



Specification for Approval

Customer : Energy Access (PG)

Part name : Open Frame Power Supply

Description : 24.0 Volts / 2.71 Amps

Model no. : ATS065A1-F240

Customer P / N : OS2524

Product P / N : ATS065A1F240000003

Issued date : 09 – Aug. – 2023

Version : A1

Issued stamp :

Customer’s approval signature

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Factory (China) : BOYANG ELECTRONICS CO., LTD.



65.04 W
Open Frame Power Supply
Specification

Model no. : **ATS065A1-F240**

Description : **24.0 Volts / 2.71 Amps**

Part no. : **ATS065A1F240000003**

Version : **A1**

Date : **09 – Aug. – 2023**

Approved	Reviewed	Checked	Prepared	Sales



1. Feature :

- ◆ **Input** : Universal 100 ~ 240 Vac / 50 ~ 60 Hz input , without any slide switch
- ◆ **Output** : +24.0 V / 0 ~ 2.71 A
- ◆ **Case dimension** : 76.2(L)*50.8(W)*23.0(H) ± 1 mm (above PCB)
- ◆ **Efficiency** : $Eff_{(av)} \geq 88\%$ (115 V/60 Hz input for Level VI)
 $Eff_{(av)} \geq 89\%$ (230 V/50 Hz input for CoC Tier2)
 $Eff \geq 79\%$ (At 230 V/50 Hz input@10% load for CoC Tier2)
- ◆ **Safety** : UL / CUL
- ◆ **EMC** : CE / FCC (conduction & radiation Class B)
- ◆ **Protection** : OVP (Over voltage protection) 、 SCP (Short circuit protection) 、 OCP (Over current protection)
- ◆ Suitable for usage at I.T.E., industrial controller
- ◆ Meet DoE Level VI/ CoC Tier 2 / ErP (Lot 7) / GEMS / NRCan.

2. Input :

2.1 Voltage	Universal 100 ~ 240 Vac , single phase
2.2 Frequency	50 ~ 60 Hz
2.3 Current	1.6A Max.
2.4 Inrush current	Cold start at 25°C , full load 80 A max. / 240 Vac (ac source chroma 6530)
2.5 Efficiency	$Eff_{(av)} \geq 88\%$ (115 V/60 Hz input for Level VI) $Eff_{(av)} \geq 89\%$ (230 V/50 Hz input for CoC Tier2) $Eff \geq 79\%$ (At 230 V/50 Hz input@10% load for CoC Tier2)
2.6 Power consumption	$P_i \leq 0.21$ W (At 115 V & 230 V & no Load for Level VI) $P_i \leq 0.15$ W (At 230 V & no Load for CoC Tier2)

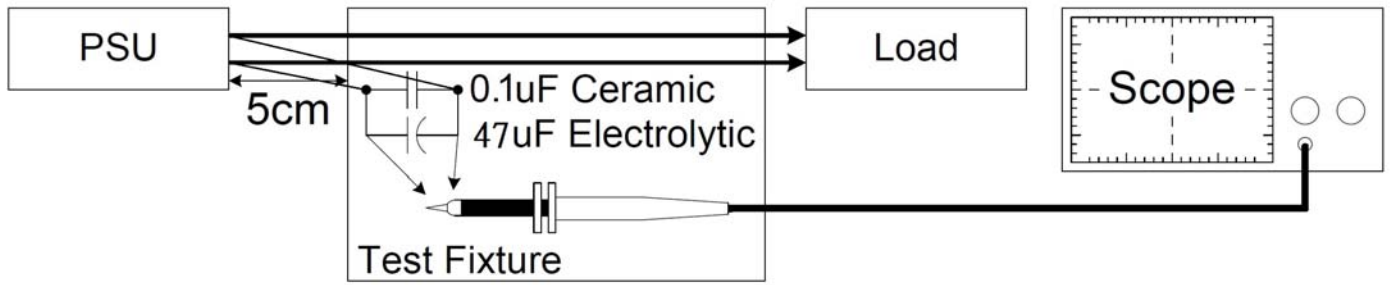
$$\text{※}Eff_{(av)} = \frac{E_1 + E_2 + E_3 + E_4}{4}$$

E_1 =efficiency with 25% rated load , E_2 =efficiency with 50% rated load
 E_3 =efficiency with 75% rated load , E_4 =efficiency with 100% rated load

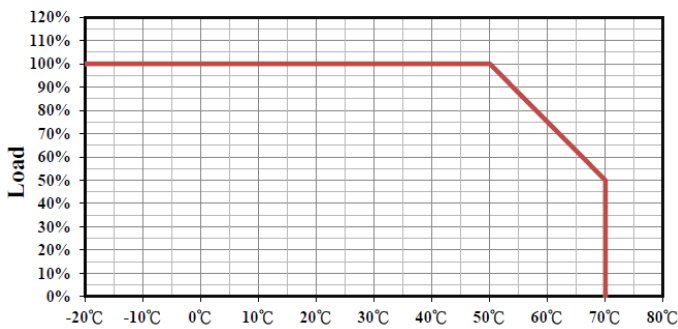
3. Output :

3.1 DC output	Voltage	+24.0 V ± 5%
	Current	2.71 A max.
	Regulation	22.8 V min. ~ 24.0 V typ. ~ 25.2 V max.
	Ripple & Noise	240 mV _{p-p} max.
	Total power	65.04 W max.

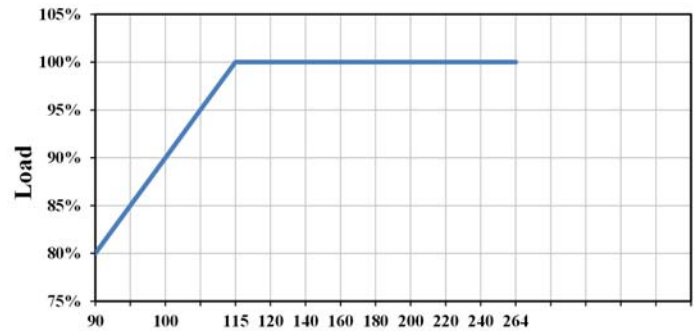
Remark : For ripple & noise measurement , use a 20 MHz bandwidth frequency oscilloscope , and add a 0.1 μF multilayer cap. and a low ESR electrolytic cap. (47 μF) at output connector terminals. (at nominal line voltage , full load)



Ripple & Noise measurement circuit



Power De-rating curve



Derating Curve VS. Input Voltage

4. Protection :

4.1 Over Voltage Protection (OVP)	43.2 V max.
4.2 Short Circuit Protection (SCP)	Automatic recovery after short-circuit fault being removed
4.3 Over Current Protection(OCP)	5.42 A max.

Remark : When short circuit protection or over current protection is activated , the power supply will shutdown automatically.

Once the abnormal condition resulting in the failure being removed , the power supply will restart accordingly.

When over voltage protection is activated , the power supply will shutdown.

5. Safety requirement :

5.1. Dielectric strength : Cut off current 10 mA

(1)	Primary to secondary	3000 Vac (RMS) for 1 minute
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5.2. Insulation resistance :

(1)	Primary to secondary	10 MΩ for 500 Vdc
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5.3. Leakage current : Less than 0.25 mA



6. Operation and environment performance :

6.1 Temperature range

Operating	0°C ~ +50°C
Storage	-20°C ~ +80°C

6.2 Humidity range (non-condensing)

Operating	20% ~ 80% RH
Storage	10% ~ 90% RH

6.3 Cooling : By natural air

7. M.T.B.F. : 300,000 Hrs. (calculated hours at 25°C , by Telcordia SR-332)

8. Connector and pin assignment

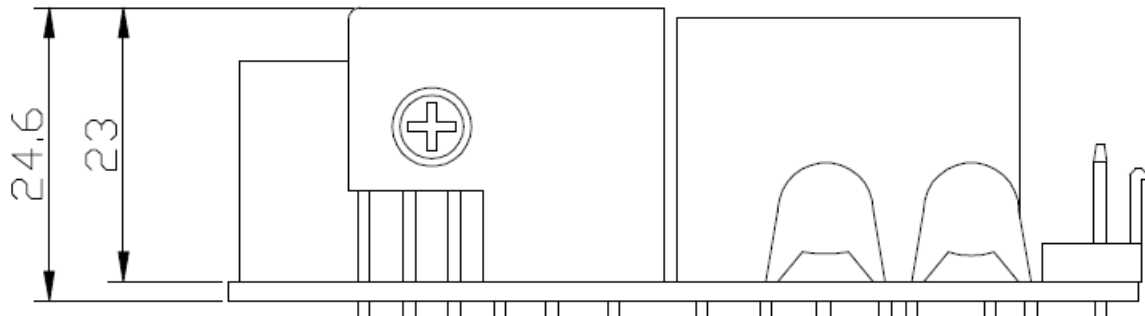
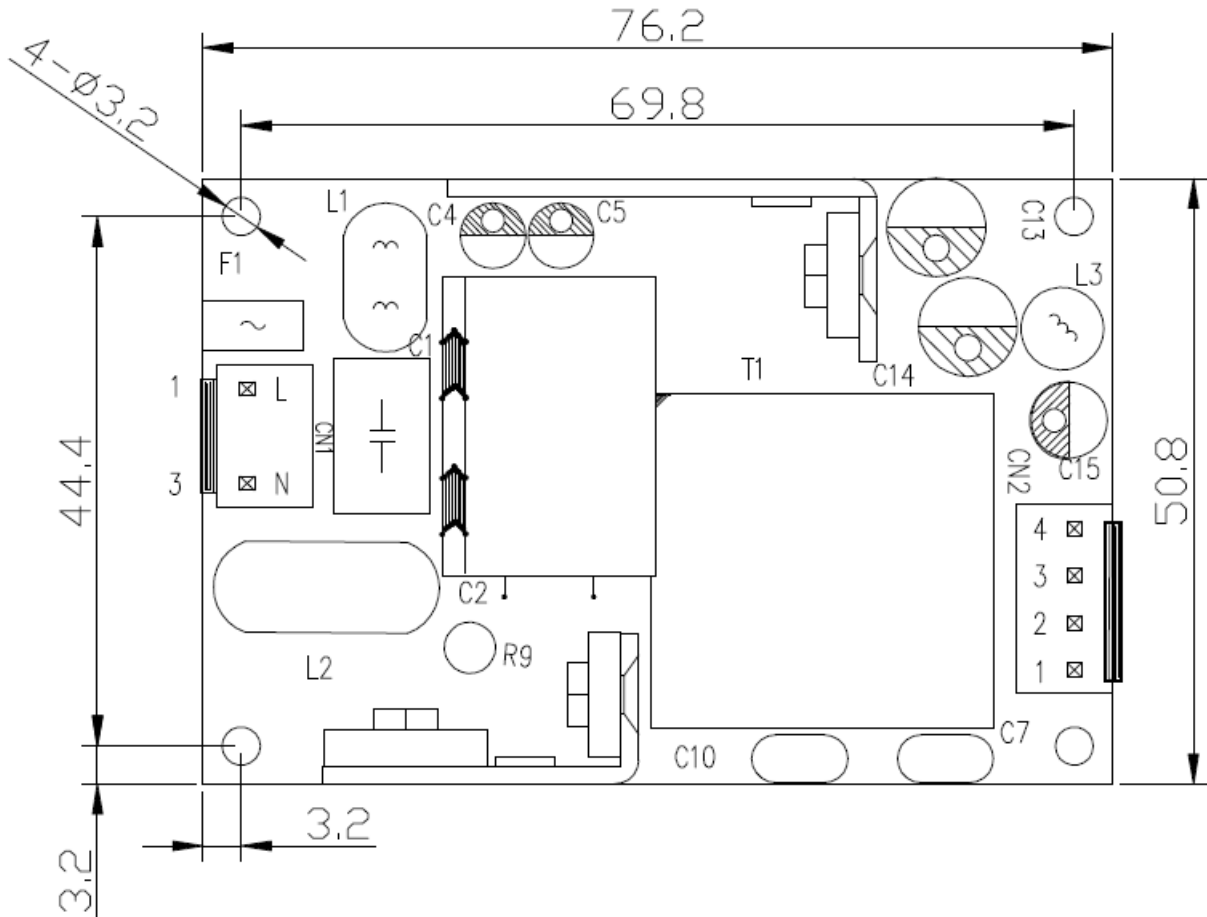
Input connector CN1 (wafer : CV-W3961-03) ,or equivalent	
Pin 1	Line
Pin 2	Null
Pin 3	Neutral
Output connector CN2 (wafer : CV-W3961-04) ,or equivalent	
Pin 1	VO-
Pin 2	VO-
Pin 3	VO+
Pin 4	VO+

9. Mechanical :

9.1 Weight : 100 g Ref.

9.2 Dimension : 76.2(L)*50.8(W)*23.0(H) ± 1 mm (above PCB)

9.3 External Look :





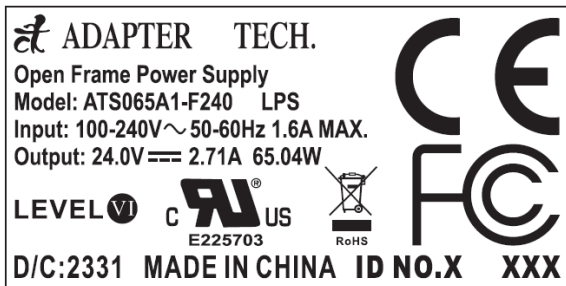
10. Label :

- 10.1 Label materials : Synthetic Paper +PO1T
- 10.2 Color : Silver Background with Black Printing
- 10.3 Label dimension : 25.0 (L) * 12.5 (W) (±0.1mm)
- 10.4 Label thickness : 75#

100%



300%



"XXX"

Label supplier's code.
It is accurate that the number of words depends on the real finished product.

ID NO."X"

Manufacturer's code.
It is accurate that the number of words depends on the real finished product.

Label Part No.: 9447000010

A. Line regulation test

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
90 Vac / 50% Load	22.8 V ~ 25.2 V	23.95 V	23.93 V	23.94 V
115 Vac / 50% Load	22.8 V ~ 25.2 V	23.95 V	23.93 V	23.94 V
132 Vac / 50% Load	22.8 V ~ 25.2 V	23.95 V	23.93 V	23.94 V
180 Vac / 50% Load	22.8 V ~ 25.2 V	23.95 V	23.93 V	23.94 V
230 Vac / 50% Load	22.8 V ~ 25.2 V	23.95 V	23.93 V	23.94 V
264 Vac / 50% Load	22.8 V ~ 25.2 V	23.95 V	23.93 V	23.94 V

B. Efficiency test

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac DOE Level VI	88% Min.	89.908%	89.898%	89.858%
230 Vac COC Tier 2	89% Min.	90.697%	90.657%	90.677%
230 Vac COC Tier 2 (10% Load)	79% Min.	86.899%	86.759%	86.769%

$$\text{Eff}_{(av)} = \frac{E_1 + E_2 + E_3 + E_4}{4}$$

E_1 =efficiency with 25% rated load , E_2 =efficiency with 50% rated load
 E_3 =efficiency with 75% rated load , E_4 =efficiency with 100% rated load

C. Load regulation test

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 0% Load	22.8 V ~ 25.2 V	23.95 V	23.94 V	23.96 V
115 Vac / 50% Load	22.8 V ~ 25.2 V	23.95 V	23.94 V	23.96 V
115 Vac / 100% Load	22.8 V ~ 25.2 V	23.92 V	23.91 V	23.93 V
230 Vac / 0% Load	22.8 V ~ 25.2 V	23.95 V	23.94 V	23.96 V
230 Vac / 50% Load	22.8 V ~ 25.2 V	23.95 V	23.94 V	23.96 V
230 Vac / 100% Load	22.8 V ~ 25.2 V	23.92 V	23.91 V	23.93 V



D. Ripple & Noise test

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100% Load	240 mV _{p-p} max.	39.6 mV _{p-p}	35.6 mV _{p-p}	33.6 mV _{p-p}
230 Vac / 100% Load	240 mV _{p-p} max.	40.6 mV _{p-p}	39.6 mV _{p-p}	36.6 mV _{p-p}

E. Inrush current

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
230 Vac / 100% Load	80 A max. (chroma 6530)	61.6 A	60.4 A	59.4 A

F. Over voltage protection

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100% Load	43.2 V max.	28.9 V	28.8 V	28.8 V
230 Vac / 100% Load	43.2 V max.	29.0 V	28.9 V	28.9 V

G. Over current protection

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac	5.42 A max.	3.98 A	3.88 A	4.02 A
230 Vac	5.42 A max.	3.80 A	3.70 A	3.95 A

H. Short circuit protection

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac	Auto recovery	OK	OK	OK
230 Vac	Auto recovery	OK	OK	OK

I. Input power consumption (no load)

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 0% Load	≤ 0.21 W	0.058 W	0.060 W	0.057 W
230 Vac / 0% Load	≤ 0.15 W	0.097 W	0.099 W	0.097 W



Efficiency Test Report

- A. Model Number : ATS065A1-F240 24.0V 2.71A 65.04W
 B. DC Power Cord :
 C. Average Efficiency :
 Erp (Lot 7) $0.0834 \cdot \ln(P_{out}) - 0.0014 \cdot P_{out} + 0.609 = 88.000\%$ Min.
 DoE Level VI $0.0834 \cdot \ln(P_{out}) - 0.0014 \cdot P_{out} + 0.609 = 88.000\%$ Min.
 GEMS Level VI $0.0834 \cdot \ln(P_{out}) - 0.0014 \cdot P_{out} + 0.609 = 88.000\%$ Min.
 CoC Tier 2 $0.0834 \cdot \ln(P_{no}) - 0.0011 \cdot P_{no} + 0.609 = 89.000\%$ Min.
 CoC Tier 2 (10% Load) $0.0834 \cdot \ln(P_{no}) - 0.00127 \cdot P_{no} + 0.518 = 79.000\%$ Min.
 D. NO Load Power Consumption :
 Erp (Lot 7) 0.21W Max.
 DoE Level VI 0.21W Max.
 GEMS Level VI 0.21W Max.
 CoC Tier 2 0.15W Max.
 E. Testing Equipment :
 a. AC Power Source : " Zentech " 2700M-10
 b. Electronic Load : " PRODIGIT " 3311C
 c. Power Meter : " YOKOGAWA " WT-210A
 d. Digital Meter : " FLUKE " 45
 F. AC Input Voltage : 115Vac/60Hz

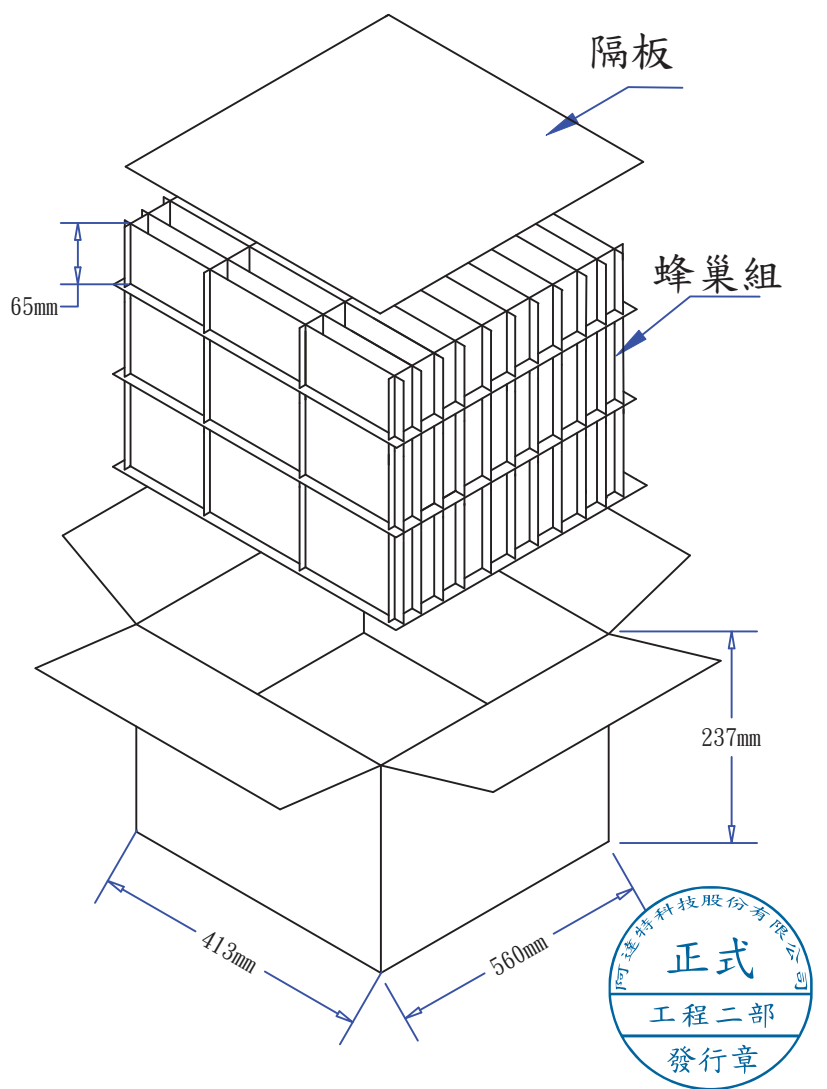
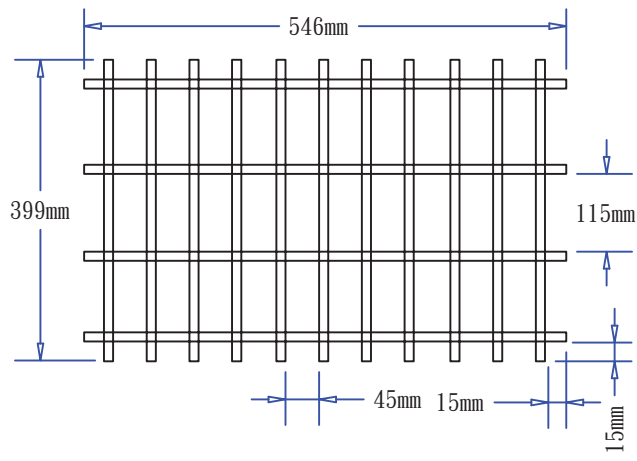
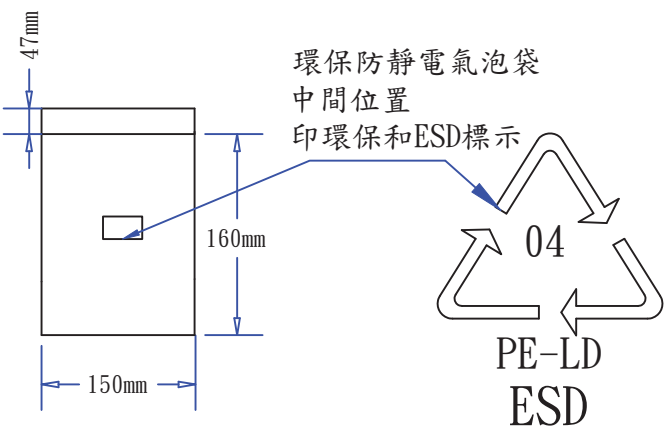
Load Conditions	100%* I ₀	75%* I ₀	50%* I ₀	25%* I ₀	10%* I ₀	0%* I ₀
Reported Quantity						
Rms Output Current(mA)	2710mA	2033mA	1355mA	678mA	271mA	0mA
Rms Output Voltage(V)	23.920V	23.950V	23.950V	23.950V	23.950V	23.950V
Active Output Power(W)	64.82W	48.68W	32.45W	16.23W	6.49W	0.00W
Rms Input Voltage(V)	115V	115V	115V	115V	115V	115V
Rms Input Current(A)	1.164A	0.913A	0.657A	0.358A	0.162A	0.014A
Rms Input Power(W)	72.890W	54.310W	35.810W	17.940W	7.302W	0.058W
True Power Factor (PF)	0.543	0.512	0.472	0.438	0.396	0.038
Total Harmonic Distortion of the input current	122.8A%	133.6A%	147.0A%	156.9A%	157.3A%	4.9A%
Power Consumed by UUT(W)	8.067W	5.632W	3.358W	1.714W	0.812W	0.058W
Active Efficiency	88.933%	89.631%	90.623%	90.447%	88.886%	*
Average Efficiency	89.908%				88.886%	*

- G. AC Input Voltage : 230Vac/50Hz

Load Conditions	100%* I ₀	75%* I ₀	50%* I ₀	25%* I ₀	10%* I ₀	0%* I ₀
Reported Quantity						
Rms Output Current(mA)	2710mA	2033mA	1355mA	678mA	271mA	0mA
Rms Output Voltage(V)	23.950V	23.950V	23.950V	23.950V	23.950V	23.950V
Active Output Power(W)	64.90W	48.68W	32.45W	16.23W	6.49W	0.00W
Rms Input Voltage(V)	230V	230V	230V	230V	230V	230V
Rms Input Current(A)	0.816A	0.616A	0.414A	0.217A	0.093A	0.023A
Rms Input Power(W)	71.560W	53.530W	35.620W	18.020W	7.469W	0.097W
True Power Factor (PF)	0.382	0.379	0.373	0.361	0.346	0.023
Total Harmonic Distortion of the input current	160.7A%	161.0A%	160.8A%	157.3A%	136.2A%	2.3A%
Power Consumed by UUT(W)	6.656W	4.852W	3.168W	1.794W	0.979W	0.097W
Active Efficiency	90.699%	90.937%	91.107%	90.045%	86.899%	*
Average Efficiency	90.697%				86.899%	*

Tester : Ian

REVISIONS				
SHOW	REV	DESCRIPTION	DATE	APPROVED
<input checked="" type="checkbox"/>		用膠帶封口		
<input type="checkbox"/>		無需膠帶封口		
△	A	初版制作	14/09/20	SUN
△	B	更新格式	21/12/25	SUN



PIS50W00003 包裝/50W~65W, 2x4寸, Open Frame 環保防靜電氣泡袋-刀卡-90

- 9550027001 1. 隔板:546(L)*399(W)*6mm K=K 4/90
- 2. 數量:10*3*3=90PCS
- 9520039901 3. 外箱:560(L)*413(W)*237(H)mm K=K 1/90
- 9560027801 4. 11刀卡:546(L)*65(W)*6mm(邊分) K=K 12/90
- 9560027901 5. 4刀卡:399(L)*65(W)*6mm(邊分) K=K 33/90
- 9540006801 6. 環保防靜電氣泡袋:160(L)*150(W)*47mm 紅色透明, 單端開口, 中間印環保和ESD標誌. 1/1
- 7. 成品裝入氣泡袋后對折袋口. 再將成品側立橫裝入蜂巢內, 方向須統一.
- 8. 外箱標注為外徑尺寸.
- 9. 上述物品必完全符合環保RoHS標準.

阿達特科技股份有限公司
Adapter Technology Co., Ltd.

DRAWING NO. PIS50W00003		APPROVAL 1 BY		
UNIT	MODEL NO. 50W-65W Open Frame型	APPROVAL 2 BY		
mm	FILE NO. ADT-0288	CHECKED BY(ENGINEER)	Sun	2021/12/25
SCALE	REV. B	SHEET 1/1	DRAWN BY	Moon
Apply for sales		Apply for engineer	Use the sales	Use the engineer