APPROVAL SHEET

Power supply

MODEL NO: SP-ATX-600Z-PPFC

ENGINEER NO: SUATX0230Z0ABPEU110

Article No. :SP-AP-SU-A179 **Issue Date :2015-10-15** **Version : A/0**	**Audited by**

Checked by	**Drafted by**

Spire Corp.

Tel.: +86-755-26801565 Fax: +86-755-26801561

Http://www.spire-corp.com
Http://www.spirepower.com
Http://www.spirecoolers.com

Approval Sheet Revisement Record

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A/0	N/A	First Version				N/A

Contents

一.Input Requirements

1-1. Input condition:

Range Select	Nominal	Units
V in	200 - 240	VAC
Frequency	47-63	Hz
AC input current	4	AMPS

1-2. Inrush Current

Maximum inrush current from power-on (with power on at any point on the AC sine) shall be limited to the peak surge current of the input line cord, bridge diode, fuse and EMI filter components according to I^2t. Receptive ON/OFF cycling of the AC input voltage shall not damage the PSU or cause the input fuse to blow.

1-3. Output Voltage and Ripple Noise Requirements

Output Voltage	MIN	MAX	Regulation (%)	Ripple Max	Min Capacitive load
+5V	4.75	5.25	+5% ~ -5%	100mV	3300uF
+3.3V	3.13	3.46	+5% ~ -5%	100mV	4700uF
+12V	11.4	12.6	+5% ~ -5%	200mV	4400uF
-12V	10.8	13.2	+10% ~ -10%	200mV	330uF
+5Vs	4.75	5.25	+5% ~ -5%	100mV	330uF

Note: 1). The output voltage should be measured at output connector terminals.

2). The output Ripple Noise should be tested with 0.1uf ceramic disk capacitors、10uf tantalum capacitor and Min Capacitive load at the point of load.

二. Output Requirements

2-1. DC Load Requirements

Output Voltage	MIN	MAX	Combined	Total
+5V	0.3A	12A	86W	230W
+3.3V	0.5A	10A		
+12V	0.5A	12A	144W	
-12V	0.0A	0.5A	6W	
+5Vs	0.05A	1.5.A	7.5W	

2-2. Cross Regulation

The cross regulation is defined in the matrix below:

Load	+5V	+3.3V	+12V1	+12V2	-12V	+5Vs	Remark
(1)	2	12	2	0	0.3	1	+3.3V Max
(2)	12	3	12	0	0.3	1	+5V Max
(3)	5	2	12	0	0.3	0.5	+12V1 Max
(4)	11	10	11	0	0.5	1.5	Full load
(5)	5.5	5	5.5	0	0.25	0.75	Half load
(6)	0.2	0.1	0.15	0	0.01	0.05	Min load

1). The total continuous output power is 230W at +25℃, 80% load at +40℃.

2). The +5V and +3.3V outputs Max-combined power is 86W(25℃).

3). The +5V , +3.3V and +12V outputs Max-combined power is 220W(25℃)

2-3. Output Transient Response

- The output voltage will remain within the regulation after applying following load changes.
- Simultaneous load step on the +5V, +3.3V,and +12V outputs.(all steps occurring in the same direction.)
- Load – changing repetition rate of 50Hz to 10K Hz.

Output	Output Range	Load step	Slew Rate	Test condition	Min. Dynamic Capacitive load
+12V1	1.0A to 10.0A	60%	1A/ usec	Load 3	10000uF
+5V	0.5A to 10.0A	30%	1A/ usec	Load 2	10000uF
+3.3V	0.5A to 8.0A	30%	1A/ usec	Load 1	10000uF
+5Vs	0.05A to 2A	0.5A	0.5A/ usec		10000uF
-12v	0.0A to 0.5A	0.1A	0.1A/ usec		350uF

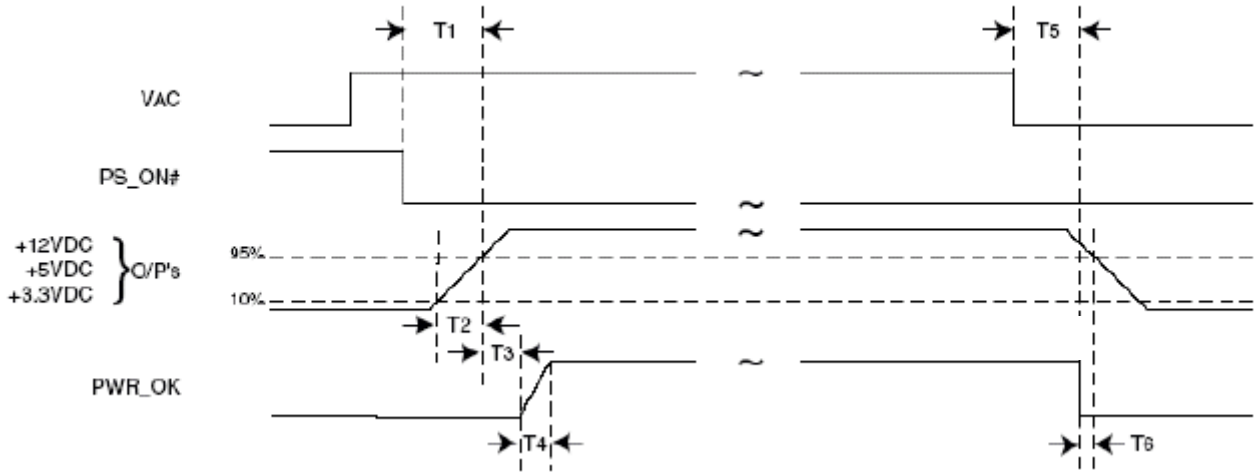
The dynamic load transient response test must follow 2-2 Cross Regulation table.

2-4. Over Shoot

The output voltage overshoot upon the application or removal of the input voltage, or the assertion /de-assertion of PS_ON#, under the condition specified in 1-6 Output Voltage table, shall be less than 10% above the nominal voltage. No voltage of opposite polarity shall be present on any output during turn-on or turn-off.

三. Timing

3-1. Power supply Time:



Parameter	Description	Value
T1	Power-on time	<500mS
T2	Rise time	0.2 – 20mS
T3	PWR_OK delay time	100 – 500mS
T4	PWR_OK rise time	<10mS
T5	AC loss to 5Vout hold-up time	16mS
T6	Power-down warning	>1mS

3-2. Hold-up Time

The power supply with 70% load at 230V/50Hz, should supply regulated output for at least 16mS after the loss of the AC input voltage.

Test load condition as below.

Load	+5V	+3.3V	+12V1	+12V2	-12V	+5Vs	Total (W)
Max. Load	7.7	7	7.7	0	0.35	1.05	161

四. Power Good Signal

4-1. Power Good Signal

The power supply should provide a “Power-Good” signal to reset system logic, indicate proper operation of the power supply and give advance warning of impending loss of regulation at turn off.

It should be an up level during normal operation, or a down level when fault conditions occur or during turn off. When the power supply is turned off for a minimum of 3.0 sec. and then turned on the power good signal should be generated.

4-2. Power Good Signal Characteristics

Signal Type	+5V TTL compatible
Logic level low	< 0.4V while sinking 4mA
Logic level high	Between 2.4V and 5V output while sourcing 200uA
High-state output impedance	1k ohms from output to common

五. Protections

5-1. Over Voltage Protection

OVP	Max.
12V	16.0V
5V	7.0V
3.3V	4.5V

5-2. Over Current Protection

The power supply should provide +5V, +3.3Vand +12V OCP and should shutdown of each output power. For testing purposes, the overload currents of each tested output rail should be ramped at a minimum rate of 10A/sec.

5-3. Short Circuit Protection

The short circuit placed on +3.3V, +5V, + 12V and –12V output shall cause no damage and the power supply shall shut down and latch.

5-4. Protection Reset

When the power supply latches into shutdown condition due to a fault on output (Over-Current, Over-Voltage, Short circuit), the protection latch must reset at after the fault has been removed and the on/off signal has switched state.

六. No Load Operation

No damage or hazardous condition will occur with all the DC output connectors disconnected from the load. The power supply may latch into the shutdown state.

七. Environment

7-1. Operating Temperature Range

Operation ambient: 0 ℃ to +40 ℃

Non-operating ambient：-40℃ ～ +70℃

Note; The maximum output power is derated at 2W/oC, to 200W at 50oC.

7-2. Thermal Shock (Shipping)

Non-operating：-40 ～ 70℃ (15℃/min≦dT/dt≦30℃/min)

八.Electrostatic Discharge Requirement (ESD)

The objective of ESD test is to determine the susceptibility and immunity of products to electrostatic discharge to which the products may be exposed, when operating under all potential environmental conditions.

8-1. **Air Discharge:**

Test Volt	Requirements
8KV	No allowed error
12.5KV	Restart & damage error are not allowed
15KV	Damage error is not allowed restart is allowed

Contact Discharge:

Test Volt	Requirements
2~4KV	No allowed error
4KV	Restart & damage error are not allowed
8KV	Damage error is not allowed restart is allowed

8-2. The above test discharge time is 1 time / sec. and repeat each test ten times.

九.Lightning Surge Immunity

The purpose of lightning surge immunity test is to verify if the power supply can withstand lightning surge wave. This is to follow the normal of IEC61000-4-5 requirements.

十 .Hi-Pot test:

100% production testing for Hi-pot and Ground continuity must be performed, Units passing these tests must be mark accordingly

十一.Photograph: