# Military COTS $28V_{IN}$ Filter

## MVA-FIAM5B

Model Number **MVA-FIAM5BMC**

## Input Attenuator Module

### Features & Benefits

- EMI filtering-MIL-STD-461E [a]
- Transient protection-MIL-STD-704E/F
- Environments-MIL-STD-810, MIL-STD-202
- Environmental stress screening
- Output power up to 560W
- Output current up to 20A
- Inrush current limiting
- Cold plate mounting

### Product Highlights

The MVA-FIAM5B is a DC front-end module that provides EMI filtering and transient protection. The MVA-FIAM5B enables designers using Vicor Maxi, Mini, Micro Series 24V converters or VIPAC Arrays™ to meet conducted emission / conducted susceptibility per MIL-STD-461E; and input transients per MIL-STD-704E/F. The MVA-FIAM9 accepts an input voltage of 14 – 36$V_{DC}$ and delivers output power up to 560W.

MVA-FIAM5B is mounted on a 4.69 x 3.62in coldplate with a height of 0.81in and convenient input and output connectors.

### Compatible Products

- Maxi, Mini, Micro Series 24V Input DC-DC converters
- 24V Input VIPAC Arrays

[a] 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.

### Absolute Maximum Rating

| Parameter | Rating | Unit | Notes |
|---|---|---|---|
| +IN to –IN | 36 | $V_{DC}$ | Continuous |
| | 50 | $V_{DC}$ | 12.5ms, See Fig.3 |

### MTBF per MIL-HDBK-217F (MVA-FIAM5BM)

| Temperature | Environment | MTBF | Unit |
|---|---|---|---|
| 25°C | Ground Benign: G.B. | 2,430 | 1,000Hrs |
| 50°C | Naval Sheltered: N.S. | 437 | 1,000Hrs |
| 65°C | Airborne Inhabited Cargo: A.I.C. | 343 | 1,000Hrs |

### Part Numbering

**MVA-FIAM5B** **M** - **C**

***Product***

***Product Grade Temperatures (°C)***

| *Grade* | *Operating* | *Storage* |
|---|---|---|
| ***H*** = | *–40 to +100* | *–55 to +125* |
| ***M*** = | *–55 to +100* | *–65 to +125* |

***Blank*** = *Standard*
***C*** = *ON/OFF Control Enabled*

**Note:** Product images may not highlight current product markings.

## Specifications

(Typical at $T_{BP}$ = 25°C, nominal line and 75% load, unless otherwise specified)

### Input Specifications

| Parameter | Min | Typ | Max | Unit | Notes |
|---|---|---|---|---|---|
| Input voltage | 14 | 28 | 36 | $V_{DC}$ | Continuous |
| Inrush limiting | | | 0.007 | A/µF | |
| Transient immunity | | | 50 | $V_{DC}$ | 12.5ms per MIL-STD-704E/F, continuous operation<br>Test conditions AA and FF normal overvoltage transients per MIL-HDBK-704 |

### Output Specifications

| Parameter | Min | Typ | Max | Unit | Notes |
|---|---|---|---|---|---|
| Output current | | | 20 | A | |
| Output power | | | 560 | W | |
| Efficiency | 96 | 98 | | % | |
| Internal voltage drop | | 0.5 | 0.7 | V | @ 20A, 100 °C baseplate |
| External capacitance | | | | | See Figure 5 on page 4 |
| | 330 | | 1000 | µF | 50V |

### 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 | $V_{DC}$ | 100kΩ internal pull up resistor |

### Safety Specifications

| Parameter | Min | Typ | Max | Unit | Notes |
|---|---|---|---|---|---|
| Dielectric withstand | 1,500 | | | $V_{RMS}$ | Input / Output to Base |
| | 2,121 | | | $V_{DC}$ | Input / Output to Base |

### EMI

| Standard | Test Procedure | Notes |
|---|---|---|
| MIL-STD-461E | | |
| Conducted emissions: | CE101, CE102 | |
| Conducted susceptibility: | CS101, CS114, CS115, CS116 | |

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.

### General Specifications

| Parameter | Min | Typ | Max | Unit | Notes |
|---|---|---|---|---|---|
| Weight | | | 0.7 [318] | Pounds [grams] | |
| Warranty | | | 2 | Years | |

## Specifications (Cont.)

### Module Environmental Qualification

**Altitude**
MIL-STD-810F, Method 500.4, Procedure I & II, 40,000ft. and 70,000ft. Operational.

**Explosive Atmosphere**
MIL-STD-810F, Method 511.4, Procedure I, Operational.

**Vibration**
MIL-STD-810F, Method 514.5, Procedure I, Category 14, Sine and Random vibration per Table 514.5C for Helicopter AH-6J Main Rotor with overall level of 5.6Grms for 4 hours per axis. MIL-STD-810F, Method 514.5C, General Minimum Integrity Curve per Figure 514.5C-17 with overall level of 7.7Grms for 1 hour per axis.

**Shock**
MIL-STD-810F, Method 516.5, Procedure I, Functional Shock, 40g. MIL-S-901D, Lightweight Hammer Shock, 3 impacts/axis, 1,3,5ft.
MIL-STD-202F, Method 213B, 60g, 9ms half sine. MIL-STD-202F, Method 213B, 75g, 11ms Saw Tooth Shock.

**Acceleration**
MIL-STD-810F, Method 513.5, Procedure II, table 513.5-II, Operational, 2-7g, 6 directions.

**Humidity**
MIL-STD-810F, Method 507.4.

**Solder Test**
MIL-STD-202G, Method 208H, 8 hour aging.

### Module Environmental Stress Screening

| Parameter | H-Grade | M-Grade |
|---|---|---|
| Operating temperature | -40°C to +100°C | -55°C to +100°C |
| Storage temperature | -55°C to +125°C | -65°C to +125°C |
| Temperature cycling* | 12 cycles<br>-65°C to +100°C | 12 cycles<br>-65°C to +100°C |
| Ambient test @ 25°C | Yes | Yes |
| Power cycling burn-in | 12 hours, 29 cycles | 24 hours, 58 cycles |
| Functional and parametric ATE tests | -40°C and +100°C | -55°C and +100°C |
| Hi-Pot test | Yes | Yes |
| Visual inspection | Yes | Yes |
| Test data | vicorpower.com | vicorpower.com |

*Temperature cycled with power off, 17°C per minute rate of change.

## 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.

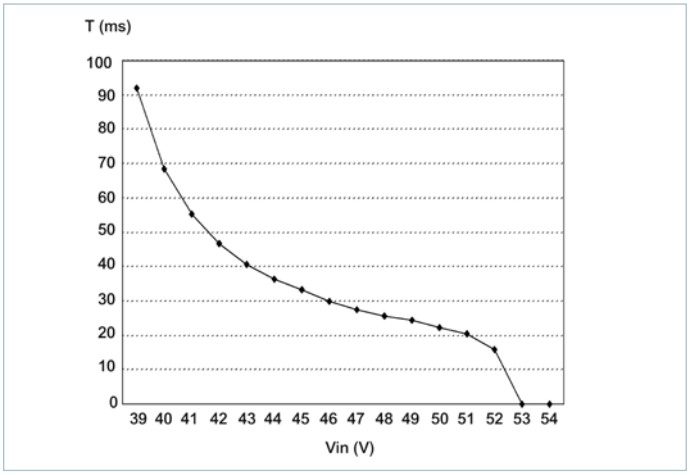



***Figure 1 —*** *Shut Down Time of MVA-FIAM5B vs. Overvoltage*

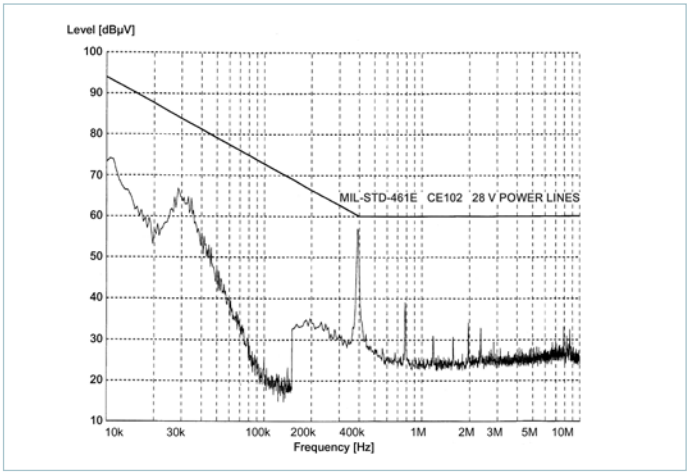



***Figure 2 —*** *Conducted Noise; MVA-FIAM5B and Model V24A12M400B DC-DC converter operating at 28$V_{DC}$, 400W.*

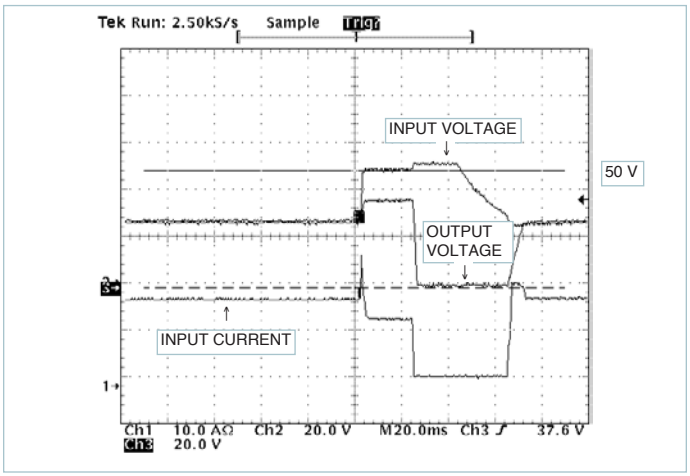



***Figure 3 —*** *Transient Immunity: MVA-FIAM5B output response to an input transient.*

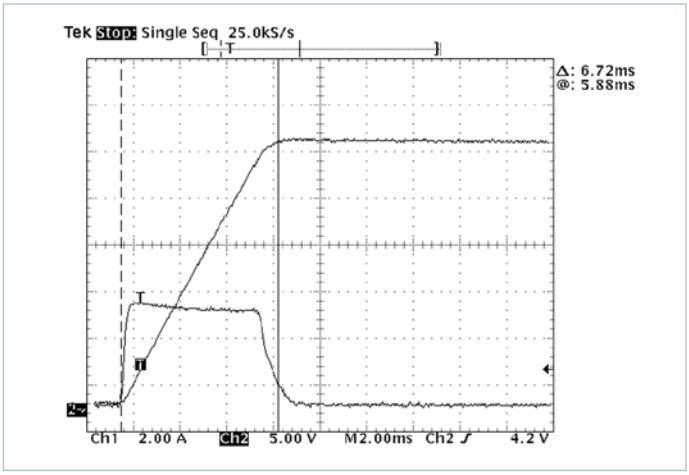
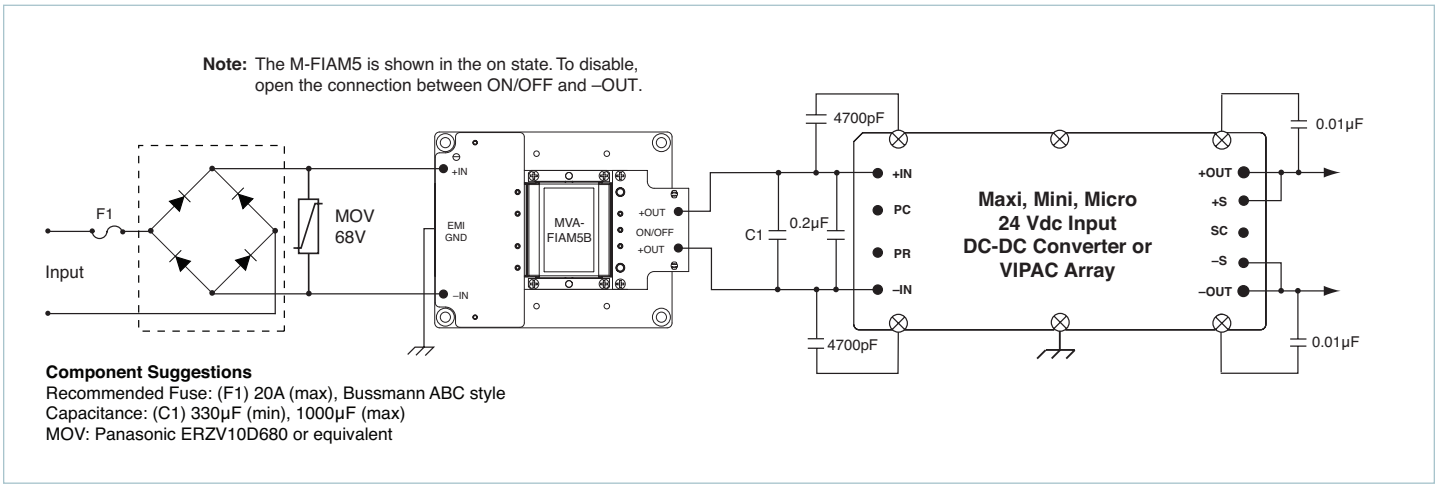
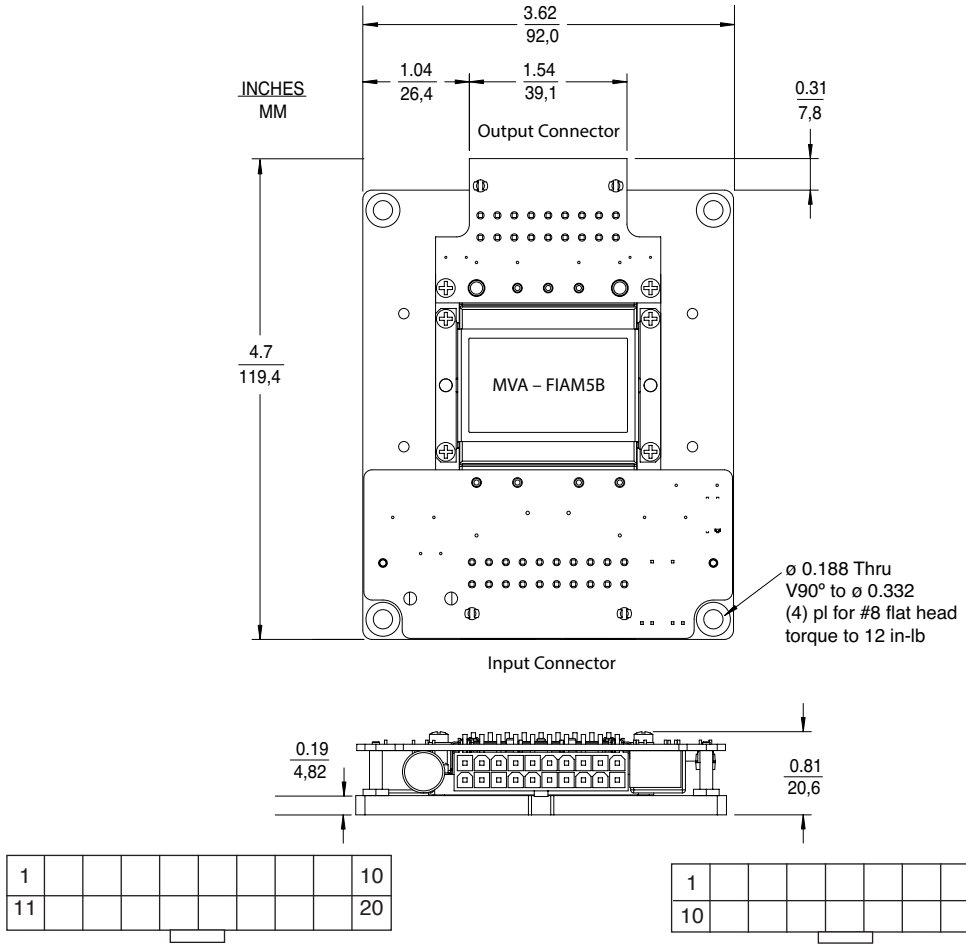



***Figure 4 —*** *Inrush Limiting: Inrush current with 1000µF external capacitance, (C1 in Figure 5)*




**Component Suggestions**
Recommended Fuse: (F1) 20A (max), Bussmann ABC style
Capacitance: (C1) 330µF (min), 1000µF (max)
MOV: Panasonic ERZV10D680 or equivalent

***Figure 5 —*** *Basic connection diagram with suggested Transient, Surge Protection and Recommended Reverse Polarity Protection.*




**Input Connector**

| Pin # | Function |
|---|---|
| 1 – 4 | –VIN |
| 5 – 7 | +VIN |
| 8 | NC |
| 9 | PE protective earth |
| 10 | PE protective earth |
| 11 – 13 | –VIN |
| 14 – 17 | +VIN |
| 18 | NC |
| 19 | PE protective earth |
| 20 | PE protective earth |

**Output Connector**

| Pin # | Function | Pin # | Function |
|---|---|---|---|
| 1 | +VOUT | 10 | +VOUT |
| 2 | +VOUT | 11 | +VOUT |
| 3 | +VOUT | 12 | +VOUT |
| 4 | N/C | 13 | N/C |
| 5 | N/C | 14 | N/C |
| 6 | N/C | 15 | On / Off |
| 7 | –VOUT | 16 | –VOUT |
| 8 | –VOUT | 17 | –VOUT |
| 9 | –VOUT | 18 | –VOUT |

| Input Mounting Connector | TE Connectivity P/N | Vicor P/N |
|---|---|---|
| Housing | 2-794657-0 | |
| Pin | 1-106529-2 | |
| Kit | | 24828 |

| Input Mounting Connector | TE Connectivity P/N | Vicor P/N |
|---|---|---|
| Housing | TYC1-794657-8 | |
| Pin | 1-106529-2 | |
| Kit | | 25067 |

**Note:** The MVA-FIAM5BH and MVA-FIAM5BM are delivered with the On / Off control already configured as On using a 0Ω resistor on the underside of the output connector board. The MVA-FIAM5BH-C and MVA-FIAM5BM-C are delivered without the 0Ω resistor installed, allowing for user control of the On / Off functionality.

***Figure 6 —*** *MVA-FIAM5B Packaging Option*

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Visit http://www.vicorpower.com/mil-cots_dc-dc/mil-cots_m-fiam_filter_input_attenuator_module for the latest product information.

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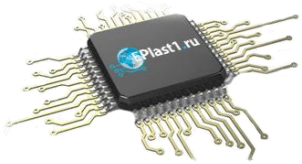


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