



### 10 to 50 Watts

### Features & Benefits

- **Inputs:**  
28V<sub>DC</sub> per MIL-STD-704D/E/F  
155V<sub>DC</sub> per MIL-STD-1399A  
270V<sub>DC</sub> per MIL-STD-704D/E/F
- Single output: 2 – 48V<sub>DC</sub>
- Up to 23 W/in<sup>3</sup>
- MIL-STD-810 environments
- Up to 90% efficiency
- Remote sense
- Current limit
- ZCS power architecture
- Low noise FM control
- Size: 2.28" x 2.4" x 0.5"  
(57,9 x 61,0 x 12,7mm)

### Product Highlights

The MI-J00 family of DC-DC converters is designed for applications utilizing distributed power architectures. Based on Vicor's VI-200 / VI-J00 family of zero-current switching, component-level DC-DC converters, the MI-J00 family offers exceptional performance in terms of power density, efficiency, noise, ease of use, and reliability.

The MI-J00 family meets the steady-state input voltage requirements of MIL-STD-704D/E/F for the 28V<sub>DC</sub> (MI-J2X) and 270V<sub>DC</sub> input (MI-J6X). The 155V<sub>DC</sub> input (MI-J5X) meets MIL-STD-1399A. When used with the MI-IAM input attenuator module, the 28V or 270V input MI-J00 converter meets the transient and spike requirements of MIL-STD-704, MIL-STD-1275, and DO-160. Please refer to the MI-IAM data sheet for details.

The output voltage can be externally trimmed or programmed from 50% to 110% of nominal output. Current limiting, remote sense, and an inhibit pin all combine to offer a high degree of protection, versatility, and reliability for power systems.

Fully encapsulated in Vicor's industry standard package, the MI-J00 family meets MIL-STD-810 environmental testing requirements for humidity, fungus, salt-fog, explosive atmosphere, acceleration, vibration, and shock.

### Packaging Options

**Standard:** Slotted baseplate

**SlimMod:** Flangeless baseplate, option suffix: - S

**Example:** MI - JXX - XX - S





**FinMod:** Finned heat sink, option suffix:

- F1, -F2, -F3 and - F4

**Examples:**

- MI - JXX - XX -F1, 0.25" fins, longitudinal
- MI - JXX - XX -F2, 0.50" fins, longitudinal
- MI - JXX - XX -F3, 0.25" fins, transverse
- MI - JXX - XX -F4, 0.50" fins, transverse

### Converter Selection Chart

**MI-J**    

Semi-custom modules available, consult factory.

#### Input Voltage

Nominal	Range	Transient <sup>[a]</sup>	Notes
<b>2</b> = 28V	18 – 50V <sup>[b]</sup>	60V	28V <sub>DC</sub> input per MIL-STD 704D/E/F
<b>5</b> = 155V	100 – 210V	230V	155V <sub>DC</sub> input per MIL-STD-1399A
<b>6</b> = 270V	125 – 400V <sup>[c]</sup>	475V	270V <sub>DC</sub> input per MIL-STD-704D/E/F
<b>7</b> = 165V	100 – 310V	n/a	

<sup>[a]</sup> Transient voltage for 1 second.

<sup>[b]</sup> 16 V operation at 75% load.

<sup>[c]</sup> These units rated at 75% load from 125 – 150V<sub>IN</sub>: MI-J6Z-xY, MI-J6Y-xY, MI-J60-xY

#### Output Voltage

<b>Z</b> = 2.0V	<b>1</b> = 12V
<b>Y</b> = 3.3V	<b>P</b> = 13.8V
<b>0</b> = 5.0V	<b>2</b> = 15V
<b>X</b> = 5.2V	<b>N</b> = 18.5V
<b>W</b> = 5.5V	<b>3</b> = 24V
<b>V</b> = 5.8V	<b>L</b> = 28V
<b>T</b> = 6.5V	<b>J</b> = 36V
<b>R</b> = 7.5V	<b>K</b> = 40V
<b>M</b> = 10V	<b>4</b> = 48V

#### Product Grade Temperatures (°C)

Operating	Storage
<b>I</b> = -40 to +100	<b>I</b> = -55 to +125
<b>M</b> = -55 to +100	<b>M</b> = -65 to +125

#### Output Power/Current Vout

≥ 5 V	<5 V
<b>A</b> = 10W	<b>A</b> = —
<b>Z</b> = 25W	<b>Z</b> = 5A
<b>Y</b> = 50W	<b>Y</b> = 10A

## Converter Specifications

(Typical at TBP =25°C, nominal line and 75% load, unless otherwise specified)

### INPUT SPECIFICATIONS

Parameter	Min	Typ	Max	Units	Test Conditions
Inrush charge		$60 \times 10^{-6}$	$100 \times 10^{-6}$	Coulombs	Nominal line
Input reflected ripple current – pp		10%		I <sub>IN</sub>	Nominal line, full load
Input ripple rejection		$30+20 \text{ Log} \left( \frac{V_{IN}}{V_{OUT}} \right)$		dB	120Hz, nominal line
		$20+20 \text{ Log} \left( \frac{V_{IN}}{V_{OUT}} \right)$		dB	2400Hz, nominal line
No load power dissipation		1.35	2	Watts	

### OUTPUT CHARACTERISTICS

Parameter	Min	Typ	Max	Units	Test Conditions
Setpoint accuracy		0.5	1	%V <sub>NOM</sub>	
Load/line regulation		0.05	0.2	%V <sub>NOM</sub>	LL to HL, 10% to Full Load
		0.2	0.5	%V <sub>NOM</sub>	LL to HL, No Load to 10%
Output temperature drift		0.01	0.02	% / °C	Over rated temperature
Long term drift		0.02		%/1K hours	
Output ripple – pp		100	150	mV	Whichever is greater
		1.0	1.5	%V <sub>NOM</sub>	20 MHz bandwidth
Trim range [a]	50		110	%V <sub>NOM</sub>	
Total remote sense compensation	0.5			Volts	
Current limit	105		125	%I <sub>NOM</sub>	Automatic restart
Short circuit current	105		130	%I <sub>NOM</sub>	

[a] 10V, 12V and 15V outputs, standard trim range ±10%. Consult factory for wider trim range.

### CONTROL PIN SPECIFICATIONS

Parameter	Min	Typ	Max	Units	Test Conditions
Gate out impedance		50		Ω	
Gate in impedance		1000		Ω	
Gate in high threshold			6	Volts	Use open collector
Gate in low threshold	0.65			Volts	
Gate in low current			6	mA	

## Converter Specifications (cont.)

### DIELECTRIC WITHSTAND CHARACTERISTICS

Parameter	Min	Typ	Max	Units	Test Conditions
Input to output	3,000			V <sub>RMS</sub>	Baseplate earthed
Output to baseplate	500			V <sub>RMS</sub>	
Input to baseplate	1,500			V <sub>RMS</sub>	
Input to output capacitance		50	75	pF	

### THERMAL CHARACTERISTICS

Parameter	Min	Typ	Max	Units	Test Conditions
Efficiency		80 – 90%			
Baseplate to sink		0.14		°C/Watt	With thermal pads

### ENVIRONMENTAL – MIL-STD-810D

Parameter	Min	Typ	Max	Units	Test Conditions
Altitude - method 500.2	70,000			feet	Procedure II
Humidity - method 507.2	88/240			%/hours	Procedure I, cycle 1
Acceleration - method 513.3	9			g	Procedure II
Vibration - method 514.3	20			g	Procedure I, category 6
Shock - method 516.3	40			g	Procedure I

### RELIABILITY - MIL-HDBK-217F (MI-J2L-MY)

Parameter	Min	Typ	Max	Units	Test Conditions
25°C Ground Benign: G.B.		3,732		1,000 hours	
50°C Naval Sheltered: N.S.		672		1,000 hours	
65°C Airborne Inhabited Cargo: A.I.C.		526		1,000 hours	

### MECHANICAL SPECIFICATIONS

Parameter	Min	Typ	Max	Units	Test Conditions
Weight	3.5	3.7	3.8	Ounces	
	101	107	109	Grams	

## Converter Specifications (cont.)

### PRODUCT GRADE SPECIFICATIONS

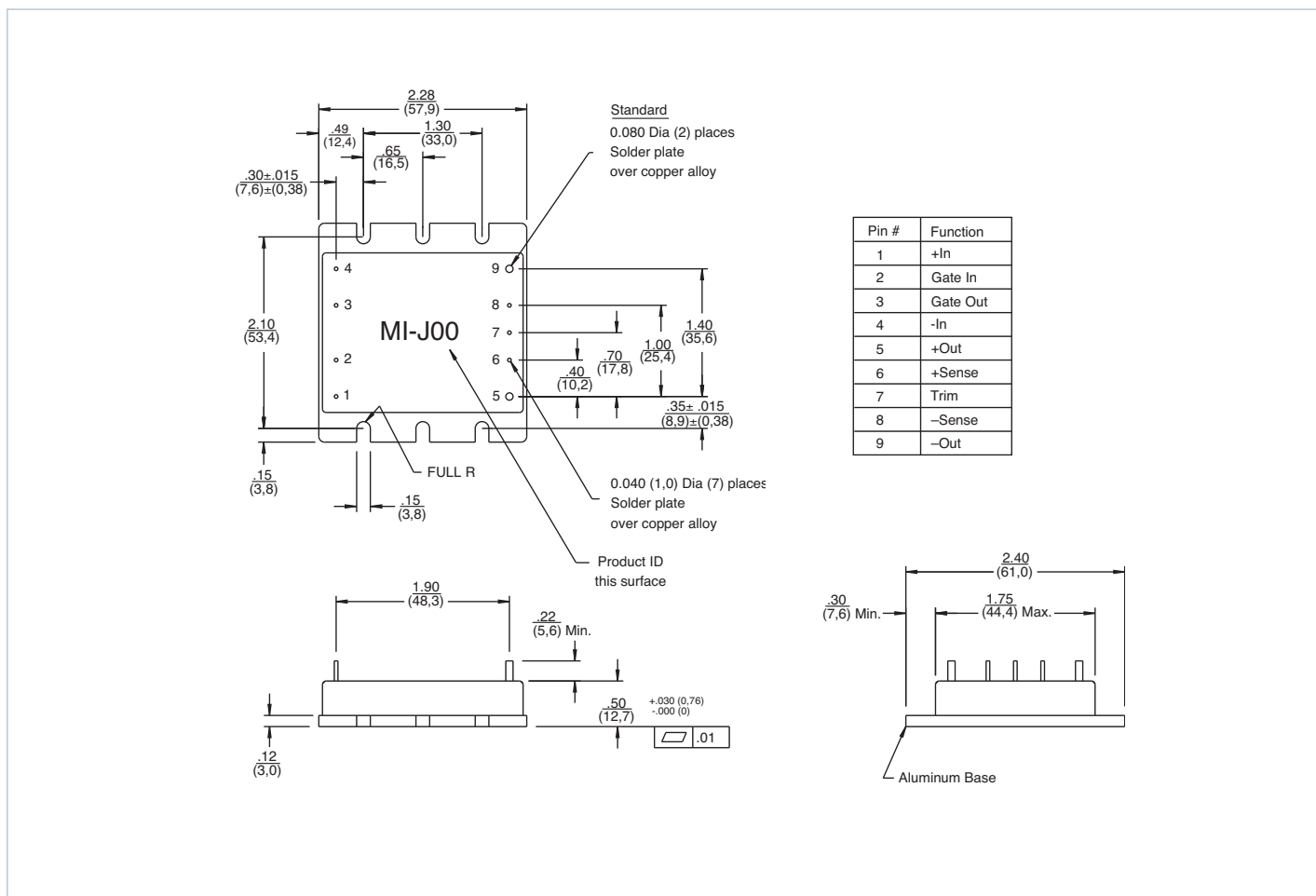
Parameter	I-Grade	M-Grade
Storage temperature	-55°C to +125°C	-65°C to +125°C
Operating temperature (baseplate)	-40°C to +100°C	-55°C to +100°C
Power cycling burn-in	12 hours, 29 cycles	96 hours, 213 cycles
Temperature cycled with power off	12 cycles	12 cycles
17°C per minute rate of change	-65°C to +100°C	-65°C to +100°C
Test data supplied at these temperatures <sup>[a]</sup>	-40°C, +80°C	-55°C, +80°C
Warranty	2 years	2 years
Environmental compliance	MIL-STD-810	MIL-STD-810
Derating	NAVMAT P-4855-1A	NAVMAT P-4855-1A

<sup>[a]</sup> Test data available for review or download from vicorpower.com

### ENVIRONMENTAL QUALIFICATIONS

Parameter	Qualification
Altitude	MIL-STD-810D, Method 500.2, Procedure III, explosive decompression (40K ft.).
	MIL-STD-810D, Method 500.2, Procedure II, 40,000 ft., 1000 – 1500 ft./min. to 70,000 ft., unit functioning
Explosive Atmosphere	MIL-STD-810C, Method 511.1, Procedure I
Vibration	MIL-STD-810D, Method 514.3, Procedure I, category 6, helicopter, 20g
	MIL-STD-810D, Method 514.3 random: 10 – 300Hz @ 0.02g <sup>2</sup> /Hz, 2000Hz @ 0.002g <sup>2</sup> /Hz, 3.9 total G rms 3 hrs/axis. Sine: 30Hz @ 20 g, 60Hz @ 10 g, 90Hz @ 6.6 g, 120Hz @ 5.0 g, 16.0 total G rms, 3 axes
	MIL-STD-810E, Method 514.4, Table 514.4-VII, ±6 db/octave, 7.7 G rms, 1hr/axis
Shock	MIL-STD-810D, Method 516.3, Procedure I, functional shock, 40g
	MIL-STD-202F, Method 213B, 18 pulses, 60g, 9 msec
	MIL-STD-202F, Method 213B, 75g, 11ms saw tooth shock
	MIL-STD-202F, Method 207A, 3 impacts / axis, 1, 3, 5 feet
Acceleration	MIL-STD-810D, Method 513.3, Procedure II Operational test, 9g for 1 minute along 3 mutually perpendicular axes
Humidity	MIL-STD-810D, Method 507.2, Procedure I, cycle I, 240hrs, 88% relative humidity
Solder Test	MIL-STD-202, Method 208, 8hr. aging
Fungus	MIL-STD-810C, Method 508.1
Salt-Fog	MIL-STD-810C, Method 509.1

Mechanical Drawing



Note: For alternate package options refer to the mechanical drawing page of vicorpower.com

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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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