

**DESCRIPTION:** 1W 1.5KVDC and 2KVDC Isolated Single Output DC/DC Converters



The TPE series are miniature, isolated 1W 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, lower output ripple noise.

**FEATURES**

|   |                                     |  |
|---|-------------------------------------|--|
| RoHS compliant, CE certification            | Single isolated output              | SIP: 1.5KVDC isolation    DIP: 2KVDC isolation |
| Efficiency up to 81%                        | Power density 1.45W/cm <sup>3</sup> | UL 94V-0 Package material                      |
| Footprint from 0.69cm <sup>2</sup>          | Industry Standard Pinout            | Input voltage: 15V, 24V, 48V                   |
| Output voltage: 3.3V, 5V, 9V, 12V, 15V, 24V | Custom solutions available          | 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                        | %          |               |
| TPE1505D    | 15                    | 5              | 200/20                    | 71         | DIP           |
| TPE1505S    | 15                    | 5              | 200/20                    | 71         | SIP           |
| TPE1515S    | 15                    | 15             | 67/6.7                    | 78         | SIP           |
| TPE2403D    | 24                    | 3.3            | 303/30.3                  | 71         | DIP           |
| TPE2405D    | 24                    | 5              | 200/20                    | 70         | DIP           |
| TPE2409D    | 24                    | 9              | 111/11.1                  | 75         | DIP           |
| TPE2412D    | 24                    | 12             | 83/8.3                    | 81         | DIP           |
| TPE2415D    | 24                    | 15             | 66/6.6                    | 81         | DIP           |
| TPE2424D    | 24                    | 24             | 41.5/4.15                 | 80         | DIP           |
| TPE2403S    | 24                    | 3.3            | 303/30.3                  | 71         | SIP           |
| TPE2405S    | 24                    | 5              | 200/20                    | 71         | SIP           |
| TPE2409S    | 24                    | 9              | 111/11.1                  | 75         | SIP           |
| TPE2412S    | 24                    | 12             | 83/8.3                    | 80         | SIP           |
| TPE2415S    | 24                    | 15             | 66/6.6                    | 80         | SIP           |
| TPE2424S    | 24                    | 24             | 41.5/4.15                 | 80         | SIP           |
| TPE4805D    | 48                    | 5              | 200/20                    | 70         | DIP           |
| TPE4809D    | 48                    | 9              | 111/11.1                  | 75         | DIP           |
| TPE4812D    | 48                    | 12             | 83/8.3                    | 80         | DIP           |
| TPE4815D    | 48                    | 15             | 66/6.6                    | 80         | DIP           |
| TPE4805S    | 48                    | 5              | 200/20                    | 70         | SIP           |
| TPE4809S    | 48                    | 9              | 111/11.1                  | 75         | SIP           |
| TPE4812S    | 48                    | 12             | 83/8.3                    | 81         | SIP           |
| TPE4815S    | 48                    | 15             | 66/6.6                    | 81         | SIP           |

Add suffix "P" for continuous short circuit protection, for example TPE2405SP.

**INPUT CHARACTERISTICS**

| Parameter     | Conditions | Min. | Typ. | Max. | Units |
|---------------|------------|------|------|------|-------|
| Voltage range | 15V input  | 13.4 | 15   | 16.4 | v     |
| Voltage range | 24V input  | 21.6 | 24   | 26.4 | V     |
| Voltage range | 48V input  | 43.2 | 48   | 52.8 | V     |

**OUTPUT CHARACTERISTICS**

| Parameter                                | Conditions             | Min. | Typ. | Max. | Units |
|--|------------------------|------|------|------|-------|
| Rated Power                              | TA= -40°C to 85°C      |      |      | 1.0  | W     |
| Voltage Set Point Accuracy               | See tolerance envelope |      |      |      |       |
| Line regulation                          | High Vin to low Vin    |      | 1.0  | 1.2  | %/%   |
| Load Regulation (10% load to rated load) | 5V output              |      |      | 15   | %     |
| Load Regulation (10% load to rated load) | all other output       |      |      | 10   | %     |

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

## ABSOLUTE MAXIMUM RATINGS

|   |          |
|---|----------|
| Short-circuit protection                        | 1 second |
| Lead temperature 1.5mm from case for 10 seconds | 300°C    |
| Input voltage $V_{in}$ , TPE15                  | 18V      |
| Input voltage $V_{in}$ , TPE24                  | 28V      |
| Input voltage $V_{in}$ , TPE48                  | 54V      |

## ISOLATION CHARACTERISTICS

| Parameter                          | Conditions          | Min. | Typ. | Max. | Units |
|------------------------------------|---------------------|------|------|------|-------|
| Isolation test voltage SIP package | Tested for 1 second | 1500 |      |      | VDC   |
| Isolation test voltage DIP package | Tested for 1 second | 2000 |      |      | VDC   |
| Resistance                         | Viso= 500VDC        | 1    |      |      | GΩ    |

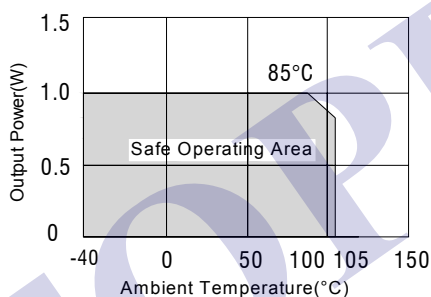
## GENERAL CHARACTERISTICS

| Parameter           | Conditions | Min. | Typ. | Max. | Units |
|---------------------|------------|------|------|------|-------|
| Switching frequency | All types  |      | 100  |      | kHz   |

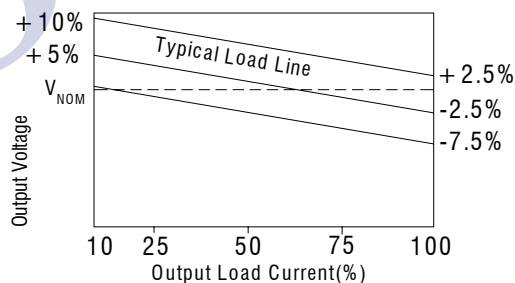
## TEMPERATURE CHARACTERISTICS

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

## TEMPERATURE DERATING GRAPHS



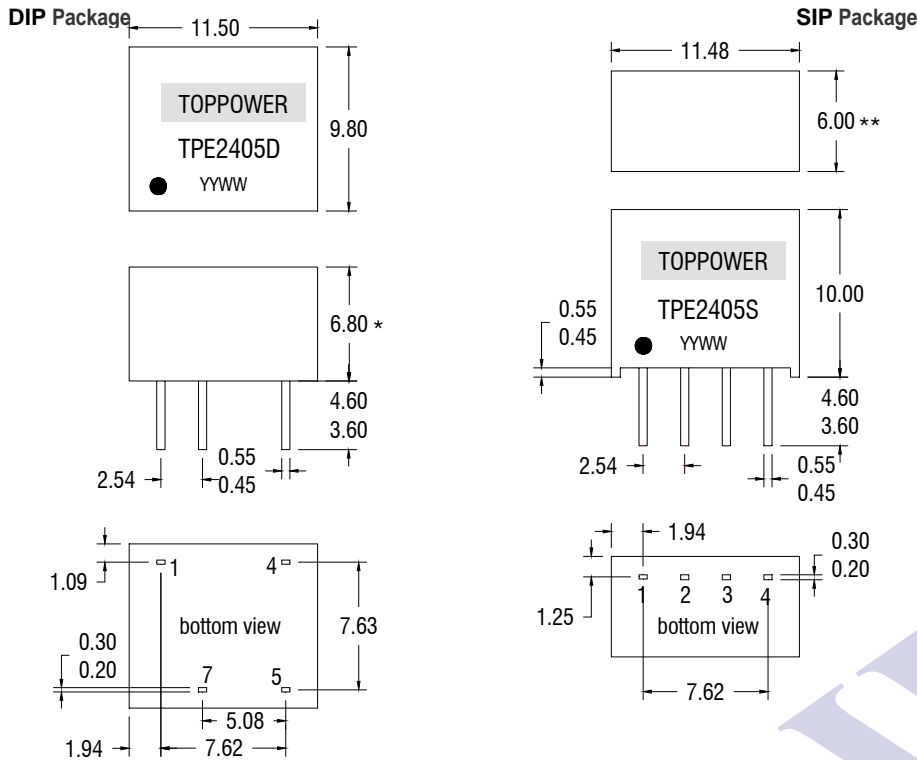
## TOLERANCE ENVELOPES



## SOLDERING INFORMATION

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

**MECHANICAL DIMENSIONS**



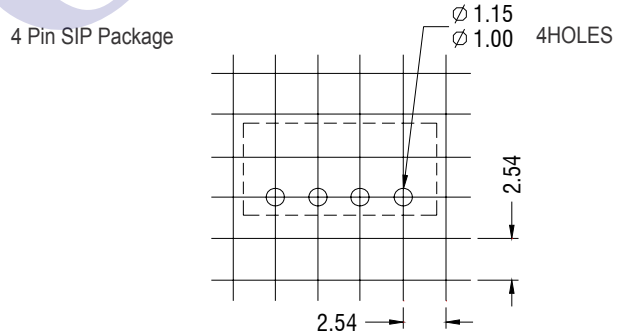
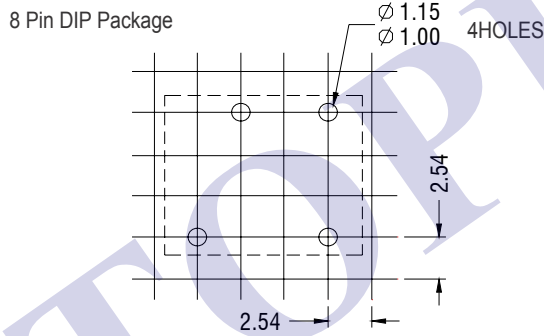
\*7.70 for 48V variants    \*\*7.50 for 48V variants    Weight: 1.48g (DIP) 1.30g (SIP)  
All dimensions in mm ±0.25mm. All pins on a 2.54mm pitch and within ±0.25mm of true position.

**PIN CONNECTIONS**

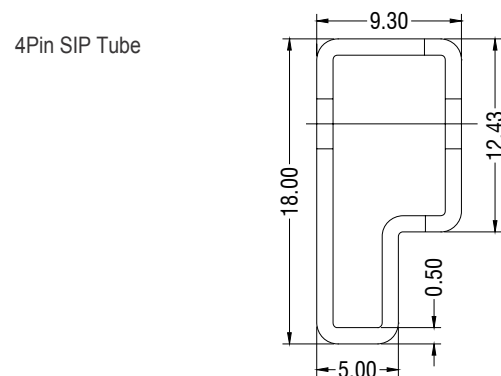
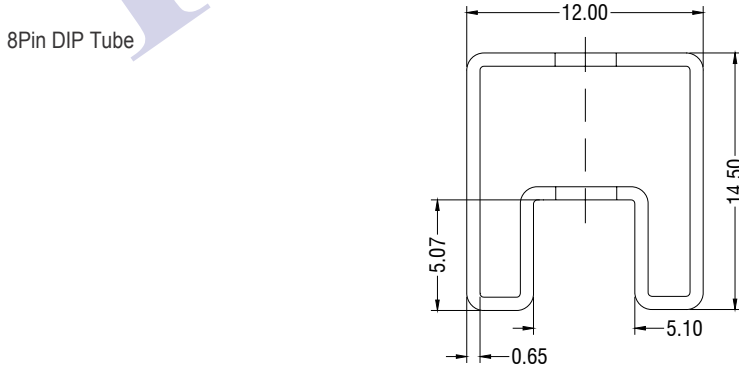
| 8 PIN DIP |          |
|-----------|----------|
| Pin       | Function |
| 1         | -Vin     |
| 4         | +Vin     |
| 5         | +Vout    |
| 7         | -Vout    |

| 4 PIN SIP |          |
|-----------|----------|
| Pin       | Function |
| 1         | -Vin     |
| 2         | +Vin     |
| 3         | -Vout    |
| 4         | +Vout    |

**RECOMMENDED FOOTPRINT DETAILS**



**TUBE OUTLINE DIMENSIONS**



Unless otherwise stated all dimensions in mm ±0.5mm.  
Tube length (8 Pin DIP) : 520mm ±2mm.  
Tube length (4 Pin SIP) : 520mm ±2mm.

Tube Quantity : 35PCS