

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 and Short Circuit Protection
- ▶ EMI Emission EN 55032 Class B & FCC Level 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.

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

The ABF-04 series provides a 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.	@Max. Load			
	VDC	mA	mA(typ.)	μF	%	
ABF-04S03	3.3	1200	82	82	1200	70
ABF-04S05	5	800	82	82	800	72
ABF-04S09	9	444	77	77	440	75
ABF-04S12	12	333	76	76	330	76
ABF-04S15	15	267	76	76	260	76
ABF-04S24	24	167	76	76	160	77
ABF-04D53	+5	600	72	72	5600	72
	+3.3	150			4700	
ABF-04D125	+12	250	72	72	330	75
	+5	120			4700	
ABF-04D12	±12	±166	76	76	# 330	77
ABF-04D15	±15	±133	76	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
Protection Class II	According IEC/EN 60536				
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 & Radiation Class B without any external components	EN 55032, FCC part 15	Class B
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

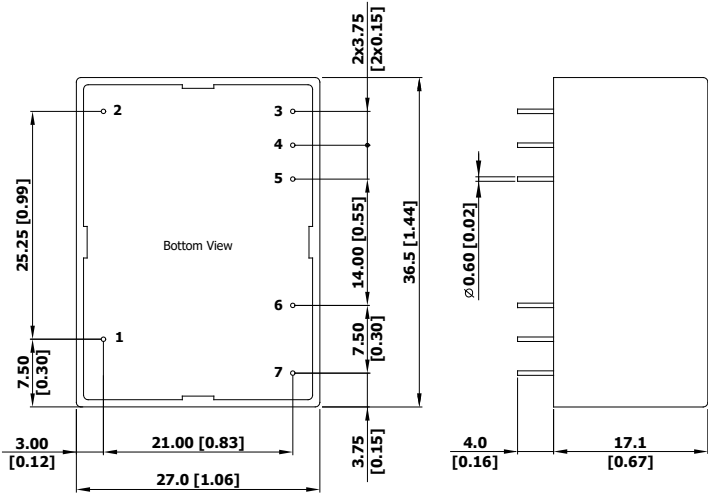
Environmental Specifications

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 factory
- 5 Specifications are subject to change without notice

Package Specifications

Mechanical Dimensions		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)	
<p>▶ All dimensions in mm (inches)</p> <p>▶ Tolerance: ±0.5 (±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 Gold Plate Over Nickel Subplate
Weight	: 30g