

FEATURES

- ▶ Fully Encapsulated Plastic Case for PCB Mounting
- ▶ Universal Input 85-264VAC, 47-440Hz
- ▶ I/O Isolation 3000VAC with Reinforced Insulation
- ▶ Wide Operating Ambient Temp. Range
- ▶ No Min. Load Requirement
- ▶ Overload/Voltage and Short Circuit Protection
- ▶ EMI Emission EN55032 Class B Approved
- ▶ EMC Immunity EN 61000-4-2,3,4,5,6,8,11 Approved
- ▶ Eco Design, Compliant to Energy Star Specification and ErP Directive 2009/125/EC
- ▶ UL/cUL/IEC/EN 62368-1, UL/cUL 60950-1 Safety Approval & CE Marking



PRODUCT OVERVIEW

The MINMAX ABF-04 series is a range of fully encapsulated AC-DC power supply modules. They are designed for direct PCB mounting with solder pins. The product features EMI emission EN 55032 Class B approved and EMS compliance to the EN 61000-4 standard. This series comply with international standard pinout and input voltage range of 85-264VAC for worldwide markets. The ABF-04 series provides a better superior solution for many space critical applications in commercial and industrial electronic equipment.

Model Selection Guide

Model Number	Output Voltage	Output Current	Input Current	Max. capacitive Load	Efficiency (typ.)
		Max. mA	@Max. Load mA(typ.)		@Max. Load %
ABF-04S03	3.3	1200	82	1200	70
ABF-04S05	5	800	82	800	72
ABF-04S09	9	444	77	440	75
ABF-04S12	12	333	76	330	76
ABF-04S15	15	267	76	260	76
ABF-04S24	24	167	76	160	77
ABF-04D53	+5	600	72	5600	72
	+3.3	150		4700	
ABF-04D125	+12	250	72	330	75
	+5	120		4700	
ABF-04D12	±12	±166	76	# 330	77
ABF-04D15	±15	±133	76	# 260	77

For each output

Input Specifications

Parameter	Conditions / Model		Min.	Typ.	Max.	Unit
Input Voltage Range	All Models		85	---	264	VAC
Input Frequency Range			47	---	440	Hz
Input Voltage Range			120	---	370	VDC
No-Load Power Consumption			---	---	0.3	W
Inrush Current	115VAC	Cold Start at 25°C	---	---	15	A
	230VAC		---	---	25	A

Output Specifications						
Parameter	Conditions / Model	Min.	Typ.	Max.	Unit	
Output Voltage Setting Accuracy	Single and Dual Output Models	---	±1.0	±2.0	%Vnom.	
	ABF-04D53 & ABF-04D125	---	±2.0	±5.0	%Vnom.	
Line Regulation	Single and Dual Output Models	---	±0.5	±1.0	%	
	ABF-04D53 & ABF-04D125	Vo1	---	±0.5	±1.0	%
		Vo2	---	±1.0	±3.0	%
Load Regulation	3.3VDC Output Model	---	±1.0	±1.5	%	
	5~24VDC and Dual Output Models	---	±0.5	±1.0	%	
	ABF-04D53 & ABF-04D125	Vo1	---	±0.5	±1.0	%
		Vo2	---	±2.5	±5.0	%
Minimum Load	Single Output and Dual +/- Output Models	No min. Load required				
	Dual +/- Output Models	25	---	---	%Inom.	
Ripple & Noise	0-20 MHz Bandwidth	3.3V & 5VDC Output Models	---	100	150	mV _{P-P}
		Other Output Models	---	0.8	1.0	%V _{PP} of Vo
Over Voltage Protection	Zener diode clamp	---	120	---	% of Vo	
Temperature Coefficient		---	±0.01	±0.02	%/°C	
Overshoot		---	---	5	%Vout	
Over Load Protection	Hiccup mode, auto-recovery	105	---	---	%Inom.	
	(long term overload condition may cause damage)					
Short Circuit Protection	Hiccup mode, Automatic Recovery					

General Specifications					
Parameter	Conditions	Min.	Typ.	Max.	Unit
I/O Isolation Voltage	Input to Output, 60 Seconds	3000	---	---	VAC
I/O Isolation Resistance	500 VDC	100	---	---	MΩ
Switching Frequency		---	130	---	kHz
Hold-up Time		---	20	---	ms
MTBF (calculated)	MIL-HDBK-217F@25°C, Ground Benign	330,000			Hours
Safety Approvals	UL/cUL 60950-1 recognition(UL certificate)				
	UL/cUL 62368-1 recognition(UL certificate), IEC/EN 62368-1(CB-report)				

EMC Specifications			
Parameter	Standards & Level		Performance
EMI	Conduction	EN 55032	Without external components
	Radiation		
EMS	EN 55035		
	ESD	EN 61000-4-2 air ± 8kV , Contact ± 4kV	
	Radiated immunity	EN 61000-4-3 10V/m	
	Fast transient	EN 61000-4-4 ±2kV	
	Surge	EN 61000-4-5 ±1kV	
	Conducted immunity	EN 61000-4-6 10Vrms	
	PFMF	EN 61000-4-8 30A/m	
	Dips	EN 61000-4-11 30% 10ms	
Interruptions	EN 61000-4-11 >95% 5000ms		

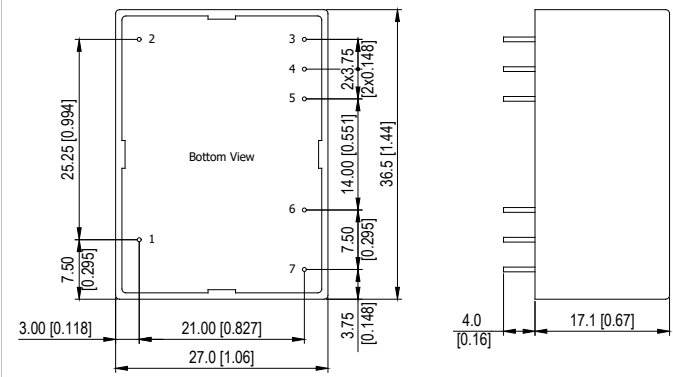
Environmental Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating Ambient Temperature Range		-25	---	+60	°C
Power Derating	+50°C to +60°C		0.3		W / °C
Storage Temperature Range		-40	---	+85	°C
Thermal Shutdown	Shutdown, Internal IC Junction Temperature	---	142	---	°C
	Automatic Recovery, Internal IC Junction Temperature	---	67	---	°C
Humidity (non condensing)		---	---	95	% rel. H
Lead Temperature (1.5mm from case for 10Sec.)		---	---	260	°C

Notes

- All specifications typical at Ta=+25°C, resistive load, 115VAC, 60Hz input voltage and after warm-up time rated output current unless otherwise noted.
- Please do not operate the product without a minimum load condition.
- We recommend to protect the converter by a slow blow fuse in the input supply line.
- Other input and output voltage may be available, please contact MINMAX.
- Specifications are subject to change without notice.
- The repeated high voltage isolation testing of the converter can degrade isolation capability, to a lesser or greater degree depending on materials, construction, environment and reflow solder process. Any material is susceptible to eventual chemical degradation when subject to very high applied voltages thus implying that the number of tests should be strictly limited. We therefore strongly advise against repeated high voltage isolation testing, but if it is absolutely required, that the voltage be reduced by 20% from specified test voltage. Furthermore, the high voltage isolation capability after reflow solder process should be evaluated as it is applied on system.

Package Specifications

Mechanical Dimensions		Pin Connections				
		Pin	Single Output	D12/D15	D53/D125	Diameter mm (inches)
		1		NC		Ø 0.6 [0.02]
		2		NC		Ø 0.6 [0.02]
		3	+Vout	+Vout	+Vout1	Ø 0.6 [0.02]
		4	-Vout	Common	Common	Ø 0.6 [0.02]
		5	No Pin	-Vout	+Vout2	Ø 0.6 [0.02]
		6		AC(N)		Ø 0.6 [0.02]
		7		AC(L)		Ø 0.6 [0.02]
<p>▶ All dimensions in mm (inches) ▶ Tolerance: ±0.5 (±0.01) ▶ Pin pitch tolerance: ±0.25 (±0.010) ▶ Pin diameter tolerance: X.X±0.1 (X.XX±0.004)</p>						

Physical Characteristics

Case Size	: 36.5x27.0x17.1mm (1.44x1.06x0.67 inches)
Case Material	: Plastic resin (flammability to UL 94V-0 rated)
Pin Material	: Copper Alloy
Weight	: 30g