TC-700PD8B

Switching Power Supply

(ATX PS2 80 Plus Bronze PSU Safety Meet 62368)

SPECIFICATION

Revision: 1.0

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1. GENERAL DESCRIPTION AND SCOPE

This is the specification of Model TC-700PD8B ; AC-line powered switching power supply with active PFC (Power Factor Correction) circuit, meet EN61000-3-2 and with Full Range Input features.

The specification below is intended to describe as detailed as possible the functions and performance of the subject power supply. Any comment or additional requirements to this specification from our customers will be highly appreciated and treated as a new target for us to approach.

2. REFERENCE DOCUMENTS

The subject power supply will meet the EMI requirements and obtain main safety approvals as following:

2.1 Emi Regulatory

- FCC Part 15 Subpart J, Class 'B' 115 Vac operation.
- CISPR 22 Class 'B' 230 Vac operation.

3. PHYSICAL REQUIREMENTS

3.1 MECHANICAL SPECIFICATIONS

The mechanical drawing of the subject power supply, which indicate the form factor, location of the mounting holes, location, the length of the connectors, and other physical specifications of the subject power supply. Please refer to the attachment drawing.

3.2 CONNECTOR SPECIFICATIONS

TBD

4. ELECTRICAL REQUIREMENTS

4.1 OUTPUT ELECTRICAL REQUIREMENTS

The subject power supply will meet all electrical specifications below, over the full operation temperature range and dynamic load regulation.

4.1.1. OUTPUT RATING

Output	Nominal	Regulation	Ripple/Noise	Min	Max	peak
1	+3.3V	±5%	50mV	0 A	24.0 A	
2	+5V	±5%	50mV	0 A	30.0 A	
3	+12V1	±5%	120mV	0 A	16A	
4	+12V2	±5%	120mV	0 A	16A	
5	+12V3	±5%	120mV	0 A	16A	
6	+12V4	±5%	120mV	0 A	16A	
7	-12V	±10%	120mV	0 A	0.5 A	
8	+5VSB	±5%	50mV	0 A	4.0A	

1. Maximum continuous total DC output power should not exceed 700W.
2. Maximum continuous combined load on +3.3VDC and +5VDC outputs shall not exceed 170W.
3. Maximum combined current for the 12V outputs shall be 56A.
4. Ripple and noise measurements shall be made under all specified load conditions through a single pole low pass filter with 20MHz cutoff frequency. Outputs shall bypassed at the connector with a 0.1uF ceramic disk capacitor and a 10uF tantalum capacitor to simulate system loading.

4.1.2. LOAD CAPACITY SPECIFICATIONS

The cross regulation defined as follows, the voltage regulation limits DC include DC Output ripple & noise.

LOAD	STM.	+3.3V	+5V	+12V1	+12V2	+12V3	+12V4	-12V	5VSB
ALL NORMAL	HHHHHHHH	14.36A	17.94A	11.29A	11.29A	11.29A	11.29A	0.4A	3.23A
+3.3V MAX others MIN	HLLLLLLL	24.0 A	0 A	0 A	0 A	0 A	0 A	0 A	0 A
+5V MAX others MIN	LHLLLLLL	0 A	30.0 A	0 A	0 A	0 A	0 A	0 A	0 A
+12V1 MAX others MIN	LLHLLLLL	0 A	0 A	16.0A	0 A	0 A	0 A	0 A	0 A
+12V2 MAX others MIN	LLLHLLLL	0 A	0 A	0 A	16.0A	0 A	0 A	0 A	0 A
+12V3 MAX others MIN	LLLLHLLL	0 A	0 A	0 A	0 A	16.0A	0 A	0 A	0 A
+12V4 MAX others MIN	LLLLLHLL	0 A	0 A	0 A	0 A	0 A	16.0A	0 A	0 A
ALL MIN	LLLLLLLL	0 A	0 A	0 A	0 A	0 A	0 A	0 A	0 A

4.1.3. HOLD-UP TIME (@90% Full LOAD)

115V / 60Hz : 16 mSec. Minimum.

230V / 50Hz : 16 mSec. Minimum.

The output voltage will remain within specification, in the event that the input power is removed or interrupted, for the duration of one cycle of the input frequency. The interruption may occur at any point in the AC voltage cycle. The power good signal shall remain high during this test.

4.1.4.OUTPUT RISE TIME

(10% TO 90% OF FINAL OUTPUT VALUE, @FULL LOAD)

115V-rms or 230V-rms 2-20m sec

4.1.5.SHORT CIRCUIT PROTECTION

Output short circuit is defined to be a short circuit load of less than 0.1 ohm..In the event of an output short circuit condition on 3.3V , 5V , +12V1, +12V2, +12V3, +12V4 , -12Voutput, the power supply will shutdown and latch off without damage to the power supply.The power supply shall return to normal operation after the short circuit has been removed and the power switch has been turned off for no more than 2 seconds.

Short the 5Vsb , the power supply will shutdown and auto restart without damage to the power supply

4.1.6.

Output	OCP point
3.3V	28A-38A
5V	33A-42A
12V1 ~12V4	18A-22A

4.1.7. Over Voltage Protection :

Output	OVP Limit (V)
5V	5.7 ~ 6.5 (latch)
12V1 ~12V4	13.3 ~ 16.7 (latch)
3.3V	3.9 ~ 4.5 (latch)

4.1.8.POWER GOOD SIGNAL

The power good signal is a TTL compatible signal for the purpose of initiating an orderly star-up procedure under normal input operating conditions. This signal is asserted (low) until +5Vdc has reached 4.75 volts during power up. Characteristics:

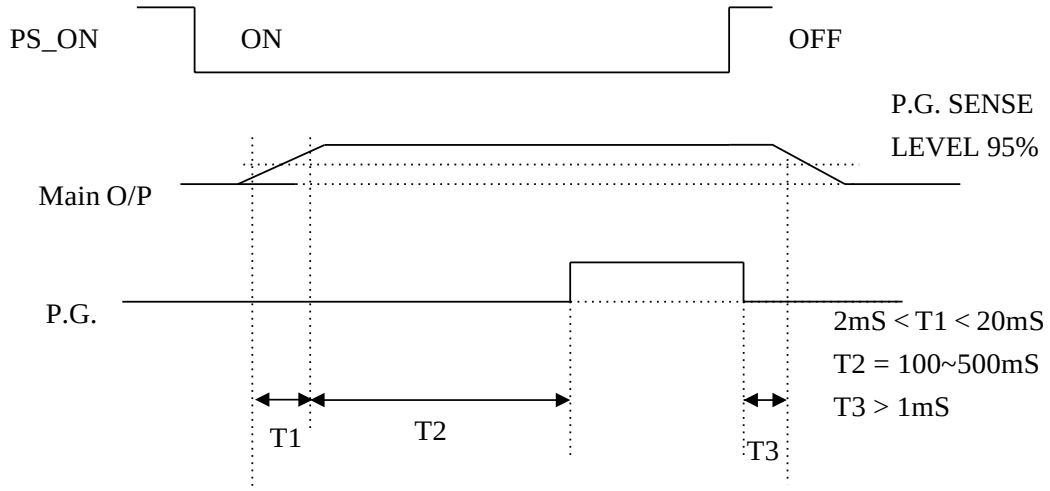
TTL signal asserted (low state) : less than 0.5V while sinking 10mA.

TTL signal asserted (high state): greater than 4.75V while sourcing 500uA.

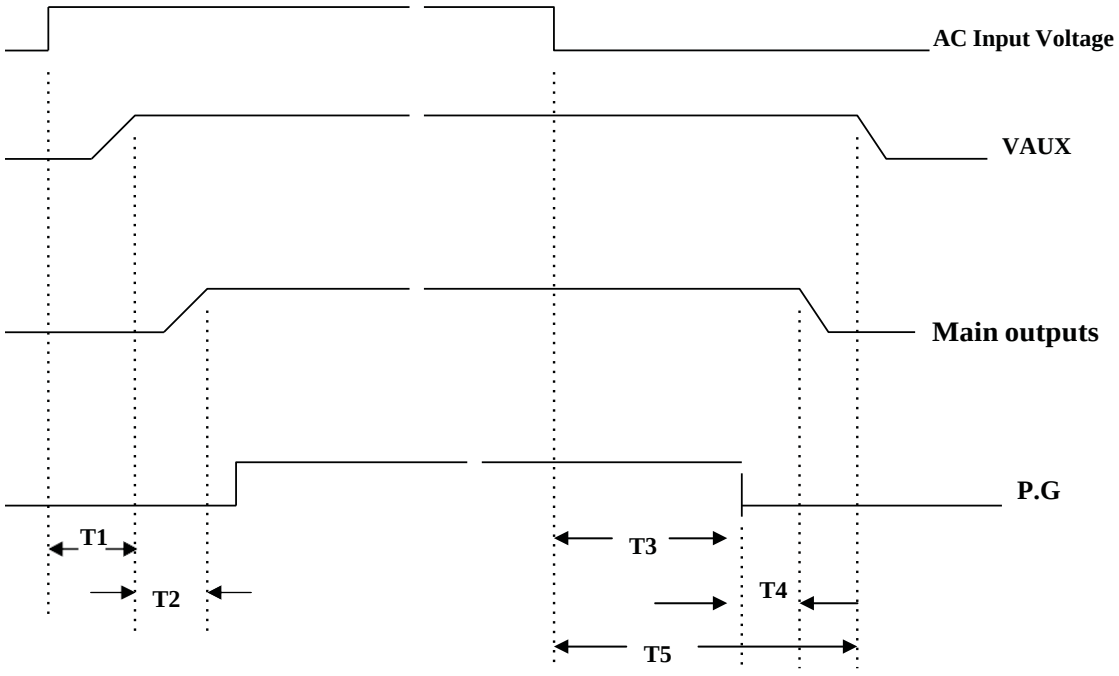
High state output impedance: less or equal to 1Kohm from output to common.

POWER GOOD @ 115/230V,FULL LOAD	100 –500m Sec.
POWER FAIL @115/230V, FULL LOAD	1 m Sec. minimum

(A) Remote ON-OFF Timing:



(B) AC ON / OFF Timing :



Turn-on Time	T1<1500ms
VAUX-on Delay	T2>1ms
P.G Hold up time	T3>16ms
P.G off time	T4>1ms
VAUX Ride Through	T5>70ms

4.1.9.Line Voltage Dropout

Test Condition :

-The PSU is subjected to a dropout of the AC line voltage from 115Vac / 230Vac to zero volt for a period of 16ms. The unit is fully loaded at 90% load . Dropout shall occur at any phase angle.

-115Vac to 0Vac for 16ms, then back to 100Vac at 50Hz @ 90% load

-230Vac to 0Vac for 16ms, then back to 200Vac at 50Hz@90% load

Check:

-Voltages and logic signal shall remain within the specified limits during and subsequent to these line transients at all test condition.

-Output voltage shall remain within specified limits and the PWR_OK signal (if any) shall remain at the high level.

4.1.10.Brownout and Brownout Recovery

Test Condition :

-The PSU shall survive the application of the following test:
Brownout and Brownout Recover.(Load condition :Full load)

-Maximum load:700W

-Brownout test:
100Vac to 0Vac@50Hz:Set Voltage decreasing step@1V/10sec from 100Vac as test start, and after finish the test period, the PSU shall have no any damage will occurred.

-Brownout Recover test:
0Vac to 100Vac @50Hz:Set Voltage increasing step@1V/10sec from 0V as test start,and after finish the test period ,the PSU shall return to operation normally without any damage occurred.

-100Vac to 0Vac then back to 100Vac at 50Hz in ,at 35C.

Check:

-The power supply shall survive with no component damage.

4.1.11 : No Load Operation.

(1) The power supply should turn on and remain on when all the output are at zero load with the regulation relaxed to +/- 10%.

(2) The power supply at nominal line voltage (low range 115Vac/60Hz and high range 230Vac/50Hz) and with PS_ON (Active High) in off state, the power supply shall be less than 5 watt with load at 400mA on the 5Vstb.

4.1.12 : Harmonic Content

(1) The power factor shall be greater than 0.9 when measure at full rated load and at 115Vac/60Hz and 230Vac/50Hz input voltage.

(2) Additionally, the power supply must meet the harmonic input current requirements of EN61000-3-2.

4.1.13 : Under Voltage

The power supply shall contain protection circuitry such that the application of an input voltage below the minimum specified in this table shall not cause damage to the power supply unit nor cause failure of the input fuse.

4.2. OUTPUT TRANSIENT LOAD RESPONSE

The output voltages shall remain within the limits specified in 4.1.1 output rating table in page 6 for the step loading and within the limits specified in Table 1 for the capacitive loading. The load transient repetition rate shall be tested between 50Hz and 5 kHz at duty cycles ranging from 10%-90%. The load transient repetition rate is only a test specification. The step load may occur anywhere within the MIN load to the MAX load shown in Table 1.

Table 1: Transient Load Reguirements

Output	Step Load Size	Load Slew Rate	Capacitive Load
+3.3V	30% of max load	0.5A/us	1000uF
+5V	30% of max load	0.5A/us	1000uF
12V1+12V2+12V3+12V4	65% of max load	1.0A/us	2200uF
+5Vsb	25% of max load	0.5A/us	1uF

4.3. INPUT ELECTRICAL SPECIFICATIONS

4.3.1. VOLTAGE RANGE

PARAMETER		UNITS
V-in Range	90 – 265	V-rms

4.3.2. INPUT FREQUENCY

INPUT FREQUENCY	47–63Hz

4.3.3. INRUSH CURRENT

(Cold start – 25 deg. C)

115V	40A
230V	80A

4.3.4. INPUT LINE CURRENT

115V	10A mps
230V	5A mps

4.4. EFFICIENCY

	Full load (100%)	Typical load (50%)	Light load (20%)
115VAC	82%	85%	82%
230VAC	82%	85%	82%

4.4.1Energy Star & ErP

The PSU shall meet ENERGY STAR 5.0 and ErP requirements, and other low Power system demands, It is recommended that the +5 VSB standby supply efficiency should be as high as possible. Standby efficiency is measured with the main outputs off (PS_ON# high state). Standby efficiency should be as shown in Table below.

Load	Efficient
45mA	>=45%
100 mA	>=55%
250 mA	>=65%
>=1A	>=75%

(loading shown in Amps)

Loading	+12V1	+12V2	+12V3	+12V4	+5V	+3.3V	-12V	+5Vsb
Full (100%)	11.29	11.29	11.29	11.29	17.94	14.36	0.4	3.23
Typical (50%)	5.65	5.65	5.65	5.65	8.97	7.18	0.2	1.61
Light (20%)	2.26	2.26	2.26	2.26	3.59	2.87	0.08	0.65

4.5. PS_ ON#

PS_ON# is an active-low, TTL-compatible signal that allows a motherboard to remotely control the power supply in conjunction with features such as soft on/off, Wake on LAN+, or wake-on-modem. When PS_ON# is pulled to TTL low, the power supply should turn on the five main DC output rails: +12V1VDC,+12V2VDC, +12V3VDC, +12V4VDC,+5VDC,+3.3VDC. When PS_ON# is pulled to TTL high or open-

circuited, the DC output rails should not deliver current and should be held at zero potential with respect to ground. PS_ON# has no effect on the +5VSB output, which is always enabled whenever the AC power is present. Table 15 lists PS_ON# signal characteristics.

The power supply shall provide an internal pull-up to TTL high. The power supply shall also provide debounce circuitry on PS_ON# to prevent it from oscillating on/off at startup when activated by a mechanical switch. The DC output enable circuitry must be SELV-compliant.

Table 15. PS_ON# Signal Characteristics

	Min.	Max.
VIL, Input Low Voltage	0.0V	0.8V
IIL, Input Low Current (Vin = 0.4V)		-1.6mA
VIH, Input High Voltage (lin = -200/1A)	2.0V	
VIH OPEN circuit, lin = 0		5.25V

5. ENVIRONMENTAL REQUIREMENTS

The power supply will be compliant with each item in this specification for the following Environmental conditions.

5.1. TEMPERATURE RANGE

Operating	0 to +50 deg. C
Storage	-20 to +80 deg. C

5.2. HUMIDITY

Operating	10~90% RH, Non-condensing
Storage	95% RH, Non-condensing

5.3. Vibration and shock

Operating Conditions:

The unit should suffer no visible cosmetic damage and should operate with no degradation in display quality during exposure to the operational conditions.

(a) Sinusoidal Vibration: 0.25G zero-to-peak, 10Hz to 500Hz, 0.25 octave/minute sweep rate. One sweep, 10Hz to 500Hz to 10Hz, along each axis.

(b) Random Vibration: 0.002G/Hz, 10Hz to 500Hz, nominal 1.0 Grms in each of the three axes. The test duration shall be sufficient so that the system performance can be completely evaluated.

(c) Half sine Wave Shock: 30G-peak acceleration for 2 milliseconds duration in each of the three axes..The number of shock inputs in each direction shall be sufficient so the system performance can be evaluated.

Non-operating Conditions:

The unit should suffer minimal visible cosmetic damage or damage that prrsents a safety hazards, or impairs the setup and operation of the system after testing.

(a) Sinusoidal Vibration: 0.75G zero-to-peak, 10Hz to 500Hz, 0.5 octave/minute sweep rate. This requires one sweep, 10Hz to 500Hz to 10Hz, along each axis of the three axes.

(b) Random Vibration: 0.008G/Hz, 10Hz to 500Hz, nominal 2.0 Grms. The test shall be for

30 minutes for each axis.

(c) Half sine Wave Shock: 160G-peak, half sine pulse, and 2 milliseconds pulse duration. Testing shall consist of one shock in each direction in each axis, for a total of 6 shock inputs.

(d) Square Wave Shock: 50G-peak acceleration, 180 inches/second velocity change. There shall be one shock in each direction in each axis, for a total of 6 shock inputs

5.4 Altitude

The power supply is applied for tropical climates and use at altitudes not exceeding 5000m above Sea level

6. SAFETY

6.1. LEAKAGE CURRENT

The leakage current from AC to safety ground will not exceed 3.5 mA-rms at 264Vac, 50 Hz.

7. ELECTORMAGNETIC COMPATIBILITY

7.1 LINE CONDUCTED EMI

The subject power supply will meet FCC and VFG class B requirements under full load conditions.

7.2. RADIATED EMI

The subject power suppy will meet FCC and CISPR 22 requirements under system load conditions.

8. LABELLING

Label marking will be permanent, legible and complied with all agency requirements.

8.1. MODEL NUMBER LABEL

Labels will be affixed to the sides of the power supply showing the following:

Manufacturer's name and logo.

- Model no., serial no., revision level, location of manufacturer.
- The total power output and the maximum load for each output.
- AC input rating.

8.2 DC OUTPUT IDENTIFICATION

Each output connector will be labeled.

9. RELIABILITY

9.1. MTBF

The power supply have a minimum predicted MTBF(MIL-HDBK-217) of 100,000 hours of continuous operation at 25℃,Full load, and nominal AC input voltage.