TOPPOWER

# TP2L-3W Series




**DESCRIPTION:** **3W Isolated Wide Input Single And Dual Output DC/DC Converters**

TP2L series are a range of isolated 3 Watt converters in a SIP package, 2:1 wide input range and tightly regulated output voltage qualifies these converters for many cost critical applications in industrial and consumer electronics. Operating temperature range from -40 ºC to 85 ºC .The internal SMD construction makes it possible to offer a product with high performance at low cost.

## FEATURES

| | | |
|---|---|---|
| RoHS compliant | 2:1 wide range voltage input | Continuous short circuit protection |
| Operating temperature: -40ºC to 85ºC | Low regulation | 3KVDC Isolation |
| Efficiency up to 83% | Power density 0.91W/cm$^3$ | Input voltage: 12V, 24V, 48V |
| Output voltage: 3.3V,5V, 9V, 12V, 15V,24V / ±5V, ±9V, ±12V, ±15V | Low noise | External control |

## SELECTION GUIDE

| Part Number | Input | | | Output | | | Efficiency (Typ.) |
|---|---|---|---|---|---|---|---|
| | Voltage(VDC) | | | Voltage | Current(mA) | | |
| | Rated | Range values | Max* | VDC | Max. | Min. | % |
| TP2L12D05S-3W | 12 (2:1) | 9-18 | 22 | ±5 | ±300 | ±30 | 74 |
| TP2L12D09S-3W | 12 (2:1) | 9-18 | 22 | ±9 | ±167 | ±16 | 76 |
| TP2L12D12S-3W | 12 (2:1) | 9-18 | 22 | ±12 | ±125 | ±13 | 78 |
| TP2L12D15S-3W | 12 (2:1) | 9-18 | 22 | ±15 | ±100 | ±10 | 79 |
| TP2L12S03S-3W | 12 (2:1) | 9-18 | 22 | 3.3 | 909 | 91 | 71 |
| TP2L12S05S-3W | 12 (2:1) | 9-18 | 22 | 5 | 600 | 60 | 74 |
| TP2L12S09S-3W | 12 (2:1) | 9-18 | 22 | 9 | 333 | 33 | 76 |
| TP2L12S12S-3W | 12 (2:1) | 9-18 | 22 | 12 | 250 | 25 | 74 |
| TP2L12S15S-3W | 12 (2:1) | 9-18 | 22 | 15 | 200 | 20 | 75 |
| TP2L12S24S-3W | 12 (2:1) | 9-18 | 22 | 24 | 125 | 13 | 78 |
| TP2L24D05S-3W | 24 (2:1) | 18-36 | 40 | ±5 | ±300 | ±30 | 76 |
| TP2L24D09S-3W | 24 (2:1) | 18-36 | 40 | ±9 | ±167 | ±17 | 78 |
| TP2L24D12S-3W | 24 (2:1) | 18-36 | 40 | ±12 | ±125 | ±13 | 79 |
| TP2L24D15S-3W | 24 (2:1) | 18-36 | 40 | ±15 | ±100 | ±10 | 80 |
| TP2L24S03S-3W | 24 (2:1) | 18-36 | 40 | 3.3 | 909 | 91 | 71 |
| TP2L24S05S-3W | 24 (2:1) | 18-36 | 40 | 5 | 600 | 60 | 76 |
| TP2L24S09S-3W | 24 (2:1) | 18-36 | 40 | 9 | 300 | 33 | 78 |
| TP2L24S12S-3W | 24 (2:1) | 18-36 | 40 | 12 | 250 | 25 | 80 |
| TP2L24S15S-3W | 24 (2:1) | 18-36 | 40 | 15 | 200 | 20 | 80 |
| TP2L24S24S-3W | 24 (2:1) | 18-36 | 40 | 24 | 125 | 13 | 82 |
| TP2L48S05S-3W | 48 (2:1) | 36-72 | 80 | 5 | 600 | 60 | 75 |
| TP2L48S12S-3W | 48 (2:1) | 36-72 | 80 | 12 | 250 | 25 | 78 |
| TP2L48S15S-3W | 48 (2:1) | 36-72 | 80 | 15 | 200 | 20 | 80 |



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## COMMON SPECIFICATIONS

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Storage humidity | | | | 95 | % |
| Operating temperature | | -40 | | 85 | ℃ |
| Storage temperature | | -55 | | 125 | ℃ |
| Temp.Rise at full load | | | 15 | | ℃ |
| Lead temperature | 1.5mm from case for 10 seconds | | | 300 | ℃ |
| No-load power consumption | | | 300 | | mW |
| Cooling | | Free Air Convection | | | |
| Short circuit protection | | Continuous.automatic recovery | | | |
| Case material | | Plastic (UL94-V0) | | | |
| MTBF | | 1000 | | | K hours |
| Weight | | | 6 | | g |

## ISOLATION CHARACTERISTICS

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Isolation Voltage | Tested for 1 minute and leakage current less than 1 mA | 3000 | | | VDC |
| Isolation Resistance | Test at 500VDC | 1 | | | GΩ |
| Isolation Capacitance | Input/Output,100KHz/1V | | 80 | | pF |

## OUTPUT SPECIFICATIONS

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Output power | Refer to product program | 0.3 | | 3 | W |
| Positive voltage accuracy | Refer to recommended circuit | | ±1 | ±3 | % |
| Negative voltage accuracy | Refer to recommended circuit | | ±3 | ±5 | % |
| Load regulation | 10% to100% load (TP2L-D-3W) | | ±0.5 | ±0.75 | % |
| Load regulation | 10% to100% load (TP2L-S-3W) | | ±0.5 | ±1.0 | % |
| Line regulation | Input Voltage from low to high | | ±0.2 | ±0.5 | % |
| Temperature drift ( Vout ) | Refer to recommended circuit | | | ±0.03 | %/℃ |
| Ripple & Noise | 20MHZ Bandwidth | | 50 | 100 | mVp-p |
| Switching frequency | 100% load ,input voltage range | | 300 | | KHZ |

All specifications typical at TA=25° C, nominal input voltage and rated output current unless otherwise specified.

## APPLICATION NOTES

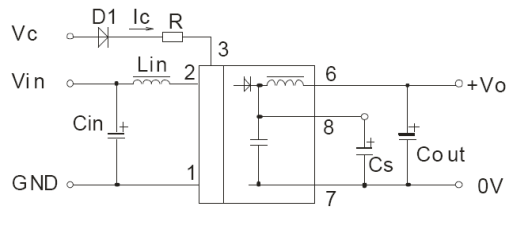
### External capacitance

These converters will work without external capacitors, in order to guarantee the full parametric performance over the full line and load range we recommended you to use the value we listed at right side. All parts have been tested and characterized using the following values and test circuit.

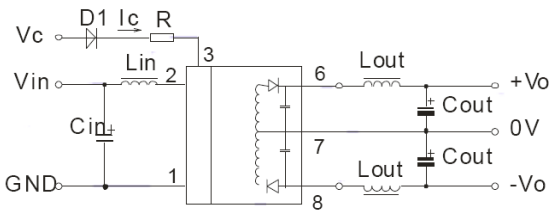
| External Capacitor Table | | | |
|---|---|---|---|
| Single Vout (VDC) | Cout (uF) | Dual Vout (VDC) | Cout (uF) |
| 3.3 | 2200 | ±5 | 680 |
| 5 | 1000 | ±9 | 470 |
| 9 | 680 | ±12 | 330 |
| 12 | 470 | ±15 | 220 |
| 15 | 330 | - | - |
| 24 | 220 | - | - |

## RECOMMENDED CIRCUIT

Single Output




Dual Output



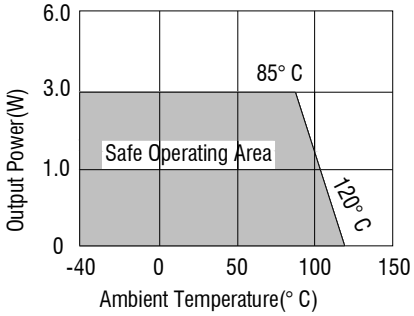



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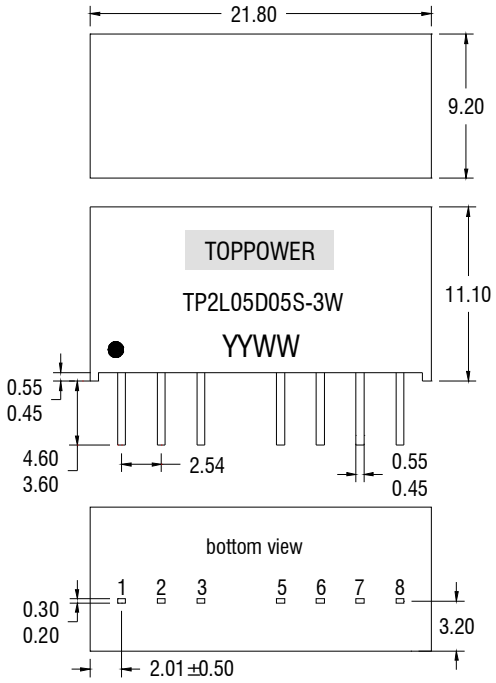
## SOLDERING INFORMATION

This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300℃for 10 seconds. The series is backward compatible with Sn/Pb soldering systems.

## TEMPERATURE DERATING GRAPHS




## MECHANICAL DIMENSIONS

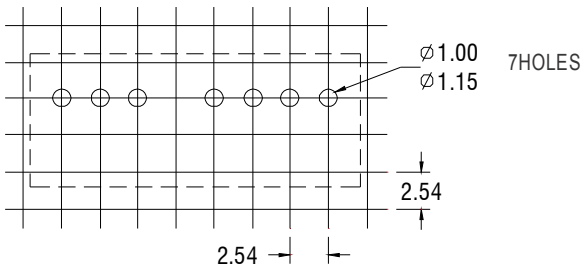



| PIN CONNECTIONS | | |
|---|---|---|
| Pin | Single | Dual |
| 1 | GND | GND |
| 2 | Vin | Vin |
| 3 | CTRL | CTRL |
| 5 * | NC | NC |
| 6 | +V0 | +V0 |
| 7 | 0V | 0V |
| 8 | CS | -V0 |

*This pin must have no external connection.

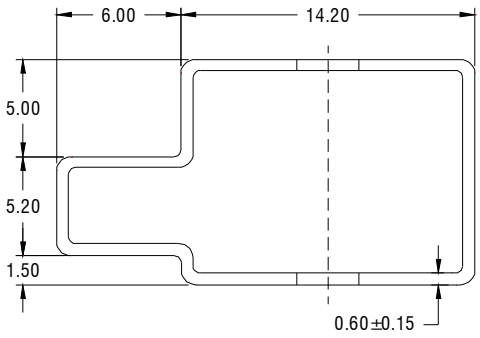
All dimensions in mm ±0.25mm .
All pins on a 2.54mm pitch and within ±0.25mm of true position.
Weight: 5.0g

## RECOMMENDED FOOTPRINT DETAILS




Unless otherwise stated all dimensions in mm ±0.5mm.

## TUBE OUTLINE DIMENSIONS




All dimensions in mm ±0.5mm.

Tube length : 520mm ±2mm . Tube Quantity:15



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