



### FEATURES

- PCB Mounting
- Package dimension: 27.0x36.5x17.1mm
- Universal Input range 85-264 VAC, 47-440 Hz
- Over Load and Over Voltage Protection
- EMI meets EN55032 Class B and EMS compliance to EN61000-4
- UL/IEC/EN 60950-1 Certified , CE Marked
- 3kVAC Isolation , Protection Class II level
- Lead free, RoHS Compliant
- 3 Years Product Warranty



The AA04S/D series , isolated fully encapsulated 4W AC/DC power module with 3kVAC isolation. With Universal input voltage 85-264VAC and International safety approvals, these power modules are ideal for applications in commercial and industrial electronic equipment. These isolated AC/DC converters are the latest offering from a world leader in power systems technology and manufacturing — Delta Electronics, Inc. With creative design technology and optimization of component placement, these converters possess outstanding electrical and thermal performance, as well as extremely high reliability under highly stressful operating conditions.

### Model List

| Model Number | Output Voltage |      | Output Current | Input Current       | Max. capacitive Load | Efficiency (typ.) |
|--------------|----------------|------|----------------|---------------------|----------------------|-------------------|
|              |                |      |                |                     |                      | @Max. Load        |
|              | VDC            |      | Max. mA        | @Max. Load mA(typ.) | μF                   | %                 |
| AA04S0300A   | 3.3            |      | 1200           | 82                  | 1200                 | 70                |
| AA04S0500A   | 5              |      | 800            | 82                  | 800                  | 72                |
| AA04S0900A   | 9              |      | 444            | 77                  | 440                  | 75                |
| AA04S1200A   | 12             |      | 333            | 76                  | 330                  | 76                |
| AA04S1500A   | 15             |      | 267            | 76                  | 260                  | 76                |
| AA04S2400A   | 24             |      | 167            | 76                  | 160                  | 77                |
| AA04D0305A   | Vout1          | +5   | 600            | 72                  | 5600                 | 72                |
|              | Vout2          | +3.3 | 150            |                     | 4700                 |                   |
| AA04D0512A   | Vout1          | +12  | 250            | 72                  | 330                  | 75                |
|              | Vout2          | +5   | 120            |                     | 4700                 |                   |
| AA04D1212A   | ±12            |      | ±166           | 76                  | * 330                | 77                |
| AA04D1515A   | ±15            |      | ±133           | 76                  | * 260                | 77                |

\* For each output

### Input Characteristics

| 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 Characteristics

| Parameter                | Conditions                                                                 | Min.                  | Typ.  | Max.  | Unit                   |
|--------------------------|----------------------------------------------------------------------------|-----------------------|-------|-------|------------------------|
| Output Voltage Accuracy  | Single and Dual Output Models                                              | ---                   | ±1.0  | ±2.0  | %                      |
|                          | AA04D0305A & AA04D0512A                                                    | ---                   | ±2.0  | ±5.0  | %                      |
| Line Regulation          | Single and Dual Output Models                                              | ---                   | ±0.5  | ±1.0  | %                      |
|                          | AA04D0305A & AA04D0512A                                                    | Vout1                 | ±0.5  | ±1.0  | %                      |
|                          |                                                                            | Vout2                 | ±1.0  | ±3.0  | %                      |
| Load Regulation          | 3.3VDC Output Model                                                        | ---                   | ±1.0  | ±1.5  | %                      |
|                          | 5~24VDC and Dual Output Models                                             | ---                   | ±0.5  | ±1.0  | %                      |
|                          | AA04D0305A & AA04D0512A                                                    | Vout1                 | ±0.5  | ±1.0  | %                      |
|                          |                                                                            | Vout2                 | ±2.5  | ±5.0  | %                      |
| Ripple & Noise (20MHz)   | 3.3V & 5VDC Output Models                                                  | ---                   | 100   | 150   | mV <sub>P-P</sub>      |
|                          | Other Output Models                                                        | ---                   | 0.8   | 1.0   | %V <sub>PP</sub> 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<br>(long term overload condition may cause damage) | 105                   | ---   | ---   | %Inom.                 |
| Short Circuit Protection | Hiccup mode, indefinite (automatic recovery)                               |                       |       |       |                        |

## General Characteristics

| 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                |
| EMC Emission             | Conducted and radiated            | EN 55032 class B, FCC part 15 class B          |         |      |                      |
| EMC Immunity             | Standard                          | Specification Requirement                      |         |      | Performance Criteria |
|                          | EN61000-4-2                       | Air ±8KV Cont. ±4KV                            |         |      | B                    |
|                          | EN61000-4-3                       | 10V/m                                          |         |      | A                    |
|                          | EN61000-4-4                       | ±2KV                                           |         |      | B                    |
|                          | EN61000-4-5                       | ±1KV                                           |         |      | B                    |
|                          | EN61000-4-6                       | 10Vrms                                         |         |      | B                    |
|                          | EN61000-4-8                       | 30A/m                                          |         |      | A                    |
|                          | EN61000-4-11                      | Dips: 30%, 10ms<br>Interruptions: >95%, 5000ms |         |      | B<br>C               |
| Protection Class II      |                                   | According IEC/EN 60536                         |         |      |                      |
| Safety Approvals         |                                   | cUL/UL 60950-1, IEC/EN 60950-1                 |         |      |                      |

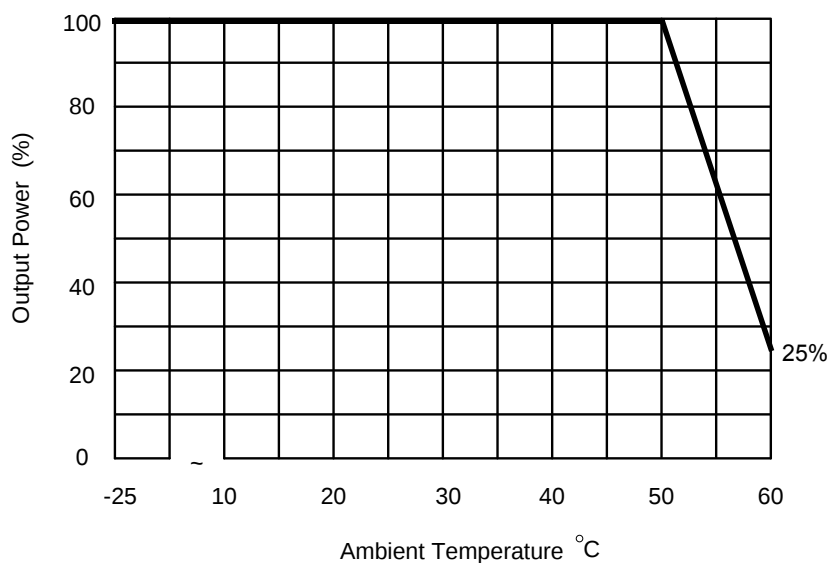
## Recommended Input Fuse

| All Models                  |                     |
|-----------------------------|---------------------|
| External Fuse (Recommended) | 1A Slow – Blow Type |

## Environmental Specifications

| Parameter                       | Conditions                                           | Min.  | Typ.  | Max.  |
|---------------------------------|------------------------------------------------------|-------|-------|-------|
| Temperature Range (operational) | Ambient                                              | -25°C | ---   | +60°C |
| Storage Temperature Range       |                                                      | -40°C | ---   | +85°C |
| Thermal Shutdown                | Shutdown, Internal IC Junction Temperature           | ---   | 142°C | ---   |
|                                 | Automatic Recovery, Internal IC Junction Temperature | ---   | 67°C  | ---   |
| Cooling                         | Free-Air convection                                  |       |       |       |
| Humidity (non condensing)       |                                                      | ---   | ---   | 95%   |

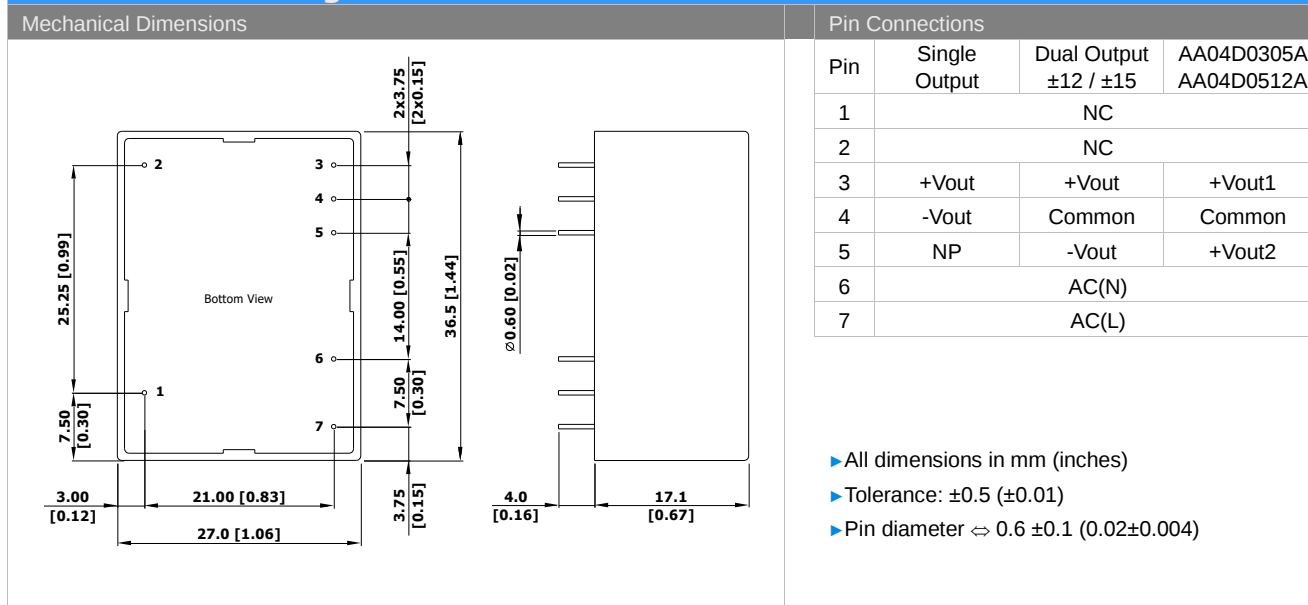
## Power Derating Curve



## Notes

- 1 All specifications typical at  $T_a=+25^{\circ}\text{C}$ , resistive load, 115VAC, 60Hz input voltage and after warm-up time rated output current unless otherwise noted.
- 2 Ripple & Noise measurement bandwidth is 0~20 MHz
- 3 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.
- 4 Suggest to protect the module by a slow blow fuse at the input line .
- 5 Specifications are subject to change without notice

## Mechanical Drawing



## Physical Outline

|               |                                                     |
|---------------|-----------------------------------------------------|
| 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                                               |

## Part Numbering System

| A                  | A                      | 04      | D                 | 12             | 12                  | A             |
|--------------------|------------------------|---------|-------------------|----------------|---------------------|---------------|
| Product type       | Family series          | Watt    | Number of Outputs | Output Voltage |                     | Option Code   |
| AC/DC Power Module | Industrial application | 04 - 4W | S - Single        | 03 - 3.3V      | 00 - not applicable | A - PCB Mount |
|                    |                        |         | D - Dual          | 05 - 5V        | 05 - 5V             |               |
|                    |                        |         |                   | 09 - 9V        | 12 - 12V            |               |
|                    |                        |         |                   | 12 - 12V       | 15 - 15V            |               |
|                    |                        |         |                   | 15 - 15V       |                     |               |
|                    |                        |         |                   | 24 - 24V       |                     |               |

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## WARRANTY

Delta offers a three(3) years limited warranty. Complete warranty information is listed on our web site or is available upon request from Delta.

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