

SPECIFICATION



Efficiency Testing Criteria

The Product Meet	Regulation	Output Power	Average Efficiency in Active Mode	Maximum Power in No Load	Total Harmonic Distortion
	Energy Star Level V	$\geq 50W$	87%	$\leq 0.5W$	THD,V <2%
	ErP Lot 7 Tier2	$\geq 50W$	87%	$\leq 0.5W$	THD,V <2%



台灣桃園市桃園區建國東路22號 統一編號：84239055
No. 22, Jianguo E. Rd., Taoyuan Dist., Taoyuan City 330, Taiwan (R.O.C)
TEL:+886-3-375-9888 Website:www.FSP-group.com
FAX:+886-3-375-6966 Email:sales@fsp-group.com.tw

SPECIFICATION

MODEL: FSP065-DBBM1

REVISION: 03

R/D	CHECKED	APPROVED

Model No.: FSP065-DBBM1	1 of 7	Date: 2015-10-21
-------------------------	--------	------------------



全漢企業股份有限公司
FSP TECHNOLOGY INC.

台灣桃園市桃園區建國東路22號 統一編號：84239055
No. 22, Jianguo E. Rd., Taoyuan Dist., Taoyuan City 330, Taiwan (R.O.C)
TEL:+886-3-375-9888 Website:www.FSP-group.com
FAX:+886-3-375-6966 Email:sales@fsp-group.com.tw

History

Rev.	Description	Date	Approved
00	Initial	2014-01-24	
01	CHANGE 2.1.1;3.4;4.1.1	2014-03-05	
02	CHANGE 2.4.2;5.1;3.1	2014-04-01	
03	Update ELECTRO STATIC DISCHARGE (ESD)	2015-10-21	

Model No.: FSP065-DBBM1

2 of 7

Date: 2015-10-21

TABLE OF CONTENTS

1. Scope	-----4
2. Electrical Specification	-----4
2.1 AC Input	-----4
2.1.1 INPUT VOLTAGE RANGE	-----4
2.1.2 INPUT FREQUENCY	-----4
2.1.3 Max. INPUT AC CURRENT	-----4
2.2 DC Output	-----4
2.2.1 OUTPUT VOLTAGE AND CURRENT AND RIPPLE NOISE	-----4
2.2.2 TURN-ON DELAY TIME	-----4
2.2.3 HOLD-UP TIME	-----4
2.2.4 OVERSHOOT	-----5
2.2.5 DYNAMIC LOAD REGULATION	-----5
2.3 EFFICIENCY REQUIREMENT	-----5
2.4 PROTECTION	-----5
2.4.1 OUTPUT OVER-VOLTAGE PROTECTION	-----5
2.4.2 OUTPUT OVER-CURRENT PROTECTION	-----5
2.4.3 OUTPUT SHORT-CIRCUIT PROTECTION	-----5
2.4.4 FUSE PROTECTION	-----5
2.4.5 OVER-TEMPERATURE PROTECTION	-----5
3. ENVIRONMENTAL SPECIFICATION	-----5
3.1 TEMPERATURE	-----5
3.2 COOLING	-----5
3.3 HUMIDITY	-----5
3.4 ALTITUDE	-----6
4. ELECTROMAGNETIC COMPATIBILITY	-----6
4.1 EMISSIONS	-----6
4.1.1 ELECTROMAGNETIC INTERERENCE	-----6
4.1.2 HARMONIC DISTORTION	-----6
4.1.3 LINE FLICKER	-----6
4.2 IMMUNITY	-----6
4.2.1 ELECTROSTATIC DISCHARGE (ESD)	-----6
4.2.2 SURGE IMMUNITY REQUIREMENT	-----6
4.2.3 ELECTRICAL FAST TRANSIENT TEST	-----6
4.2.4 RADIDATED IMMUNITY	-----6
4.2.5 CONDUCTED IMMUNITY	-----6
4.2.6 MAGNETIC FIELD IMMUNITY	-----6
4.2.7 VOLTAGE DIP IMMUNITY	-----6
5. AGENCY APPROVALS	-----7
5.1 SAFETY AND APPROVALS	-----7
5.2 LEAKAGE CURRENT	-----7
5.3 DIELECTRIC STRENGTH	-----7
5.4 INSULATION RESISTANCE	-----7
6. RELIABILITY	-----7
6.1 MEAN TIME BETWEEN FAILURES (MTBF)	-----7
6.2 BURN-IN	-----7

1. SCOPE

This is the specification for Model FSP065-DBBM1(9NA0654301) an AC input to DC output, class I constructed and double insulated power supply designed and manufactured by FSP Technology, Inc. This specification defines the performance characteristics of the 65W single output power supply.

2. ELECTRICAL SPECIFICATION

2.1 AC INPUT

The power supply uses a 3 prong IEC 320/C6 inlet for Class I construction and is double insulated for protection against electric shock.



2.1.1 INPUT VOLTAGE RANGE

The operating range of the power supply is 90 to 264VAC.

	Minimum	Nominal	Maximum	Unit
Input range	90	100/240	264	Vrms

2.1.2 INPUT FREQUENCY

The input frequency range is 47 to 63 Hz.

2.1.3 MAXIMUM INPUT CURRENT

The steady state input current shall not exceed 1.8A @ 90Vac at full load.

2.2 DC OUTPUT

2.2.1 OUTPUT VOLTAGE, CURRENT AND RIPPLE & NOISE

Under any combinations of line and load variation and environmental conditions, all outputs shall remain within the tolerance defined in Table shown below.

Output voltage	Line / Load regulation	Minimum load	Maximum load	Ripple & noise
19.0Vdc	±1% / ±5%	0A	3.43A	190mV

Note: Ripple & noise measurements shall be made with an oscilloscope of at least 20MHz bandwidth. Output shall be bypassed at the connector with a 0.1μF ceramic disk capacitor and a 10μF electrolytic capacitor to simulate system loading.

2.2.2 TURN-ON DELAY TIME

The turn-on delay from application of AC input power to the establishment of rated DC voltage should not exceed 3.0 seconds under any conditions within input and load ranges.

2.2.3 HOLD-UP TIME

When the power supply is operated at 100% of maximum continuous output load, the minimum output hold-up time after loss of input power shall be 8 mS for AC input voltage at 115Vac/60Hz.

2.2.4 OVERSHOOT

The output overshoot at turn-on or turn-off shall not exceed 10% of nominal voltage value with or without the load connected.

2.2.5 DYNAMIC LOAD REGULATION

Output voltage within 18.05 – 19.95V, for load 90% ~ 50% and 50% ~10% on the output. S/R=0.05A/uS, 100Hz & 1KHz 50% duty

2.3 EFFICIENCY REQUIREMENT :

- * No load power consumption less than 0.5W
- * Average active efficiency $\geq 87\%$

Percentage of Nameplate Output Current	
Load Condition 1	100% +/-2%
Load Condition 2	75% +/-2%
Load Condition 3	50% +/-2%
Load Condition 4	25% +/-2%
Load Condition 5	0%

Note: All measurements are to be taken after DUT has operated at 100% for at least 10 minutes.

2.4 PROTECTION

The following sections describe power supply protections.

2.4.1 OUTPUT OVER-VOLTAGE PROTECTION (OVP)

Output Voltage	Upper trip limit	Remark
18.05Vdc ~ 19.95Vdc	21Vdc ~ 30Vdc	Only internal test

2.4.2 OUTPUT OVER-CURRENT PROTECTION (OCP)

Output current shall be limited between 200% max and auto recovery or latch protection

2.4.3 OUTPUT SHORT-CIRCUIT PROTECTION

Output can be short-circuited without damage, and will recover automatically after short-circuit condition is removed.

2.4.4 FUSE PROTECTION

Both line and neutral are fused internally. The fuses inside the power supply shall open when the AC input current is over the rated current of fuses. This fuse protection will cause the power supply to fail.

2.4.5 OVER-TEMPERATURE PROTECTION

The power supply will shut down while over-temperature happened. It will shutdown operation after the fault condition is removed. Product is latch-off that need pull off AC cord and then pull-on again to turn on PSU again. Once this is happened, it's normally a serious issue happens on PSU that need to be replaced.

3. ENVIRONMENTAL SPECIFICATION

3.1 TEMPERATURE

Operating Temperature Range 0 °C to +40°C
 Storage Temperature Range -20 °C to +85°C

3.2 COOLING

Convection cooling

3.3 HUMIDITY

Operating Humidity 5% to 95% relative humidity (non-condensing)
 Storage Humidity 5% to 95% relative humidity (non-condensing)

3.4 ALTITUDE

The power supply must operate to a maximum altitude of 5000M above sea level

4. ELECTROMAGNETIC COMPATIBILITY

The power supply shall meet IEC/EN60601-1-2, The relative requirements are as follows:

4.1 EMISSIONS

4.1.1 ELECTROMAGNETIC INTERFERENCE: EN55011/CISPR 11/FCC Part 15, Class B

4.1.2 HARMONIC DISTORTION: EN61000-3-2 Class A

4.1.3 LINE FLICKER: EN61000-3-3

4.2 IMMUNITY

4.2.1 ELECTROSTATIC DISCHARGE (ESD)

The power supply shall meet EN61000-4-2; ± 15KV air and ± 8KV contact.

4.2.2 SURGE IMMUNITY REQUIREMENT

The power supply shall meet EN61000-4-5; ±1KV differential-mode, ±2KV common-mode.

4.2.3 ELECTRICAL FAST TRANSIENT TEST

The power supply shall meet EN61000-4-4; ±2KV.

4.2.4 RADIDATED IMMUNITY

The power supply shall meet EN61000-4-3; 3V/m.

4.2.5 CONDUCTED IMMUNITY

The power supply shall meet EN61000-4-6; 3V rms.

4.2.6 MAGNETIC FIELD IMMUNITY

The power supply shall meet EN61000-4-8; 3A/m.

4.2.7 VOLTAGE DIP IMMUNITY

The power supply shall meet EN61000-4-11; 30% reduction for 500ms, 60% reduction for 100ms, and >95% reduction for 10 ms.

5. AGENCY APPROVALS

5.1 SAFETY APPROVALS

Safety agency	Certified	Meet
CB 60601-1:2005		
EN 60601-1:2006		
ANSI/AAMI ES60601-1		
CAN/CAS-C22.2 NO. 60601-1		
EN60601-1-2:2007+AC:2010		

5.2 LEAKAGE CURRENT

The power supply leakage current, when measured per test configuration indicated in UL60601-1, shall not exceed 100uA at input voltage of 264Vac/63Hz.

5.3 DIELECTRIC STRENGTH

The power supply shall withstand 4000Vac from input to output for 1 minute without breakdown.

5.4 INSULATION RESISTANCE

Primary to secondary: 10M Ohms minimum @500VDC

6. RELIABILITY

6.1 MEAN TIME BETWEEN FAILURES (MTBF)

The power supply shall have an MTBF greater than 150,000 hours as calculated per MIL-HDBK-217F with the following assumptions:

Input voltage: 115/230Vac
 Output load: Full load
 Ambient temperature: 25°C

6.2 BURN-IN

The power supply shall be burned in for 4 hours and full load at ambient temperature of 40 °C