

# Isolation Power Transformers

Toroid Platform SMD - PH9385.XXXNL and PM2155.XXXNL



- 🔌 Push Pull Converter Transformer
- 🔌 IEC 60950 and 61558 basic insulation
- 🔌 Compliant, 12mm creepage  
4KVrms isolation (600Vrms continuous)
- 🔌 **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) (Ω MAX)	DCR (5-8) (Ω MAX)	ET (1-4) <sup>1</sup> (V-μsec Max)	Turns Ratio (1:4) (8:5)	Isolated Voltage <sup>2</sup> (Vrms)
Commerical	Automotive <sup>8</sup>	(μH ±35%)	(μH MAX)	(pF MAX)					
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	

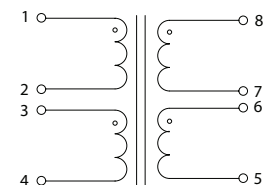
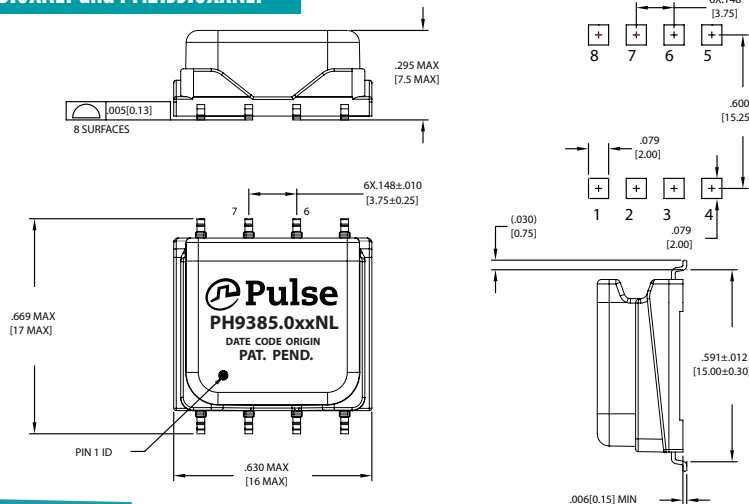
### Notes:

- 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<sub>rms\_Primary</sub><sup>2</sup> \* DCR\_Primary + I<sub>rms\_Secondary</sub><sup>2</sup> \* DCR\_Secondary.
  - To calculate total core loss (W), use the following formula:  
Core Loss (W) = 3.93E-10 \* (Frequency in kHz)<sup>1.7</sup> \* (180 \* [ET/ET Max])<sup>2.17</sup>  
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.
- Optional Tape & Reel packing can be ordered by adding a "T" suffix to the part number (i.e. PH9385.011NL becomes PH9385.011NLT). Pulse complies to industry standard tape and reel specification EIA481.
- The "NL" suffix indicates an RoHS-compliant part number.
- Continuous isolation voltage confirmed by 125°C/1000hrs accelerated aging with the bias voltage applied between primary and secondary windings.
- The PM2155.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.

## Mechanical

## Schematic

### PH9385.0XXNL and PM2155.0XXNL



Weight .....2.5/grams  
Tray .....80/tray

Dimensions: Inches  
mm

Unless otherwise specified,  
all tolerances are ±  $\frac{.010}{.025}$

# Isolation Power Transformers

Toroid Platform SMD - PH9385.XXXNLT and PM2155.XXXNLT

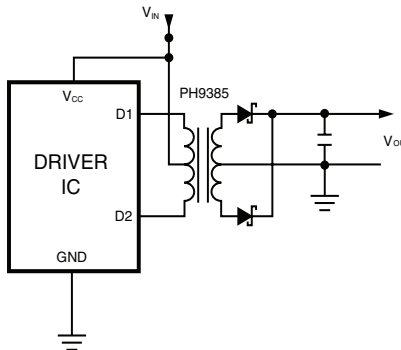
## TAPE & REEL INFO



SURFACE MOUNTING TYPE, REEL/TAPE LIST						
PART NUMBER	REEL SIZE (mm)		TAPE SIZE (mm)			QTY
	A	G	P <sub>1</sub>	W	K <sub>0</sub>	PCS/REEL
PH9385.XXXNLT/PM2155.XXXNLT	Ø330	32.4	24	32	8.3	300

## APPLICATION

PH9385.XXXNLT 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

### Pulse Worldwide Headquarters

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

### Pulse Europe

Pulse Electronics GmbH  
Am Rottland 12  
58540 Meinerzhagen  
Germany

### 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

### Pulse North China

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

### Pulse South Asia

3 Fraser Street  
0428 DUO Tower  
Singapore 189352

### Pulse North Asia

1F., No.111 Xiyuan Rd  
Zhongli City  
Taoyuan City 32057  
Taiwan (R.O.C)

Tel: 858 674 8100  
Fax: 858 674 8262

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

Tel: 86 755 33966678  
Fax: 86 755 33966700

Tel: 86 21 62787060  
Fax: 86 2162786973

Tel: 65 6287 8998  
Fax: 65 6280 0080

Tel: 886 3 4356768  
Fax: 886 3 4356820

Performance warranty of products offered on this data sheet is limited to the parameters specified. Data is subject to change without notice. Other brand and product names mentioned herein may be trademarks or registered trademarks of their respective owners. © Copyright, 2019. Pulse Electronics, Inc. All rights reserved.

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)  
Email: org@lifeelectronics.ru