

#### Features

- ◆ Wide 2:1 input voltage range
- ◆ Fully regulated output voltage
- ◆ Compact SIP-8 package
- ◆ Models with 1'500 VDC and 3'000 VDC I/O isolation (functional insulation)
- ◆ Small footprint
- ◆ Temperature range  $-40^{\circ}$  to  $+85^{\circ}\text{C}$
- ◆ High efficiency up to 85%
- ◆ Short-circuit protection
- ◆ Remote On/Off control
- ◆ 3-year product warranty



The TMR-3 series is a new family of isolated 3W 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 a small footprint occupying only 2.0 cm<sup>2</sup> (0.3 square in.) of board space.

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

#### Models

| Order code         |                    | Input voltage range              | Output voltage | Output current max. | Efficiency typ. |
|--------------------|--------------------|----------------------------------|----------------|---------------------|-----------------|
| 1500 VDC isolation | 3000 VDC isolation |                                  |                |                     |                 |
| TMR 3-0510         | TMR 3-0510HI       | 4.5 – 9.0 VDC<br>(5 VDC nominal) | 3.3 VDC        | 700 mA              | 75 %            |
| TMR 3-0511         | TMR 3-0511HI       |                                  | 5 VDC          | 600 mA              | 79 %            |
| TMR 3-0512         | TMR 3-0512HI       |                                  | 12 VDC         | 250 mA              | 81 %            |
| TMR 3-0513         | TMR 3-0513HI       |                                  | 15 VDC         | 200 mA              | 82 %            |
| TMR 3-0521         | TMR 3-0521HI       |                                  | $\pm 5$ VDC    | $\pm 300$ mA        | 78 %            |
| TMR 3-0522         | TMR 3-0522HI       |                                  | $\pm 12$ VDC   | $\pm 125$ mA        | 81 %            |
| TMR 3-0523         | TMR 3-0523HI       |                                  | $\pm 15$ VDC   | $\pm 100$ mA        | 81 %            |
| TMR 3-1210         | TMR 3-1210HI       | 9 – 18 VDC<br>(12 VDC nominal)   | 3.3 VDC        | 700 mA              | 77 %            |
| TMR 3-1211         | TMR 3-1211HI       |                                  | 5 VDC          | 600 mA              | 81 %            |
| TMR 3-1212         | TMR 3-1212HI       |                                  | 12 VDC         | 250 mA              | 83 %            |
| TMR 3-1213         | TMR 3-1213HI       |                                  | 15 VDC         | 200 mA              | 83 %            |
| TMR 3-1221         | TMR 3-1221HI       |                                  | $\pm 5$ VDC    | $\pm 300$ mA        | 82 %            |
| TMR 3-1222         | TMR 3-1222HI       |                                  | $\pm 12$ VDC   | $\pm 125$ mA        | 83 %            |
| TMR 3-1223         | TMR 3-1223HI       |                                  | $\pm 15$ VDC   | $\pm 100$ mA        | 83 %            |
| TMR 3-2410         | TMR 3-2410HI       | 18 – 36 VDC<br>(24 VDC nominal)  | 3.3 VDC        | 700 mA              | 76 %            |
| TMR 3-2411         | TMR 3-2411HI       |                                  | 5 VDC          | 600 mA              | 82 %            |
| TMR 3-2412         | TMR 3-2412HI       |                                  | 12 VDC         | 250 mA              | 83 %            |
| TMR 3-2413         | TMR 3-2413HI       |                                  | 15 VDC         | 200 mA              | 84 %            |
| TMR 3-2421         | TMR 3-2421HI       |                                  | $\pm 5$ VDC    | $\pm 300$ mA        | 80 %            |
| TMR 3-2422         | TMR 3-2422HI       |                                  | $\pm 12$ VDC   | $\pm 125$ mA        | 83 %            |
| TMR 3-2423         | TMR 3-2423HI       |                                  | $\pm 15$ VDC   | $\pm 100$ mA        | 85 %            |
| TMR 3-4810         | TMR 3-4810HI       | 36 – 75 VDC<br>(48 VDC nominal)  | 3.3 VDC        | 700 mA              | 74 %            |
| TMR 3-4811         | TMR 3-4811HI       |                                  | 5 VDC          | 600 mA              | 79 %            |
| TMR 3-4812         | TMR 3-4812HI       |                                  | 12 VDC         | 250 mA              | 81 %            |
| TMR 3-4813         | TMR 3-4813HI       |                                  | 15 VDC         | 200 mA              | 82 %            |
| TMR 3-4821         | TMR 3-4821HI       |                                  | $\pm 5$ VDC    | $\pm 300$ mA        | 79 %            |
| TMR 3-4822         | TMR 3-4822HI       |                                  | $\pm 12$ VDC   | $\pm 125$ mA        | 82 %            |
| TMR 3-4823         | TMR 3-4823HI       |                                  | $\pm 15$ VDC   | $\pm 100$ mA        | 83 %            |

## Input Specifications

|                                                                    |             |                                                                                                                                                                                    |
|--------------------------------------------------------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input current at full load / at no load<br>(nominal input voltage) |             | 4.5–9 Vin models: 810 mA max. / 60 mA typ.<br>9–18 Vin models: 330 mA max. / 30 mA typ.<br>18–36 Vin models: 160 mA max. / 18 mA typ.<br>36–75 Vin models: 85 mA max. / 12 mA typ. |
| Surge voltage (100 msec. max.)                                     |             | 4.5–9 Vin models: 15 V max.<br>9–18 Vin models: 36 V max.<br>18–36 Vin models: 50 V max.<br>36–75 Vin models: 100 V max.                                                           |
| Input voltage variation (dv/dt)                                    |             | 5 V/ms, max.<br>(complies with ETS300 132 part 4.4)                                                                                                                                |
| Input filter                                                       |             | capacitor type (see application note for compliance to EN 55022 class A/B)                                                                                                         |
| Start up time<br>(constant resistive load)                         | – Power On  | 30 ms typ.                                                                                                                                                                         |
|                                                                    | – Remote On | 30 ms typ.                                                                                                                                                                         |

## Output Specifications

|                                                        |                                        |                                              |
|--------------------------------------------------------|----------------------------------------|----------------------------------------------|
| Voltage set accuracy                                   |                                        | ±1 % max                                     |
| Regulation                                             | – Input variation Vin min. to Vin max. | 0.2 % max.                                   |
|                                                        | – Load variation 5 – 100%              | single output models: 0.5 % max.             |
|                                                        |                                        | dual output models: 1.0 % max. balanced load |
|                                                        | – Load variation 0 – 100%              | single output models: 1.0 % max.             |
|                                                        |                                        | dual output models: 1.0 % max. balanced load |
| – Load cross regulation 25/100%                        |                                        | 5.0 % max. (dual output models)              |
| Minimum load                                           |                                        | 0 % of rated max. load                       |
| Ripple and noise (20 MHz Bandwidth)                    |                                        | 50 mVpk-pk max.                              |
| Transient response setting time (25% load step change) |                                        | 500 µs typ.                                  |
| Short circuit protection                               |                                        | indefinite, automatic recovery               |
| Capacitive load                                        | 3.3 VDC / 5 VDC output models:         | 3300 µF max. / 1680 µF max.                  |
|                                                        | 12 VDC / 15 VDC output models:         | 820 µF max. / 680 µF max.                    |
|                                                        | ±5 VDC / ±12 VDC output models:        | ±1000 µF max. / ±470 µF max.                 |
|                                                        | ±15 VDC output models:                 | ±330 µF max.                                 |

## General Specifications

|                                                                       |                              |                                             |
|-----------------------------------------------------------------------|------------------------------|---------------------------------------------|
| Temperature ranges                                                    | – Operating                  | –40°C to +85°C                              |
|                                                                       | – Case temperature           | +100°C max.                                 |
|                                                                       | – Storage                    | –55°C to +105°C                             |
| Load derating                                                         |                              | 3.3 %/K above 70°C                          |
| Humidity (non condensing)                                             |                              | 95 % rel. H max.                            |
| Temperature coefficient                                               |                              | ±0.02 %/K                                   |
| Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign) |                              | >4.8 Mio h                                  |
| Isolation voltage (60 sec.)                                           | – Input/Output               | 1500 VDC                                    |
|                                                                       | with suffix -HI:             | 3000 VDC                                    |
| Isolation capacitance                                                 | – Input/Output               | 200 pF max.                                 |
|                                                                       | with suffix -HI:             | 40 pF max.                                  |
| Isolation resistance                                                  |                              | >10 GOhm                                    |
| Switching frequency                                                   |                              | 100 kHz min. (PFM)                          |
| Remote On/Off                                                         | – On:                        | open or high impedance                      |
|                                                                       | – Off:                       | 2...4 mA current applied via 1KOhm resistor |
|                                                                       | – Off stand by input current | 2.5 mA max.                                 |

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

## General Specifications

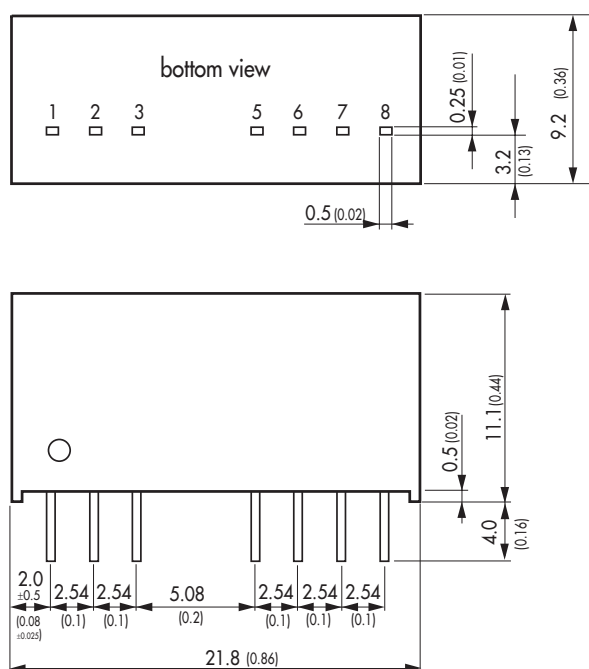
|                          |                                                                                                                                                              |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety standards         | IEC/EN 60950-1, UL 60950-1                                                                                                                                   |
| Safety approvals         | – UL/cUL<br><a href="http://www.ul.com">www.ul.com</a> > UL File no.: e188913                                                                                |
| Environmental compliance | – Reach<br>– RoHS<br><a href="http://www.tracopower.com/products/tmr3-reach.pdf">www.tracopower.com/products/tmr3-reach.pdf</a><br>RoHS directive 2011/65/EU |

## Physical Specifications

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

**Application note:** [www.tracopower.com/products/tmr3-application.pdf](http://www.tracopower.com/products/tmr3-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         |

\*No pin 5 with HI version

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

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