



E-Star Power Development Co., Ltd. (E-STAR)
 1F., No.40, Juren Ln., Sec. 2, Sanmin Rd., Banciao Dist., New Taipei City
 22069, Taiwan (R.O.C.)
 Phone : 886-2-2957 5580 Fax : 886-2-2957 7473

15W Open Frame Medical power supply < MFM-15



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

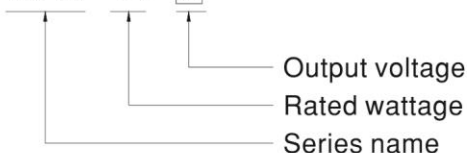
- Portable medical device
- Mobile clinical workstation
- Medical computer monitor
- Medical examination instrument

Description

MFM-15 is a 15W 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 - 15 - 5





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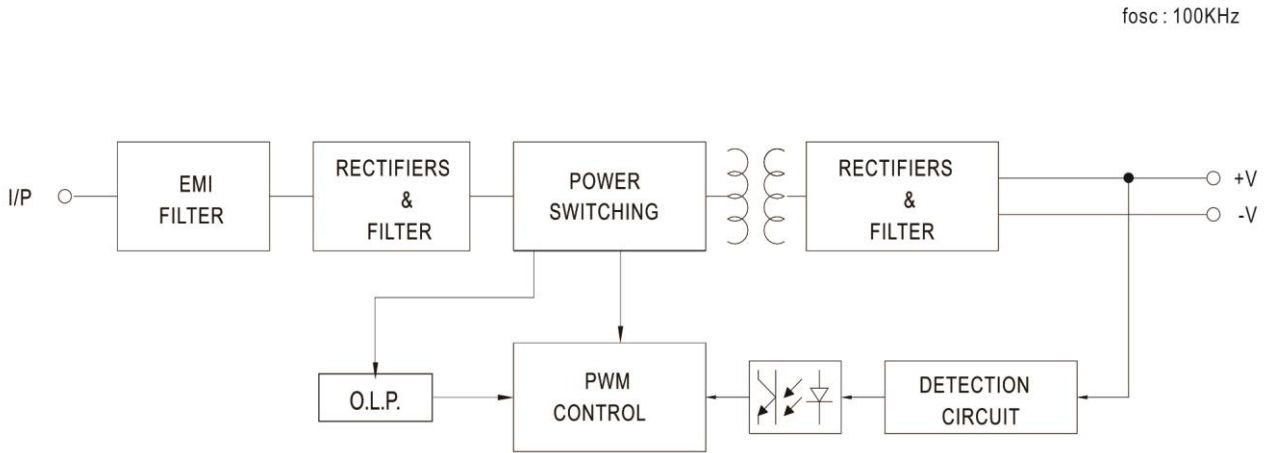
SPECIFICATION

MODEL		MFM-15-3.3	MFM-15-5	MFM-15-12	MFM-15-15	MFM-15-24	
OUTPUT	DC VOLTAGE	3.3V	5V	12V	15V	24V	
	RATED CURRENT	3.5A	3A	1.25A	1A	0.63A	
	CURRENT RANGE <small>Note.2</small>	0 ~ 3.5A	0 ~ 3A	0 ~ 1.25A	0 ~ 1A	0 ~ 0.63A	
	PEAK CURRENT	3.85A	3.3A	1.38A	1.1A	0.69A	
	RATED POWER	11.6W	15W	15W	15W	15.1W	
	PEAK LOAD(10sec.) <small>Note.3</small>	12.7W	16.5W	16.6W	16.5W	16.6W	
	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	150ms, 30ms/230VAC 150ms, 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.)	83.5%	85.5%	86.5%	87%	86.5%	
	AC CURRENT (Typ.)	0.6A/115VAC 0.3A/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 ~ 55 $^{\circ}$ 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 <small>(Note.9)</small>	SAFETY STANDARDS	IEC60601-1, EN60601-1, EAC TP TC 004, 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	EN60601-1-2	Parameter			Standard	
		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	<ol style="list-style-type: none"> All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25$^{\circ}$C of ambient temperature. No minimum load required. 33% Duty cycle maximum within every 30 seconds. Average output power should not exceed the rated power. 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. Tolerance : includes set up tolerance, line regulation and load regulation. Derating may be needed under low input voltages. Please check the derating curve for more details. Touch current was measured from primary input to DC output. The ambient temperature derating of 3.5$^{\circ}$C/1000m with fanless models and of 5$^{\circ}$C/1000m with fan models for operating altitude higher than 2000m(6500ft). 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." 						

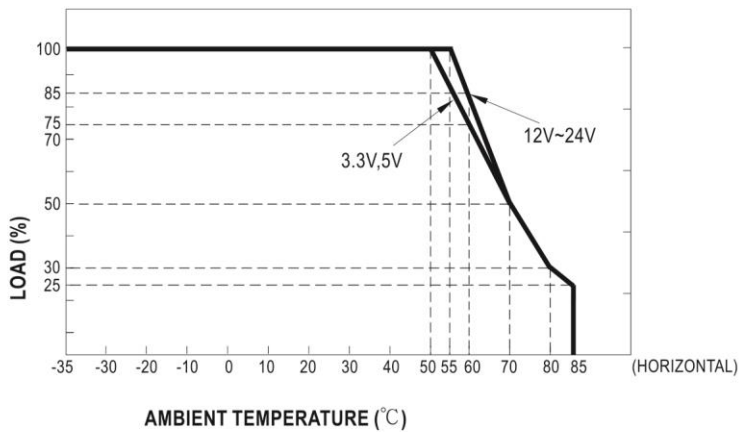


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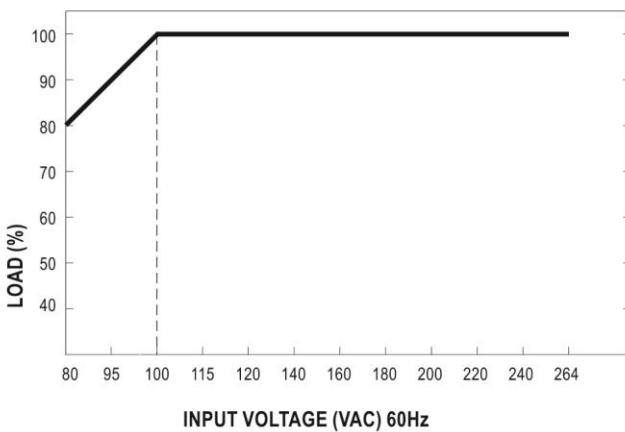
Block Diagram



Derating Curve



Output Derating VS Input Voltage





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Mechanical Specification

Unit:inch(mm)

