



DESCRIPTION: 1W 3KVDC Isolated Single & Dual Output DC/DC Converters

The TPV 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 and 3KVDC isolation.

FEATURES

| | | |
|--------------------------------------|----------------------------|---|
| RoHS compliant | Efficiency to 80% | Power density up to 0.85W/cm ³ |
| Operating temperature: -40°C to 85°C | Single or dual output | UL 94V-0 package material |
| Power sharing on dual output | 3KVDC isolation (1 minute) | Input voltage: 3.3V,5V,9V,12V,15V |
| CE certification | / | Output voltage: 3.3V,5V,9V,12V,15V,24V /±5V,±9V,±12V,±15V |

SELECTION GUIDE

| Part Number | Nominal Input Voltage | Output Voltage | Output Current (Max./Min) | Efficiency | Package Style |
|-------------|-----------------------|----------------|---------------------------|------------|---------------|
| | V | V | mA | % | |
| TPV0303DA | 3.3 | 3.3 | 303/30.3 | 72 | DIP |
| TPV0305DA | 3.3 | 5 | 200/20 | 72 | DIP |
| TPV0503DA | 5 | 3.3 | 303/30.3 | 73 | DIP |
| TPV0505DA | 5 | 5 | 200/20 | 72 | DIP |
| TPV0509DA | 5 | 9 | 111/11.1 | 75 | DIP |
| TPV0512DA | 5 | 12 | 84/8.4 | 76 | DIP |
| TPV0515DA | 5 | 15 | 67/6.7 | 78 | DIP |
| TPV0524DA | 5 | 24 | 42/4.2 | 79 | DIP |
| TPV0303SA | 3.3 | 3.3 | 303/30.3 | 72 | SIP |
| TPV0305SA | 3.3 | 5 | 200/20 | 72 | SIP |
| TPV0503SA | 5 | 3.3 | 303/30.3 | 73 | SIP |
| TPV0505SA | 5 | 5 | 200/20 | 83 | SIP |
| TPV0509SA | 5 | 9 | 111/11.1 | 75 | SIP |
| TPV0512SA | 5 | 12 | 84/8.4 | 76 | SIP |
| TPV0515SA | 5 | 15 | 67/6.7 | 78 | SIP |
| TPV0524SA | 5 | 24 | 42/4.2 | 79 | SIP |
| TPV0909SA | 9 | 9 | 111/11.1 | 79 | SIP |
| TPV0915SA | 9 | 15 | 67/6.7 | 82 | SIP |
| TPV1205DA | 12 | 5 | 200/20 | 72 | DIP |
| TPV1209DA | 12 | 9 | 111/11.1 | 75 | DIP |
| TPV1212DA | 12 | 12 | 84/8.4 | 77 | DIP |
| TPV1215DA | 12 | 15 | 67/6.7 | 78 | DIP |
| TPV1205SA | 12 | 3.3 | 303/30.3 | 70 | SIP |
| TPV1205SA | 12 | 5 | 200/20 | 72 | SIP |
| TPV1209SA | 12 | 9 | 111/11.1 | 75 | SIP |
| TPV1212SA | 12 | 12 | 84/8.4 | 77 | SIP |
| TPV1215SA | 12 | 15 | 67/6.7 | 78 | SIP |
| TPV1224SA | 12 | 24 | 42/4.2 | 79 | SIP |
| TPV1505DA | 15 | 5 | 200/20 | 69 | DIP |
| TPV1505SA | 15 | 5 | 200/20 | 72 | SIP |
| TPV1509SA | 15 | 9 | 111/11.1 | 73 | SIP |
| TPV1512SA | 15 | 12 | 84/8.4 | 74 | SIP |
| TPV1515SA | 15 | 15 | 67/6.7 | 78 | SIP |
| TPV0505D | 5 | ±5 | ±100/±10 | 72 | DIP |
| TPV0509D | 5 | ±9 | ±55/±5.5 | 77 | DIP |
| TPV0512D | 5 | ±12 | ±43/±4.3 | 78 | DIP |
| TPV0515D | 5 | ±15 | ±33/±3.3 | 80 | DIP |
| TPV0505S | 5 | ±5 | ±100/±10 | 72 | SIP |
| TPV0509S | 5 | ±9 | ±55/±5.5 | 77 | SIP |
| TPV0512S | 5 | ±12 | ±43/4.3 | 78 | SIP |
| TPV0515S | 5 | ±15 | ±33/±3.3 | 80 | SIP |
| TPV1205D | 12 | ±5 | ±100/±10 | 72 | DIP |
| TPV1209D | 12 | ±9 | ±55/±5.5 | 74 | DIP |
| TPV1212D | 12 | ±12 | ±43/±4.3 | 76 | DIP |
| TPV1215D | 12 | ±15 | ±33/±3.3 | 77 | DIP |

SELECTION GUIDE

| Part Number | Nominal Input Voltage | Output Voltage | Output Current (Max./Min) | Efficiency | Package Style |
|-------------|-----------------------|----------------|---------------------------|------------|---------------|
| | V | V | mA | % | |
| TPV1205S | 12 | ±5 | ±100/±10 | 72 | SIP |
| TPV1209S | 12 | ±9 | ±55/±5.5 | 74 | SIP |
| TPV1212S | 12 | ±12 | ±43/±4.3 | 76 | SIP |
| TPV1215S | 12 | ±15 | ±33/±3.3 | 77 | SIP |
| TPV1505S | 15 | ±5 | ±100/±10 | 72 | SIP |
| TPV1512S | 15 | ±12 | ±43/±4.3 | 74 | SIP |
| TPV1515S | 15 | ±15 | ±33/±3.3 | 78 | SIP |

add Suffix "P" for Continuous Short Circuit Protection

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 | 9V input variants | 8.03 | 9 | 10 | 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 |
| Internal power dissipation | 540mW |
| Input voltage Vin, TPV03 variants | 5.5V |
| Input voltage Vin, TPV05 variants | 6.6V |
| Input voltage Vin, TPV09 variants | 11.5V |
| Input voltage Vin, TPV12 variants | 14.5V |
| Input voltage Vin, TPV15 variants | 18V |

OUTPUT CHARACTERISTICS

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|----------------------------|------------------------|------|------|------|-------|
| Rated Power | TA=-45°C to 85°C | | | 1 | W |
| Voltage Set Point Accuracy | See tolerance envelope | | | | |
| Line regulation | High Vin to low Vin | | 1.0 | 1.2 | %/% |

ISOLATION CHARACTERISTICS

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

GENERAL CHARACTERISTICS

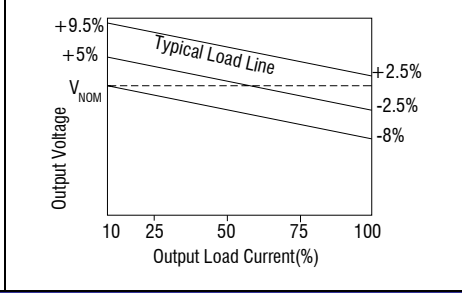
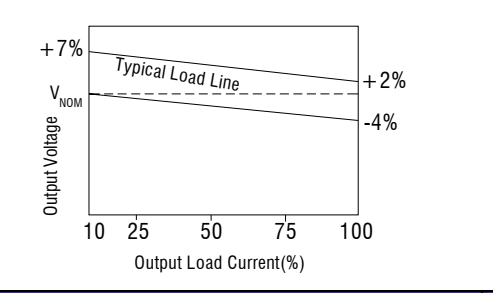
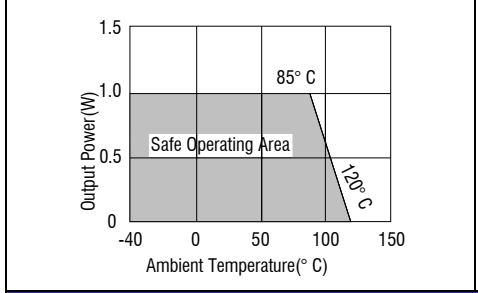
| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---------------------|---------------------|------|------|------|-------|
| Switching frequency | 3.3V input variants | | 95 | | kHz |
| Switching frequency | 5V input variants | | 120 | 140 | kHz |
| Switching frequency | 9V input variants | | 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 | All output variants | -40 | | 85 | °C |
| Storage | | -50 | | 130 | °C |
| Case Temperature above ambient | 5V output variants | | | 30 | °C |
| Case Temperature above ambient | All other output variants | | | 30 | °C |
| Cooling | Free air convection | | | | |

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

TEMPERATURE DERATING GRAPHS TPV0505SA TOLERANCE ENVELOPES OTHER TOLERANCE ENVELOPES



MECHANICAL DIMENSIONS PIN CONNECTIONS

DIP Package

SIP Package

* Pin not fitted on single output variants. Weight: 2.4g (DIP) 2.1g (SIP)
All dimensions in mm ±0.25mm. All pins on a 2.54 mm pitch and within ±0.25mm of true position.

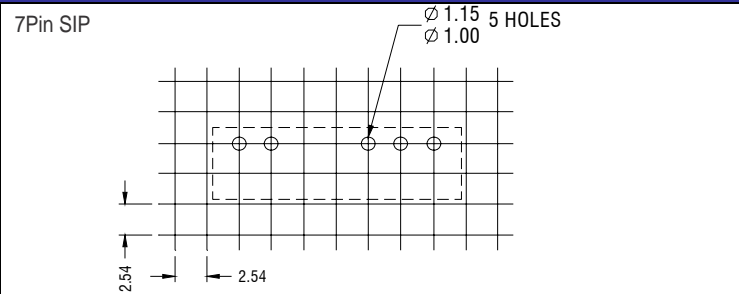
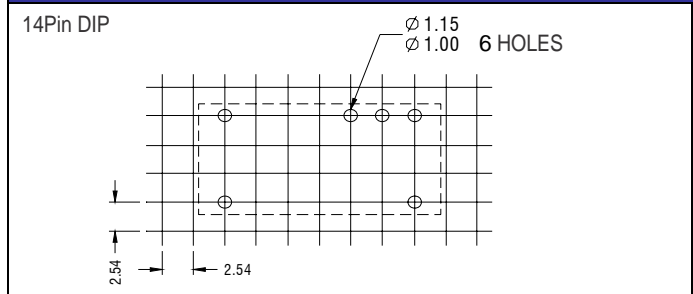
Dual Output Variants

| 14 PIN DIP | | 7 PIN SIP | |
|------------|----------|-----------|----------|
| Pin | Function | Pin | Function |
| 1 | -Vin | 1 | +Vin |
| 7 | NC | 2 | -Vin |
| 8 | +Vout | 5 | -Vout |
| 9 | OV | 6 | OV |
| 10 | -Vout | 7 | +Vout |
| 14 | +Vin | | |

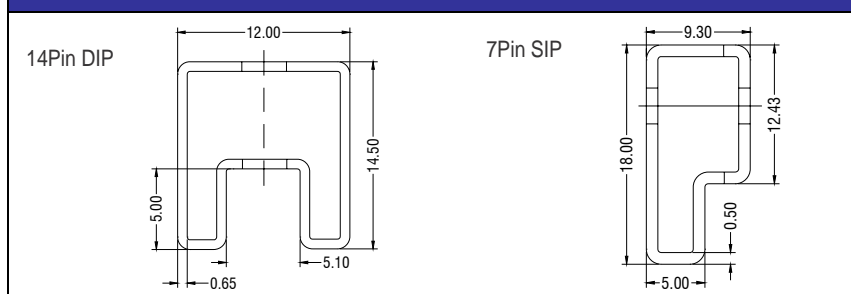
Single output variants

| 14 PIN DIP | | 7 PIN SIP | |
|------------|----------|-----------|----------|
| Pin | Function | Pin | Function |
| 1 | -Vin | 1 | +Vin |
| 7 | NC | 2 | -Vin |
| 8 | +Vout | 5 | -Vout |
| 10 | -Vout | 7 | +Vout |
| 14 | +Vin | | |

RECOMMENDED FOOTPRINT DETAILS



TUBE OUTLINE DIMENSIONS



Unless otherwise stated all dimensions in mm ±0.5mm.
 Tube length (14 Pin DIP) : 520mm ±2mm.
 Tube length (7 Pin SIP) : 520mm ±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, this series are backward compatible with Sn/Pb soldering systems.