

Features

- ◆ Ultra compact DIP-24 package
- ◆ Wide 2:1 input voltage ranges
- ◆ I/O isolation voltage 4000 VACrms
- ◆ Reinforced insulation rated for working voltage 300 VAC
- ◆ Industrial and medical safety approvals
- ◆ Operating temperature range -40°C to $+71^{\circ}\text{C}$
- ◆ Low leakage current
- ◆ Short circuit protection
- ◆ Input filter to meet EN 55022, Class A
- ◆ 3-year product warranty



The THB 6 series is a new range of high performance, regulated DC/DC converters in a DIP-24 plastic package. A reinforced I/O-isolation system and a wide 2:1 input voltage range make this product the best choice for many demanding applications like transportation systems, industrial controls, medical equipment, instrumentation, everywhere where high basic-, supplementary- or reinforced insulation is required to meet requested safety standards.

A high efficiency allows safe operation in a temperature range of -40°C to $+71^{\circ}\text{C}$. Other features of this product are over voltage protection and internal EMI-input filter to meet EN 55022 class A without additional components. Full SMD-design with exclusive use of ceramic capacitors ensures a very high reliability and a long product lifetime.

Models

| Order code | Input voltage range | Output voltage | Output current max. | Efficiency typ. |
|------------|---------------------------------|----------------|---------------------|-----------------|
| THB 6-1211 | 9 - 18 VDC (12 VDC nominal) | 5 VDC | 1000 mA | 75 % |
| THB 6-1212 | | 12 VDC | 500 mA | 78 % |
| THB 6-1222 | | ± 12 VDC | ± 250 mA | 78 % |
| THB 6-1223 | | ± 15 VDC | ± 200 mA | 78 % |
| THB 6-2411 | 18 - 36 VDC (24 VDC nominal) | 5 VDC | 1000 mA | 77 % |
| THB 6-2412 | | 12 VDC | 500 mA | 80 % |
| THB 6-2422 | | ± 12 VDC | ± 250 mA | 80 % |
| THB 6-2423 | | ± 15 VDC | ± 200 mA | 80 % |
| THB 6-4811 | 36 - 75 VDC (48 VDC nominal) | 5 VDC | 1000 mA | 77 % |
| THB 6-4812 | | 12 VDC | 500 mA | 80 % |
| THB 6-4822 | | ± 12 VDC | ± 250 mA | 80 % |
| THB 6-4823 | | ± 15 VDC | ± 200 mA | 80 % |

Input Specifications

| | |
|--|---|
| Input current at no load / full load | 12 Vin; 5 VDC model: 30 mA typ. / 570 mA typ. 12 Vin; other models: 30 mA typ. / 640 mA typ. 24 Vin; 5 VDC model: 20 mA typ. / 280 mA typ. 24 Vin; other models: 20 mA typ. / 315 mA typ. 48 Vin; 5 VDC model: 10 mA typ. / 140 mA typ. 48 Vin; other models: 10 mA typ. / 155 mA typ. |
| Start-up voltage / under voltage shut down | 12 Vin models: 9 VDC / 8.5 VDC typ. 24 Vin models: 18 VDC / 16 VDC typ. 48 Vin models: 36 VDC / 34 VDC typ. |
| Recommended input fuse (slow blow) | 12 Vin models: 1.2 A 24 Vin models: 0.6 A 48 Vin models: 0.3 A |
| Surge voltage (1 sec. max.) | 12 Vin models: 25 VDC max. 24 Vin models: 50 VDC max. 48 Vin models: 100 VDC max. |
| Input filter | EN 55022 class A |

Output Specifications

| | |
|---|--|
| Voltage set accuracy | ±1.0 % |
| Regulation | – Input variation Vin min. to Vin max. 1.0 % max. – Load variation 25 – 100 %: single output models: 1.0 % max. dual output models: 2.0 % max. balanced load |
| Minimum load | 20 % 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: 100 mVp-p max. other models: 150 mVp-p max. |
| Transient Response (25% load step change) | 500 µs max. |
| Current limitation | >120 % Iout max. |
| Short circuit protection | indefinite (automatic recovery) |
| Capacitive load | 5 VDC output models: 1000 µF max. 12 VDC output models: 470 µF max. dual output models: 220 µF max. (each output) |

Isolation / Safety Standards

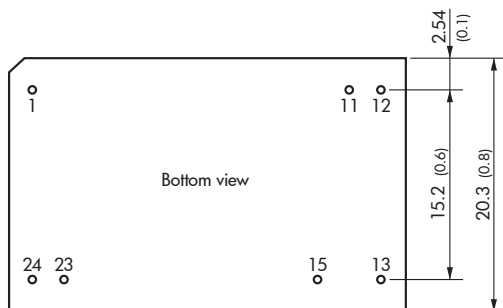
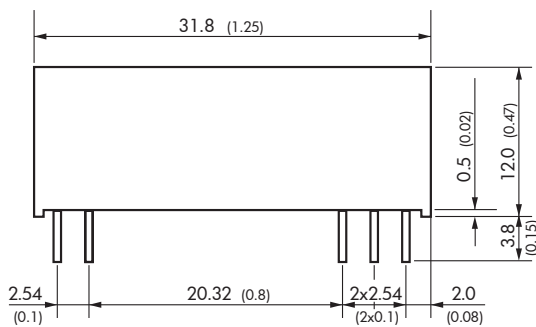
| | |
|--|--|
| Isolation test voltage (flash tested 1 sec.) | 6000 Vpk |
| I/O isolation voltage (50Hz, 60sec.) | 4000 VACrms |
| Leakage current (at 240VAC, 60Hz) | 2 µA |
| I/O isolation capacity (at 100KHz, 1V) | 7 pF typ. |
| I/O isolation resistance (at 500VDC) | >1000 Mohm |
| Safety standards | IEC/EN 60950-1, UL 60950-1 IEC/EN 60601-1, UL 60601-1 |
| Safety approvals (pending) | CB-report, CSA |

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

General Specifications

| | | |
|--|------------------------------------|---|
| Temperature ranges | - Operating - Case - Storage | -40°C to +71°C +95°C max. -40°C to +125°C |
| Derating | | 3.0 %/K above 60°C |
| Humidity (non condensing) | | 95 % rel H max. |
| Temperature coefficient | | ±0.02 %/K typ. |
| Reliability, calculated MTBF (MIL-HDBK-217F @ 25°C, ground benign) | | >700'000 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 | | 18 g (0.63 oz) |
| Soldering temperature | | max. 265°C / 10 sec. |

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 ± 0.25 (± 0.01)
Pin pitch tolerances ± 0.13 (± 0.005)

Specifications can be changed any time without notice.