

Features

- ◆ Wide 2:1 input voltage range
- ◆ Compact SIP-6 or SMD package
- ◆ Fully regulated outputs
- ◆ Cost optimised design
- ◆ No minimum load required
- ◆ Continuous short circuit protection
- ◆ Temperature range -40°C to $+85^{\circ}\text{C}$
- ◆ I/O isolation 1500 VDC
- ◆ Remote On/Off control (SMD)
- ◆ 3-year product warranty



The TMR-1 and TMR 1SM series are families of isolated 1 W dc-dc converter modules with regulated output, featuring wide 2:1 input voltage ranges. These products come in a compact SIP-6 or SMD package with small footprint occupying only 1.2 cm² (0.2 square inch) of board space.

An excellent efficiency allows -40°C to $+85^{\circ}\text{C}$ operation temperature. Further features include remote On/Off control (SMD-Version) and continuous short circuit protection. The compact dimensions and cost optimised design make this converters an ideal solution for applications in communication equipment, instrumentation and industrial electronics.

| Models | | | | | | |
|------------------------|------------------------|----------------------------------|----------------|---------------------|---------------------|---------------------|
| Order code SIP-package | Order code SMD-package | Input voltage range | Output voltage | Output current max. | Efficiency SIP typ. | Efficiency SMD typ. |
| TMR 1-0511 | TMR 1-0511SM | 4.5 – 9.0 VDC (5 VDC nominal) | 5.0 VDC | 200 mA | 76 % | 78 % |
| TMR 1-0512 | TMR 1-0512SM | | 12 VDC | 83 mA | 77 % | 79 % |
| TMR 1-0513 | TMR 1-0513SM | | 15 VDC | 67 mA | 79 % | 81 % |
| TMR 1-0515 | | | 24 VDC | 42 mA | 76 % | |
| TMR 1-0522 | TMR 1-0522SM | | ± 12 VDC | ± 42 mA | 77 % | 79 % |
| TMR 1-0523 | TMR 1-0523SM | | ± 15 VDC | ± 33 mA | 78 % | 80 % |
| TMR 1-1211 | TMR 1-1211SM | 9.0 – 18 VDC (12 VDC nominal) | 5.0 VDC | 200 mA | 77 % | 79 % |
| TMR 1-1212 | TMR 1-1212SM | | 12 VDC | 83 mA | 77 % | 79 % |
| TMR 1-1213 | TMR 1-1213SM | | 15 VDC | 67 mA | 80 % | 82 % |
| TMR 1-1215 | | | 24 VDC | 42 mA | 77 % | |
| TMR 1-1222 | TMR 1-1222SM | | ± 12 VDC | ± 42 mA | 79 % | 81 % |
| TMR 1-1223 | TMR 1-1223SM | | ± 15 VDC | ± 33 mA | 78 % | 80 % |
| TMR 1-2411 | TMR 1-2411SM | 18 – 36 VDC (24 VDC nominal) | 5.0 VDC | 200 mA | 77 % | 79 % |
| TMR 1-2412 | TMR 1-2412SM | | 12 VDC | 83 mA | 80 % | 82 % |
| TMR 1-2413 | TMR 1-2413SM | | 15 VDC | 67 mA | 80 % | 82 % |
| TMR 1-2415 | | | 24 VDC | 42 mA | 77 % | |
| TMR 1-2422 | TMR 1-2422SM | | ± 12 VDC | ± 42 mA | 80 % | 82 % |
| TMR 1-2423 | TMR 1-2423SM | | ± 15 VDC | ± 33 mA | 80 % | 82 % |
| TMR 1-4811 | TMR 1-4811SM | 36 – 75 VDC (48 VDC nominal) | 5.0 VDC | 200 mA | 77 % | 79 % |
| TMR 1-4812 | TMR 1-4812SM | | 12 VDC | 83 mA | 78 % | 80 % |
| TMR 1-4813 | TMR 1-4813SM | | 15 VDC | 67 mA | 78 % | 80 % |
| TMR 1-4815 | | | 24 VDC | 42 mA | 76 % | |
| TMR 1-4822 | TMR 1-4822SM | | ± 12 VDC | ± 42 mA | 79 % | 81 % |
| TMR 1-4823 | TMR 1-4823SM | | ± 15 VDC | ± 33 mA | 79 % | 81 % |

Input Specifications

| | |
|--|---|
| Input current at no load (nominal input voltage) | 5.0 V models: 40 mA typ. 12 V models: 20 mA typ. 24 V models: 10 mA typ. 48 V models: 7 mA typ. |
| Surge voltage (1 sec. max.) | 5.0 V models: 15 V max. 12 V models: 25 V max. 24 V models: 50 V max. 48 V models: 100 V max. |
| Start-up voltage / under voltage lockout | 5.0 V models: 4.5 VDC / 4 VDC or lower 12 V models: 9 VDC / 8.5 VDC or lower 24 V models: 18 VDC / 17 VDC or lower 48 V models: 36 VDC / 34 VDC or lower long term operation at undervoltage will damage the converter! |
| Conducted noise (input) | EN 55022 level A, FCC part 15, level A with external capacitor. see EMC consideration |
| Recommended input fuse (slow blow) | 5 V models: 500 mA 12 V models: 250 mA 24 V models: 120 mA 48 V models: 60 mA |

Output Specifications

| | |
|--|--|
| Voltage set accuracy | ±1 % max. |
| Regulation | – Input variation $V_{in\ min.}$ to $V_{in\ max.}$: 0.2 % max. – No load to full load Single & Dual output models: ±1.0 % max. – Load variation 10 – 90% Single output models: ±0.5 % max. Dual output models (balanced load): ±0.8 % max. |
| Minimum load | no minimum load required |
| Temperature coefficient | 0.02 %/K |
| Ripple and noise (20 MHz bandwidth) | SMD models: 30 mVp-p max. SIP models: 50 mVp-p max. |
| Transient response setting time (25% load step change) | 250 µs typ. (PFM) |
| Current limitation | >120 % of $I_{out\ max.}$ |
| Short circuit protection | continuous, automatic recovery |
| Capacitive load | 5 VDC models: 1'680 µF max. 12 VDC models: 820 µF max. 15 VDC models: 680 µF max. 24 VDC models: 470 µF max. ±12 VDC models: 470 µF max. (each output) ±15 VDC models: 330 µF max. (each output) |

General Specifications

| | | |
|---|--|---|
| Temperature ranges | – Operating – Case temperature – Storage | SIP models: –40°C to +85°C with no derating SMD models: –40°C to +82°C with derating +105°C (SIP) / +95°C (SMD) max. –55°C to +125°C |
| Load derating | SMD models: | 7.2 %/K above +75°C |
| Humidity (non condensing) | | 95 % rel. H max. |
| Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign) | | >2.8 Mio h |

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

General Specifications

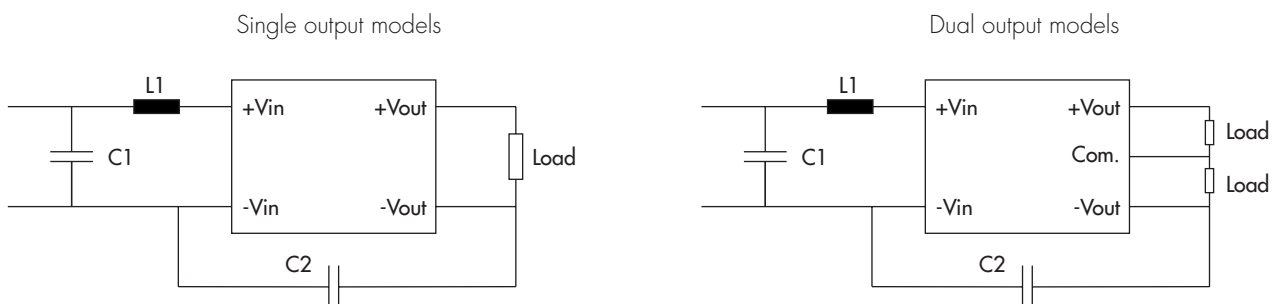
| | | |
|---------------------------------|---|--|
| Isolation voltage (60 sec.) | - Input/Output | 1'500 VDC |
| Isolation capacitance | - Input/Output | 50 pF max. |
| Isolation resistance | - Input/Output (500 VDC) | >1 GOhm |
| Switching frequency | | 220 kHz (PFM) |
| Safety standards | | UL 60950-1, IEC/EN 60950-1 IEC 60950-1:2005 (2nd Edition); Am 1:2009 EN 60950-1:2006+A11:2009+A1:2010+A12:2011 |
| Safety approvals | - CB test certificate (IEC 60950-1) | www.tracopower.com/products/tmr1-cb.pdf |
| Remote On/Off (SMD models only) | - On: - Off: - Off standby current: - Off control input current: | < 0.6 VDC or open circuit 2.7 to 15 VDC (ref. to -Vin) 2.5 mA max. 1 mA max. |

Physical Specifications

| | | |
|--|-------------------|---|
| Casing material | | non-conductive plastic (UL94V-0 rated) |
| Potting material | | epoxy, (UL 94V-0 rated) |
| Weight | | 3.1 g (0.11oz) (SIP)/3.3 g (0.12oz) (SMD) |
| Soldering profile for SIP-package models | | max. 265°C / 10 sec. (wave soldering) |
| Lead-free reflow solder process for SMD-package models | | as per J-STD-020D.01 (to find at: www.jedec.org - free registration required) |
| Moisture sensivity level (for SMD-package models) | | level 2a as per J-STD-033B.01 (to find at: www.jedec.org - free registration required) |
| Environmental compliance | - Reach - RoHS | www.tracopower.com/products/reach-declaration.pdf RoHS directive 2011/65/EU |

EMC Consideration

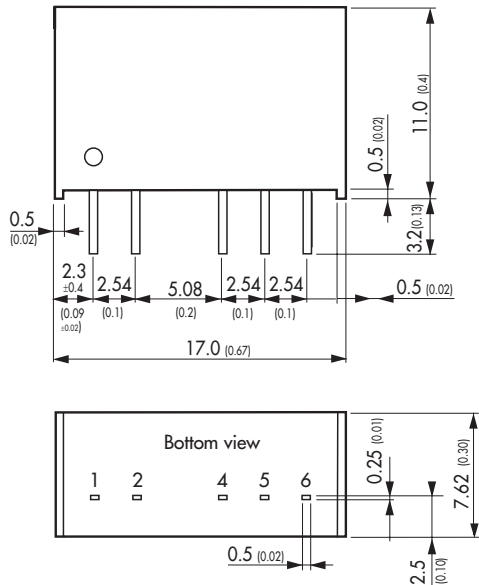
Filter suggestion for to comply with EN55022 class A conducted noise emission



| Input models | C1 | C2 | L1 |
|--------------|----------------------|-----------------------|-----------------------|
| 5 VDC | 4.7µF /50V, 1210 X7R | 220pF /2 kV, 1808 X7R | 4.7µH / 1.2 A, SR0302 |
| 12 VDC | 4.7µF /50V, 1210 X7R | | 4.7µH / 1.2 A, SR0302 |
| 24 VDC SIP | 4.7µF /50V, 1210 X7R | | 18µH / 0.58 A, SR0302 |
| 24 VDC SMD | 4.7µF /50V, 1210 X7R | | 12µH / 0.75 A, SR0302 |
| 48 VDC SIP | 4.7µF /100V 1210 X7R | | 18µH / 0.58A, SR0302 |
| 48 VDC SMD | 2.2µF / 00V 1210 X7R | | 18µH / 0.58A, SR0302 |

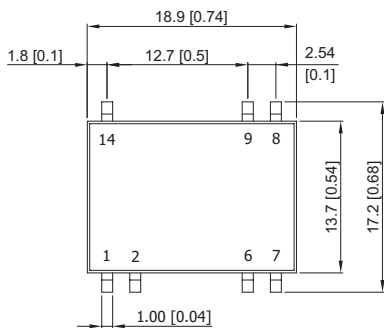
Outline Dimensions mm (inches)

SIP-Package



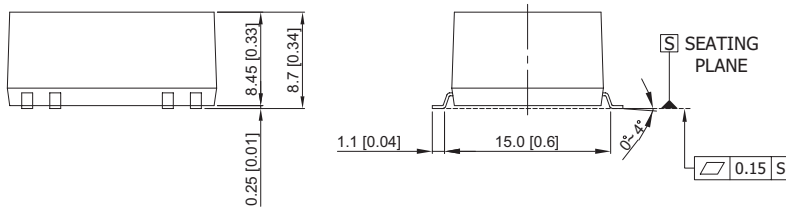
| Pinout | | |
|--------|---------------|-------------|
| Pin | single output | dual output |
| 1 | -Vin (GND) | -Vin (GND) |
| 2 | +Vin (Vcc) | +Vin (Vcc) |
| 4 | +Vout | +Vout |
| 5 | No Pin | Common |
| 6 | -Vout | -Vout |

SMD-Package



| Pinout | | |
|--------|---------------|---------------|
| Pin | single output | dual output |
| 1 | -Vin (GND) | -Vin (GND) |
| 2 | Remote On/Off | Remote On/Off |
| 6 | ntc | Common |
| 7 | ntc | -Vout |
| 8 | +Vout | +Vout |
| 9 | -Vout | Common |
| 14 | +Vin | +Vin |

ntc = not to connect to electrical circuit



Dimensions in [mm], () = Inch
Tolerances: ±0.5 (±0.02)
Pin pitch tolerances: ±0.25 (±0.01)

Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at www.tracopower.com



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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