



# 20W Single Output Medical Grade Switching Power Supply

# NFM-20 series



### ■ Features :

- Universal AC input / Full range
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Ultra-miniature size, light weight
- Cooling by free air convection
- Medical safety approved (2 x MOPP between primary to secondary)
- No load power consumption<0.75W
- 100% full load burn-in test
- Optional on-board type version available
- Fixed switching frequency at 90KHz
- High reliability
- Suitable for BF application with appropriate system consideration
- 3 years warranty

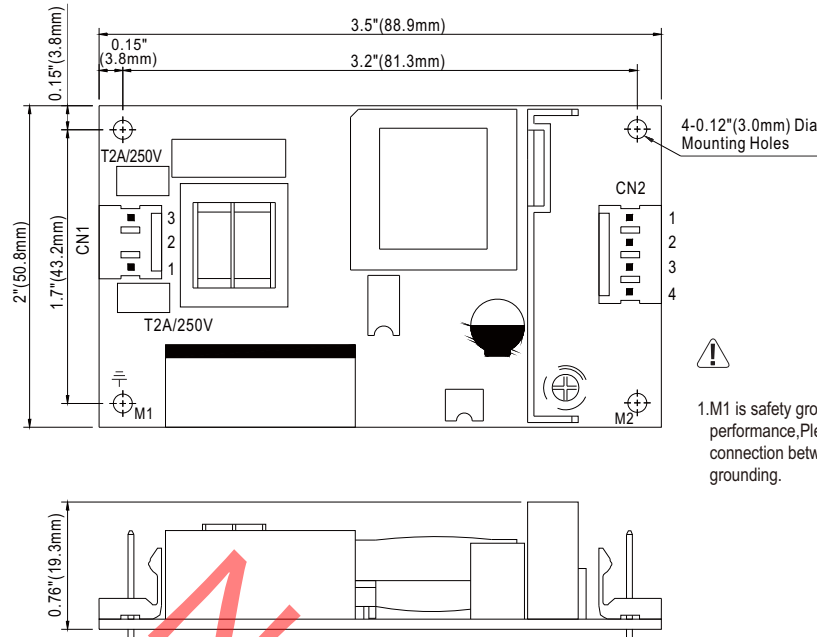


### SPECIFICATION

MODEL	NFM-20-3.3	NFM-20-5	NFM-20-12	NFM-20-15	NFM-20-24	
OUTPUT	DC VOLTAGE	3.3V	5V	12V	15V	24V
	RATED CURRENT	4.5A	4.4A	1.8A	1.4A	0.92A
	CURRENT RANGE	0 ~ 4.5A	0 ~ 4.4A	0 ~ 1.8A	0 ~ 1.4A	0 ~ 0.92A
	RATED POWER	14.85W	22W	21.6W	21W	22.08W
	RIPPLE & NOISE (max.) Note.2	80mVp-p	80mVp-p	150mVp-p	150mVp-p	240mVp-p
	VOLTAGE ADJ. RANGE	3.1 ~ 3.6V	4.5 ~ 5.4V	10.8 ~ 13.2V	13.5 ~ 16.5V	21.6 ~ 26.4V
	VOLTAGE TOLERANCE Note.3	±2.0%	±2.0%	±1.0%	±1.0%	±1.0%
	LINE REGULATION	±1.0%	±1.0%	±0.5%	±0.5%	±0.5%
	LOAD REGULATION	±1.5%	±1.5%	±0.5%	±0.5%	±0.5%
	SETUP, RISE TIME	500ms, 20ms/230VAC 500ms, 20ms/115VAC at full load				
HOLD UP TIME (Typ.)	50ms/230VAC 15ms/115VAC at full load					
INPUT	VOLTAGE RANGE	85 ~ 264VAC	120 ~ 370VDC			
	FREQUENCY RANGE	47 ~ 440Hz				
	EFFICIENCY (Typ.)	71%	75%	81%	83%	84%
	AC CURRENT (Typ.)	0.6A/115VAC	0.4A/230VAC			
	INRUSH CURRENT (Typ.)	COLD START 30A/115VAC 65A/230VAC				
LEAKAGE CURRENT Note.6	Earth leakage current < 30μA/264VAC , Touch current < 10μA/264VAC					
PROTECTION	OVERLOAD	Above 105% rated output power Protection type : Hiccup mode, recovers automatically after fault condition is removed				
	OVER VOLTAGE	3.8 ~ 4.46V	5.75 ~ 6.75V	13.8 ~ 16.2V	17.25 ~ 20.25V	27.6 ~ 32.4V
	OVER TEMPERATURE Note.5	Shut down o/p voltage, recovers automatically after temperature goes down				
ENVIRONMENT	WORKING TEMP.	-20 ~ +60°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 ~ 50°C)				
SAFETY & EMC (Note 4)	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes				
	SAFETY STANDARDS	ANSI/AAMI ES60601-1, TUV EN60601-1, IEC60601-1, EAC TP TC 004 approved				
	ISOLATION LEVEL	Primary-Secondary: 2xMOPP, Primary-Earth: 1xMOPP, Secondary-Earth: 1xMOPP				
	WITHSTAND VOLTAGE	I/P-O/P: 4KVAC I/P-FG: 2KVAC O/P-FG: 1.5KVAC				
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG: 100M Ohms / 500VDC / 25°C / 70% RH				
	EMC EMISSION	Compliance to EN55011(CISPR11), EN55032 (CISPR32) Class B, EN61000-3-2,-3, EAC TP TC 020				
OTHERS	EMC IMMUNITY	Compliance to EN61000-4-2,3,4,5,6,8,11, EN55024, EN60601-1-2, EN61204-3, medical level, criteria A, EAC TP TC 020				
	MTBF	487.8Khrs min. MIL-HDBK-217F (25°C)				
	DIMENSION	89*51*19.3mm (L*W*H)				
	PACKING	0.09Kg; 105pcs/10.5Kg/0.97CUFT				
NOTE	<ol style="list-style-type: none"> <li>1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature.</li> <li>2. Ripple &amp; noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uF &amp; 47uF parallel capacitor.</li> <li>3. Tolerance : includes set up tolerance, line regulation and load regulation.</li> <li>4. The power supply is considered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit on a 360mm*360mm metal plate with 1mm of thickness. 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> <li>5. The over temperature protection (OTP) is the built-in function of the control IC (U1). The activating level described above is based on the specification provided by the IC manufacturer.</li> <li>6. Touch current was measured from primary input to DC output.</li> <li>7. 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).</li> </ol>					

**Mechanical Specification**

Unit:inch(mm)



1.M1 is safety ground. For better EMC performance, Please secure an electrical connection between M1, M2 and chassis grounding.

AC Input Connector (CN1) : Molex 41791-03 or equivalent

Pin No.	Assignment	Mating Housing	Terminal
1	AC/N	Molex 2139 or equivalent	Molex 2478 or equivalent
2	No Pin		
3	AC/L		

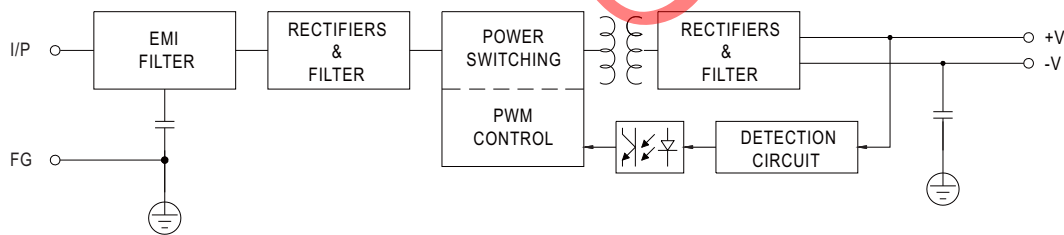
DC Output Connector (CN2) : Molex 41791-04 or equivalent

Pin No.	Assignment	Mating Housing	Terminal
1,2	+V	Molex 2139 or equivalent	Molex 2478 or equivalent
3,4	-V		

⊥ : Grounding Required

**Block Diagram**

fosc : 90KHz



**Derating Curve**

**Output Derating VS Input Voltage**

