

5W Single Output Medical Grade Switching Power Supply

NFM-05 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
- * Isolation class ${\mathbb I}$
- Medical safety approved (2 x MOPP between primary to secondary)
- No load power consumption<0.5W
- 100% full load burn-in test
- Fixed switching frequency at 67KHz
- High reliability
- Suitable for BF application with appropriate system consideration
- 3 years warranty



VOLTAGE TOLERANCE Note.3	PECIFIC	CATION		· ·		TE C 744 US 🚞 🚾 CDC		
RATED CURRENT RANGE	MODEL		NFM-05-3.3	NFM-05-5	NFM-05-12	NFM-05-15	NFM-05-24	
CURRENT RANGE 0 - 1,25A 0 - 1A 0 - 0,42A 0 - 0,33A 0 - 0,23A	ОИТРИТ	DC VOLTAGE	3.3V	5V	12V	15V	24V	
NUTPUT RATED POWER		RATED CURRENT	1,25A	1A	0.42A	0.33A	0 .23A	
RIPPLE & NOISE (max.) Note.2 80mVp-p 80mVp-p 150mVp-p 150mVp-p 240mVp-p		CURRENT RANGE	0 ~ 1.25A	0 ~ 1A	0 ~ 0.42A	0 ~ 0.33A	0 ~ 0.23A	
VOLTAGE ADJ. RANGE 3 - 3.63V 4.5 - 5.5V 10.8 - 13.2V 13.5 - 16.5V 21.6 - 26.4V		RATED POWER	4.125W	5W	5.04W	4.95W	5.52W	
VOLTAGE TOLERANCE Note.3 ±2.0% ±2.0% ±1.0% ±1.0% ±1.0% ±0.5% ±		RIPPLE & NOISE (max.) Note.2	80mVp-p	80mVp-p	150mVp-p	150mVp-p	240mVp-p	
LINE REGULATION		VOLTAGE ADJ. RANGE	3 ~ 3,63V	4.5 ~ 5.5V	10.8 ~ 13.2V	13.5 ~ 16.5V	21.6 ~ 26.4V	
LOAD REGULATION ±1.0% ±1.0% ±0.5% ±0.5% ±0.5% ±0.5% ±0.5% SETUP, RISE TIME 1000ms, 20ms/230VAC 1000ms, 20ms/115VAC at full load HOLD UP TIME (Typ.) 100ms/230VAC 24ms/1/6VAC at full load HOLD UP TIME (Typ.) 100ms/230VAC 24ms/1/6VAC at full load HOLD UP TIME (Typ.) 100ms/230VAC 24ms/1/6VAC at full load HOLD UP TIME (Typ.) 100ms/230VAC 24ms/1/6VAC at full load HOLD UP TIME (Typ.) 100ms/230VAC 24ms/1/6VAC at full load HOLD UP TIME (Typ.) 100ms/230VAC 120 ~ 370VDC FREQUENCY RANGE 47 ~ 440Hz		VOLTAGE TOLERANCE Note,3	±2.0%	±2.0%	±1.0%	±1.0%	±1.0%	
SETUP, RISE TIME		LINE REGULATION	±1.0%	±1.0%	±0.5%	±0.5%	±0.5%	
HOLD UP TIME (Typ.)		LOAD REGULATION	±1.0%	±1.0%	±0.5%	±0.5%	±0.5%	
VOLTAGE RANGE		SETUP, RISE TIME	1000ms, 20ms/230VAC	1000ms, 20ms/1	15VAC at full load			
FREQUENCY RANGE 47 ~ 440Hz		HOLD UP TIME (Typ.)	100ms/230VAC 24ms/115VAC at full load					
EFFICIENCY (Typ.) 67% 71% 13% 74% 76%	INPUT	VOLTAGE RANGE	85 ~ 264VAC 120 ~ 370VDC					
AC CURRENT (Typ.) 0.12A/115VAC 0.08A/230VAC		FREQUENCY RANGE	47 ~ 440Hz					
AC CURRENT (Typ.) INRUSH CURRENT (Typ.) LEAKAGE CURRENT Note.5 OVERLOAD OVERUAD OVER VOLTAGE OVER TEMPERATURE ENVIRONMENT STORAGE TEMP., HUMIDITY STORAGE TEMP., H		EFFICIENCY (Typ.)	67%	71%	73%	74%	76%	
DVERLOAD OVER VOLTAGE OVER TEMPERATURE WORKING TEMP. STORAGE TEMP., HUMIDITY STORAGE TEMP., HUMIDITY STORAGE TEMP., HUMIDITY TEMP. COEFFICIENT VIBRATION SAFETY & SAFETY & SAFETY STANDARDS SAFETY & SEMC OVER LOAD OVER LOAD OVER UOLTAGE OVER VOLTAGE Above 105% rated output power Protection type : Hiccup mode, recovers automatically after fault condition is removed 13.8 ~ 4.95V		AC CURRENT (Typ.)	0.12A/115VAC 0.08A/230VAC					
OVER VOLTAGE OVER TEMPERATURE Note.5 WORKING TEMP. OVER HUNDITY ENVIRONMENT STORAGE TEMP., HUMIDITY TEMP. COEFFICIENT VIBRATION 10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes SAFETY & SAFETY & SAFETY & SEMEC Above 105% rated output power Protection type : Hiccup mode, recovers automatically after fault condition is removed 13.8 ~ 4.95V 5.75 ~ 6.75V 13.8 ~ 16.2V 17.25 ~ 20.25V 27.6 ~ 32.4V 28.8 ~ 16.2V 29.8 ~ 16.2V		INRUSH CURRENT (Typ.)	COLD START 25A/115VAC 45A/230VAC					
PROTECTION OVER VOLTAGE OVER TEMPERATURE Note.5 WORKING TEMP. OVER HUMIDITY ENVIRONMENT TEMP. COEFFICIENT VIBRATION SAFETY & SAFETY & SAFETY & SEMEC OVER TEMPERATOR OVER TEMPERATOR Note.5 Protection type: Hiccup mode, recovers automatically after fault condition is removed 13.8 ~ 4.95 V		LEAKAGE CURRENT Note.6	Touch current < 80µ A/264VAC					
PROTECTION OVER VOLTAGE OVER TEMPERATURE Note.5 WORKING TEMP. -20 ~ +70°C (Refer to "Derating Curve") WORKING HUMIDITY STORAGE TEMP., HUMIDITY TEMP. COEFFICIENT VIBRATION 10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes SAFETY & SAFETY STANDARDS ISOLATION LEVEL WITHSTAND VOLTAGE 3.8 ~ 4.95V 5.75 ~ 6.75V 13.8 ~ 16.2V 17.25 ~ 20.25V 27.6 ~ 32.4V 27.6 ~ 4.5° 20 ~ 90%	PROTECTION	OVERLOAD	Above 105% rated output power					
PROTECTION OVER VOLTAGE OVER TEMPERATURE Note.5 Tj 145°C typically (U1) detect on main control IC Protection type: Shut down o/p voltage, clamping by zener diode Tj 145°C typically (U1) detect on main control IC Protection type: Shut down o/p voltage, recovers automatically after temperature goes down WORKING TEMP. WORKING HUMIDITY 20 ~ 90° RH non-condensing STORAGE TEMP., HUMIDITY -40 ~ +85°C, 10 ~ 95% RH TEMP. COEFFICIENT ±0.03%°C (0 ~ 50°C) 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 BOLATION LEVEL Primary-Secondary: 2xMOPP WITHSTAND VOLTAGE I/P-O/P:4KVAC			Protection type: Hiccup mode, recovers automatically after fault condition is removed					
OVER TEMPERATURE Note.5 Tj 145°C typically (U1) detect on main control IC Protection type: Shut down o/p voltage, recovers automatically after temperature goes down WORKING TEMP20 ~ +70°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% fC (0 ~ 50°C) 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 WITHSTAND VOLTAGE 1/P-O/P:4KVAC		OVER VOLTAGE	3.8 ~ 4.95V	5.75 ~ 6.75V	13.8 ~ 16.2V	17.25 ~ 20.25V	27.6 ~ 32.4V	
Protection type: Shut down o/p voltage, recovers automatically after temperature goes down WORKING TEMP. 20 ~ +70°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% fC (0 ~ 50°C) 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 SAFETY & ISOLATION LEVEL Primary-Secondary: 2xMOPP WITHSTAND VOLTAGE I/P-O/P:4KVAC			Protection type : Shut off o/p voltage, clamping by zener diode					
Protection type: Shut down o/p voltage, recovers automatically after temperature goes down WORKING TEMP20 ~ +70°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) 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 WITHSTAND VOLTAGE 1/P-O/P:4KVAC		OVER TEMPERATURE Note.5	Ti 145°C typically (U1) detect on main control IC					
WORKING HUMIDITY 20 ~ 90% RH non-condensing			Protection type : Shut down o/p voltage, recovers automatically after temperature goes down					
ENVIRONMENT STORAGE TEMP., HUMIDITY -40 ~ +85°C, 10 ~ 95% RH TEMP. COEFFICIENT	ENVIRONMENT	WORKING TEMP.	-20 ~ +70°C (Refer to "Derating Curve")					
TEMP. COEFFICIENT		WORKING HUMIDITY	20 ~ 90% RH non-condensing					
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 SAFETY & ISOLATION LEVEL Primary-Secondary: 2xMOPP EMC WITHSTAND VOLTAGE I/P-O/P:4KVAC		STORAGE TEMP., HUMIDITY	-40 ~ +85°C, 10 ~ 95% RH					
SAFETY STANDARDS ANSI/AAMI ES60601-1, TUV EN60601-1, IEC60601-1, EAC TP TC 004 approved SAFETY & ISOLATION LEVEL Primary-Secondary: 2xMOPP WITHSTAND VOLTAGE I/P-O/P:4KVAC		TEMP. COEFFICIENT	±0.03%/C (0~50°C)					
SAFETY & EMC ISOLATION LEVEL Primary-Secondary: 2xMOPP I/P-O/P:4KVAC I/P-O/P:4KVAC		VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes					
EMC WITHSTAND VOLTAGE I/P-O/P:4KVAC	SAFETY & EMC (Note 4)	SAFETY STANDARDS	ANSI/AAMI ES60601-1, TUV EN60601-1, IEC60601-1, EAC TP TC 004 approved					
LINO		ISOLATION LEVEL	Primary-Secondary: 2xMOPP					
		WITHSTAND VOLTAGE	I/P-O/P:4KVAC					
(Note 4) ISOLATION RESISTANCE I/P-O/P:100M Ohms / 500VDC / 25°C / 70% RH		ISOLATION RESISTANCE	I/P-O/P: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		EMC EMISSION	Compliance to EN55011(CISPR11),EN55032 (CISPR32) Class B, EN61000-3-2,-3, EAC TP TC 020					
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		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 738,7Khrs min. MIL-HDBK-217F (25°C)	OTHERS	MTBF						
		DIMENSION						
PACKING 0.03Kg; 120pcs/5.0Kg/0.97CUFT		PACKING						
1. All payameters NOT appoints montioned are propertied at 220\/AC input valed lead and 25°C of ambient tempoyature					material to a discount OF°C	ali ta ali ta anno anno a		

NOTE

- 1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature.
 2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.
 3. Tolerance: includes set up tolerance, line regulation and load regulation.
- 4. 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.
- 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.

 6. Touch current was measured from primary input to DC output.

 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).



