



Specification for Approval

Customer : **Ropla Elektronik**

Part name : **Power Supply**

Description : **13.8 Volts / 4.71 Amps**

Model no. : **ATM065A4-F138**

Customer P / N :

Product P / N :

Issued date : **05 – Dec. – 2024**

Version : **01**

Issued stamp :

Customer’s approval signature

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64.998 W
Open Frame Power Supply
Specification

Model no. : **ATM065A4-F138**

Description : **13.8 Volts / 4.71 Amps**

Part no. :

Version : **01**

Date : **05 – Dec. – 2024**

Approved	Reviewed	Checked	Prepared	Sales



1. Feature :

- ◆ **Input** : Universal 100 ~ 240 Vac / 50 ~ 60 Hz input , without any slide switch
- ◆ **Output** : +13.8 V / 0 ~ 4.71A
- ◆ **Case dimension** : 76.2(L)*50.8(W)*23.0(H) ± 1 mm (above PCB)
- ◆ **Efficiency** : $Eff_{(av)} \geq 88\%$ (115V/60Hz input for Level VI)
 $Eff_{(av)} \geq 89\%$ (230V/50Hz input for CoC Tier2)
 $Eff \geq 79\%$ (At 230V/50Hz input@10% load for CoC Tier2)
- ◆ **Safety** :
- ◆ **EMC** : (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, medical
- ◆ Meet DoE Level VI/ CoC Tier 2 / ErP (Lot 7) / GEMS

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	$Eff_{(av)} \geq 88\%$ (115V/60Hz input for Level VI) $Eff_{(av)} \geq 89\%$ (230V/50Hz input for CoC Tier2) $Eff \geq 79\%$ (At 230V/50Hz input@10% load for CoC Tier2)
2.6 Power consumption	$P_i \leq 0.21\text{ W}$ (At 115V & 230V & no Load for Level VI) $P_i \leq 0.15\text{ W}$ (At 230 V & no Load for CoC Tier2)

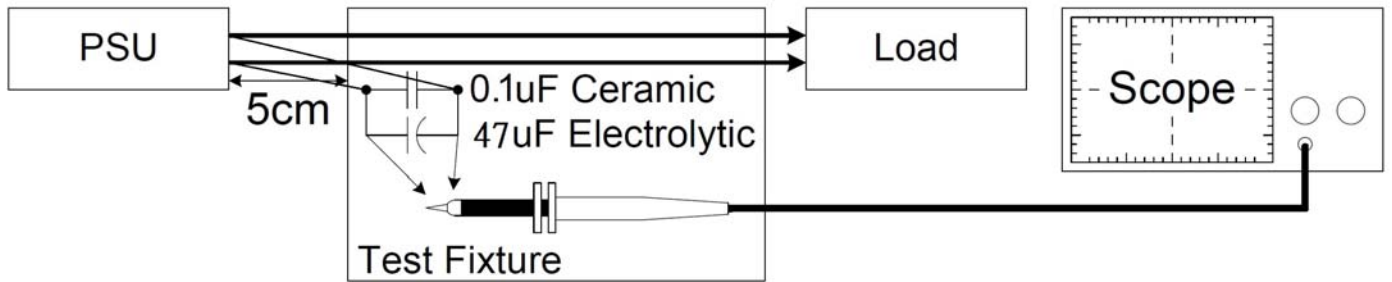
$$\text{※}Eff_{(av)} = \frac{E_1 + E_2 + E_3 + E_4}{4}$$

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

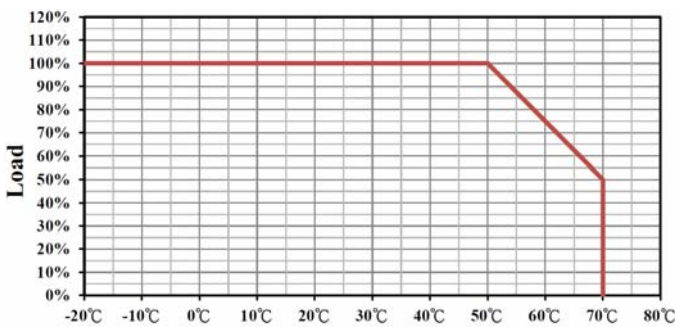
3. Output :

3.1 DC output	Voltage	+13.8 V ± 5 %
	Current	4.71 A max.
	Regulation	13.11 V min. ~ 13.8 V typ. ~ 14.49 V max.
	Ripple & Noise	130 mV _{p-p} max.
	Total power	64.998 W max.

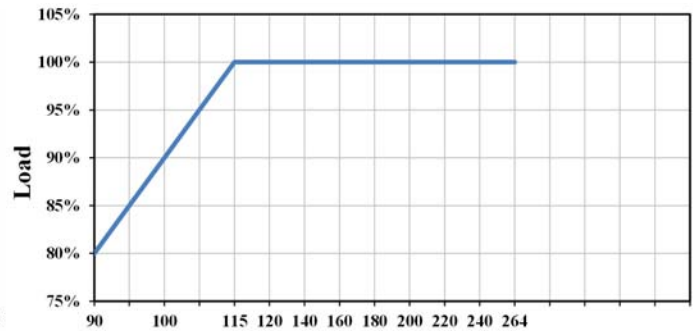
Remark : For ripple & noise measurement , use a 20 MHz bandwidth frequency oscilloscope , and add a 0.1 μF multilayer cap. and a low ESR electrolytic cap. (47 μF) at output connector terminals. (at nominal line voltage , full load)



Ripple & Noise measurement circuit



Power De-rating curve



Derating Curve VS. Input Voltage

4. Protection :

4.1 Over Voltage Protection (OVP)	25 V max.
4.2 Short Circuit Protection (SCP)	Automatic recovery after short-circuit fault being removed
4.3 Over Current Protection(OCP)	9.42 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	3000Vac (RMS) for 1 minute
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5.2. Insulation resistance :

(1)	Primary to secondary	10 MΩ for 500Vdc
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5.3. Leakage current : Less than 0.5 mA (RMS) or 0.707 mA (Peak)



6. Operation and environment performance :

6.1 Temperature range

Operating	-20 °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

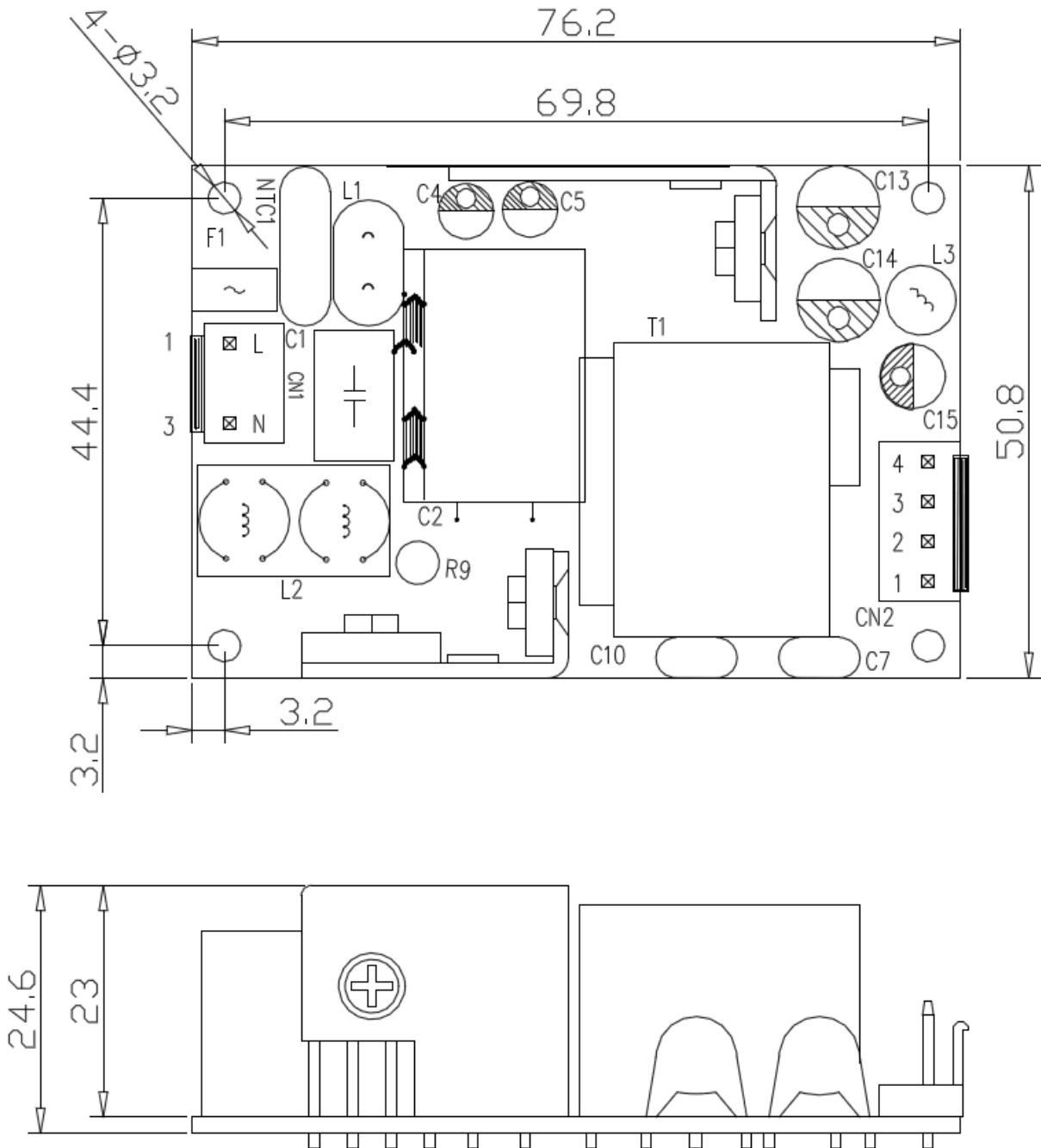
7. M.T.B.F. : 300,000 Hrs. (calculated hours at 25 °C , by Telcordia SR-332)

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 :





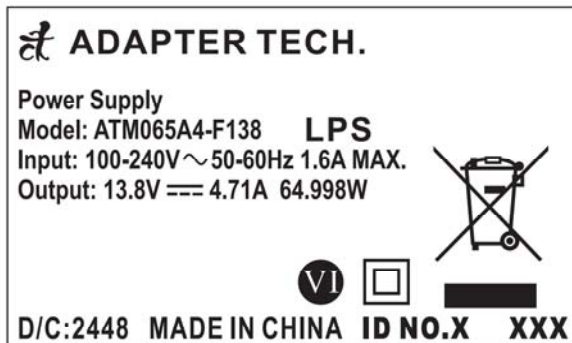
10. Label :

- 10.1 Label materials : PET
- 10.2 Color : Silver Background with Black Printing
- 10.3 Label dimension : 25.0 (L) * 15.0 (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.



A. Line regulation test

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
90 Vac / 50 % Load	13.11 V ~ 14.49 V	13.93 V	13.93 V	13.93 V
115 Vac / 50 % Load	13.11 V ~ 14.49 V	13.93 V	13.93 V	13.93 V
132 Vac / 50 % Load	13.11 V ~ 14.49 V	13.93 V	13.93 V	13.93 V
180 Vac / 50 % Load	13.11 V ~ 14.49 V	13.93 V	13.93 V	13.93 V
230 Vac / 50 % Load	13.11 V ~ 14.49 V	13.93 V	13.93 V	13.93 V
264 Vac / 50 % Load	13.11 V ~ 14.49 V	13.93 V	13.93 V	13.93 V

B. Efficiency test

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac DOE Level VI	88 % Min.	90.527 %	90.254 %	90.139 %
230 Vac COC Tier 2	89 % Min.	91.291 %	90.887 %	90.922 %
230 Vac COC Tier 2 (10 % Load)	79 % Min.	88.024 %	88.033 %	87.852 %

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

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	13.11 V ~ 14.49 V	13.94 V	13.94 V	13.94 V
115 Vac / 50 % Load	13.11 V ~ 14.49 V	13.93 V	13.93 V	13.93 V
115 Vac / 100 % Load	13.11 V ~ 14.49 V	13.92 V	13.92 V	13.92 V
230 Vac / 0 % Load	13.11 V ~ 14.49 V	13.94 V	13.94 V	13.94 V
230 Vac / 50 % Load	13.11 V ~ 14.49 V	13.93 V	13.93 V	13.93 V
230 Vac / 100 % Load	13.11 V ~ 14.49 V	13.92 V	13.92 V	13.92 V



D. Ripple & Noise test

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100 % Load	130 mV _{p-p} max.	46.3 mV _{p-p}	42.3 mV _{p-p}	40.3 mV _{p-p}
230 Vac / 100 % Load	130 mV _{p-p} max.	49.7 mV _{p-p}	45.7 mV _{p-p}	43.7 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	60.6 A	59.5 A

F. Over voltage protection

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac / 100 % Load	25 V max.	18.5 V	18.2 V	18.3 V
230 Vac / 100 % Load	25 V max.	18.3 V	18.4 V	18.5 V

G. Over current protection

Test result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115 Vac	9.42 A max.	7.20 A	7.18 A	7.15 A
230 Vac	9.42 A max.	6.86 A	6.95 A	6.93 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	0.052 W	0.050 W	0.051 W
230 Vac / 0 % Load	≤ 0.15 W	0.088 W	0.089 W	0.087 W



Efficiency Test Report

A.	Model Number	: ATM065A4-F138	13.8V	4.71A	65.00W
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	Reported Quantity					
	100%* I ₀	75%* I ₀	50%* I ₀	25%* I ₀	10%* I ₀	0%* I ₀
Rms Output Current(mA)	4710mA	3533mA	2355mA	1178mA	471mA	0mA
Rms Output Voltage(V)	13.920V	13.930V	13.930V	13.940V	13.940V	13.940V
Active Output Power(W)	65.56W	49.21W	32.81W	16.41W	6.57W	0.00W
Rms Input Voltage(V)	115V	115V	115V	115V	115V	115V
Rms Input Current(A)	1.127A	0.878A	0.622A	0.338A	0.157A	0.021A
Rms Input Power(W)	73.300W	54.360W	36.070W	18.000W	7.314W	0.052W
True Power Factor (PF)	0.568	0.541	0.506	0.464	0.406	0.021
Total Harmonic Distortion of the input current	142.7A%	155.8A%	178.4A%	220.3A%	255.4A%	281.0A%
Power Consumed by UUT(W)	7.737W	5.152W	3.265W	1.586W	0.748W	0.052W
Active Efficiency	89.445%	90.522%	90.949%	91.191%	89.769%	*
Average Efficiency	90.527%				89.769%	*

G. AC Input Voltage : 230Vac/50Hz

Load Conditions	Reported Quantity					
	100%* I ₀	75%* I ₀	50%* I ₀	25%* I ₀	10%* I ₀	0%* I ₀
Rms Output Current(mA)	4710mA	3533mA	2355mA	1178mA	471mA	0mA
Rms Output Voltage(V)	13.920V	13.920V	13.930V	13.930V	13.940V	13.940V
Active Output Power(W)	65.56W	49.17W	32.81W	16.40W	6.57W	0.00W
Rms Input Voltage(V)	230V	230V	230V	230V	230V	230V
Rms Input Current(A)	0.730A	0.571A	0.392A	0.202A	0.096A	0.035A
Rms Input Power(W)	71.870W	53.810W	35.820W	18.030W	7.459W	0.088W
True Power Factor (PF)	0.427	0.410	0.398	0.387	0.337	0.014
Total Harmonic Distortion of the input current	226.5A%	247.5A%	269.6A%	318.5A%	336.3A%	166.7A%
Power Consumed by UUT(W)	6.307W	4.638W	3.015W	1.627W	0.893W	0.088W
Active Efficiency	91.225%	91.382%	91.583%	90.974%	88.024%	*
Average Efficiency	91.291%				88.024%	*

Tester : Jett