



# Data Sheet

## MIL-COTS VIPAC Array

### Low Profile, Configurable Power Solution

#### Features

- Inputs: 24, 28 (VA-D only), or 300 Vdc
- -55°C operation
- Configurable single, dual, triple and quad outputs
- Any output: 0.5 – 48 Vdc; up to 650 W
- Current share option for high power/ redundant operation
- Fully connectorized input & output for simplified hook up
- Rugged, low profile, cold plate chassis
- High temperature capability
- Environmental stress screening (modules only)
- Compliant to MIL-STD-810F for vibration (Method 514.5, Procedure I) and shock (Method 516.5, Procedure I)

#### Product Highlights

VIPAC Arrays are a highly flexible system of DC input, power building-blocks that can be configured with as many as four user definable outputs on a low profile, cold plate chassis. Using Vicor's VCAD design tool, designers are able to specify VIPAC Arrays with Maxi, Mini and Micro product series H or M grade converters with nominal inputs of 24, 28 (VA-D only), or 300 Vdc and outputs from 2 to 48 Vdc at power levels up to 500 W per output. VIPAC Arrays are ideal for use in distributed and modular power systems where power density and reliable operation are critical. A current share option is available on single output models enabling them to be used in applications requiring high power / redundancy. Fully connectorized input and output terminations speed system installation and a versatile cold plate chassis simplifies thermal management.

For additional technical or design information; or to create a VIPAC Array tailored to your specific requirements using Vicor's online configurator, please visit [www.vicorpower.com](http://www.vicorpower.com).



#### Configurations

	<b>2 Minis (A)</b> • 3.62" x 6.69" (92,0 x 170,0 mm) • 1.25 lbs. (567 g)	<ul style="list-style-type: none"> <li>• Single or dual outputs</li> <li>• Up to 500 W total</li> </ul>
	<b>1 Mini, 2 Micros (B)</b> • 3.62" x 6.69" (92,0 x 170,0 mm) • 1.3 lbs. (590 g)	<ul style="list-style-type: none"> <li>• Single, dual or triple outputs</li> <li>• Up to 550 W total</li> </ul>
	<b>3 Micros (C)</b> • 3.62" x 6.69" (92,0 x 170,0 mm) • 1.3 lbs. (590 g)	<ul style="list-style-type: none"> <li>• Dual or triple outputs</li> <li>• Up to 450 W total</li> </ul>
	<b>1 Maxi (D/J)</b> • 3.62" x 6.69" (92,0 x 170,0 mm) • 1.05 lbs. (476 g)	<ul style="list-style-type: none"> <li>• Single output</li> <li>• Up to 500 W</li> <li>• Current share option</li> </ul>
	<b>1 Micro, 2 Minis (E)</b> • 3.62" x 7.52" (92,0 x 191,0 mm) • 1.35 lbs. (612 g)	<ul style="list-style-type: none"> <li>• Dual or triple outputs</li> <li>• Up to 650 W total</li> </ul>
	<b>4 Micros (F)</b> • 3.62" x 7.52" (92,0 x 191,0 mm) • 1.3 lbs. (590 g)	<ul style="list-style-type: none"> <li>• Dual, triple, or quad outputs</li> <li>• Up to 600 W total</li> </ul>
	<b>1 Mini (G/K)</b> • 3.62" x 4.39" (92,0 x 112,0 mm) • 0.7 lbs. (318 g)	<ul style="list-style-type: none"> <li>• Single output</li> <li>• Up to 250 W total</li> <li>• Current share option</li> </ul>
	<b>2 Micros (H)</b> • 3.62" x 4.39" (92,0 x 112,0 mm) • 0.7 lbs. (318 g)	<ul style="list-style-type: none"> <li>• Single or dual outputs</li> <li>• Up to 300 W total</li> </ul>

# MIL VIPAC ARRAY GENERAL SPECIFICATIONS

Typical at 25°C, nominal line and load, unless otherwise specified.

## ■ ENVIRONMENTAL - SYSTEM

Parameter	Min	Typ	Max	Unit	Notes
Dielectric withstand, input to chassis	1500/2121			Vrms/Vdc	
Operating temperature- ambient					
H-grade	-40		65	°C	Max chassis temp., 95 °C
M-grade	-55		65	°C	
Storage temperature					
H-Grade	-55		125	°C	
M-Grade	-65		125	°C	
Shock	MIL-STD-810F, Method 514.5, Procedure I				40 g for 15-23 ms, 75 g for 8-13 ms
Vibration	MIL-STD-810F, Method 516.5, Procedure I				20-2000 Hz at 5 g

## ■ ENVIRONMENTAL MODULES ONLY

<b>Altitude</b> MIL-STD-810C, Method 500.2, 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 grams 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 grams for 1 hour per axis.
<b>Shock</b> MIL-STD-810-F, Method 516.5, Procedure I, Functional Shock, 40 G's. MIL-S-901D, Lightweight Hammer Shock, 3 impacts/axis, 1,3,5 ft. MIL-STD-202F, Method 213B, 60 G's, 9ms half sine. MIL-STD-202F, Method 213B, 75 G's, 11ms Saw Tooth Shock.
<b>Acceleration</b> MIL-STD-810F, Method 513.5, Procedure II, Table 513.5-II, Operational, 2-7 G's, 6 directions.
<b>Humidity</b> MIL-STD-810F, Method 507.4, Procedure I, Cycle I, 240 hrs, 95% RH.
<b>Solder Test</b> MIL-STD-202F, Method 208, 8 hour aging.

## MIL VIPAC ARRAY GENERAL SPECIFICATIONS (CONT.)

Typical at 25°C, nominal line and load, unless otherwise specified.

### ■ OPERATING SPECIFICATIONS – 24 V INPUT

Parameter	Min	Typ	Max	Unit	Notes
Operating input voltage	18	24	36	Vdc	
Input surge withstand			50	Vdc	<100 ms
Output voltage setpoint			±1	% Vout nom.	Nominal input; full load; 25°C

### ■ OPERATING SPECIFICATIONS – 28 V INPUT

Parameter	Min	Typ	Max	Unit	Notes
Operating input voltage	10	24	36	Vdc	
Input surge withstand			50	Vdc	<100 ms
Output voltage setpoint			±1	% Vout nom.	Nominal input; full load; 25°C

### ■ OPERATING SPECIFICATIONS – 300 V INPUT

Parameter	Min	Typ	Max	Unit	Notes
Operating input voltage	180	300	375	Vdc	
Input surge withstand			400	Vdc	<100 ms
Output voltage setpoint			±1	% Vout nom.	Nominal input; full load; 25°C

### ■ INPUT SPECIFICATIONS – 24 V INPUT

Parameter	Min	Typ	Max	Unit	Notes
Undervoltage turn-on		17.5	17.9	Vdc	
Undervoltage turn-off	14.8	15.3		Vdc	See note
Oversvoltage turn-off/on	36.3	37.8	39.6	Vdc	

### ■ INPUT SPECIFICATIONS – 28 V INPUT

Parameter	Min	Typ	Max	Unit	Notes
Undervoltage turn-on		9.75	9.9	Vdc	
Undervoltage turn-off		9.5		Vdc	
Oversvoltage turn-off/on	36.3	37.8	39.6	Vdc	

### ■ INPUT SPECIFICATIONS – 300 V INPUT

Parameter	Min	Typ	Max	Unit	Notes
Undervoltage turn-on		174.6	178.2	Vdc	
Undervoltage turn-off	147.4	152.8		Vdc	
Oversvoltage turn-off/on				Vdc	Not included

**Note:** The following models will operate down to 16 V at 75% rated power after startup at >17.9 V :

- Maxi – 48 V
- Mini – all modules
- Micro – all 50 W modules, 3.3 V/75 W, 5 V/100 W, 12 V/100 W

# MIL VIPAC ARRAY OUTPUT SPECIFICATIONS

## 24 Vin Modules

### ■ MICRO MODULES<sup>1</sup>

Parameter	3.3 V	5 V	12 V	15 V	24 V	28 V	48 V	Unit	Notes
Efficiency (typ)	79	84	85.8	89	88	89	87.7	%	Nominal input; full load; 25°C
Ripple & noise, p-p (typ)	140	100	209	100	70	85	100	mV	20 MHz bandwidth
Output power	75	100	100	100	100	100	100	Watts	95°C Chassis
Output OVP setpoint	4.3	6.25	14.3	17.8	28.1	32.7	55.7	Volts	Recycle input volt. to restart (1 m off)
Dissipation, standby (typ)	4	3.2	4.4	4.6	3.6	3.3	3	Watts	No load
Load reg. (typ)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	±%Vout	No load to full load

### ■ MINI MODULES<sup>1</sup>

Parameter	3.3 V	5 V	12 V	15 V	24 V	28 V	48 V	Unit	Notes
Efficiency (typ)	79	82.5	86	86.6	87	87	87.5	%	Nominal input; full load; 25°C
Ripple & noise, p-p (typ)	100	95	360	250	260	180	225	mV	20 MHz bandwidth
Output power	150	200	200	200	200	200	200	Watts	95 °C Chassis
Output OVP setpoint	4.3	6.3	14.4	17.8	28.5	32.8	55.8	Volts	Recycle input volt. to restart (1 m off)
Dissipation, standby (typ)	5	5.1	4.6	3.4	5.1	4.5	5.4	Watts	No load
Load reg. (typ)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	±%Vout	No load to full load

### ■ MAXI MODULES<sup>1</sup>

Parameter	3.3 V	5 V	12 V	15 V	24 V	28 V	48 V	Unit	Notes
Efficiency (typ)	78.5	82	86.8	87.5	88.5	87.8	86.7	%	Nominal input; full load; 25°C
Ripple & noise, p-p (typ)	75	152	70	60	80	172	58	mV	20 MHz bandwidth
Output power	264	400	400	400	400	400	400	Watts	95 °C Chassis
Output OVP setpoint	4.3	6.25	14.3	17.8	28.1	32.7	55.8	Volts	Recycle input volt. to restart (1 m off)
Dissipation, standby (typ)	8	6.8	6.8	6.3	11	6.3	11.8	Watts	No load
Load reg. (typ)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	±%Vout	No load to full load

## 28 Vin Modules

### ■ MAXI MODULES

Parameter	3.3 V	5 V	12 V	15 V	24 V	28 V	48 V	Unit	Notes
Efficiency (typ)	78.6	76.8	83.0	83.5	84.8	85.0	82.5	%	Nominal input; full load; 25°C
Ripple & noise, p-p (typ)	80	280	280	220	200	200	360	mV	20 MHz bandwidth
Output power	150	175	200	200	200	200	200	Watts	95 °C Chassis
Output OVP setpoint	4.3	6.25	14.3	17.8	28.1	32.7	55.8	Volts	Recycle input volt. to restart (1 m off)
Dissipation, standby (typ)	11.4	14.4	11.0	12.7	12.3	15.5	15.6	Watts	No load
Load reg. (typ)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	±%Vout	No load to full load

<sup>1</sup> Lower output Maxi, Mini and Micro modules are available

# MIL VIPAC ARRAY OUTPUT SPECIFICATIONS

## 300 Vin Modules

### ■ MICRO MODULES<sup>1</sup>

Parameter	2V	3.3V	5V	12V	15V	24V	28V	48V	Unit	Notes
Efficiency (typ)	75.9	79.8	81.5	85.3	86.5	86.5	86.5	88.2	%	Nominal input; full load; 25°C
Ripple & noise, p-p (typ)	120	120	105	170	150	150	180	55	mV	20 MHz bandwidth
Output power	75	75	100	150	150	150	150	150	Watts	95 °C Chassis
Output OVP setpoint	2.8	4.3	6.25	14.3	17.8	28.1	32.7	55.7	Volts	Recycle input volt. to restart (1 m off)
Dissipation, standby (typ)	3.5	3.4	4.4	5	7	4.9	4.6	3.5	Watts	No load
Load reg. (typ)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	±%Vout	No load to full load


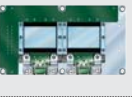










### ■ MINI MODULES<sup>1</sup>

Parameter	2V	3.3V	5V	12V	15V	24V	28V	48V	Unit	Notes
Efficiency (typ)	74	80	83	86.3	87.5	87.5	88.5	89	%	Nominal input; full load; 25°C
Ripple & noise, p-p (typ)	120	160	80	150	300	320	200	100	mV	20 MHz bandwidth
Output power	100	150	200	250	250	250	250	250	Watts	95 °C Chassis
Output OVP setpoint	2.8	4.3	6.25	14.3	17.8	28.1	32.7	55.7	Volts	Recycle input volt. to restart (1 m off)
Dissipation, standby (typ)	3.8	4.6	4.2	4	5.5	6.4	5.9	4.2	Watts	No load
Load reg. (typ)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	±%Vout	No load to full load

### ■ MAXI MODULES<sup>1</sup>

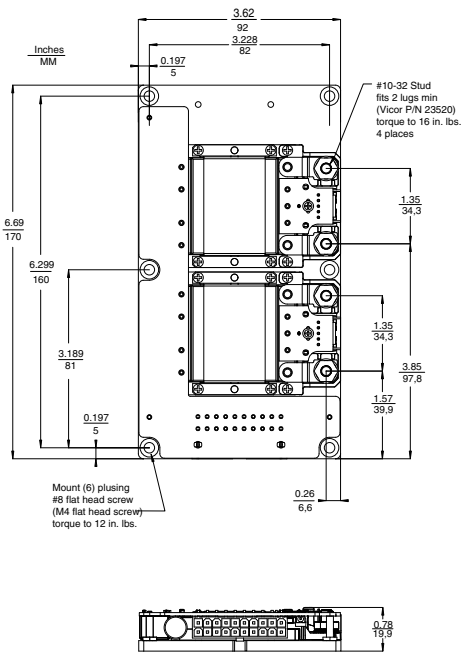
Parameter	2V	3.3V	5V	12V	15V	24V	28V	48V	Unit	Notes
Efficiency (typ)	74	81	83	86	86	89	88	89	%	Nominal input; full load; 25°C
Ripple & noise, p-p (typ)	80	80	100	280	200	100	80	100	mV	20 MHz bandwidth
Output power	160	264	400	500	500	500	500	500	Watts	95 °C Chassis
Output OVP setpoint	2.8	4.3	6.25	14.3	17.8	28.1	32.7	55.7	Volts	Recycle input volt. to restart (1 m off)
Dissipation, standby (typ)	7.9	8.1	6.2	8	8	9.8	10.1	12.6	Watts	No load
Load reg. (typ)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	±%Vout	No load to full load

<sup>1</sup> Lower output Maxi, Mini and Micro modules are available

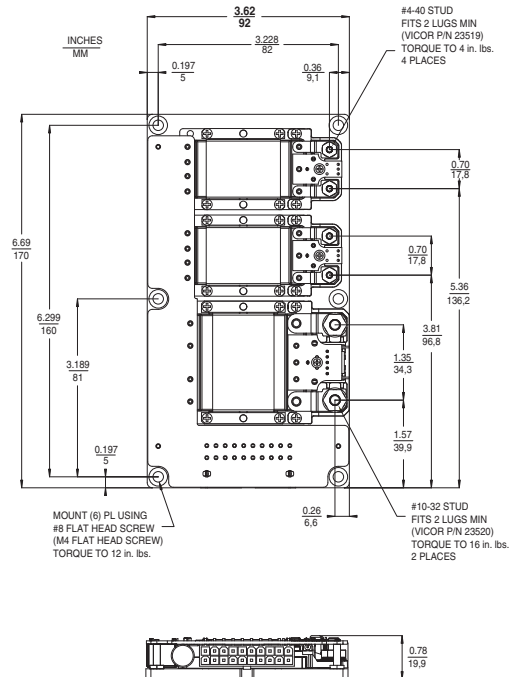
Configuration Type				Nominal Output Voltage/Maximum Output Power (W)									
				Vin	2 V	3.3 V	5 V	12 V	15 V	24 V	28 V	48 V	
Single Output Configurations		VA-H 4.39 x 3.62 in. (111.5 x 92.0 mm)	Dual Micro	24	100	150	200	200	200	200	200	200	200
				300	100	150	200	300	300	300	300	300	
		VA-G/K 4.39 x 3.62 in. (111.5 x 92.0 mm)	Single Mini	24	100	132	200	200	200	200	200	200	
				300	100	150	200	250	250	250	250	250	
	VA-A 6.69 x 3.62 in. (170.0 x 92.0 mm)	Dual Mini	24	200	264	400	400	400	400	400	400		
			300	200	300	400	500	500	500	500	500		
	VA-D/J 6.69 x 3.62 in. (170.0 x 92.0 mm)	Single Maxi	24	160	264	400	400	400	400	400	400		
			28	—	150	175	200	200	200	200	200		
			300	160	264	400	500	500	500	500	500		
Dual Output Configurations		VA-H 4.39 x 3.62 in. (111.5 x 92.0 mm)	Single Micro Output 1 & 2	24	50	75	100	100	100	100	100	100	
				300	50	75	100	150	150	150	150	150	
		VA-A 6.69 x 3.62 in. (170.0 x 92.0 mm)	Single Mini Output 1 & 2	24	100	132	200	200	200	200	200	200	
				300	100	150	200	250	250	250	250	250	
		VA-C 6.69 x 3.62 in. (170.0 x 92.0 mm)	Single Micro Output 1	24	50	75	100	100	100	100	100	100	
				300	50	75	100	150	150	150	150	150	
			Dual Micro Output 2	24	50	75	100	100	100	100	100	100	
				300	50	75	100	150	150	150	150	150	
		VA-B 6.69 x 3.62 in. (170.0 x 92.0 mm)	Single Mini Output 1	24	100	132	200	200	200	200	200	200	
				300	100	150	200	250	250	250	250	250	
			Dual Micro Output 2	24	100	150	200	200	200	200	200	200	
				300	100	150	200	300	300	300	300	300	
	VA-E 7.52 x 3.62 in. (191.0 x 92.0 mm)	Single Micro Output 1	24	50	75	100	100	100	100	100	100		
			300	50	75	100	150	150	150	150	150		
		Dual Mini Output 2	24	200	264	400	400	400	400	400	400		
			300	200	300	400	500	500	500	500	500		
	VA-F 7.52 x 3.62 in. (191.0 x 92.0 mm)	Dual Micro Output 1	24	100	150	200	200	200	200	200	200		
			300	100	150	200	300	300	300	300	300		
		Dual Micro Output 2	24	100	150	200	200	200	200	200	200		
			300	100	150	200	300	300	300	300	300		
Triple Output Configurations		VA-B 6.69 x 3.62 in. (170.0 x 92.0 mm)	Single Mini Output 1	24	100	132	200	200	200	200	200	200	
				300	100	150	200	250	250	250	250	250	
			Single Micro Output 2 & 3	24	50	75	100	100	100	100	100	100	
	300	50	75	100	150	150	150	150	150				
			VA-C 6.69 x 3.62 in. (170.0 x 92.0 mm)	Single Micro Output 1-3	24	50	75	100	100	100	100	100	
	300				50	75	100	150	150	150	150	150	
		VA-E 7.52 x 3.62 in. (191.0 x 92.0 mm)	Single Micro Output 1	24	50	75	100	100	100	100	100	100	
				300	50	75	100	150	150	150	150	150	
Single Mini Output 2 & 3			24	100	132	200	200	200	200	200	200		
			300	100	150	200	250	250	250	250	250		
	VA-F 7.52 x 3.62 in. (191.0 x 92.0 mm)	Single Micro Output 1 & 2	24	50	75	100	100	100	100	100	100		
			300	50	75	100	150	150	150	150	150		
		Dual Micro Output 3	24	100	150	200	200	200	200	200	200		
			300	100	150	200	300	300	300	300	300		
Quad Output Config.		VA-F 7.52 x 3.62 in. (191.0 x 92.0 mm)	Single Micro Output 1-4	24	50	75	100	100	100	100	100	100	
				300	50	75	100	150	150	150	150	150	

Note: Model numbers and total output power capability are application specific.  
See VIPAC configuration tool at: [vicorpower.com/vcad](http://vicorpower.com/vcad)

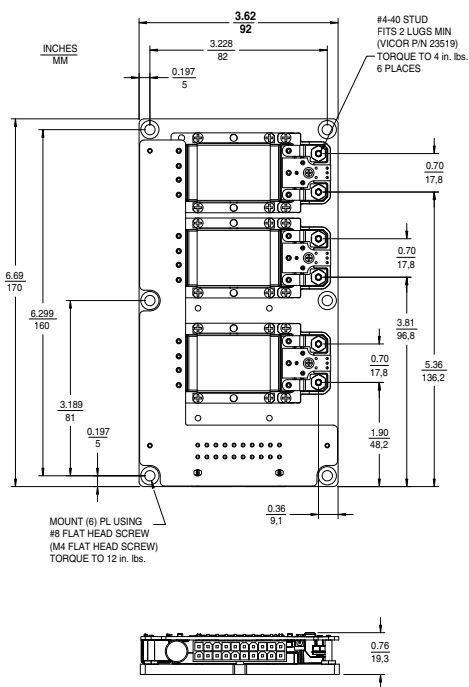
**Configuration VA-A**  
**LugMates**



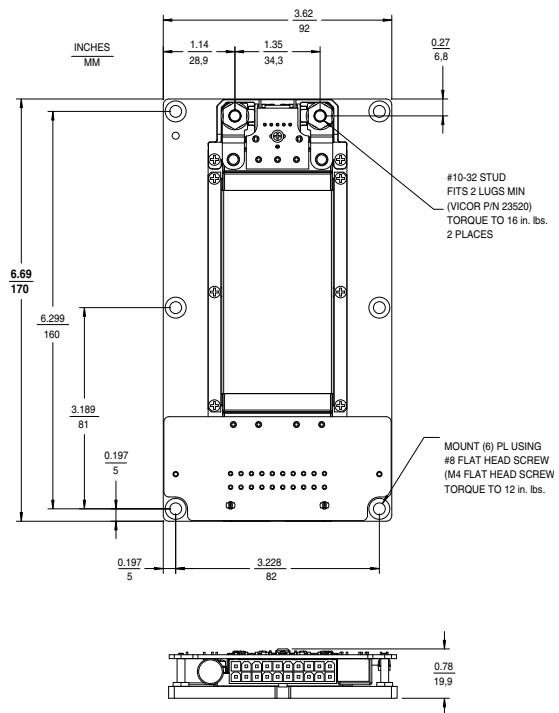
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**LugMates**



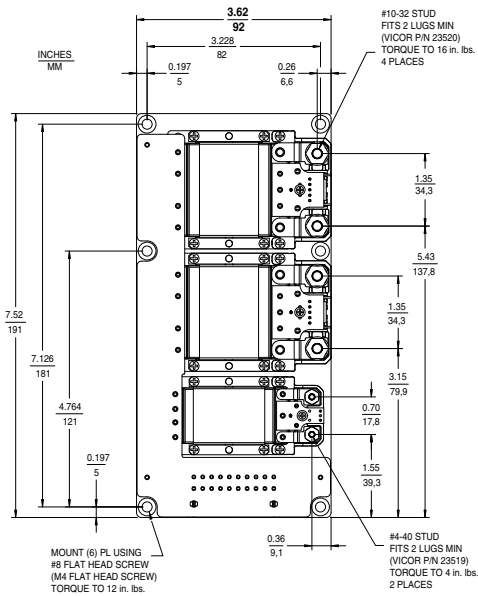
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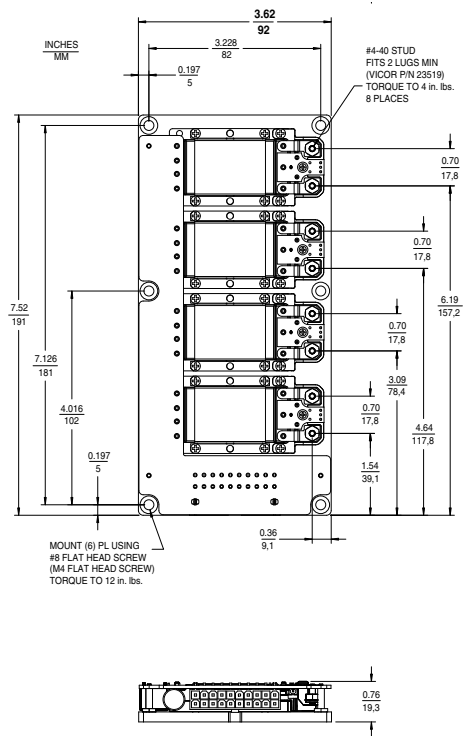
**Configuration VA-D/J**  
**LugMates**



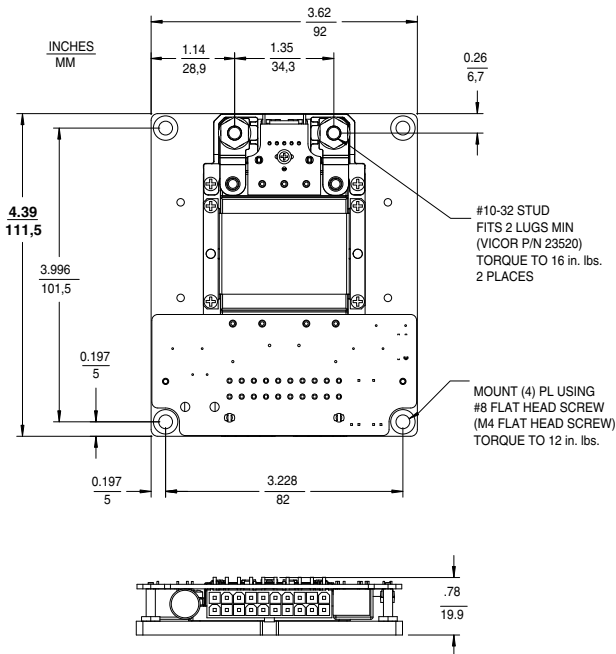
**Configuration VA-E**  
**LugMates**



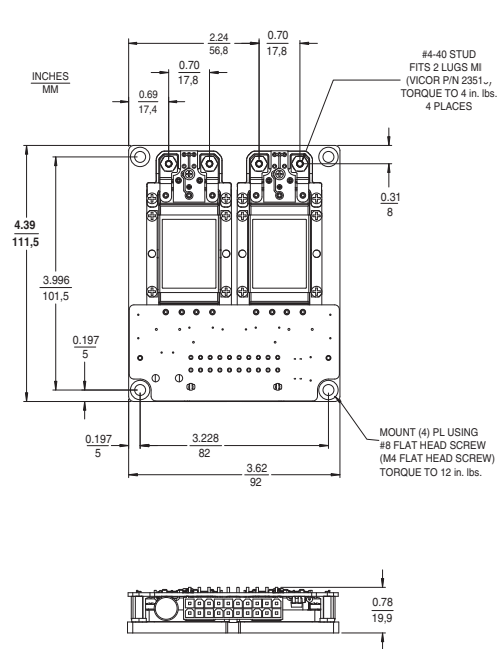
**Configuration VA-F**  
**LugMates**



**Configuration VA-G/K**  
**LugMates**



**Configuration VA-H**  
**LugMates**



## **Warranty**

Vicor products are guaranteed for two years from date of shipment against defects in material or workmanship when in normal use and service. This warranty does not extend to products subjected to misuse, accident, or improper application or maintenance. Vicor shall not be liable for collateral or consequential damage. This warranty is extended to the original purchaser only.

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## **Vicor's comprehensive line of power solutions includes high density AC-DC and DC-DC modules and accessory components, fully configurable AC-DC and DC-DC power supplies, and complete custom power systems.**

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**Vicor Corporation**  
25 Frontage Road  
Andover, MA, USA 01810  
Tel: 800-735-6200  
Fax: 978-475-6715

### **email**

Customer Service: [custserv@vicorpower.com](mailto:custserv@vicorpower.com)  
Technical Support: [apps@vicorpower.com](mailto:apps@vicorpower.com)