

350W AC to DC Open Frame Power Supply

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Features

- Universal 90V AC to 264V AC or 127V DC to 373V DC input voltage
- Compact size: 5" x 3" x 1"
- Accepts AC or DC input (dual-use of same terminal)
- Operating ambient temperature range: -40°C to +70°C
- Built-in active PFC function
- High I/O isolation test voltage up to 4000V AC
- Extremely low leakage current<0.1mA
- Stand-by power consumption<0.3W
- The base plate with conformal coating
- Output short circuit, over-current, over-voltage, over-temperature protection
- Installing in system of Safety Class I/II is available
- Suitable for BF application
- Safety according to IEC/EN/UL62368, IEC/EN60335, IEC/EN61558, GB4943, IEC/EN/ES60601
- Withstand 300VAC surge input for 5s
- Operating altitude up to 5000m

**RoHS
Compliant**

These series is one of open frame AC-DC switching power supply and suitable for all kinds of BF type (be accessible to patients) medical system equipment. It features universal AC input and at the same time accepts DC input voltage, cost-effective, built-in active PFC function, high efficiency and high reliability. These converters offer excellent EMC performance and meet IEC/EN/UL62368, GB4943, IEC/EN60335, IEC/EN61558, IEC/EN/ES60601 standards and they are widely used in areas of industrial, LED, street light control, electricity, security, telecommunications, smart home, medical etc.

Selection Guide

Part Number	Cool Mode	Output Power (W)	Nominal Output Voltage and Current (Vo/Io)	Output adj. Range (V)	Efficiency at 230VAC (%) Typ.	Max. Capacitive Load (μF)
MPOF350-20B12	Air cooling	180	12V/15A	11.4-12.6	92	6000
	20.5CFM	300	12V/25A			
MPOF350-20B15	Air cooling	180	15V/12A	14.25-15.75		5000
	20.5CFM	325	15V/21.67A			
MPOF350-20B24	Air cooling	199.9	24V/8.33A	22.8-25.2	93	3200
	20.5CFM	350.4	24V/14.6A			
MPOF350-20B27	Air cooling	199.8	27V/7.4A	25.65-28.35		2600
	20.5CFM	351	27V/13A			
MPOF350-20B48	Air cooling	200.1	48V/4.17A	45.6-50.4	94	2000
	20.5CFM	350.4	48V/7.3A			

Note: 1.*Under any conditions, the total power of the product should not exceed the rated power. When the output voltage is increased, the total output power cannot exceed the rated output power, when the output voltage is decreased, the output current cannot exceed the rated output current;
2.*When measuring the full load efficiency, the fan should be connected to an external power supply. Fan loss is not included in the input power.

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Input Specifications						
Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	AC input		90	--	264	VAC
	DC input		127	--	373	VDC
Input Frequency			47	--	63	Hz
Input Current	115VAC		--	--	4	A
	230VAC		--	--	2	
Inrush Current	115VAC	Cold start	--	50	--	A
	230VAC		--	75	--	
Power Factor	115VAC	Full Load	0.98	--	--	--
	230VAC		0.95	--	--	
Leakage Current	240VAC		<0.1mA; single failure<0.5mA			
Hot Plug			Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy*	Full load range	12V/15V	--	±3	--	--
		24V/27V/48V	--	±2	--	
Line Regulation	Rated load		--	±0.5	--	
Load Regulation	0% - 100% load		--	±1	--	
Output Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	12V	--	--	120	mV
		15V	--	--	120	
		24V	--	--	150	
		27V	--	--	200	
		48V	--	--	250	
Temperature Coefficient			--	±0.03	--	%/°C
Minimum Load			0	--	--	%
Hold-up Time	230VAC, full load	Air cooling	12	14	--	ms
		20.5CFM	6	8		
Stand-by Power Consumption			--	--	0.5	W
Short Circuit Protection	recover time <5s after the short circuit disappear		Constant current, continuous, self-recover			
Over-current Protection			≥110%, self-recover			
Over-voltage Protection	12V		≤15.0V (Output voltage turn off, re-power on for recover)			
	15V		≤18.5V (Output voltage turn off, re-power on for recover)			
	24V		≤30.0V (Output voltage turn off, re-power on for recover)			
	27V		≤33.5V (Output voltage turn off, re-power on for recover)			
	48V		≤59.5V (Output voltage turn off, re-power on for recover)			

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Item	Operating Conditions	Min.	Typ.	Max.	Unit
Over-temperature Protection		Output voltage turn off, re-power on for recover after the temperature drops.			
Fan power	12V/15V/24V/48V	Offer output power of 12V/0.5A with output voltage accuracy ±15%			
	27V	Offer output power of 12V/0.5A with output voltage accuracy -25% - +15%			
Note: 1. *Output voltage accuracy: including the setting error, line regulation, load regulation. 2. *The “Tip and barrel method” is used for ripple and noise test, output parallel 10uF electrolytic capacitor and 0.1uF ceramic capacitor, please refer to AC-DC Converter Application Notes for specific information. 3. *When the product works at light load (≤15% IO), in order to improve the efficiency to reach at green working mode, the value of ripple and noise will be double. 4. *For all the above test items, please refer to our company standard “AC-DC Black Box Test Specification” for specific test specifications and methods.					

General Specifications							
Item		Operating Conditions		Min.	Typ.	Max.	Unit
Isolation Test	Input - 	Electric strength test for 1min., leakage current <10mA		2000	-	--	VAC
	Input - output			4000		--	
	Output - 			1500		--	
Insulation Resistance	Input - 	Ambient temperature: 25 ± 5°C	100	--		MΩ	
	Input - output	Relative humidity: < 95%RH, no condensation	100	--			
	Output - 	Test voltage: 500V DC	100	--			
Isolation level	Input - output	2 × MOPP					
	Input - 	1 × MOPP					
	Output - 	1 × MOPP					
Operating Temperature				-40	-	+70	°C
Storage Temperature				-40		+85	
Storage Humidity		Non-condensing		10		95	%RH
Operating Humidity				20		90	
Power Derating	Operating temperature derating	+50°C to +70°C	2.5	--		% / °C	
		-40°C to +50°C	0	--			
	Input voltage derating	90VAC - 100VAC	1	--	% / VAC		
		100VAC - 264VAC	0	--			
Safety Standard		Meet IEC/EN/UL62368-1/EN60335-1/IEC/EN61558-1/GB4943-1/IEC/EN60601-1/ES60601-1(3.1 version)/CAN/CSA-C22.2 No.60601-1:14-Edition 3/ EN60601-1-2 Edition 4					
Safety Certification		IEC/EN/UL62368/EN60601 (Pending)					
Safety Class		CLASS I (with PE)/CLASS II (without PE)					
MTBF		MIL-HDBK-217F@25°C		≥300,000 h			

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Mechanical Specifications

Case Material	Open frame
Dimensions	127mm × 76.2mm × 25.4mm
Weight	295g (Typ.)
Cooling Method*	Air cooling (180W/200W) / 20.5CFM (300W/350W)
Note: *Cooling method and power derating refer to typical characteristic curves.	

Electromagnetic Compatibility (EMC)

Emissions*	CE	CISPR32/EN55032 CLASS B	
	RE	CISPR32/EN55032 (Category I, CLASS B, category II, CLASS A)	
	Harmonic current	IEC/EN61000-3-2 CLASS A	
Immunity	ESD	IEC/EN 61000-4-2 Contact ±8KV/Air ±15KV	Perf. Criteria A
	RS	IEC/EN 61000-4-3 10V/m	Perf. Criteria A
	EFT	IEC/EN 61000-4-4 ±4KV	Perf. Criteria A
	Surge	IEC/EN 61000-4-5 ±2KV/±4KV	Perf. Criteria A
	CS	IEC/EN61000-4-6 10 Vr.m.s	Perf. Criteria A
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-11 0%, 70%	perf. Criteria B

Note: 1.*The power supply should be considered as a part of the components in the system. All EMC performance are been tested on a metal plate (L x W x H, 360mm x 360mm x 1mm). Power supply should be combined with final equipment for EMC confirmation;

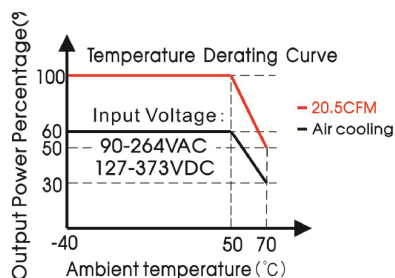
2.*Category I products with PE, category II products without PE.

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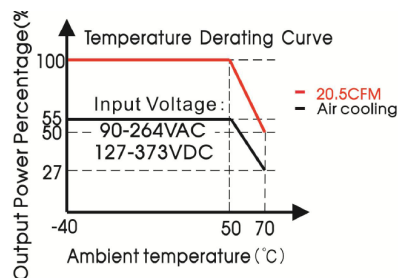
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Product Characteristic Curve

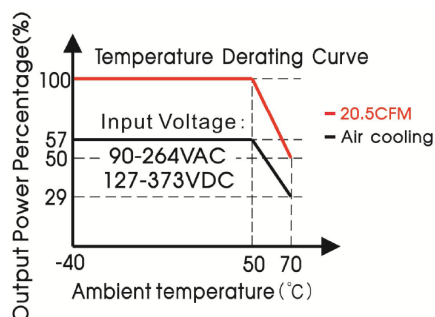
MPOF350-20B12-C (full load 300W with Forced Air)



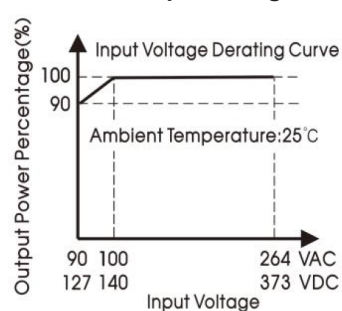
MPOF350-20B15-C (full load 325W with Forced Air)



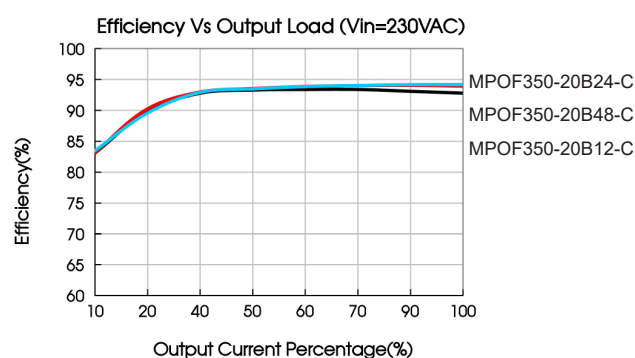
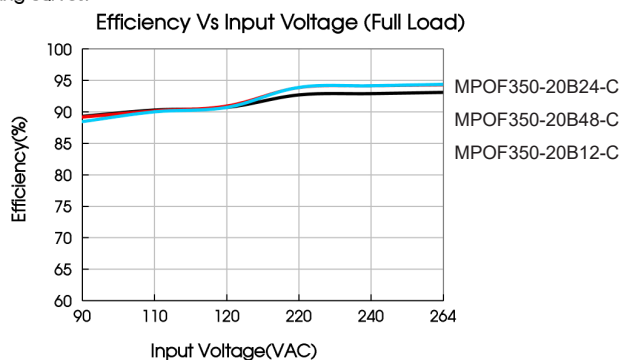
MPOF350-20B24/27/48-C (full load 350W with Forced Air)



MPOF350-20B2XX-C Input Voltage Derating Curve



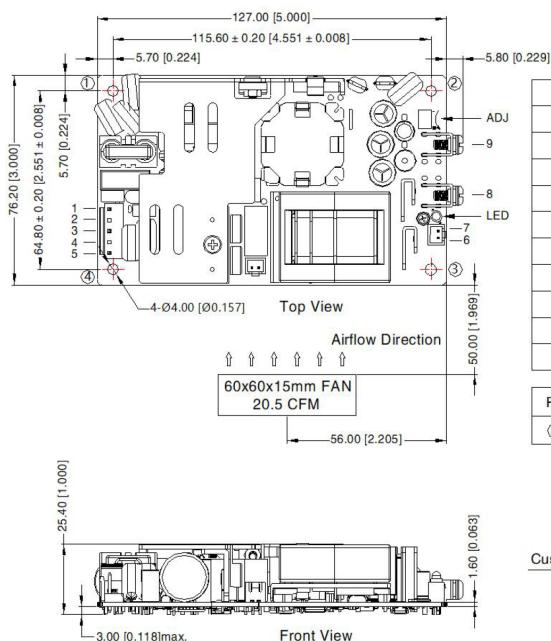
Note: With an AC input voltage between 90 - 100VAC and a DC input between 127 - 140VDC the output power must be derated as per the temperature derating curves.



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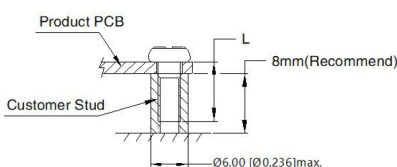
Dimensions and Recommended Layout



THIRD ANGLE PROJECTION

Pin-Out			
Pin	Function	Product Connector	Customer Connector
1	AC(N)	JST B5P-VH or equivalent	Housing: JST VHR Contact: JST SVH-21T-P1.1 or equivalent
2	NC		
3	AC(L)		
4	NC		
5	⏏	KANGDAO 2.5XHS-2A or equivalent	Housing: KANGDAO 2.5XHS-2Y Contact: KANGDAO 2.5XH-TE or equivalent
6	FAN-		
7	FAN+		
8	-Vo		
9	+Vo		

Position	Screw Spec.	L(Recommend)	Torque(max)
① - ④	M3	6mm	0.4N · m



Note:

1. Unit: mm[inch]
2. General tolerances: $\pm 1.00[\pm 0.039]$
3. Connector tightening torque: M3.5, 0.8N · m
4. The layout of the device is for reference only, please refer to the actual product
5. It is recommended 10mm distance between the PCB and other components for safety purpose
6. Class I system ①, ②, ④ positions must be connected to the earth(⏏)
7. Class II system ①, ②, ④ positions must be connected together

Notes:

1. Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25^{\circ}\text{C}$, humidity<75%RH with nominal input voltage and rated output load;
2. The ambient temperature derating of $5^{\circ}\text{C}/1000\text{m}$ is needed for operating altitude greater than 2000m;
3. All index testing methods in this datasheet are based on our company corporate standards;
4. In order to improve the efficiency at light load, there will be audible noise generated, but it does not affect product performance and reliability;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. The out case needs to be connected to PE () of system when the terminal equipment in operating;
8. Warning: Use double fuses, please disconnect the power before maintenance and replacement;
9. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.
10. The power supply is considered a component which will be installed into a final equipment. All EMC tests should be confirmed with the final equipment. Please consult our FAE for EMC test operation instructions.

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