



# Data Sheet

## M-FIAM7

### Military COTS 28 Vin Filter Input Attenuator Module

Model Number: M-FIAM7M21\*



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

#### Features

- EMI filtering-MIL-STD-461E<sup>(1)</sup>
- Transient protection-MIL-STD-1275A/B/D, MIL-STD-704A-F and DO-160E
- Environments-MIL-STD-810, MIL-STD-202
- Environmental stress screening
- Low profile mounting options
- Output power up to 130 W
- Output current up to 10 A
- Mini sized package
- Inrush current limiting

#### Product Highlights

The M-FIAM7 is a DC front-end module that provides EMI filtering and transient protection. The M-FIAM7 enables designers using Vicor's 28 V DC-DC V•I Chip modules to meet conducted emission/ conducted susceptibility per MIL-STD-461E; and input transients per MIL-STD-1275A/B/D, MIL-STD-704A-F and DO-160E. The M-FIAM7 accepts an input voltage of 14 – 50 Vdc and delivers output current up to 10 A.

M-FIAM7 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

- 28 V Input DC-DC V•I Chip modules.

Note: This product is not compatible with Maxi, Mini, Micro DC-DC converters.

<sup>(1)</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.

#### Absolute Maximum Rating

Parameter	Rating	Unit	Notes
+In to -In	50	Vdc	Continuous
+In to -In	100	Vdc	See Fig.1
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

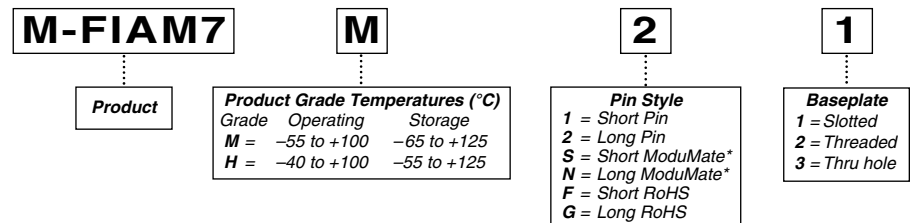
#### Thermal Resistance and Capacity

Parameter	Min	Typ	Max	Unit
Baseplate to sink flat, greased surface		0.16		°C/Watt
		0.1		°C/Watt
Baseplate to ambient Free convection		7.9		°C/Watt
		2.2		°C/Watt

#### MTBF per MIL-HDBK-217F (M-FIAM7M21)

Temperature	Environment	MTBF	Unit
25°C	Ground Benign: G.B.	3,540	1,000 Hrs
50°C	Naval Sheltered: N.S.	637	1,000 Hrs
65°C	Airborne Inhabited Cargo: A.I.C.	499	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	50	Vdc	Continuous
Inrush limiting			0.007	A/ $\mu\text{F}$	
Transient immunity			100	Vdc	50 ms per MIL-STD-1275A/B/D, continuous operation
			250	Vdc	70 $\mu\text{s}$ per MIL-STD-1275B, continuous operation
			70	Vdc	20 ms per MIL-STD-704A, continuous operation
		80	Vdc	100 ms per DO-160E, Section 16, Power Input, Category Z	

### OUTPUT SPECIFICATIONS

Parameter	Min	Typ	Max	Unit	Notes
Output current			10	A	Over continuous input and temp. range (see Fig.4)
Output power			130	W	Transient compliance over temp. range (see Fig.6)
Efficiency	96	98		%	
Internal voltage drop		0.5	0.7		@10 A, 100°C baseplate
External capacitance	330		1000	$\mu\text{F}$	See illustration C1 on page 4 63 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)	4.0		5.50	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	

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			3.3 (94)	Ounces (grams)	
Warranty			2	Years	

# SPECIFICATIONS (CONT.)

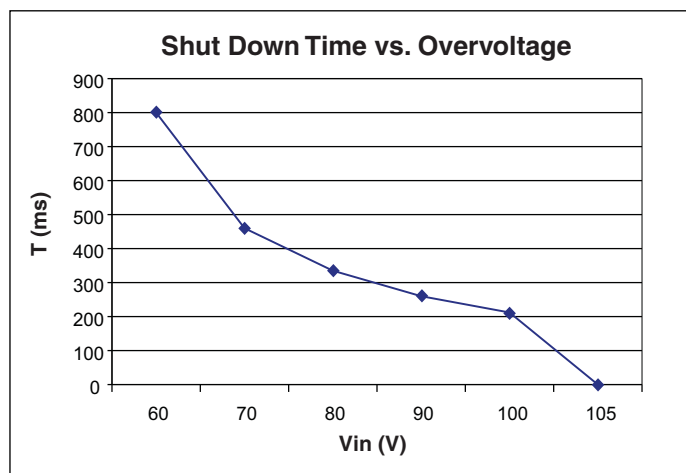
## ENVIRONMENTAL QUALIFICATION

<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, 9ms half sine. MIL-STD-202F, Method 213B, 75 g, 11ms 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.

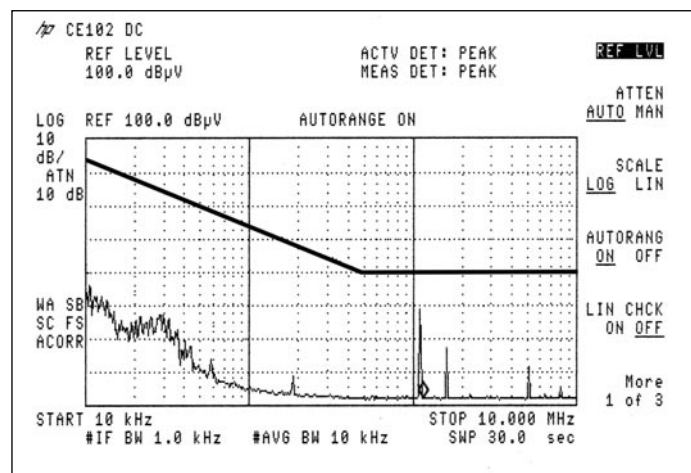
## ENVIRONMENTAL STRESS SCREENING

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** – T = Time period before over-voltage protection. Vin = Input voltage (switching up from 28 Vdc)



**Figure 2** – Conducted Noise; M-FIAM7 and MP028F036M12AL + MV036F120M010 DC-DC V•I Chip modules operating at 28 Vdc, 120 W.

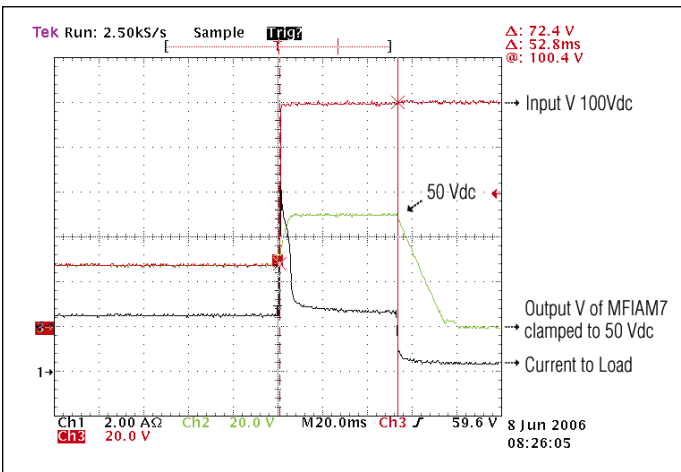
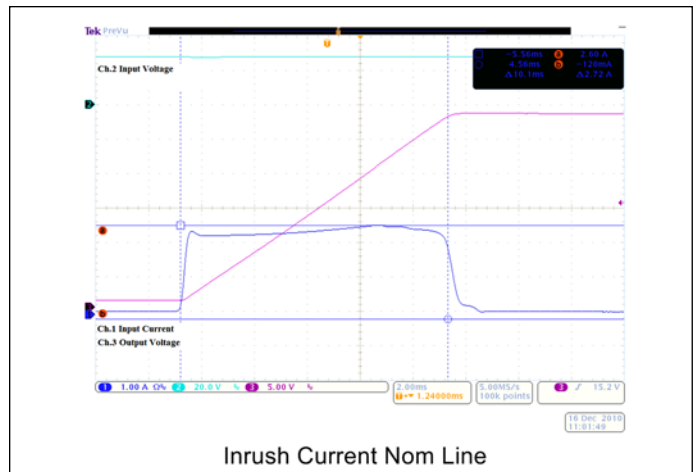


Figure 3 – Transient Immunity; M-FIAM7 output response to an input transient.



Inrush Current Nom Line

Figure 4 – Inrush Limiting; Inrush current with 1000  $\mu$ F external capacitance.

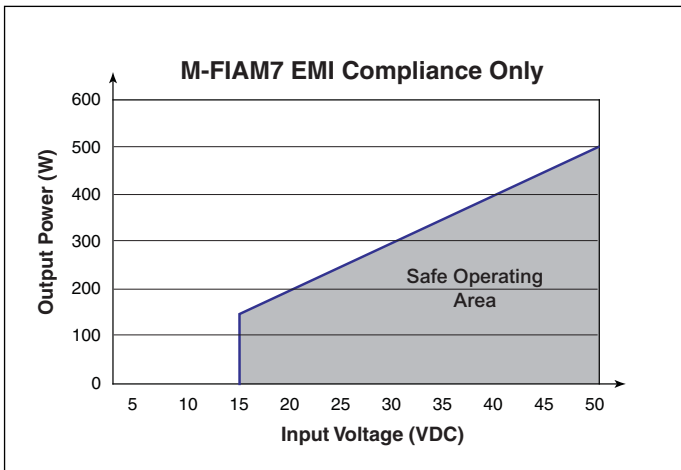


Figure 5 – M-FIAM7 EMI Compliance only

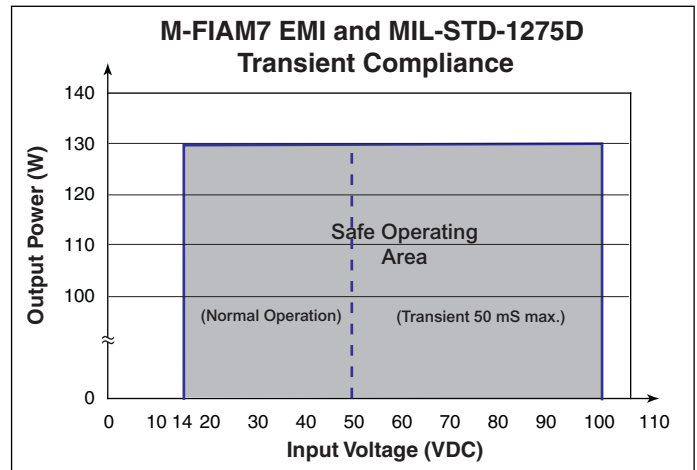


Figure 6 – M-FIAM7 EMI and MIL-STD-1275D Transient Compliance

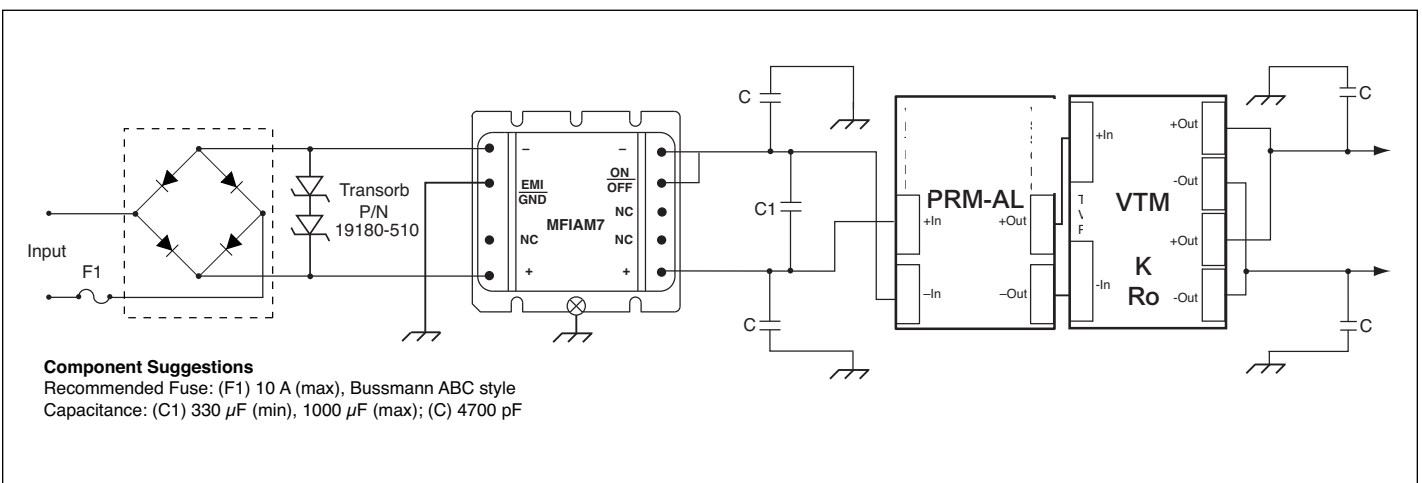


Figure 7 – Basic connection diagram with Transient, Surge Protection and Recommended Reverse Polarity Protection.

# MECHANICAL DRAWINGS

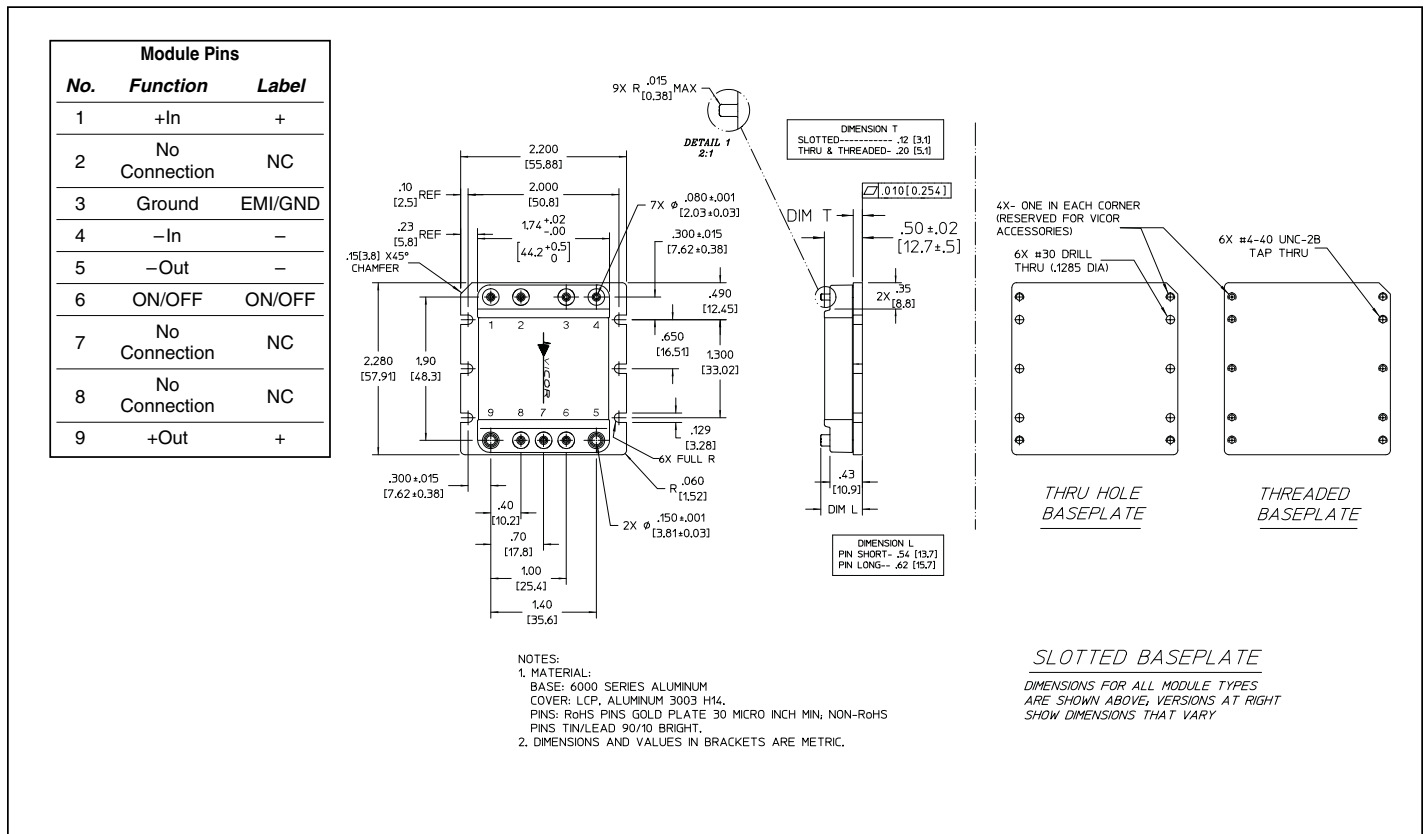


Figure 8 – Mechanical diagram

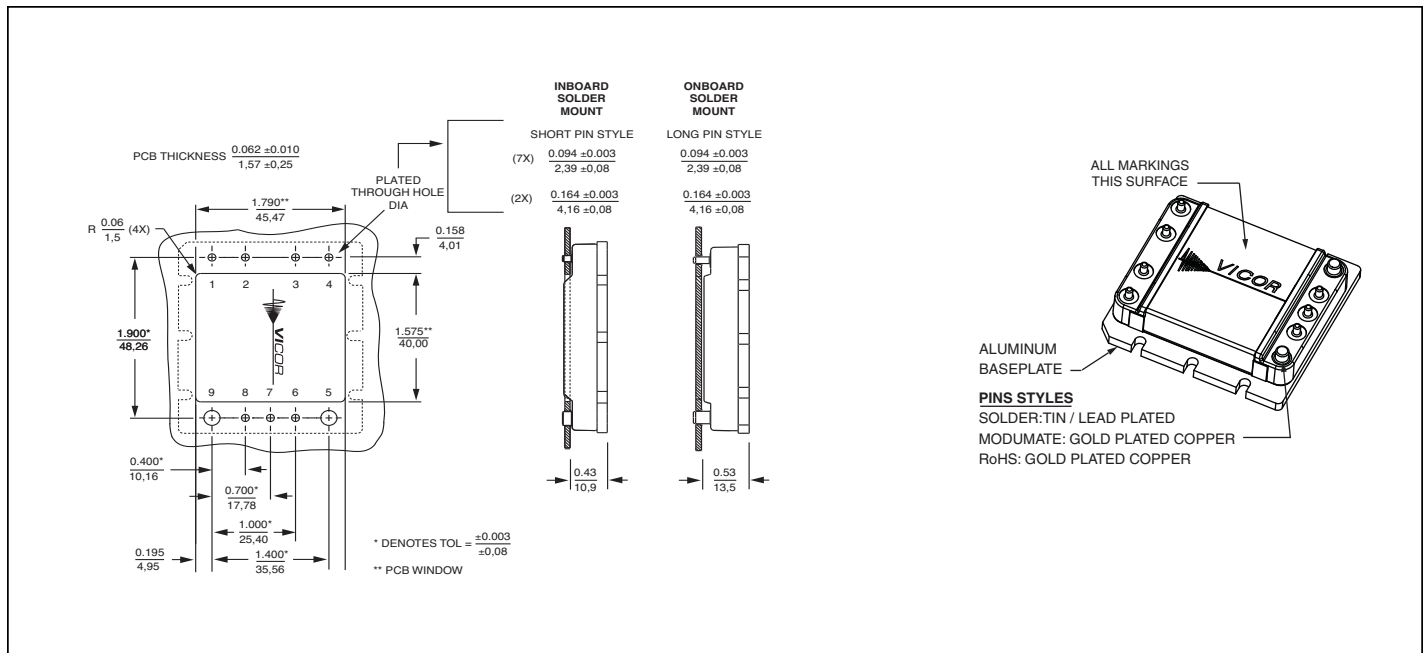


Figure 9 – PCB Mounting Specifications

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