

## 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 +70°C
- ▶ Overload/Voltage and Short Circuit Protection
- ▶ EMI Emission EN55032 Class B
- ▶ EMC Immunity EN61000-4-2,3,4,5,6,8,11 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 AGF-10 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-filter to EN 55032, 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 AGF-10 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.) |
|--------------|----------------|----------------|---------------|----------------------|-------------------|
|              |                |                | 115VAC, 60Hz  |                      | @Max. Load        |
|              |                | Max.           | @Max. Load    |                      |                   |
|              | VDC            | mA             | mA(typ.)      | μF                   | %                 |
| AGF-10S03    | 3.3            | 2500           | 171           | 2200                 | 70                |
| AGF-10S05    | 5              | 2000           | 201           | 2200                 | 72                |
| AGF-10S12    | 12             | 833            | 191           | 1000                 | 76                |
| AGF-10S15    | 15             | 667            | 193           | 1000                 | 75                |
| AGF-10S24    | 24             | 417            | 201           | 680                  | 72                |

### 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             |                    | ---                   | ---  | 30   | A    |
| External Fuse (Recommended) | All Models         |                    | 1.5A Slow – Blow Type |      |      |      |

### Output Specifications

| Parameter                       | Conditions / Model                              |                            | Min. | Typ.  | Max.  | Unit       |
|---------------------------------|-------------------------------------------------|----------------------------|------|-------|-------|------------|
| Output Voltage Setting Accuracy |                                                 |                            | ---  | ±1.0  | ±2.0  | %Vnom.     |
| Line Regulation                 | Vin=Min. to Max.                                |                            | ---  | ±0.5  | ±1.0  | %          |
| Load Regulation                 | Io=Min. to Max.                                 |                            | ---  | ±0.5  | ±1.0  | %          |
| Ripple & Noise                  | 0-20 MHz Bandwidth                              | 3.3 & 5.0VDC Output Models | ---  | 1.5   | 1.8   | %VPP of Vo |
|                                 |                                                 | Other Output Models        | ---  | 0.8   | 1.0   | %VPP of Vo |
| Minimum Load                    |                                                 |                            | ---  | 10    | ---   | %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                         |                            | 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    | ---  | ---  | VACrms |
| I/O Isolation Resistance | 500 VDC                                                                 | 100     | ---  | ---  | MΩ     |
| Switching Frequency      |                                                                         | ---     | 125  | ---  | kHz    |
| Hold-up Time             |                                                                         | ---     | 20   | ---  | ms     |
| MTBF (calculated)        | MIL-HDBK-217F@25°C, Ground Benign                                       | 300,000 |      |      | 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**

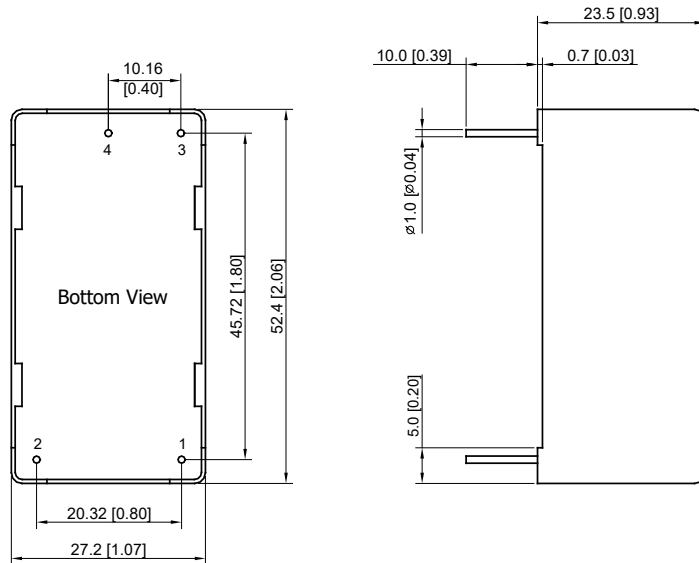
| Parameter |                    | Standards & Level                     |                             | Performance |
|-----------|--------------------|---------------------------------------|-----------------------------|-------------|
| EMI       | Conduction         | EN 55032                              | 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   | ---  | +70  | °C       |
| Power Derating                                | +50°C to +70°C                                       | 0.375 |      |      | 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**

- Specifications typical at Ta=+25°C, resistive load, 115VAC, 60Hz input voltage and after warm-up time rated output current unless otherwise noted.
- We recommend to protect the converter by a slow blow fuse in the input supply line.
- 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.
- Other input and output voltage may be available, please contact factory.
- Specifications are subject to change without notice.

**Package Specifications**
**Mechanical Dimensions**

**Pin Connections**

| Pin | Function           |
|-----|--------------------|
| 1   | AC(N) – AC Neutral |
| 2   | AC(L) – AC Line    |
| 3   | +Vout              |
| 4   | -Vout              |

- ▶ All dimensions in mm (inches)
- ▶ Tolerance:  $\pm 0.5$  ( $\pm 0.02$ )
- ▶ Pin pitch tolerance:  $\pm 0.25$  ( $\pm 0.01$ )
- ▶ Pin diameter  $\varnothing 1.0 \pm 0.1$  ( $0.04 \pm 0.004$ )

**Physical Characteristics**

|               |                                                  |
|---------------|--------------------------------------------------|
| Case Size     | : 52.4x27.2x23.5mm (2.06x1.07x0.93 Inches)       |
| Case Material | : Plastic resin (flammability to UL 94V-0 rated) |
| Weight        | : 54g                                            |