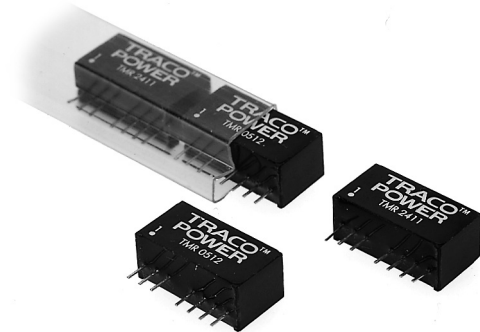


#### Features

- ◆ Wide 2:1 input voltage range
- ◆ Compact SIP-8 package
- ◆ Small footprint
- ◆ Full SMD design
- ◆ Temperature range -40° to +85°C
- ◆ High efficiency
- ◆ Excellent load and line regulation
- ◆ Indefinite short-circuit protection
- ◆ I/O isolation 1000VDC
- ◆ Remote On/Off control
- ◆ Fully RoHS compliant
- ◆ 3-year product warranty



The TMR-2 series is a family of isolated 2W dc-dc converter modules with regulated output, featuring wide 2:1 input voltage ranges. The product comes in a compact SIP-8 plastic package with small footprint occupying only 2.0 cm<sup>2</sup> (0.3 square in.) of board space.

An excellent efficiency allows -40° to +85°C operation temperatures. Further features include remote On/Off control and continuous short circuit protection. The ultra-compact dimensions of these converters make them an ideal solution for many space critical applications in communication equipment, instrumentation and industrial electronics.

#### Models

| Ordercode | Input voltage range                     | Output voltage | Output current max. | Efficiency typ. |
|-----------|-----------------------------------------|----------------|---------------------|-----------------|
| TMR 0510  | <b>4.5 – 9.0 VDC</b><br>(5 VDC nominal) | 3.3 VDC        | 500 mA              | 76 %            |
| TMR 0511  |                                         | 5 VDC          | 400 mA              | 80 %            |
| TMR 0512  |                                         | 12 VDC         | 165 mA              | 81 %            |
| TMR 0521  |                                         | ±5 VDC         | ±200 mA             | 79 %            |
| TMR 0522  |                                         | ±12 VDC        | ±85 mA              | 82 %            |
| TMR 0523  |                                         | ±15 VDC        | ±65 mA              | 81 %            |
| TMR 1210  | <b>9 – 18 VDC</b><br>(12 VDC nominal)   | 3.3 VDC        | 500 mA              | 77 %            |
| TMR 1211  |                                         | 5 VDC          | 400 mA              | 81 %            |
| TMR 1212  |                                         | 12 VDC         | 165 mA              | 83 %            |
| TMR 1221  |                                         | ±5 VDC         | ±200 mA             | 81 %            |
| TMR 1222  |                                         | ±12 VDC        | ±85 mA              | 83 %            |
| TMR 1223  |                                         | ±15 VDC        | ±65 mA              | 84 %            |
| TMR 2410  | <b>18 – 36 VDC</b><br>(24 VDC nominal)  | 3.3 VDC        | 500 mA              | 78 %            |
| TMR 2411  |                                         | 5 VDC          | 400 mA              | 81 %            |
| TMR 2412  |                                         | 12 VDC         | 165 mA              | 83 %            |
| TMR 2421  |                                         | ±5 VDC         | ±200 mA             | 80 %            |
| TMR 2422  |                                         | ±12 VDC        | ±85 mA              | 83 %            |
| TMR 2423  |                                         | ±15 VDC        | ±65 mA              | 82 %            |
| TMR 4810  | <b>36 – 75 VDC</b><br>(48 VDC nominal)  | 3.3 VDC        | 500 mA              | 76 %            |
| TMR 4811  |                                         | 5 VDC          | 400 mA              | 78 %            |
| TMR 4812  |                                         | 12 VDC         | 165 mA              | 83 %            |
| TMR 4821  |                                         | ±5 VDC         | ±200 mA             | 80 %            |
| TMR 4822  |                                         | ±12 VDC        | ±85 mA              | 81 %            |
| TMR 4823  |                                         | ±15 VDC        | ±65 mA              | 81 %            |

## Input Specifications

|                                                        |                                                                                                                                                |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Input current at full load (nominal input)             | 5 Vin models: 645 mA max.<br>12 Vin models: 242 mA max.<br>24 Vin models: 117 mA max.<br>48 Vin models: 62 mA max.                             |
| Surge voltage (100 msec. max.)                         | 5 Vin models: 15 V max.<br>12 Vin models: 36 V max.<br>24 Vin models: 50 V max.<br>48 Vin models: 100 V max.                                   |
| Input voltage variation (dv/dt)                        | 5 V/ms, max.<br>(complies to ETS 300 132 part. 4.4)                                                                                            |
| Input Filter                                           | capacitor type                                                                                                                                 |
| Start up time                                          | 5 ms typ. (at nominal input and resistive load)                                                                                                |
| ESD (electrostatic discharge)                          | EN 61000-4-2, air $\pm 8$ kV, contact $\pm 6$ kV, perf. criteria A                                                                             |
| Radiated immunity                                      | EN 61000-4-3, 10 V/m, perf. criteria A                                                                                                         |
| Fast transient / surge (with external input capacitor) | EN 61000-4-4, $\pm 2$ kV, perf. criteria A<br>EN 61000-4-5, $\pm 1$ kV perf. criteria A<br>Nippon chemi-con KY 220 $\mu$ F, 100 V, ESR 48 mOhm |
| – external input capacitor                             |                                                                                                                                                |
| Conducted immunity                                     | EN 61000-4-6, 10 Vrms, perf. criteria A                                                                                                        |

## Output Specifications

|                                           |                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Voltage set accuracy                      | $\pm 1$ %                                                                                                                                                                                                                                                                                                                              |
| Regulation                                | – Input variation Vin min. to Vin max. 0.2 % max.<br>– No load to full load single output models: $\pm 1.0$ % max.<br>dual output models: $\pm 1.0$ % max.<br>– Load variation 10 – 90 % single output models: $\pm 0.5$ % max.<br>dual output models: $\pm 0.8$ % max.<br>dual output models asymmetric load: 5.0 % max. (25% / 100%) |
| Minimum load                              | 0 %                                                                                                                                                                                                                                                                                                                                    |
| Ripple and noise (20 MHz Bandwidth)       | 50 mVpk-pk max.                                                                                                                                                                                                                                                                                                                        |
| Temperature coefficient                   | $\pm 0.02$ %/°C                                                                                                                                                                                                                                                                                                                        |
| Transient response (25% load step change) | 500 $\mu$ s typ.                                                                                                                                                                                                                                                                                                                       |
| Short circuit protection                  | continuous, automatic recovery                                                                                                                                                                                                                                                                                                         |
| Capacitive load                           | 3.3 VDC / 5 VDC output models: 2'200 $\mu$ F max. / 1'000 $\mu$ F max.<br>12 VDC / $\pm 5$ VDC output models: 170 $\mu$ F max. / $\pm 470$ $\mu$ F max.<br>$\pm 12$ VDC / $\pm 15$ VDC output models: 100 $\mu$ F max. / $\pm 47$ $\mu$ F max.                                                                                         |

## General Specifications

|                                                                      |                                                                        |
|----------------------------------------------------------------------|------------------------------------------------------------------------|
| Temperature ranges                                                   | – Operating –55°C to +85°C (non derating)<br>– Storage –55°C to +125°C |
| Derating (convection cooling)                                        | 2 %/K above 75°C                                                       |
| Humidity (non condensing)                                            | 95 % rel. H max.                                                       |
| Reliability, calculated MTBF (Telcordia SR-332, 50% stress, Ta=40°C) | 5.1 Mio. h                                                             |
| Isolation voltage (60 sec.)                                          | – Input/Output 1'600 VDC                                               |
| Isolation capacitance                                                | – Input/Output 200 pF max.                                             |
| Isolation resistance                                                 | – Input/Output (500 VDC) >1'000 MOhm                                   |
| Switching frequency                                                  | 100 to 650 kHz (PFM)                                                   |

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

## General Specifications

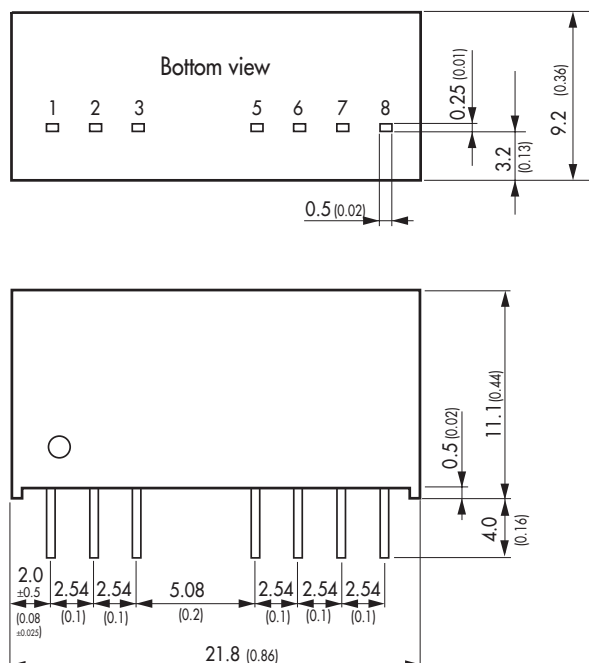
|                                             |                                                                                                               |                                                                                                                                                                |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Remote On/Off                               | <ul style="list-style-type: none"> <li>– On:</li> <li>– Off:</li> <li>– Off stand by input current</li> </ul> | open or high impedance<br>2...4 mA input current applied via 1KW resistor<br>max. 2.5 mA                                                                       |
| Safety standards                            |                                                                                                               | UL/cUL 60950-1, IEC/EN 60950-1                                                                                                                                 |
| Safety approvals                            | – UL/cUL                                                                                                      | <a href="http://www.ul.com">www.ul.com</a> -> certifications -> File e188913                                                                                   |
| Thermal shock, mechanical shock & vibration | – Test conditions                                                                                             | MIL-STD-810F<br><a href="http://www.tracopower.com/products/mil810.pdf">www.tracopower.com/products/mil810.pdf</a>                                             |
| Environmental compliance                    | <ul style="list-style-type: none"> <li>– Reach</li> <li>– RoHS</li> </ul>                                     | <a href="http://www.tracopower.com/products/tmr2-reach.pdf">www.tracopower.com/products/tmr2-reach.pdf</a><br>RoHS Directive 2011/65/EU                        |
| Altitude                                    | <ul style="list-style-type: none"> <li>– operation</li> <li>– non operation</li> <li>– test report</li> </ul> | < 40'000ft (12'000m)<br>< 50'000ft (15'000m)<br><a href="http://www.tracopower.com/products/tmr-altitude.pdf">www.tracopower.com/products/tmr-altitude.pdf</a> |

## Physical Specifications

|                  |                                        |
|------------------|----------------------------------------|
| Casing material  | non-conductive plastic                 |
| Potting material | epoxy (UL 94V-0-rated)                 |
| Weight           | 4.8 g (0.17oz) Physical Specifications |

**Application note:** [www.tracopower.com/products/tmr2-application.pdf](http://www.tracopower.com/products/tmr2-application.pdf)

## Outline Dimensions mm (inches)



| Pin-Out |               |               |
|---------|---------------|---------------|
| Pin     | Single        | Dual          |
| 1       | –Vin (GND)    | –Vin (GND)    |
| 2       | +Vin (Vcc)    | +Vin (Vcc)    |
| 3       | Remote On/Off | Remote On/Off |
| 5       | No function   | No function   |
| 6       | +Vout         | +Vout         |
| 7       | –Vout         | Common        |
| 8       | No function   | –Vout         |

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

Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at [www.tracopower.com](http://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.);

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- 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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