

### Features

- ◆ Encapsulated power supplies with increased power density
- ◆ Replaces TML 15 and TML 30 series
- ◆ PCB mount or chassis mount with screw terminals
- ◆ Single, dual and triple output models
- ◆ Universal input 90–264 VAC, 47–440 Hz
- ◆ EMI meets EN 55022, class B and FCC, level B
- ◆ Protection class II for TML 40 models
- ◆ Short circuit and overload protection
- ◆ 3-year product warranty



Also see:

#### TMLM Series, 4 to 20 Watt

highest power density, PCB mount.

[www.tracopower.com/products/tmlm.pdf](http://www.tracopower.com/products/tmlm.pdf)

Reference datasheet for primary TML models, see:

[www.tracopower.com/products/tml-primary.pdf](http://www.tracopower.com/products/tml-primary.pdf)

(not recommended for new design in)

The TML series are ultra compact AC/DC power supplies in a fully encapsulated plastic case. They feature versions with screw terminals for easy installation or with solder pins for direct PCB mounting. International safety approvals qualify this product for worldwide markets. The TML series AC/DC modules offer an interesting solution for many space critical applications in commercial and industrial electronic equipment.

### 20 Watt Models

| Order code |               | Output power max. | Output 1         | Output 2         | Output 3 |
|------------|---------------|-------------------|------------------|------------------|----------|
| PCB mount  | Chassis mount |                   |                  |                  |          |
| TML 20103  | TML 20103C    | 14.9 W            | 3.3 VDC/4500 mA  |                  |          |
| TML 20105  | TML 20105C    | 20 W              | 5.0 VDC/4000 mA  |                  |          |
| TML 20112  | TML 20112C    |                   | 12 VDC/1670 mA   |                  |          |
| TML 20115  | TML 20115C    |                   | 15 VDC/1340 mA   |                  |          |
| TML 20124  | TML 20124C    |                   | 24 VDC/840 mA    |                  |          |
| TML 20205  | TML 20205C    |                   | +5.0 VDC/2000 mA | -5.0 VDC/2000 mA |          |
| TML 20212  | TML 20212C    | +12 VDC/833 mA    | -12 VDC/833 mA   |                  |          |
| TML 20215  | TML 20215C    | +15 VDC/667 mA    | -15 VDC/667 mA   |                  |          |
| TML 20512  | TML 20512C    | 5 VDC/2800 mA     | +12 VDC/250 mA   | -12 VDC/250 mA   |          |
| TML 20515  | TML 20515C    | 5 VDC/2800 mA     | +15 VDC/200 mA   | -15 VDC/200 mA   |          |

**40 Watt Models**

| Order code |               | Output power max. | Output 1         | Output 2         | Output 3       |
|------------|---------------|-------------------|------------------|------------------|----------------|
| PCB mount  | Chassis mount |                   |                  |                  |                |
| TML 40103  | TML 40103C    | 26.4 W            | 3.3 VDC/8000 mA  |                  |                |
| TML 40105  | TML 40105C    | 40 W              | 5.0 VDC/8000 mA  |                  |                |
| TML 40112  | TML 40112C    |                   | 12 VDC/3333 mA   |                  |                |
| TML 40115  | TML 40115C    |                   | 15 VDC/2666 mA   |                  |                |
| TML 40124  | TML 40124C    |                   | 24 VDC/1667 mA   |                  |                |
| TML 40205  | TML 40205C    |                   | +5.0 VDC/4000 mA | -5.0 VDC/4000 mA |                |
| TML 40212  | TML 40212C    |                   | +12 VDC/1666 mA  | -12 VDC/1666 mA  |                |
| TML 40215  | TML 40215C    |                   | +15 VDC/1333 mA  | -15 VDC/1333 mA  |                |
| TML 40252  | TML 40252C    |                   | *5.0 VDC/5000 mA | *12 VDC/1250 mA  |                |
| TML 40254  | TML 40254C    |                   | *5.0 VDC/5000 mA | *24 VDC/625 mA   |                |
| TML 40512  | TML 40512C    |                   | *5.0 VDC/5000 mA | +12 VDC/600 mA   | -12 VDC/600 mA |
| TML 40515  | TML 40515C    | *5.0 VDC/5000 mA  | +15 VDC/500 mA   | -15 VDC/500 mA   |                |

\* Output floating

**Input Specifications**

|  |                                  |  |
|--|----------------------------------|--|
| Input voltage ranges   | - AC input<br>- DC Input         | 90 – 264 VAC<br>100 – 375 VDC                |
| Input frequency  |                                  | 47 – 440 Hz                                  |
| Input current at full load (115 VAC / 230 VAC nominal input) | TML 20 models:<br>TML 40 models: | 400 mA / 270 mA typ.<br>860 mA / 460 mA typ. |
| Leakage current  |                                  | 0.75 mA max.                                 |
| External fuse (required)                                     |                                  | 1.5 A slow blow type (recommendation)        |

**Output Specifications**

|                                     |  |   |
|-------------------------------------|--|---|
| Voltage set accuracy                | TML 20 models:<br>TML 40 single and symetric dual output models:<br>TML 40 asymeric dual and triple output models:   | ±2 %<br>±2 %<br>±3 % for output 1, ±5 % for output 2&3  |
| Minimum load                        | TML 20 single and dual output models:<br>TML 20 triple output models:<br>TML 40 single output models:<br>TML 40 symetric dual output models:<br>TML 40 asymeric dual and triple output models: | 0 %<br>10 % (each output)<br>1 %<br>10 % (each output)<br>25 % (each output)<br>operation at lower load condition will not damage these power supplies, however, they may not meet all listed specifications. |
| Ripple and noise (20 MHz bandwidth) | TML 20 models:<br>TML 40, 3.3 VDC model:<br>TML 40 other models:   | <0.7 % of Vout +90 mV [Vp-p]<br><50 mVp-p<br><1 % of Vout [Vp-p]  |
| Regulation – Input variation        | single and symetric dual output models:<br>TML 20 triple output models:<br>TML 40 asymeric dual and triple output models:  | 0.5 % (each output)<br>1 % for output 1, 5 % for output 2&3<br>±0.5 % for output 1, ±5 % for output 2&3   |

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

### Output Specifications

|   |   |
|---|---|
| Regulation – Load variation                               | TML 20 single output models: 1 %, 0–100 % load<br>TML 20 dual output models: 3 % (each output), 10–100 % symmetric load<br>TML 20 triple output models: 2 % for output 1, 20–100 % load<br>5 % for output 2&3, 20–100 % symmetric load<br>TML 40 single output models: 0.5 % 1–100 % load<br>TML 40 symmetric dual output models: 3 % (each output), 10–100 % symmetric load<br>TML 40 asymmetric dual output models: 2 % for output 1, 25–100 % load<br>6 % for output 2, 25–100 % load<br>TML 40 triple output models: 3 % for output 1, 25–100 % load<br>7 % for output 2&3, 25–100 % symmetric load |
| Current limitation  | above 105 % of rated output current.  |
| Overvoltage protection by Zehner diode (main output only) | 120 % of Vout typ.  |
| Short circuit protection                                  | hiccup mode, indefinite (automatic recovery)  |
| Overtemperature protection (TML 40 models only)           | at +100°C   |

| Max. capacitive load [µF]     |                      | Model series      |                    |
|-------------------------------|----------------------|-------------------|--------------------|
| Output:                       |                      | TML 20            | TML 40             |
| Single output models          | 3.3 VDC              | 25'000            | 60'000             |
|                               | 5.0 VDC              | 13'000            | 40'000             |
|                               | 12 VDC               | 920               | 8'600              |
|                               | 15 VDC               | 820               | 6'600              |
|                               | 24 VDC               | 600               | 1400               |
| Dual output models symmetric  | +5.0 / -5.0 VDC      | 4300 / 4300       | 12'000 / 12'000    |
|                               | +12 / -12 VDC        | 560 / 560         | 4'400 / 4'400      |
|                               | +15 / -15 VDC        | 220 / 220         | 1'000 / 1'000      |
| Dual output models asymmetric | +5.0 / +12 VDC       | –                 | 10'000 / 470       |
|                               | +5.0 / +24 VDC       | –                 | 10'000 / 400       |
| Triple output models          | +5.0 / +12 / -12 VDC | 3'500 / 220 / 220 | 10'000 / 780 / 780 |
|                               | +5.0 / +15 / -15VDC  | 3'500 / 150 / 150 | 10'000 / 900 / 900 |

### General Specifications

|   |   |  |
|---|---|--|
| Temperature ranges  | – Operating<br>– Power derating above +50°C<br>– Case max.<br>– Storage (non operating) | TML 20 models: -25°C to +60°C<br>TML 40 models: -40°C to +60°C<br>3.0 %/K<br>+95°C<br>-40°C to +85°C |
| Temperature coefficient   |   | 0.02 %/°C  |
| Efficiency  |   | 75 – 84 % (depending on model)   |
| Humidity (non condensing)   |   | 95 % rel max.  |
| Switching frequency (pulse width modulation PWM)                      |   | TML 20 models: 100 kHz typ.<br>TML 40 models: 132 kHz typ.   |
| Hold-up time  |   | 10 ms min.   |
| Isolation voltage   | – Input/Output  | 3'000 VAC  |
| Reliability /calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign) |   | >200'000 h   |
| EMI / RFI conducted   |   | EN 55022, class B, FCC part 15, level B  |
| EMC compliance  |   | EN 55024   |
| Protection class  |   | TML 20 models: class I<br>TML 40 models: class II to IEC/EN 60536                                    |

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

**General Specifications**

|                          |  |  |
|--------------------------|--|--|
| Safety standards         |  | UL 60950-1, IEC/EN 60950-1   |
| Safety approvals         | - CB certificate for IEC 60950-1<br>- UL/cUL 60950-1 | <a href="http://www.tracopower.com/products/tml-cb.pdf">www.tracopower.com/products/tml-cb.pdf</a><br><a href="http://www.ul.com">www.ul.com</a> -> certifications -> File e188913 |
| Casing material          |  | plastic resin + fiberglass (UL 94V-0 rated)  |
| Environmental compliance | - Reach<br>- RoHS                                    | <a href="http://www.tracopower.com/products/tml-reach.pdf">www.tracopower.com/products/tml-reach.pdf</a><br>RoHS directive 2002/95/EC  |

**Outline Dimensions**

**TML 20 models**  
for PCB mount:



Pin diameter  $\varnothing$  1.0 mm (0.039)

**Weight: 110 g (3.9 oz)**

**TML 20C models**  
for chassis mount:



**Weight: 155 g (5.5 oz)**

| Pinout / Connection |               |             |               |
|---------------------|---------------|-------------|---------------|
| Pin/ con.           | Single output | Dual output | Triple output |
| 1                   | FG            |             |               |
| 2                   | AC in (N)     |             |               |
| 3                   | AC in (L)     |             |               |
| 4                   | no pin / nc   | no pin / nc | Vout 3        |
| 5                   | -Vout 1       | Vout 2      | com. 2/3      |
| 6                   | no pin        | com. 1/2    | Vout 2        |
| 7                   | +Vout 1       | +Vout 1     | -Vout 1       |
| 8                   | no pin        | no pin      | +Vout 1       |

nc = not to connect

Dimensions in [mm], ( ) = Inches  
Tolerances = 0.5mm (0.02)

**Outline Dimensions**

**TML 40 models**  
for PCB mount:



Pin diameter  $\varnothing$  1.2 mm (0.047)      **Weight : 280 g (9.9 oz)**

**TML 40C models**  
for chassis mount:



**Weight : 325 g (11.5 oz)**

| Pinout / Connection |               |                  |                   |               |
|---------------------|---------------|------------------|-------------------|---------------|
| Pin/ con.           | Single output | Dual sym. output | Dual asym. output | Triple output |
| 1                   | no pin / nc   |                  |                   |               |
| 2                   | AC in (L)     |                  |                   |               |
| 3                   | AC in (N)     |                  |                   |               |
| 4                   | +Vout 1       | Vout 1           | +Vout 2           | Vout 2        |
| 5                   | no pin / nc   | no pin / nc      | +Vout 1           | +Vout 1       |
| 6                   | -Vout 1       | com. 1/2         | -Vout 2           | com. 2/3      |
| 7                   | no pin / nc   | no pin / nc      | -Vout 1           | -Vout 1       |
| 8                   | nc            | Vout 2           | no pin / nc       | Vout 3        |

nc = not to connect

Dimensions in [mm], ( ) = Inches  
Tolerances = 0.5mm (0.02)

Specifications can be changed any time without notice.

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