

Features

- ◆ Supplementary and reinforced insulation
- ◆ I/O isolation 3000 VACrms rated for 300 Vrms working voltage
- ◆ Medical safety to UL 60601-1 and IEC/EN 60601-1 3rd Edition, 2 x MOOP
- ◆ Industrial safety to IEC/EN/UL 60950-1
- ◆ 9-40 VDC, 18-80 VDC and 36-160 VDC
- ◆ Extended operating temperature range -40°C to 85°C max.
- ◆ Input filter meets EN55022A without ext. components
- ◆ Continuous short circuit protection
- ◆ High reliability, MTBF >1 Mio. hours
- ◆ Lead free design, RoHS compliant
- ◆ 3-year product warranty



The THP-3 series is a new range of high performance 3W DC/DC converters in a low profile DIL-24 package with standard industry pin-out. The very high I/O-isolation system of these converters and input voltages up to 160 VDC make this product the best choice for many demanding applications in railroad and transportation systems, medical equipment, instrumentation, everywhere where high basic-, supplementary- or reinforced insulation is requested to meet specific safety standards. A high efficiency allows safe operation in a temperature range of -40°C to +75°C at full load. Full SMD-design with exclusive use of ceramic capacitors ensure a very high reliability and a long product lifetime.

Models

| Order code | Input voltage range | Output voltage | Output current max. | Efficiency typ. |
|------------|----------------------------------|----------------|---------------------|-----------------|
| THP 3-2411 | 9 – 40 VDC (24 VDC nominal) | 5 VDC | 600 mA | 78 % |
| THP 3-2412 | | 12 VDC | 250 mA | 83 % |
| THP 3-2422 | | ±12 VDC | ±125 mA | 83 % |
| THP 3-2423 | | ±15 VDC | ±100 mA | 83 % |
| THP 3-4811 | 18 – 80 VDC (48 VDC nominal) | 5 VDC | 600 mA | 78 % |
| THP 3-4812 | | 12 VDC | 250 mA | 83 % |
| THP 3-4822 | | ±12 VDC | ±125 mA | 83 % |
| THP 3-4823 | | ±15 VDC | ±100 mA | 83 % |
| THP 3-7211 | 36 – 160 VDC (72 VDC nominal) | 5 VDC | 600 mA | 78 % |
| THP 3-7212 | | 12 VDC | 250 mA | 83 % |
| THP 3-7222 | | ±12 VDC | ±125 mA | 83 % |
| THP 3-7223 | | ±15 VDC | ±100 mA | 83 % |

Input Specifications

| | |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Input current at no load / full load | 24 Vin models: 20 mA typ. / 160 mA typ. 48 Vin models: 10 mA typ. / 100 mA typ. 72 Vin models: 5 mA typ. / 85 mA typ. |
| Start-up voltage / under voltage shut down | 24 Vin models: 9 VDC / 8.5 VDC 48 Vin models: 17 VDC / 16 VDC 72 Vin models: 34 VDC / 32 VDC |
| Recommended external input fuse (slow blow) | 24 Vin models: 1.0 A 48 Vin models: 0.6 A 72 Vin models: 0.3 A |
| Surge voltage (1 sec. max.) | 24 Vin models: 50 V max. 48 Vin models: 100 V max. 72 Vin models: 180 V max. |
| Reverse voltage protection | 0.3 A max. |
| Input filter | EN 55022 class A, FCC part 15, class A |

Output Specifications

| | |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Voltage set accuracy | ±1 % |
| Voltage balance (dual output models) | 2 % max. |
| Regulation | – Input variation Vin min. to Vin max.: 0.5 % max. – Load variation 25 – 100 %: 1.0 % max. |
| Minimum load | 15 % of rated max. output current. (Operation at lower load is safe but major deviations to specified data may occur) |
| Ripple and noise (20 MHz Bandwidth) | 5 VDC models: 75 mVpk-pk typ. other models: 100 mVpk-pk typ. |
| Temperature coefficient | ±0.02 %/K typ. |
| Current limitation | >120 % Iout max. |
| Startup rise time 0 % to 100 % Vout | 25 mS max. |
| Short circuit protection | indefinite (automatic recovery) |
| Capacitive load | 5 VDC models: 1000 µF max. 12 VDC models: 470 µF max. Dual output models: 220 µF max. (each output) |

Isolation / Safety

| | |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I/O isolation test voltage (flash tested 1 sec.) | 6000 Vpk |
| I/O isolation voltage (50Hz, 60sec.) | 3000 VACrms, rated for 300 Vrms working voltage, 2 x MOOP |
| Leakage current (at 240VAC, 60Hz) | 2 µA |
| I/O isolation capacitance (at 100KHz, 1V) | 7 pF typ. |
| I/O isolation resistance (at 500VDC) | >1000 Mohm |
| Safety standards | IEC/EN 60950-1, UL 60950-1 CSA C22.2 No. 60950-1-03 IEC/EN 60601-1 3rd edition, 2 x MOOP, UL 60601-1, CSA C22.2 No. 601.1 |
| Safety approvals | – CB test report according IEC 60950-1 www.tracopower.com/products/thp3-cb60950.pdf – CB test report according IEC 60601-1 www.tracopower.com/products/thp3-cb60601.pdf – CSA certificate according UL 60950-1/60601-1 www.tracopower.com/products/thp3-csa.pdf |

All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

General Specifications

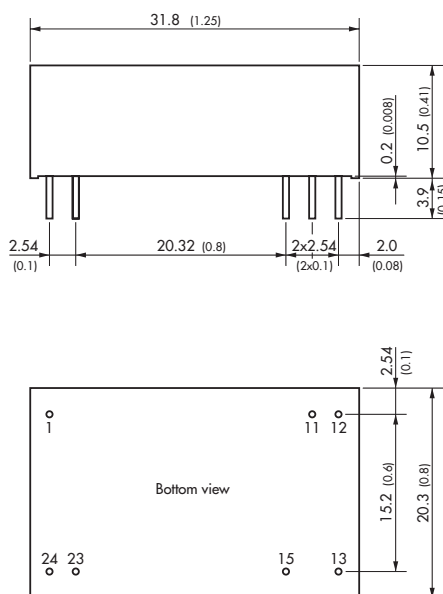
| | | |
|----------------------------------------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Temperature ranges | - Operating - Casing - Storage | -40°C to +85°C +95°C max. -40°C to +125°C |
| Derating | | 3.3 %/K above +70°C |
| Humidity (non condensing) | | 95 % rel H max. |
| Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C ground benign) | | >1 Mio. h |
| Switching frequency | | 150 kHz typ. (puls width modulation) |
| Casing material | | non conductive plastic (UL 94V-0-rated) |
| Potting material | | Silicon TSE 3331 (UL 94V-0-rated) |
| Weight | | 16.2 g (0.57 oz) |
| Soldering temperature | | max. 265°C / 10 sec. |
| Altitude during operation | | up to 5'000 m (16'400 ft) approved |
| Environmental compliance | - Reach - RoHS | www.tracopower.com/products/thp3-reach.pdf RoHS directive 2011/65/EU |

Application note: www.tracopower.com/products/thp3-application.pdf



- The component is not be used in an oxygen rich environment.
- The component is not to be used in conjunction with flammable anaesthetics and agents.
- The component has to be disposed appropriately. Please refer to local regulations (Waste Electrical and Electronic Equipment).
- A modification of the component is not allowed.

Outline Dimensions



| Pin-Out | | |
|---------|------------|------------|
| Pin | Single | Dual |
| 1 | +Vin (Vcc) | +Vin (Vcc) |
| 11 | No pin | Common |
| 12 | -Vout | No pin |
| 13 | +Vout | -Vout |
| 15 | No pin | +Vout |
| 23 | -Vin (GND) | -Vin (GND) |
| 24 | -Vin (GND) | -Vin (GND) |

Dimensions in [mm], () = Inch
 Pin diameter $\varnothing 0.6 \pm 0.05$ (0.024 \pm 0.002)
 Tolerances ± 0.5 (± 0.02)
 Pin pitch tolerances ± 0.2 (± 0.01)

Specifications can be changed any time without notice.