



**DESCRIPTION: 2W 3KVDC Isolated Single And Dual Output DC/DC Converters**

The TPK series are miniature, isolated 2W 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 / ±5V, ±9V, ±12V, ±15V, ±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   | 3.3                   | 3.3            | 606/60.6                 | 7.2                   | 82                | SIP     |
| TPK0305SA   | 3.3                   | 5              | 400/40                   | 7.2                   | 82                | SIP     |
| TPK0503SA   | 5                     | 3.3            | 606/60.6                 | 7.2                   | 82                | SIP     |
| TPK0505SA   | 5                     | 5              | 400/40                   | 7.2                   | 82                | SIP     |
| TPK0509SA   | 5                     | 9              | 222/22.2                 | 5.8                   | 86                | SIP     |
| TPK0512SA   | 5                     | 12             | 167/16.7                 | 5.0                   | 86                | SIP     |
| TPK0515SA   | 5                     | 15             | 133/13.3                 | 4.6                   | 87                | SIP     |
| TPK1205SA   | 12                    | 5              | 400/40                   | 4.9                   | 82                | SIP     |
| TPK1209SA   | 12                    | 9              | 222/22.2                 | 3.0                   | 87                | SIP     |
| TPK1212SA   | 12                    | 12             | 167/16.7                 | 2.9                   | 87                | SIP     |
| TPK1215SA   | 12                    | 15             | 133/13.3                 | 2.5                   | 89                | SIP     |
| TPK1515SA   | 15                    | 15             | 133/13.3                 | 2.5                   | 84                | SIP     |
| TPK2405SA   | 24                    | 5              | 400/40                   | 4.9                   | 82                | SIP     |
| TPK2412SA   | 24                    | 12             | 167/16.7                 | 5.0                   | 84                | SIP     |
| TPK2415SA   | 24                    | 15             | 133/13.3                 | 2.5                   | 84                | SIP     |
| TPK2424SA   | 24                    | 24             | 83.3/8.33                | 5.0                   | 83                | SIP     |
| TPK0505S    | 5                     | ±5             | ±200/±20                 | 6.3                   | 82                | SIP     |
| TPK0509S    | 5                     | ±9             | ±111/±11.1               | 5.4                   | 86                | SIP     |
| TPK0512S    | 5                     | ±12            | ±83/±8.3                 | 4.8                   | 86                | SIP     |
| TPK0515S    | 5                     | ±15            | ±67/±6.7                 | 5.3                   | 87                | SIP     |
| TPK0524S    | 5                     | ±24            | ±41.65/±4.165            | 5.0                   | 83                | SIP     |
| TPK1205S    | 12                    | ±5             | ±200/±20                 | 3.9                   | 82                | SIP     |
| TPK1209S    | 12                    | ±9             | ±111/±11.1               | 2.9                   | 86                | SIP     |
| TPK1212S    | 12                    | ±12            | ±83/±8.3                 | 2.8                   | 87                | SIP     |
| TPK1215S    | 12                    | ±15            | ±67/±6.7                 | 2.5                   | 87                | SIP     |
| TPK1515S    | 15                    | ±15            | ±67/±6.7                 | 2.5                   | 87                | SIP     |
| TPK2405S    | 24                    | ±5             | ±200/±20                 | 3.9                   | 82                | SIP     |
| TPK2409S    | 24                    | ±9             | ±111/±11.1               | 2.9                   | 86                | DIP     |
| TPK2412S    | 24                    | ±12            | ±83/±8.3                 | 2.8                   | 87                | SIP     |
| TPK2415S    | 24                    | ±15            | ±67/±6.7                 | 2.5                   | 87                | SIP     |
| TPK2424S    | 24                    | ±24            | ±41.65/±4.165            | 5.0                   | 83                | SIP     |
| TPK0305DA   | 3.3                   | 5              | 400/40                   | 7.2                   | 82                | DIP     |
| TPK0505DA   | 5                     | 5              | 400/40                   | 7.2                   | 82                | DIP     |
| TPK0509DA   | 5                     | 9              | 222/22.2                 | 5.8                   | 86                | DIP     |
| TPK0512DA   | 5                     | 12             | 167/16.7                 | 5.0                   | 86                | DIP     |
| TPK0515DA   | 5                     | 15             | 133/13.3                 | 4.6                   | 87                | DIP     |
| TPK1205DA   | 12                    | 5              | 400/40                   | 4.9                   | 82                | DIP     |
| TPK1209DA   | 12                    | 9              | 222/22.2                 | 3.0                   | 87                | DIP     |
| TPK1212DA   | 12                    | 12             | 167/16.7                 | 2.9                   | 87                | DIP     |
| TPK1215DA   | 12                    | 15             | 133/13.3                 | 2.5                   | 89                | DIP     |
| TPK1515DA   | 15                    | 15             | 133/13.3                 | 2.5                   | 84                | DIP     |
| TPK2405DA   | 24                    | 5              | 400/40                   | 4.9                   | 82                | DIP     |
| TPK2412DA   | 24                    | 12             | 167/16.7                 | 5.0                   | 84                | DIP     |
| TPK2424DA   | 24                    | 24             | 83.3/8.33                | 5.0                   | 83                | DIP     |
| TPK0505D    | 5                     | ±5             | ±200/±20                 | 6.3                   | 82                | DIP     |
| TPK0509D    | 5                     | ±9             | ±111/±11.1               | 5.4                   | 86                | DIP     |
| TPK0512D    | 5                     | ±12            | ±83/±8.3                 | 4.8                   | 86                | DIP     |
| TPK0515D    | 5                     | ±15            | ±67/±6.7                 | 5.3                   | 87                | DIP     |
| TPK1205D    | 12                    | ±5             | ±200/±20                 | 3.9                   | 82                | DIP     |
| TPK1209D    | 12                    | ±9             | ±111/±11.1               | 2.9                   | 86                | DIP     |
| TPK1212D    | 12                    | ±12            | ±83/±8.3                 | 2.8                   | 87                | DIP     |
| TPK1215D    | 12                    | ±15            | ±67/±6.7                 | 2.5                   | 87                | DIP     |
| TPK1515D    | 15                    | ±15            | ±67/±6.7                 | 2.5                   | 87                | DIP     |
| TPK2405D    | 24                    | ±5             | ±200/±20                 | 3.9                   | 82                | DIP     |
| TPK2412D    | 24                    | ±12            | ±83/±8.3                 | 2.8                   | 87                | DIP     |
| TPK2424D    | 24                    | ±24            | ±41.65/±4.164            | 5.0                   | 83                | DIP     |

Add Suffix "P" for Continuous Short Circuit Protection, for example TPK0505SAP.

**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       |      |      | 2    | W     |
| Voltage Set Point Accuracy | See tolerance envelope |      |      |      |       |
| Line regulation            | High Vin to low Vin    |      | 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    |

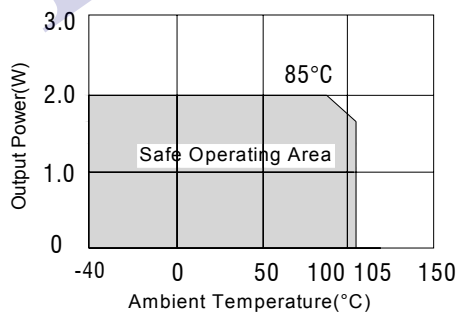
**GENERAL CHARACTERISTICS**

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

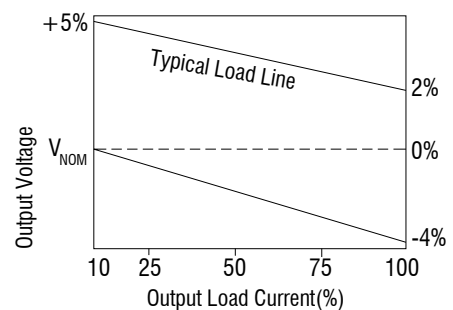
**TEMPERATURE CHARACTERISTICS**

| 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**

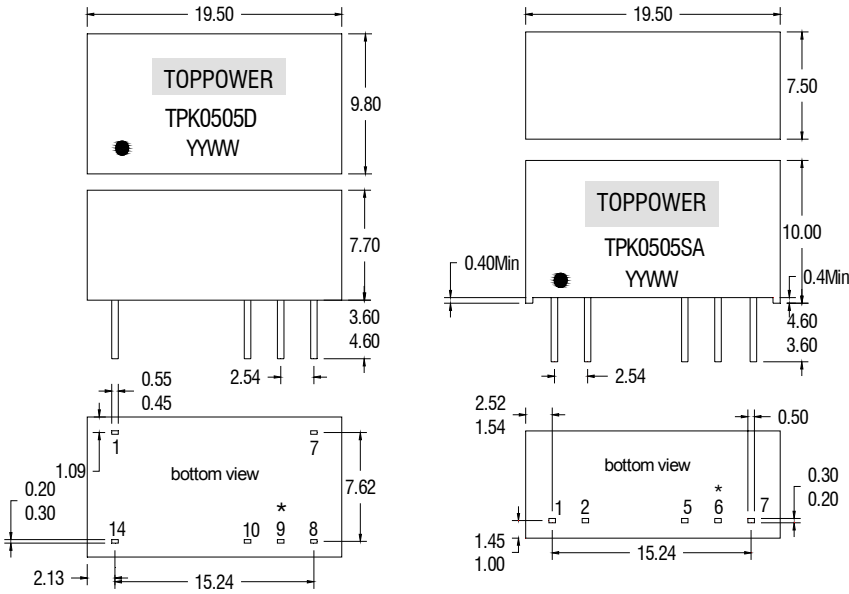


**MECHANICAL DIMENSIONS**

**PIN CONNECTIONS**

**DIP Package**

**SIP Package**



**Dual Output Variants**

**14 PIN DIP**

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

**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    |
| 6   | 0V       |
| 7   | +Vout    |

**7 PIN SIP**

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

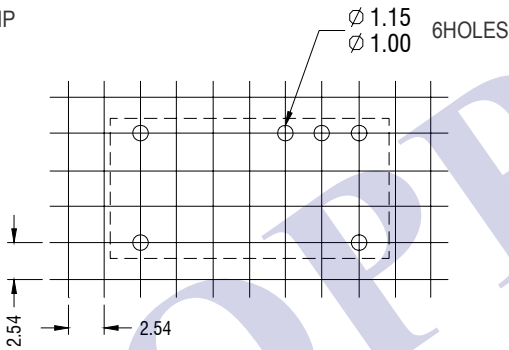
All dimensions in mm  $\pm 0.25$ mm .

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

\* Pin not fitted on single output variants

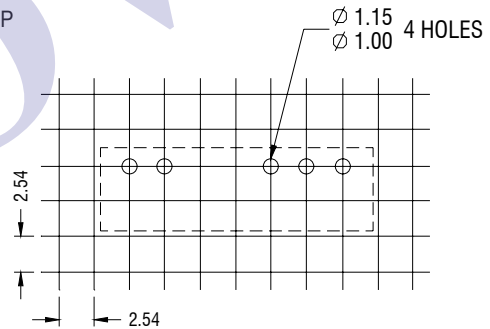
**RECOMMENDED FOOTPRINT DETAILS**

**14Pin DIP**



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

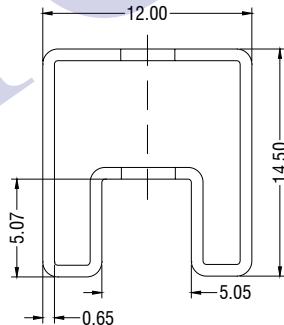
**7Pin SIP**



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

**TUBE OUTLINE DIMENSIONS**

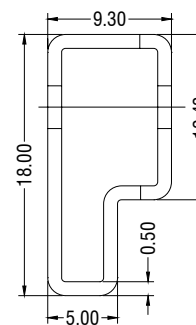
**14Pin DIP**



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

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

**7Pin SIP**



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

Tube length : 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. The series is backward compatible with Sn/Pb soldering systems