

## SPECIFICATION

For

## SWITCHING POWER SUPPLY

### M/N: MPD-F113-2

#### Revision History

Version	Revise Date	Change Items
Rev. 01	Mar. 10. 2011	Revised the value of inrush current.
Rev. 02	Mar. 15. 2011	Conformed the solution of EMI class B.
Rev. 03	Mar. 17. 2011	Revised the dimension.
Rev. 04	Mar. 28. 2011	Updated safety approvals status.
Rev. 05	Nov. 25. 2011	Revised the initial setting accuracy.
Rev. 06	Jun. 4. 2013	Added recommended torque of input connector.
Rev. 07	Nov. 25. 2015	1. Added vibration test. 2. Added "or equivalent" after "Dinkle".
Rev. 08	Dec. 21. 2015	Changed Over Voltage Protection 15V to 16V.
Rev. 09	Dec. 25. 2017	1. Changed form. 2. Added EN 55032.
Rev. 10	Jun. 28. 2018	Changed mechanical diagram.
Rev. 11	Dec. 24. 2018	Added output current to output field.



## FEATURES

- ✓ 110W isolated DC/DC converter with 11.7 CFM forced air-cooling, 70W convection cooled.
- ✓ Fully isolated Primary to Secondary; Primary to Earth Ground.
- ✓ Wide input range 9-32VDC.
- ✓ Compact size 2 x 5 inch.
- ✓ Low inrush current to prevent power adapter turn on issue.
- ✓ Input polarity reversed protection.
- ✓ Built in DC input on/off switch controller.
- ✓ High efficiency up to 89%.



## Models & Ratings

Model Number	Wattage (Rated / Max)	Output Voltage	Min. Current	Rated Current	Max. Current
MPD-F113-2	70 W / 110 W	+12 V	0 A	5.8 A	9.2 A <sup>(Note.1)</sup>

Total Output Power: 110W at 50°C environment temperature.<sup>(Note 2)</sup>

Note:

1. When output current above 5.8A, it has to force air cooling 11.7 CFM.
2. The total DC continuous power shall be kept with 70W at input from 18V to 32VDC; 65W at input from 12V-17.9VDC; 60W at input from 9-11.9VDC convection cooled and 110W at input from 12 to 32VDC; 95W at input from 9 to 11.9VDC with force air cooling 11.7 CFM.

## Summary

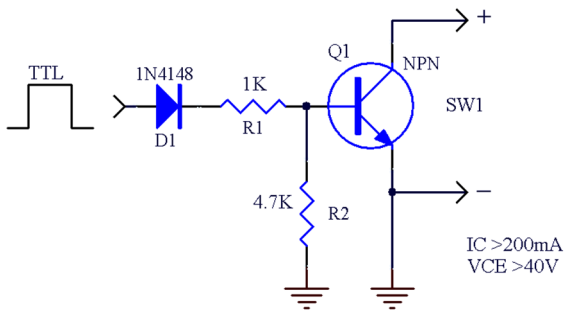
Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Range	9	12 / 24	32	VDC	Continuous input range.
Efficiency		88	89	%	At input voltage 12/24V, rated load condition.
Operation Temperature	-10		+70	°C	Derate linearly above 50°C by 1.5% per °C to a maximum temperature of 70°C at 50% load.
Weight		184.6		g	
Dimensions	50.8 (L) x 127.0 (W) x 32.3 (H) mm, Tolerance +/- 0.5mm.				
EMC	EN 55022 / EN 55032 / CISPR 32 & FCC Part 15, IEC 61000-4-2: 2001, IEC 61000-4-3: 2002, IEC 61000-4-4: 2004, IEC 61000-4-5: 2001, IEC 61000-4-6: 2006				
Safety Approvals	IEC 60950-1: 2005+A1: 2009, 2 <sup>nd</sup> , EN 60950-1: 2006+A1: 2010, UL 60950-1, 2 <sup>nd</sup> Edition, 2007-03-27, CSA C22.2 No.60950-1-07, 2 <sup>nd</sup> Edition, 2007-03				

## Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage	9	12 / 24	32	VDC	Continuous input range.
Input Current			13	A	DC Input Voltage 10VDC, rated load.
Inrush Current			45	A	Cold start at 25°C.
Input On/Off switch	Use a switch to short pin1 and pin2 of SW1 to turn on the power supply. Or, it can use TTL signal to control the power on/off. (Please see more detail at Note 1)				

Note:

1. Please refer circuit below when use TTL to control the PSU turning on/off.



Connect to SW1 + and -

## Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage		12		VDC	
Output Current		5.8	9.2	A	
Initial Set Accuracy	11.76		12.24	V	At factory, all outputs in 60% rated load. The +12V output is set to between 11.88V and 12.12V.
Minimum Load		0		A	
Line Regulation		±1.0		%	Less than ±1% at rated load with ±10% changing in input voltage +12V and +24V.
Load Regulation		±1.0		%	Measured from 60% to 100% rated load and from 60% to 20% rated load (60% ±40% rated load).
Ripple & Noise		120		mV	Measured at rated load by a 20MHz bandwidth limited oscilloscope and the each output is connected with a 10µF Electrolytic capacitor and a 0.1µF Ceramic Capacitor.
Overvoltage Protection	For some reason the power supply fails to control itself, the build-in over voltage protection circuit will shut down the outputs to prevent damaging external circuits. The trigger point is from 12.8V to 16V.				
Short Circuit or Over Load Protection	The power supply will go into hiccup mode against short circuit or over load conditions, and will auto-recovery while fault conditions moved.				

## General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		88	89	%	At input voltage 12/24V, rated load condition.
Isolation	IP to OP	500		VDC	
Switching Frequency		65		KHZ	

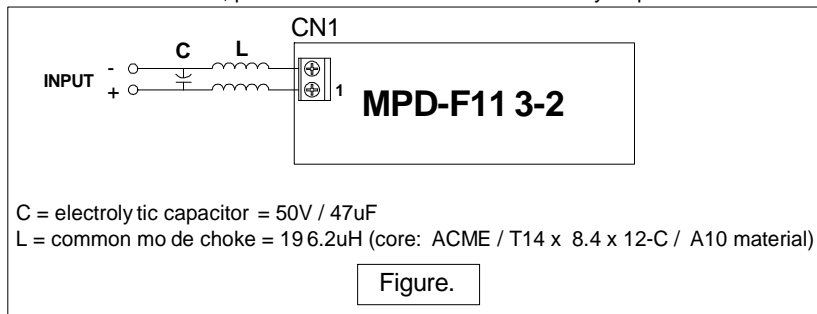
## Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-10		+70	°C	Derate linearly above 50°C by 1.5% per °C to a maximum temperature of 70°C at 50% load.
Storage Temperature	-20		+75	°C	
Relative Humidity	10		90	%RH	Non-condensing.
Cooling	11.7			CFM	Forced-cooled > 70W
Operating Altitude		2000		m	
Vibration	0.26		6.09	G	Frequency Type: Sweep Frequency Frequency Range: 10~55 Hz Displacement: 1.0mm Sweep Rate: 60 minute / cycle Number of cycle: 1 cycle / axis Direction: X ,Y and Z axis

## EMC: Emissions

Phenomenon	Standard	Class	Notes & Conditions
Conducted	EN 55022 / EN 55032 CISPR 32 & FCC Part 15	A	
Radiated	EN 55022 / EN 55032 CISPR 32 & FCC Part 15	A	

- Note:
- As a build-in type power supply, the power supply needs to be installed in a suitable enclosure to pass the EMI/EMC tests. The final assembly has to comply with the valid EMI/EMC and safety.
  - With Class B radiation and conduction are required an additional filter circuit, please see the figure below. MAGIC POWER also provide the electrolytic capacitor and the common mode choke, please feel free to contact us if has any request.



## EMC: Immunity

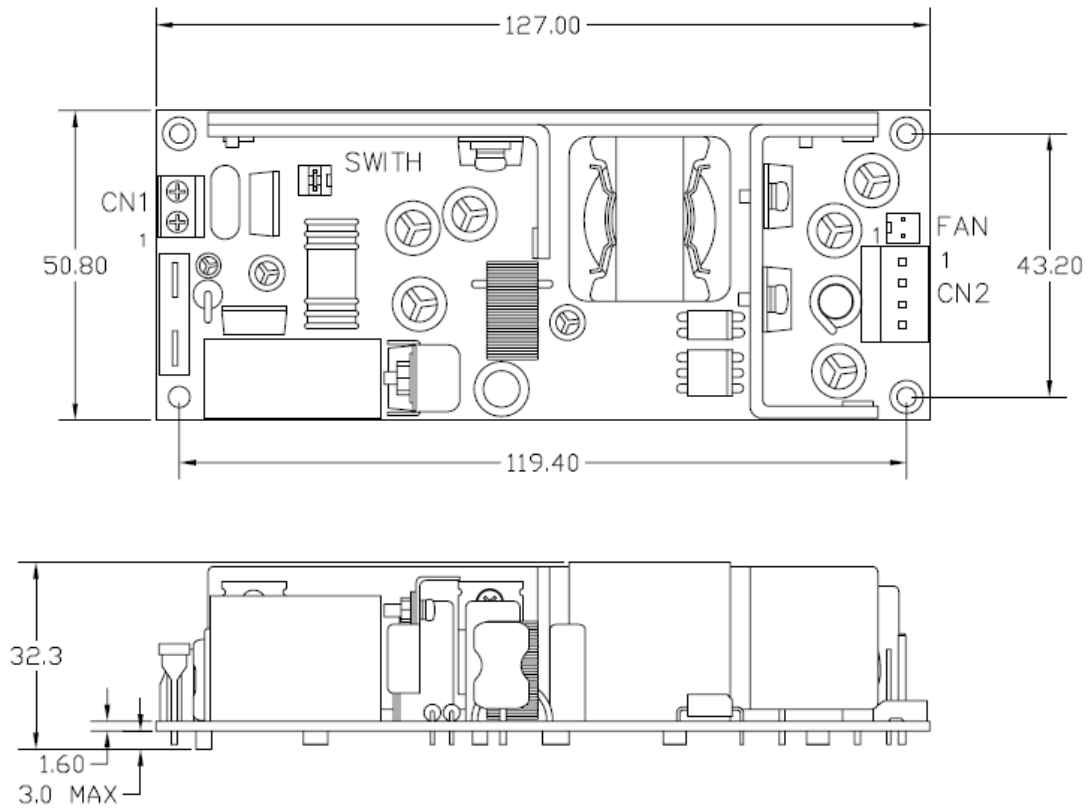
Phenomenon	Standard	Criteria	Notes & Conditions
ESD	IEC 61000-4-2: 2001	A	8KV air discharge, 6KV contact discharge
Radiated	IEC 61000-4-3: 2002	A	3V/m
EFT	IEC 61000-4-4: 2004	A	0.5KV Line to PE
Surges	IEC 61000-4-5: 2001	A	0.5KV Line to PE
Conducted	IEC 61000-4-6: 2006	A	3V/m

## Safety Approvals

Safety Agency	Safety Standard	Notes & Conditions
TUV	EN 60950-1: 2006+A1: 2010	Approved.
CB	IEC 60950-1: 2005+A1: 2009, 2 <sup>nd</sup>	Approved.
UL/cUL	UL 60950-1, 2 <sup>nd</sup> Edition, 2007-03-27, CSA C22.2 No.60950-1-07, 2 <sup>nd</sup> Edition, 2007-03	Designed to meet.

## Mechanical Details

SIZE : 50.8(L) x 127.0(W) x 32.3(H)mm, Tolerance +/-0.5mm.



Parameter	Conditions/Description				
Dimension	50.8 (L) x 127 (W) x 32.3 (H) mm, Tolerance +/- 0.5mm.				
Connector	CN1 --- DC input:	Dinkle ED500V-02 Terminal blocks or equivalent.			
	CN2 --- DC output:	Molex 5273-04A or equivalent.			
	FAN --- Output:	Molex 5045-02A or equivalent.			
	SW1 --- Remote on/off	Molex 5045-02A or equivalent.			
Pin Assignment	CN1	Pin	1. +	2. -	(With max. torque=0.4N*m)
	CN2	Pin	1. +12V	3. GND	
			2. +12V	4. GND	
	FAN	Pin	1. +12V	2. GND	
	SWITCH	Pin	1. +	2. -	

## Thermal Considerations

In order to ensure safe operation of the PSU in the end-use equipment, the temperature of the components listed in the table below must not be exceeded.

Temperature should be monitored using J type thermocouples placed on the hottest part of the component (out of any direct air flow). See Mechanical Details for component locations.

Temperature Measurements at max. amb.	
Component	Max Temperature
T1	110°C
Q2	120°C
D5	120°C
C2	105°C
C21	105°C