



# Data Sheet

## M-FIAM7B

### Military COTS 28 Vin Filter Input Attenuator Module

Model Number: M-FIAM7BM21\*



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 400 W
- Mini sized package
- Inrush current limiting

#### Product Highlights

The M-FIAM7B is a DC front-end module that provides EMI filtering and transient protection. The M-FIAM7B enables designers using Vicor's 28 V DC-DC V•I Chip and VIBRICK 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-FIAM7B accepts an input voltage of 14 – 50 Vdc and delivers output power up to 400 W.

M-FIAM7B 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 or VIBRICK 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
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

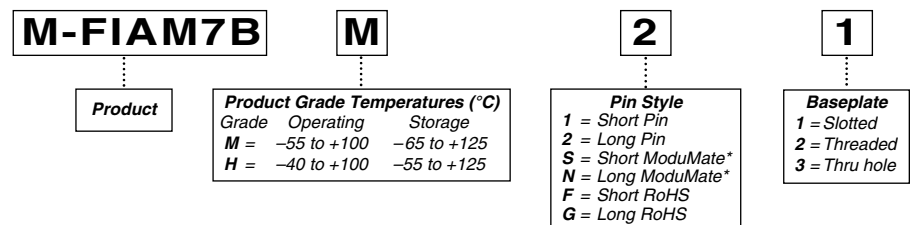
#### Thermal Resistance and Capacity

Parameter	Min	Typ	Max	Unit
Baseplate to sink				
		0.16		°C/Watt
		0.1		°C/Watt
Baseplate to ambient				
		7.9		°C/Watt
	1000 LFM	2.2		°C/Watt

#### MTBF per MIL-HDBK-217F (M-FIAM7BM21)

Temperature	Environment	MTBF	Unit
25°C	Ground Benign: G.B.	4,041	1,000 Hrs
50°C	Naval Sheltered: N.S.	727	1,000 Hrs
65°C	Airborne Inhabited Cargo: A.I.C.	570	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/ $\mu\text{F}$	See Fig. 4
Transient immunity			100	Vdc	50 ms per MIL-STD-1275A/B/D, continuous operation (see Fig. 3)
			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 50 ms per MIL-STD-704A, continuous operation

### OUTPUT SPECIFICATIONS

Parameter	Min	Typ	Max	Unit	Notes
Output current			25	A	Over continuous input and temp. range
Output power			400	W	Transient compliance over temp. range (see Fig.7)
Efficiency	96	98		%	
Internal voltage drop		0.5	0.7		@25 A, 100°C baseplate
External capacitance					See Figure 8
	330		3300	$\mu\text{F}$	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
EMI GRD		earth			Not electrically connected to baseplate

### 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 (see note), CS114, CS115, CS116	With suggested Reverse Polarity Protection

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.)

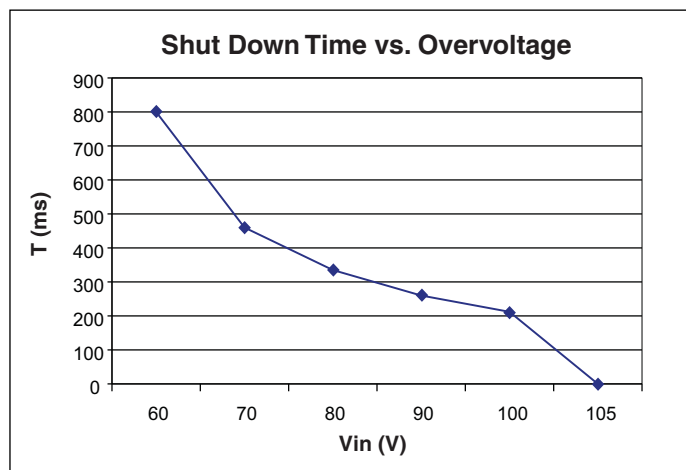
## ENVIRONMENTAL QUALIFICATION

<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.

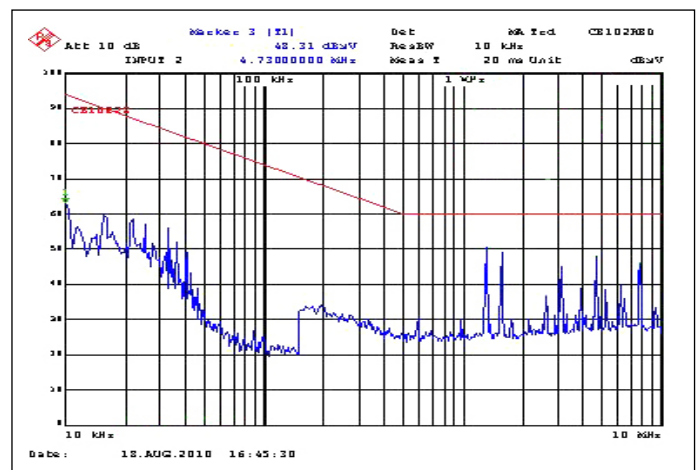
## ENVIRONMENTAL STRESS SCREENING

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.  $V_{in}$  = Input voltage (switching up from 28 Vdc)



**Figure 2** – MIL-STD-461F, CE102; M-FIAM7B and three MIL-COTS PRMs and three MIL-COTS VTMs, 350 W

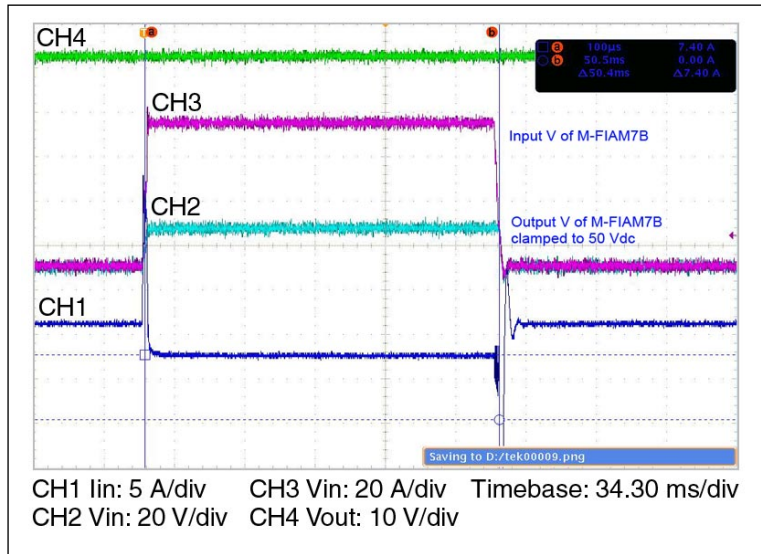


Figure 3 – Transient Immunity; M-FIAM7B output response to an input transient

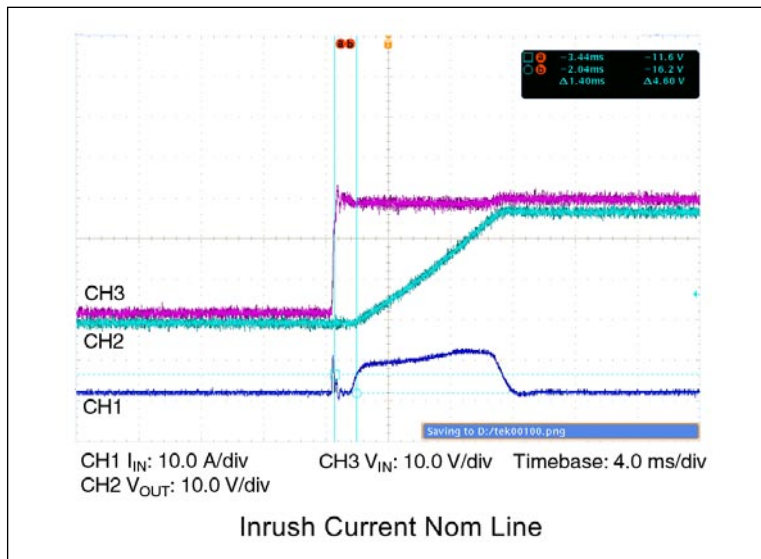


Figure 4 – Inrush Limiting; Inrush current with 3300 µF external capacitance

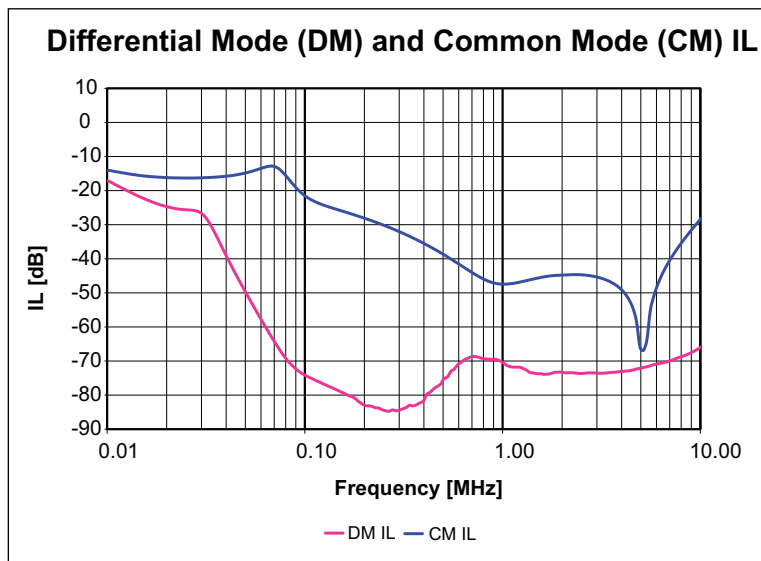


Figure 5 – Insertion Loss Curve

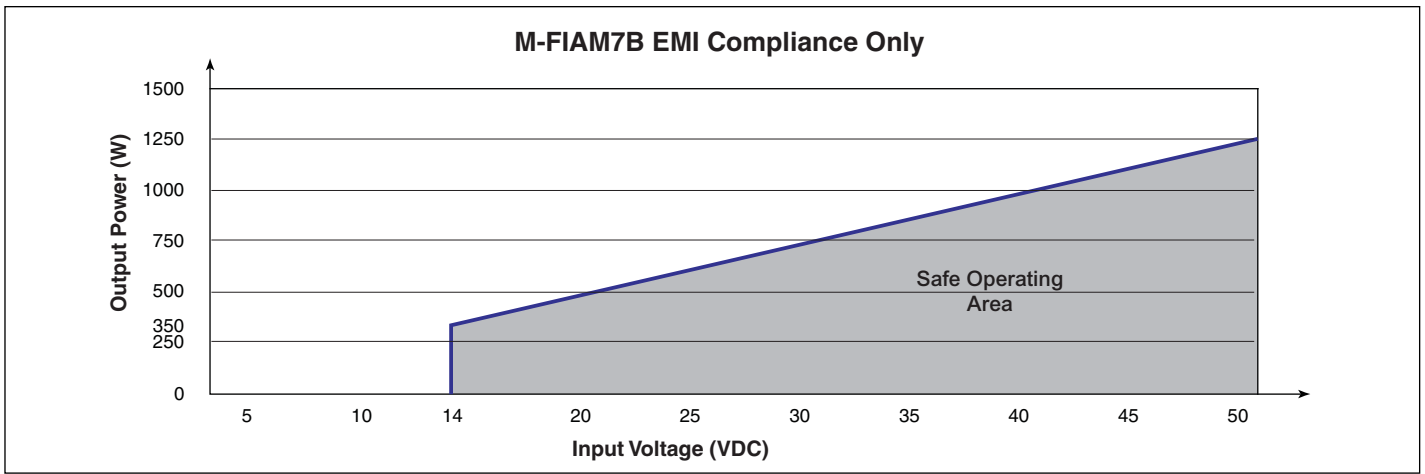


Figure 6 – M-FIAM7B EMI Compliance only

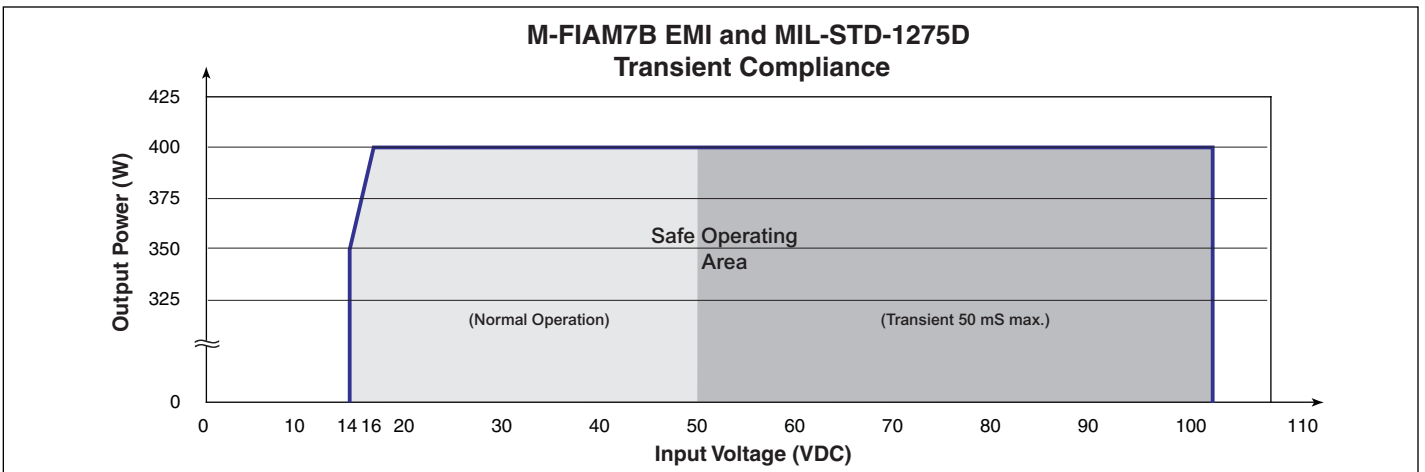


Figure 7 – M-FIAM7B EMI and MIL-STD-1275D Transient Compliance

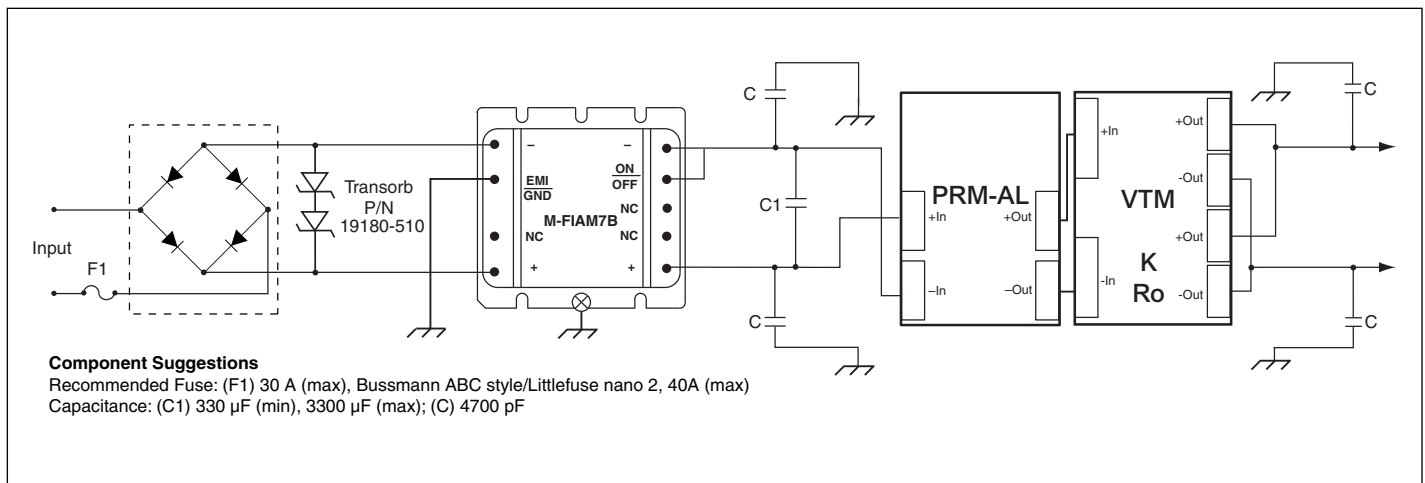


Figure 8 – Basic connection diagram with suggested Transient, Surge Protection and Reverse Polarity Protection (R.P.P)

# MECHANICAL DRAWINGS

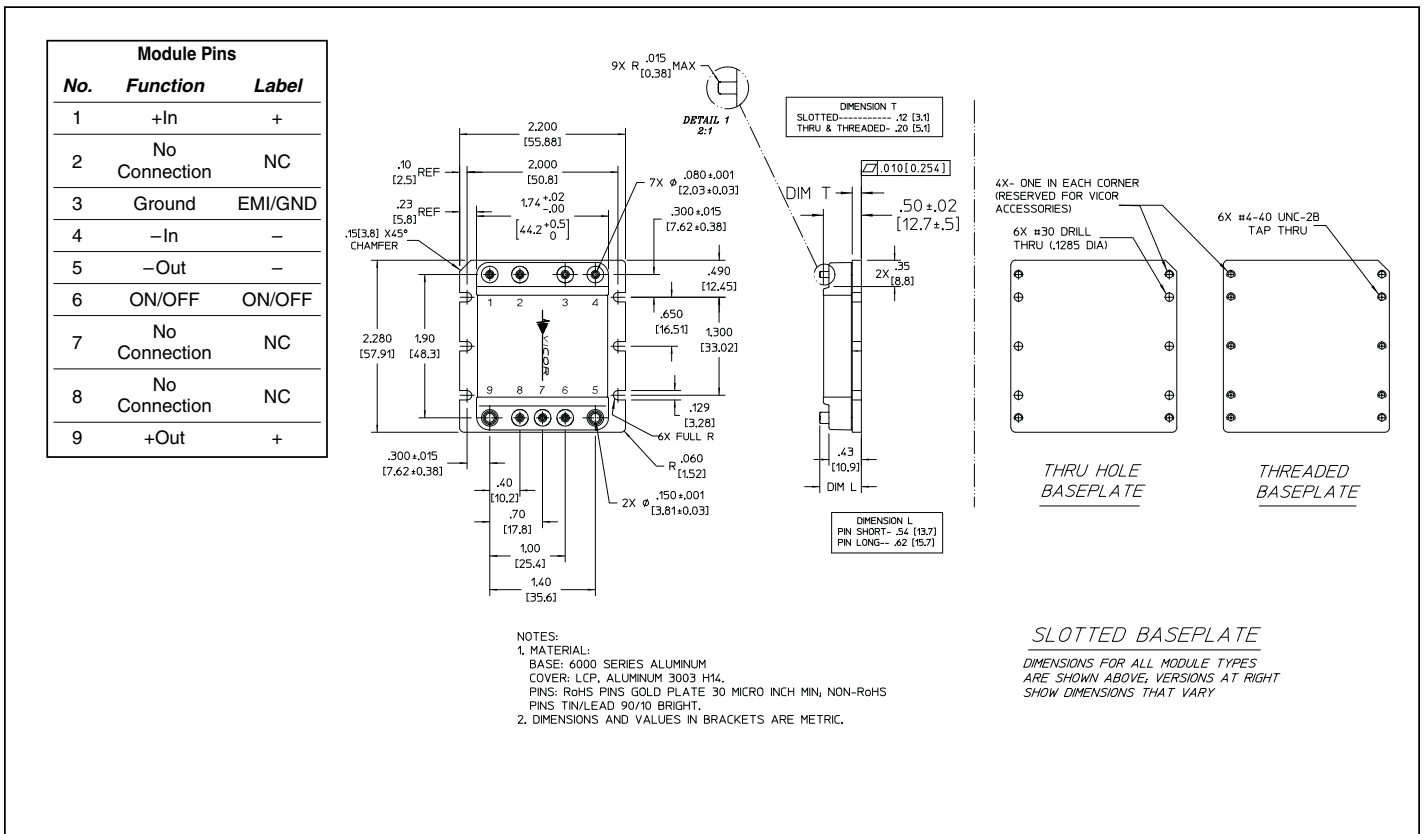


Figure 9 – Mechanical diagram

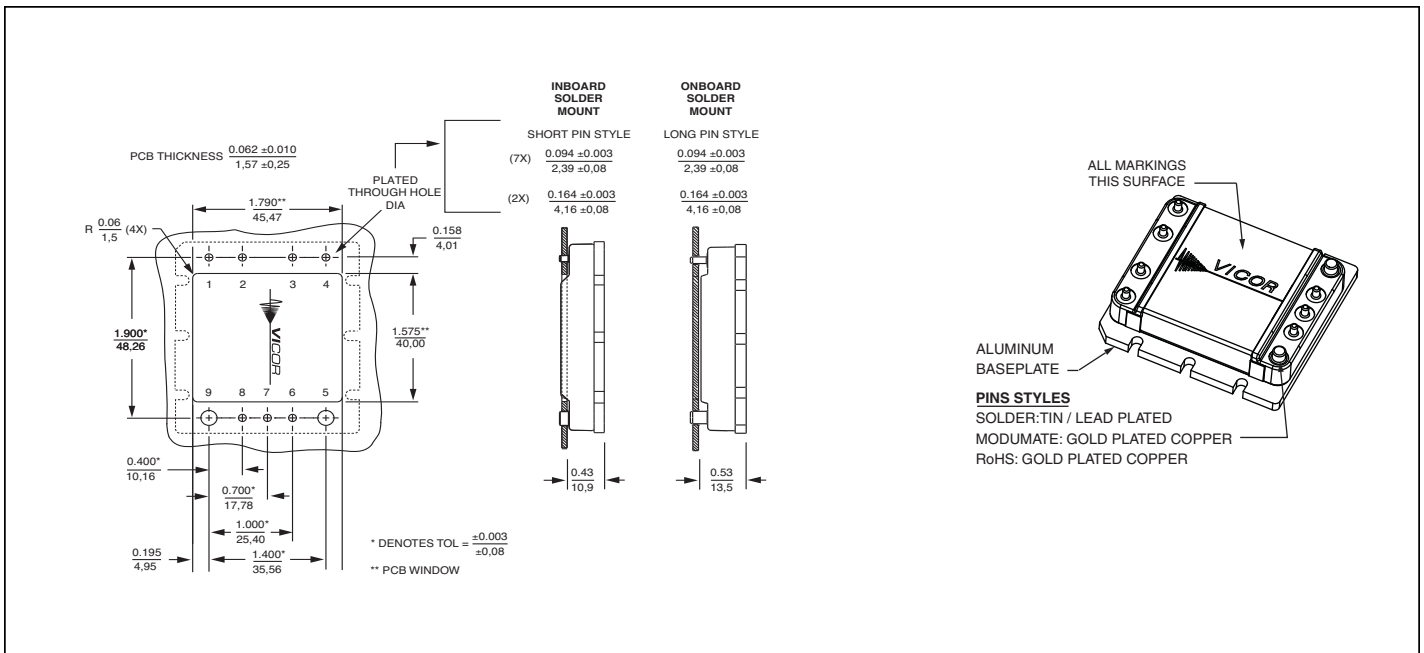


Figure 10 – PCB Mounting Specifications

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