

FEATURES

- ▶ Fully Encapsulated Plastic Case for PCB Mounting
- ▶ Universal Input 85-264VAC, 47-440Hz
- ▶ I/O Isolation 3000VAC with Reinforced Insulation
- ▶ Operating Ambient Temp. Range -25°C to +60°C
- ▶ 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)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 VDC	Output Current	Input Current	Max. capacitive Load μF	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	%
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
Minimum Load	Single Output and Dual +/- Output Models	No min. Load required	---	---	%Inom.	
	Dual +/- Output Models	---	25	---	%Inom.	
Over Voltage Protection	Zener diode clamp	---	120	---	% of Vo	
Temperature Coefficient		---	±0.01	±0.02	%/°C	
Overshoot		---	---	5	%Vout	
Over Load Protection	Foldback, auto-recovery (long term overload condition may cause damage)	105	---	---	%Inom.	
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) , IEC/EN 60950-1(CB-report)				
	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	Class B
	Radiation			
EMS	EN 55024			
	ESD	EN 61000-4-2 air ± 8kV , Contact ± 4kV		B
	Radiated immunity	EN 61000-4-3 10V/m		A
	Fast transient	EN 61000-4-4 ±2kV		B
	Surge	EN 61000-4-5 ±1kV		B
	Conducted immunity	EN 61000-4-6 10Vrms		B
	PFMF	EN 61000-4-8 30A/m		A
	Dips	EN 61000-4-11 30% 10ms		B
Interruptions	EN 61000-4-11 >95% 5000ms		C	

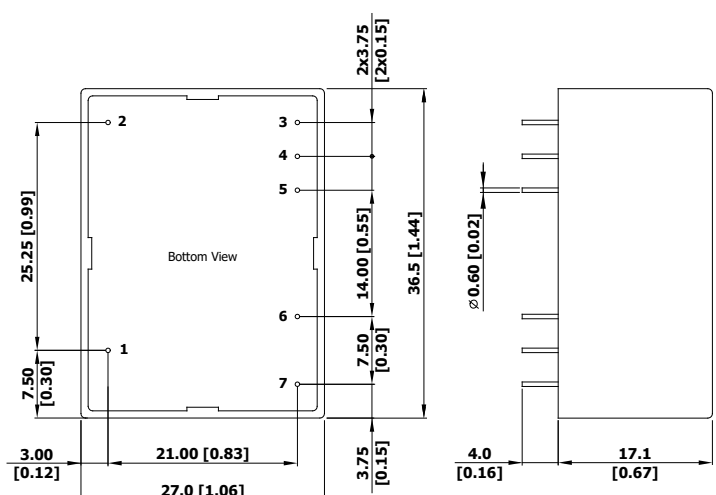
Environmental Specifications

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

- 1 All specifications typical at Ta=+25°C, resistive load, 115VAC, 60Hz input voltage and after warm-up time rated output current unless otherwise noted.
- 2 These power modules require a minimum output loading to maintain specified regulation, operation under no-load conditions will not damage the power supplies however they may not meet all listed specifications.
- 3 We recommend to protect the converter by a slow blow fuse in the input supply line.
- 4 Other input and output voltage may be available, please contact MINMAX.
- 5 Specifications are subject to change without notice.

Package Specifications

Mechanical Dimensions		Pin Connections			
 <p>Bottom View</p>		Pin	Single Output	D12/D15	D53/D125
		1		NC	
		2		NC	
		3	+Vout	+Vout	+Vout1
		4	-Vout	Common	Common
		5	No Pin	-Vout	+Vout2
		6		AC(N)	
		7		AC(L)	
<p>▶ All dimensions in mm (inches)</p> <p>▶ Tolerance: ±0.5 (±0.01)</p> <p>▶ Pin pitch tolerance: ±0.25 (±0.01)</p> <p>▶ Pin diameter $\varnothing 0.6 \pm 0.1$ (0.02±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 with Tin Plate Over Nickel Subplate
Weight	: 30g