



Data Sheet

M-FIAM9

Military COTS 28 Vin Filter Input Attenuator Module

Model Number: M-FIAM9M21*

Features

- EMI filtering-MIL-STD-461E
- Transient protection-MIL-STD-704A/E/F, MIL-STD-1275A/B/D
- Environments-MIL-STD-810, MIL-STD-202
- Environmental stress screening
- Low profile mounting options
- Output power up to 500 W
- Output current up to 18 A
- Mini sized package
- Inrush current limiting
- Reverse polarity protection

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



Product Highlights

The M-FIAM9 is a DC front-end module that provides EMI filtering and transient protection. The M-FIAM9 enables designers using Vicor's Maxi, Mini, Micro Series 24 V & Maxi Series 28 V DC-DC converters to meet conducted emission / conducted susceptibility per MIL-STD-461E; and input transients per MIL-STD-704A/E/F and MIL-STD-1275A/B/D. The M-FIAM9 accepts an input voltage of 10 – 36 Vdc and delivers output power up to 500 W.

M-FIAM9 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
- Maxi Series 28 V Input DC-DC converters

Absolute Maximum Rating

Parameter	Rating	Unit	Notes
+In to -In	36	Vdc	Continuous
	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

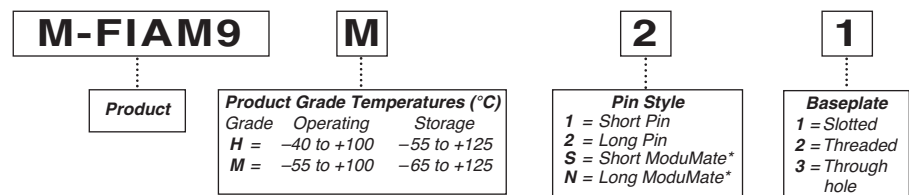
Thermal Resistance and Capacity

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
	1000 LFM	2.2		°C/Watt

MTBF per MIL-HDBK-217F (M-FIAM9M21)

Temperature	Environment	MTBF	Unit
25°C	Ground Benign: G.B.	6,157	1,000 Hrs
50°C	Naval Sheltered: N.S.	1,108	1,000 Hrs
65°C	Airborne Inhabited Cargo: A.I.C.	868	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	10	28	36	Vdc	Continuous
Inrush limiting			0.007	A/ μF	
Transient immunity			100	Vdc	50 ms per MIL-STD-1275A/B/D, continuous operation
			250	Vdc	70 μs per MIL-STD-1275A/B/D, continuous operation
			70	Vdc	20 ms per MIL-STD-704A, continuous operation
			50	Vdc	12.5 ms per MIL-STD-704E/F, continuous operation

OUTPUT SPECIFICATIONS

Parameter	Min	Typ	Max	Unit	Notes
Output power			500	W	
Output current			18	A	
Efficiency	96	97		%	
Internal voltage drop		0.85	1.5	V	500 W, 25°C baseplate
External capacitance	330		1000	μF	See Figure 4 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 Ω 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

Altitude MIL-STD-810F, Method 500.4, Procedure I & II, 40,000 ft. and 70,000 ft. 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 5.6 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.
Shock 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.
Acceleration MIL-STD-810F, Method 513.5, Procedure II, table 513.5-II, Operational, 2-7 g, 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.

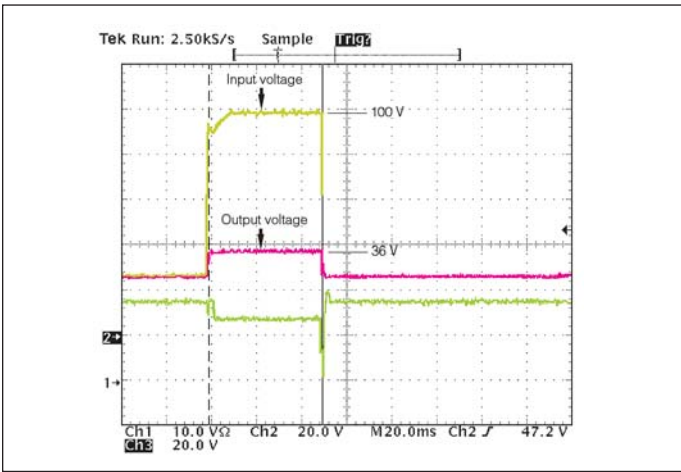


Figure 1 — Transient Immunity: M-FIAM9 output response to an input transient.

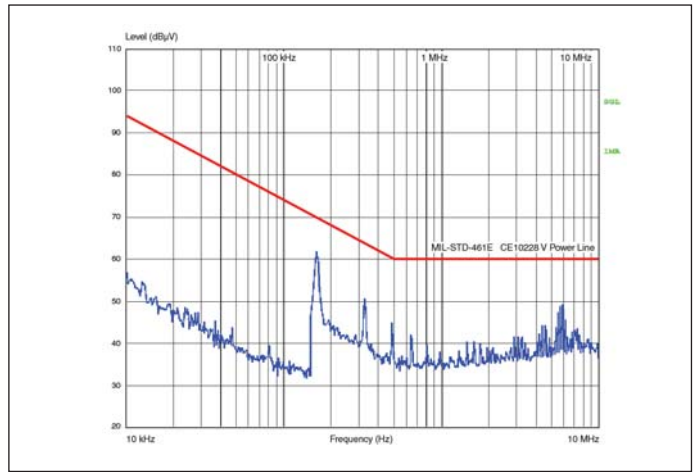


Figure 2 — Conducted Noise; M-FIAM9 and Model V28A12M200B DC-DC converter operating at 28 Vdc, 200 W.

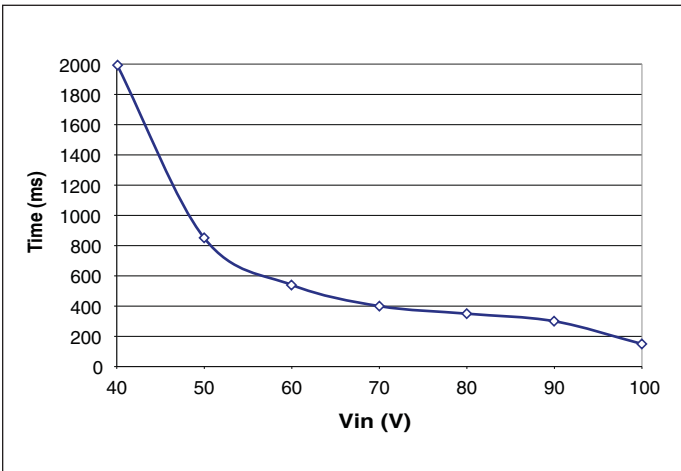


Figure 3 — Shut down time of M-FIAM9 vs. Overvoltage

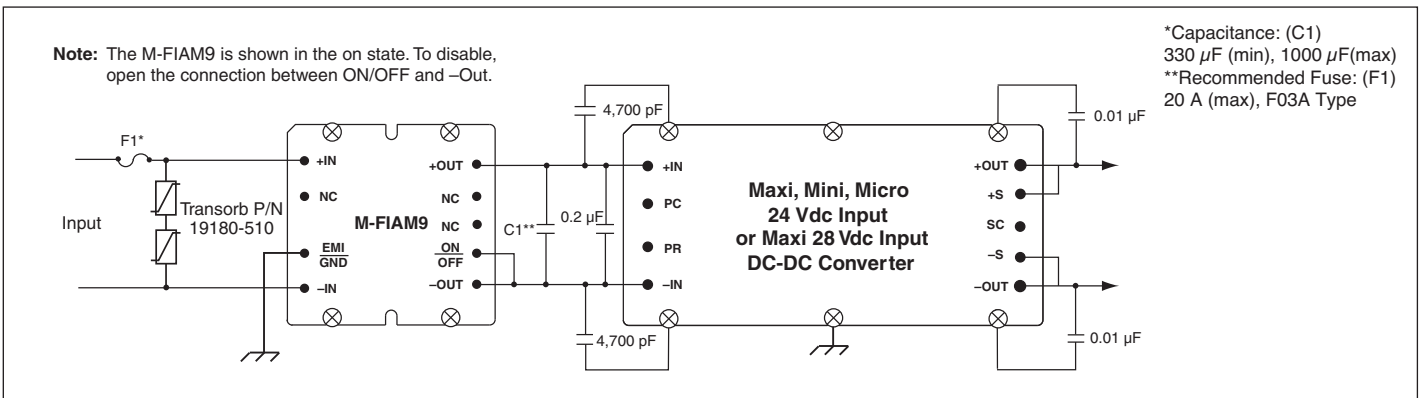


Figure 4— Transient and Surge Protection

MECHANICAL DRAWINGS

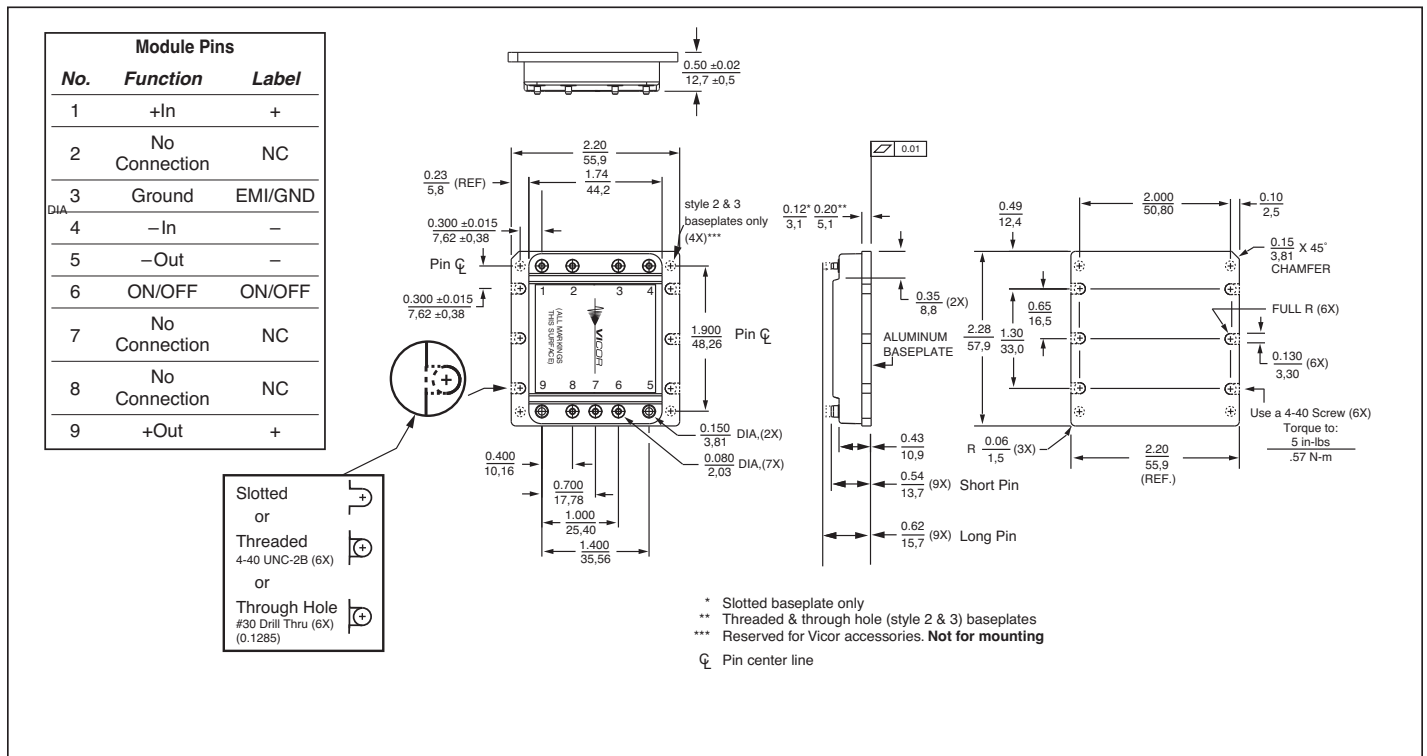


Figure 4 — Mechanical diagram

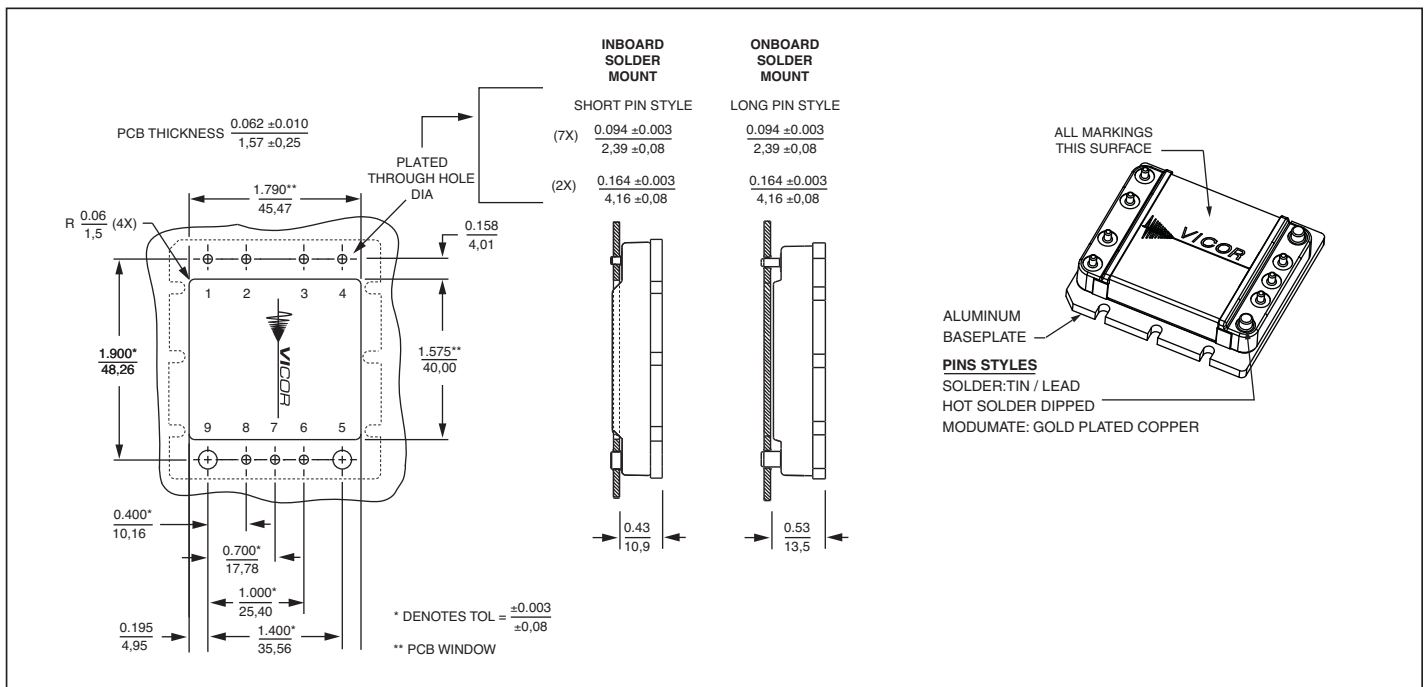


Figure 5 — PCB Mounting Specifications.

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