

1. INTRODUCTION

The "ZM460-APS" is a Power Supply designed to be used "ATX/ATX12V" form factor personal computers.

1.1 SCOPE

The scope of this document is limited to the requirements of "ATX/ATX12V" PC form factor switching Power Supply. Especially, It is applied to the line input capability, remote ON/OFF, cooling, standby voltage("VSB") and electrical characteristics.

Form-factor		ATX/ATX12V		
POWER		520. Watt max peak 460. Watt max Continuous		
Efficiency		≥75% at Full load		
Output voltage	Regulation	Min load(Amps)	Max load(Amps)	Peak current(Amps)
+12V1DC	±5%	1	16	19
+12V2DC	±5%	1	18	22
+5VDC	±5%	0.5A	28.0A	
+3.3VDC	±5%	0.3A	30.0A	
-12VDC	±5%	0A	0.8A	
+5VSB	±5%	0A	2A	2.5A

2. ELECTRICAL SPECIFICATION

2.1 AC INPUT LINE REQUIREMENTS

Parameter	MIN	NOM	MAX	UNIT
Vin(115VAC)	90	115	135	VACrms
Vin(230VAC)	180	230	265	VACrms
Vin FREQUENCY	47	-	63	Hz
Vin(115VAC)			10	A
Vin(230VAC)			5	A

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2.1.1 INRUSH CURRENT

Max. inrush current shall not exceed as 115V 70A-peak and 230V 100A-peak.

2.2 DC OUTPUT REQUIREMENTS

2.2.1 OUTPUT REQUIREMENTS

TEST POINT : OUTPUT CONNECTOR LOAD TERMINALS.

Parameter	Range	MIN	NOM	MAX	UNIT
+12V1DC	±5%	+11.4	+12.00	+12.6	Volts
+12V2DC	±5%	+11.4	+12.00	+12.6	Volts
+5VDC	±5%	+4.75	+5.00	+5.25	Volts
+3.3VDC	±5%	+3.14	+3.30	+3.47	Volts
-12VDC	±10%	-10.80	-12.00	-13.20	Volts
+5VSB	±5%	+4.75	+5.00	+5.25	Volts

2.2.2 DC output CURRENT

- 1) Maximum continuous total DC output power shall not exceed 460Watts.
- 2) Maximum +5V and +3.3V output power shall not exceed **180Watts**.
- 3) Maximum Peak Total DC output power shall not exceed 520Watts.
- 4) Maximum combined current for 12V outputs shall be 30A.
- 4) Maximum combined peak current for 12V outputs shall be 36A.
- 5) Output voltage of +5VSB shall be maintained within the power shut down.

Range	Parameter	MIN	NOM	MAX	PEAK	UNIT
Range 1 (high Load)	+12V1DC	1.0	-	13		Amps
	+12V2DC	1.0		16		"
	+5VDC	0.5	-	11	-	"
	+3.3VDC	0.3	-	13	-	"
	-12VDC	0.0	-	0.7	-	"
	+5VSB	0.0	-	1.0	-	"
Range 2 (normal Load)	+12V1DC	1.0	-	10		Amps
	+12V2DC	1.0	-	10		"
	+5VDC	0.5	-	3.0		"
	+3.3VDC	0.3	-	5.0		"
	-12VDC	0.0	-	0.3	-	"
	+5VSB	0.0	-	1.0	-	"

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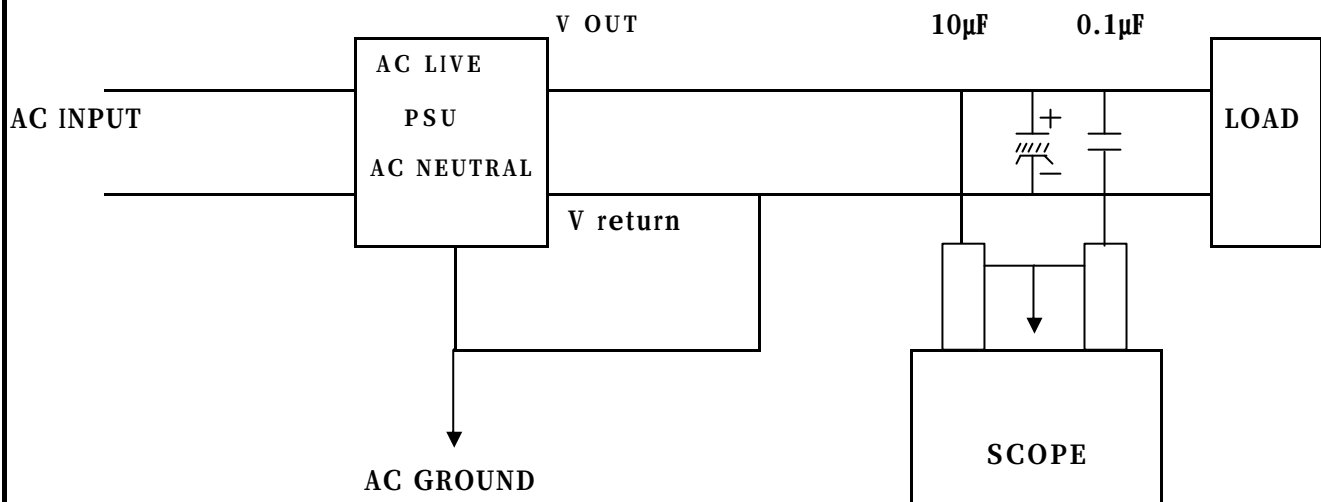
2.2.3 EFFICIENCY

1) The power supply at full load provide AC/DC conversion efficiency **75%** minimum.

2.2.4 OUTPUT RIPPLE/NOISE

. The measurements should be made by crossing a 10 μ F electrolytic capacitor and a 0.1 μ F Ceramic capacitors at each output with measuring band width from DC to 20MHz.

Parameter	Range	MIN	NOR	MAX	UNIT
+12V1DC	$\pm 1.0\%$	-		120	mVp-p
+12V2DC	$\pm 1.0\%$	-		120	"
+5VDC	$\pm 1.0\%$	-		50	"
+3.3VDC	$\pm 1.0\%$	-		50	"
-12VDC	$\pm 1.0\%$	-		120	"
+5VSB	$\pm 1.0\%$	-		50	"

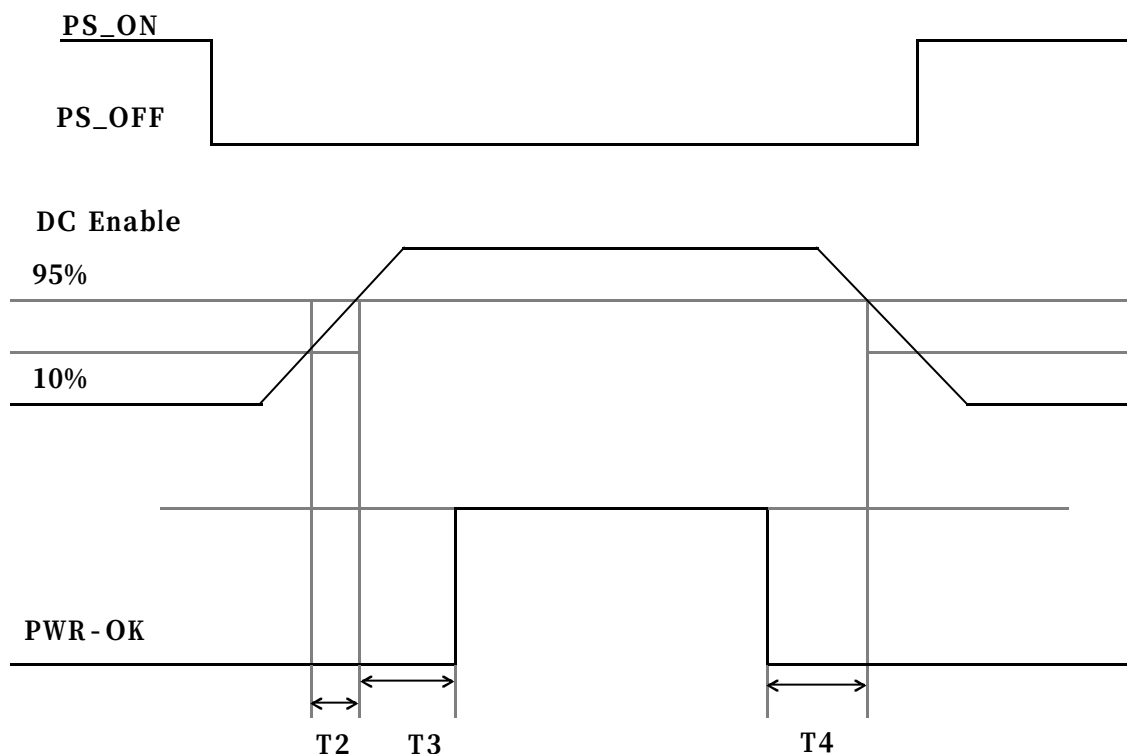


2.2.5 OUTPUT TRANSIENT RESPONSE & OVERSHOOT AT TURN ON/OFF

. Load Slew Rate : 0.2A/ μ s

Parameter	+12V1DC	+12V2DC	+5VDC	+3.3VDC	-12VDC	+5VSB
MAX step	40%	60%	30%	30%	0.1A	0.5A
Voltage range	$\pm 3\%$	$\pm 3\%$	$\pm 3\%$	$\pm 3\%$	$\pm 3\%$	-
Shoot range	$\pm 10\%$	$\pm 10\%$	$\pm 10\%$	$\pm 10\%$	$\pm 10\%$	-

2.3 TIMING / HOUSE KEEPING



* PW-OK sense level : 95% of nominal

2.3.1 REMOTE ON/OFF CONTROL

The power supply DC outputs (with the exception of +5VSB) shall be enabled with an active-low, TTL-compatible signal("PS-ON"). The +5VSB is on whenever the AC power is present.

- . 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. Turn ON/OFF delay $\geq 1\text{sec}$

2.3.2 POWER UP DELAY

The output voltages shall rise from $10\% \leq T2 \leq 90\%$ of nominal to within the regulation ranges specified in sec 2.2.1 within $0.1 \leq T2 \leq 20\text{ms}$

2.3.3 POWER GOOD SIGNAL, POK

- . Signal Type : Open Collector +5VDC, TTL compatible.
- . Logic level Low : <0.4V 4mA
- . Logic level High :Between 2.4VDC and 5VDC output while sourcing current, 200µA
- . POK Delay : $100\text{ms} \leq T_3 \leq 500\text{ms}$
- . Power Down Warning : $T_4 \geq 1\text{ms}$

2.3.4 VOLTAGE HOLD-UP TIME

The power supply shall maintain output regulation per section 2.2.1 despite a loss of input power at the low-end nominal range at maximum continuous output load as specified in section 1.1 for a minimum 16ms.

2.4 OUTPUT PROTECTION

2.4.1. OVER VOLTAGE PROTECTION

Parameter	Min	Nom	Max	Unit
+5VDC	5.74	6.3	7.0	V
+12VDC	13.4	15	15.6V	V
+3.3VDC	3.76	4.2	4.3	V

*Change latch mode at above voltage in power supply unit.

2.4.2. SHORT CIRCUIT PROTECTION

- . Shutdown or latch at short +3.3, +5V and +12V.
- . No damage in compenents, PCB trace connector at continous shout.
- . The maximum short circuit current shall not exceed 240VA.

2.4.3. OVER POWER PROTECTION

- . +5V : 30A~ Test Condition : Output Full Load
- . +3.3V : 32A~
- . +12V1 : 21A~ at 12V1 at no load
- . +12V2 : 23A~ at 12V2 at no load

2.4.4 DC INPUT PROTECTION

- . Use proper fuse for DC input over current protection.

2.4.5. BURN-IN

Primary lot is output full load at 55°C 24HR

2.4.6. MEAN TIME BETWEEN FAILURES

- . Operating Time 50,000HR at 25°C.

2.4.7. This power supply shall comply with the followings.

- . UL1950
- . CSA C22.2 NO220 & CSA Bulletin 1402C, Level3
- . VDE 0806, EN60950 A3
- . IEC950

2.4.8. EMI

- . FCC Part 15 Sub Part J, Class B
- . VDE 0871/6.78 Class B

2.4.9. POWER SWITCH On/Off TEST

Control Signal	Output Status
Logic " Low"	On
Logic " High"	Off

2.4.10. INSULATION VOLTAGE WITHSTAND

- . Primary to Secondary : 500VDC 100MΩ
- . Primary to FG : 500VDC 100MΩ

2.4.11. LEAKAGE CURRENT(IEC950)

- . The Maximum Leakage Current Following The Frame / AC Sine Conductor
Shall be 1.0mA Maximum at 220VAC Input

2.4.12. DIELECTRIC STRENGTH

- . Between Input and Output : 1500VAC 10mA 1min or 1800VAC 10mA 3sec**
- . Between Input and FG : 1500VAC 10mA 1min or 1800VAC 10mA 3sec**

2.4.13. TEMPRATURE RANGE

- . Operating : 5°C ~ 25°C**
- . Storage : -20°C ~ 85°C**

2.4.14. HUMIDITY RANGE

- . Operating : 20% ~ 80%**
- . Storage : 10% ~ 95%**

2.4.15. VIBRATION TEST

- . Non Operation : Sweep Test**
- . Frequency : 5 ⇒ 20 ⇒ 500 ⇒ 5Hz**
- . Acceleration :0.02G**
- . Airection : X, Y, Z**
- . Period : 6 Minutes**
- . Cycie : 10**

2.4.16. ACOUSTIC NOISE

- . The power Supply Must not generate Acoustic Noise in excess of 38dB at a Distance of 1 Meter from any Point on The requirments Surface.**

2.4.18. AC LINE NOISE

- . The Power Supply Shall Operate Normally When AC Line Noise is Applied**
- . Noise Crest Value : 1000VAC**
- . Polarity : +, -**
- . Pulse Width : 1μs**
- . Phase : 0 - 360 °**
- . Mode : Common, Normal**
- . Time : 3Minutes**

2.5. DC CONNECTOR REQUIREMENTS

2.5.1 BASE BOARD CONNECTOR

·Connector : MOLEX 39-01-2240 or equivalent

·Contacts : Molex #5556 or equivalent

Pin	Signal	Pin	Pin	Signal	Wire Color
1	+3.3VDC	Orange	13	+3.3VDC	Orange
				sense	Brown
2	+3.3VDC	Orange	14	-12VDC	Blue
3	COM	Black	15	COM	Black
4	+5VDC	Red	16	PS - ON	Green
5	COM	Black	17	COM	Black
6	+5VDC	Red	18	COM	Black
7	COM	Black	19	COM	Black
8	POK	Gray	20		N.C
9	+5VSB	Violet	21	+5VDC	Red
10	+12VDC	Yellow	22	+5VDC	Red
11	+12VDC	Yellow	23	+5VDC	Red
12	+3.3VDC	Orange	24	COM	Black

. 18AWG is suggested for all wire except for the 3.3V sense return wire, pin 13 (22AWG) For 300W configurations, 16AWG is recommended all 12VDC, +5VDC, +3.3VDC, and COM

2.5.2 Serial ATA Power Connector

Wire	Signal	Wire Color
5	+3.3VDC	Orange
4	COM	Black
3	+5VDC	Red
2	COM	Black
1	+12VDC	Yellow

·MOLEX Housing #675820000

·MOLEX Terminal #675810000

2.5.3. PERIPHERAL CONNECTORS

. Connector : AMP 1-480424-0 or Molex 8981-04P or equivalent.

. Contacts : AMP 61314-1 terminals or equivalent.

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Pin	Signal	Wire Color
11-1	+12VDC	Yellow
23-2	COM	Black
24-3	COM	Black
12-4	+5VDC	Red

2.5.4 Floppy Drive Connector

•Connector : AMP 171822-4 or equivalent.

Pin	Signal	Wire Color
1	+5VDC	Red
2	COM	Black
3	COM	Black
4	+12VDC	Yellow

2.5.5 +12V Power Connector

•Connector : Molex 39-01-2040 or equivalent.

•Contacts : Molex 44476-11111 or equivalent.

Pin	Signal	Wire Color
1	COM	Black
2	COM	Black
3	+12VDC	Yellow
4	+12VDC	Yellow

2.5.5 PCI Express High-End Graphics Power Cards Connectors

•Connector : Molex 45559-0002 or equivalent.

•Contacts : Molex #5556 or equivalent.

Wire	Signal	18AWG Wire
5	+3.3VDC	Orange
4	COM	Black
3	+5VDC	Red
2	COM	Black
1	+12VDC	Yellow

3. MECHANICAL

3.1. PHYSICAL DIMENSION

Dimension : 156 * 146 * 86 mm

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