



■ **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**

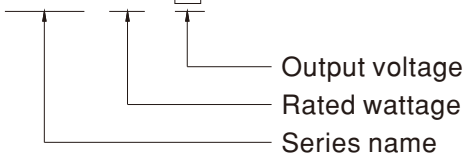
- Portable medical device
- Mobile clinical workstation
- Medical computer monitor
- Medical examination instrument

■ **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**

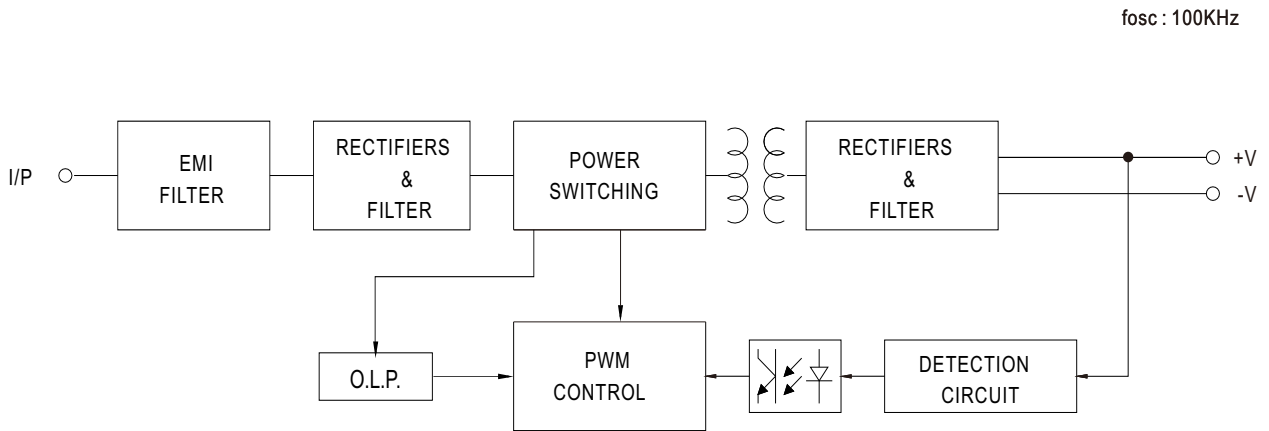
MFM - 20 - 5



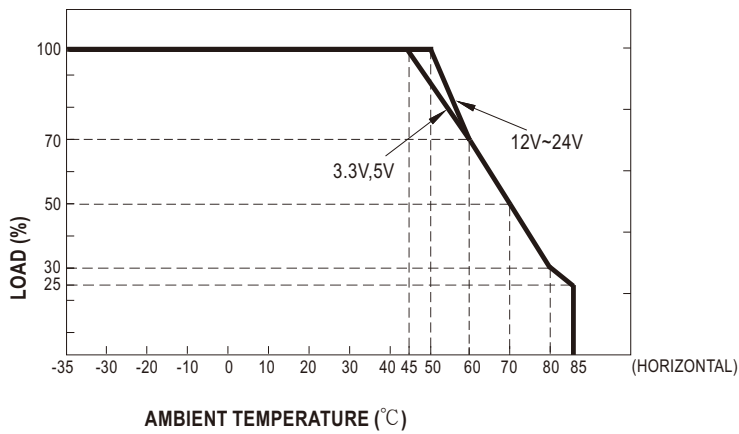
SPECIFICATION

| MODEL | | MFM-20-3.3 | MFM-20-5 | MFM-20-12 | MFM-20-15 | MFM-20-24 | |
|--|--|---|-------------------|--------------|---|--|--|
| OUTPUT | DC VOLTAGE | 3.3V | 5V | 12V | 15V | 24V | |
| | RATED CURRENT | 4.5A | 4A | 1.8A | 1.4A | 0.9A | |
| | CURRENT RANGE <small>Note.2</small> | 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.) <small>Note.3</small> | 16.3W | 22W | 23.8W | 23.1W | 23.8W | |
| | RIPPLE & NOISE (max.) <small>Note.4</small> | 150mVp-p | 150mVp-p | 150mVp-p | 180mVp-p | 180mVp-p | |
| | VOLTAGE TOLERANCE <small>Note.5</small> | ± 1.5% | ± 1.5% | ± 1.5% | ± 1.5% | ± 1.5% | |
| | 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 | VOLTAGE RANGE <small>Note.6</small> | 80 ~ 264VAC | | | | | |
| | FREQUENCY RANGE | 47 ~ 440Hz | | | | | |
| | EFFICIENCY (Typ.) | 81% | 85% | 85.5% | 87% | 87% | |
| | AC CURRENT (Typ.) | 0.75A/115VAC 0.5A/230VAC | | | | | |
| | INRUSH CURRENT (Typ.) | COLD START 20A/115VAC 45A/230VAC | | | | | |
| | LEAKAGE CURRENT (max.) <small>Note.7</small> | Touch current <80 μ A/264VAC | | | | | |
| PROTECTION | OVERLOAD | 110% ~ 150% rated output power 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 | |
| | OVER TEMPERATURE | Protection type : Shut down o/p voltage, recovers automatically after temperature goes down | | | | | |
| ENVIRONMENT | WORKING TEMP. | -35 ~ +85 $^{\circ}$ C (Refer to "Derating Curve") | | | | | |
| | WORKING HUMIDITY | 20 ~ 90% RH non-condensing | | | | | |
| | STORAGE TEMP., HUMIDITY | -40 ~ +85 $^{\circ}$ C, 10 ~ 95% RH non-condensing | | | | | |
| | TEMP. COEFFICIENT | ± 0.03%/ $^{\circ}$ C (0 ~ 50 $^{\circ}$ C) | | | | | |
| | SOLDERING TEMPERATURE | 260 $^{\circ}$ C ± 5 $^{\circ}$ C/10sec.max. | | | | | |
| | VIBRATION | 10 ~ 500Hz, 5G 10min./1cycle, period for 60min. each along X, Y, Z axes | | | | | |
| OPERATING ALTITUDE <small>Note.8</small> | 5000 meters | | | | | | |
| SAFETY & EMC (Note.9) | SAFETY STANDARDS | IEC60601-1, EN60601-1, UL ANSI/AAMI ES60601-1(3.1 version), CAN/CSA-C22 3 rd Edition approved; Design refer to EN60335-1 | | | | | |
| | ISOLATION LEVEL | Primary-Secondary: 2xMOPP | | | | | |
| | WITHSTAND VOLTAGE | I/P-O/P:4KVAC | | | | | |
| | ISOLATION RESISTANCE | I/P-O/P:100M Ohms / 500VDC / 25 $^{\circ}$ C / 70% RH | | | | | |
| | EMC EMISSION | Parameter | Standard | | | Test Level / Note | |
| | | Conducted emission | EN55011 (CISPR11) | | | Class B | |
| | | Radiated emission | EN55011 (CISPR11) | | | Class B | |
| | | Harmonic current | EN61000-3-2 | | | Class A | |
| | | Voltage flicker | EN61000-3-3 | | | ----- | |
| | EMC IMMUNITY | Parameter | Standard | | | Test Level / Note | |
| | | ESD | EN61000-4-2 | | | Level 4, 15KV air ; Level 4, 8KV contact | |
| | | RF field susceptibility | EN61000-4-3 | | | Level 3, 10V/m(80MHz~2.7GHz) Table 9, 9~28V/m(385MHz~5.78GHz) | |
| | | EFT bursts | EN61000-4-4 | | | Level 3, 2KV | |
| | | Surge susceptibility | EN61000-4-5 | | | Level 3, 1KV/Line-Line | |
| Conducted susceptibility | | EN61000-4-6 | | | Level 3, 10V | | |
| Magnetic field immunity | | EN61000-4-8 | | | Level 4, 30A/m | | |
| Voltage dip, interruption | | EN61000-4-11 | | | 100% dip 1 periods, 30% dip 25 periods, 100% interruptions 250 periods | | |
| OTHERS | MTBF | 1210Khrs min. MIL-HDBK-217F (25 $^{\circ}$ C) | | | | | |
| | 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 | <p>1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25$^{\circ}$C of ambient temperature.</p> <p>2. No minimum load required.</p> <p>3. 33% Duty cycle maximum within every 30 seconds. Average output power should not exceed the rated power.</p> <p>4. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1 μf & 47 μf parallel capacitor.</p> <p>5. Tolerance : includes set up tolerance, line regulation and load regulation.</p> <p>6. Derating may be needed under low input voltages. Please check the derating curve for more details.</p> <p>7. Touch current was measured from primary input to DC output.</p> <p>8. The ambient temperature derating of 2.5$^{\circ}$C/ 1000m is needed for operating altitude greater than 2000m(6500ft).</p> <p>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)</p> | | | | | | |

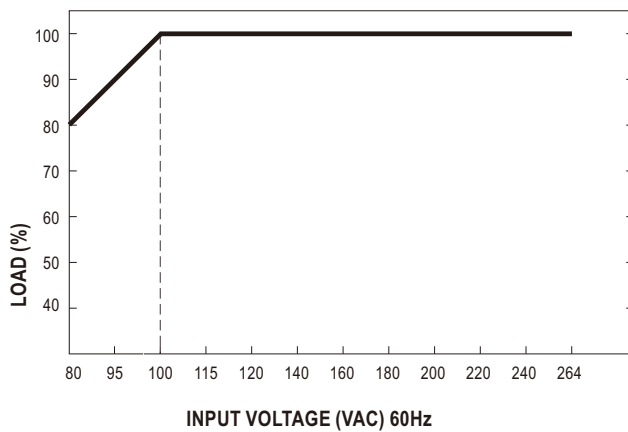
Block Diagram



Derating Curve

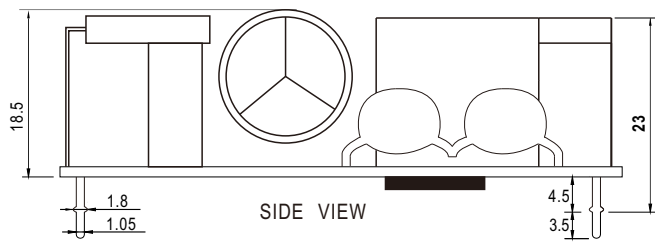
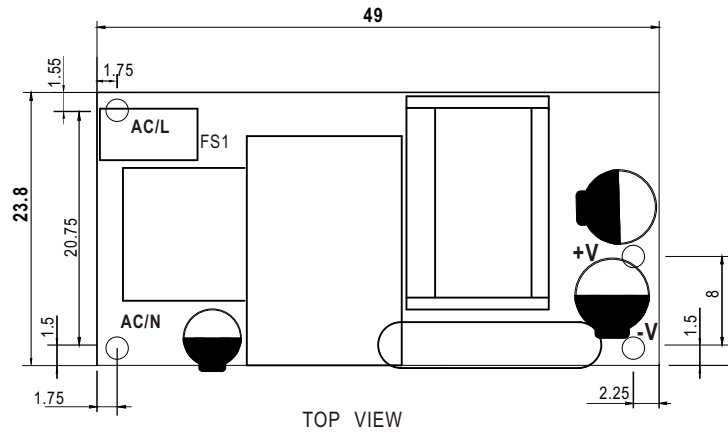


Output Derating VS Input Voltage



■ **Mechanical Specification**

Unit:inch(mm)



■ **Installation Manual**

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

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