

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



### ■ Features

- 2.58"x1.38" 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 < 0.075W
- Extremely low leakage current
- Wide operating temp. range -40 ~ +85°C
- EMI class B for class II configuration
- Protections: Short circuit / Overload / Over voltage
- No minimum load required
- 3 years warranty

### ■ Applications

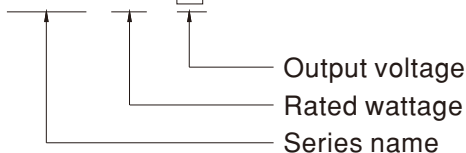
- Portable medical device
- Mobile clinical workstation
- Medical computer monitor
- Medical examination instrument

### ■ Description

MFM-30 is a 30W high density and small size (65.5x35x23mm) AC/DC on board type medical power supply series offered in pin type . It features the operation for 80~264VAC, a low no load power consumption less than 0.075W, a high efficiency up to 91%, Class II (no FG) double insulation, outstanding dissipation, 3G anti-vibration, high EMC performance, 4KVAC isolation, etc. The design observes IEC/BS EN/EN60601-1 and ANSI/AAMI ES60601-1 version three with 2 x MOPP level and ultra-low leakage current (<80µA). It is very suitable for BF (patient contact) type medical device or relevant equipment.

### ■ Model Encoding

**MFM - 30 - 5**

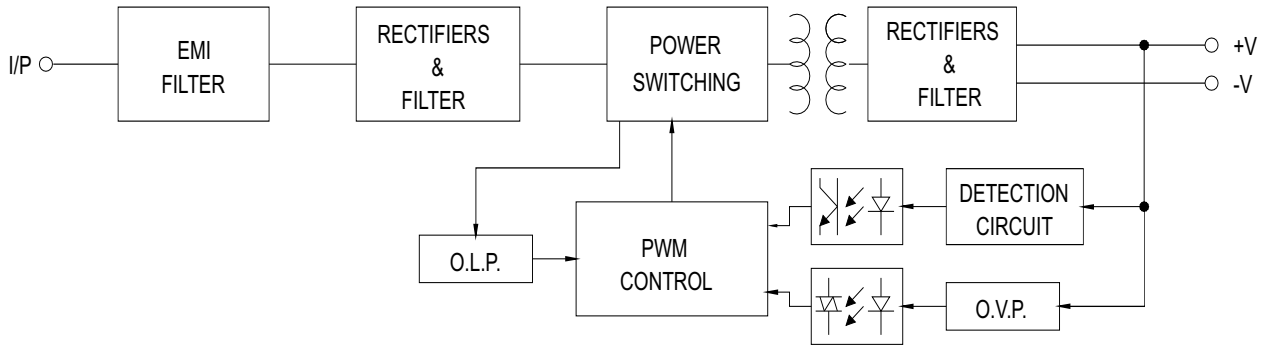


**SPECIFICATION**

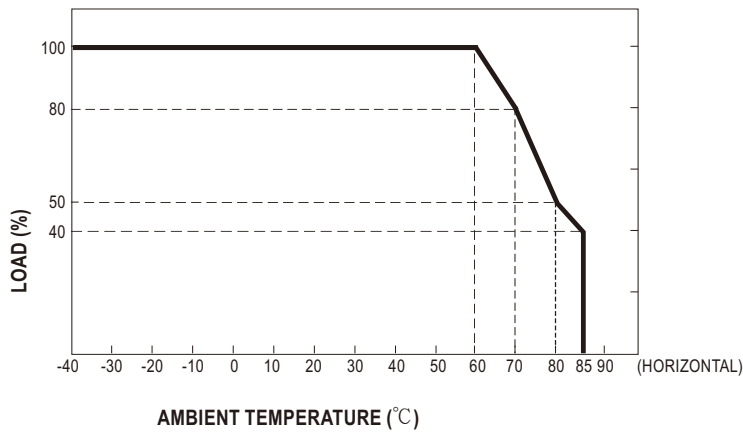
MODEL	MFM-30-3.3	MFM-30-5	MFM-30-12	MFM-30-15	MFM-30-24	MFM-30-48		
OUTPUT	DC VOLTAGE	3.3V	5V	12V	15V	24V	48V	
	RATED CURRENT	6A	6A	2.5A	2A	1.3A	0.63A	
	CURRENT RANGE <small>Note.2</small>	0 ~ 6A	0 ~ 6A	0 ~ 2.5A	0 ~ 2A	0 ~ 1.3A	0 ~ 0.63A	
	PEAK CURRENT	7.8A	6.9A	2.9A	2.3A	1.5A	0.73A	
	RATED POWER	19.8W	30W	30W	30W	31.2W	30.2W	
	PEAK LOAD(10sec.) <small>Note.3</small>	25.7W	34.5W	34.8W	34.5W	36W	35W	
	RIPPLE & NOISE (max.) <small>Note.4</small>	80mVp-p	80mVp-p	120mVp-p	120mVp-p	200mVp-p	200mVp-p	
	VOLTAGE TOLERANCE <small>Note.5</small>	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	
	LINE REGULATION	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	
	LOAD REGULATION	±1.0%	±1.0%	±0.5%	±0.5%	±0.5%	±0.5%	
	SETUP, RISE TIME	500ms, 30ms/230VAC    500ms, 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 ~ 63Hz						
	EFFICIENCY (Typ.)	82.5%	86.5%	90%	89%	90%	91%	
	AC CURRENT (Typ.)	0.75A/115VAC    0.5A/230VAC						
	INRUSH CURRENT (Typ.)	COLD START    25A/115VAC    45A/230VAC						
	LEAKAGE CURRENT (max.) <small>Note.7</small>	Touch current <80µA/264VAC						
PROTECTION	OVERLOAD	115% ~ 165% rated output power Protection type : Hiccup mode, recovers automatically after fault condition is removed						
	OVER VOLTAGE	3.5 ~ 4.5V	5.3 ~ 6.8V	12.6 ~ 16.2V	15.8 ~ 20.3V	25.2 ~ 32.4V	50.4 ~ 64V	
ENVIRONMENT	WORKING TEMP.	-40 ~ +85°C (Refer to "Derating Curve")						
	WORKING HUMIDITY	20 ~ 90% RH non-condensing						
	STORAGE TEMP., HUMIDITY	-40 ~ +85°C, 10 ~ 95% RH						
	TEMP. COEFFICIENT	±0.03%/°C (0 ~ 60°C)						
	SOLDERING TEMPERATURE	260°C ±5°C/10sec.max.						
	VIBRATION	10 ~ 500Hz, 3G 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, BS EN/EN60601-1, EAC TP TC 004, UL ANSI/AAMI ES60601-1(3.1 version), CAN/CSA-C22 3 <sup>rd</sup> Edition approved; Design refer to BS EN/EN60335-1(by request)						
	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	BS EN/EN55011 (CISPR11)				Class B	
		Radiated	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/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	779Khrs min.    MIL-HDBK-217F (25°C)						
	DIMENSION	65.5*35*23mm (L*W*H)    or    2.58**1.38**0.90" inch						
	PACKING	0.053Kg; 144pcs/8.6Kg/0.97CUFT						
NOTE	<p>1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature.</p> <p>2. No minimum load required.</p> <p>3. 33% Duty cycle maximum within every 30 seconds. Average output power should not exceed the rated power.</p> <p>4. Ripple &amp; noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1 µf &amp; 47 µf parallel capacitor.</p> <p>5. Tolerance : includes set up tolerance, line regulation and load regulation.</p> <p>6. Derating may be needed under low input voltages. Please check the derating curve for more details.</p> <p>7. Touch current was measured from primary input to DC output.</p> <p>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).</p> <p>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>)</p> <p>※ Product Liability Disclaimer : For detailed information, please refer to <a href="https://www.meanwell.com/serviceDisclaimer.aspx">https://www.meanwell.com/serviceDisclaimer.aspx</a></p>							

## Block Diagram

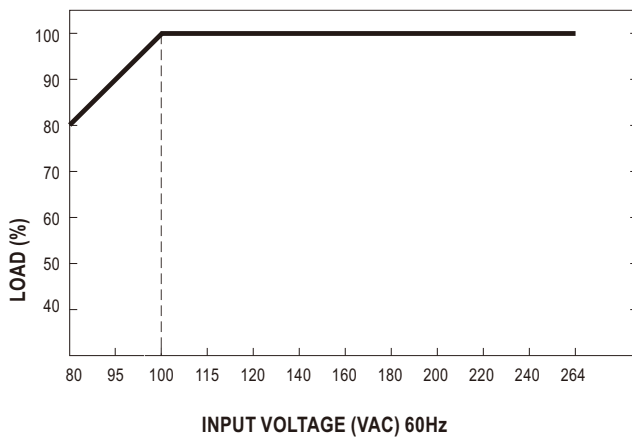
fosc : 65KHz



## Derating Curve

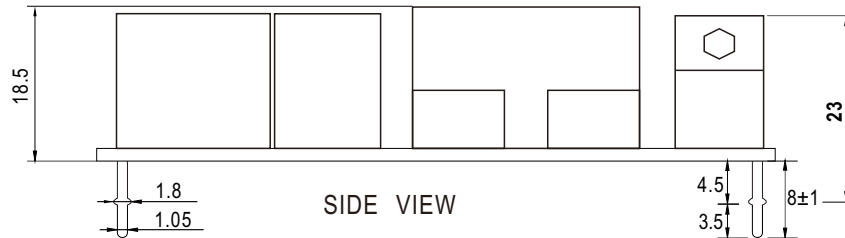
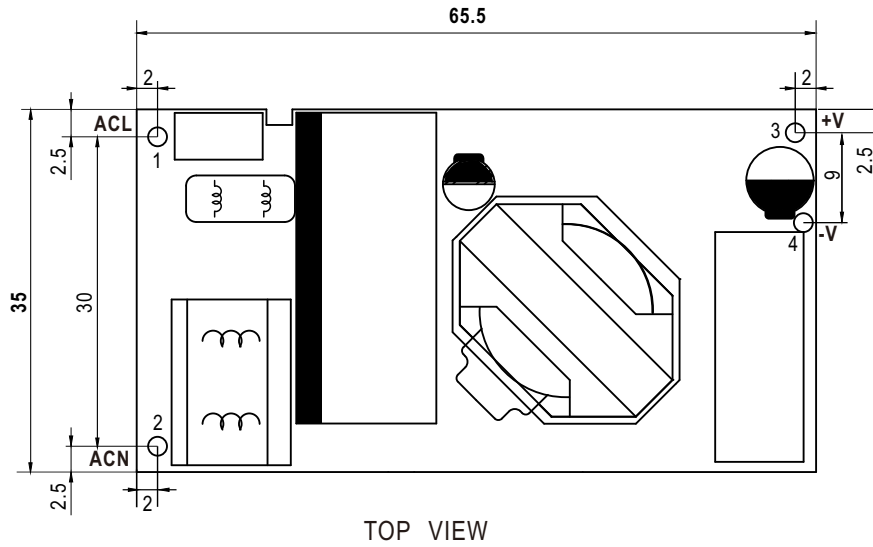


## Output Derating VS Input Voltage



■ Mechanical Specification

Unit:inch(mm)



■ Installation Manual

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