

FEATURES

- ▶ Ultra Compact Size 1.0 x 1.0 x 0.64"
- ▶ Fully Encapsulated Plastic Case for PCB and Chassis Mounting Version
- ▶ Universal Input 85-264VAC
- ▶ Protection Class II as per IEC/EN 60536
- ▶ I/O Isolation 3000VAC with Reinforced Insulation
- ▶ No Min. Load Requirement
- ▶ Operating Ambient Temp. Range -25°C to +70°C
- ▶ Overload/Voltage and Short Circuit Protection
- ▶ EMI Emission EN 55032/14-1 Class B & FCC Level B Approved
- ▶ EMC Immunity EN 61000-4-2,3,4,5,6,8,11 Approved
- ▶ Eco Design, No Load Input Power 300mW max.
- ▶ Safety Approval to UL/cUL/IEC/EN 62368-1(60950-1), TUV IEC/EN 60335-1 & CE Marking



PRODUCT OVERVIEW

The AAF-05 Series from MINMAX is a range of ultra-small, fully encapsulated 5 Watt AC-DC power supply modules. They are designed for easy PCB mounting with solder pins. The modules feature EMI emission EN 55032/14-1 class B approved. EMC immunity complies with EN 61000-6-1. The low stand-by power consumption complies with European ErP Directive 2009/125/EC.

Universal input voltage range of 85-264VAC and an International safety approval package qualifies these power modules for worldwide markets.

The AAF-05 power supplies provide a superior solution for space critical applications in consumer appliances and instrumentation and communication equipment.

Model Selection Guide

| Model Number | Output Voltage VDC | Output Current | | Input Current @Max. Load mA(typ.) | Max. Capacitive Load μF | Efficiency (typ.) @Max. Load % |
|--------------|-----------------------|----------------|---------------------------|---|----------------------------|--------------------------------------|
| | | Max. mA | Peak ₍₁₎ mA | | | |
| AAF-05S03 | 3.3 | 1515 | 1970 | 117 | 2200 | 74 |
| AAF-05S05 | 5 | 1000 | 1300 | 108 | 1000 | 80 |
| AAF-05S09 | 9 | 555 | 721 | 106 | 300 | 82 |
| AAF-05S12 | 12 | 416 | 540 | 106 | 160 | 82 |
| AAF-05S15 | 15 | 333 | 433 | 104 | 100 | 83 |
| AAF-05S24 | 24 | 208 | 270 | 104 | 43 | 83 |
| AAF-05S48 | 48 | 104 | 135 | 102 | 10 | 85 |

Input Specifications

| Parameter | Conditions / Model | Min. | Typ. | Max. | Unit |
|-------------------------------------|--------------------|------|------|------|------|
| Input Voltage Range | All Models | 85 | --- | 264 | VAC |
| Input Frequency Range | | 47 | --- | 63 | Hz |
| Input Voltage Range | | 120 | --- | 370 | VDC |
| No-Load Power Consumption | | --- | --- | 300 | mW |
| Inrush Current (Cold Start at 25°C) | 115VAC | --- | --- | 20 | A |
| | 230VAC | --- | --- | 40 | A |

| Output Specifications | | | | | | |
|--------------------------|---|---------------------------|------|------|-------|------------------------|
| Parameter | Conditions / Model | | Min. | Typ. | Max. | Unit |
| Output Voltage Accuracy | | | --- | --- | ±2.0 | %Vnom. |
| Line Regulation | Vin=Min. to Max. @Full Load | | --- | --- | ±1.0 | % |
| Load Regulation | Io=0% to 100% | | --- | --- | ±1.0 | % |
| Ripple & Noise | 0-20 MHz Bandwidth | 3.3V & 5VDC Output Models | --- | --- | 60 | mV _{PP} of Vo |
| | | Other Output Models | --- | --- | 1 | %V _{PP} of Vo |
| Minimum Load | No minimum Load Requirement | | | | | |
| Over Voltage Protection | Zener Diode Clamp | | --- | 125 | 190 | % of Vo |
| Temperature Coefficient | | | --- | --- | ±0.05 | %/°C |
| Overshoot | | | --- | --- | 5 | %Vout |
| Over Load Protection | Foldback, auto-recovery | | 135 | 150 | --- | %Inom. |
| | (long term overload condition may cause damage) | | | | | |
| Short Circuit Protection | Hiccup mode, Automatic Recovery | | | | | |

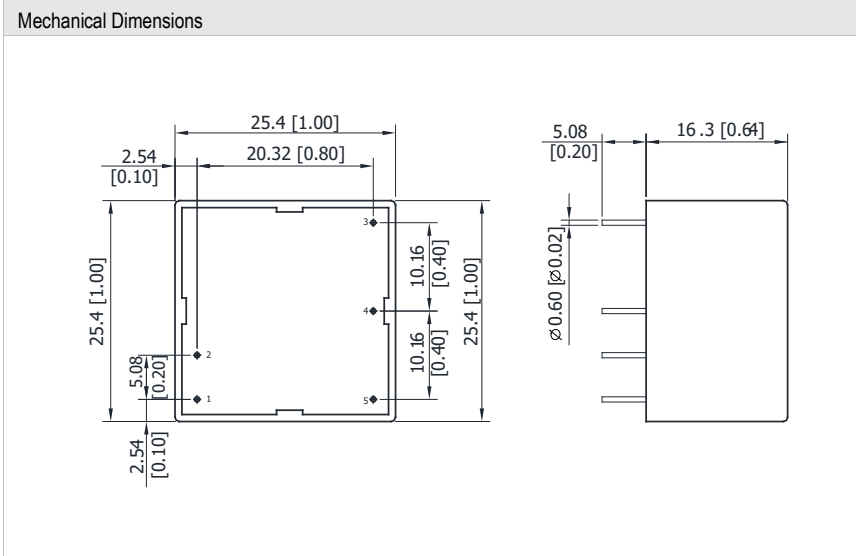
| General Specifications | | | | | | |
|--------------------------|---|---------|------|------|--------|--|
| Parameter | Conditions | Min. | Typ. | Max. | Unit | |
| I/O Isolation Voltage | 60 Seconds | 3000 | --- | --- | VACrms | |
| I/O Isolation Resistance | 500 VDC | 100 | --- | --- | MΩ | |
| Switching Frequency | | --- | 65 | --- | kHz | |
| Hold-up Time | 115VAC, Full Load | --- | 8 | --- | ms | |
| | 230VAC, Full Load | --- | 40 | --- | ms | |
| MTBF (calculated) | MIL-HDBK-217F@25°C, Ground Benign | 520,000 | --- | --- | 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) | | | | | |
| | IEC/EN 60335-1 recognition (CB-report, TUV certificate) | | | | | |

| EMC Specifications | | | |
|--------------------|--|---------------------------------------|--|
| Parameter | Standards & Level | Performance | |
| EMI | Conduction & Radiation Class B without any external components | EN 55014-1, EN 55032, FCC part 15 | |
| EMS | EN 55014-2, EN 55024 | | |
| | 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. | Max. | Unit | |
| Operating Ambient Temperature Range | | -25 | +70 | °C | |
| Power Derating | +50°C to +70°C | 0.125 | | W / °C | |
| Storage Temperature Range | | -40 | +85 | °C | |
| Humidity (non condensing) | | --- | 95 | % rel. H | |
| Lead Temperature (1.5mm from case for 10Sec.) | | --- | 260 | °C | |

| Notes | |
|-------|--|
| 1 | Peak load lasting <30s with a maximum duty cycle of 10%, average output power not to exceed maximum power. |
| 2 | All specifications typical at Ta=+25°C, resistive load, 115VAC, 60Hz input voltage and after warm-up time rated output current unless otherwise noted. |
| 3 | Ripple & Noise of PCB mounting type measured with a 1μF/50V MLCC. |
| 4 | We recommend to protect the converter by a slow blow fuse in the input supply line. |
| 5 | Other input and output voltage may be available, please contact factory. |
| 6 | Specifications are subject to change without notice. |

Package Specifications PCB Mounting



| Pin Connections | |
|-----------------|----------|
| Pin | Function |
| 1 | AC (N) |
| 2 | AC (L) |
| 3 | NC |
| 4 | -Vout |
| 5 | +Vout |

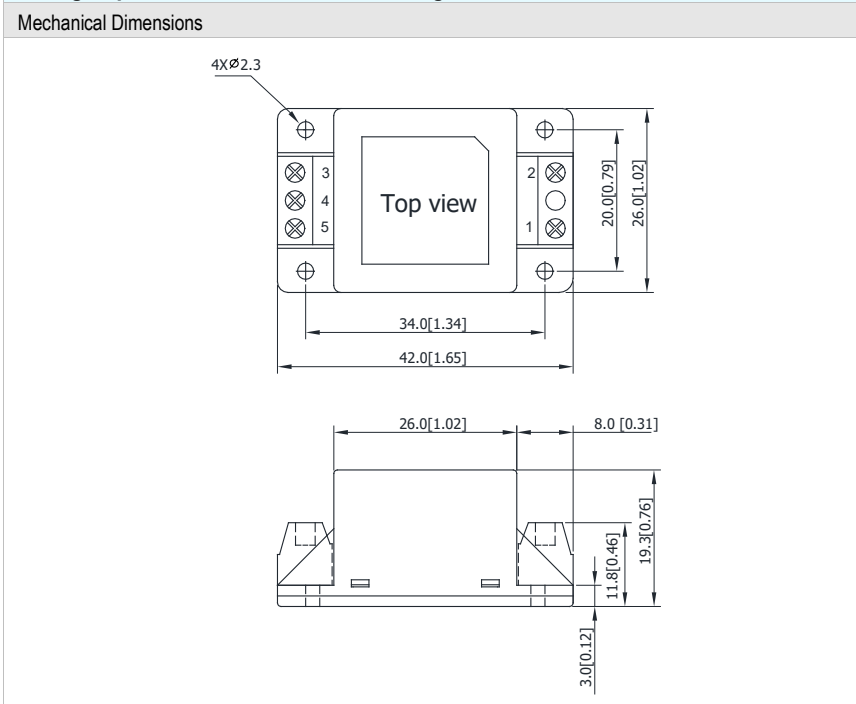
NC: No Connection

- ▶ All dimensions in mm (inches)
- ▶ Tolerance: ± 0.5 (± 0.01)
- ▶ Pin pitch tolerance: ± 0.25 (± 0.01)
- ▶ Pin diameter $\varnothing 0.6 \pm 0.1$ (0.02 ± 0.004)

Physical Characteristics

| | |
|---------------|--|
| Case Size | : 25.4x25.4x16.3mm (1.0x1.0x0.64 inches) |
| Case Material | : Plastic resin (flammability to UL 94V-0 rated) |
| Pin Material | : Tinned Copper |
| Weight | : 19.7g |

Package Specifications Chassis Mounting



| Connections | |
|-------------|----------|
| Pin | Function |
| 1 | AC (N) |
| 2 | AC (L) |
| 3 | NC |
| 4 | -Vout |
| 5 | +Vout |

- ▶ All dimensions in mm (inches)
- ▶ Tolerance: ± 0.5 (± 0.02)

Physical Characteristics

| | |
|---------------|--|
| Case Size | : 42.0x26.0x19.3mm (1.65x1.02x0.76 inches) |
| Case Material | : Plastic resin (flammability to UL 94V-0 rated) |
| Weight | : 23.9g |

| Order Code Table | |
|------------------|------------------|
| PCB Mounting | Chassis Mounting |
| AAF-05S03 | AAF-05S03C |
| AAF-05S05 | AAF-05S05C |
| AAF-05S09 | AAF-05S09C |
| AAF-05S12 | AAF-05S12C |
| AAF-05S15 | AAF-05S15C |
| AAF-05S24 | AAF-05S24C |
| AAF-05S48 | AAF-05S48C |