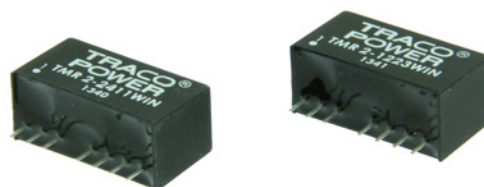


### Features

- ◆ Ultra-wide 4:1 input range
- ◆ Compact SIP-8 package
- ◆ Temperature range -40 to +90°C (up to +75°C at full load)
- ◆ High efficiency of 82%
- ◆ Excellent load and line regulation
- ◆ Continuous short-circuit protection
- ◆ Overload protection
- ◆ I/O isolation 1500 VDC
- ◆ Remote On/Off control
- ◆ 3-year product warranty



The TMR-2WIN series is a family of isolated 2 W DC/DC converter modules with accurately regulated output voltages and ultra-wide 4:1 input voltage ranges. They require no minimum load and are protected against overload and short circuit. An excellent efficiency along with the use of high grade components allows a compact construction in SIP-8 package; even the converters can reliably operate in an ambient temperature of -40°C to +75°C at full load and up to 90°C with 50% power derating. Typical applications for these converters are distributed power architectures in communication, instrumentation and industrial electronics, everywhere where space on the PCB is critical.

### Models

| Ordercode     | Input voltage range                     | Output voltage | Output current max. | Efficiency typ. |
|---------------|-----------------------------------------|----------------|---------------------|-----------------|
| TMR 2-1210WIN | <b>4.5 – 18 VDC</b><br>(12 VDC nominal) | 3.3 VDC        | 500 mA              | 75 %            |
| TMR 2-1211WIN |                                         | 5 VDC          | 400 mA              | 80 %            |
| TMR 2-1212WIN |                                         | 12 VDC         | 167 mA              | 82 %            |
| TMR 2-1213WIN |                                         | 15 VDC         | 134 mA              | 82 %            |
| TMR 2-1221WIN |                                         | ±5 VDC         | ±200 mA             | 80 %            |
| TMR 2-1222WIN |                                         | ±12 VDC        | ±83 mA              | 82 %            |
| TMR 2-1223WIN |                                         | ±15 VDC        | ±67 mA              | 82 %            |
| TMR 2-2410WIN | <b>9 – 36 VDC</b><br>(24 VDC nominal)   | 3.3 VDC        | 500 mA              | 75 %            |
| TMR 2-2411WIN |                                         | 5 VDC          | 400 mA              | 80 %            |
| TMR 2-2412WIN |                                         | 12 VDC         | 167 mA              | 82 %            |
| TMR 2-2413WIN |                                         | 15 VDC         | 134 mA              | 82 %            |
| TMR 2-2421WIN |                                         | ±5 VDC         | ±200 mA             | 80 %            |
| TMR 2-2422WIN |                                         | ±12 VDC        | ±83 mA              | 82 %            |
| TMR 2-2423WIN |                                         | ±15 VDC        | ±67 mA              | 82 %            |
| TMR 2-4810WIN | <b>18 – 75 VDC</b><br>(48 VDC nominal)  | 3.3 VDC        | 500 mA              | 74 %            |
| TMR 2-4811WIN |                                         | 5 VDC          | 400 mA              | 80 %            |
| TMR 2-4812WIN |                                         | 12 VDC         | 167 mA              | 82 %            |
| TMR 2-4813WIN |                                         | 15 VDC         | 134 mA              | 82 %            |
| TMR 2-4821WIN |                                         | ±5 VDC         | ±200 mA             | 80 %            |
| TMR 2-4822WIN |                                         | ±12 VDC        | ±83 mA              | 82 %            |
| TMR 2-4823WIN |                                         | ±15 VDC        | ±67 mA              | 82 %            |

### Input Specifications

|                                                                                                                   |                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Input current at no load (nominal input)                                                                          | 12 Vin models: 60 mA typ.<br>24 Vin models: 30 mA typ.<br>48 Vin models: 20 mA typ.                                   |
| Surge voltage (1 sec. max.)                                                                                       | 12 Vin models: 25 V max.<br>24 Vin models: 50 V max.<br>48 Vin models: 100 V max.                                     |
| Short circuit input power                                                                                         | 1500 mW                                                                                                               |
| Input Filter                                                                                                      | capacitor type                                                                                                        |
| Recommended input fuse (DC slow blow)                                                                             | 12 Vin models: 1000 mA<br>24 Vin models: 500 mA<br>48 Vin models: 250 mA                                              |
| Start up voltage / under voltage shutdown (hysteresis)<br>long term operation with under-voltage may cause damage | 12 Vin models: 4.5 / 4.0 V (or lower)<br>24 Vin models: 9.0 / 8.0 V (or lower)<br>48 Vin models: 18 / 16 V (or lower) |
| Recommended input fuse (DC slow blow)                                                                             | 12 Vin models: 1000 mA<br>24 Vin models: 500 mA<br>48 Vin models: 250 mA                                              |

### Output Specifications

|                                            |                                                                                                                                                                                                                         |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Voltage set accuracy                       | ±2 %                                                                                                                                                                                                                    |
| Regulation                                 | – Input variation Vin min. to Vin max. 0.5 % max.<br>– Load variation 0 – 100 % single output models: 1.0 % max.<br>dual output models: 2.0 % max. (balanced load)                                                      |
| Minimum load                               | no minimum load required                                                                                                                                                                                                |
| Temperature coefficient                    | ±0.02 %/°C                                                                                                                                                                                                              |
| Ripple and noise (20 MHz Bandwidth)        | 100 mVp-p max                                                                                                                                                                                                           |
| Transient response (25 % load step change) | 500 µs max.                                                                                                                                                                                                             |
| Short circuit protection                   | continuous (automatic recovery)                                                                                                                                                                                         |
| Capacitive load                            | 3.3 VDC / 5 VDC models: 1'000 µF max.<br>12 VDC models: 170 µF max.<br>15VDC models: 110 µF max.<br>±5 VDC models: 470 µF max.<br>±12 VDC models: 100 µF max. (each output)<br>±15 VDC models: 47 µF max. (each output) |

### General Specifications

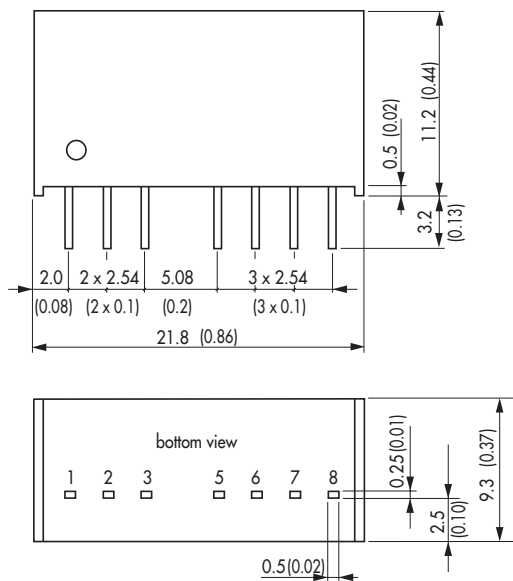
|                                                                      |                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature ranges                                                   | – Operating (natural convection 20 LFM) –40°C to +90°C<br>– Case temperature +105°C max.<br>– Storage –55°C to +125°C                                                                                                                                                                                     |
| Derating (convection cooling)                                        | 3.3 %/K above 75°C                                                                                                                                                                                                                                                                                        |
| Humidity (non condensing)                                            | 95 % rel. H max.                                                                                                                                                                                                                                                                                          |
| Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground benign) | >1 Mio h                                                                                                                                                                                                                                                                                                  |
| Isolation voltage (60 sec.) – Input/Output                           | 1'500 VDC                                                                                                                                                                                                                                                                                                 |
| Isolation capacitance – Input/Output                                 | 500 pF max.                                                                                                                                                                                                                                                                                               |
| Isolation resistance – Input/Output (500 VDC)                        | >1'000 M Ohm                                                                                                                                                                                                                                                                                              |
| Switching frequency                                                  | 300 kHz (PFM)                                                                                                                                                                                                                                                                                             |
| Safety standards                                                     | CAN/CSA-C22.2 No 60950-1-07, 2nd ed; A1:2011<br>ANSI/UL No. 60950-1, 2nd ed.; A1:2011<br>IEC 60950-1:2005 (2nd edition); Am 1:2009<br>EN 60950-1:2006/A11:2009/A1:2010/A12:2011<br>– Certification documents <a href="http://www.tracopower.com/overview/tmr2win">www.tracopower.com/overview/tmr2win</a> |

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

### Physical Specifications

|                          |                                                     |                                                                                                                                            |
|--------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Remote On/Off            | – On:<br>– Off:<br><br>– Off stand by input current | open or high impedance<br>2...4 mA input current (constant)<br>or: 6...9 VDC via 1 k $\Omega$ resistor (Referenced to –Vin)<br>max. 2.5 mA |
| Casing material          |                                                     | non-conductive plastic                                                                                                                     |
| Potting material         |                                                     | epoxy (UL 94V-0 rated)                                                                                                                     |
| Weight                   |                                                     | 4.65 g (0.16 oz)                                                                                                                           |
| Soldering temperature    |                                                     | max. 260°C / 10 sec.                                                                                                                       |
| Environmental compliance | – Reach<br>– RoHS                                   | <a href="http://www.tracopower.com/overview/tmr2win">www.tracopower.com/overview/tmr2win</a><br>directive 2011/65/EU                       |

### Outline Dimensions



| Pin-Out |               |               |
|---------|---------------|---------------|
| Pin     | Single        | Dual          |
| 1       | –Vin (GND)    | –Vin (GND)    |
| 2       | +Vin (Vcc)    | +Vin (Vcc)    |
| 3       | Remote On/Off | Remote On/Off |
| 5       | ntc           | ntc           |
| 6       | +Vout         | +Vout         |
| 7       | –Vout         | Common        |
| 8       | ntc           | –Vout         |

(ntc = not to connect)

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