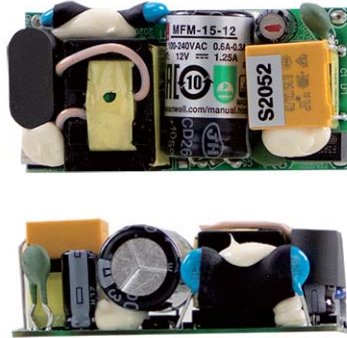




15W High Reliable Green Medical On Board Type

MFM-15 series

User's Manual



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

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 0.1W, 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 μA). It is very suitable for BF (patient contact) type medical device or relevant equipment.

Model Encoding

MFM - 15 - 5

Output voltage
Rated wattage
Series name

Applications

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

GTIN CODE

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



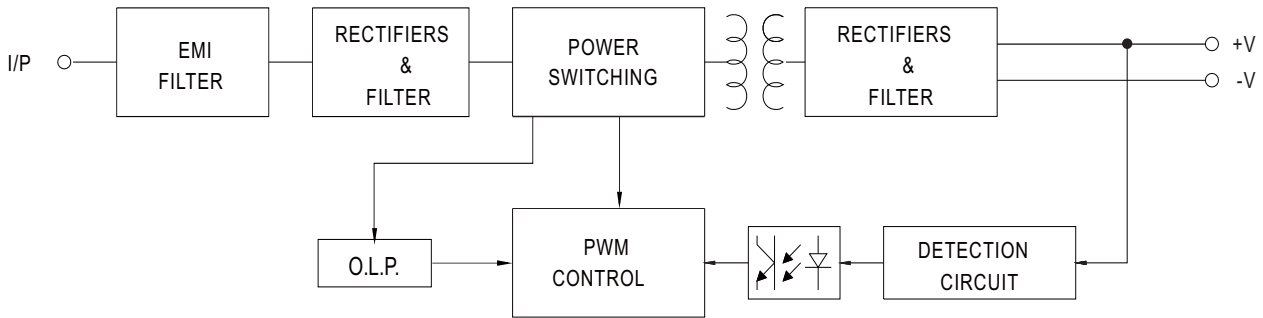
SPECIFICATION

| 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> | ±2.0% | ±2.0% | ±2.0% | ±2.0% | ±2.0% | |
| | 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 113V~370VDC | | | | | |
| | 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 | Wave soldering: 265 $^{\circ}$ C, 5s (max.); Manual soldering: 390 $^{\circ}$ C, 3s (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 | IEC 60601-1:2005+A1, TUV BS EN/ EN 60601-1:2006+A1+A12+A2, ANSI/AAMI ES60601-1:2005/A2:2021, CAN/CSA C22.2 No. 60601-1:2014+A2, IEC 60335-1:2010/AMD2:2016, Dekra BS EN/ EN 60335-1:2012+A11+A13+A1+A14+A2+A15, EAC TP TC 004 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 emission | BS EN/EN55011 (CISPR11) | | | Class B | |
| | | Radiated emission | BS EN/EN55011 (CISPR11) | | | Class B | |
| | | Harmonic current | BS EN/EN61000-3-2 | | | Class A | |
| | Voltage flicker | BS EN/EN61000-3-3 | | | ----- | | |
| | EMC IMMUNITY | BS EN/EN55035, 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 | | |
| Magnetic field immunity | | BS EN/EN61000-4-8 | | | Level 4, 30A/m | | |
| Voltage dip, interruption | BS EN/EN61000-4-11 | | | 100% dip 1 periods, 30% dip 25 periods, 100% interruptions 250 periods | | | |
| OTHERS | MTBF | 7319.8K hrs min. Telcordia SR-332 (Bellcore) ; 1210.1K hrs 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/0.94CUFT | | | | | |
| 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." (as available on https://www.meanwell.com/Upload/PDF/EMI_statement_en.pdf) <p>※ Product Liability Disclaimer : For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx</p> | | | | | | |

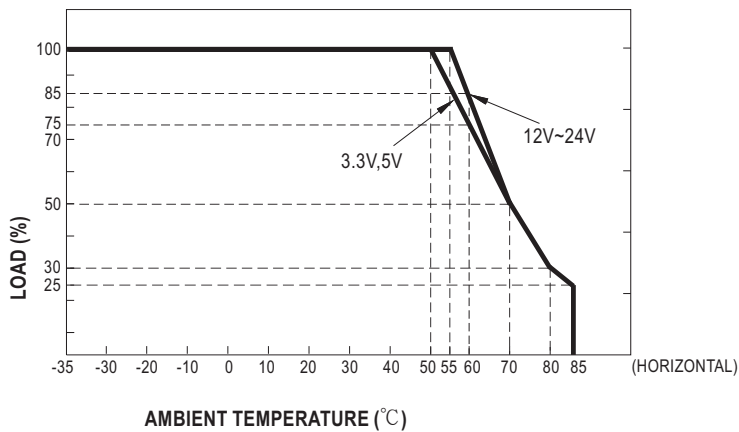


■ Block Diagram

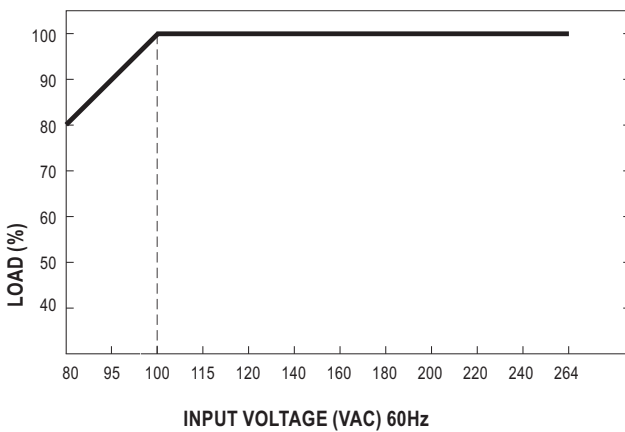
fosc: 100KHz



■ Derating Curve



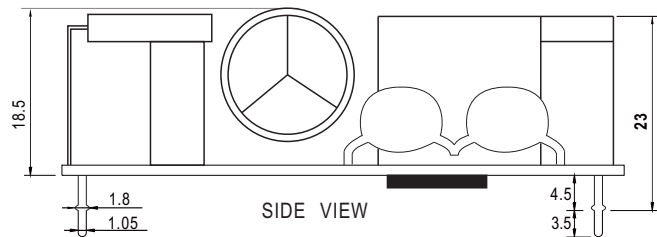
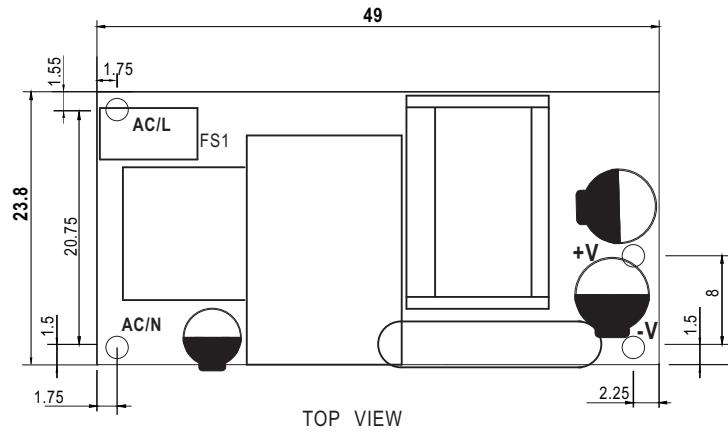
■ Output Derating VS Input Voltage





■ **Mechanical Specification**

(Unit:mm, tolerance $\pm 0.5\text{mm}$)



■ **Installation Manual**

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