

BS EN/EN60335-1 ANSI/AAMI ES60601-1 BS EN/EN60601-1 IEC60601-1 TPTC004

## ■ Features

- 1.93"x0.94" 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<0.1W
- 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

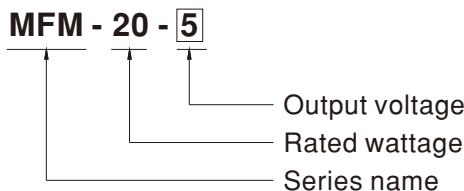
## ■ GTIN CODE

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

## ■ 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 0.1W, 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/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.

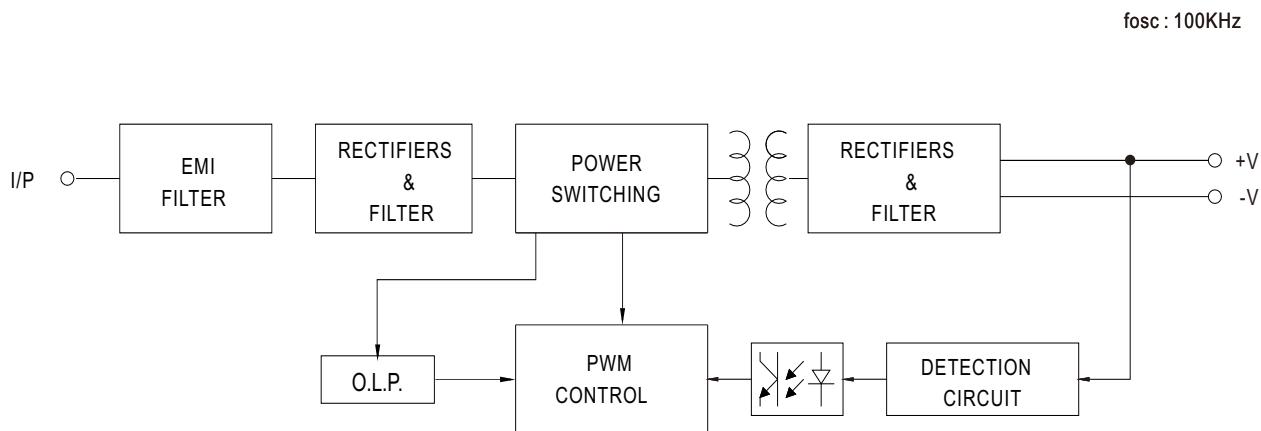
## ■ Model Encoding



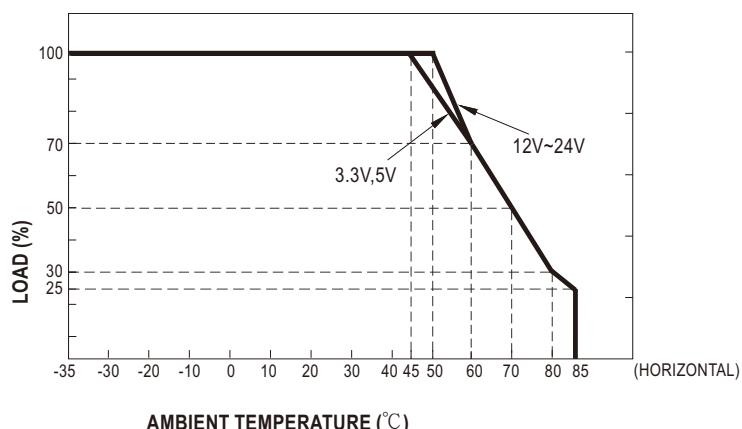
## SPECIFICATION

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						
	RATED CURRENT	4.5A	4A	1.8A	1.4A						
	CURRENT RANGE Note.2	0 ~ 4.5A	0 ~ 4A	0 ~ 1.8A	0 ~ 1.4A						
	PEAK CURRENT	4.95A	4.4A	1.98A	1.54A						
	RATED POWER	14.9W	20W	21.6W	21W						
	PEAK LOAD(10sec.) Note.3	16.3W	22W	23.8W	23.8W						
	RIPPLE & NOISE (max.) Note.4	150mVp-p	150mVp-p	150mVp-p	180mVp-p						
	VOLTAGE TOLERANCE Note.5	±2.0%	±2.0%	±2.0%	±2.0%						
	LINE REGULATION	±0.5%	±0.5%	±0.3%	±0.3%						
	LOAD REGULATION	±0.5%	±0.5%	±0.5%	±0.5%						
INPUT	SETUP, RISE TIME	1500ms, 30ms/230VAC	1500ms, 30ms/115VAC at full load								
	HOLD UP TIME (Typ.)	40ms/230VAC	10ms/115VAC at full load								
PROTECTION	VOLTAGE RANGE Note.6	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								
ENVIRONMENT	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 off o/p voltage, clamping by zener diode									
	WORKING TEMP.	-35 ~ +85°C (Refer to "Derating Curve")									
SAFETY & EMC (Note.9)	WORKING HUMIDITY	20 ~ 90% RH non-condensing									
	STORAGE TEMP., HUMIDITY	-40 ~ +85°C, 10 ~ 95% RH non-condensing									
	TEMP. COEFFICIENT	±0.03%/°C (0 ~ 50°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 Note.8	5000 meters									
	SAFETY STANDARDS	IEC60601-1, BS EN/EN60601-1, IEC60335-1, BS EN/EN60335-1, EAC TP TC 004, UL ANSI/AAMI ES60601-1(3.1 version), CAN/CSA-C22 3 <sup>rd</sup> Edition approved									
OTHERS	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 emission	BS EN/EN55011 (CISPR11)	Class B							
		Radiated emission	BS EN/EN55011 (CISPR11)	Class B							
		Harmonic current	BS EN/EN61000-3-2	Class A							
	EMC IMMUNITY	Voltage flicker	BS EN/EN61000-3-3	-----							
		BS EN/EN5035, 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 ) 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							
NOTE	Magnetic field immunity	BS EN/EN61000-4-8	Level 4, 30A/m			100% dip 1 periods, 30% dip 25 periods, 100% interruptions 250 periods					
	Voltage dip, interruption	BS EN/EN61000-4-11									
	MTBF	7319.8K hrs min. Telcordia SR-332 (Bellcore) ; 1210.1K hrs min. MIL-HDBK-217F (25°C)									
	DIMENSION	49*23.8*23mm (L*W*H) or 1.93 " * 0.94 " * 0.91 " inch									
	PACKING	0.028Kg; 200pcs/6.6Kg/0.94CUFT									
1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C 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 μf & 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 3.5°C/1000m with fanless models and of 5°C/1000m with fan models for operating altitude higher than 2000m(6500ft). 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 <a href="http://www.meanwell.com">http://www.meanwell.com</a> )											
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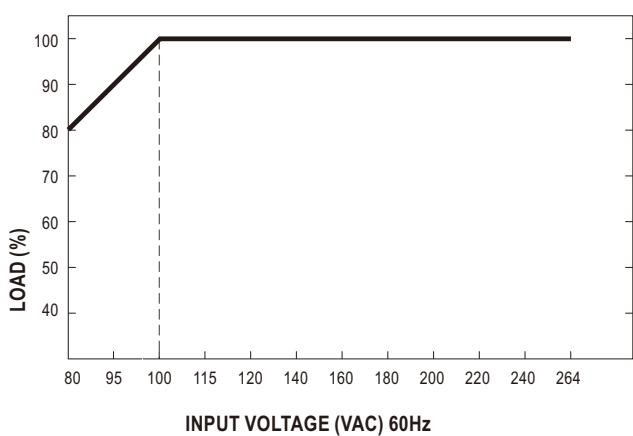
## ■ Block Diagram



## ■ Derating Curve

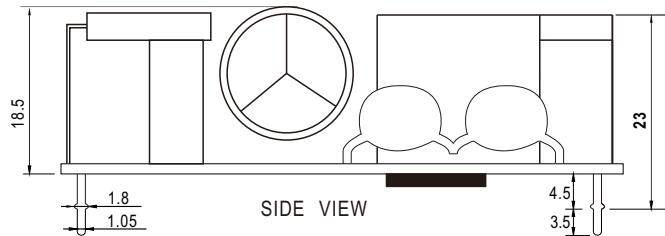
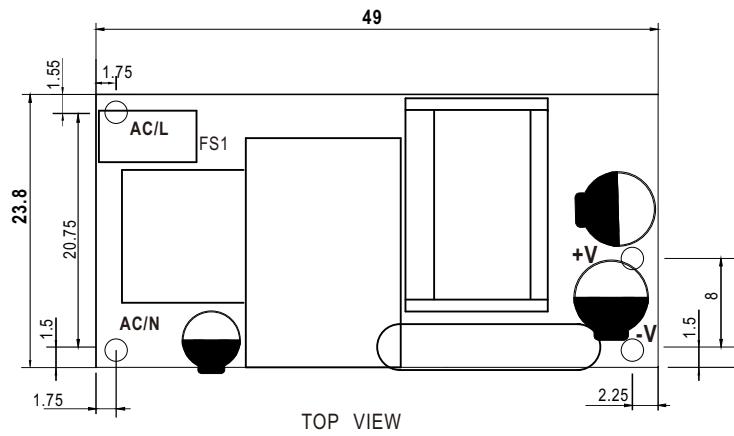


## ■ Output Derating VS Input Voltage



**■ Mechanical Specification**

Unit:inch(mm)

**■ Installation Manual**

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