



### Features

- ◆ Fully encapsulated low profile plastic casing in PCB- or chassis mount version
- ◆ 2 x MOPP Medical safety according to AAMI/ANSI ES 60601-1:2005(R) and IEC/EN 60601-1 3rd edition
- ◆ IT and industrial safety according to IEC/UL 60950-1 and UL 508
- ◆ Ready to meet ErP directive <0.3W no load power consumption
- ◆ -40°C start-up temperature
- ◆ Safety class II prepared
- ◆ Protection against over-temperature overload and short circuit
- ◆ 3-year product warranty



The TMM 60 Series of fully encapsulated 60 Watt AC/DC power supply modules feature a reinforced/double I/O isolation system according to latest medical safety standards 60601-3 3rd edition for 2 x MOPP (Means Of Patient Protection). The high efficiency and the use of highest grade components make the units suitable for an operating temperature range of -40°C to +60°C while it goes up to 75°C with 50% load derating. EMI/EMC characteristics and the safety approval package qualify these modules not only for medical devices but also for demanding applications in transportation systems and for equipment in industrial an commercial environment.

Also see:

**TMM 24 Series, 24 Watt**

[www.tracopower.com/products/tmm24.pdf](http://www.tracopower.com/products/tmm24.pdf)

**TMM 40 Series, 40 Watt**

[www.tracopower.com/products/tmm40.pdf](http://www.tracopower.com/products/tmm40.pdf)

Order code		Output power max.	Output	Efficiency
PCB mount	Chassis mount			
TMM 60105	TMM 60105C	60 W	5.1 VDC / 10000 mA	86 %
TMM 60112	TMM 60112C		12 VDC / 5000 mA	87 %
TMM 60115	TMM 60115C		15 VDC / 4000 mA	87 %
TMM 60124	TMM 60124C		24 VDC / 2500 mA	87 %
TMM 60148	TMM 60148C		48 VDC / 1250 mA	87 %

### Input Specifications

Input voltage ranges	– nominal – AC input – DC Input	100 – 240 VAC 85 – 264 VAC 120 – 370 VDC
Input frequency		47 – 440 Hz
Input current at full load (115 VAC / 230 VAC nominal input)	5.0 VDC model: other models:	860 mA / 515 mA typ. 1000 mA / 600 mA typ
Leakage current		80 µA typ.
No-Load power consumption		<0.3 W
External input fuse required (recommended value)		3 A slow blow type or characteristic C

### Output Specifications

Voltage set accuracy		±1% typ.
Minimum load		no minimum load required
Regulation	– Input variation – Load variation (0-100%)	0.2% typ. : 0.5% typ.
Temperature coefficient		0.02 %/K
Ripple and noise (20 MHz bandwidth)	5.0 VDC model: other models:	<3% of Vout [Vp-p] max. <1.5% of Vout [Vp-p] max.
Current limitation		above 105 % of rated output current. hicup, auto recovery
Overvoltage protection by Zehner diode (main output only)		120 % of Vout typ.
Short circuit protection		continuous
Max. capacitive load	5.0 VDC model: 12 VDC model: 15 VDC model: 24 VDC model: 48 VDC model:	8000 µF 3900 µF 3300 µF 1500 µF 680 µF

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

## General Specifications

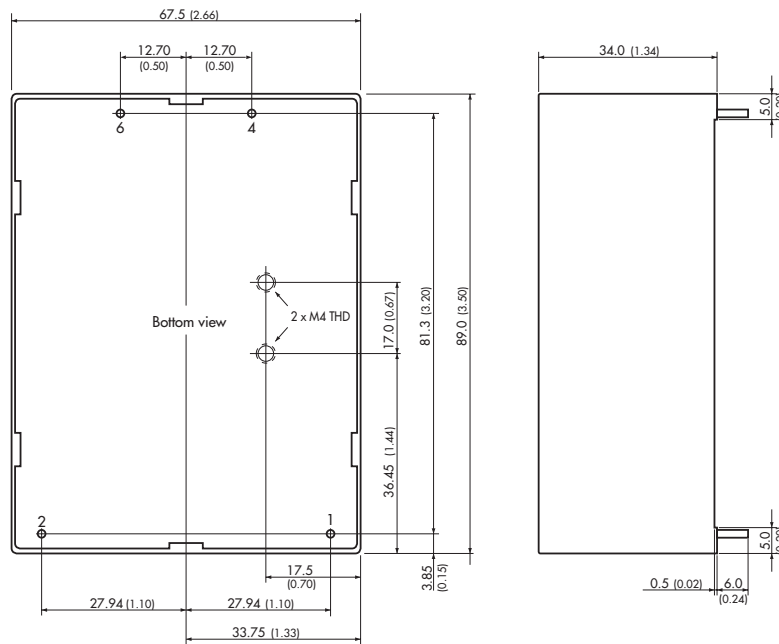
Temperature ranges	<ul style="list-style-type: none"> <li>- Operating (natural convection cooling 20 LFM)</li> <li>- Power derating above +60°C</li> <li>- Storage (non operating)</li> </ul>	-40°C to +75°C 3.75 %/K -40°C to +95°C
Over temperature protection	shutdown: automatic recovery:	at 90°C at approx 67°C
Humidity (non condensing)		95 % rel max.
Altitude during operation		5000 m
Switching frequency (pulse width modulation PWM)		100 kHz typ.
Hold-up time	115 VAC: 230 VAC:	20 ms typ. 80 ms typ.
Isolation voltage	- Input/Output	4'000 VAC
Isolation resistance	- at 500 VDC	1'000 MOhm
Reliability /calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		>125'000 h
EMI / RFI conducted and radiated		EN 55022, class B, FCC part 15, level B EN 55011 class B
Electromagnets compatibility (EMC), immunity	<ul style="list-style-type: none"> <li>- Electrostatic discharge ESD</li> <li>- RF field immunity</li> <li>- Electrical fast transients/burst immunity</li> <li>- Surge</li> <li>- Conducted RF</li> <li>- Magnetic field immunity</li> </ul>	IEC / EN 61000-4-2, 8kV/4kV perf. criteria B IEC / EN 61000-4-3, 10V/m perf. criteria A IEC / EN 61000-4-4, ± 2kV perf. criteria B IEC / EN 61000-4-5, ± 1kV/± 2kV perf. criteria B IEC / EN 61000-4-6, 10 Vr.m.s perf. criteria B IEC / EN 61000-4-8, 30A/m perf. criteria A
Voltage dip and interruptions according to EN 61000-4-11 reference: 115 VAC / 60Hz		30%, 10ms perf. criteria B 60%, 100ms perf. criteria C 95%, 5000ms perf. criteria C
Protection class II		according IEC/EN 60536
Safety standards		UL 60950-1, IEC/EN 60950-1, IEC/EN 60601-1 3rd edition, 2 x MOPP ANSI/AAMI ES60601-1:2005(R)2012 UL 508 for chassis mount version
Safety approvals and certifications	<ul style="list-style-type: none"> <li>- UL online certification (ES60601-1:2005(R)2012)</li> <li>- UL certificate (UL 60950-1)</li> <li>- UL approval for UL 508 (chassis mount models only)</li> <li>- CB certificate (60601-1 3rd edition 2 x MOPP)</li> <li>- CB certificate (IEC/EN 60950-1)</li> </ul>	<a href="http://www.ul.com">www.ul.com</a> File e188913, copy: e188913qqhm2.pdf <a href="http://www.ul.com">www.ul.com</a> File e188913, copy: e188913qqgq2.pdf <a href="http://www.ul.com">www.ul.com</a> -> certifications -> File: e322109 <a href="http://www.tracopower.com/products/imm24-cb60601.pdf">www.tracopower.com/products/imm24-cb60601.pdf</a> <a href="http://www.tracopower.com/products/imm24-cb60950.pdf">www.tracopower.com/products/imm24-cb60950.pdf</a>
Casing material		plastic resin + fiberglass (UL 94V-0 rated)
Environmental compliance	<ul style="list-style-type: none"> <li>- Reach</li> <li>- RoHS</li> </ul>	<a href="http://www.tracopower.com/products/reach-declaration.pdf">www.tracopower.com/products/reach-declaration.pdf</a> RoHS directive 2011/65/EU

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

**Outline Dimensions**

**TMM 60:**

for PCB mount:

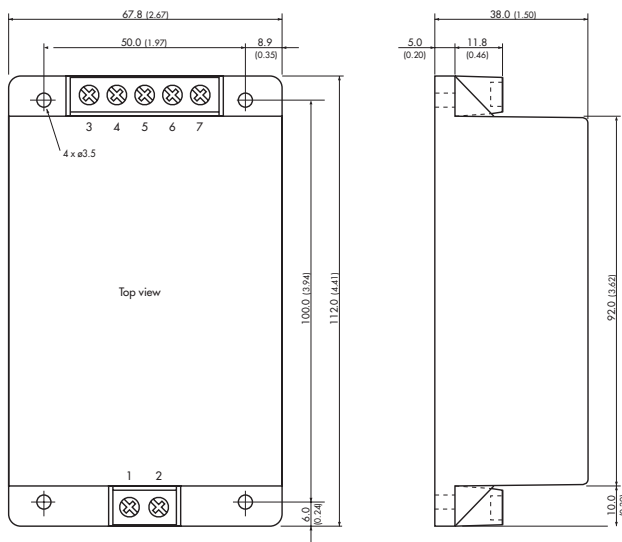


Pin diameter  $\varnothing$  1.0 mm (0.039)

**Weight: 360 g (12.70oz)**

**TMM 60C:**

for chassis mount:



**Weight: 380 g (13.4oz)**

**Pinout / Connection**

Pin/con.	Single
1	AC (N)
2	AC (L)
3	No Pin / NC
4	+Vout
5	No Pin / NC
6	-Vout
7	No Pin / NC

NC = not to connect

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