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Isolation Power Transformers

Toroid Platform SMD PH9085.XXXNL and PM2180.XXXNL

Pulse a YAGEO company



- *Push Pull Converter Transformer*
- *Functional insulation for isolated power supply driver*
- *2.5KVrms isolation (380Vrms continuous)*

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

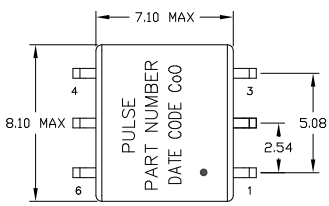
Part Number		Inductance (1-3) (µH ±35%)	Leakage Inductance (1-3) with (4-6) shorted (µH MAX)	Capacitance (1, 2, 3) to (4, 5, 6) (pF MAX)	DCR (1-3) (Ω MAX)	DCR (4-6) (Ω MAX)	ET MAX (1-3)[1] (V-µsec Max)	Turns Ratio (1:3) (6:4)	Isolated Voltage (Vrms)
Commerical	Automotive[5]								
PH9085.011NL	PM2180.011NL	1020	0.8	30	0.60	0.65	22	1CT : 1CT	
PH9085.012NL	PM2180.012NL	1020	0.6	40	0.85	1.60	22	1CT : 2CT	
PH9085.021NL	PM2180.021NL	1160	1.6	20	0.60	0.35	23.6	2CT : 1CT	
PH9085.034NL	PM2180.034NL	1020	0.6	40	0.60	0.75	22	3CT : 4CT	
PH9085.035NL	PM2180.035NL	1020	0.6	40	0.80	1.20	22	3CT : 5CT	2500
PH9085.038NL	PM2180.038NL	1020	0.7	40	0.85	2.00	22	3CT : 8CT	
PH9085.043NL	PM2180.043NL	1160	0.8	30	0.60	0.50	23.6	4CT : 3CT	
PH9085.083NL	PM2180.083NL	1160	2.0	15	0.60	0.30	23.6	8CT : 3CT	
PH9085.089NL	PM2180.089NL	1160	0.6	40	0.60	0.70	23.6	8CT :9CT	

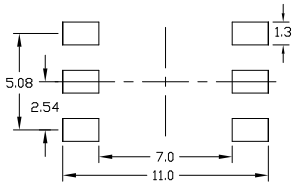
Notes:

1. The ET Max is calculated to limit the core loss and temperature rise at 420KHz based on a bipolar flux swing of 210mT Peak.
2. 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.
3. 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) = 6.55E-12 * (Frequency in kHz)$^{1.68}$ * (210 * [ET/ET Max])$^{2.55}$
   Where ET is the applied Volt Second, ET Max is the rated Volt Second for 210mT flux swing
   C. To calculate temperature rise, use the following formula: Temperature Rise (°C) = 140 * (Core Loss(W) + Copper Loss (W))
4. Continuous isolation voltage confirmed by 125°C/1000hrs accelerated aging with the bias voltage applied between primary and secondary windings..
5. The PM2180.XXXNL part numbers are AEC-Q200 and IATF16949 certified. The mechanical dimensions are 100% tested in production but do not necessarily meet aproduct capability index (Cpk) >1.33 and therefore may not strictly conform to PPAP.

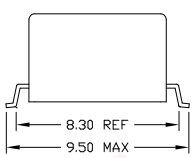
Mechanical

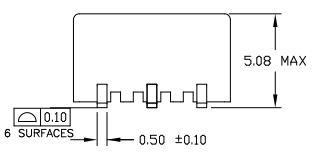
PH9085.XXXNL and PM2180.XXXNL





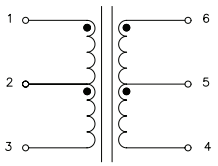
SUGGESTED LAND PATTERN





FINAL OUTLINE

Schematic



SCHEMATIC

Weight 0.365grams
Tape & Reel 700/reel
Tray 55/tray
Dimensions: mm
Unless otherwise specified, all tolerances are±0.25

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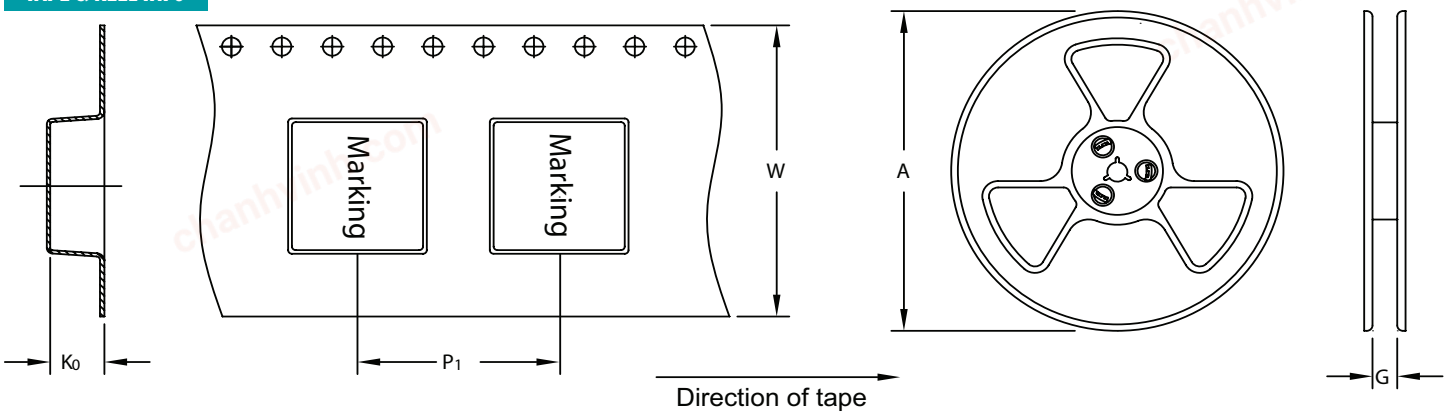
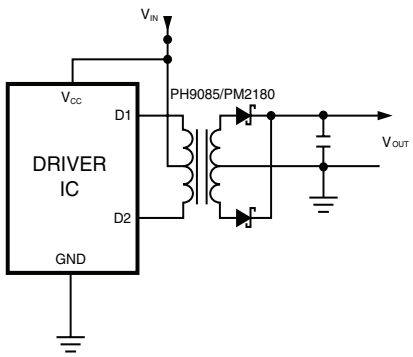
TAPE & REEL INFO



SURFACE MOUNTING TYPE, REEL/TAPE LIST						
PART NUMBER	REEL SIZE (mm)		TAPE SIZE (mm)			QTY
	A	G	P_1	W	K_0	PCS/REEL
PH9085.XXXNLT/PM2180.XXXNLT	Ø330	16.4	12	16	6.6	700

APPLICATION

PH9085.XXXNL 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 2W) from a low voltage source. A typical implementation would be an isolated RS-485/RS-232 power supply driver circuit, the design is compatible with the MAXIM™ MAX253 IC.
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.

MAXIM is a registered trademark of Maxim Integrated Products.

For More Information:
Americas - prodinfo_power@pulseelectronics.com | **Europe -** power-apps-europe@pulseelectronics.com | **Asia -** power-apps-asia@pulseelectronics.com

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