

User's Manual



ANSI/AAMI ES60601-1 BS EN/EN60601-1 IEC60601-1 TPTC004



## Features

- 1.8"x1" compact size
- Medical safety approved (2 x MOPP) according to ANSI/AAMI ES60601-1 and IEC/BS EN/EN60601-1
- Suitable for BF application with appropriate system consideration
- No load power consumption<0.075W
- Extremely low leakage current
- Wide operating temp. range -40 ~ +85°C
- EMI class B for class II configuration
- Protections:  
Short circuit / Overload / Over voltage / Over temperature
- No minimum load required
- Typical lifetime > 48K hours
- 3 years warranty

## Applications

- Portable medical device
- Mobile clinical workstation
- Medical computer monitor
- Medical examination instrument

## GTIN CODE

MW Search: <https://www.meanwell.com/serviceGTIN.aspx>

## Description

MPM-05 is a 5W high density and small size (45.7\*25.4\*21.5mm) AC/DC module type medical grade power supply series offered in pin type. It features the operation for 80~264VAC, a low no load power consumption less than 0.075W, a high efficiency up to 82%, Class II (no FG) double insulation, outstanding dissipation and high lifespan thanks to the interior potting, 5G anti-vibration, high EMC performance, 4KVAC isolation, etc. The design observes IEC/BS EN/EN60601-1 and ANSI/AAMI ES60601-1 version three with 2xMOPP level and ultra-low leakage current (<80  $\mu$  A). It is very suitable for BF (patient contact) type medical device or relevant equipment.

## Model Encoding

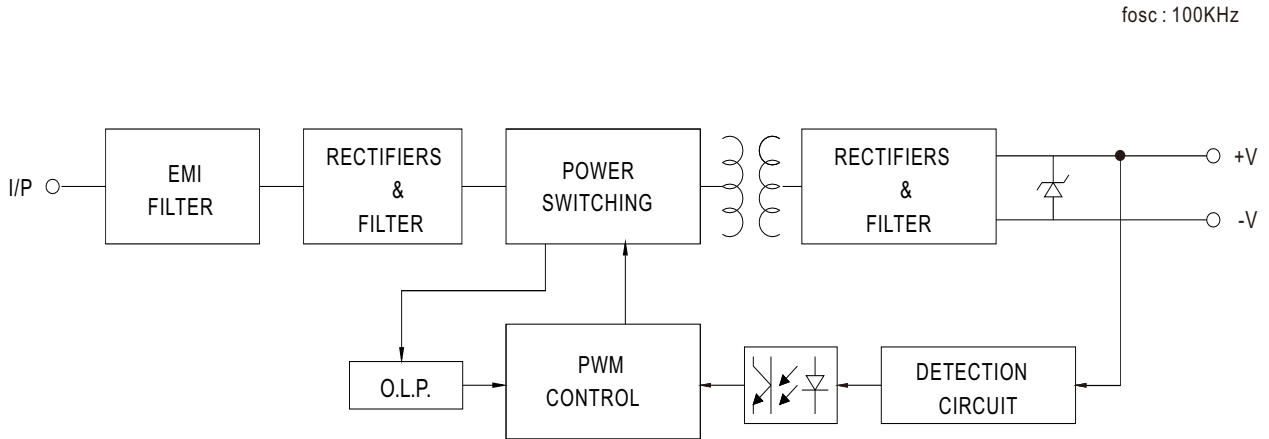
MPM - 05 - 5

Output voltage  
Rated wattage  
Series name

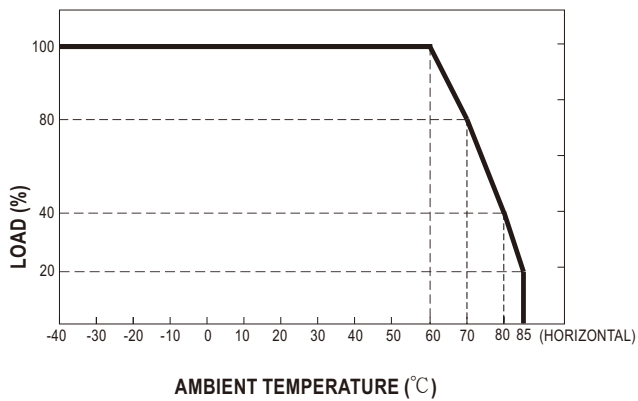
**SPECIFICATION**

| MODEL                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | MPM-05-3.3                                                                                                                                                                  | MPM-05-5                | MPM-05-12                                                                                  | MPM-05-15                                                                 | MPM-05-24    |  |  |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------|--|--|
| OUTPUT                   | DC VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3.3V                                                                                                                                                                        | 5V                      | 12V                                                                                        | 15V                                                                       | 24V          |  |  |
|                          | RATED CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1.25A                                                                                                                                                                       | 1A                      | 0.42A                                                                                      | 0.33A                                                                     | 0.23A        |  |  |
|                          | CURRENT RANGE <span>Note.2</span>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0 ~ 1.25A                                                                                                                                                                   | 0 ~ 1A                  | 0 ~ 0.42A                                                                                  | 0 ~ 0.33A                                                                 | 0 ~ 0.23A    |  |  |
|                          | PEAK CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1.38A                                                                                                                                                                       | 1.1A                    | 0.46A                                                                                      | 0.36A                                                                     | 0.25A        |  |  |
|                          | RATED POWER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4.1W                                                                                                                                                                        | 5W                      | 5W                                                                                         | 5W                                                                        | 5.5W         |  |  |
|                          | PEAK LOAD(10sec.) <span>Note.3</span>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 4.6W                                                                                                                                                                        | 5.5W                    | 5.5W                                                                                       | 5.4W                                                                      | 6W           |  |  |
|                          | RIPPLE & NOISE (max.) <span>Note.4</span>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 100mVp-p                                                                                                                                                                    | 100mVp-p                | 150mVp-p                                                                                   | 150mVp-p                                                                  | 180mVp-p     |  |  |
|                          | VOLTAGE TOLERANCE <span>Note.5</span>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ±2.5%                                                                                                                                                                       | ±2.5%                   | ±2.5%                                                                                      | ±2.5%                                                                     | ±2.5%        |  |  |
|                          | LINE REGULATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ±0.3%                                                                                                                                                                       | ±0.3%                   | ±0.3%                                                                                      | ±0.3%                                                                     | ±0.3%        |  |  |
|                          | LOAD REGULATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ±0.5%                                                                                                                                                                       | ±0.5%                   | ±0.5%                                                                                      | ±0.5%                                                                     | ±0.5%        |  |  |
|                          | SETUP, RISE TIME                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1000ms, 30ms/230VAC      1000ms, 30ms/115VAC at full load                                                                                                                   |                         |                                                                                            |                                                                           |              |  |  |
|                          | HOLD UP TIME (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 40ms/230VAC      12ms/115VAC at full load                                                                                                                                   |                         |                                                                                            |                                                                           |              |  |  |
| INPUT                    | VOLTAGE RANGE <span>Note.6</span>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 80 ~ 264VAC                                                                                                                                                                 |                         |                                                                                            |                                                                           |              |  |  |
|                          | FREQUENCY RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 47 ~ 440Hz                                                                                                                                                                  |                         |                                                                                            |                                                                           |              |  |  |
|                          | EFFICIENCY (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 74%                                                                                                                                                                         | 78%                     | 80%                                                                                        | 81%                                                                       | 82%          |  |  |
|                          | AC CURRENT (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0.2A/115VAC      0.1A/230VAC                                                                                                                                                |                         |                                                                                            |                                                                           |              |  |  |
|                          | INRUSH CURRENT (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | COLD START    25A/115VAC    45A/230VAC                                                                                                                                      |                         |                                                                                            |                                                                           |              |  |  |
|                          | LEAKAGE CURRENT (max.) <span>Note.7</span>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Touch current <80 $\mu$ A/264VAC                                                                                                                                            |                         |                                                                                            |                                                                           |              |  |  |
| PROTECTION               | OVERLOAD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 110% ~ 180% rated output power<br>Protection type : Hiccup mode, recovers automatically after fault condition is removed                                                    |                         |                                                                                            |                                                                           |              |  |  |
|                          | OVER VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3.8 ~ 5V                                                                                                                                                                    | 5.8 ~ 6.8V              | 13.8 ~ 16.2V                                                                               | 17.3 ~ 20.3V                                                              | 27.6 ~ 32.4V |  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Protection type : Shut off o/p voltage, clamping by zener diode                                                                                                             |                         |                                                                                            |                                                                           |              |  |  |
|                          | OVER TEMPERATURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Protection type : Shut down o/p voltage, recovers automatically after temperature goes down                                                                                 |                         |                                                                                            |                                                                           |              |  |  |
| ENVIRONMENT              | WORKING TEMP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -40 ~ +85°C (Refer to "Derating Curve")                                                                                                                                     |                         |                                                                                            |                                                                           |              |  |  |
|                          | WORKING HUMIDITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 20 ~ 90% RH non-condensing                                                                                                                                                  |                         |                                                                                            |                                                                           |              |  |  |
|                          | STORAGE TEMP., HUMIDITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -40 ~ +100°C, 10 ~ 95% RH non-condensing                                                                                                                                    |                         |                                                                                            |                                                                           |              |  |  |
|                          | TEMP. COEFFICIENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ±0.03%/°C (0 ~ 60°C)                                                                                                                                                        |                         |                                                                                            |                                                                           |              |  |  |
|                          | SOLDERING TEMPERATURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Wave soldering: 265°C, 5s (max.); Manual soldering: 390°C, 3s (max.)                                                                                                        |                         |                                                                                            |                                                                           |              |  |  |
|                          | VIBRATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 10 ~ 500Hz, 5G 10min./1cycle, period for 60min. each along X, Y, Z axes                                                                                                     |                         |                                                                                            |                                                                           |              |  |  |
|                          | OPERATING ALTITUDE <span>Note.8</span>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 5000 meters                                                                                                                                                                 |                         |                                                                                            |                                                                           |              |  |  |
|                          | SAFETY STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | IEC60601-1, BS EN/EN60601-1, EAC TP TC 004, UL ANSI/AAMI ES60601-1(3.1 version), CAN/CSA-C22 3 <sup>rd</sup> Edition approved ; Design refer to BS EN/EN60335-1(by request) |                         |                                                                                            |                                                                           |              |  |  |
| ISOLATION LEVEL          | Primary-Secondary: 2xMOPP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                             |                         |                                                                                            |                                                                           |              |  |  |
| WITHSTAND VOLTAGE        | I/P-O/P:4KVAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                             |                         |                                                                                            |                                                                           |              |  |  |
| ISOLATION RESISTANCE     | I/P-O/P:100M Ohms / 500VDC / 25°C / 70% RH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                             |                         |                                                                                            |                                                                           |              |  |  |
| SAFETY & EMC<br>(Note 9) | EMC EMISSION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Parameter                                                                                                                                                                   | Standard                |                                                                                            | Test Level / Note                                                         |              |  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Conducted                                                                                                                                                                   | BS EN/EN55011 (CISPR11) |                                                                                            | Class B                                                                   |              |  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Radiated                                                                                                                                                                    | BS EN/EN55011 (CISPR11) |                                                                                            | Class B                                                                   |              |  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Harmonic Current                                                                                                                                                            | BS EN/EN61000-3-2       |                                                                                            | Class A                                                                   |              |  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Voltage Flicker                                                                                                                                                             | BS EN/EN61000-3-3       |                                                                                            | -----                                                                     |              |  |  |
|                          | EMC IMMUNITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | BS EN/EN60601-1-2                                                                                                                                                           |                         |                                                                                            |                                                                           |              |  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Parameter                                                                                                                                                                   | Standard                |                                                                                            | Test Level / Note                                                         |              |  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ESD                                                                                                                                                                         | BS EN/EN61000-4-2       |                                                                                            | Level 4, 15KV air ; Level 4, 8KV contact                                  |              |  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | RF field susceptibility                                                                                                                                                     | BS EN/EN61000-4-3       |                                                                                            | Level 3, 10V/m( 80MHz~2.7GHz )<br>Table 9, 9~28V/m( 385MHz~5.78GHz )      |              |  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | EFT bursts                                                                                                                                                                  | BS EN/EN61000-4-4       |                                                                                            | Level 3, 2KV                                                              |              |  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Surge susceptibility                                                                                                                                                        | BS EN/EN61000-4-5       |                                                                                            | Level 3, 1KV/Line-Line                                                    |              |  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Conducted susceptibility                                                                                                                                                    | BS EN/EN61000-4-6       |                                                                                            | Level 3, 10V                                                              |              |  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Magnetic field immunity                                                                                                                                                     | BS EN/EN61000-4-8       |                                                                                            | Level 4, 30A/m                                                            |              |  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Voltage dip, interruption                                                                                                                                                   | BS EN/EN61000-4-11      |                                                                                            | 100% dip 1 periods, 30% dip 25 periods,<br>100% interruptions 250 periods |              |  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | OTHERS                                                                                                                                                                      | MTBF                    | 9337.3K hrs min.    Telcordia SR-332 (Bellcore) ; 1799.5K hrs min.    MIL-HDBK-217F (25°C) |                                                                           |              |  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                             | DIMENSION               | 45.7*25.4*21.5mm (L*W*H) or 1.8*1.0*0.85" inch                                             |                                                                           |              |  |  |
| PACKING                  | 0.035Kg; 270pcs/10.5Kg/0.94CUFT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                             |                         |                                                                                            |                                                                           |              |  |  |
| NOTE                     | 1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature.<br>2. No minimum load required.<br>3. 33% Duty cycle maximum within every 30 seconds. Average output power should not exceed the rated power<br>4. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1 $\mu$ f & 47 $\mu$ f parallel capacitor.<br>5. Tolerance : includes set up tolerance, line regulation and load regulation.<br>6. Derating may be needed under low input voltages. Please check the derating curve for more details.<br>7. Touch current was measured from primary input to DC output.<br>8. The ambient temperature derating of 3.5°C/1000m with fanless models and of 5°C/1000m with fan models for operating altitude higher than 2000m(6500ft).<br>9. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to "EMI testing of component power supplies."<br>(as available on <a href="http://www.meanwell.com">http://www.meanwell.com</a> )<br>※ Product Liability Disclaimer : For detailed information, please refer to <a href="https://www.meanwell.com/serviceDisclaimer.aspx">https://www.meanwell.com/serviceDisclaimer.aspx</a> |                                                                                                                                                                             |                         |                                                                                            |                                                                           |              |  |  |

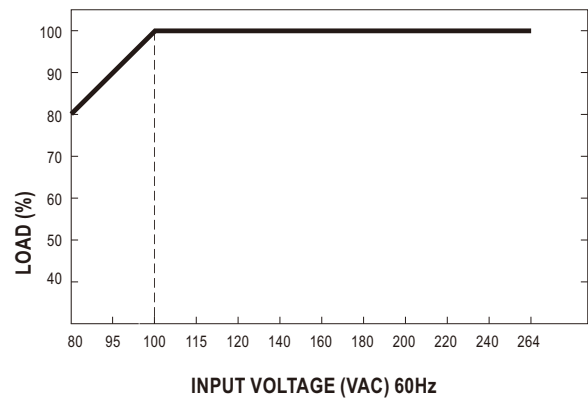
## ■ Block Diagram



## ■ Derating Curve

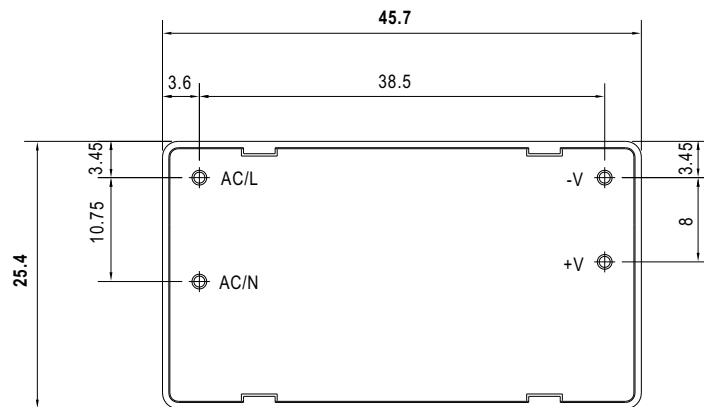


## ■ Output Derating VS Input Voltage

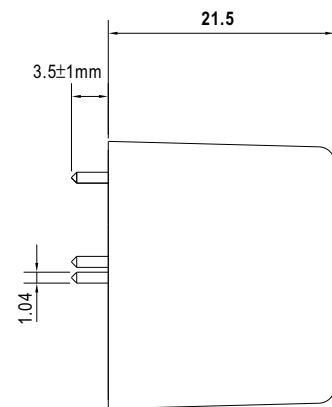


## ■ Mechanical Specification

Case No.222A Unit:(mm)



BOTTOM VIEW



SIDE VIEW

## ■ Installation Manual

Please refer to : <http://www.meanwell.com/manual.html>