



## ■ Features

- 1.9"x0.9" 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
- Low leakage current <math><80\mu A</math>
- Wide operating temp. range -30 ~ +80°C
- Isolation Class II
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Cooling by free air convection
- 3 years warranty

## ■ Applications

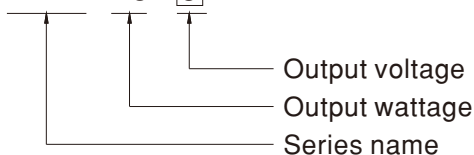
- Portable medical device
- Mobile clinical workstation
- Medical computer monitor
- Medical examination instrument

## ■ Description

MFM-20 is a 20W high density and small size (49\*23.8\*18.5mm) AC/DC module type medical power supply series. It features the operation for 80~264VAC, a low no load power consumption less than 0.075W, a high efficiency up to 87%, 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/EN60601-1 and ANSI/AAMI ES60601-1 version three with 2xMOPP level and ultra-low leakage current (<math><80\mu A</math>). It is very suitable for BF (patient contact) type medical device or relevant equipment.

## ■ Model Encoding

MFM - 20 - 5

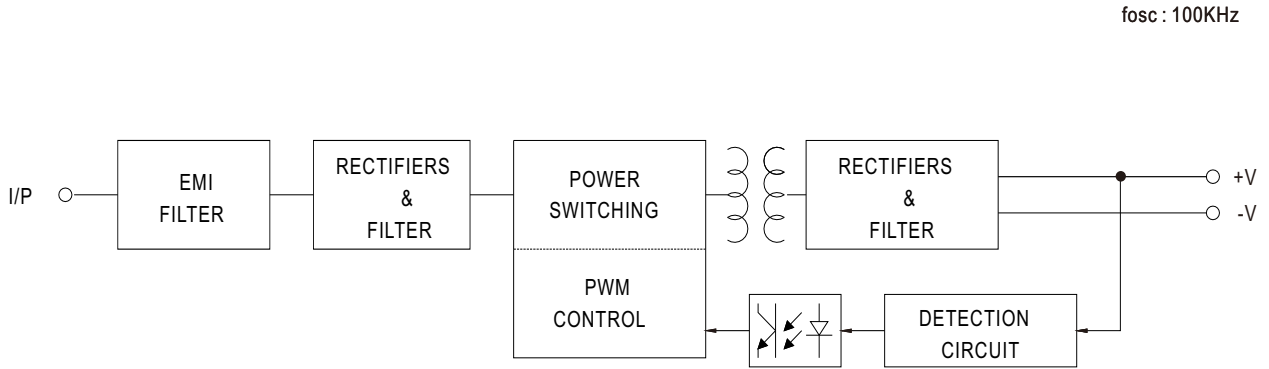




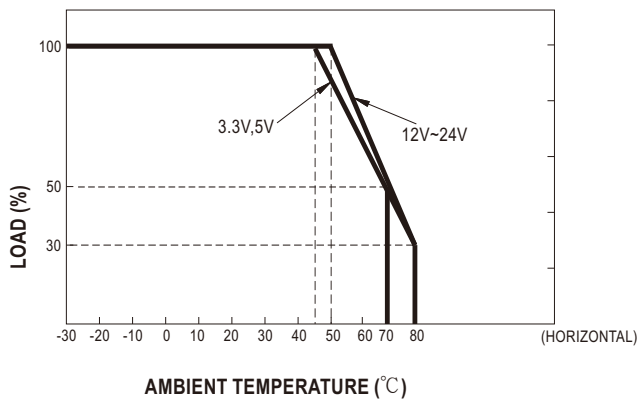
**SPECIFICATION**

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 LOAD (10sec.) <small>Note.3</small>	4.95A	4.4A	1.98A	1.54A	0.99A	
	RATED POWER	14.85W	20W	21.6W	21W	21.6W	
	RIPPLE & NOISE (max.) <small>Note.4</small>	200mVp-p	200mVp-p	200mVp-p	200mVp-p	200mVp-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    12ms/115VAC at full load						
INPUT	VOLTAGE RANGE <small>Note.6</small>	80 ~ 264VAC					
	FREQUENCY RANGE	47 ~ 440Hz					
	EFFICIENCY (Typ.)	83%	86%	86%	87%	87%	
	AC CURRENT (Typ.)	0.75A/115VAC    0.5A/230VAC					
	INRUSH CURRENT (Typ.)	COLD START 20A/115VAC    40A/230VAC					
	LEAKAGE CURRENT (max.) <small>Note.7</small>	Touch current <80 $\mu$ A/264VAC					
PROTECTION	OVERLOAD	110% ~ 150% rated output power Protection type : Hiccup mode, recovers automatically after fault condition is removed					
	OVER VOLTAGE	3.8 ~ 4.95V	5.75 ~ 6.75V	13.8 ~ 16.2V	17.25 ~ 20.25V	27.6 ~ 32.4V	
	OVER TEMPERATURE	Protection type : Shut down o/p voltage, recovers automatically after temperature goes down					
ENVIRONMENT	WORKING TEMP.	-30 ~ +80 $^{\circ}$ C (Refer to "Derating Curve")					
	WORKING HUMIDITY	20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY	-40 ~ +85 $^{\circ}$ C, 10 ~ 95% RH					
	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>	5000m					
SAFETY & EMC (Note.9)	SAFETY STANDARDS	IEC60601-1, EN60601-1, AAMI/ANSI ES60601-1(3.1 version), CAN/CSA-C22 3 <sup>rd</sup> Edition approved					
	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	EN55011 (CISPR11)			Class B	
		Radiated	EN55011 (CISPR11)			Class B	
		Harmonic Current	EN61000-3-2			Class A	
		Voltage Flicker	EN61000-3-3			----	
	EMC IMMUNITY	EN55024 , EN60601-1-2, EN61204-3					
		Parameter	Standard			Test Level / Note	
		ESD	EN61000-4-2			Level 3, 8KV air ; Level 4, 8KV contact	
		Radiated	EN61000-4-3			Level 3	
		EFT / Burst	EN61000-4-4			Level 3	
Surge		EN61000-4-5			Level 2, 1KV/Line-Line		
Conducted		EN61000-4-6			Level 3		
Magnetic Field		EN61000-4-8			Level 4		
Voltage Dips and Interruptions		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*18.5mm (L*W*H)					
	PACKING	0.028Kg; 240pcs/7.7Kg/0.97CUFT					
NOTE	<ol style="list-style-type: none"> <li>All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25<math>^{\circ}</math>C of ambient temperature.</li> <li>No minimum load required.</li> <li>33% Duty cycle maximum within every 30 seconds. Average output power should not exceed the rated power.</li> <li>Ripple &amp; noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1 <math>\mu</math>f &amp; 47 <math>\mu</math>f parallel capacitor.</li> <li>Tolerance : includes set up tolerance, line regulation and load regulation.</li> <li>Derating may be needed under low input voltages. Please check the derating curve for more details.</li> <li>Touch current was measured from primary input to DC output.</li> <li>The ambient temperature derating of 3.5<math>^{\circ}</math>C/ 1000m with fanless models and of 5<math>^{\circ}</math>C/1000m with fan models for operating altitude higher than 2000m(6500ft).</li> <li>The power supply is considered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit on a 360mm*360mm metal plate with 1mm of thickness. 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 <a href="http://www.meanwell.com">http://www.meanwell.com</a>)</li> </ol>						

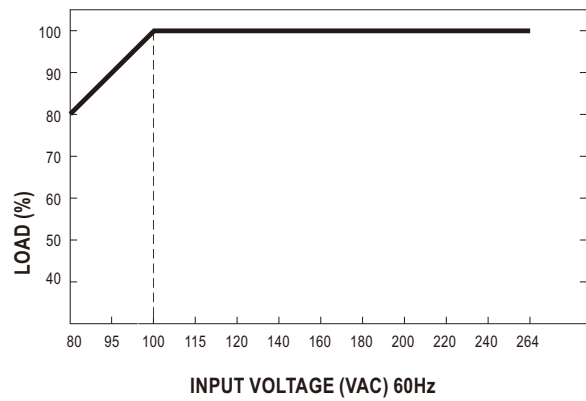
### Block Diagram



### Derating Curve

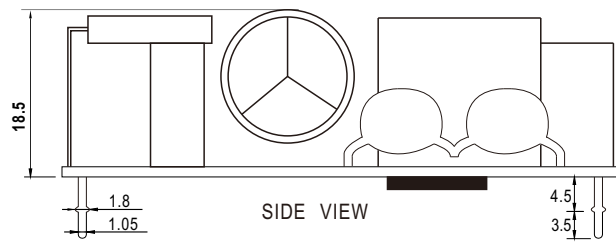
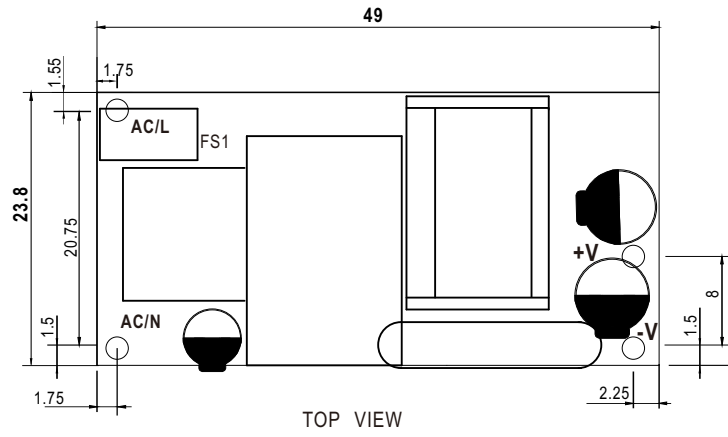


### Output Derating VS Input Voltage



■ **Mechanical Specification**

Unit:inch(mm)



■ **Installation Manual**

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