

# LAN3VSOP

## 2.5G BASE-T LAN transformer, PoE



Photo is representative

### Product features

- IEEE 802.3bz, 802.3.at compliant
- 1500 Vac isolation between primary and secondary
- Dual port, PoE, CMC/xfrm/CMC structure
- Toroid core winding, open header, surface mount
- Weight 4.28 g typical
- Moisture sensitivity level (MSL): 1

### Applications

- SELV/ELV equipment
- IP telephones
- Wireless LAN access point
- IoT, Remote monitoring
- Smart TV
- Network camera
- Data centers

### Environmental compliance and general specifications

- Operating ambient temperature range: -40 °C to +85 °C
- Storage temperature range (component): -40 °C to +125 °C



**Product specifications** (+25 °C)

Meets IEEE 802.3 at Standards 1150 mA current capability Per PoE Port /Two-pair.

| Part number <sup>4</sup> | Port | Pins | Inductance <sup>1,5</sup><br>( $\mu$ H) | Leakage inductance <sup>1,5</sup><br>( $\mu$ H) | DCR <sup>2,5</sup><br>( $\Omega$ ) | CWW <sup>1,5</sup><br>(pF) | Turns Ratio <sup>3</sup> | Insertion loss <sup>3,5</sup><br>(dB) | Return loss <sup>3,5</sup><br>(dB) | Cross talk <sup>5</sup><br>(dB) (between each channel) | CMRR <sup>3,5</sup><br>(dB) | DCMR <sup>3,5</sup><br>(dB) |
|--------------------------|------|------|---|---|------------------------------------|----------------------------|--------------------------|---------------------------------------|------------------------------------|--|-----------------------------|-----------------------------|
| LAN3VSOPD48151C2*        | Dual | 48   | 180 @ 0 mA DC Bias                      | 0.5   | 1.0 (Sec)<br>1.6 (Pri)             | 35                         | 1CT:1CT,<br>$\pm 2\%$    | -1 @ 1-100 MHz                        | -20 @ 1-40 MHz                     | -32 @ 10-100 MHz                                       | -14 @ 10-200 MHz            | -26 @ 10-200 MHz            |
|                          |      |      | 150 @ 15 mA DC Bias                     |   |                                    |                            |                          | -1.5 @ 100-200 MHz                    | -20+15*log(f/40) @ 40-200 MHz      | -25 @ 100-200 MHz                                      | -8 @ 200-500 MHz            | -16 @ 200-500 MHz           |

1. Inductance (Transformer side), Leakage Inductance (Transformer side, short CMC side), CWW (Interwinding capacitance, Pri to Sec): Test parameters: 100 kHz, 0.2 V

2. DCR: CMC side

3. Turns ratio, Insertion loss, return loss, DCMR (Differential to common mode rejection) and CMRR (Common mode rejection ratio): Primary to secondary: Polarity pin 1 side in phase

\*= Operating temperature: (temperature rise not included) -40 °C to +85 °C

LAN3VSOPD48151C2: temperature rise  $\leq$  50 °C

Hipot: 1500 Vac primary to secondary

4. Part number definition: LAN3VSOPxxx151xx

LAN3VSOP= Product code

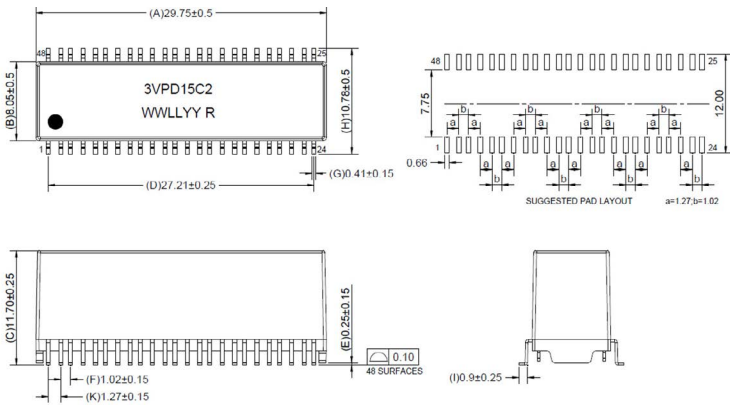
xxx: D48 = Dual port, 48 pin

xx: C2 = -40 to +85 °C

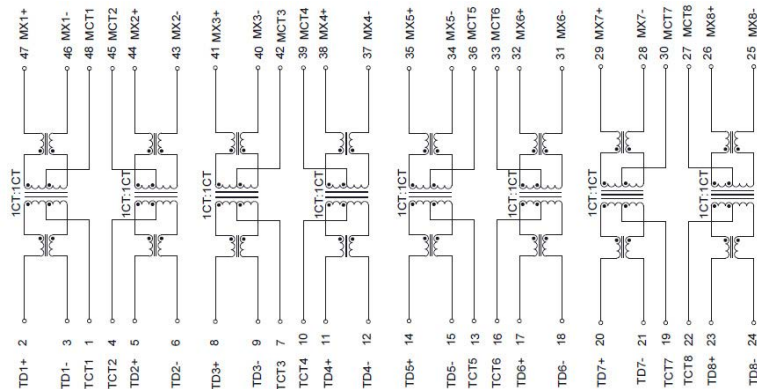
5. DCR, CWW, Leakage inductance and Insertion loss values are maximum; Inductance, Return loss, CMRR, DCMR and Cross talk values are minimum

**Mechanical parameters (mm)**

**LAN3VSOPD48151C2**



**Schematic**



Part marking: 3VPD15C2, WWLLYY R = Lot code, Dot indicates pin 1

Pin length does not include include solder point

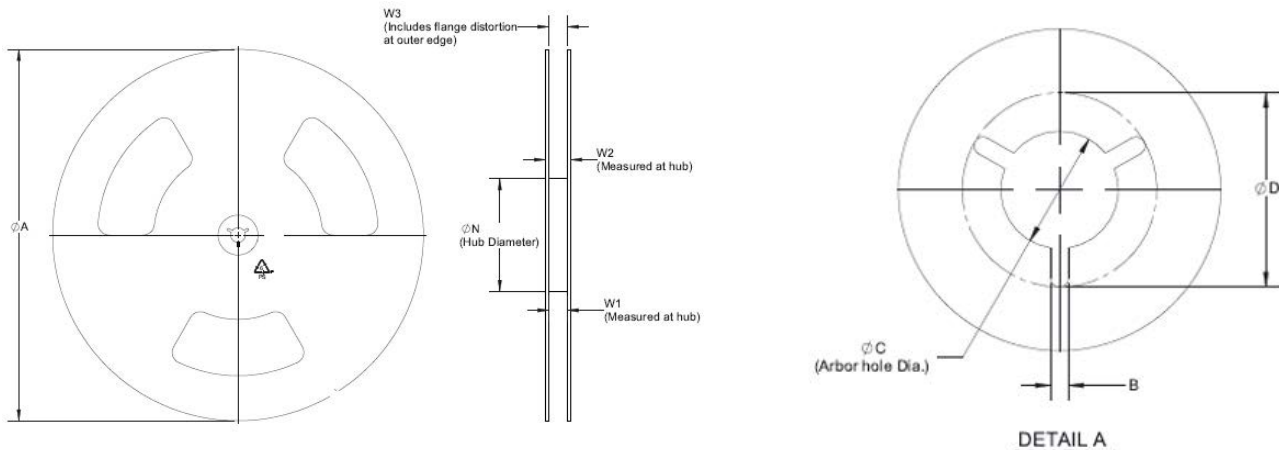
Silkscreen thickness: 0.1 mm to 0.15 mm

Traces or vias underneath the transformer is not recommended

**Packaging information (mm)**

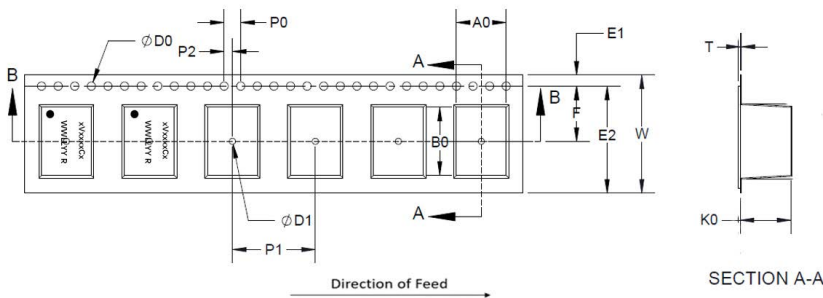
Drawing not to scale

Supplied in tape and reel packaging on a 13" diameter reel, EIA-481 compliant



**Reel dimension (mm)**

| Part number      | $\varnothing A$ | B       | $\varnothing C$   | $\varnothing D$ | $\varnothing N$ | W1              | W2       | W3  |
|------------------|-----------------|---------|-------------------|-----------------|-----------------|-----------------|----------|-----|
| LAN3VSOPD48151C2 | $330 \pm 2$     | 1.5 min | $13 + 0.5 / -0.2$ | 20.2 min        | 100             | $56.4 + 2 / -0$ | 62.4 max | N/A |



**Tape dimension (mm)**

| Part number      | Ao              | Bo             | Ko             | T              | W            | F               | E              | E2        | P0          | P1           | P2          | $\varnothing D0$ | $\varnothing D1$ |
|------------------|-----------------|----------------|----------------|----------------|--------------|-----------------|----------------|-----------|-------------|--------------|-------------|------------------|------------------|
| LAN3VSOPD48151C2 | $11.25 \pm 0.1$ | $30.1 \pm 0.1$ | $12.4 \pm 0.1$ | $0.5 \pm 0.05$ | $56 \pm 0.3$ | $26.2 \pm 0.15$ | $1.75 \pm 0.1$ | 53.85 min | $4 \pm 0.1$ | $24 \pm 0.1$ | $2 \pm 0.1$ | $1.5 + 0.1 / -0$ | 2.0 min          |

**Packaging quantity**

| Part number      | Reel | Bag | Box | Carton |
|------------------|------|-----|-----|--------|
| LAN3VSOPD48151C2 | 190  | 190 | 190 | 760    |

### General specifications

|                           |                          |  |
|---------------------------|--------------------------|--|
| Solderability             | J-STD-002.               | 8 hours steam age test, Solder: +245 °C ± 5 °C (5 s)   |
| Reflow                    | MIL-STD-202G Condition J | +260 °C ± 5 °C, 30 s ± 5 s, 1 times reflow   |
| Resistance soldering heat | MIL-STD-202H, Method 210 | +260 °C , 10 s   |
| Operational life          | MIL-STD-202, Method 108  | 1000 hours, +85 °C @ 1150 mA   |
| Temperature cycling       | MIL-STD-202G             | High temperature= +125 °C, low temperature -40 °C, conversion time 15 minutes, 32 cycles   |
| Biased humidity           | MIL-STD-202G             | +85 °C, 85% RH, Duration= 1000 hours   |
| Vibration                 | MIL-STD-202              | 10 Hz to 80 Hz, Increased at +3 dB/octave, 80 Hz to 350 Hz, 0.053 g <sup>2</sup> /Hz, 350 Hz to 2000 Hz, Decrease at -3 dB/octave, X, Y and Z vibrate for 15 minutes each. |
| Mechanical shock          | MIL-STD-202, Method 213  | Half-sine shock pulse, peak=50 g's, 11 ms, total 18 shocks   |
| Terminal strength         | CBA203A-001              | Standard: 4.5 kg, Minimum: 60 s, no visible damage   |

Solder reflow profile

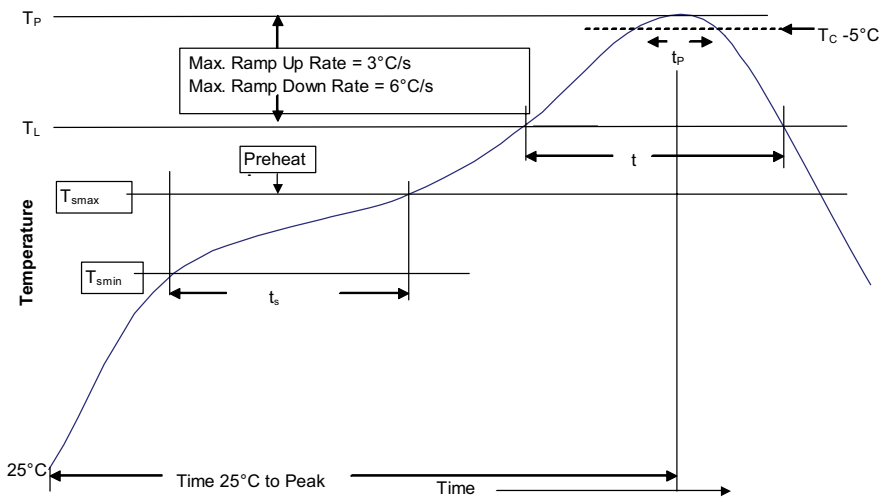


Table 1 - Standard SnPb solder (T<sub>C</sub>)

| Package thickness | Volume mm <sup>3</sup> <350 | Volume mm <sup>3</sup> ≥350 |
|-------------------|-----------------------------|-----------------------------|
| <2.5 mm           | 235 °C                      | 220 °C                      |
| ≥2.5 mm           | 220 °C                      | 220 °C                      |

Table 2 - Lead (Pb) free solder (T<sub>C</sub>)

| Package thickness | Volume mm <sup>3</sup> <350 | Volume mm <sup>3</sup> 350 - 2000 | Volume mm <sup>3</sup> >2000 |
|-------------------|-----------------------------|-----------------------------------|------------------------------|
| <1.6 mm           | 260 °C                      | 260 °C                            | 260 °C                       |
| 1.6 – 2.5 mm      | 260 °C                      | 250 °C                            | 245 °C                       |
| >2.5 mm           | 250 °C                      | 245 °C                            | 245 °C                       |

Reference J-STD-020

| Profile feature   | Standard SnPb solder | Lead (Pb) free solder |
|---|----------------------|-----------------------|
| Preheat and soak  |                      |                       |
| • Temperature min. (T <sub>smin</sub> )   | 100 °C               | 150 °C                |
| • Temperature max. (T <sub>smax</sub> )   | 150 °C               | 200 °C                |
| • Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )                                | 60-120 seconds       | 60-120 seconds        |
| Ramp up rate T <sub>L</sub> to T <sub>p</sub>   | 3 °C/ second max.    | 3 °C/ second max.     |
| Liquidous temperature (T <sub>L</sub> )   | 183 °C               | 217 °C                |
| Time (t <sub>L</sub> ) maintained above T <sub>L</sub>  | 60-150 seconds       | 60-150 seconds        |
| Peak package body temperature (T <sub>p</sub> )*  | Table 1              | Table 2               |
| Time (t <sub>p</sub> )* within 5 °C of the specified classification temperature (T <sub>C</sub> ) | 20 seconds*          | 30 seconds*           |
| Ramp-down rate (T <sub>p</sub> to T <sub>L</sub> )  | 6 °C/ second max.    | 6 °C/ second max.     |
| Time 25 °C to peak temperature  | 6 minutes max.       | 8 minutes max.        |

\* Tolerance for peak profile temperature (T<sub>p</sub>) is defined as a supplier minimum and a user maximum.

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Printed in USA  
Publication No. ELX1377 BU-ELX22245  
October 2023

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