

PSU Engineering Reference Specifications

Model : D16-500P1A

UP/N : D500C002P

Revision History

Revision	Revision Description	Date
A	New release	2020/9/29
B	Update 4.1 Efficiency Update Model label/Packing label	2020/12/29

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1. AC INPUT

1.1 Input Voltage

Min	Normal	Max	Units
90	100-240	264	Vrms

1.2 Input Frequency

Min	Normal	Max	Units
47	50-60	63	Hz

1.3 Input Current

AC Input	I ac(Max)	Units
100	10	Arms
240	5	Arms

1.4 Inrush Current

No component damage shall be occurred to power supply.

1.5 Harmonic Current

The power factor is greater than 0.9 when measured at full rated load and at 230VAC/50Hz input voltages. Power Factor Correction is the active type. The PSU shall comply with EN61000-3-2 Class D

2. DC OUTPUT

2.1 Remote ON/OFF (PS-On/Off)

The power supply DC outputs shall be enabled with an active-low. When PS-ON is pulled to TTL low, the DC outputs are to be enabled. When PS-ON is pulled to TTL high or open-circuited, the DC outputs are to be disabled.

2.2 DC Output Voltage

DC Output	Min	Normal	Max	Units
+3.3V	+3.135	+3.300	+3.465	Volts
+ 5.1V	+4.75	+ 5.1	+5.25	Volts
+12V1	+ 11.40	+ 12.00	+12.60	Volts
+ 12V2	+ 11.40	+ 12.00	+12.60	Volts
- 12V	- 10.80	- 12.00	-13.20	Volts
+ 5.1VSB	+ 4.75	+ 5.1	+ 5.25	Volts

*Note: The output voltage should be measured at output connector terminals

2.3 DC Output Current

Output Voltage	Min	Max	Surge Load	Combined		Total
+3.3V	0.1A	10A		130W	485W(35°C) 434W(50°C)	500W(35°C) 450W(50°C)
+5.1V	0.2A	22A				
+12V1	0.075A	20A	22A/10ms	435W(35°C) 390W(50°C)		
+12V2	0.075A	25A	27A/10ms			
-12V	0.0A	0.3A	0.5A	3.6W		
+5.1VSB	0A	2.5A		12.75W		

Notes:

- 1) The combined output power of +5.1V & +3.3V shall not exceed 130W.
- 2) The combined output power of +12V1&+12V2 shall not exceed 435W under 35°C.
- 3) The combined output power of +12V1&+12V2 shall not exceed 390W under 50°C.
- 4) The combined Peak power of +12V1&+12V2 shall not exceed 485W/10ms.
- 5) The combined output power of +12V1&+12V2 & +5.1V & +3.3V shall not exceed 485W under 35°C.
- 6) The combined output power of +12V1&+12V2 & +5.1V & +3.3V shall not exceed 434W under 50°C.
- 7) Total output power: 500W max continues under 35°C.
- 8) Total output power: 450W max continues under 50°C.
- 9) Peak power: 550W/10ms max continues under 35°C.

2.4 Cross Regulation

Load	3.3V	5.1V	+12V1	+12V2	-12V	5.1Vsb	TOTAL POWER	COMMENTS
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Min Turn On Load
2	0.10	0.20	0.075	0.075	0.00	0.00	3.15	Min Load
3	1.425	3.136	2.85	3.56	0.042	0.356	99.93	20% Load
4	3.56	7.84	7.13	8.9	0.11	0.89	249.95	Half Load
5	5.7	12.54	11.4	14.256	0.17	1.424	399.93	80% Load
6	7.127	15.68	14.254	17.82	0.213	1.78	500.00	Max Load
7	5.39	22	12.65	12.65	0.3	2.5	449.93	For 50°C
8	5.21	11.46	20.00	14.00	0.30	2.50	499.98	+12V1 Max Load
9	5.21	11.46	9	25.00	0.30	2.50	499.98	+12V2 Max Load
10	10.00	19.00	14.74	14.74	0.30	2.50	500.00	+3.3V Max Load
11	5.39	22.00	14.74	14.74	0.30	2.50	500.00	+5.1V Max Load
12	Stand-by					0	0	
13						2.5	12.75	

Notes:

- 1) Load condition 7* shall be tested at 50°C.

2.5 Output Transient Response

Test conditions: Input voltage 115Vac/230Vac at frequency 50Hz~10KHz and 50% duty cycle.

The loading specified in below.

Parameter	Output Range	Load step	Slew Rate(A/uS)	Min.Capacitive load
+12V1	0.075A to 20A	40%	1	270uF
+12V2	0.075A to 25A	60%	1	270uF
+5.1V	0.2A to 22A	30%	1	1500uF
+3.3V	0.1A to 10A	30%	1	1500uF
-12V	0A to 0.3A	0.1A	0.1	330uF
+5.1Vsb	0A to 2.5A	0.5A	0.5	560uF

Notes:

- 1) Turn-On Delay Time: 2000ms max. at any condition. AC input with respect to +5.1V.

*Note : The dynamic load transient response test must follow regulation table as bellow.

DC Output	Min	Normal	Max	Units
+3.3V	+3.135	+3.300	+3.465	Volts
+ 5.1V	+4.75	+ 5.1	+5.25	Volts
+12V1	+ 11.40	+ 12.00	+12.60	Volts
+ 12V2	+ 11.40	+ 12.00	+12.60	Volts
- 12V	- 10.80	- 12.00	-13.20	Volts
+ 5.1VSB	+ 4.75	+ 5.1	+ 5.25	Volts

2.6 Ripple and Noise

DC Output	Ripple/Noise	Units
+ 3.3V	50	mVp-p
+ 5.1V	50	mVp-p
+ 12V1	120	mVp-p
+ 12V2	120	mVp-p
- 12V	120	mVp-p
+ 5.1VSB	50	mVp-p

Note:

- 1) Bandwidth is limited 10Hz to 20 MHz
- 2) A 10uF EL-Cap and a 0.1uF high frequency Ceramic-Cap shall be added in parallel during the measurements.

2.7 Capacitive Load

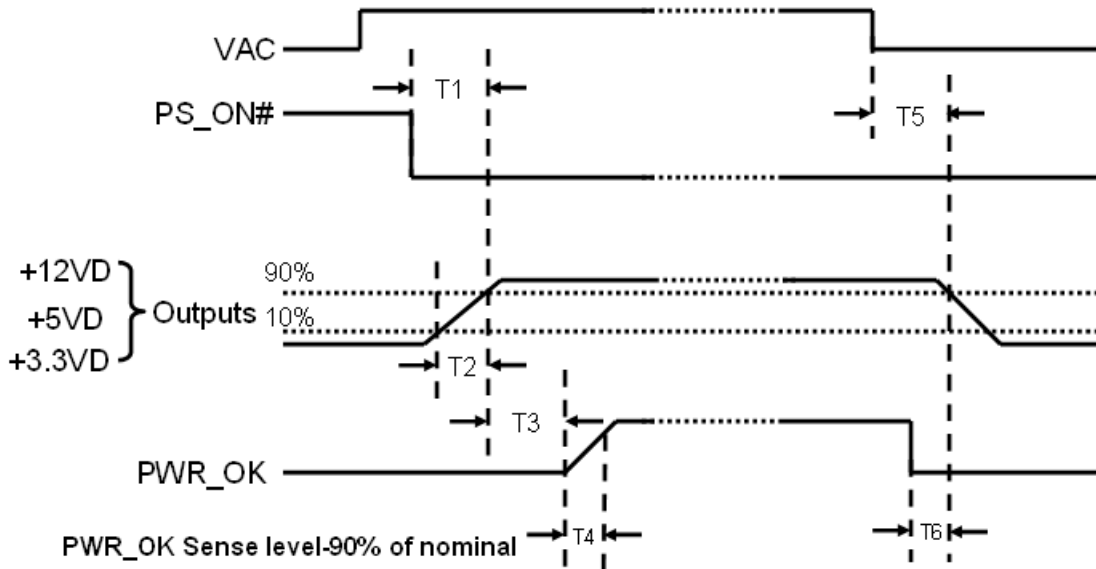
The PSU should be able to power up and operate normally with the following capacitances simultaneously present on the DC outputs:

DC Output	EL-Capacitor	uF
+ 5.1V	1500	uF
+12V1	270	uF
+12V2	270	uF
- 12V	330	uF
+ 5.1VSB	560	uF
+ 3.3V	1500	uF

2.8 Overshoot

Overshoot at turn-on and turn-off shall not exceed 10% voltage.

3. TIMING / HOUSEKEEPING



Parameter	Description	Value
T1	Power-on time	<500mS
T2	Rise time	<20mS
T3	PWR_OK delay time	100 – 500mS
T4	PWR_OK rise time	<10mS
T5	AC loss to DC loss hold-up time	>10mS
T6	PWR_OK inactive to DC loss delay	>1mS

*Note: T5 Test condition: 115Vac/60Hz or 230Vac/50Hz @ load: 5.1V/22A,3.3V/5.39A, 12V1/12.65A,12V2/12.65A, -12V/0.3A, 5.1Vsb/2.5A.

4. EFFICIENCY

4.1 Efficiency

	20%	50%	100%
115Vac/230Vac	82%	85%	82%

LOAD MATRIX FOR EFFICIENCY MEASUREMENTS

230V/50Hz, 115V/60HZ							
+3.3V(A)	+5.1V(A)	+12V1(A)	12V2(A)	-12V(A)	+5.1VSB(A)	Total(W)	Mark
1.56	3.41	2.86	3.4	0.05	0.43	100	20% max load
3.91	8.53	7.11	8.5	0.13	1.08	250	50% max Load
7.81	17.03	14.06	17	0.26	2.15	500	100% max Load

4.2 Standby Efficiency

The power supply shall less than 0.5W of input power at output 45mA/5.1V and input 230V/50Hz

5. BRUN IN:

Test Condition:

Ambient=40°C ~45°C

Load Condition:70% load. AC input:230V/50HZ.

All units Subjected to burn in will be exposed to 45min.on, 10min off, 10 times on/off(15s/15s)

6. PROTECTION REQUIREMENTS:

6.1 Protection Type

This main switcher is shutdown protection type.

5.1VSB can automatically recovery when the fault condition is removed.

6.2 Over Voltage Protection: (Minimum Load)

+5.1V : 7V (max)

+12V : 15.6V (max)

+3.3V : 4.6V (max)

Minimum Load refers to Item (Table) 2.4

6.3 Short Circuit Protection

+3.3V, +5.1V, +12V, -12V shall shut down and latch off if any of the outputs are shorted to the secondary common. For the +5.1VSB, the power supply can automatically recover when the fault condition is removed.

6.4 No Load Operation

No damage or hazardous condition shall be occurred to power supply.

6.5 Over Current Protection

In an over-current condition, this protection circuit will become active and latch the supply off, within this module. For testing purposes, the overload currents should be ramped at a minimum rate of 10A/sec starting from full load.

Over Current Protection

Output Voltage	Current Limit MIN
+ 3.3V	12A
+ 5.1V	23A
+ 12V1	22A
+ 12V2	27A
+ 5.1VSB	3A

6.6 Components Stress Requirement

The component stress should not exceed the limits specified 100% at continuous mode, that include thermal, voltage and current stress.

7. FAN SPEED CONTROL

The power supply shall contain a thermal sensing circuitry capable of varying fan speed.

Test condition: Vin 230V 50HZ

Sound pressure (1 m distance)

Loading	Acoustic Noise (25°C)
20% load	< 26 dB
50% load	< 40 dB
100% load	< 50 dB

8. ENVIRONMENT

8.1 Operating

Temperature ----- 0°C to 50°C(500W at 35°C ,450W at 50°C)

Temperature ----- 0°C to 40°C(Standby Mode)

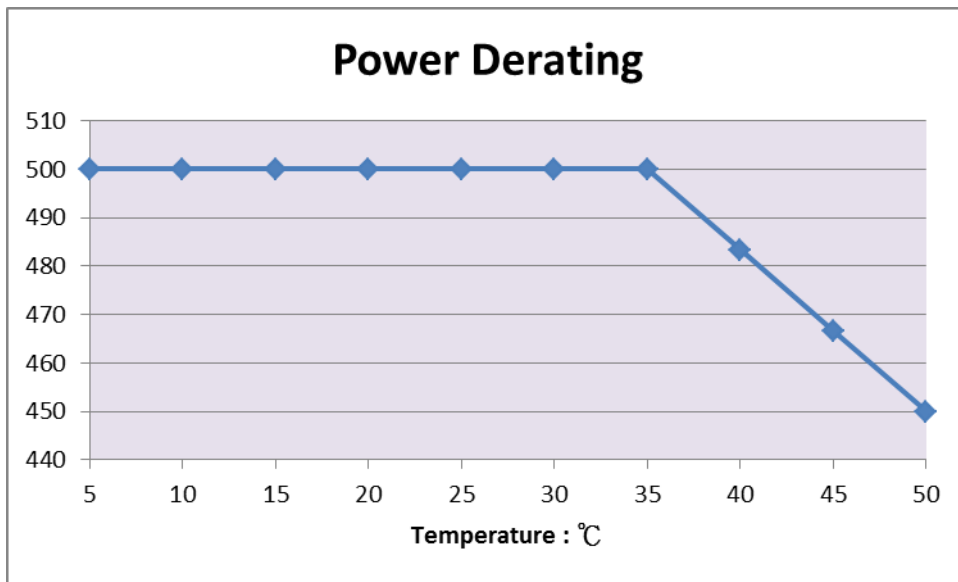
Relative Humidity ----- 20% to 85% RH
 Altitude -----10,000 feet above sea level with a 25°C ambient air.

8.2 Shipping/Storage

Temperature ----- -20°C to 60°C
 Relative Humidity ----- 5% to 95% RH
 Non-operation ----- 5,000 feet above sea level

8.3 Max. DC Output Power

The maximum continuous power rating of supply is 500W at 35°C.
 The maximum continuous power rating of supply is 450W at 50°C.



8.4 Mechanical Shock (non-operation)

The power supply shall not be damaged during a shock of 50G half sine wave 11mS at non-operation mode. Minimum 3 shocks on each of six faces.

8.5 Vibration (non-operation)

0.015G²/Hz 5 to 100 Hz
 -6 dB/octave 100 to 137Hz
 0.008G²/Hz 137 to 350 Hz
 -6 dB/octave 350 to 500Hz
 0.0039G²/Hz 500Hz
 2.09 Grms 20 minutes/axis along all three axes

8.6 RoHS

PSU shall meet RoHS compliance.

9. SAFETY

9.1 Safety

The power supply complies with the following requirements:

- CE
- CCC
- CB
- BSMI
- UL, CUL
- FCC
- BIS
- TUV

9.2 Leakage Current

Measured at 230Vac /50HZ and 2mA Max.

9.3 Insulation Resistance

Primary to F.G: 5M ohms min at 500Vdc.

9.4 Dielectric Strength

Items		Specification	Remark
Hi-Pot	AC input -> Secondary	AC 2.1KV for 1 Sec	Current Limit:10mA
	AC input -> FG	AC 2.1KV for 1 Sec	

9.5 Model Label

本體左側 1pcs 綠底 Barcode

Chicony POWER TECHNOLOGY
SWITCHING POWER SUPPLY
开关电源/交換式電源供應器

MODEL/모델명(型号/型號):D16-500P1A
INPUT/정격입력(輸入/輸入):50-60 Hz 100-240 V~/10-5 A MAX
OUTPUT/정격출력(輸出/輸出):
+5 Vsb = /2.5 A , +5 V = /22 A , +3.3 V = /10 A
+12 V1 = /20 A , +12 V2 = /25 A , -12 V = /0.3 A
+5 V AND +3.3 V SHALL NOT EXCEED 130 W
+5 V 和 +3.3 V 的總輸(總輸)出功率不超過(過) 130 W
MAX. CONTINUOUS LOAD ON THE COMBINED
+12 V OUTPUT SHALL NOT EXCEED 36.25 A
所有+12 V的總持續電流不超過36.25 A
TOTAL OUTPUT POWER(總輸出功率/總輸出功率): 500 W
PEAK POWER(瞬間/間最大功率): 550 W /10 ms
제조사:Chicony Power Technology (Dongguan) Co., Ltd.
製造商:群光電能科技股份有限公司
Made in China (中國製造/中國製造)-F3

IS 13252 (Part 1)
IEC 60950-1
R-41046230
www.bis.gov.in

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CAN ICES-3(B)/NMB-3(B)
R35737 RoHS

警告! 危險區域
不要打開上蓋 未附備用組件
UP/N:D500C002P

S/N: XXCCCCYYWWXXXXXX REV.01

9.6 Packing Label

Note:
 1. Bar code symbology = Code 128
 2. 条码高度为6mm.
 3. 符合RoHS的产品，Barcode Label必须为绿色（367C），非RoHS产品为白色，因PSU之产品均为RoHS产品，因此Dellia全系列产品Barcode Label均为绿色。

SAMPLE APPROVED CARD
 NON SAMPLE APPROVED CARD

內容OOBA或產線自印

A. 料號(字體大小為W2.2 * H3.4mm，字距0.2mm)
 B. Barcode(Height: 6mm)
 C. 序號(字體大小為W2.2 * H2.8mm，字距0.2mm)
 1. 1-2碼代表年份(以西元年號之後二位數表示)
 2. 3-4碼代表當年製造日週別(01~53)
 3. 5-6碼代表廠別(DS為群光)。
 4. 7-10碼代表流水號(0001開始編起)
 D. 版本(字體大小為W2.2 * H2.8mm，字距0.2mm)
 A、B、C須靠左對齊。

注：不同產品同週別產出，流水號不可重複，須同箱內本体Barcode一致。

EX：
 APA-1001 & APA-1002 版本為100，廠碼DS，同週別產出(D/C:2001)各100pcs，流水號需001~200
 APA-1001 序號2001DS0001~2001DS0100
 APA-1002 序號2001DS0101~2001DS0200

	Tol:	Part no. : 878500C0002TxxHF
Unit mm	Scale : 1/2	UP/N: D500C002P
Material :	See Note	File Name : Label_D500C002P-PW01_A0
Drawn	Grape	Size:A4 Sheet 1/1 Ver. 4
Checked	Joan	
Approved	Jessy	

10. EMI

6dB below CISPR 22 CLASS B.
 6dB below FCC PART 15 CLASS B.

11. RELIABILITY

The calculated MTBF shall be more than 100,000 hours at 500W load(115Vac) and 35°C ambient temperature.

12. LIST OF BANNED SUBSTANCES

The environment related substances listing in Chicony Power DOC no. HPT-01-043 is forbidden. Used in product, part and manufacturing process