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Military COTS 270 V_{IN} Filter

M-FIAM3

Model Number **M-FIAM3M21***

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

Input Attenuator Module

Features & Benefits

- EMI filtering-MIL-STD-461E ^[1]
- Transient protection-MIL-STD-704E/F
- Environments-MIL-STD-810, MIL-STD-202
- Environmental stress screening
- Low profile mounting options
- Output current up to 3A
- Mini sized package
- Inrush current limiting

Product Highlights

The M-FIAM3 is a DC front-end module that provides EMI filtering and transient protection. The M-FIAM3 enables designers using Vicor's Maxi, Mini, Micro Series 300V DC-DC converters to meet conducted emission/conducted susceptibility per MIL-STD-461E; and input transients per MIL-STD-704E/F. The M-FIAM3 accepts an input voltage of 180 – 375V_{DC} and delivers output current up to 3A.

M-FIAM3 is housed in an industry standard "half brick" module measuring 2.28" x 2.2" x 0.5" and depending upon model selected, may be mounted on-board or in-board for height critical applications.

Compatible Products

- Maxi, Mini, Micro Series 300V Input DC-DC converters

^[1] EMI performance is subject to a wide variety of external influences such as PCB construction, circuit layout etc. External components in addition to those listed herein may be required in specific instances to gain full compliance to the standards specified at various line and load conditions.

Absolute Maximum Rating

| Parameter | Rating | Unit | Notes |
|---------------------------|-----------|-----------------|---------------------|
| +IN to -IN | 375 | V _{DC} | Continuous |
| | 400 | V _{DC} | 100ms |
| Mounting torque | 5 (0.57) | in-lbs | 6 each, #4-40 or M3 |
| Pin Soldering temperature | 500 (260) | °F (°C) | <5sec; wave solder |
| | 750 (390) | °F (°C) | <7sec; hand solder |

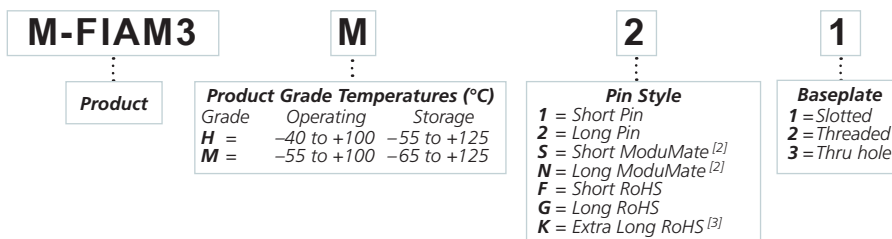
Thermal Resistance and Capacity

| Parameter | Min | Typ | Max | Unit |
|----------------------|------------------------------|-----|---------|---------|
| Baseplate to sink | | | | |
| | flat, greased surface | | 0.16 | °C/Watt |
| | with thermal pad (P/N 20264) | | 0.1 | °C/Watt |
| Baseplate to ambient | | | | |
| | Free convection | | 7.9 | °C/Watt |
| 1000LFM | | 2.2 | °C/Watt | |

MTBF per MIL-HDBK-217F (M-FIAM3M21)

| Temperature | Environment | MTBF | Unit |
|-------------|----------------------------------|--------|----------|
| 25°C | Ground Benign: G.B. | 13,291 | 1,000Hrs |
| 50°C | Naval Sheltered: N.S. | 2,392 | 1,000Hrs |
| 65°C | Airborne Inhabited Cargo: A.I.C. | 1,874 | 1,000Hrs |

Part Numbering



^[2] Compatible with SurfMate and InMate socketing system

^[3] Not intended for socket or Surfmate mounting

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 | 180 | 270 | 375 | V_{DC} | Continuous |
| Inrush limiting | | | 0.018 | A/ μF | |
| Transient immunity | | | | | Exceeds limits of MIL-STD-704E/F |

OUTPUT SPECIFICATIONS

| Parameter | Min | Typ | Max | Unit | Notes |
|-----------------------|-----|-----|-----|---------------|---------------------------------|
| Output current | | | 3 | A | |
| Efficiency | 96 | 98 | | % | |
| Internal voltage drop | | 3.0 | 5.0 | V | @ 3A, 100°C baseplate |
| External capacitance | 10 | | 22 | μF | See Figure 5 on page 4. 400V |

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 Ω 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.

Specifications (Cont.)

GENERAL SPECIFICATIONS

| Parameter | Min | Typ | Max | Unit | Notes |
|-----------|-----|----------|-----|----------------|-------|
| Weight | | 3.3 (94) | | Ounces (grams) | |
| Warranty | | | 2 | Years | |

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, 1,3,5 ft. 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. |

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 -65°C to +100°C | 12 cycles -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.

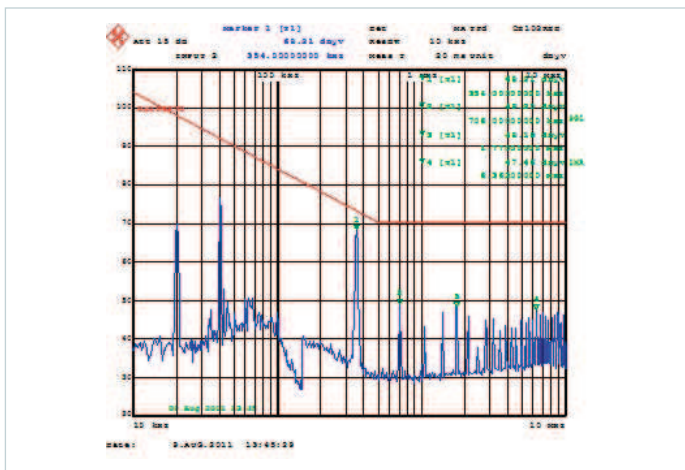


Figure 1 — Conducted noise; M-FIAM3 and V300A48C500BG DC-DC converter operating at 270V_{DC} input at 450W

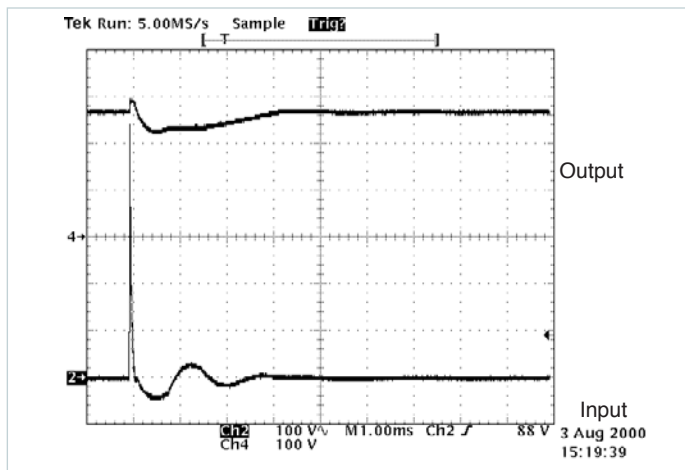


Figure 2 — Transient Immunity; M-FIAM3 output response to an input transient

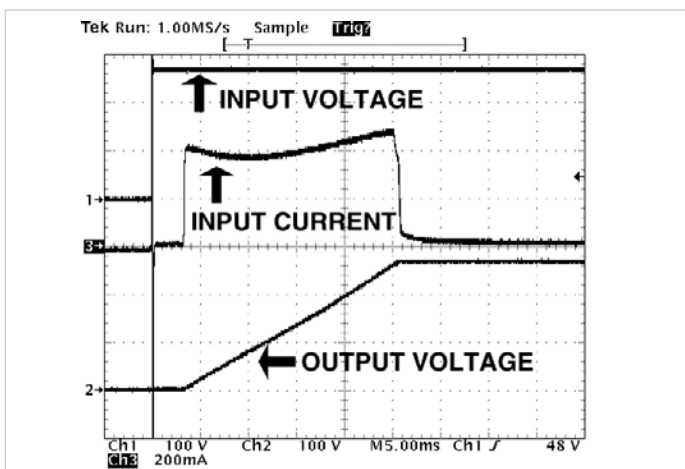


Figure 3 — Inrush Limiting; Inrush current with 22μF external capacitance, (C1 in Figure 5)

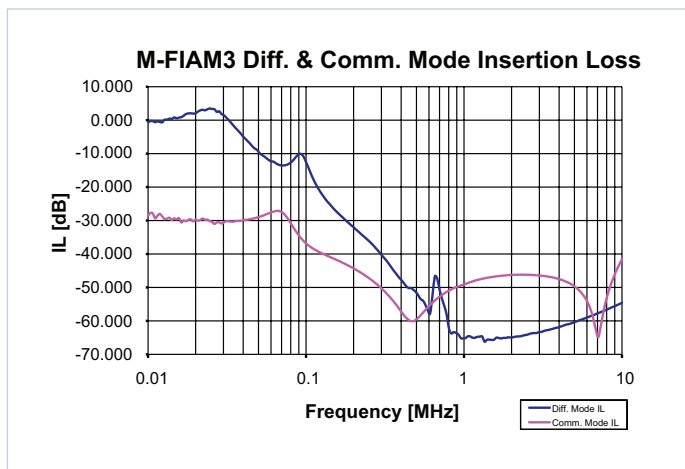


Figure 4 — Insertion Loss Curve

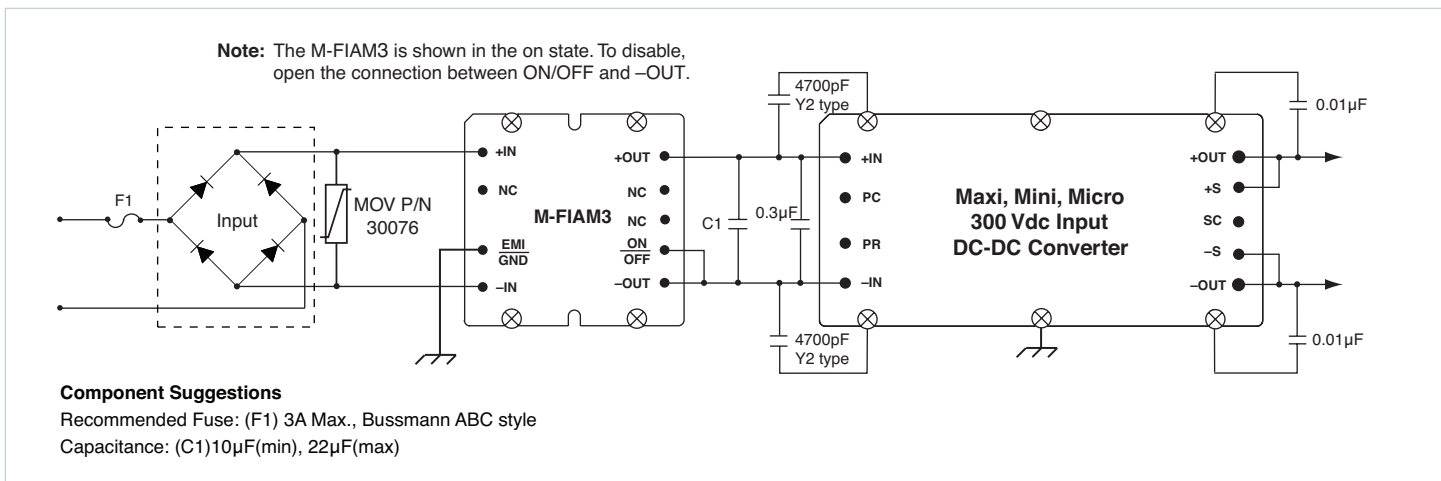


Figure 5 — Basic connection diagram with Transient, Surge Protection and Recommended Reverse Polarity Protection

Mechanical Drawings

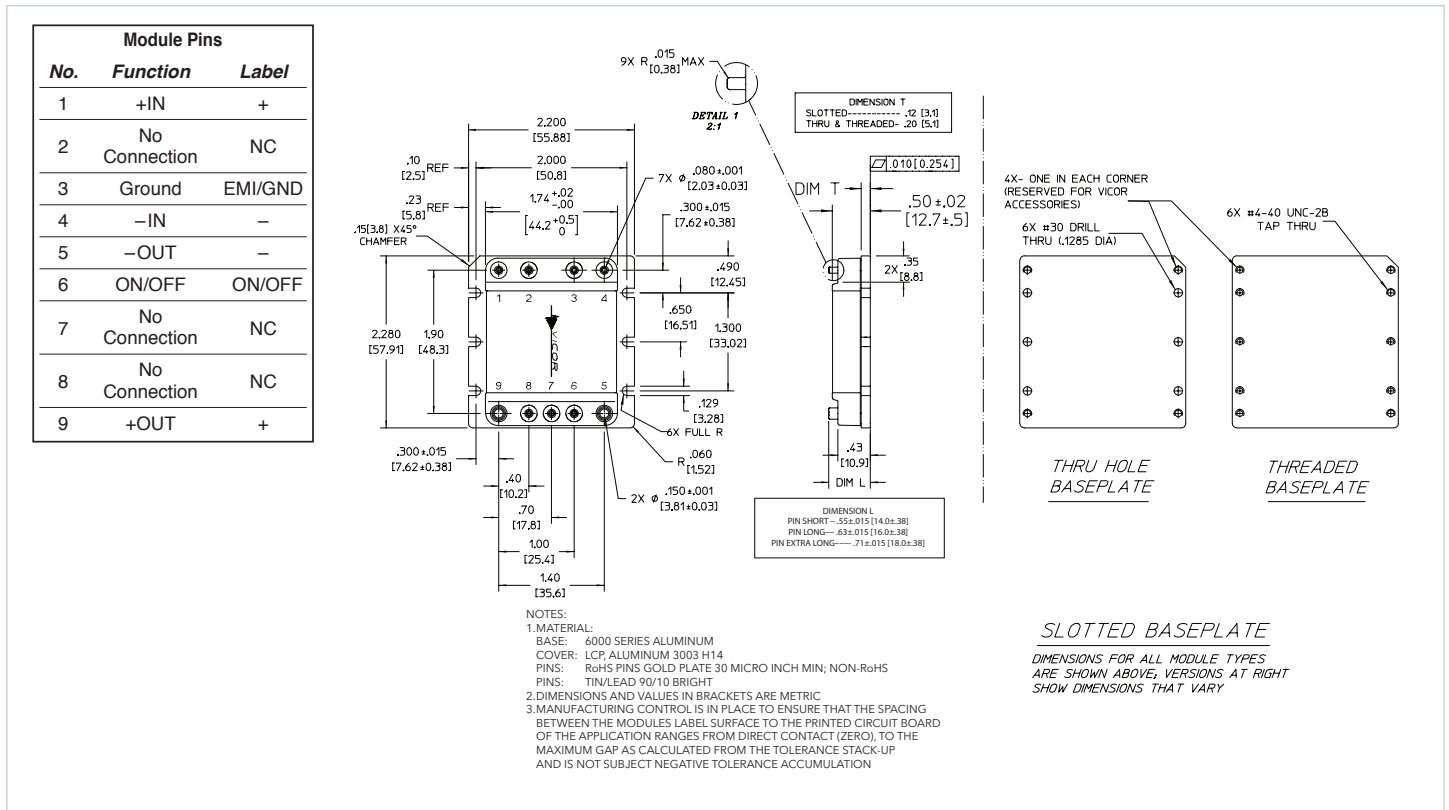


Figure 6 — Mechanical diagram

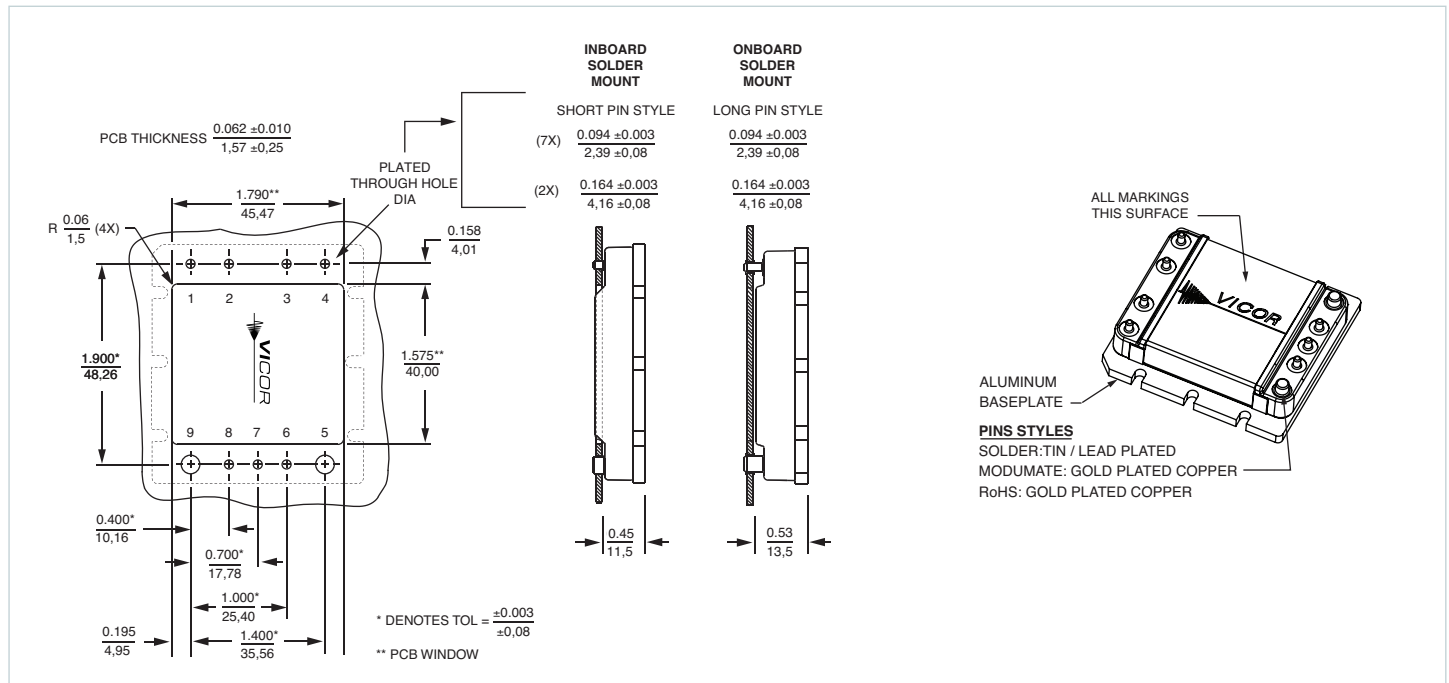


Figure 7 — PCB Mounting Specifications

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