(\text{Frequency in kHz})^{1.42}$ * $(K1 * ET)^{2.5}$
      Where ET = (V * Duty Cycle) / Frequency
   C. To calculate temperature rise, use the following formula:
      Temperature Rise (°C) = 71 * (Core Loss(W) + Copper Loss (W))
3. Continuous isolation voltage confirmed by 125°C/1000hrs accelerated aging with the bias voltage applied between gate and drive windings.
4. 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.
5. 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.
6. Unless otherwise specified, all testing is made at 100kHz, $0.1V_{AC}$.
7. Optional Tape & Reel packaging can be ordered by adding a "**T**" suffix to the part number (i.e. PH9400.111NL becomes PH9400.111NL**T**). Pulse complies to industry standard tape and reel specification EIA481.

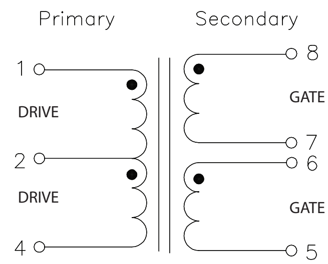
Mechanicals

Schematics

PH9400.XXXNL and PH9400.XXXANL



PA9400.XXXNL



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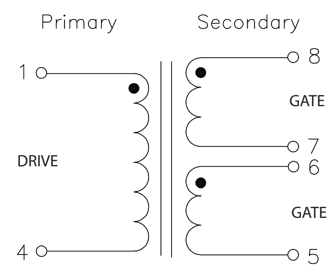

Weight ....2.5 grams
Tape & Reel 150/Reel
Tray 80/tray

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

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

For More Information

Pulse Worldwide Headquarters
15255 Innovation Drive Ste 100
San Diego, CA 92128
U.S.A.

Tel: 858 674 8100
Fax: 858 674 8262

Pulse Europe
Pulse Electronics GmbH
Am Rottland 12
58540 Meinerzhagen
Germany

Tel: 49 2354 777 100
Fax: 49 2354 777 168

Pulse China Headquarters
Pulse Electronics (ShenZhen) CO., LTD
D708, Shenzhen Academy of
Aerospace Technology,
The 10th Keji South Road,
Nanshan District, Shenzhen,
P.R. China 518057

Tel: 86 755 33966678
Fax: 86 755 33966700

Pulse North China
Room 2704/2705
Super Ocean Finance Ctr.
2067 Yan An Road West
Shanghai 200336
China

Tel: 86 21 62787060
Fax: 86 2162786973

Pulse South Asia
3 Fraser Street 0428
DUO Tower
Singapore 189352

Tel: 65 6287 8998
Fax: 65 6280 0080

Pulse North Asia
1F., No.111 Xiyuan Road
Zhongli District
Taoyuan City 32057
Taiwan (R.O.C)

Tel: 886 3 4356768
Fax: 886 3 4356820