


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

The TPK-3W series are miniature, isolated 3W DC/DC converters in a SIP 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, lower output ripple noise and 3KVDC isolation.

**FEATURES**

|                                       |                            |                                                                                                       |
|---------------------------------------|----------------------------|-------------------------------------------------------------------------------------------------------|
| RoHS compliant                        | Efficiency from 80%        | Input voltage: 3.3V, 5V, 12V, 15V, 24V                                                                |
| Operating temperature: -40°C to 105°C | UL 94V-0 package material  | Output voltage: 3.3V, 5V, 9V, 12V, 15V, 24V / $\pm 5V$ , $\pm 9V$ , $\pm 12V$ , $\pm 15V$ , $\pm 24V$ |
| Industry standard pinout              | 3KVDC isolation (1 minute) | CE certification                                                                                      |

**SELECTION GUIDE**

| Part Number  | Nominal Input Voltage | Output Voltage | Output Current (Max./Min) | Load Regulation (Max) | Efficiency (Typ.) | Package |
|--------------|-----------------------|----------------|---------------------------|-----------------------|-------------------|---------|
|              | V                     | V              | mA                        | %                     | %                 | Style   |
| TPK0303SA-3W | 3.3                   | 3.3            | 909/90.9                  | 7.2                   | 82                | SIP     |
| TPK0305SA-2W | 3.3                   | 5              | 600/60                    | 7.2                   | 82                | SIP     |
| TPK0503SA-3W | 5                     | 3.3            | 909/90.9                  | 7.2                   | 82                | SIP     |
| TPK0505SA-3W | 5                     | 5              | 600/60                    | 7.2                   | 82                | SIP     |
| TPK0509SA-3W | 5                     | 9              | 333/33.3                  | 5.8                   | 86                | SIP     |
| TPK0512SA-3W | 5                     | 12             | 250/25                    | 5.0                   | 86                | SIP     |
| TPK0515SA-3W | 5                     | 15             | 200/20                    | 4.6                   | 87                | SIP     |
| TPK1205SA-3W | 12                    | 5              | 600/60                    | 4.9                   | 82                | SIP     |
| TPK1209SA-3W | 12                    | 9              | 333/33.3                  | 3.0                   | 87                | SIP     |
| TPK1212SA-3W | 12                    | 12             | 250/25                    | 2.9                   | 87                | SIP     |
| TPK1215SA-3W | 12                    | 15             | 200/20                    | 2.5                   | 89                | SIP     |
| TPK1515SA-3W | 15                    | 15             | 200/20                    | 2.5                   | 84                | SIP     |
| TPK2405SA-3W | 24                    | 5              | 600/60                    | 4.9                   | 82                | SIP     |
| TPK2412SA-3W | 24                    | 12             | 250/25                    | 5.0                   | 84                | SIP     |
| TPK2415SA-3W | 24                    | 15             | 200/20                    | 2.5                   | 89                | SIP     |
| TPK2424SA-3W | 24                    | 24             | 125/12.5                  | 5.0                   | 83                | SIP     |
| TPK0505S-3W  | 5                     | $\pm 5$        | $\pm 300/\pm 30$          | 6.3                   | 82                | SIP     |
| TPK0509S-3W  | 5                     | $\pm 9$        | $\pm 166.5/\pm 16.65$     | 5.4                   | 86                | SIP     |
| TPK0512S-3W  | 5                     | $\pm 12$       | $\pm 125/\pm 12.5$        | 4.8                   | 86                | SIP     |
| TPK0515S-3W  | 5                     | $\pm 15$       | $\pm 100/\pm 10$          | 5.3                   | 87                | SIP     |
| TPK0524S-3W  | 5                     | $\pm 24$       | $\pm 62.5/\pm 6.25$       | 5.0                   | 83                | SIP     |
| TPK1205S-3W  | 12                    | $\pm 5$        | $\pm 300/\pm 30$          | 3.9                   | 82                | SIP     |
| TPK1209S-3W  | 12                    | $\pm 9$        | $\pm 166.5/\pm 16.65$     | 2.9                   | 86                | SIP     |
| TPK1212S-3W  | 12                    | $\pm 12$       | $\pm 125/\pm 12.5$        | 2.8                   | 87                | SIP     |
| TPK1215S-3W  | 12                    | $\pm 15$       | $\pm 100/\pm 10$          | 2.5                   | 87                | SIP     |
| TPK1515S-3W  | 15                    | $\pm 15$       | $\pm 100/\pm 10$          | 2.5                   | 87                | SIP     |
| TPK2405S-3W  | 24                    | $\pm 5$        | $\pm 300/\pm 30$          | 3.9                   | 82                | SIP     |
| TPK2412S-3W  | 24                    | $\pm 12$       | $\pm 125/\pm 12.5$        | 2.8                   | 87                | SIP     |
| TPK2415S-3W  | 24                    | $\pm 15$       | $\pm 100/\pm 10$          | 2.5                   | 87                | SIP     |
| TPK2424S-3W  | 24                    | $\pm 24$       | $\pm 62.5/\pm 6.25$       | 5.0                   | 83                | SIP     |
| TPK0305DA-3W | 3.3                   | 5              | 600/60                    | 7.2                   | 82                | DIP     |
| TPK0505DA-3W | 5                     | 5              | 600/60                    | 7.2                   | 82                | DIP     |
| TPK0509DA-3W | 5                     | 9              | 333/33.3                  | 5.8                   | 86                | DIP     |
| TPK0512DA-3W | 5                     | 12             | 250/25                    | 5.0                   | 86                | DIP     |
| TPK0515DA-3W | 5                     | 15             | 200/20                    | 4.6                   | 87                | DIP     |
| TPK1205DA-3W | 12                    | 5              | 600/60                    | 4.9                   | 82                | DIP     |
| TPK1209DA-3W | 12                    | 9              | 333/33.3                  | 3.0                   | 87                | DIP     |
| TPK1212DA-3W | 12                    | 12             | 250/25                    | 2.9                   | 87                | DIP     |
| TPK1215DA-3W | 12                    | 15             | 200/20                    | 2.5                   | 89                | DIP     |
| TPK1515DA-3W | 15                    | 15             | 200/20                    | 2.5                   | 84                | DIP     |
| TPK2405DA-3W | 24                    | 5              | 600/60                    | 4.9                   | 82                | DIP     |
| TPK2412DA-3W | 24                    | 12             | 250/25                    | 5.0                   | 84                | DIP     |
| TPK2424DA-3W | 24                    | 24             | 125/12.5                  | 5.0                   | 83                | DIP     |
| TPK0505D-3W  | 5                     | $\pm 5$        | $\pm 300/\pm 30$          | 6.3                   | 82                | DIP     |
| TPK0509D-3W  | 5                     | $\pm 9$        | $\pm 166.5/\pm 16.65$     | 5.4                   | 86                | DIP     |
| TPK0512D-3W  | 5                     | $\pm 12$       | $\pm 125/\pm 12.5$        | 4.8                   | 86                | DIP     |
| TPK0515D-3W  | 5                     | $\pm 15$       | $\pm 100/\pm 10$          | 5.3                   | 87                | DIP     |
| TPK1205D-3W  | 12                    | $\pm 5$        | $\pm 300/\pm 30$          | 3.9                   | 82                | DIP     |
| TPK1209D-3W  | 12                    | $\pm 9$        | $\pm 166.5/\pm 16.65$     | 2.9                   | 86                | DIP     |
| TPK1212D-3W  | 12                    | $\pm 12$       | $\pm 125/\pm 12.5$        | 2.8                   | 87                | DIP     |
| TPK1215D-3W  | 12                    | $\pm 15$       | $\pm 100/\pm 10$          | 2.5                   | 87                | DIP     |
| TPK1515D-3W  | 15                    | $\pm 15$       | $\pm 100/\pm 10$          | 2.5                   | 87                | DIP     |
| TPK2405D-3W  | 24                    | $\pm 5$        | $\pm 300/\pm 30$          | 3.9                   | 82                | DIP     |
| TPK2412D-3W  | 24                    | $\pm 12$       | $\pm 125/\pm 12.5$        | 2.8                   | 87                | DIP     |
| TPK2424D-3W  | 24                    | $\pm 24$       | $\pm 62.5/\pm 6.25$       | 5.0                   | 83                | DIP     |

Add suffix "P" for continuous short circuit protection, for example TPK0505SP-3W.

**INPUT CHARACTERISTICS**

| Parameter     | Conditions | Min. | Typ. | Max. | Units |
|---------------|------------|------|------|------|-------|
| Voltage range | 3.3V input | 2.9  | 3.3  | 3.6  | V     |
| Voltage range | 5V input   | 4.5  | 5    | 5.5  | V     |
| Voltage range | 12V input  | 11   | 12   | 13   | V     |
| Voltage range | 15V input  | 13.4 | 15   | 16.4 | V     |
| Voltage range | 24V input  | 22   | 24   | 26   | V     |

**OUTPUT CHARACTERISTICS**

| Parameter                  | Conditions                                    | Min. | Typ. | Max. | Units |
|----------------------------|-----------------------------------------------|------|------|------|-------|
| Rated Power                | TA=-40°C to 85°C                              |      |      | 3    | W     |
| Voltage Set Point Accuracy | See tolerance envelope                        |      |      |      |       |
| Line regulation            | High VIN to low VIN (voltage variation +/-5%) |      | 1.0  | 1.2  | %/%   |

**ABSOLUTE MAXIMUM RATINGS**

|                                                 |       |
|-------------------------------------------------|-------|
| Lead temperature 1.5mm from case for 10 seconds | 300°C |
| Internal power dissipation                      | 650mW |
| Input voltage Vin, TPK03                        | 5.5V  |
| Input voltage Vin, TPK05                        | 7V    |
| Input voltage Vin, TPK12                        | 15V   |
| Input voltage Vin, TPK15                        | 18V   |
| Input voltage Vin, TPK24                        | 28V   |

**ISOLATION CHARACTERISTICS**

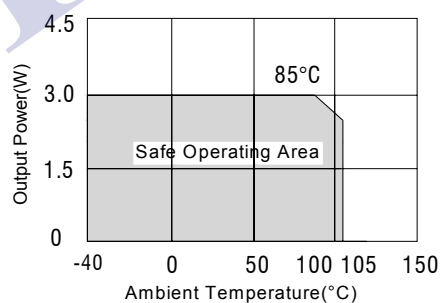
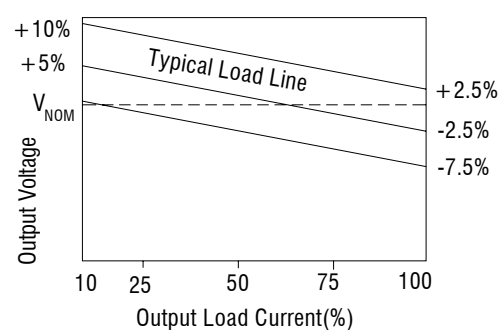
| Parameter              | Conditions          | Min. | Typ. | Max. | Units |
|------------------------|---------------------|------|------|------|-------|
| Isolation test voltage | Tested for 1 minute | 3000 |      |      | VDC   |
| Resistance             | Viso= 1000VDC       | 1    |      |      | GΩ    |

**GENERAL CHARACTERISTICS**

| Parameter           | Conditions | Min. | Typ. | Max. | Units |
|---------------------|------------|------|------|------|-------|
| Switching frequency |            |      | 65   |      | kHz   |

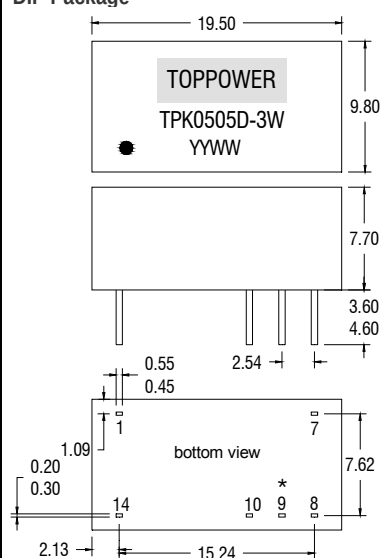
**TEMPERATURE CHARACTERISTICS**

| Parameter                      | Conditions                        | Min. | Typ. | Max. | Units |
|--------------------------------|-----------------------------------|------|------|------|-------|
| Specification                  | Derating if the temperature ≥85°C | -40  |      | 105  | °C    |
| Storage                        |                                   | -50  |      | 150  | °C    |
| Case Temperature above ambient | 5V output                         |      |      | 30   | °C    |
| Case Temperature above ambient | All other output                  |      |      | 30   | °C    |
| Cooling                        | Free air convection               |      |      |      |       |

**TEMPERATURE DERATING GRAPHS**

**TOLERANCE ENVELOPES**


## MECHANICAL DIMENSIONS

### DIP Package

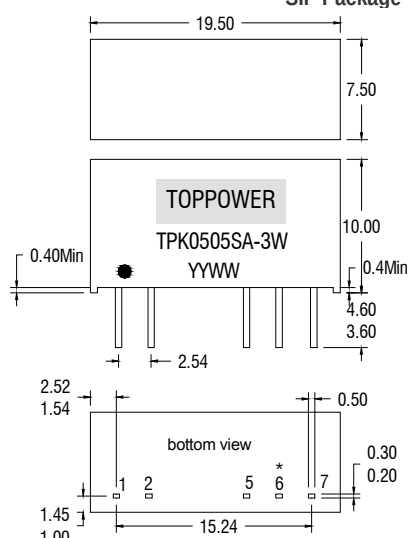


All dimensions in mm  $\pm 0.25$ mm.

All pins on a 2.54mm pitch and within  $\pm 0.25\text{mm}$  of true position. Weight: 2.8g

\* Pin not fitted on single output variants

## SIP Package



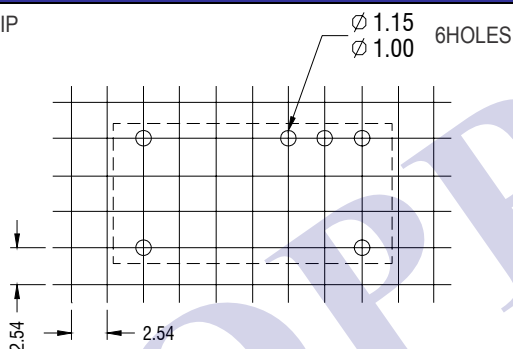
## PIN CONNECTIONS

| 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    |

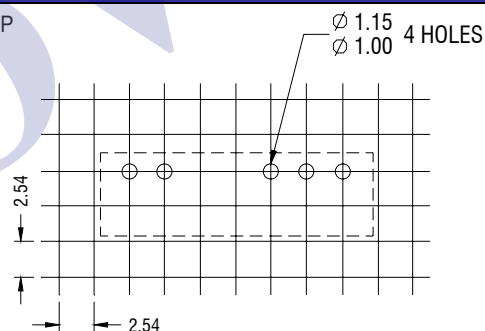
## RECOMMENDED FOOTPRINT DETAILS

## 14Pin DIP



Unless otherwise stated all dimensions in mm  $\pm 0.5$ mm.

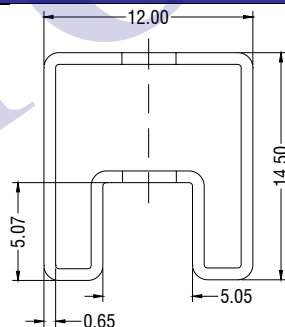
## 7Pin SIP



Unless otherwise stated all dimensions in mm  $\pm 0.5$ mm.

## TUBE OUTLINE DIMENSIONS

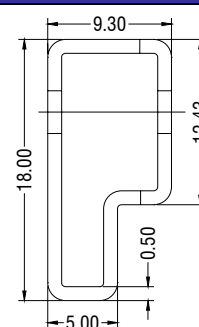
## 14Pin DIP



Unless otherwise stated all dimensions in mm  $\pm 0.5$ mm.

Tube length : 520mm  $\pm$ 2mm.      Tube Quantity : 25PCS

## 7Pin SIP



Unless otherwise stated all dimensions in mm  $\pm 0.5$ mm.

Tube length : 520mm  $\pm$ 2mm.      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. The series is backward compatible with Sn/Pb soldering systems