120W

Switching Power Adapter

SPECIFICATION

Description	:	**24Volts / 5Amps**
Part No.	:	**AD-AT24050**
Version	:	**2.0**
Date	:	**14 - Apr-2010**

1. Feature：

- ♦ Input ： Universal 100 ~ 240 Vac / 47 ~ 63 Hz Input, without any slide switch.
- ♦ Output ： +24V / 0 ~ 5A
- ♦ Case Dimension ： 168.1(L) * 65.9(W) * 39(H) mm
- ♦ Efficiency ： Eff (av) ≧ 87%
- ♦ Safety ： CUL / UL / GS / PSE / BSMI / CCC / RCM
- ♦ EMI ： CE / FCC Class B ； Conduction & Radiation Met.
- ◆ Protection ： OVP (Over Voltage Protection)、SCP (Short Circuit Protection)、OCP (Over Current Protection)、OTP (Over Temperature Protection)
- ◆ High frequency design，less power consumption.
- ◆ Suitable for usage at Telecommunication, Computer, Industrial Controller, & OA System.
- ◆ Meet Energy Star V / Erp (Stage 2) / MEPS V .

2. Input：

2.1 Voltage	Universal 100 ~ 240Vac, single phase
2.2 Frequency	47 ~ 63 Hz
2.3 Current	1.6A Max.
2.4 Inrush Current	60A Max. / 240Vac (Cold start at 25 ºC，full load)
2.5 Efficiency	Eff (av) ≧ 87% (At 115 Vac & 230 Vac)
2.6 Power Consumption	Pi ≦ 0. 5 W (At 240Vac & No load)
2.7 Power Factor (PF)	Pi ≧ 0. 9 (At Full load)

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

E1=efficiency with 25% rated load ; E2= efficiency with 50% rated load

E3=efficiency with 75% rated load ; E4= efficiency with 100% rated load

3. Output：

3.1 DC Output	Voltage	+24.00V ± 5%
	Current	5A Max.
	Regulation	22.8Vmin. ~ 24.0Vtyp. ~ 25.2Vmax.
	Ripple & Noise	120mV Max.
	Total Power	120W Max.

Remark : For ripple & noise measurement, use a 20MHz bandwidth frequency oscilloscope, and add a 0.1μF multilayer Cap. and a Low ESR Electrolytic Cap. (10 μF) at output connector terminals. (At nominal line voltage, full load)

4. Protection :

4.1 Over Voltage Protection (OVP)	V out * (110%~150%)
4.2 Short Circuit Protection (SCP)	Automatic recovery after short-circuit fault being removed
4.3 Over Current Protection(OCP)	I out * (110%~150%)

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 latch.

5. Safety、EMI and EMC Requirement：

5.1 Safety Requirement

a. Safety ： CUL / UL / GS / PSE / BSMI / CCC / RCM

b. Dielectric Strength ： Cut off current 10mA

(1)	Primary to Secondary	1800Vac for 1 Minute

c. Insulation Resistance ：

(1)	Primary to Secondary	10 M ohm for 500Vdc

5.2 EMI Requirement ： CE / FCC Class B ； Conduction & Radiation Met.

5.3 Leakage Current ： Less than 3.5mA

5.4 Grounding Test ： Resistance 0.1ohm Max. @ 25A

6. Operation and Environment Performance：

6.1 Temperature Range

Operating	+ 0ºC ~ + 40ºC
Storage	- 20 ºC ~ + 80 ºC

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.：50,000 hours min. (at 25℃, by MIL-HDBK-217F)

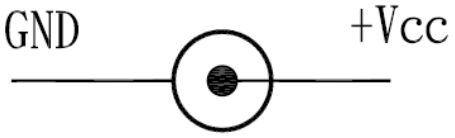
8. Mechanical :

8.1 Weight : 580g Typical

8.2 Cable Type : Black UL1185 AWG16

(Wire + Plug)

Plug : ϕ5.5* ϕ2.5*9.5mm



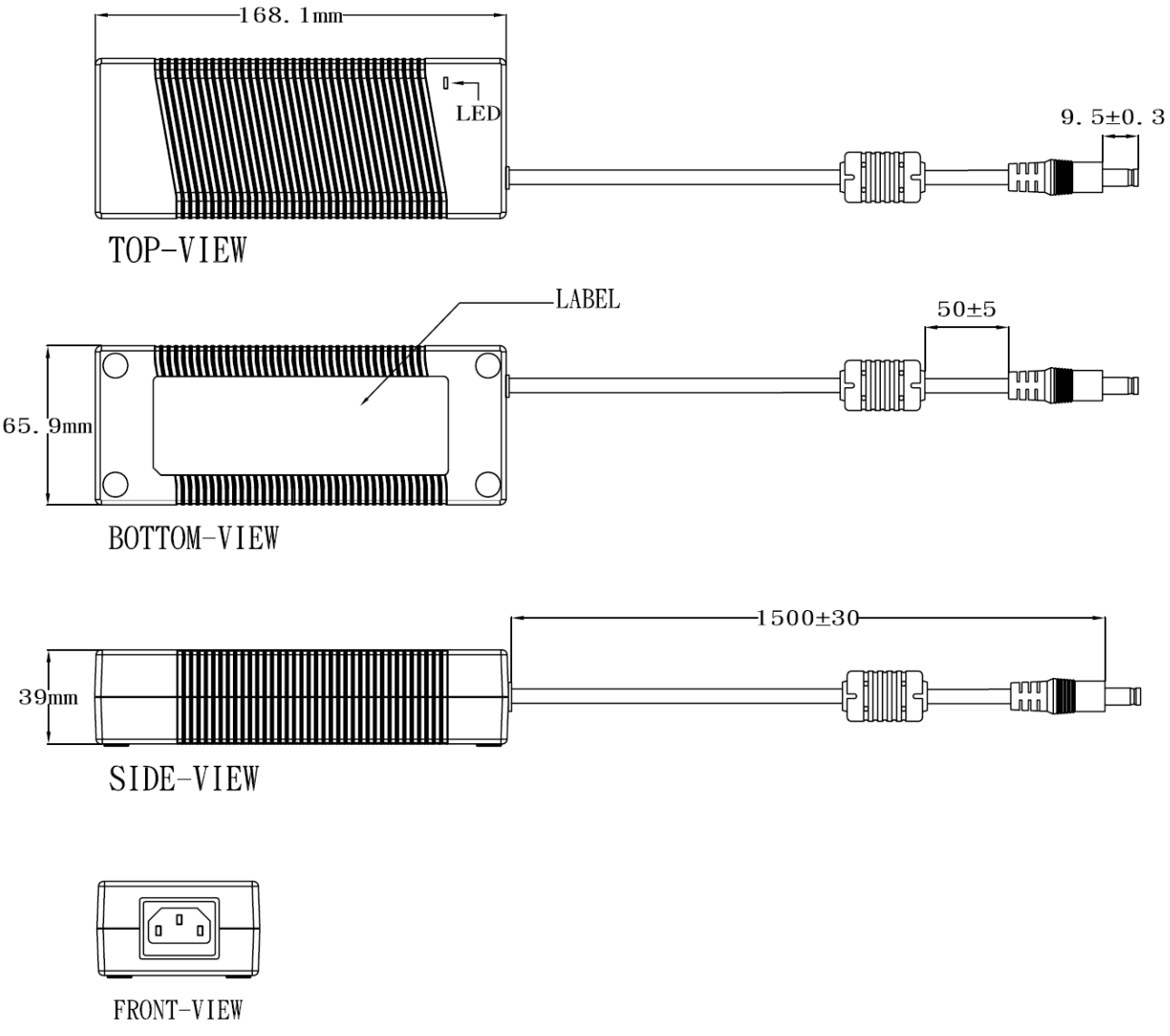
Output Cable Plug Pin Assignment

8.3 Cable Length : 1500mm

8.4 Case Dimension : 168.1mm(L) * 65.9mm(W) * 39mm(H)

8.5 Material Flammability : UL 94V-0

8.6 External Appearance : As drawing below (Scale → mm)



A. Line Regulation Test

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
90Vac / 50 % Load	22.8 V ~ 25.2V	24.034V	24.145V	24.256V
115Vac / 50 % Load	22.8 V ~ 25.2V	24.034V	24.145V	24.256V
132Vac / 50 % Load	22.8 V ~ 25.2V	24.035V	24.145V	24.256V
180Vac / 50 % Load	22.8 V ~ 25.2V	24.044V	24.153V	24.261V
230Vac / 50 % Load	22.8 V ~ 25.2V	24.044V	24.153V	24.261V
264Vac / 50 % Load	22.8 V ~ 25.2V	24.044V	24.153V	24.261V

B. Efficiency Test

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115Vac	87 % Min.	89.69%	89.14%	89.31%
230Vac	87 % Min.	89.14%	88.48%	88.61%

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

E1=efficiency with 25% rated load ; E2= efficiency with 50% rated load

E3=efficiency with 75% rated load ; E4= efficiency with 100% rated load

C. Load Regulation Test

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115Vac / 0 % Load	22.8 V ~ 25.2V	24.282V	24.427V	24.530V
115Vac / 50 % Load	22.8 V ~ 25.2V	24.032V	24.141V	24.255V
115Vac / 100 % Load	22.8 V ~ 25.2V	23.773V	23.858V	23.989V
230Vac / 0 % Load	22.8 V ~ 25.2V	24.282V	24.427V	24.530V
230Vac / 50 % Load	22.8 V ~ 25.2V	24.042V	24.151V	24.260V
230Vac / 100 % Load	22.8 V ~ 25.2V	23.780V	23.869V	23.993V

D. Ripple & Noise Test

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115Vac / 100 % Load	120mV Max.	62.5mV	70.3mV	59.4mV
230Vac / 100 % Load	120mV Max.	57.8mV	67.2mV	56.2mV

E. Inrush Current

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
230Vac / 100 % Load	60A Max.	58.6A	57.5A	57.1A

F. Over Voltage Protection

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115Vac / 100 % Load	Vout*(110%~150%)	119%	116%	117%
230Vac / 100 % Load	Vout*(110%~150%)	119%	116%	116%

G. Over Current Protection

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115Vac / 100 % Load	Iout*(110%~150%)	123%	125%	124%
230Vac / 100 % Load	Iout*(110%~150%)	123%	125%	124%

H. Short Circuit Protection

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115Vac / 100 % Load	Auto Recovery	OK	OK	OK
230Vac / 100 % Load	Auto Recovery	OK	OK	OK

I. Input Power Consumption(No Load)

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
230Vac / 0 % Load	≦ 0.5 W	0.320W	0.322W	0.312W

J. Power Factor

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115Vac / 100 % Load	≧ 0.9	0.989	0.992	0.992
230Vac / 100 % Load	≧ 0.9	0.949	0.949	0.948

Efficiency Test Report

A. Model Number: AD-AT24050 (24V/ 5A)

B. DC Power Cord: UL1185, 16AWG, 1.5M

C. Average Efficiency

Energy Star V	87% min.
Erp (Stage 2)	87% min.
MEPS V	87% min.

D. NO Load Power Consumption

Energy Star V	0.5 W max.
Erp (Stage 2)	0.5 W max.
MEPS V	0.5W max.

E. Testing Equipment

1.AC Power Source	"APE"	APW-110N
2. Electronic Load	"PRODIGIT"	3356
3. Power Meter	"YOKOGAWA"	WT210
4. 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	0%* I_0
Rms Output Current (mA)	5000mA	3750mA	2500mA	1250mA	0mA
Rms Output Voltage(V)	23.767V	23.898V	24.029V	24.155V	24.283V
Active Output Power(W)	118.84 W	89.62W	60.07 W	30.19 W	0.00W
Rms Input Voltage(V)	115V	115V	115V	115V	115V
Rms Input Current(A)	1.177A	0.878A	0.592A	0.313A	0.020A
Rms Input Power(W)	133.90 W	99.50W	66.15 W	33.88 W	0.11W
Voltage T.H.D.(%)	0.11	0.10	0.09	0.09	0.08
True Power Factor	0.989	0.985	0.972	0.941	0.045
Power Consumed by UUT(W)	15.07 W	9.88 W	6.08 W	3.69W	0.11W
Efficiency	88.75%	90.07%	90.81%	89.12%	*
Average Efficiency	89.69%				*

G. AC Input Voltage: 230Vac/50Hz

Load Conditions / Reported Quantity	100%* I_0	75%* I_0	50%* I_0	25%* I_0	0%* I_0
Rms Output Current(mA)	5000mA	3750mA	2500mA	1250mA	0mA
Rms Output Voltage(V)	23.778V	23.909V	24.042V	24.167V	24.283V
Active Output Power(W)	118.89 W	89.66W	60.11W	30.21W	0.00W
Rms Input Voltage(V)	230V	230V	230V	230V	230V
Rms Input Current(A)	0.604A	0.463A	0.324A	0.180A	0.032A
Rms Input Power(W)	131.89 W	98.98W	67.06 W	35.05W	0.32W
Voltage T.H.D (%)	0.12	0.13	0.13	0.11	0.09
True Power Factor	0.949	0.929	0.901	0.847	0.044
Power Consumed by UUT(W)	13.00W	9.32W	6.95W	4.84W	0.32W
Efficiency	90.14%	90.58%	89.63%	86.19%	*
Average Efficiency	89.14%				*