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SPECIFICATION

ESD09006768

FSP100-1Y80,YM-1101C,AR

Released Date:2010/1/15-16:31:42

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1. GENERAL

This specification describes the performance characteristic of a 100W open frame power supply module with +48V main DC outputs.

2. ELECTRICAL PERFORMANCE

2.1 AC power Input

2.1.1. Input voltage, frequency and phase

The power supply shall be capable of supplying full rated output power in the voltage range of 90V to 264VAC from a single phase source. The power supply shall operate at any input frequency between 47 Hz and 63Hz. The nominal voltage is 115V for a voltage source with 90-132V range, and is 230V for a voltage source with 180 to 264V range.

2.1.2. Input current and inrush current

Input current shall meet the limits shown in Table 1.

Input voltage	Maximum input current	Maximum inrush current
115VAC	2.0A	40A
230VAC	1.0A	80A

Table 1 – Input current

Inrush current shall be measured after the power supply has been idled at a room temperature of 25 deg C for a minimum of ten minutes with the input voltage removed.

2.1.3. Input Power factor

The minimum power factor at full load shall be 0.98/115V 60 Hz and 0.95/230V 50 Hz.

2.1.4. Input current harmonics

The input current drawn on the power line shall not exceed the limits set by IEC 1000-3-2 when the power module is operated at an input voltage within the ranges described in section 2.1.1.

2.1.5. Brown out

The power supply shall not be damaged when AC input voltage is dropped below the minimum specified AC input voltage. Furthermore, when AC input voltage returns to normal, the power supply shall return to normal operation.

2.1.6. Output current capacity

The voltage outputs shall be capable of supplying the output current shown in Table 2 subject to:

Output	Nominal output (V_{dc})	Minimum	Maximum	Units	Conditions
1	48 V	0	2.09	A	

Table 2 – Output current capacity

2.1.7. Regulation, ripple and noise

The power supply shall meet the regulation, ripple and noise parameters shown in Table 3,

	Output voltage limits(V_{dc})			Ripple/noise
Output	Minimum	Nominal	Maximum	Maximum
1	45.6 V	48.00 V	50.4 V	200mV_{p-p}

Table 3 – Output voltage regulation

Output ripple and noise measurement shall be made using the following methods:

a) Measurements made differentially (common mode noise subtracted from the measured voltage).

b) Measurements made where the cable connectors attach to the load.

c) Outputs bypassed at the point of measurement with the following:

12V use 10 uF electrolytic and 0.1 uF ceramic capacitors

d) Oscilloscope bandwidth limited to 20 MHz.

e) Ground lead of oscilloscope probe≦0.25inch.

f) Line regulation：the line regulation for +48V is less than +/-2%, while measuring at full load and +/-10% of input voltage changing.

g) Load regulation：the line regulation for +48V is less than +/-3% measuring is done by changing the measured output any load.

h) Output power 100W with 4.5CFM forced air.

2.1.8. Output voltage rise time

The rise time shall be between 0.1mS to 30msec at 100Vac to 240Vac input, measured from 10 % to 90 % on the leading edge of the voltage waveform.

2.1.9. Output voltage hold-up time

Upon loss of input voltage at 115V/60Hz（230V/50Hz）, the output voltages shall remain in regulation for at least 15mS when supplying the maximum load..

2.1.10. Overshoot

Output overshoot at turn on shall be less than 10% of the nominal output value. Overshoot shall recover to within regulation in less than 50mS.

2.1.11. Transient response

The following shall apply to 48 V outputs:

Output voltage shall recover to within 1 % of its static operating level ≤ 1 mS under the following conditions:

1. Load step from 75 % to 100 % to 75 % maximum load
2. Repetition rate of 10 mS with 50 % duty cycle
3. Current slew rate ≤0.05A/uS.

4. Capacitive loads see Table 4.

2.1.12. Capacitive Loads

The power supply shall power up and operate normally with the following capacitances simultaneously present on the DC outputs.

Output	+48VDC
Capacitive load (uF)	2000uF

Table 4 – Output capacitive loads

2.1.13 Maximum load change

The power supply shall continue to operate normally when there is a step change, at ≤ 0.5 A/uS, from minimum load to maximum load or maximum load to minimum load

2.1.14. Temperature coefficient

After operating for 30 minutes or longer at 25° C ambient, the output voltages shall change no more than ± 0.05 % per degree C.

2.1.15. Efficiency

The power supply efficiency with maximum load shall be ≥ 86 %.

2.1.16. Output protection

2.1.16.1.Short circuit protection

DC output shall have short circuit protection. A short condition on any of DC output shall cause no damage to the power supply. The unit shall recover and function automatically as soon as the short condition is removed.

2.1.16.2.Over voltage protection

+48V output exceeding 110-130% shall cause a shutdown and latched ,the output shall recover when the cause of over voltage is removed and turn off the unit for a minute.

2.1.16.3.Overload protection

Power limit-within 120-180% of total power.

2.1.16.4.Over temperature protection

The unit shall cause a shut down and latched when there is a high temperature happen on the unit self or nearby .Output shall recover when the high temperature is removed and turn off the unit for a minute.

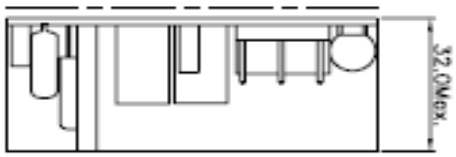
2.1.16.5.Remote sense

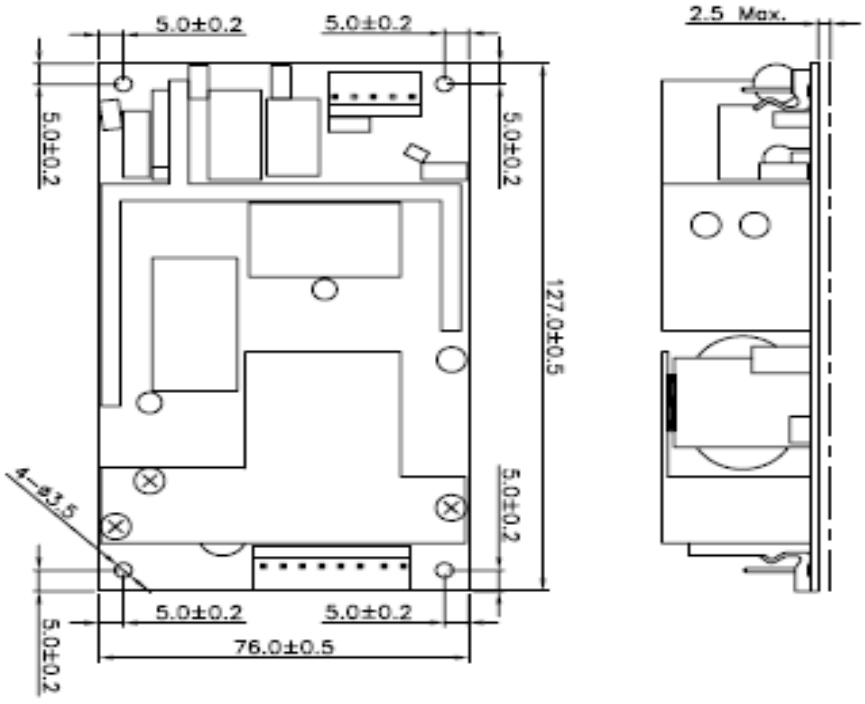
The unit has voltage compensate function for voltage loss in long cable,But normally the function is disable unless customer require.

3. MECHANICAL

3.1 Dimension

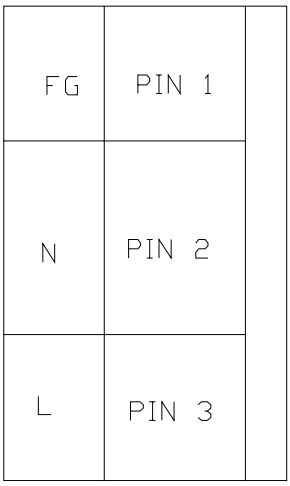
The outside dimension, not including handle and output connector, shall be W76.2mm（3"）x D127 mm（5"） x H32 mm（1.2 "）.





3.2 AC input connector and canfilter with fuse with I/O switch

The power supply shall have 3pin connector(pitch:7.92mm) an internal AC input



3.3 Output connectors

The power supply shall have 8pin connector(pitch:3.96mm) an internal DC output Header

	PIN 1	V+
	PIN 2	V+
	PIN 3	V+
	PIN 4	V-
	PIN 5	V-
	PIN 6	V-
	PIN 7	V-RS
	PIN 8	V+RS

4. ENVIRONMENTAL

The power supply shall operate normally, show no degradation of performance, and sustain no damage as a result of the environmental conditions listed in paragraphs 4.1 through 4.5.

4.1 Temperature

Operating: 0 to 50 °C

Non-operating: -40 to 70 °C

4.2 Humidity

Operating: 5 % to 90 % non-condensing
Non-operating: 5 % to 90 % non-condensing

4.3 Altitude

Operating: sea level to 9843 feet
Non-operating: sea level to 40,000 feet

4.4 Shock

Operating: 5 g for 11 ms with a ½ sine wave for each of the perpendicular axes X, Y, and Z.
Non-operating: 30 g for 11 ms with a ½ sine wave for each of the perpendicular axes X, Y, and Z.

4.5 Vibration

Operating: 10 Hz to 500 Hz sweep at 0.5 g constant acceleration for one hour on each of the perpendicular axes X, Y, and Z.
Non-operating: 10 Hz to 300 Hz sweep at 2 g constant acceleration for one hour on each of the perpendicular axes X, Y, and Z.

5. REGULATORY

5.1 Safety certification

The power supply shall have the certification approval for affixing UL1950, CSA22.2 NO.234, and EN60950/TUV safety logos on power supply model label.

5.1.1. Leakage current

Leakage current from power supply AC input to safety ground shall not exceed 3.0 mA at 240VAC/50Hz.

5.2 Electromagnetic compatibility

5.2.1. EMI

The power supply, operating with resistive load, shall meet FCC Part 15 class B, EN55022 class B and meet GR-1089-CORE class A conducted limit.

5.2.2. Electrical fast transient/burst

The power supply shall comply with the surge voltage requirements of EN61000-4-5 level 3 (2 kV peak open circuit voltage from line/neutral to GND , and 1 kV from line to neutral).

5.2.3. Lightating surge immunity

The power supply shall operate normally when installed in a computer system and subjected to power line noise described in EN61000-4-4, level 3 (2 kV open circuit voltage). The power supply shall not cause any failure in the host computer system during line noise testing.

5.2.4. Hi-pot

Hi-pot 1800VAC, line/neutral to chassis, no breakdown

6. MISCELLANEOUS

6.1 Marking

6.1.1. Model label

6.2 Reliability

The MTBF, calculated per MIL-HDBK-217F at 25 °C ambient, nominal AC input and maximum load, shall be at least 100,000 hours.

7. ROHS COMPLIANCE

CP-1198R2 certifies that to its knowledge Power Supply Product conform to the requirements of the European Restriction on the use of Hazardous Substances (RoHS) Directive, 2002/95/EC *for six of the six* identified substances.

N	Banned Substances	RoHS Proposed Maximum Limit (PPM)
1	Cadmium (Cd)	100
2	Lead (Pb)	1000
3	Mercury (Hg)	1000
4	Hexavalent Chromium (Cr^{6+})	1000
5	Poly Brominate Byphenyls (PBB)	1000
6	Poly Brominated Diphenyl Ethers (PBDE)	1000

This declaration is base on CP-1198R2 model understanding of the RoHS Directive and knowledge of the materials that of into its products as of the date of disclosure information.

8. REVISION LOG

This section contains the release history of this document:

Date	Section	Revision	Issue
2010/1/15		01	Modify model name

APPROVE		CHECK		PREPARE	

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1. GENERAL DESCRIPTION AND SCOPE

2. RELATED DOCUMENTS

2.1. TURN ON

This procedure tests the turn on characteristic of unit:

TEST CONDITION	
VAC	90Vrms /47Hz
+48.0V	2.09A
Total Max output 100W	

TEST PARAMETERS DESCRIPTION		
PARAMETER	**DESCRIPTION**	
TON	Turn on time	Time between AC power on to +48.0V reaching +45.6V.
PK IIN	Inrush current	Peak input current at turn on when power supply ambient is at 25 degrees C.
IIN	Input current	Steady state AC line current.
TPG	Power Good delay	
TPG1	AC Vs PG ON	
VRIP	Ripple voltage	Peak to peak voltage measured with terminated into 10uF electrolytic cap in parallel with 0.1uF ceramic cap. Test condition:115V/60Hz ,230V/50Hz Oscilloscope bandwidth limited to 20MHz
VDC	Output DC voltage	Output DC voltage
Hold up Time	Hold up time	Time between AC power off to +48.0V reaching +45.6V.
PF	Power factor	Power factor correction

TEST PARAMETERS RESULT			
PARAMETER		**MINIMUM**	**MAXIMUM**
TON		-----	3sec
PK IIN		-----	80A/230VAC
PK IIN		-----	
IIN		-----	115V/2A
IIN		-----	230V/1A
POWER FACTOR		115V/60Hz:0.98	------
POWER FACTOR		230V/50Hz:0.95	
TPG			
TPG1			
PF		---------	
Overshoot		- - - - - -	10%
undershoot		- - - - - -	5%
V rip	200mV	- - - - - -	200mV
V dc	48.0V	45.6V	50.4V

2.2. TURN OFF

TEST PARAMETERS DESCRIPTION		
PARAMETER	**DESCRIPTION**	
THU	Hold up time	Time between AC power off to +48.0V reaching +45.6V
TPF	Power Fail delay	

TEST CONDITION	
VAC	115Vrms/60Hz
+48V/2.09A	
+48V/1.05A	
+48V/0A	

TEST RESULTS		
PARAMETER	**MINIMUM**	**MAXIMUM**
THU	15mSec	-------
TPF	------	

2.3. REGULATION TEST

2.3.1. LOAD REGULATION

PARAMETER	TEST
VAC	115Vrms
+48V	0A
+48V	1.05A
+48V	2.09A

OUTPUT	
MINIMUM	MAXIMUM
45.6V	50.4V
45.6V	50.4V
45.6V	50.4V

2.3.2. LINE REGULATION

PARAMETER	TEST
VAC	90Vrms /60Hz
VAC	115Vrms /60Hz
VAC	230Vrms /50Hz
VAC	264Vrms /50Hz

OUTPUT READ	
MINIMUM	MAXIMUM
-1%	+1%

2.4. EFFICIENCY

TEST PARAMETERS DESCRIPTION		
PARAMETERS	DESCRIPTION	
EFF	Efficiency	Ratio of DC output to AC input real power.
PIN	INPUT REAL POWER	Real power drawn from AC line.

2.4.1 Efficiency at maximum load

PARAMETER	TEST CONDITION
VAC	115Vrms /60Hz
+48V	100% load

PARAME	MINIMU	MAXIM
EFF	86%	-------

2.4.2 Over current/short circuit protection

The power supply shall have current limit to prevent the+48 Voutput from exceeding the value shown in Table 1. The current limiting shall be of the constant current type for the +48V.The power supply shall automatically return to normal .

Table 1 – Over current/short circuit protection

Voltage	Over current limit
+48V	2.5A~3.75A

2.5 OVER VOLTAGE PROTECTION

The power supply shall have over voltage protection, the trip point of over protection value show in Table 3,The power supply shall go into hiccup mode when the output reach the limits set above .

Test description

TEST PARAMETERS DESCRIPTION		
PARAMETERS	**DESCRIPTION**	
R parallel	R parallel to feedback resistor	R parallel to feedback resistor such that when applied to output will cause output to drop to 0.5V or less.

Table 3 – Over voltage protection

PARAMETER	TEST	OUTPUT	
		MINIMUM	MAXIMUM
VAC	115Vrms/60Hz		
+48V	0.1A	52.8V	62.4V

2.6 THERMAL PROTECTION TEST

The power supply shall be protected against over temperature conditions excessive ambient temperature. In an over temperature condition the PSU shall be shutdown .The temperature set value is 95DEG,

2.7 NO LOAD OPERATION TEST

The power supply shall meet all requirements except for the transient loading requirements when operated at no load on all outputs.

2.8 TRANSIENT LOADING TEST

The power supply shall operate within specified limits and meet regulation requirements over the following transient loading conditions anywhere within the specified load range of the power supply. The transient loading show in Table 4.

Table 4 – Transient loading condition

Load setup	Minimum	Maximum	Transient voltage	Cycle	Slew rate
CASE 1	0.5A	1.05A	+/-5%	4ms	0.1A/usec
CASE2	1.05A	1.6A	+/-5%	4ms	0.1A/usec

2.9 CAPACITIVE LOAD TEST

The power supply shall operate within specifications and the PSU shall turn on not have shutdown status , the capacitive load range defined show in Table 5

Table 5 – Capacitive load

Output	Min	Max
+12V	0uF	2,000uF

2.10. MAXIMUM LOAD CHANGE TEST

The power supply shall continue to operate normally when there is a step change ≤ 1 A/USEC between minimum load and maximum load.

2.10.1. Timing requirements test

The timing requirements for the power supply's +48and PG signal status, the timing value have show in Table 6

Table 6 - Turn on/off timing

Turn on	Description	Min	Max	Units
Tvout rise	Output voltage rise time from each main output	1	30	msec
Tac_on_delay	Delay from AC being applied to +12V output voltage being within regulation,Turn on in 220Vac and Full load condition		3000	msec
Tvout_holdup	Time all output voltages, including +48V, stay within regulation after loss of AC	15		msec
Tpwok_holdup	Delay from loss of AC to deassertion of PWOK	--	--	msec
Tpwok_on	Delay from output voltage within regulation limits to PWOK asserted at turn on	---	----	msec
Tpwok_off	Delay from PWOK deasserted to 48VDC dropping out of regulation limits	----		msec

3. SAEFTY TESTING

3.1 HI-POT

Unit shall pass hi-pot test at :

Primary to Secondary:3000VAC,10Ma

Primary to FG:1800VAC,10Ma

I/R test :500Vdc,I/R>100M ohm

, test condition PSU must add vibration function

3.2 LEAKAGE CURRENT

Unit shall pass leakage current 264V 50Hz 3mA max.

4. BURN-IN TEST CONDITION

4.1. FULL LOAD BURN-IN TEST

Test condition: PSU must have 4.5CFM airflow，the air flow into the PSU on the left or the right keep 10mm distance

PARAMETER	TEST CONDITION
VAC	230VAC/50HZ
+48V	2.09A

Burn-in time:50℃

5. REVISION LOG

This section contains the release history of this document:

DATE	SECTION	REVISION	ISSUE
2010/1/15		01	Modify model name

APPROVE		CHECK		PREPARE	