



Data Sheet

FIAM™



Filter Input Attenuator Module

Features

- RoHS Compliant (with F or G pin style)
- EMI filtering-Class B⁽¹⁾
- Transient protection
- Low profile mounting options
- 10 and 20 Ampere versions
- UL, CSA, EN compliance
- Mini-size package
- Inrush current limiting

Product Highlights

The FIAM is a DC front-end module providing transient protection, inrush current limiting and Class B EMI filtering in a Mini-size package. The FIAM enables designers using Vicor 48 Vin Mini, Micro, or Maxi DC-DC converters to meet the transient immunity and EMI requirements of Bellcore, FCC, ETSI and European Norms and protect system hardware from inrush current. The FIAM accepts an input voltage of 36 – 76 Vdc, is available in 10 or 20 A versions and provides reverse polarity protection and remote on/off control.

Internally, the FIAM employs a transient suppressor diode directly across the input. Refer to Figure 1. This is followed by a passive EMI filter that provides attenuation of both common mode and differential mode conducted emissions. Surge protection and inrush current limiting is accomplished by a MOS FET in series with the positive rail whose gate is driven by the charge pump/control circuit. During normal operation the FET is fully enhanced; essentially a closed switch. The charge pump limits the time rate of change of gate bias voltage at startup, or in the event of a voltage surge at the input. During this condition, the source terminal of the FET follows the gate, offset by the gate threshold voltage. A transient event at the input, or drain terminal of the FET is therefore attenuated and absorbed by the FET, which during this condition is in the source follower mode. As a result, the transient is virtually non-existent at the output of the FIAM. In addition, upon application of power, the controlled voltage ramp up, limits the rate at which the output capacitor is charged, thereby limiting inrush current.

FIAM 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

- Mini, Micro, Maxi 48 V Input DC-DC converters



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

Absolute Maximum Rating

Parameter	Rating	Unit	Notes
+In to -In	80	Vdc	Continuous
	100	V	100 ms
+Out to -Out	75	Vdc	Continuous
Mounting torque	5(0.57)	in-lbs	6 each, #4-40 or M3
Operating temperature	-40 to +100	°C	T and H -Grade
Storage temperature	-55 to +125	°C	H-Grade
Pin soldering temperature	500 (260)	°F(°C)	<5 sec; wave solder
	750 (390)	°F(°C)	<7 sec; hand solder

Thermal Resistance

Parameter	Min	Typ	Max	Unit
Baseplate to sink flat, greased surface thermal pad (P/N 20264)		0.16		°C/Watt
		0.14		°C/Watt
Baseplate to ambient Free Convection 1000 LFM		8.0		°C/Watt
		1.9		°C/Watt

Part Numbering

FIAM	1	C	1	1
Product	Type 1 = 10 A 2 = 20 A	Product Grade Temperatures (°C) Grade Operating Storage E = -10 to +100 -20 to 125 C = -20 to +100 -40 to 125 T = -40 to +100 -40 to 125 H = -40 to +100 -55 to 125	Pin Style 1 = Short 2 = Long S = Short ModuMate N = Long ModuMate F = Short RoHS G = Long RoHS	Baseplate 1 = Slotted 2 = Threaded 3 = Thru-hole

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	36	48	76	Vdc	Continuous
Inrush limiting			0.014	A/ μF	Capacitor C1. Fig 6

■ OUTPUT SPECIFICATIONS

Parameter	Min	Typ	Max	Unit	Notes
Output current					
FIAM1xxx			10	A	
FIAM2xxx			20	A	
Efficiency	96.0	97.5			Internal voltage drop is 1.4 max. @ 20 A, 100 °C baseplate
External capacitance					See illustration on page 3, Fig 6.
FIAM1xxx	10		150	μF	100 V
FIAM2xxx	100		330	μF	100 V

■ CONTROL PIN SPECIFICATIONS

Parameter	Min	Typ	Max	Unit	Notes
ON / OFF control					
Enable (ON)	0.0		1.0		Referenced to $-V_{out}$
Disable (OFF)	3.5		5.0	Vdc	100k Ω internal pull-up resistor

■ ELECTROMAGNETIC COMPATIBILITY

Parameter	Min	Typ	Max	Unit	Notes
Transient immunity					
Bellcore TR-NWT-000499			200	V	1 μsec duration
ETS 300 386-1 Class 2			200	V	5.0 μsec rise time, 50 μsec duration surge
			250	V	1 – 100 nsec burst

■ SAFETY SPECIFICATIONS

Parameter	Min	Typ	Max	Unit	Notes
Dielectric withstand (I/O to baseplate)		1,500		V _{RMS}	
		2,121		Vdc	

Specifications (Cont.)

■ AGENCY APPROVALS

Safety Standards	Markings	Notes
UL1950, CSA 22.2-950, EN60950		
Conducted Emission (Figures 2&3) ⁽¹⁾		
Bellcore GR-001089-Core		Issue 2
EN55022		Level B; When used with Vicor Mini, Maxi, Micro 48 Vin DC-DC converter
FCC Part 15		Level B

■ GENERAL SPECIFICATIONS

Parameter	Min	Typ	Max	Unit	Remarks
Reverse polarity protection					No damage to module, external fuse required
Weight		3.1 (88)	4 (113)	ounces (grams)	
Warranty			2	years	

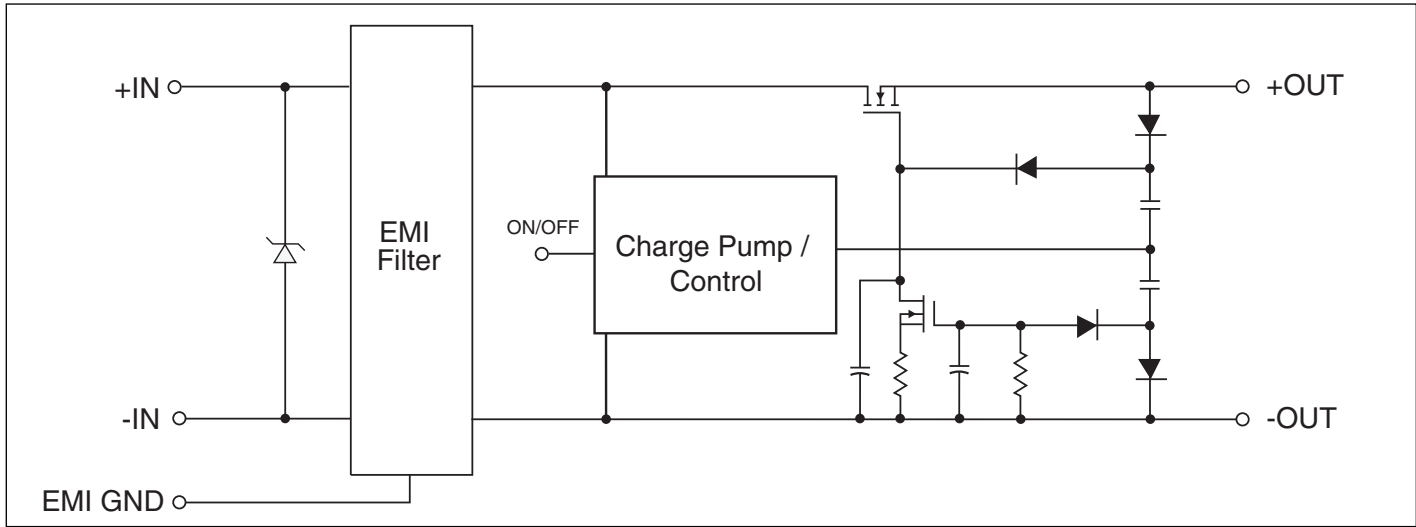


Figure 1 — FIAM Block Diagram

⁽¹⁾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.

Conducted Noise

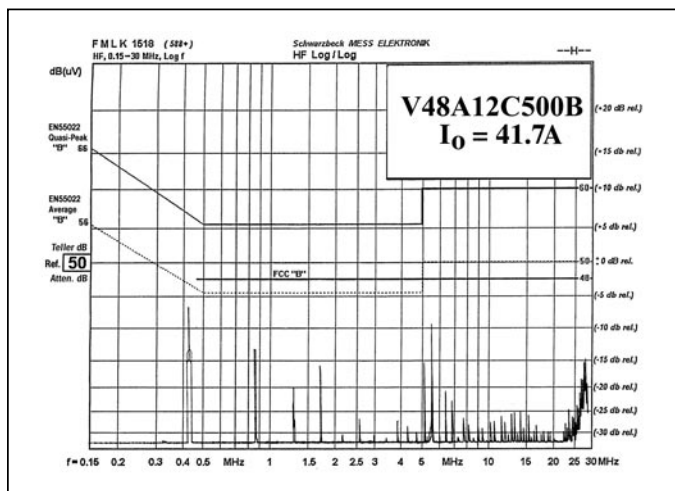


Figure 2 — FIAM and Model V48A12C500 DC-DC converter.

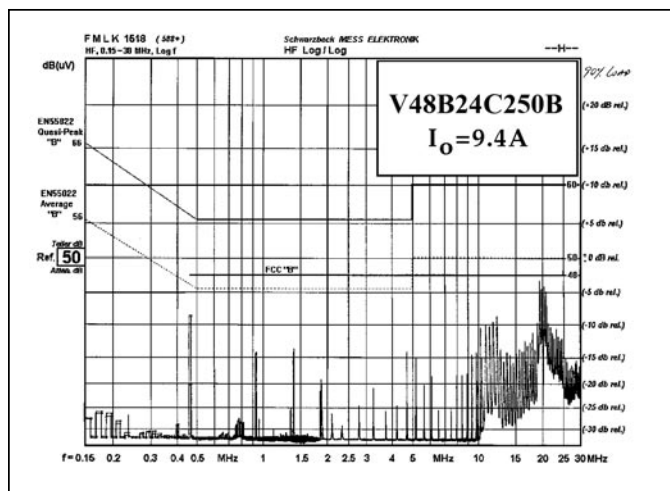


Figure 3 — FIAM and Model V48B24C250 DC-DC converter.

Inrush Limiting

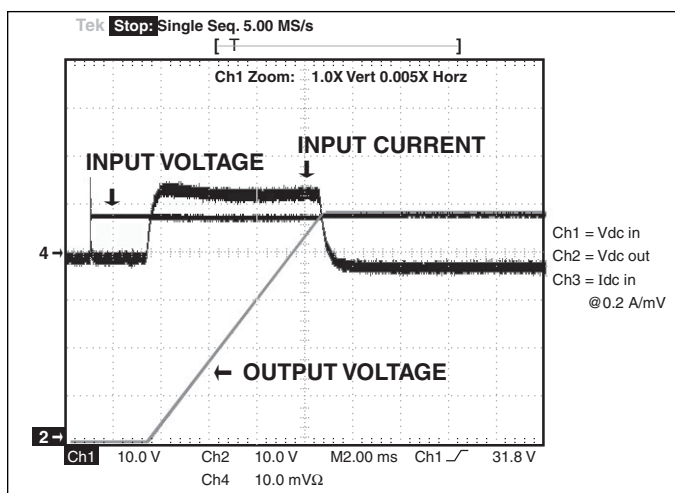


Figure 4 — Inrush Limiting: Inrush current with 330 μ F external capacitance.

Transient Immunity

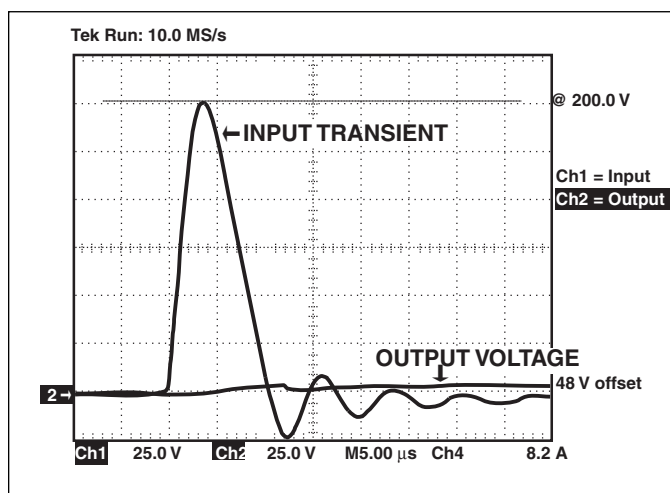


Figure 5 — Transient Immunity: FIAM output response to an input transient.

Transient and Surge Protection

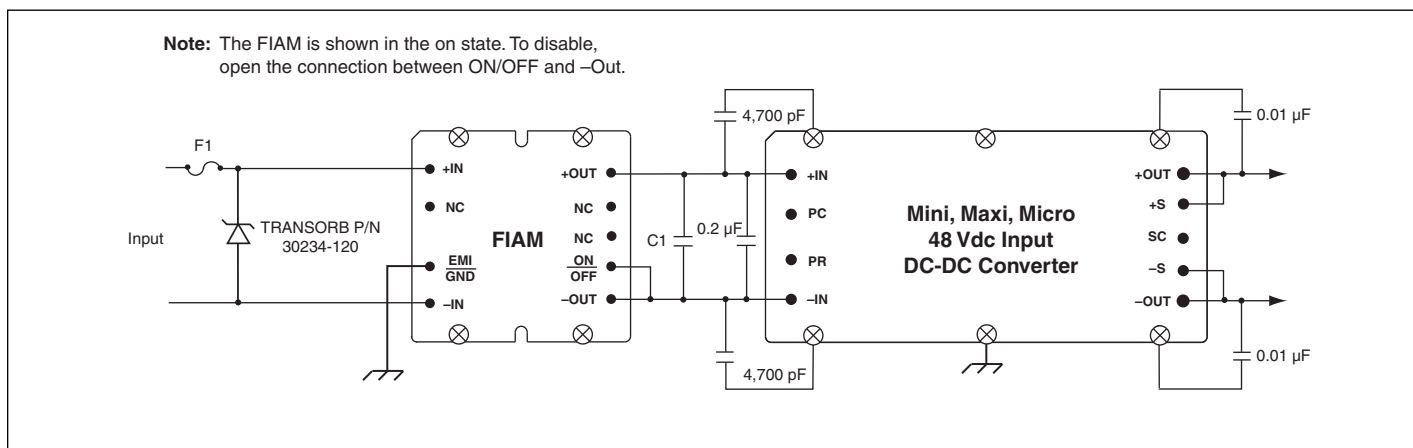
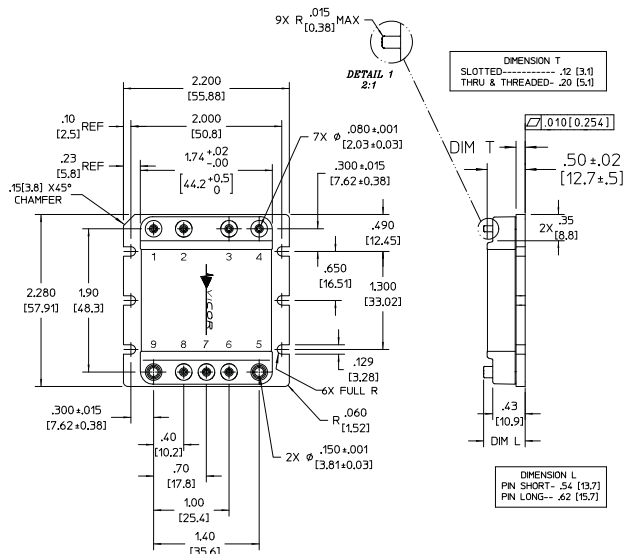


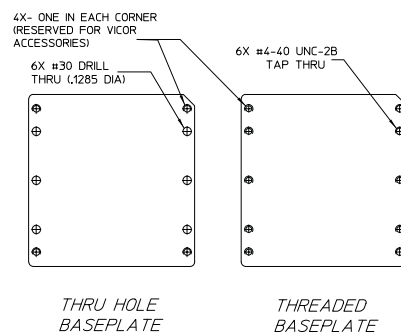
Figure 6 — Typical Connection Diagram

Mechanical Diagram

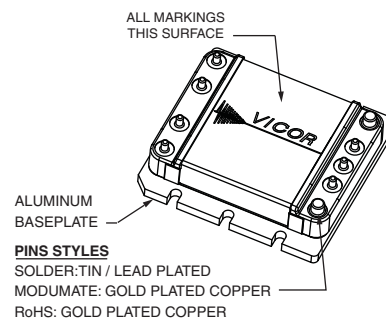
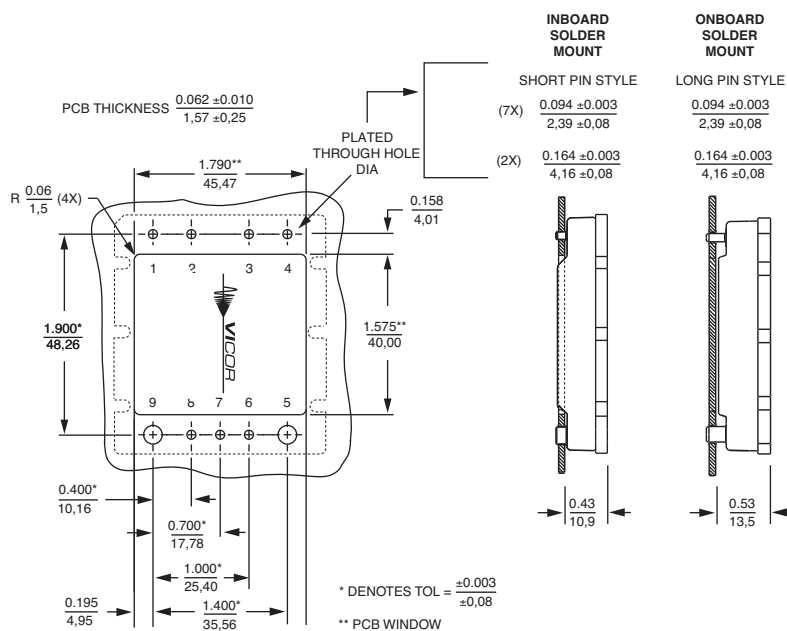
Converter Pins		
No.	Function	Label
1	+In	+
2	No Connection	NC
3	Ground	EMI/GND
4	–In	–
5	–Out	–
6	ON/OFF	ON/OFF
7	No Connection	NC
8	No Connection	NC
9	+Out	+



NOTES:
1. MATERIAL:
BASE: 6000 SERIES ALUMINUM
COVER: LCP, ALUMINUM 3003 H14.
PINS: RoHS PINS GOLD PLATE 30 MICRO INCH MIN; NON-RoHS
PINS TIN/LEAD 90/10 BRIGHT.
2. DIMENSIONS AND VALUES IN BRACKETS ARE METRIC.



PCB Mounting Specifications



Consult Vicor Application Note:
Soldering methods and procedures for
1st and 2nd Generation modules.

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