

FEATURES

- ▶ Fully Encapsulated Plastic Case for PCB Mounting
- ▶ Universal Input 85~264VAC, 47~440Hz
- ▶ Protection Class II as per IEC/EN 60536
- ▶ I/O Isolation 3000VAC with Reinforced Insulation
- ▶ Operating Ambient Temp. Range -25°C to +60°C
- ▶ No Min. Load Requirement
- ▶ Overload/Voltage/Temp. and Short Circuit Protection
- ▶ Designed-in EMI Emission meets EN55011/22 Class B & FCC Level B
- ▶ Designed-in EMC Immunity meets EN61000-4-2,3,4,5,6,8,11
- ▶ Eco Design, Compliant to Energy Star Specification and ErP Directive 2009/125/EC
- ▶ UL/cUL/IEC/EN 60950-1 Safety Approval & CE Marking



PRODUCT OVERVIEW

The MINMAX ABF-04 series is a new range of fully encapsulated AC/DC power supply modules. They are designed for direct PCB mounting with solder pins. The product features EMI-filter to EN55022, class B and EMS compliance to the EN 61000-4 standard.

Universal input voltage 85-264VAC and International safety approvals qualifies these power modules for applications in products with worldwide markets.

The ABF-04 series provide a cost effective 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.	@Max. Load		@Max. Load
	VDC	mA	mA(typ.)	μF	%
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	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 (Cold Start at 25°C)	115VAC	---	---	15	A
	230VAC	---	---	25	A

Output Specifications

Parameter	Conditions	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	
Current Limitation	Foldback, 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
Protection Class II	According IEC/EN 60536				
Safety Approvals	UL/cUL 60950-1 recognition(UL certificate) , IEC/EN 60950-1(CB-report)				

EMC Specifications

Parameter	Standards & Level		Performance
EMI	Conduction and Radiation	EN 55011, EN55022, FCC part 15	Class B
	EN 55011, EN55024		
EMS	ESD	EN61000-4-2 air ± 8kV , Contact ± 4kV	B
	Radiated immunity	EN61000-4-3 10V/m	A
	Fast transient	EN61000-4-4 ±2kV	B
	Surge	EN61000-4-5 ±1kV	B
	Conducted immunity	EN61000-4-6 10Vrms	B
	PFMF	EN61000-4-8 30A/m	A
	Dips	EN61000-4-11 30% 10ms	B
	Interruptions	EN61000-4-11 >95% 5000ms	C

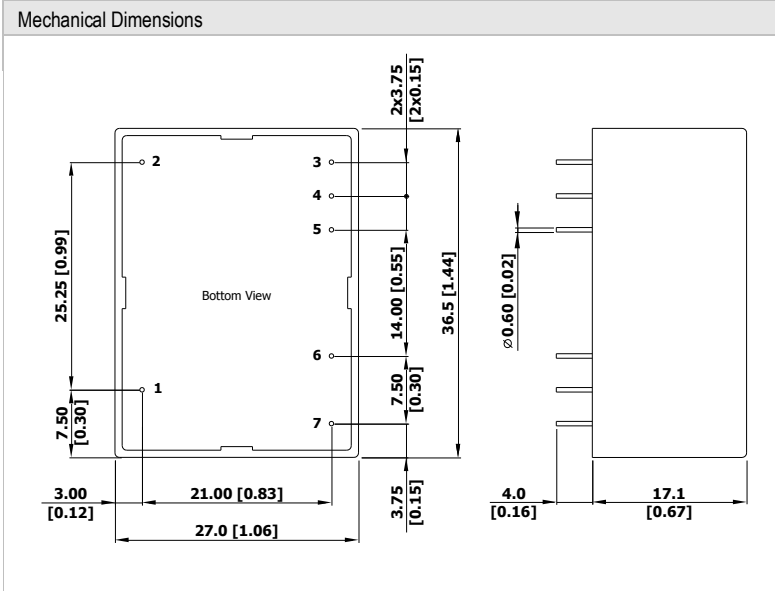
Environmental Specifications

Parameter	Conditions	Min.	Max.	Unit
Operating Ambient Temperature Range (See Power Derating Curve)	Natural Convection	-25	+60	°C
Storage Temperature Range		-40	+85	°C
Power Derating	+50°C to +60°C	0.3		W / °C
Over Temperature Protection	at 90°C (automatic recovery at 67°C)			
Humidity (non condensing)		---	95	% rel. H
Cooling	Natural Convection			
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 factory
- 5 Specifications are subject to change without notice

Package Specifications



Pin Connections

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)	

- ▶ All dimensions in mm (inches)
- ▶ Tolerance: ± 0.5 (± 0.01)
- ▶ Pin diameter $\varnothing 0.6 \pm 0.1$ (0.02 ± 0.004)

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 Gold Plate Over Nickel Subplate
Weight	: 30g