YAGEO GROUP PULSE

- *Up to 3W LLC/SiC & GaN drive Transformer*
- *Reinforced insulation, 12mm creepage & 7.4mm clearance[3]*
- *Up to 4200Vrms Hi-Pot isolation voltage*
- *Up to 1250Vpk rated voltage[4]*
- *Footprint: 17.2 x 11x 8.5mm MAX*

Electrical Specifications @ 25°C - Operating Temperature -40°C to +125°C									
Part Number	Inductance (1-3) (uH)	Leakage Inductance (uH Typ)	Capacitance (1,3) to (6,4) (pF MAX)	DCR (1-3) (Ω Max)	DCR (6-4) (Ω Max)	E*T(1-3)[1] (V*uSec Max)	Turns Ratio ±3.0%	Core Loss Factor K1	Hi-Pot Voltage (Vrms)
PMT6709NLT	23.5 ±25%	3.45	2.5	0.23	1.66	27	1 : 3.64	7.5	3750
PHT7249NLT	45 ±45%	1.4	2.5	0.12	0.20	17	1 : 1.67	12.3	4200

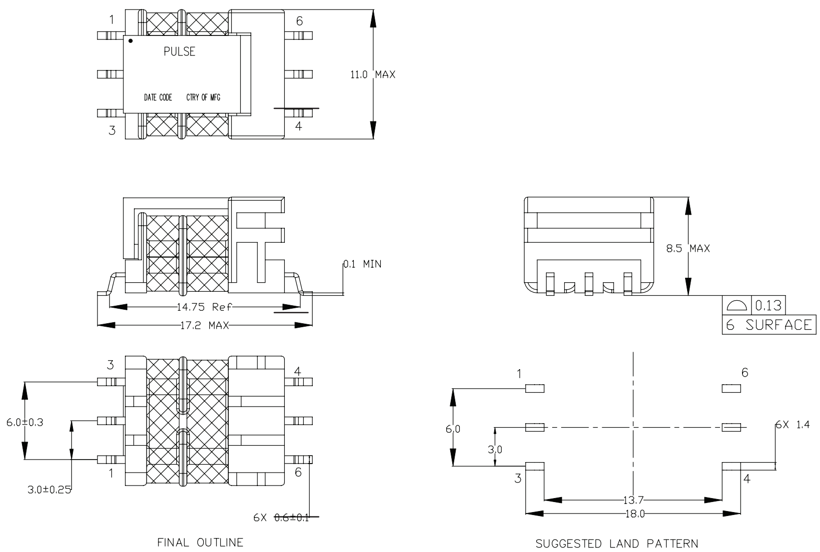
Notes:

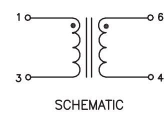
1. The ET Max is calculated to limit the core loss and temperature rise at 200KHz, based on a bipolar flux swing of 210mT Peak.
2. The applied ET may need to be further derated for higher frequencies based on the temperature rise which results from the core and copper losses
   A. To calculate total copper loss (W), use the following formula:
   Copper Loss (W)=Irms_Primary^2*DCR_Primary+Irms_Secondary^2*DCR_Secondary
   B. To calculate total core loss (W), use the following formula:
   Core Loss(W) = 9.738E-12*f$^{1.878}$*(E*T*K1)$^{2.52}$
   Where f is the working frequency in KHz, E*T is the voltage*times in V*uSecond, K1 is the Core Loss factor.
   C. To calculate temperature rise, use the following formula: Temperature Rise (°C) =125*(Core Loss(W)+Copper Loss (W))
3. The creepage and clearance distances satisfy the requirements of IEC61558-1, based on pollution degree 2, OVCII & 2000m altitude, for the following working voltages and insulations.
   PMT6709NLT: 450Vrms Reinforced, 900Vrms Basic (MGIII)
   PHT7249NLT: 900Vrms Reinforced, 1250Vrms Basic (MGI)
4. Rated voltage is based on a positive partial discharge test (discharge < 10pC) for PHT7249NLT, in accordance with IEC60664 for basic insulation. Refer to the partial discharge profiles on pages 3 & 4 for rated voltages of each part, in applications that require basic/reinforced insulation
5. These products are automotive ready, but have not completed AEC-Q200 qualification testing. Please contact your Yageo representative to discuss your IATF or other turns ratio requirements

Mechanical

Schematic

PMT6709NLT, PHT7249NLT

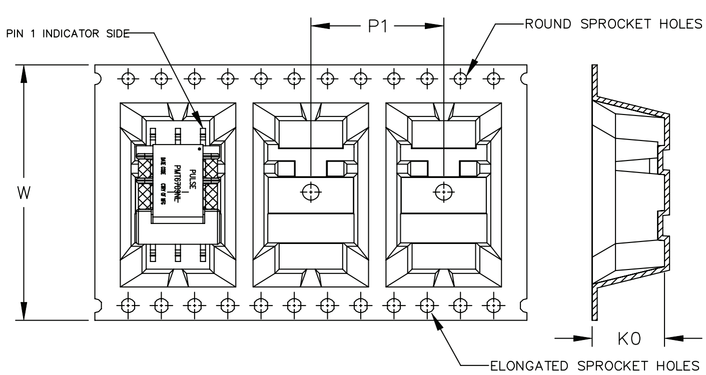


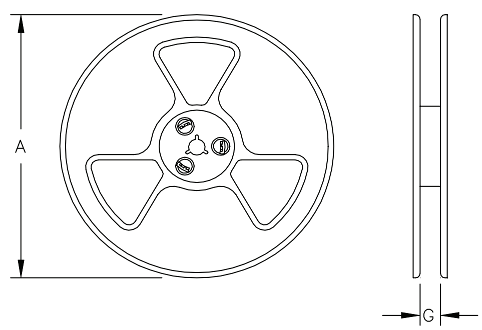


Weight 1.6grams

Dimensions: mm
Unless otherwise specified,
all tolerances are±0.25

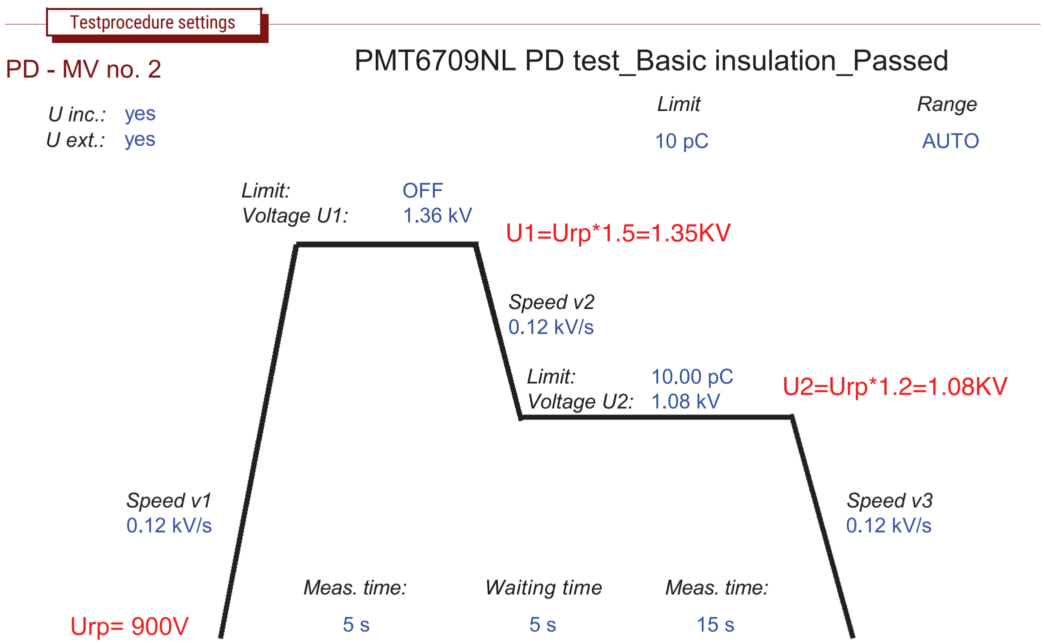
TAPE & REEL INFO

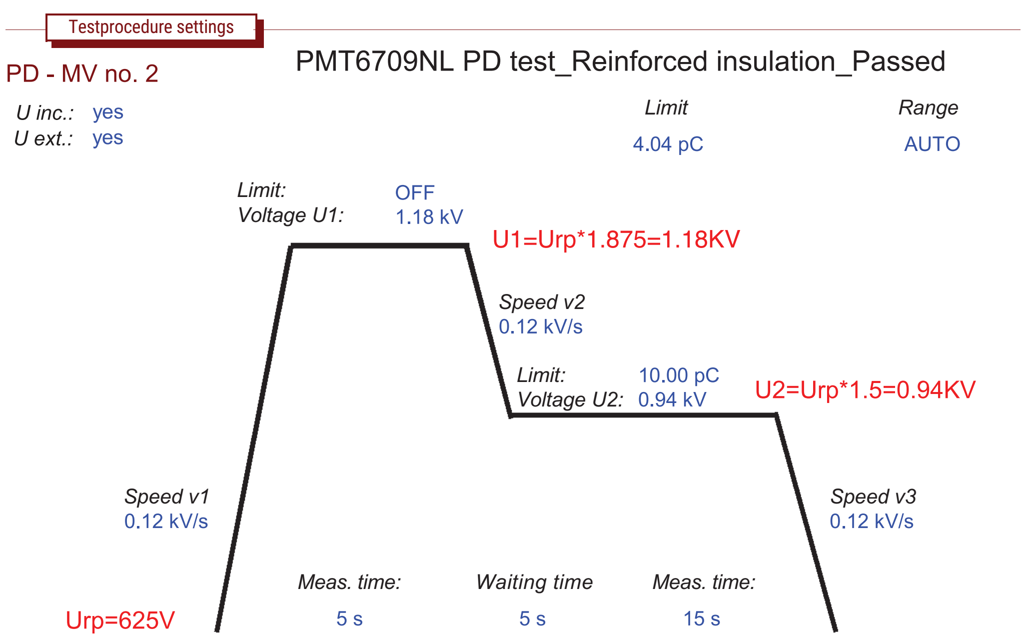




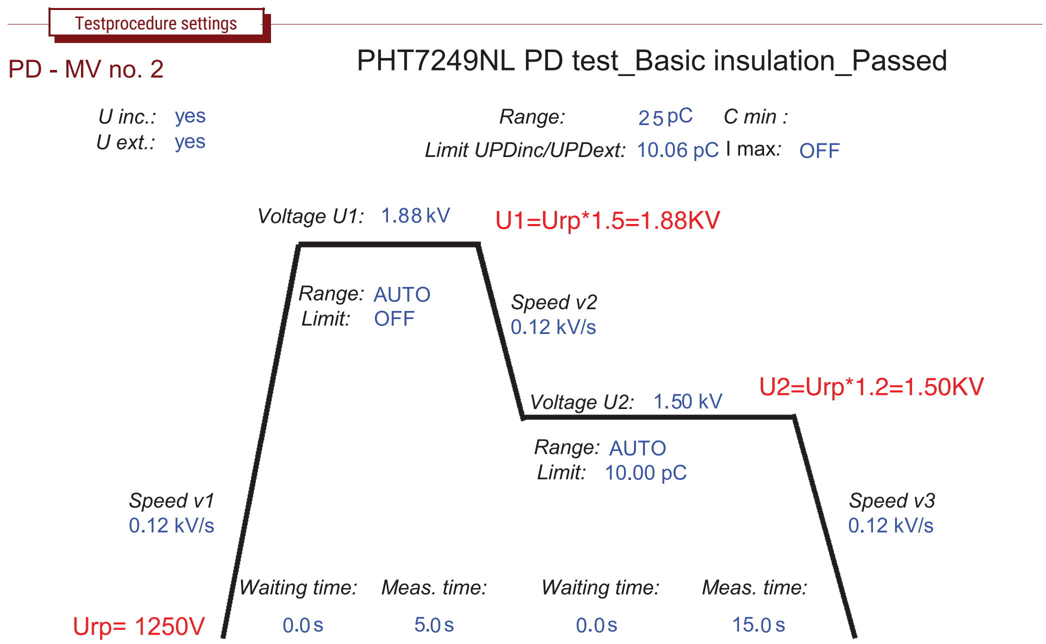
SURFACE MOUNTING TYPE, REEL/TAPE LIST						
PART NUMBER	REEL SIZE (mm)		TAPE SIZE (mm)			QTY
	A	G	P_1	W	K_0	PCS/REEL
PMT6709NLT, PHT7249NLT	Ø330	32.4	16	32	8.7	350

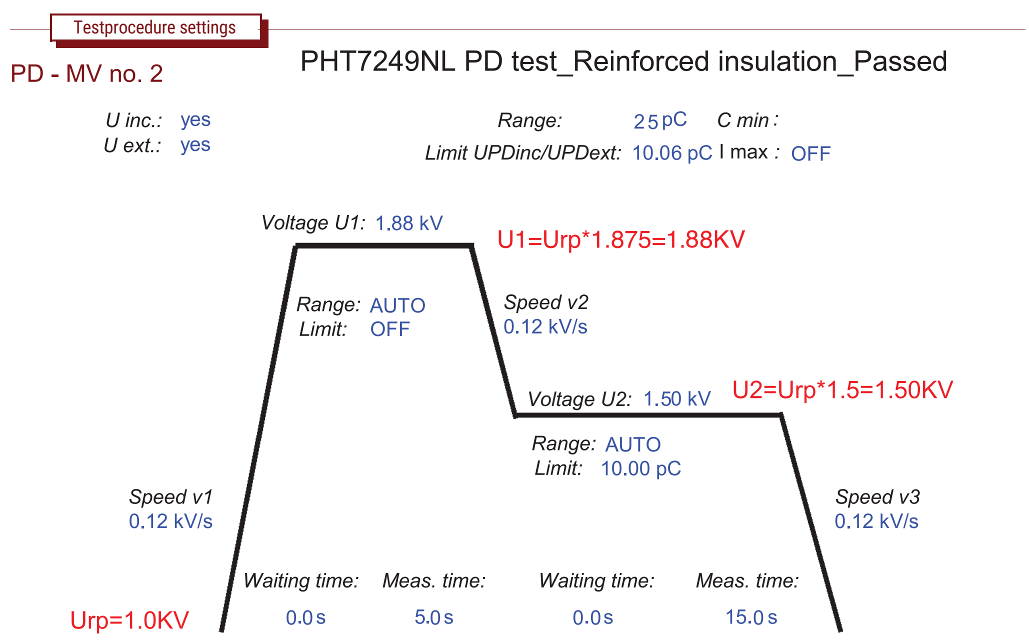
Partial Discharge Test Profile





Partial Discharge Test Profile



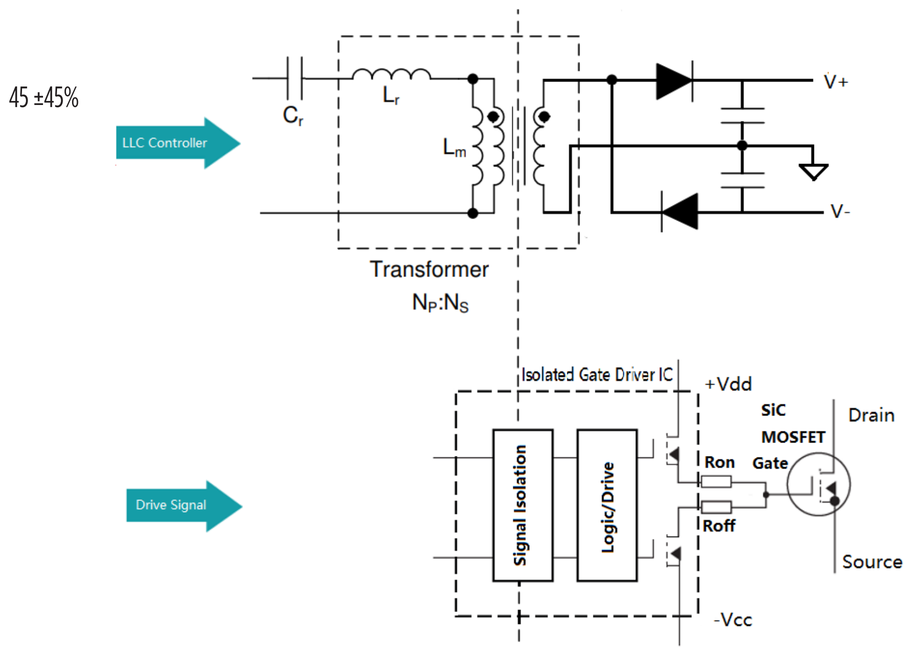


Application Note

Flyback and Push-Pull topologies have been widely used for MOSFET drive circuits. Tight coupling is necessary to minimise transformer leakage inductance, which enhances the efficiency of the drive circuit. However a tightly coupled transformer design results in relatively high interwinding capacitance, limiting higher switching frequency and the full utilisation of the benefits of using SiC/GaN Mosfets. Thus, it is difficult to simultaneously have low leakage inductance and low interwinding capacitance in a transformer.

This points to the significant benefit when using the LLC topology where a relatively high leakage inductance can be used as part of the resonant circuit, even replacing the need for an external resonant inductor. PMT6709NLT and PHT7249NLT utilize a two-section bobbin, which naturally minimizes the interwinding capacitance while the leakage inductance increases to a level which contributes to the resonant inductance. The low capacitance enables an order of magnitude reduction in the common-mode current injection through the bias transformer, making this solution ideal for high frequency switching SiC/GaN Mosfet drive circuits. The soft-switching feature further reduces the EMI noise.

The below circuit shows how the LLC transformer can be used to provide positive and negative voltages for SiC/GaN device switching. The voltage required across the gate-source terminals of a SiC/Gan MOSFET is typically in the range of 14 to 20 V for full turn-on and 0 to -5 V for robust turn-off. PMT6709NLT and PHT7249NLT are suitable for this circuit and compatible with LLC controllers such as the TI UCC25800-Q1



In addition to the providing galvanic isolation between the high-voltage and low-voltage sides, the purpose of the transformer is to satisfy the requirements of the relevant safety standards. PMT6709NL and PHT7249NL are designed to comply with the IEC61558-1 & -2/16 for basic and reinforced insulation. Refer to note 3 on page 1 for the working voltages that correspond to the 12mm creepage distance, based on pollution degree 2, OVCII & 2000m altitude. Contact your Pulse Electronics representative for other required output voltages and safety requirements.