


**DESCRIPTION: 0.25W 3KVDC Isolated Single & Dual Output DC/DC Converters**

The TPV-W25 series are miniature, isolated 0.25W DC/DC converters in a SIP and DIP package. They offer the ideal solution in many space critical applications for board level power distribution. The Internal SMD construction makes it possible to offer a product with high performance at low cost. The series offers smaller size, improved efficiency and 3KVDC isolation.

**FEATURES**

|                                    |                                                           |                                           |
|------------------------------------|-----------------------------------------------------------|-------------------------------------------|
| RoHS compliant, CE certification   | Efficiency to 80%                                         | Power density up to 0.85W/cm <sup>3</sup> |
| Single or dual output              | UL 94V-0 package material                                 | Power sharing on dual output              |
| Footprint from 1.17cm <sup>2</sup> | Industry standard pinout                                  | 3KVDC isolation (1 minute)                |
| Input voltage: 3.3V,5V,12V,15V     | Output voltage: 3.3V,5V,9V,12V,15V,24V /±5V,±9V,±12V,±15V | Operating temperature: -40°C to 105°C     |

**SELECTION GUIDE**

| Part Number   | Nominal Input Voltage | Output Voltage | Output Current (Max./Min) | Efficiency | Package Style |
|---------------|-----------------------|----------------|---------------------------|------------|---------------|
|               | V                     | V              | mA                        | %          |               |
| TPV0303DA-W25 | 3.3                   | 3.3            | 75.8/7.58                 | 72         | DIP           |
| TPV0305DA-W25 | 3.3                   | 5              | 50/5                      | 72         | DIP           |
| TPV0505DA-W25 | 5                     | 5              | 50/5                      | 72         | DIP           |
| TPV0509DA-W25 | 5                     | 9              | 27.8/2.78                 | 75         | DIP           |
| TPV0512DA-W25 | 5                     | 12             | 21/2.1                    | 76         | DIP           |
| TPV0515DA-W25 | 5                     | 15             | 16.7/1.67                 | 78         | DIP           |
| TPV0303SA-W25 | 3.3                   | 3.3            | 75.8/7.58                 | 72         | SIP           |
| TPV0305SA-W25 | 3.3                   | 5              | 50/5                      | 72         | SIP           |
| TPV0505SA-W25 | 5                     | 5              | 50/5                      | 83         | SIP           |
| TPV0509SA-W25 | 5                     | 9              | 27.8/2.78                 | 75         | SIP           |
| TPV0512SA-W25 | 5                     | 12             | 21/2.1                    | 76         | SIP           |
| TPV0515SA-W25 | 5                     | 15             | 16.7/1.67                 | 78         | SIP           |
| TPV0524SA-W25 | 5                     | 24             | 10.4/1.04                 | 79         | SIP           |
| TPV1205DA-W25 | 12                    | 5              | 50/5                      | 72         | DIP           |
| TPV1209DA-W25 | 12                    | 9              | 27.8/2.78                 | 75         | DIP           |
| TPV1212DA-W25 | 12                    | 12             | 21/2.1                    | 77         | DIP           |
| TPV1215DA-W25 | 12                    | 15             | 16.7/1.67                 | 78         | DIP           |
| TPV1203SA-W25 | 12                    | 3.3            | 75.8/7.58                 | 72         | SIP           |
| TPV1205SA-W25 | 12                    | 5              | 50/5                      | 72         | SIP           |
| TPV1209SA-W25 | 12                    | 9              | 27.8/2.78                 | 75         | SIP           |
| TPV1212SA-W25 | 12                    | 12             | 21/2.1                    | 77         | SIP           |
| TPV1215SA-W25 | 12                    | 15             | 16.7/1.67                 | 78         | SIP           |
| TPV1505SA-W25 | 15                    | 5              | 50/5                      | 72         | SIP           |
| TPV1512SA-W25 | 15                    | 12             | 21/2.1                    | 74         | SIP           |
| TPV1515SA-W25 | 15                    | 15             | 16.7/1.67                 | 78         | SIP           |
| TPV0505D-W25  | 5                     | ±5             | ±25/±2.5                  | 72         | DIP           |
| TPV0509D-W25  | 5                     | ±9             | ±13.9/±1.39               | 77         | DIP           |
| TPV0512D-W25  | 5                     | ±12            | ±10.5/±1.05               | 78         | DIP           |
| TPV0515D-W25  | 5                     | ±15            | ±8.35/±0.84               | 80         | DIP           |
| TPV0505S-W25  | 5                     | ±5             | ±25/±2.5                  | 72         | SIP           |
| TPV0509S-W25  | 5                     | ±9             | ±13.9/±1.39               | 77         | SIP           |
| TPV0512S-W25  | 5                     | ±12            | ±10.5/±1.05               | 78         | SIP           |
| TPV0515S-W25  | 5                     | ±15            | ±8.35/±0.84               | 80         | SIP           |
| TPV1205D-W25  | 12                    | ±5             | ±25/±2.5                  | 72         | DIP           |
| TPV1209D-W25  | 12                    | ±9             | ±13.9/±1.39               | 74         | DIP           |
| TPV1212D-W25  | 12                    | ±12            | ±10.5/±1.05               | 76         | DIP           |
| TPV1215D-W25  | 12                    | ±15            | ±8.35/±0.84               | 77         | DIP           |
| TPV1205S-W25  | 12                    | ±5             | ±25/±2.5                  | 72         | SIP           |
| TPV1209S-W25  | 12                    | ±9             | ±13.9/±1.39               | 74         | SIP           |
| TPV1212S-W25  | 12                    | ±12            | ±10.5/±1.05               | 76         | SIP           |
| TPV1215S-W25  | 12                    | ±15            | ±8.35/±0.84               | 77         | SIP           |
| TPV1505S-W25  | 15                    | ±5             | ±25/±2.5                  | 72         | SIP           |
| TPV1512S-W25  | 15                    | ±12            | ±10.5/±1.05               | 74         | SIP           |
| TPV1515S-W25  | 15                    | ±15            | ±8.35/±0.84               | 78         | SIP           |

Add suffix "P" for continuous short circuit protection, for example TPV0505SAP-W25.

**INPUT CHARACTERISTICS**

| Parameter     | Conditions          | Min. | Typ. | Max. | Units |
|---------------|---------------------|------|------|------|-------|
| Voltage range | 3.3V input variants | 2.9  | 3.3  | 3.6  | V     |
| Voltage range | 5V input variants   | 4.4  | 5    | 5.6  | V     |
| Voltage range | 12V input variants  | 11   | 12   | 13.3 | V     |
| Voltage range | 15V input variants  | 13.4 | 15   | 16.4 | V     |

**ABSOLUTE MAXIMUM RATINGS**

|                                                 |          |
|-------------------------------------------------|----------|
| Short-circuit protection                        | 1 second |
| Lead temperature 1.5mm from case for 10 seconds | 300°C    |
| Input voltage $V_{in}$ , TPV03 variants         | 5.5V     |
| Input voltage $V_{in}$ , TPV05 variants         | 6.6V     |
| Input voltage $V_{in}$ , TPV12 variants         | 14.5V    |
| Input voltage $V_{in}$ , TPV15 variants         | 18V      |

**OUTPUT CHARACTERISTICS**

| Parameter                  | Conditions                                                   | Min. | Typ. | Max. | Units |
|----------------------------|--------------------------------------------------------------|------|------|------|-------|
| Rated Power                | $T_A = -40^{\circ}\text{C}$ to $85^{\circ}\text{C}$          |      |      | 0.25 | W     |
| Voltage Set Point Accuracy | See tolerance envelope                                       |      |      |      |       |
| Line regulation            | High $V_{IN}$ to low $V_{IN}$ (voltage variation $\pm 5\%$ ) |      | 1.0  | 1.2  | %/%   |

**ISOLATION CHARACTERISTICS**

| Parameter              | Conditions                 | Min. | Typ. | Max. | Units |
|------------------------|----------------------------|------|------|------|-------|
| Isolation test voltage | Tested for 1 minute        | 3000 |      |      | VDC   |
| Resistance             | $V_{iso} = 1000\text{VDC}$ | 1    |      |      | GΩ    |

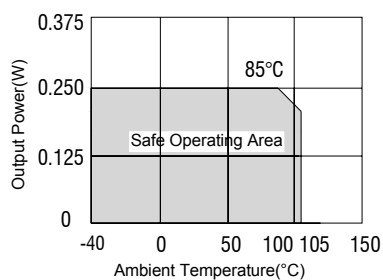
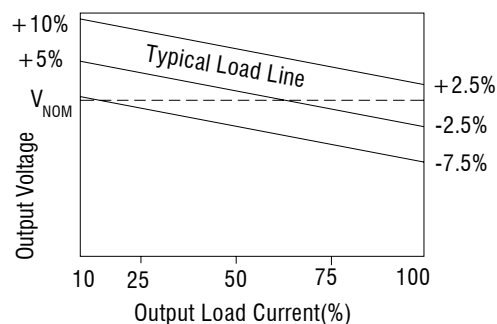
**GENERAL CHARACTERISTICS**

| Parameter           | Conditions          | Min. | Typ. | Max. | Units |
|---------------------|---------------------|------|------|------|-------|
| Switching frequency | 3.3V input variants |      | 95   |      | kHz   |
| Switching frequency | 5V input variants   |      | 120  | 140  | kHz   |
| Switching frequency | 12V input variants  |      | 145  | 180  | kHz   |
| Switching frequency | 15V input variants  |      | 90   | 180  | kHz   |

**TEMPERATURE CHARACTERISTICS**

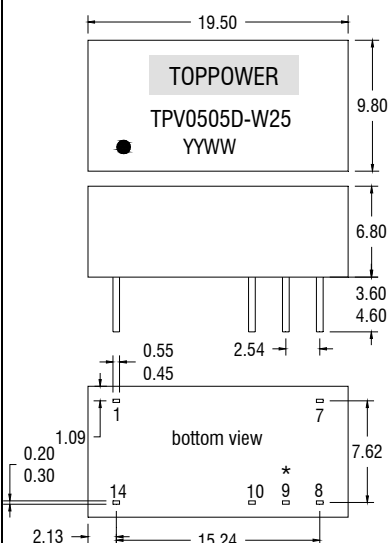
| Parameter     | Conditions                                            | Min. | Typ. | Max. | Units              |
|---------------|-------------------------------------------------------|------|------|------|--------------------|
| Specification | Derating if the temperature $\geq 85^{\circ}\text{C}$ | -40  |      | 105  | $^{\circ}\text{C}$ |
| Storage       |                                                       | -55  |      | 130  | $^{\circ}\text{C}$ |
| Cooling       | Free air convection                                   |      |      |      |                    |

All specifications typical at  $T_A = 25^{\circ}\text{C}$ , nominal input voltage and rated output current unless otherwise specified.

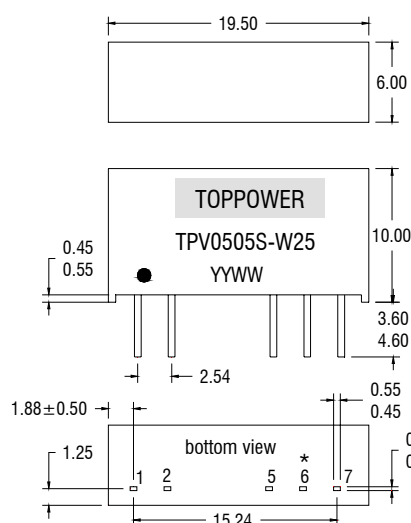
**TEMPERATURE DERATING GRAPHS**

**TOLERANCE ENVELOPES**


## MECHANICAL DIMENSIONS

### DIP Package



### SIP Package



Pin not fitted on single output variants. All dimensions in mm  $\pm 0.25$ mm.  
 \*7.70 for 48V variants \*\*7.50 for 48V variants  
 All pins on a 2.54mm pitch and within  $\pm 0.25$ mm of true position.  
 Weight: 2.11g (DIP and SIP)

## PIN CONNECTIONS

### Dual output variants

| 14 PIN DIP |          |
|------------|----------|
| Pin        | Function |
| 1          | -Vin     |
| 7          | NC       |
| 8          | +Vout    |
| 9          | 0V       |
| 10         | -Vout    |
| 14         | +Vin     |

### 7 PIN SIP

| Pin | Function |
|-----|----------|
| 1   | +Vin     |
| 2   | -Vin     |
| 5   | -Vout    |
| 6   | 0V       |
| 7   | +Vout    |

### Single output variants

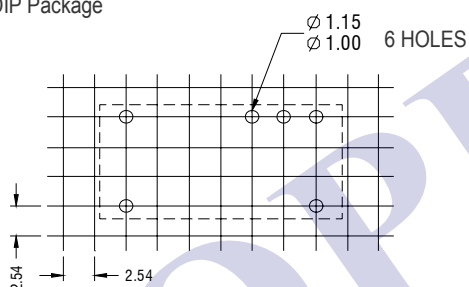
| 14 PIN DIP |          |
|------------|----------|
| Pin        | Function |
| 1          | -Vin     |
| 7          | NC       |
| 8          | +Vout    |
| 10         | -Vout    |
| 14         | +Vin     |

### 7 PIN SIP

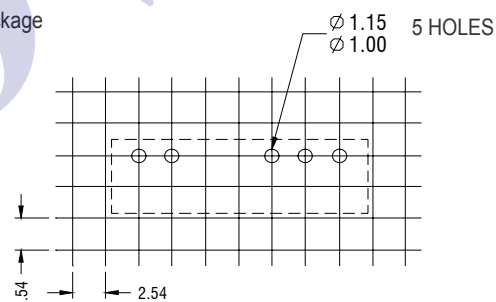
| Pin | Function |
|-----|----------|
| 1   | +Vin     |
| 2   | -Vin     |
| 5   | -Vout    |
| 7   | +Vout    |

## RECOMMENDED FOOTPRINT DETAILS

### 14Pin DIP Package

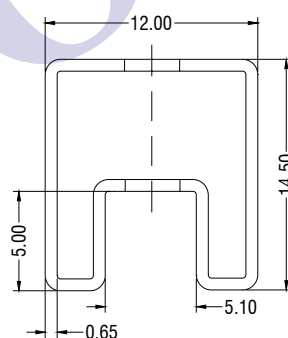


### 7Pin SIP Package

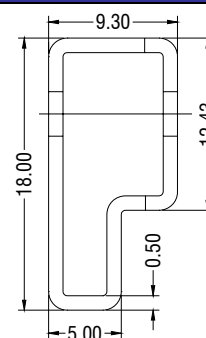


## TUBE OUTLINE DIMENSIONS

### 14Pin DIP Tube



### 7Pin SIP Tube



Unless otherwise stated all dimensions in mm  $\pm 0.5$ mm.  
 Tube length (14 Pin DIP) : 520mm  $\pm 2$ mm.  
 Tube length (7 Pin DIP) : 520mm  $\pm 2$ mm.

Tube Quantity : 25PCS

## SOLDERING INFORMATION

This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300 ° C for 10 seconds. Both SIP and DIP types in this series are backward compatible with Sn/Pb soldering systems.