

- Fully encapsulated chassis mount modules
- Harsh industrial EMC capabilities: Integrated filters for emission (EN 55032) & immunity (EN 55035)
- Ultra wide 4:1 input voltage range: 9-36 and 18-75 VDC
- Operating temperature range -40 to +80 °C without derating
- I/O-isolation 3'000 VDC
- Protection against overload, undervoltage and short circuit
- DC-OK (LED) and Remote On/Off function
- IEC/EN/UL 62368-1 safety approvals
- 3-year product warranty



The TMDC 06 series (6 Watt) is the latest additions to Traco Power's existing TMDC line of Industrial DC/DC off-board modules. Equipped with integrated filters which limit conducted and radiated emissions (EN 55032 class A) but also increase the modules EMC immunity (EN 55035), this series is suitable for many harsh industrial applications which require increased EMC and isolation (3000 VDC I/O-isolation) capabilities.

The modules come in fully encapsulated 2.09" x 1.34" x 1.04" plastic package and feature a temperature range from -40° to 80°C without derating. All models have an ultra wide 4:1 input voltage range from either 9-36 VDC or 18-75 VDC and fully regulated outputs. Latest IT safety certifications (UL 62368-1) and DC-OK and remote on/off functions complete the package to provide an ideal solution for many harsh industrial applications.

### Models

| Order Code   | Input Voltage Range          | Output 1 |                  | Output 2 |                  | Efficiency typ. |
|--------------|------------------------------|----------|------------------|----------|------------------|-----------------|
|              |                              | Vnom     | I <sub>max</sub> | Vnom     | I <sub>max</sub> |                 |
| TMDC 06-2411 | 9 - 36 VDC<br>(24 VDC nom.)  | 5.1 VDC  | 1'200 mA         |          |                  | 81 %            |
| TMDC 06-2412 |                              | 12 VDC   | 500 mA           |          |                  | 84 %            |
| TMDC 06-2413 |                              | 15 VDC   | 400 mA           |          |                  | 84 %            |
| TMDC 06-2415 |                              | 24 VDC   | 250 mA           |          |                  | 85 %            |
| TMDC 06-2418 |                              | 48 VDC   | 125 mA           |          |                  | 83 %            |
| TMDC 06-2422 |                              | +12 VDC  | 250 mA           | -12 VDC  | 250 mA           | 84 %            |
| TMDC 06-2423 |                              | +15 VDC  | 200 mA           | -15 VDC  | 200 mA           | 85 %            |
| TMDC 06-2425 |                              | +24 VDC  | 125 mA           | -24 VDC  | 125 mA           | 84 %            |
| TMDC 06-4811 | 18 - 75 VDC<br>(48 VDC nom.) | 5.1 VDC  | 1'200 mA         |          |                  | 80 %            |
| TMDC 06-4812 |                              | 12 VDC   | 500 mA           |          |                  | 84 %            |
| TMDC 06-4813 |                              | 15 VDC   | 400 mA           |          |                  | 84 %            |
| TMDC 06-4815 |                              | 24 VDC   | 250 mA           |          |                  | 85 %            |
| TMDC 06-4818 |                              | 48 VDC   | 125 mA           |          |                  | 83 %            |
| TMDC 06-4822 |                              | +12 VDC  | 250 mA           | -12 VDC  | 250 mA           | 85 %            |
| TMDC 06-4823 |                              | +15 VDC  | 200 mA           | -15 VDC  | 200 mA           | 85 %            |
| TMDC 06-4825 |                              | +24 VDC  | 125 mA           | -24 VDC  | 125 mA           | 84 %            |

### Options

|          |  |
|----------|--|
| TMDC-MK1 | - Optional DIN-Rail Mounting Kit: <a href="http://www.tracopower.com/products/tmdc-mk1.pdf">www.tracopower.com/products/tmdc-mk1.pdf</a> |
|----------|--|

### Input Specifications

|                        |                |   |
|------------------------|----------------|---|
| Input Current          | - At no load   | 24 Vin models: <b>10 mA typ.</b><br>48 Vin models: <b>8 mA typ.</b>                           |
|                        | - At full load | 24 Vin models: <b>300 mA typ.</b><br>48 Vin models: <b>150 mA typ.</b>                        |
| Surge Voltage          |                | 24 Vin models: <b>50 VDC max.</b> (1 s max.)<br>48 Vin models: <b>100 VDC max.</b> (1 s max.) |
| Under Voltage Lockout  |                | 24 Vin models: <b>8 VDC typ.</b><br>48 Vin models: <b>16 VDC typ.</b>                         |
| Recommended Input Fuse |                | (The need of an external fuse has to be assessed in the final application.)                   |
| Input Filter           |                | <b>Internal Pi-Type</b>   |

### Output Specifications

|  |  |   |
|--|--|---|
| Voltage Set Accuracy                   |  | <b>±2% max.</b>   |
| Regulation                             | - Input Variation (Vmin - Vmax)            | single output models: <b>0.5% max.</b><br>dual output models: <b>0.5% max.</b>  |
|  | - Load Variation (0 - 100%)                | single output models: <b>0.5% max.</b><br>dual output models: <b>0.5% max.</b> (Output 1)<br><b>0.5% max.</b> (Output 2)  |
|  | - Voltage Balance (symmetrical load)       | dual output models: <b>2% max.</b>  |
|  | - Cross Regulation (25% / 100% asym. load) | dual output models: <b>5% max.</b>  |
| Ripple and Noise<br>(20 MHz Bandwidth) | - single output                            | 5.1 Vout models: <b>75 mVp-p typ.</b><br>12 Vout models: <b>75 mVp-p typ.</b><br>15 Vout models: <b>75 mVp-p typ.</b><br>24 Vout models: <b>180 mVp-p typ.</b><br>48 Vout models: <b>180 mVp-p typ.</b> |
|  | - dual output                              | 12 / -12 Vout models: <b>75 / 75 mVp-p typ.</b><br>15 / -15 Vout models: <b>75 / 75 mVp-p typ.</b><br>24 / -24 Vout models: <b>180 / 180 mVp-p typ.</b>   |
| Capacitive Load                        | - single output                            | 5.1 Vout models: <b>680 µF max.</b><br>12 Vout models: <b>330 µF max.</b><br>15 Vout models: <b>330 µF max.</b><br>24 Vout models: <b>150 µF max.</b><br>48 Vout models: <b>68 µF max.</b>              |
|  | - dual output                              | 12 / -12 Vout models: <b>150 / 150 µF max.</b><br>15 / -15 Vout models: <b>150 / 150 µF max.</b><br>24 / -24 Vout models: <b>68 / 68 µF max.</b>  |
| Minimum Load                           |  | <b>Not required</b>   |
| Temperature Coefficient                |  | <b>±0.02 %/K max.</b>   |
| Start-up Time                          |  | <b>30 ms typ.</b>   |
| Short Circuit Protection               |  | <b>Continuous, Automatic recovery</b>   |
| Output Current Limitation              |  | <b>150% typ. of Iout max.</b>   |
| Transient Response                     | - Response Deviation                       | <b>5% max.</b> (75% to 100% Load Step)  |
|  | - Response Time                            | <b>500 µs typ.</b> (75% to 100% Load Step)  |

### Safety Specifications

|                  |                             |  |
|------------------|-----------------------------|--|
| Standards        | - IT / Multimedia Equipment | <b>EN 62368-1</b><br><b>IEC 62368-1</b><br><b>UL 62368-1</b>                               |
|                  | - Certification Documents   | <a href="http://www.tracopower.com/overview/tmdc06">www.tracopower.com/overview/tmdc06</a> |
| Pollution Degree |                             | <b>PD 3</b>  |

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

## EMC Specifications

|               |                             |  |
|---------------|-----------------------------|--|
| EMI Emissions | - Conducted Emissions       | EN 55032 class A (internal filter)<br>FCC Part 15 class A (internal filter)                            |
|               | - Radiated Emissions        | EN 55032 class A (internal filter)<br>FCC Part 15 class A (internal filter)                            |
| EMS Immunity  |                             | EN 55035 (Multimedia)  |
|               | - Electrostatic Discharge   | Air: EN 61000-4-2, $\pm 8$ kV, perf. criteria A<br>Contact: EN 61000-4-2, $\pm 6$ kV, perf. criteria A |
|               | - RF Electromagnetic Field  | EN 61000-4-3, 10 V/m, perf. criteria A   |
|               | - EFT (Burst) / Surge       | EN 61000-4-4, $\pm 2$ kV, perf. criteria A   |
|               | - Conducted RF Disturbances | EN 61000-4-5, $\pm 2$ kV, perf. criteria A   |
|               | - PF Magnetic Field         | EN 61000-4-6, 10 Vrms, perf. criteria A<br>Continuous: EN 61000-4-8, 100 A/m, perf. criteria A         |

## General Specifications

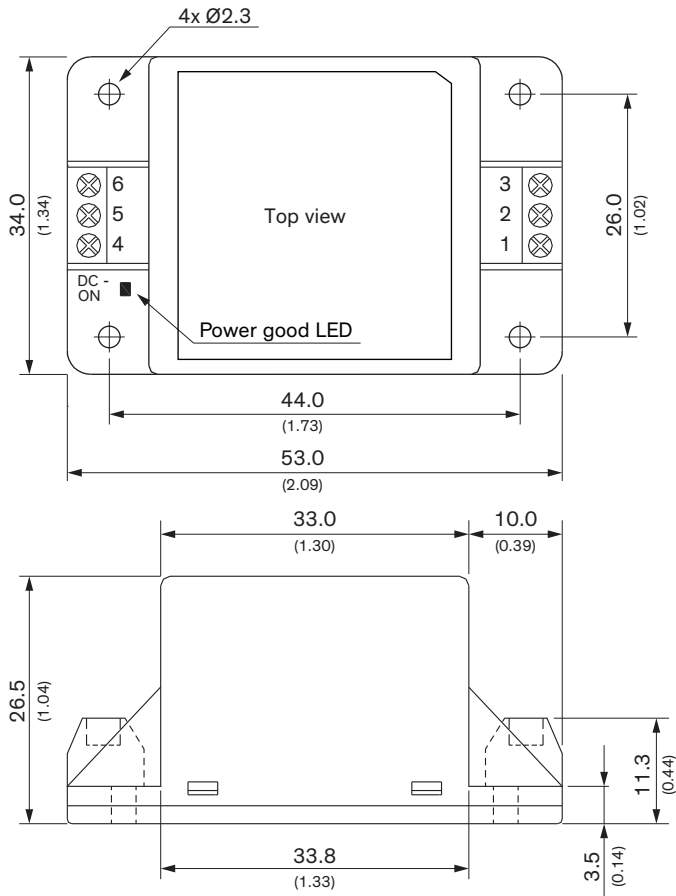
|                           |  |  |
|---------------------------|--|--|
| Relative Humidity         |  | 95% max. (non condensing)  |
| Temperature Ranges        | - Operating Temperature                    | -40°C to +93°C   |
|                           | - Case Temperature                         | +105°C max.  |
|                           | - Storage Temperature                      | -50°C to +125°C  |
| Power Derating            | - High Temperature                         | 4 %/K above 80°C   |
|                           |  | See application note: <a href="http://www.tracopower.com/overview/tmdc06">www.tracopower.com/overview/tmdc06</a>   |
| Cooling System            |  | Natural convection (20 LFM)  |
| Remote Control            | - Voltage Controlled Remote (passive = on) | On: 3.5 to 12 VDC or open circuit<br>Off: 0 to 1.2 VDC or short circuit<br>Refers to 'Remote' and '-Vin' Pin   |
|                           | - Off Idle Input Current                   | 2.5 mA typ.  |
|                           | - Remote Pin Input Current                 | -0.5 to 0.5 mA   |
| Altitude During Operation |  | 5'000 m max.   |
| Switching Frequency       |  | 370 kHz typ. (PWM)   |
| Insulation System         |  | Functional Insulation  |
| Isolation Test Voltage    | - Input to Output, 60 s                    | 3'000 VDC  |
| Isolation Resistance      | - Input to Output, 500 VDC                 | 1'000 M $\Omega$ min.  |
| Isolation Capacitance     | - Input to Output, 100 kHz, 1 V            | 2'200 pF typ.  |
| Reliability               | - Calculated MTBF                          | 4'167'000 h (MIL-HDBK-217F, ground benign)   |
| Housing Material          |  | Plastic resin (UL 94 V-0 rated)  |
| Potting Material          |  | Silicone (UL 94 V-0 rated)   |
| Housing Type              |  | Plastic Case   |
| Mounting Type             |  | Chassis Mount  |
| Connection Type           |  | Screw Terminal   |
| Weight                    |  | 49 g   |
| Thermal Impedance         | - Case to Ambient                          | 3.1 K/W typ.   |
| Environmental Compliance  | - REACH Declaration                        | <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a><br>REACH SVHC list compliant<br>REACH Annex XVII compliant  |
|                           | - RoHS Declaration                         | <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a><br>Exemptions: 6c, 7a<br>(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule.)) |
|                           | - SCIP Reference Number                    | 39791a09-18a4-4f76-8de3-29063549d7b8   |

## Supporting Documents

|  |  |
|--|--|
| Overview Link (for additional Documents) | <a href="http://www.tracopower.com/overview/tmdc06">www.tracopower.com/overview/tmdc06</a> |
|--|--|

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

### Outline Dimensions



Dimensions in mm (inch)  
 Tolerances: x.x ±0.5 (±0.02)  
 x.xx ±0.25 (±0.01)

Mounting screw locked torque: 0.2 Nm (2.04 kgfcm)

| Pinout |               |             |
|--------|---------------|-------------|
| Pin*   | Single Output | Dual Output |
| 1      | Remote        | Remote      |
| 2      | -Vin (GND)    | -Vin (GND)  |
| 3      | +Vin (Vcc)    | +Vin (Vcc)  |
| 4      | -Vout         | -Vout       |
| 5      | NC            | Common      |
| 6      | +Vout         | +Vout       |

NC: Not connected  
 \* Wires 1.5 mm<sup>2</sup> max.

Terminal screw locked torque: 0.2 Nm max.