### Features

- 1.93”x0.94” compact size
- Medical safety approved (2 x MOPP) according to ANSI/AAMI ES60601-1 and IEC/EN60601-1
- Suitable for BF application with appropriate system consideration
- No load power consumption < 0.075W (0.09W for 3.3V)
- Extremely low leakage current
- Wide operating temp. range -35 ~ +85°C
- EMI class B for class II configuration
- Protections:
  - Short circuit / Overload / Over voltage / Over temperature
- No minimum load required
- 3 years warranty

### Applications

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

### Description

MFM-20 is a 20W high density and small size (49*23.8*23mm) AC/DC on board type medical power supply series. It features the operation for 80~264VAC, a low no load power consumption less than 0.075W (0.09W for 3.3V), a high efficiency up to 87%, Class II (no FG) double insulation, outstanding dissipation, 5G anti-vibration, high EMC performance, 4KVAC isolation, etc. The design observes IEC/EN60601-1 and ANSI/AAMI ES60601-1 version three with 2xMOPP level and ultra-low leakage current (<80 μA). It is very suitable for BF (patient contact) type medical device or relevant equipment.

### Model Encoding

**MFM - 20 - 5**

- **Output voltage**
- **Rated wattage**
- **Series name**
20W High Reliable Green Medical On Board Type

MFM-20 series

SPECIFICATION

MODEL | MFM-20-3.3 | MFM-20-5 | MFM-20-12 | MFM-20-15 | MFM-20-24
--- | --- | --- | --- | --- | ---
 DC VOLTAGE | 3.3V | 5V | 12V | 15V | 24V
 RATED CURRENT | 4.5A | 4A | 1.8A | 1.4A | 0.9A
 CURRENT RANGE | 0 ~ 4.5A | 0 ~ 4A | 0 ~ 1.8A | 0 ~ 1.4A | 0 ~ 0.9A
 PEAK CURRENT | 4.95A | 4.4A | 1.98A | 1.54A | 0.99A
 RATED POWER | 14.9W | 20W | 21.6W | 21W | 21.6W
 PEAK LOAD(10sec.) | 16.3W | 22W | 23.8W | 23.1W | 23.8W
 RIPPLE & NOISE (max.) | ±1.5% | ±1.5% | ±1.5% | ±1.5% | ±1.5%
 VOLTAGE TOLERANCE | ±150mVp-p | ±150mVp-p | ±150mVp-p | ±150mVp-p | ±150mVp-p
 LINE REGULATION | ±0.5% | ±0.5% | ±0.3% | ±0.3% | ±0.3%
 LOAD REGULATION | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5%
 SETUP, RISE TIME | 1500ms, 30ms/230VAC | 1500ms, 30ms/115VAC at full load
 HOLD UP TIME (Typ.) | 40ms/230VAC | 10ms/115VAC at full load

INPUT

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Standard</th>
<th>Test Level / Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conducted emission</td>
<td>EN55011 (CISPR11)</td>
<td>Class B</td>
</tr>
<tr>
<td>Radiated emission</td>
<td>EN55011 (CISPR11)</td>
<td>Class B</td>
</tr>
<tr>
<td>Harmonic current</td>
<td>EN61000-3-2</td>
<td>Class A</td>
</tr>
<tr>
<td>Voltage flicker</td>
<td>EN61000-3-3</td>
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</tr>
</tbody>
</table>

SAFETY & EMC (Note.5)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Standard</th>
<th>Test Level / Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN60601-1-2</td>
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<td>---</td>
</tr>
<tr>
<td>ESD</td>
<td>EN61000-4-2</td>
<td>Level 4, 15KV air; Level 4, 8KV contact</td>
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<tr>
<td>RF field susceptibility</td>
<td>EN61000-4-3</td>
<td>Level 3, 10V/m (80MHz<del>2.7GHz) Table 9, 9</del>28V/m (385MHz~5.78GHz)</td>
</tr>
<tr>
<td>EFT bursts</td>
<td>EN61000-4-4</td>
<td>Level 3, 2KV</td>
</tr>
<tr>
<td>Surge susceptibility</td>
<td>EN61000-4-5</td>
<td>Level 3, 1KV/Line-Line</td>
</tr>
<tr>
<td>Conducted susceptibility</td>
<td>EN61000-4-6</td>
<td>Level 3, 10V</td>
</tr>
<tr>
<td>Magnetic field immunity</td>
<td>EN61000-4-8</td>
<td>Level 4, 30A/m</td>
</tr>
<tr>
<td>Voltage dip, interruption</td>
<td>EN61000-4-11</td>
<td>100% dip 1 periods, 30% dip 25 periods, 100% interruptions 250 periods</td>
</tr>
</tbody>
</table>

EMC IMMUNITY

MTBF: 12100Khrs min. MIL-HDBK-217F (25℃)

DIMENSION: 49*23.8*23mm (L*W*H) or 1.93"*0.94"*0.91" inch

PACKING: 0.028Kg; 200pcs/6.6Kg/0.97CUFT

NOTE

1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25℃ of ambient temperature.
2. No minimum load required.
3. 33% Duty cycle maximum within every 30 seconds. Average output power should not exceed the rated power.
4. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1 uF & 47 μF parallel capacitor.
5. Tolerance: includes set up tolerance, line regulation and load regulation.
6. Derating may be needed under low input voltages. Please check the derating curve for more details.
7. Touch current was measured from primary input to DC output.
8. The ambient temperature derating of 8℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6560ft).
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.” (as available on http://www.meanwell.com)
**Block Diagram**

- **I/P**
- **EMI FILTER**
- **RECTIFIERS & FILTER**
- **POWER SWITCHING**
- **O.L.P.**
- **PWM CONTROL**
- **RECTIFIERS & FILTER**
- **DETECTION CIRCUIT**

*Block Diagram Diagram: fosc: 100KHz*

**Derating Curve**

- **AMBIENT TEMPERATURE (℃)**
- **LOAD (%)**
- **Derating Curve**: AMBIENT TEMPERATURE (℃) vs. LOAD (%)

**Output Derating VS Input Voltage**

- **INPUT VOLTAGE (VAC) 60Hz**
- **LOAD (%)**
- **Output Derating VS Input Voltage**: INPUT VOLTAGE (VAC) vs. LOAD (%)
### Mechanical Specification

Unit: inch (mm)

#### Top View

- FS1
- AC/I
- AC/N
- +V
- -V

#### Side View

- AC/I
- FS1
- +V
- -V

### Installation Manual