

## Model: BPA-350W Series Single Output 350W

### PRODUCT OVERVIEW

The **BPA-350 Series** is a highly reliable and efficient power supply. It's capable of delivering 200W convection-cooled and up to 350W with force air cooling with a 10CFM Fan. It offers a variety of single voltages output ranging from 12V to 56V with full range input 90-264VAC. The BPA-350 Series also minimizes no load power, reducing running cost.



### Special Features

- 200W Convection-cooled / 350W Forced-cooled Rating/ 450W Max Power
- High Peak Output Power under 200ms(600W)
- High efficiency up to 94%
- Compact footprint of 2.5"x 4.5" & Low profile 1.25" (Open Frame)
- Less than 0.3 W No Load Input Power
- 12V Fan Output
- Active Power Factor Correction
- ITE & Medical Compliant
- Fully secure(OTP, OVP, OCP, SCP)
- Three Year Warranty
- **Custom Modifications Available**

### Safety( To be submitted)

- UL62368-1
- CB Report IEC62368-1
- TUV/EN EN62368-1
- CE

### Applications

- Printers
- Instrumentation
- Lighting
- Industrial Applications
- Applied Computing
- Robotics
- Wireless Communications
- Renewable Energy
- Test and Measurement
- (Medical Applications)

### Models and Ratings

Output Power	Output Voltage	Output Current				Efficiency	Model Number
		Convection-cooled	Forced-cooled	Max Load*	Peak Load		
350V	12V	16.67A	29.16A	37.0A	50.0A	93%	BPA-350-120
350V	15V	13.33A	23.33A	30.0A	40.0A	93%	BPA-350-150
350V	24V	8.33A	14.58A	18.75A	25.0A	93.5%	BPA-350-240
350V	28V	7.14A	12.50A	16.07A	21.4A	93.5%	BPA-350-280
350V	36V	5.55A	9.72A	12.5A	16.7A	94%	BPA-350-360
350V	48V	4.17A	7.29A	9.38A	12.5A	94%	BPA-350-480
350V	56V	3.57A	6.25A	8.03A	10.7A	94%	BPA-350-560

\* Max Power represents the max power before the current limit turn –off. The power supply is protected by OTP; however we suggest limiting the max load to less than 10 s.

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# 1. Input Specifications

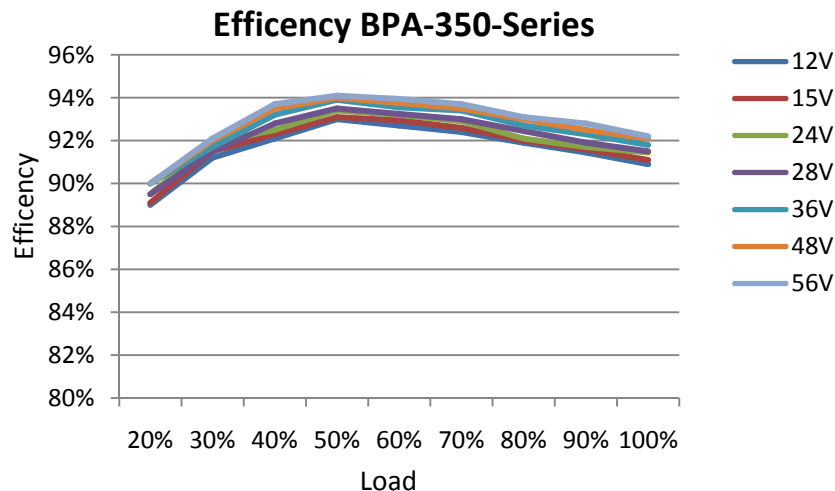
Parameter	Description/Condition	Min	Nom	Max	Units
V <sub>i nom</sub>	Nominal Input Voltage	100		240	VAC
V <sub>i</sub>	Input Voltage Ranges	Normal operating (V <sub>min</sub> to V <sub>max</sub> )		264	VAC
I <sub>i max</sub>	Max. Input Current	V <sub>in</sub> =90VAC/60HZ,Full Load		4.4	A <sub>rms</sub>
I <sub>i p</sub>	Inrush Current	264V <sub>rms</sub> ,25°C		30	A <sub>p</sub>
	Leakage Current			0.3	mA
F <sub>i</sub>	Input Frequency	47	50/60	63	Hz
PF	Power Factor	V <sub>in</sub> =230V/50Hz		0.95	W/VA
V <sub>i on</sub>	Turn-on Voltage	Ramping Up		89	VAC
V <sub>i off</sub>	Turn-off Voltage	Ramping Down		83	VAC
Power	Rated Power	V <sub>in</sub> = 90VAC-264VAC		450	W
		V <sub>in</sub> =230V@ 20% Load, T <sub>A</sub> =25°C		90	
η	Efficiency without Fan	V <sub>in</sub> =230V@ 50% Load, T <sub>A</sub> =25°C		94	%
		V <sub>in</sub> =230V@ 100% Load ,T <sub>A</sub> =25°C		92	
T <sub>hold</sub>	Hold-up Time	16			mS

**1.1 Input Fuse Fast-acting** An internal 5A input fuse, in series with the input line, protects against severe defects.

**1.2 Inrush Current** When the power supply module is connected to the main input, it exhibits a low and short peak current due to an X-capacitances initial charge. The internal bulk capacitor is charged through a controlled NTC circuit which will limit the inrush current.

**1.3 Input Under-Voltage** If the input voltage stays below the specified input voltage range for more than 10 seconds the main output will shut down. The power supply module will automatically return to normal operational condition when the input voltage returns to the specified range.

**1.4 Power Factor Correction** Power factor correction (PFC) is achieved by controlling the input current waveform synchronous with the input voltage. A fully digital controller is implemented giving outstanding PFC results over wide input voltage and load ranges.



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## 2. Output Specifications

Parameter	Description/Condition	Min	Nom	Max	Units		
<b>Main Output V<sub>1</sub></b>							
V <sub>1 nom</sub>	Nominal Output Voltage	0.5 * I <sub>nom</sub> , T <sub>amb</sub> =25°C		12	56	Vdc	
V <sub>1 set</sub>	Output Setpoint Accuracy	0.5 * I <sub>nom</sub> , T <sub>amb</sub> =25°C		-0.04	0.04	V <sub>1</sub>	
P <sub>1 nom</sub>	Nominal Output Power	V <sub>1</sub> =12 V <sub>DC</sub>			350	450	W
P <sub>pk</sub>	Peak Output Power	For less than 200 ms				600	W
I <sub>1 nom</sub>	Nominal Output Current	V <sub>1</sub> =12 V <sub>DC</sub>		0		29.2	A <sub>DC</sub>
V <sub>1 pp</sub>	Output Ripple Voltage	V <sub>1 nom</sub> , I <sub>1 nom</sub> , 20MHz BW			0.5		%V <sub>pp</sub>
dV <sub>1 Load</sub>	Load Regulation	V <sub>i</sub> =V <sub>i nom</sub> , 0 - 100% I <sub>1 nom</sub>		-1		1	%V
dV <sub>1 Line</sub>	Line Regulation	V <sub>i</sub> =V <sub>i min</sub> .....V <sub>i max</sub>		-0.2		0.2	%V
dV <sub>1 tot</sub>	Total Regulation	V <sub>i min</sub> to V <sub>i max</sub> , 0 to 100% I <sub>1 nom</sub> , T <sub>a min</sub> to T <sub>a max</sub>		-1		1	%V <sub>1</sub>
dV <sub>dyn</sub>	Dynamic Load Regulation	I <sub>out</sub> :10%--60% of full load;50--100% of full load		-2		2	%V
T <sub>rec</sub>	Recovery Time	dl <sub>1</sub> /dt =1A/μs, recovery within 1% of V <sub>1 nom</sub>			0.2	1	ms
t <sub>AC V1</sub>	Start-up Time from AC	Varies with Input Line				3	sec
tV <sub>1 rise</sub>	Rise Time	V <sub>1</sub> =10%.....90% V <sub>1 nom</sub>				100	ms
C <sub>Load</sub>	Capacitive Loading	T <sub>amb</sub> =25°C		30000			μF
MTBF	Mean Time Before Failure	MIL-HDBK-217F + 25°C GB			300		kHrs

**2.1. Fan Output** 12V/0.5A FAN1 connector is protected by a PTC resettable fuse.

**2.2. Output Voltage Ripple** Ripple and noise are measured with 0.1 μF of ceramic capacitance and 10 μF of tantalum capacitance on each of the outputs.

## 3. Protection

Parameter	Description/Condition	Min	Nom	Max	Units	
F <sub>1</sub>	Input Fuse	Not user accessible, fast acting		5	A	
V <sub>1 OV</sub>	Over Voltage Threshold V <sub>1</sub>	110		130	%Vdc	
t <sub>OV V1</sub>	Over Voltage Latch Off Time V <sub>1</sub>			1	ms	
I <sub>V1 lim</sub>	Current Limit	110		140	%A	
V <sub>1 SC Max</sub>	Short Circuit Current V <sub>1</sub>	V <sub>1</sub> < 3V		160	A	
t <sub>V1 SC off</sub>	Short Circuit Latch Off Time	Time to latch off when in short circuit		200	ms	
T <sub>SD</sub>	Over Temperature Protection	Internal temperature		115	120	°C

**3.1 Overvoltage Protection** The power supply module will shut down if the output voltage exceeds the over voltage threshold. The power supply module must be manually repowered by recycling AC Source after a 1 min wait time.

**3.2 Overload Protection** The power supply module will shut down and latch if the power supply exceeds the maximum power for more than 200 ms. The power supply module must be manually repowered by recycling AC Source after a 1 min wait time.

**3.3 Short-circuit Protection** The power supply module will shut down and latch if the power supply exceeds the maximum power for more than 200 ms. The power supply module must be manually repowered by recycling AC Source after a 1 min wait time.

**3.4 Over Temperature Protection** The power supply module will shut down if temperature exceeds the over temperature threshold (internal temperature). The power supply module must be manually repowered by recycling AC Source after a 1 min wait time.

## 4. Safety/Approval

<b>Parameter</b>	<b>Description/Condition</b>	<b>Min</b>	<b>Max</b>	<b>Units</b>
Agency Approvals	Must be submitted for approval for the latest edition of the following standards: UL/cUL 62368-1 IEC/EN 62368-1		Approved by  independent body	
Isolation Strength	Input(L/N) to case (PE)	1500	1 MOPP	VAC
	Input (L/N) to output	4000	2 MOPP	VAC
	Output to case (PE)	1500	1 MOPP	VAC

## 5. Electromagnetic Compatibility

### 5.1 Immunity

<b>Parameter</b>	<b>Description/Condition</b>	<b>Criterion</b>
Medical Device EMC	IEC60601-1-2	A
Low Voltage PSU EMC	EN61204-3	A
ESD Contact Discharge	IEC/EN61000-4-2, Level 4 ±8kV	A
ESD Air Discharge	IEC/EN61000-4-2, Level 3 ±15V	A
Radiated Electromagnetic Field	IEC/EN61000-4-3,Level 3 (3V/m)	A
Electrical Fast Transients/ Burst	IEC/EN61000-4-4,level 2 AC port ±1kV,1 minute	A
Surge	IEC/EN61000-4-5,	
	Level 2 AC port± 1kV,1 min CM,	A
	Level 3 AC port ±2kV,1 min CM	A
RF Conducted Immunity	IEC/EN 61000-4-6,Level 3	A
Magnetic Field Immunity	IEC/EN 61000-4-8,Level 4	A
Voltage Dips and Interruptions	EN55024/ EN60601-1-2	
	1.0% residual voltage, 0.5 cycle	A
	2.0% residual voltage, 1 cycle	A
	3.40% residual voltage, 5 cycles	B
	4.70% residual voltage, 0.5 cycle	A
	5.70% residual voltage, 25 cycles/50Hz	A
	6.0% residual voltage, 250 cycles/50Hz	B

## 5.2 Emission

Parameter	Description/Condition	Criterion
Conducted Emissions	EN 55022 / EN 55016-2-1 conducted	Class B
Radiated Emission	EN 55022 / EN 55016-2-1 radiated	Class A
Harmonics Emission	IEC61000-3-2, Vin =230VAC/50Hz, 100% Load	Class A
AC Flicker	IEC61000-3-3, Vin=230VAC/50Hz, 100% Load, <20Arms	Pass

## 6. Environmental Specifications

Parameter	Description/Condition	Min	Nom	Max	Units
T <sub>A</sub> Ambient Temperature	V <sub>i min</sub> to V <sub>i max</sub> , I <sub>1 nom</sub> , I <sub>SB nom</sub>	-40		70*	°C
T <sub>S</sub> Storage Temperature	Non- operational	-40		85	°C
Altitude	Operational, above Sea Level		5000		Meter
			16400		Feet
RH Humidity	Non-condensing	5		95	%
Shock and Vibration Acceleration	IPC-9592B, Class II		3		Grms

\*Derating linearly from 51 -70°C @50% load

## 7. Connectors

### 7.1 Connectors

Input (CN1) ----- Molex: 26-60-4030(3-Pin Connector)

Output (CN2) ----- Molex: 26-60-4100(10-Pin Connector) or Screw Terminal

Fan Connector (Fan1) ----- AMP: 640456-2

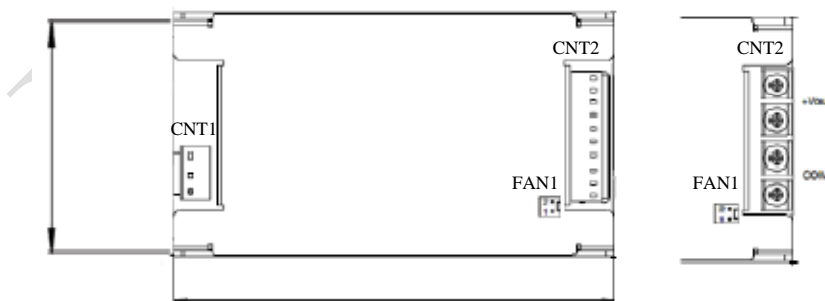
### Pin Assignments

Input Connector – CNT1 ( Molex: 26-60-4030)	
Pin 1	Line
Pin 2	Not Fitted
Pin 3	Neutral

Output Connector – CNT2 ( Molex: 26-60-4100)	
Pin 1-5	+Vout
Pin 6-10	Com

Output Connector – CNT2 ( Screw Terminal)	
Terminal 1-2	+Vout
Terminal 3-4	Com

Fan Connector – FAN1 ( AMP: 640456-2)	
Pin 1	Fan(-)
Pin 2	Fan(+)

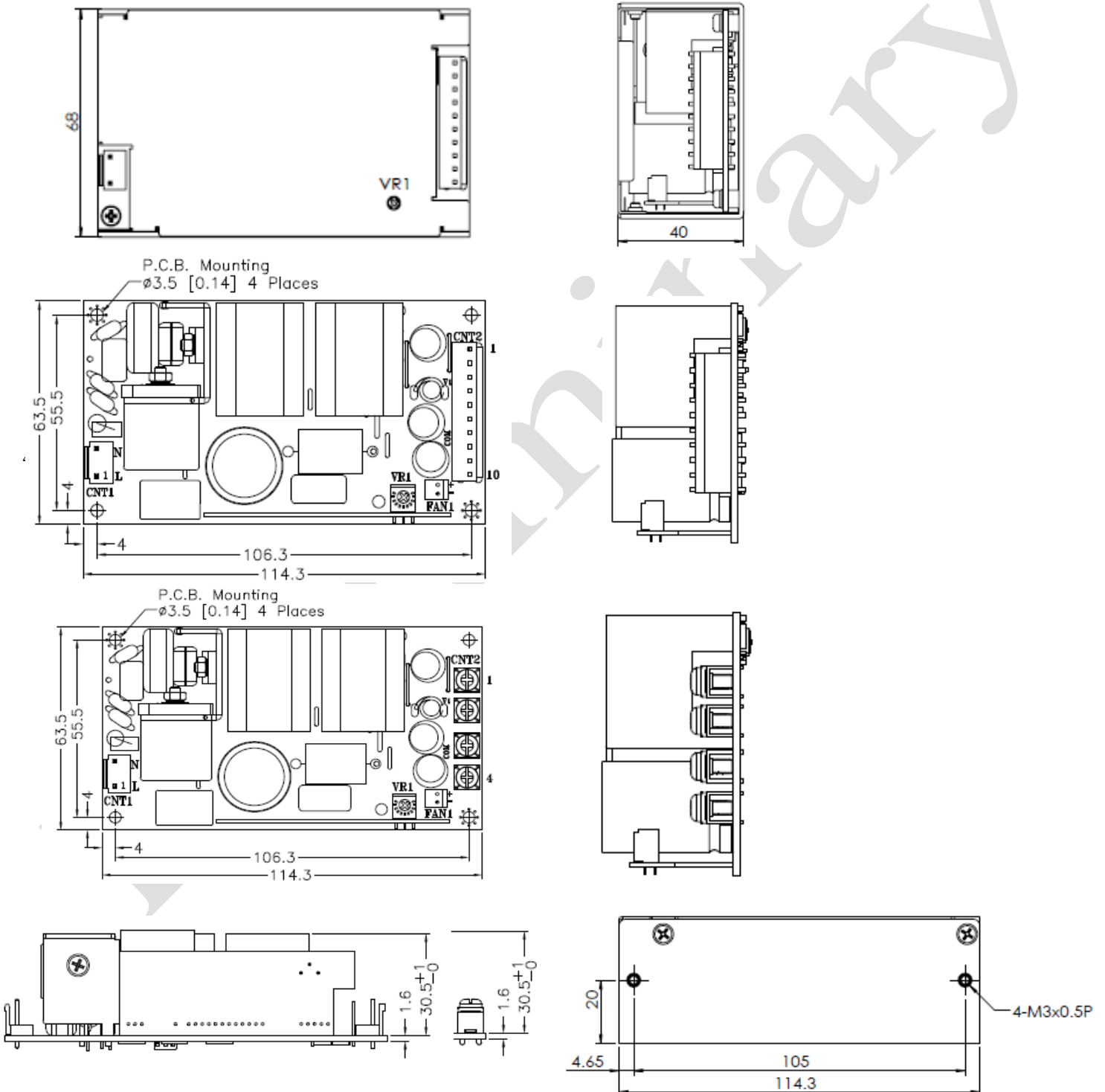


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## 8. Mechanical

Parameter	Description/Condition	Open Frame	With Chassis	Units
Dimension	Width	63.5(2.5)	68(2.67)	mm(in)
	Height	30.5(1.20)	40 (1.60)	
	Depth	114.3(4.5)	114.3(4.50)	
Weight		340(0.75)	454(1.0)	g(lbs)

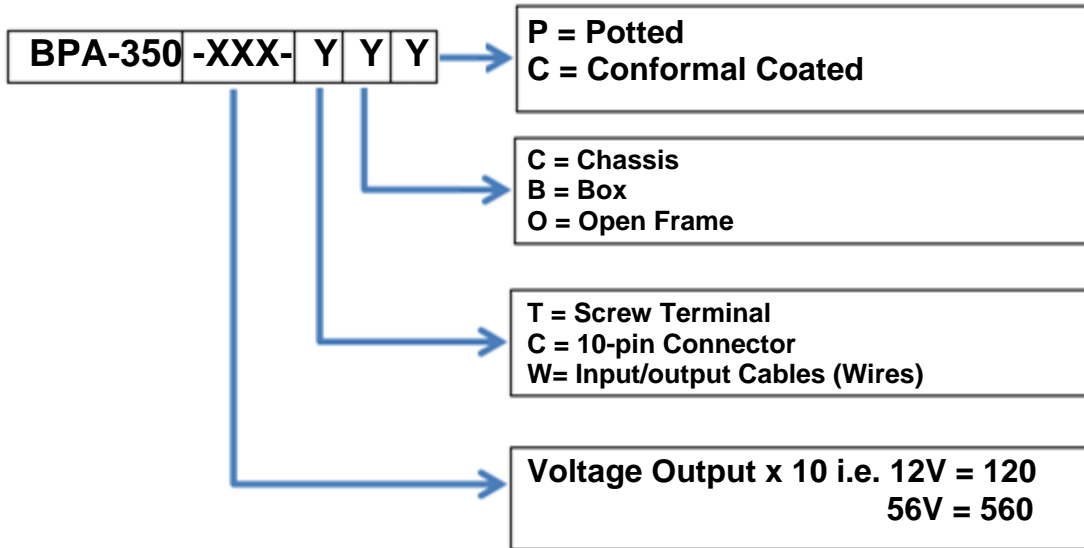


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## 9. Ordering Information

### Model number matrix for BPA-350-XXX-YYY



**Technical Revisions** – The appearance of products, including safety agency certification pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.

### Custom Modifications

#### **Contact Info:**

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