

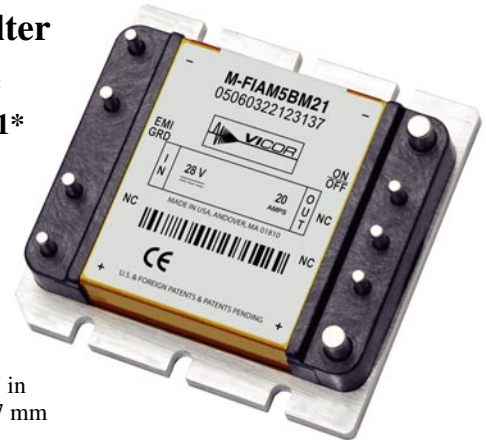


# Data Sheet

## M-FIAM5B

### Military COTS 28 Vin Filter Input Attenuator Module

Model Number: M-FIAM5BM21\*



M-FIAM5B:  
2.28 x 2.2 x 0.5 in  
57,9 x 55,9 x 12,7 mm

### Features

- EMI filtering-MIL-STD-461E
- Transient protection-MIL-STD-704E/F
- Environments-MIL-STD-810, MIL-STD-202
- Environmental stress screening
- Low profile mounting options
- Output power up to 560 W
- Output current up to 20 A
- Mini sized package
- Inrush current limiting

### Product Highlights

The M-FIAM5B is a DC front-end module that provides EMI filtering and transient protection. The M-FIAM5B enables designers using Vicor's Maxi, Mini, Micro Series 24 V DC-DC converters to meet conducted emission / conducted susceptibility per MIL-STD-461E; and input transients per MIL-STD-704E/F. The M-FIAM5B accepts an input voltage of 14 – 36 Vdc and delivers output current up to 20 A.

M-FIAM5B 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 onboard or inboard for height critical applications.

### Compatible Products

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

### Absolute Maximum Rating

Parameter	Rating	Unit	Notes
+In to -In	36	Vdc	Continuous
	50	Vdc	12.5 ms, See Fig.3
Mounting torque	5 (0.57)	in-lbs	6 each, #4-40 or M3
Pin soldering temperature	500 (260)	°F(°C)	<5 sec; wave solder
	750 (390)	°F(°C)	<7 sec; hand solder

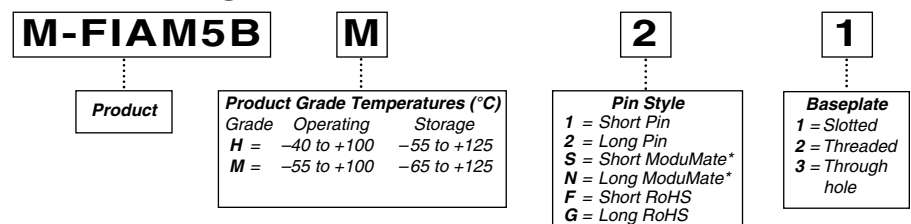
### Thermal Resistance and Capacity

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
1000 LFM		2.2	°C/Watt	

### MTBF per MIL-HDBK-217F (M-FIAM5BM21)

Temperature	Environment	MTBF	Unit
25°C	Ground Benign: G.B.	2,533	1,000 Hrs
50°C	Naval Sheltered: N.S.	456	1,000 Hrs
65°C	Airborne Inhabited Cargo: A.I.C.	375	1,000 Hrs

### Part Numbering\*



\*Compatible with SurfMate and InMate socketing system.

## 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	14	28	36	Vdc	Continuous
Inrush limiting			0.007	A/ $\mu\text{F}$	
Transient immunity			50	Vdc	12.5 ms per MIL-STD-704E/F, continuous operation

### 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	Vdc	@20 A, 100°C baseplate
External capacitance	330		1000	$\mu\text{F}$	See Figure 5 on page 4 50 V

### CONTROL PIN SPECIFICATIONS

Parameter	Min	Typ	Max	Unit	Notes
ON/OFF control					
Enable (ON)	0.0		1.0	Vdc	Referenced to – Vout
Disable (OFF)	3.5		5.0	Vdc	100 k $\Omega$ internal pull up resistor

### SAFETY SPECIFICATIONS

Parameter	Min	Typ	Max	Unit	Notes
Dielectric withstand		1,500	Vrms		Input / Output to Base
		2,121	Vdc		Input / Output to Base

### EMI

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

### GENERAL SPECIFICATIONS

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

## SPECIFICATIONS (CONT.)

### ■ ENVIRONMENTAL QUALIFICATION

<b>Altitude</b>	MIL-STD-810F, Method 500.4, Procedure I & II, 40,000 ft. and 70,000 ft. Operational.
<b>Explosive Atmosphere</b>	MIL-STD-810F, Method 511.4, Procedure I, Operational.
<b>Vibration</b>	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 5.6 G rms for 4 hours per axis. MIL-STD-810F, Method 514.5C, General Minimum Integrity Curve per Figure 514.5C-17 with overall level of 7.7 G rms for 1 hour per axis.
<b>Shock</b>	MIL-STD-810F, Method 516.5, Procedure I, Functional Shock, 40 g. MIL-S-901D, Lightweight Hammer Shock, 3 impacts/axis, 1,3,5 ft. MIL-STD-202F, Method 213B, 60 g, 9 ms half sine. MIL-STD-202F, Method 213B, 75 g, 11 ms Saw Tooth Shock.
<b>Acceleration</b>	MIL-STD-810F, Method 513.5, Procedure II, table 513.5-II, Operational, 2-7 g, 6 directions.
<b>Humidity</b>	MIL-STD-810F, Method 507.4.
<b>Solder Test</b>	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	<a href="http://vicorpower.com">vicorpower.com</a>	<a href="http://vicorpower.com">vicorpower.com</a>

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

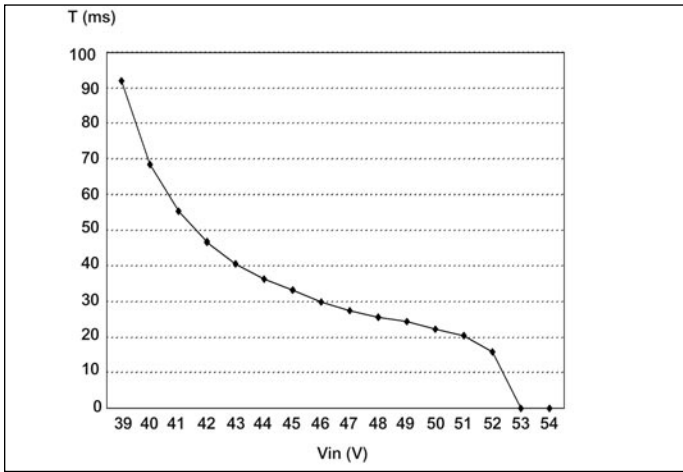


Figure 1 — Shut Down Time of M-FIAM5B vs. Overvoltage

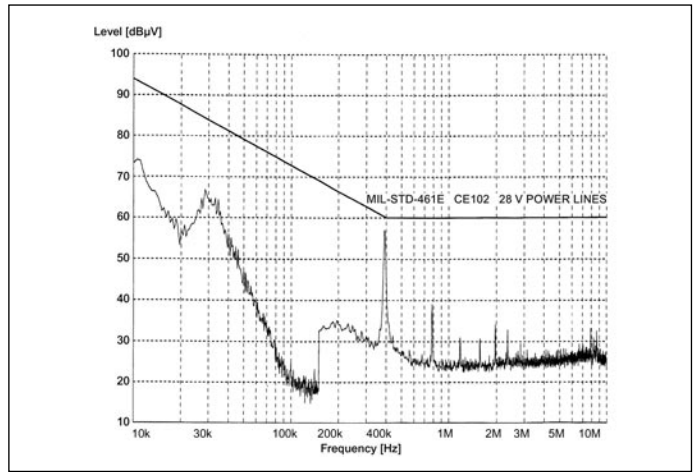


Figure 2 — Conducted Noise; M-FIAM5B and Model V24A12M400B DC-DC converter operating at 28 Vdc, 400 W.

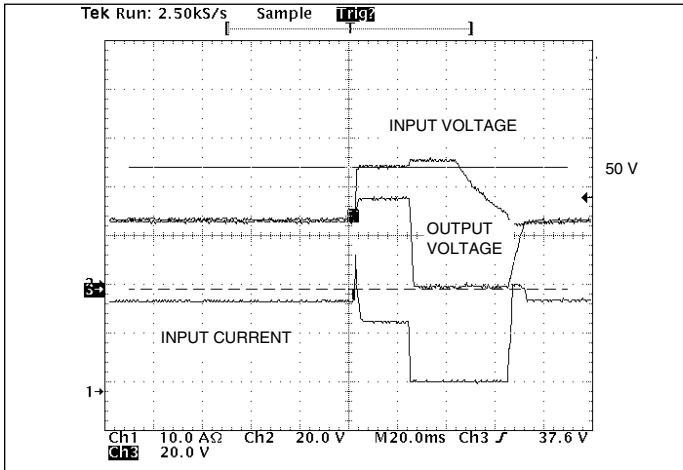


Figure 3 — Transient Immunity: M-FIAM5B output response to an input transient.

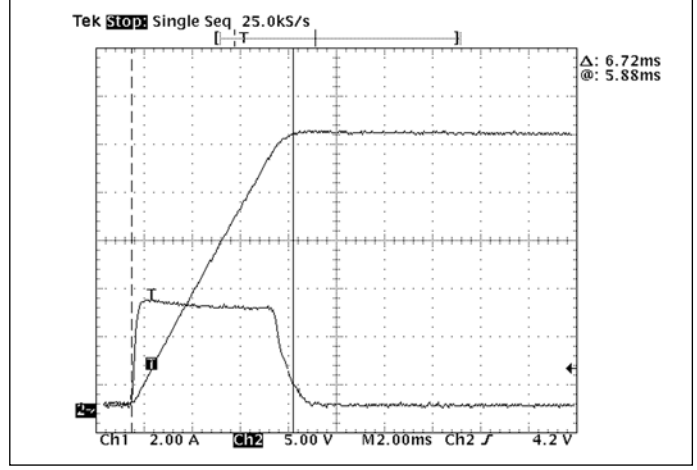


Figure 4— Inrush Limiting: Inrush current with 1000  $\mu$ F external capacitance, (C1 in Figure 5)

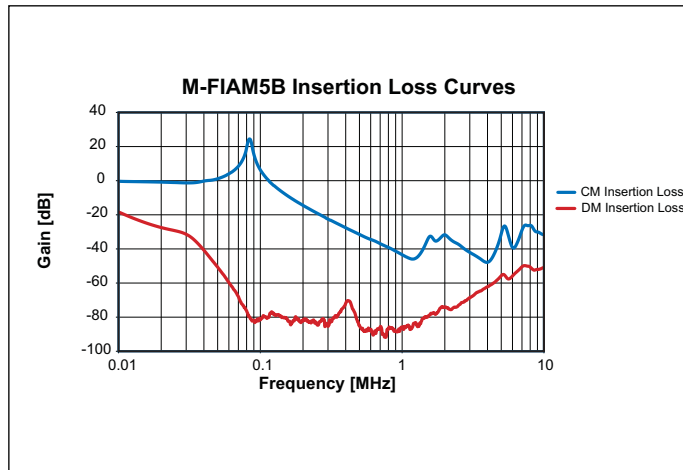
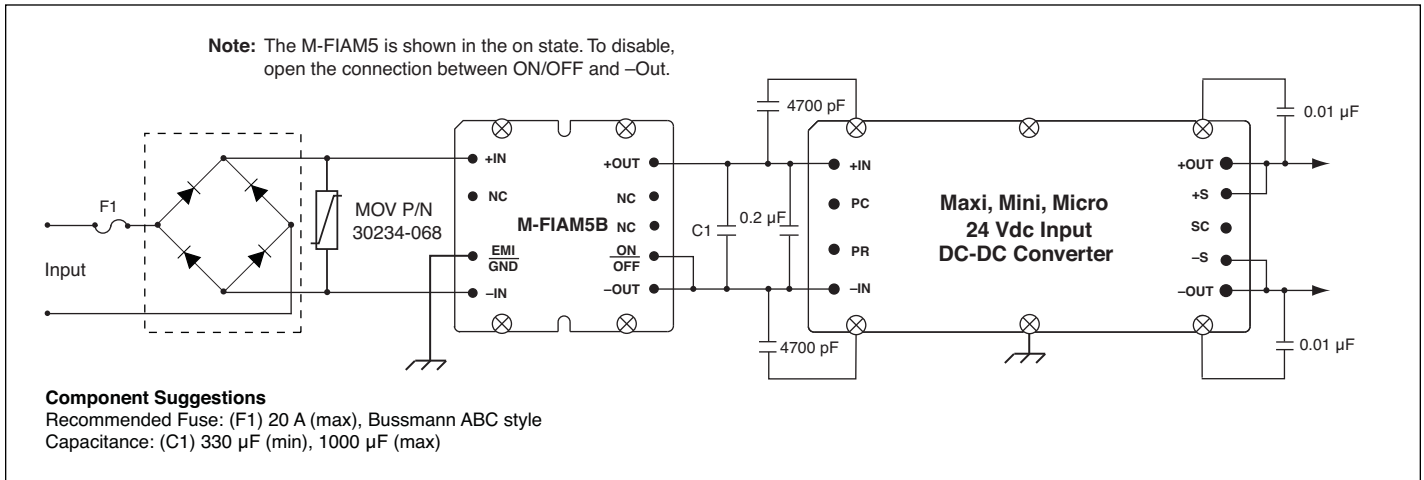


Figure 5 — Insertion Loss



**Figure 6**—Basic connection diagram with suggested Transient, Surge Protection and Recommended Reverse Polarity Protection.

# MECHANICAL DRAWINGS

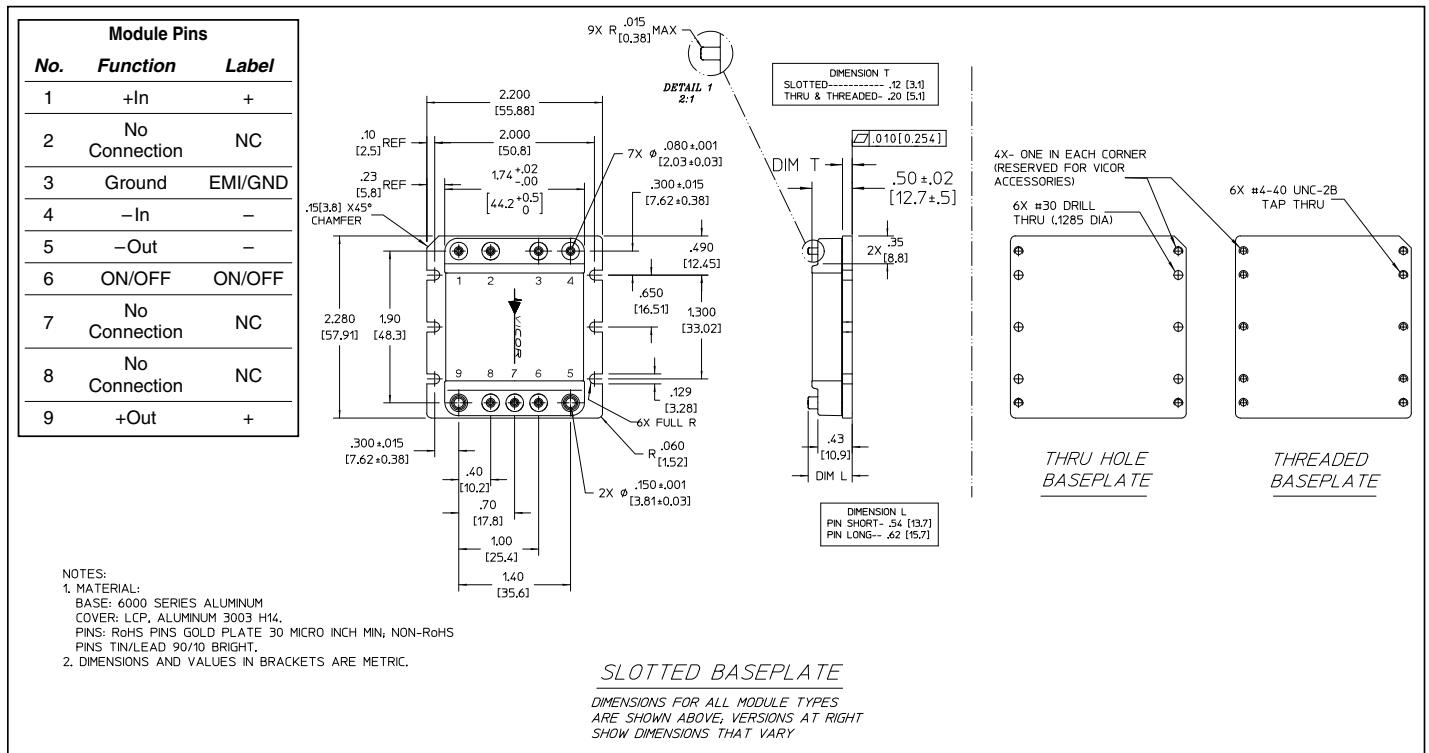


Figure 7 — Mechanical diagram

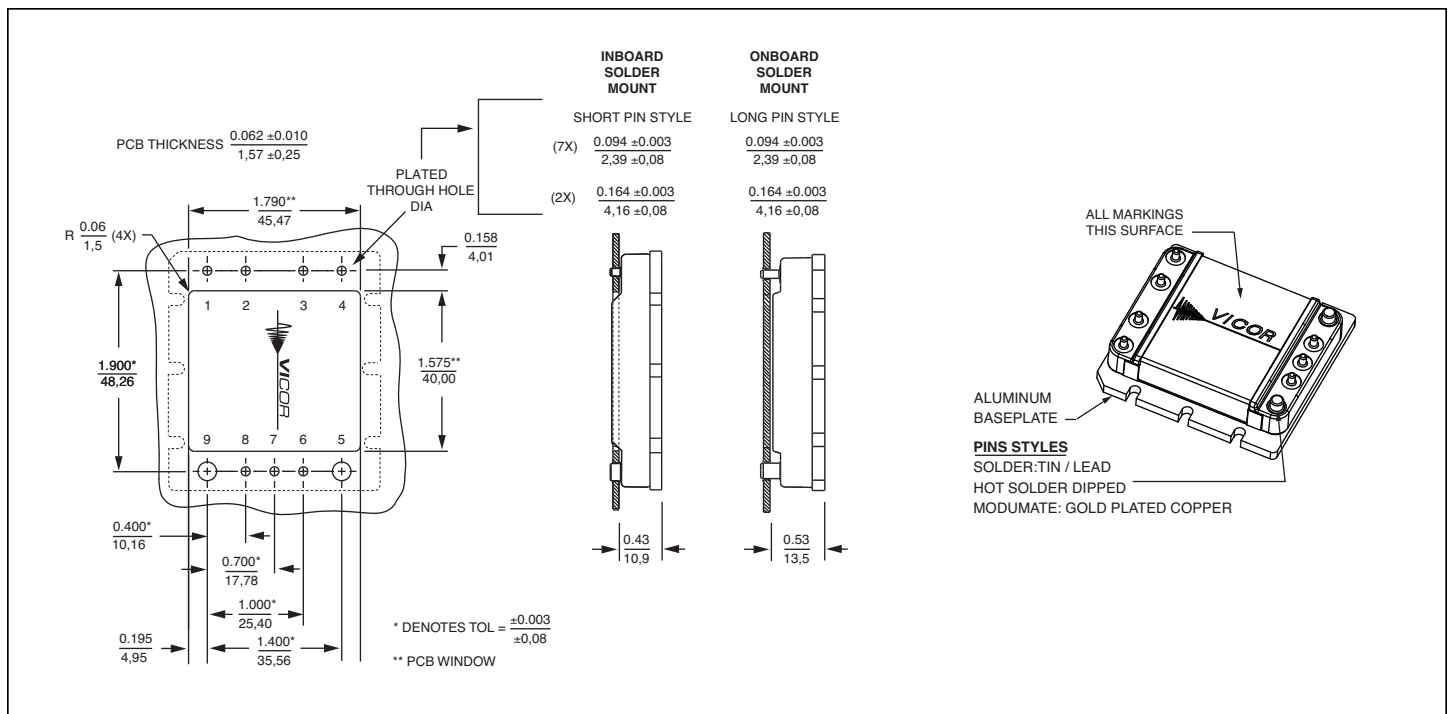


Figure 8 — PCB Mounting Specifications.

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