



Actual size:  
2.28 x 2.2 x 0.5in  
[57,9 x 55,9 x 12,7mm]

**FIAM™**  
**48V Input**



## Filter Input Attenuator Module

### Features & Benefits

- RoHS Compliant (with F or G pin style)
- EMI filtering – Class B <sup>[a]</sup>
- Transient protection
- Low-profile mounting options
- 10 and 20 Ampere versions
- UL, CSA, EN compliance
- Mini-size package
- Inrush current limiting

### Product Highlights

The FIAM is a DC front-end module providing transient protection, inrush current limiting and Class B EMI filtering in a Mini-size package. The FIAM enables designers using Vicor 48V<sub>IN</sub> Mini, Micro or Maxi DC-DC converters to meet the transient immunity and EMI requirements of Bellcore, FCC, ETSI and European Norms and protect system hardware from inrush current. The FIAM accepts an input voltage of 36 – 76V<sub>DC</sub>, is available in 10 or 20A versions and provides reverse polarity protection and remote on/off control.

The FIAM is housed in an industry-standard “half brick” module measuring 2.28 x 2.2 x 0.5in and, depending upon model selected, may be mounted onboard or inboard for height-critical applications.

<sup>[a]</sup> EMI performance is subject to a wide variety of external influences such as PCB construction, circuit layout etc. As such, external components in addition to those listed herein may be required in specific instances to gain full compliance to the standards specified.

### Compatible Products

- Mini, Micro, Maxi 48V Input DC-DC converters

### Absolute Maximum Rating

| Parameter                 | Rating      | Unit            | Notes               |
|---------------------------|-------------|-----------------|---------------------|
| +IN to –IN                | 80          | V <sub>DC</sub> | Continuous          |
|                           | 100         | V               | 100ms               |
| +OUT to –OUT              | 75          | V <sub>DC</sub> | Continuous          |
| Mounting torque           | 5 [0.57]    | in-lbs [N·m]    | 6 each, #4-40 or M3 |
| Operating temperature     | –40 to +100 | °C              | T- and H-Grade      |
| Storage temperature       | –55 to +125 | °C              | H-Grade             |
| Pin soldering temperature | 500 [260]   | °F [°C]         | <5sec; wave solder  |
|                           | 750 [390]   | °F [°C]         | <7sec; hand solder  |

### Thermal Resistance

| Parameter            | Min | Typ  | Max | Unit    |
|----------------------|-----|------|-----|---------|
| Baseplate to sink    |     |      |     |         |
|                      |     | 0.16 |     | °C/Watt |
|                      |     | 0.14 |     | °C/Watt |
| Baseplate to ambient |     |      |     |         |
|                      |     | 8.0  |     | °C/Watt |
|                      |     | 1.9  |     | °C/Watt |

### Part Numbering

|             |                    |                                                                                                                                                 |                                                                                                                                           |                                              |
|-------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| <b>FIAM</b> | <b>1</b>           | <b>C</b>                                                                                                                                        | <b>1</b>                                                                                                                                  | <b>1</b>                                     |
| Product     | Type               | Product Grade Temperatures (°C)                                                                                                                 | Pin Style                                                                                                                                 | Baseplate                                    |
|             | 1 = 10A<br>2 = 20A | Grade Operating Storage<br>E = –10 to +100 –20 to 125<br>C = –20 to +100 –40 to 125<br>T = –40 to +100 –40 to 125<br>H = –40 to +100 –55 to 125 | 1 = Short<br>2 = Long<br>S = Short ModuMate<br>N = Long ModuMate<br>F = Short RoHS<br>G = Long RoHS<br>K = Extra Long RoHS <sup>[b]</sup> | 1 = Slotted<br>2 = Threaded<br>3 = Thru hole |

<sup>[b]</sup> Not intended for socket or Surfmate mounting

Note: Product images may not highlight current product markings.

## Specifications

(Typical at  $T_{BP} = 25^{\circ}\text{C}$ , nominal line and 75% load, unless otherwise specified.)

### Input Specifications

| Parameter       | Min | Typ | Max   | Unit             | Notes                  |
|-----------------|-----|-----|-------|------------------|------------------------|
| Input voltage   | 36  | 48  | 76    | $V_{DC}$         | Continuous             |
| Inrush limiting |     |     | 0.014 | A/ $\mu\text{F}$ | Capacitor C1. Figure 6 |

### Output Specifications

| Parameter            | Min  | Typ  | Max | Unit          | Notes                                                    |
|----------------------|------|------|-----|---------------|----------------------------------------------------------|
| Output current       |      |      |     |               |                                                          |
| FIAM1xxx             |      |      | 10  | A             |                                                          |
| FIAM2xxx             |      |      | 20  | A             |                                                          |
| Efficiency           | 96.0 | 97.5 |     | %             | Internal voltage drop is 1.4 max. @ 20A, 100°C baseplate |
| External capacitance |      |      |     |               | See illustration on page 3, Figure 6.                    |
| FIAM1xxx             | 10   |      | 150 | $\mu\text{F}$ | 100V                                                     |
| FIAM2xxx             | 100  |      | 330 | $\mu\text{F}$ | 100V                                                     |

### Control Pin Specifications

| Parameter        | Min | Typ | Max | Unit     | Notes                                   |
|------------------|-----|-----|-----|----------|-----------------------------------------|
| ON / OFF control |     |     |     |          |                                         |
| Enable (ON)      | 0.0 |     | 1.0 | $V_{DC}$ | Referenced to $-V_{OUT}$                |
| Disable (OFF)    | 3.5 |     | 5.0 | $V_{DC}$ | 100k $\Omega$ internal pull-up resistor |

### Electromagnetic Compatibility

| Parameter             | Min | Typ | Max | Unit | Notes                                                            |
|-----------------------|-----|-----|-----|------|------------------------------------------------------------------|
| Transient immunity    |     |     |     |      |                                                                  |
| Belcore TR-NWT-000499 |     |     | 200 | V    | 1 $\mu\text{sec}$ duration                                       |
| ETS 300 386-1 Class 2 |     |     | 200 | V    | 5.0 $\mu\text{sec}$ rise time, 50 $\mu\text{sec}$ duration surge |
|                       |     |     | 250 | V    | 1 – 100nsec burst                                                |

### Safety Specifications

| Parameter                               | Min | Typ   | Max | Unit      | Notes |
|-----------------------------------------|-----|-------|-----|-----------|-------|
| Dielectric withstand (I/O to baseplate) |     | 1,500 |     | $V_{RMS}$ |       |
|                                         |     | 2,121 |     | $V_{DC}$  |       |

## Specifications (Cont.)

(Typical at  $T_{BP} = 25^{\circ}\text{C}$ , nominal line and 75% load, unless otherwise specified.)

### Agency Approvals

| Safety Standards                                | Markings | Notes                                                                             |
|-------------------------------------------------|----------|-----------------------------------------------------------------------------------|
| UL1950, CSA 22.2-950, EN60950                   |          |                                                                                   |
| Conducted Emission (Figures 2&3) <sup>[c]</sup> |          |                                                                                   |
| Bellcore GR-001089-Core                         |          | Issue 2                                                                           |
| EN55022                                         |          | Level B; When used with Vicor Mini, Maxi, Micro 48V <sub>IN</sub> DC-DC converter |
| FCC Part 15                                     |          | Level B                                                                           |

### General Specifications

| Parameter                   | Min | Typ         | Max        | Unit              | Remarks                                     |
|-----------------------------|-----|-------------|------------|-------------------|---------------------------------------------|
| Reverse polarity protection |     |             |            |                   | No damage to module, external fuse required |
| Weight                      |     | 3.1<br>[88] | 4<br>[113] | ounces<br>[grams] |                                             |
| Warranty                    |     |             | 2          | years             |                                             |

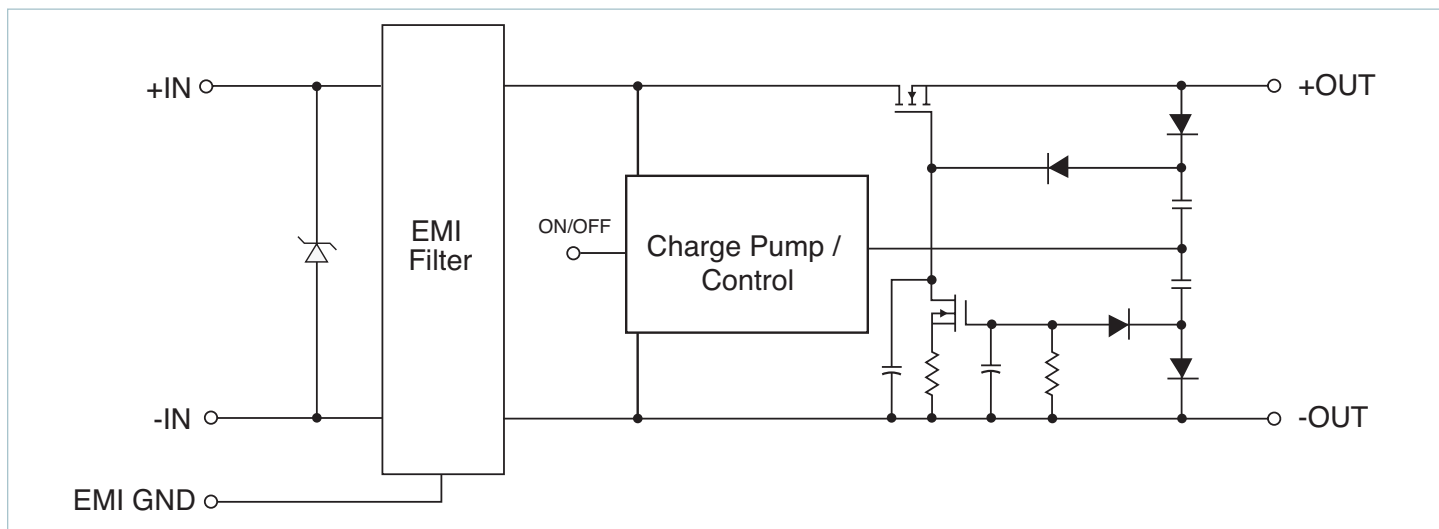


**Figure 1** — FIAM block diagram

<sup>[c]</sup> EMI performance is subject to a wide variety of external influences such as PCB construction, circuit layout etc.

As such, external components in addition to those listed herein may be required in specific instances to gain full compliance to the standards specified.

## Conducted Noise

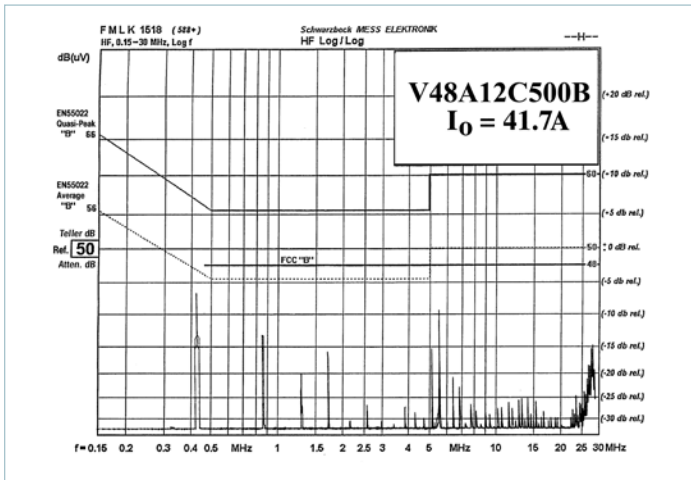


Figure 2 — FIAM and model V48A12C500 DC-DC converter

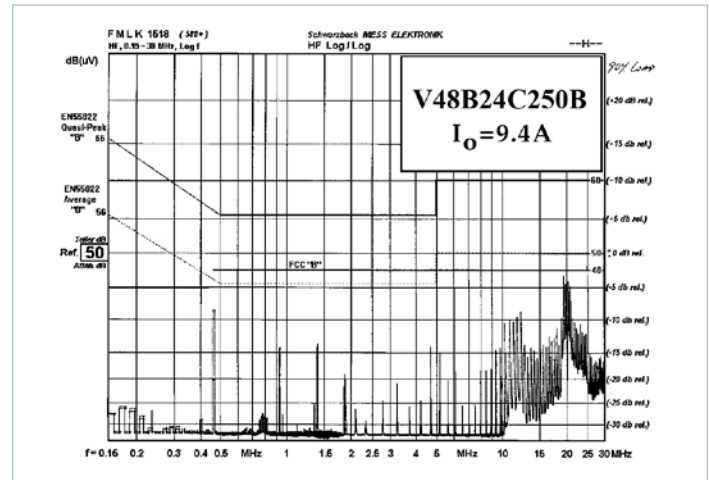


Figure 3 — FIAM and model V48B24C250 DC-DC converter

## Inrush Limiting

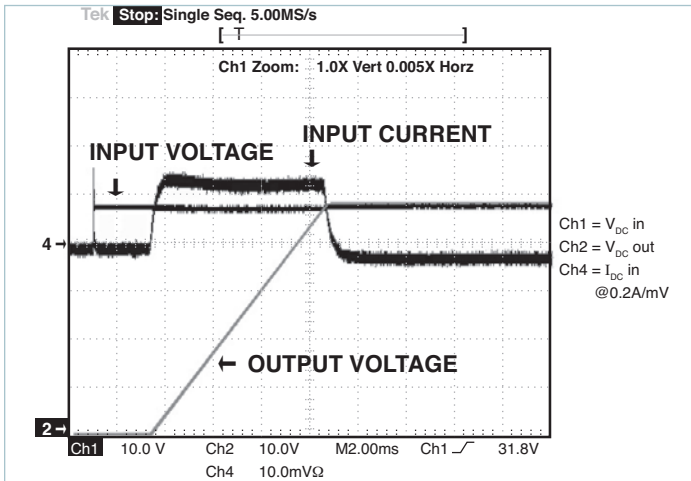


Figure 4 — Inrush limiting: inrush current with 330μF external capacitance

## Transient Immunity

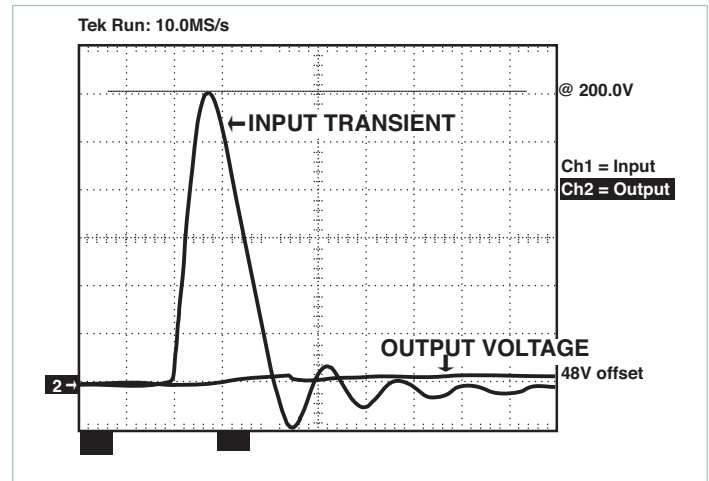


Figure 5 — Transient immunity: FIAM output response to an input transient

## Transient and Surge Protection

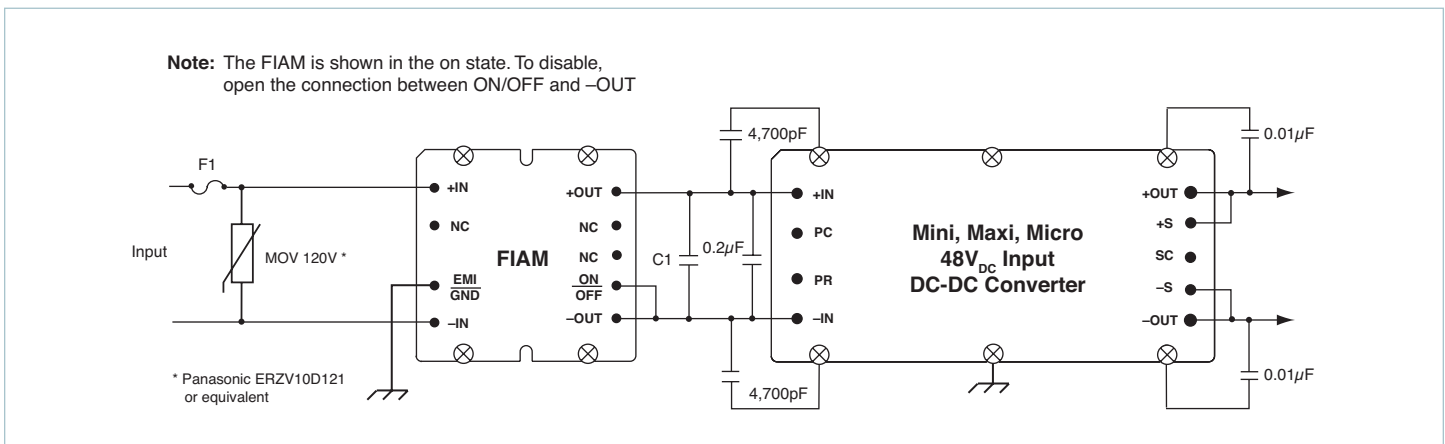
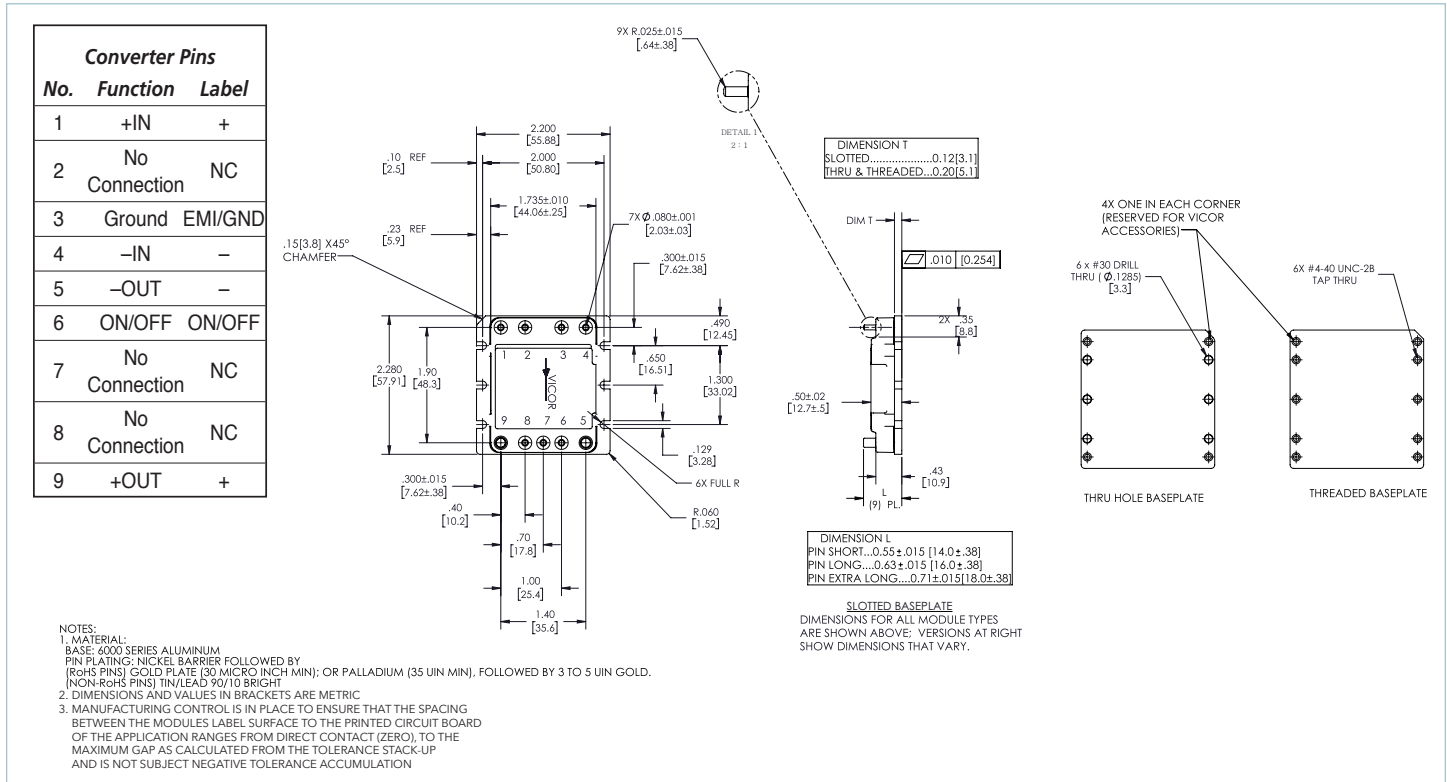


Figure 6 — Typical connection diagram

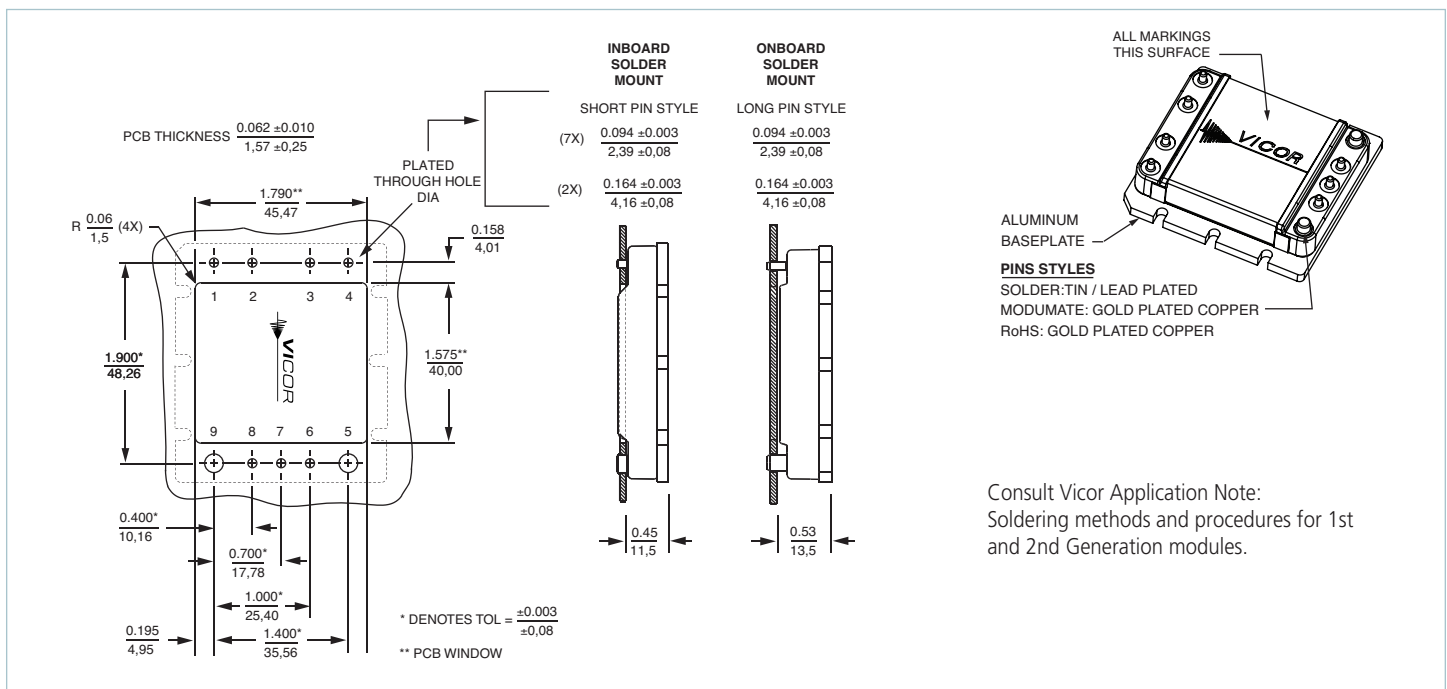
## Storage

Vicor products, when not installed in customer units, should be stored in ESD safe packaging in accordance with ANSI/ESD S20.20, "Protection of Electrical and Electronic Parts, Assemblies and Equipment" and should be maintained in a temperature controlled factory/warehouse environment not exposed to outside elements controlled between the temperature ranges of 15°C and 38°C. Humidity shall not be condensing, no minimum humidity when stored in an ESD compliant package.

## Mechanical Diagram



## PCB Mounting Specifications



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