



## ■ Features

- 1.65"x0.88" 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
- 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 > 52K hours
- 3 years warranty

## ■ Applications

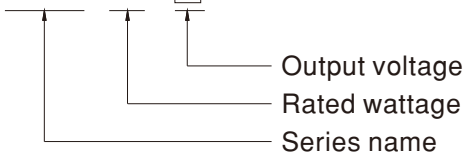
- Portable medical device
- Mobile clinical workstation
- Medical computer monitor
- Medical examination instrument

## ■ Description

MFM-05 is a 5W high density and small size (42\*22.3\*20.5mm) AC/DC open frame type medical grade 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 82%, 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

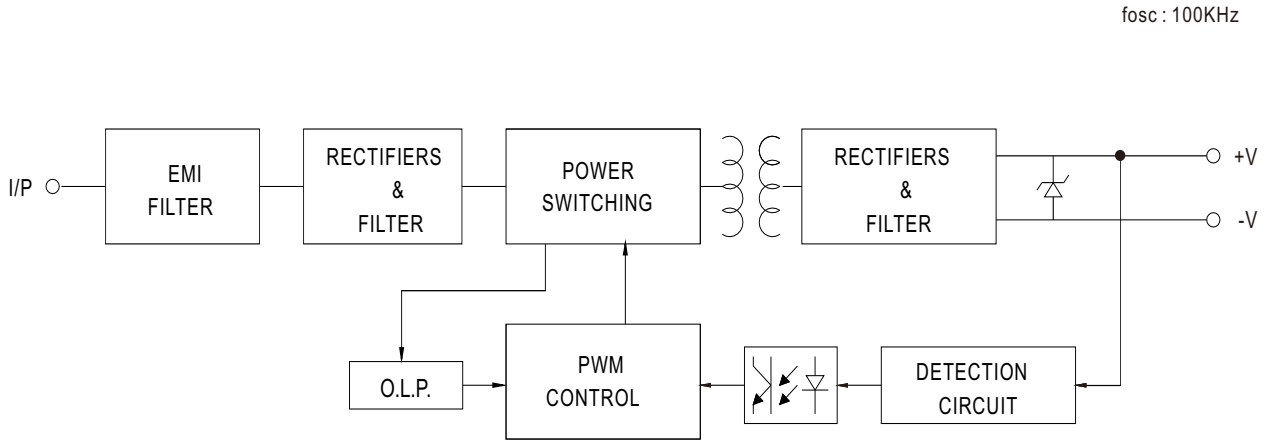
**MFM - 05 - 5**



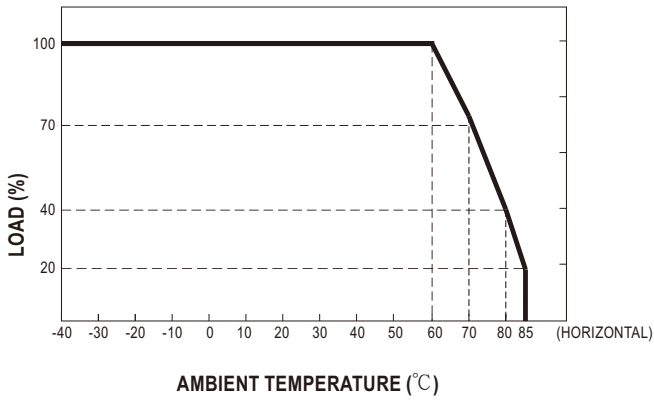
**SPECIFICATION**

MODEL		MFM-05-3.3	MFM-05-5	MFM-05-12	MFM-05-15	MFM-05-24	
OUTPUT	DC VOLTAGE	3.3V	5V	12V	15V	24V	
	RATED CURRENT	1.25A	1A	0.42A	0.33A	0.23A	
	CURRENT RANGE <small>Note.2</small>	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.) <small>Note.3</small>	4.6W	5.5W	5.5W	5.4W	6W	
	RIPPLE & NOISE (max.) <small>Note.4</small>	100mVp-p	100mVp-p	150mVp-p	150mVp-p	180mVp-p	
	VOLTAGE TOLERANCE <small>Note.5</small>	±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 <small>Note.6</small>	80 ~ 264VAC					
	FREQUENCY RANGE	47 ~ 440Hz					
	EFFICIENCY (Typ.)	74%	80%	80%	81%	82%	
	AC CURRENT (Typ.)	0.2A/115VAC    0.1A/230VAC					
	INRUSH CURRENT (Typ.)	COLD START    25A/115VAC    45A/230VAC					
	LEAKAGE CURRENT (max.) <small>Note.7</small>	Touch current <80 $\mu$ A/264VAC					
PROTECTION	OVERLOAD	110% ~ 180% rated output power Protection type : Hiccup mode, recovers automatically after fault condition is removed					
	OVER VOLTAGE	3.8 ~ 5V	5.75 ~ 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.	-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	260°C ±5°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 <sup>rd</sup> 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°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 4, 15KV air ; Level 4, 8KV contact	
		Radiated	EN61000-4-3			Level 3	
		EFT / Burst	EN61000-4-4			Level 3	
Surge		EN61000-4-5			Level 3, 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	1799.5Khrs min.    MIL-HDBK-217F (25°C)					
	DIMENSION	42*22.3*20.5mm (L*W*H) or 1.65*0.88*0.80" inch					
	PACKING	0.018Kg; 270pcs/5.8Kg/0.97CUFT					
NOTE	<ol style="list-style-type: none"> <li>All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°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 2.5°C/ 1000m is needed for operating altitude greater than 2000m(6500ft).</li> <li>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 <a href="http://www.meanwell.com">http://www.meanwell.com</a>)</li> </ol>						

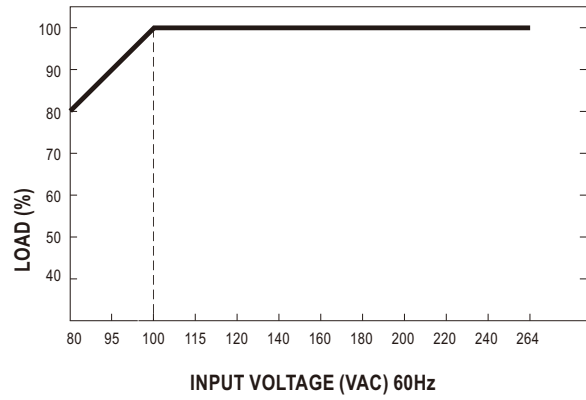
■ Block Diagram



■ Derating Curve

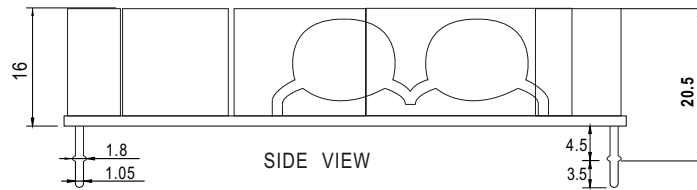
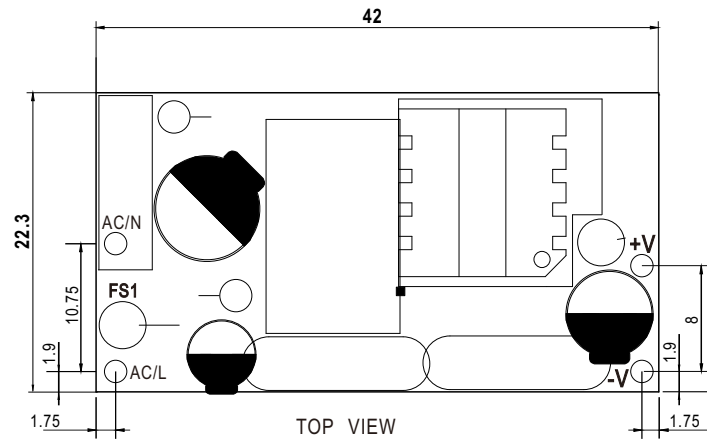


■ Output Derating VS Input Voltage



## ■ Mechanical Specification

Unit: mm



## ■ Installation Manual

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