



# Data Sheet

## M-FIAM9

### Military COTS 28 Vin Filter Input Attenuator Module

Model Number: M-FIAM9M21\*



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
- 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

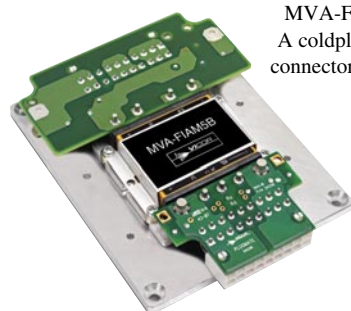
### Product Highlights

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



MVA-FIAM9:  
A coldplate and connector option.

The MVA-FIAM9 provides a coldplate and connector option for use with either 24 V input Maxi, Mini, Micro series DC-DC converters or VIPAC Arrays.

### 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

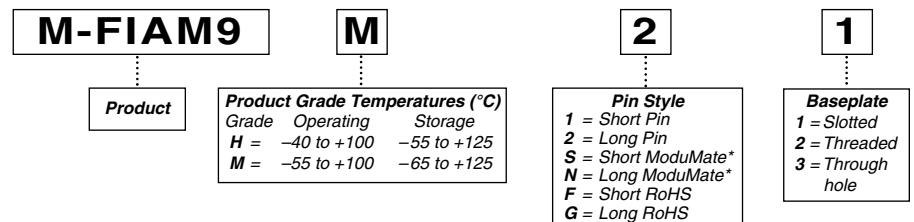
### Thermal Resistance and Capacity

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.	3,582	1,000 Hrs
50°C	Naval Sheltered: N.S.	644	1,000 Hrs
65°C	Airborne Inhabited Cargo: A.I.C.	505	1,000 Hrs

### Part Numbering\*



\*Compatible with SurfMate and InMate socketing system.

#### MVA-FIAM9 (Coldplate and connector option)

H-Grade (-40°C to +100°C operation): MVA-FIAM9H, MVA-FIAM9H-C (On / Off control enabled)

M-Grade (-55°C to +100°C operation): MVA-FIAM9M, MVA-FIAM9M-C (On / Off control enabled)

## 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/ $\mu\text{F}$	
Transient immunity			100	Vdc	50 ms per MIL-STD-1275A/B/D, continuous operation
			250	Vdc	70 $\mu\text{s}$ per MIL-STD-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, $25^{\circ}\text{C}$ baseplate
External capacitance	330		1000	$\mu\text{F}$	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 $\Omega$ 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	When using with V28 series converters a 27 $\mu\text{H}$ inductor is needed between the filter and converter for compliance below 30% of rated power.
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.)

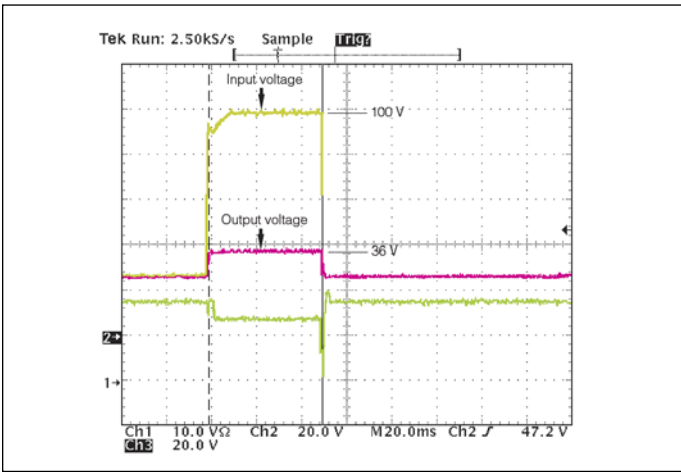
### ■ ENVIRONMENTAL QUALIFICATION

<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, 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.

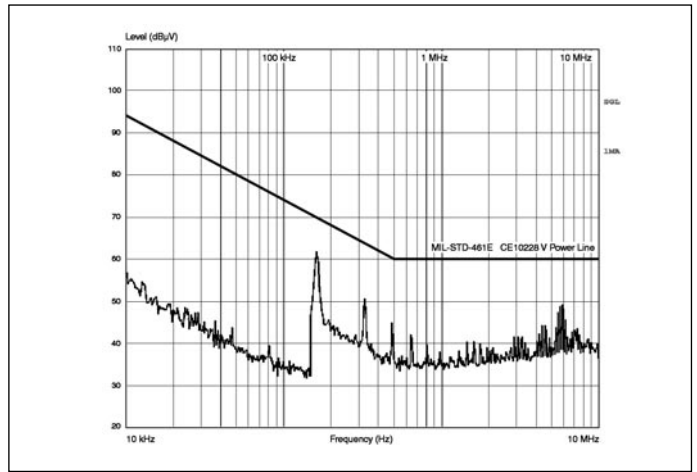
### ■ ENVIRONMENTAL STRESS SCREENING

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>

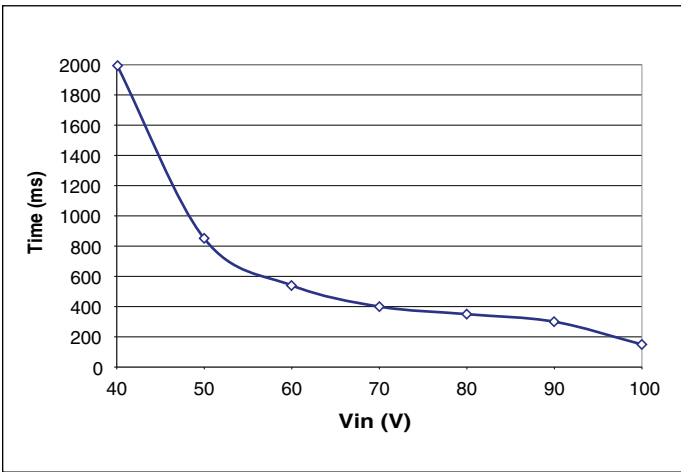
\*Temperature cycled with power off, 17°C per minute rate of change.



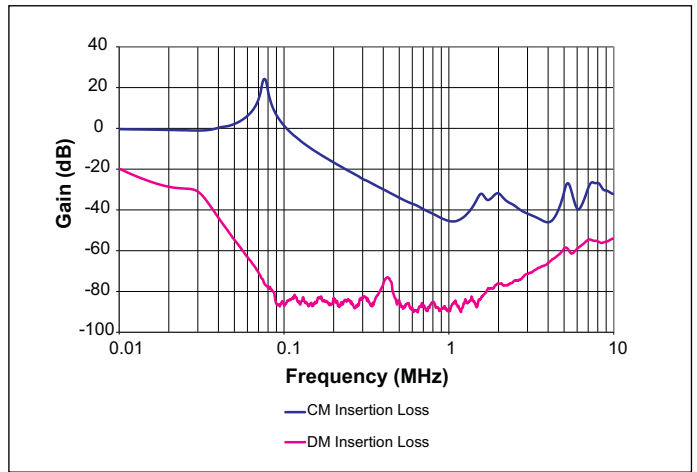
**Figure 1** — Transient Immunity: M-FIAM9 output response to an input transient.



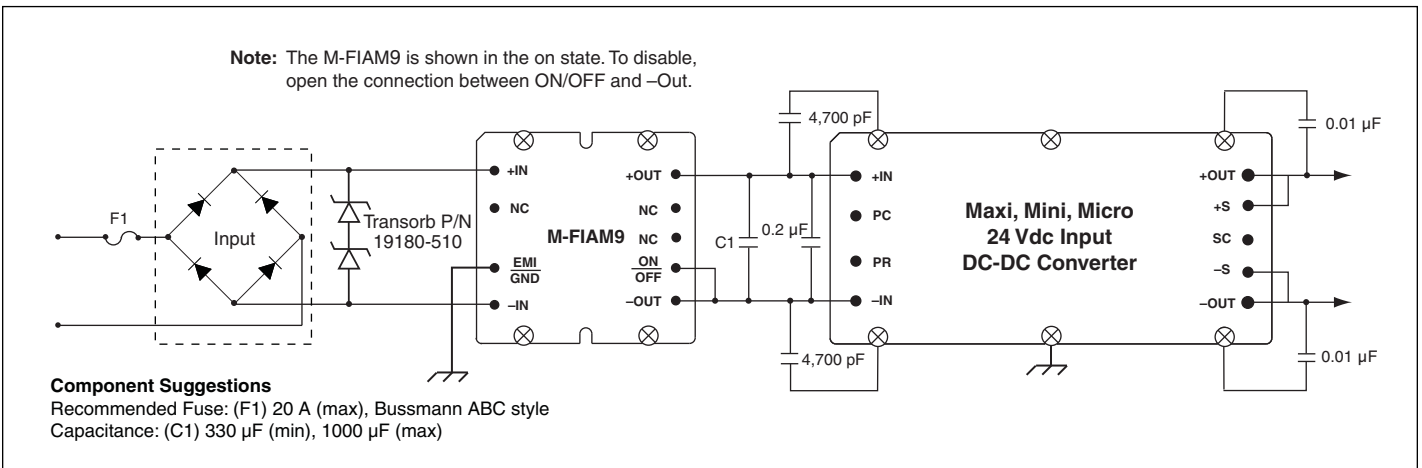
**Figure 2** — Conducted Noise; M-FIAM9 and Model V28A12M200B DC-DC converter operating at 28 Vdc, 200 W.



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



**Figure 4** — M-FIAM9 insertion loss



**Figure 5**— Transient, Surge Protection and Recommended Reverse Polarity Protection.

# MECHANICAL DRAWINGS

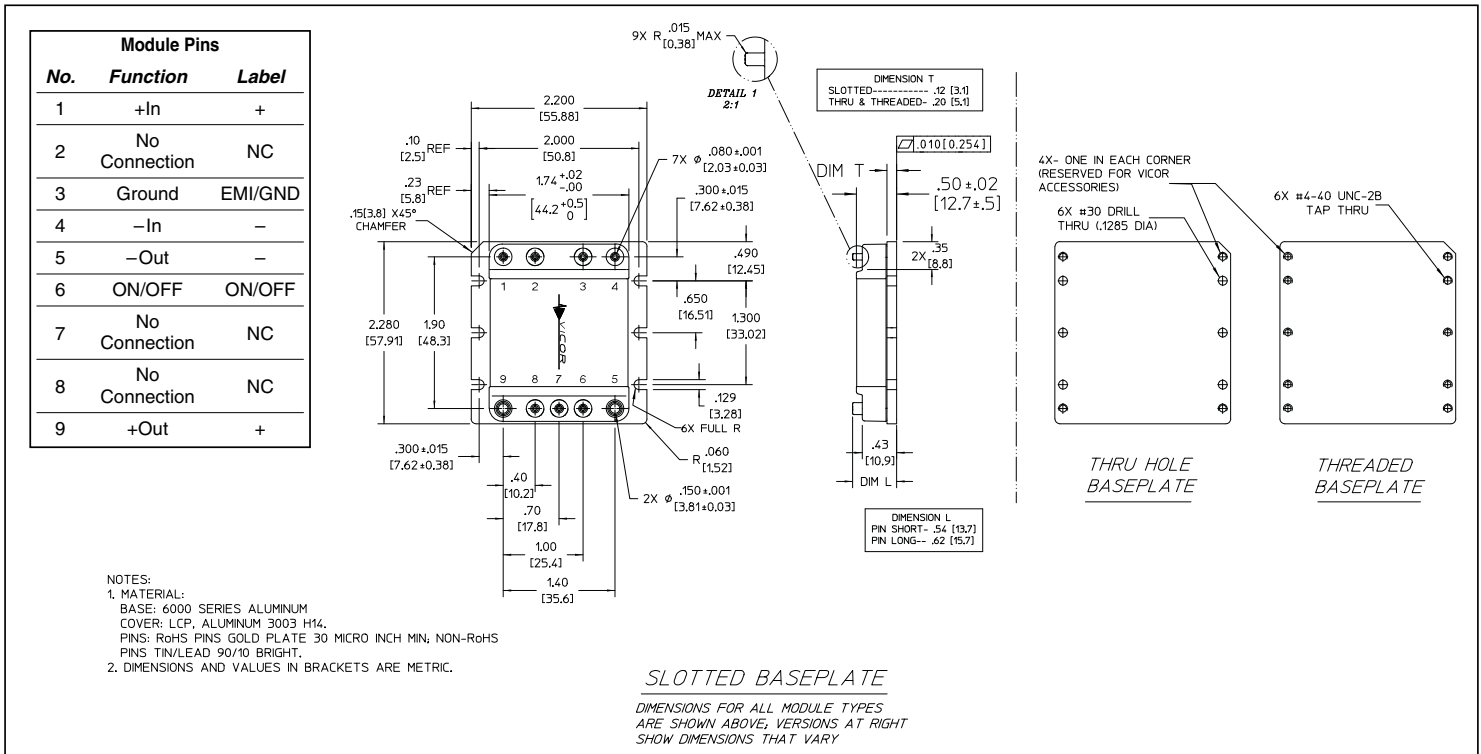


Figure 6 — Mechanical diagram

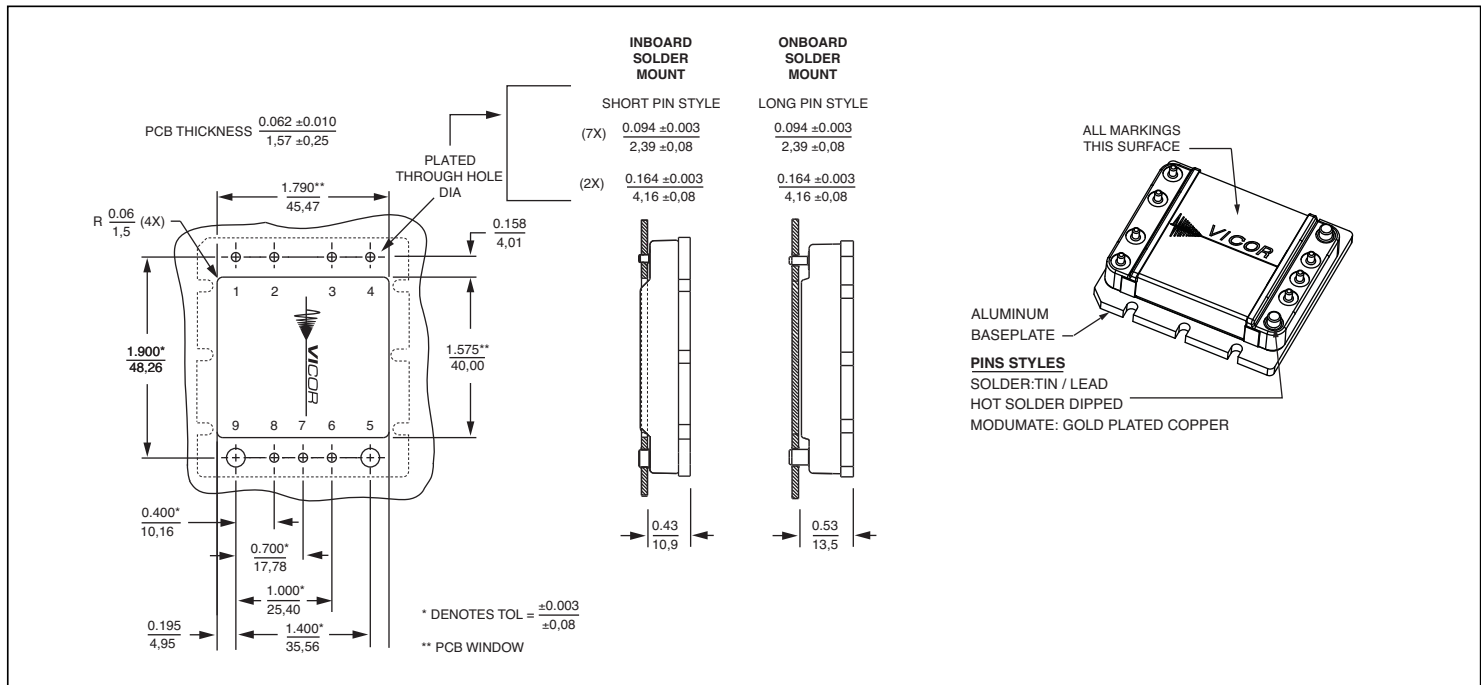
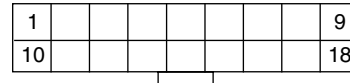
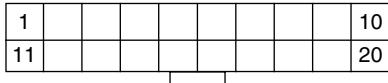
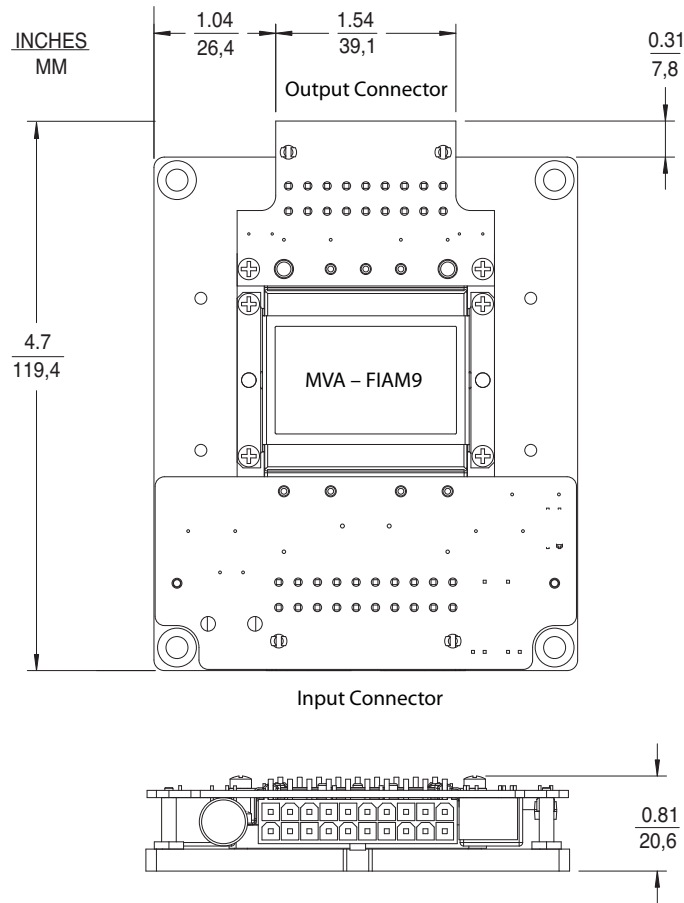


Figure 7 — PCB Mounting Specifications.



**Input Connector**

Pin #	Function
1 – 4	-Vin
5 – 7	+Vin
8	NC
9	PE protective earth
10	PE protective earth
11 – 13	-Vin
14 – 17	+Vin
18	NC
19	PE protective earth
20	PE protective earth

**Output Connector**

Pin #	Function	Pin #	Function
1	+Vout	10	+Vout
2	+Vout	11	+Vout
3	+Vout	12	+Vout
4	N/C	13	NC
5	N/C	14	NC
6	N/C	15	On / Off
7	-Vout	16	-Vout
8	-Vout	17	-Vout
9	-Vout	18	-Vout

Input Mounting Connector	Vicor P/N
Housing	24795
Pin	24796
Kit	24828

Output Mounting Connector	Vicor P/N
Housing	25050
Pin	24796
Kit	25067

**Note:** The MVA-FIAM9H and MVA-FIAM9M are delivered with the On / Off control already configured as On using a 0 Ohm resistor on the underside of the output connector board. The MVA-FIAM9H-C and MVA-FIAM9M-C are delivered without the 0 Ohm resistor installed, allowing for user control of the On / Off functionality.

**Figure 8** — MVA-FIAM9 Packaging Option

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