



# MI-J00™

## Military DC-DC Converters 10 to 50W

### Product Highlights

The MI-J00 family of miniaturized DC-DC converters is designed for military applications utilizing distributed power architectures. Based on Vicor's 1st Generation family of zero-current/zero-voltage switching, component-level, DC-DC converters, the MI-J00 family offers state-of-the-art performance in terms of power density, efficiency, noise, ease of use, and reliability.

The MI-J00 family is designed to exceed all steady-state, transient and under/overvoltage requirements of MIL-STD-704D/E for both 28Vdc input (MI-J20) and 270Vdc input (MI-J60), and the worst case envelope of DOD-STD-1399A for 155Vdc input.

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 military power systems.

All units are manufactured in ISO 9001-registered facilities. Full epoxy encapsulation in Vicor's industry standard package enables the MI-J00 family units to meet MIL-STD-810 environmental testing requirements for humidity, fungus, salt fog, explosive atmosphere, acceleration, vibration, and shock. (See page 32.)

### Features

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

### Converter Specifications

(At  $T_{BP} = 25^{\circ}\text{C}$ , nominal line and 75% load, unless otherwise specified)

PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
<b>Input Characteristics</b>					
Input voltage range	See input voltage chart				
No load power dissipation	1.35	2.0		Watts	
<b>Output Characteristics</b>					
Set point accuracy		0.5	1.0	% Vnom	
Load/line regulation	0.05	0.2	0.5	% Vnom	LL to HL, 10% to FL
		0.2	0.5	% Vnom	LL to HL, NL to 10%
Output temperature drift	0.01	0.02		%/°C	
Output noise - pp	1.0	1.5		% Vnom	} Whichever is greater 20MHz BW
	100	150		mV	
Output voltage trimming <sup>(1)</sup>	50		110	% Vnom	
Remote sense compensation	0.5			Vdc	
OVP set point		N/A			
Current limit	105		125	% Inom	Auto restart
Short circuit current	105		130	% Inom	
<b>Control Pin Characteristics</b>					
Gate-in high threshold		6		Vdc	
Gate-in low threshold	0.65			Vdc	
Gate-in low current			6	mA	
<b>Isolation Characteristics</b>					
Isolation (input to output)	3,000			V <sub>rms</sub>	
Isolation (output to baseplate)	500			V <sub>rms</sub>	
Isolation (input to baseplate)	1,500			V <sub>rms</sub>	
Input/output capacitance		50	75	pF	
<b>Environmental (MIL-STD-810)</b>					
Altitude - method 500.2	70,000			feet	Procedure II
Humidity - method 507.2	86/240			%/hours	Procedure 1, cycle 1
Acceleration - method 513.3	9			g's	Procedure 2
Vibration - method 514.3	20			g's	Procedure 1, category 6
Shock - method 516.3	40			g's	Procedure 1
<b>Reliability (MIL-HDBK-217F)</b>					
25°C Ground Benign: G.B.		2,871,050		hours	
50°C Naval Sheltered: N.S.		667,568		hours	
65°C Airborne Inhabited Cargo: A.I.C.		559,855		hours	
<b>Thermal Characteristics</b>					
Efficiency		80-90		%	
Baseplate to sink		0.14		°C/W	With thermal pads
Thermal shutdown		N/A			
Baseplate operating temperature			+100	°C	See product grade
Storage temperature			+125	°C	See product grade
<b>Mechanical Specifications</b>					
Weight		3.0 (85)		ounces (grams)	

<sup>(1)</sup> 10V, 12V, and 15V outputs, standard trim range ±10%. Consult factory for wider trim range.

# Configuration Chart

## MI - J

Semi-custom modules available:  
Consult factory.

- (1) 16V operation at 75% load.
- (2) These units rated at 75% load from 125-150Vin:  
MI-J6Z-xY  
MI-J6Y-xY  
MI-J60-xY

28Vdc input per MIL-STD 704D/E  
155Vdc input per DOD-STD-1399A  
270Vdc input per MIL-STD-704D/E

Input Voltage		
Nominal	Range	Transient
2 = 28V	18 - 50V <sup>(1)</sup>	60V
5 = 155V	100 - 210V	230V
6 = 270V	125 - 400V <sup>(2)</sup>	475V
7 = 165V	100 - 310V	

Output Voltage		
Z = 2V	T = 6.5V	N = 18.5V
Y = 3.3V	R = 7.5V	3 = 24V
O = 5V	M = 10V	L = 28V
X = 5.2V	1 = 12V	J = 36V
W = 5.5V	P = 13.8V	K = 40V
V = 5.8V	2 = 15V	4 = 48V

Product Grade	Operating Temp.
I	= -40°C to +100°C
M	= -55°C to +100°C

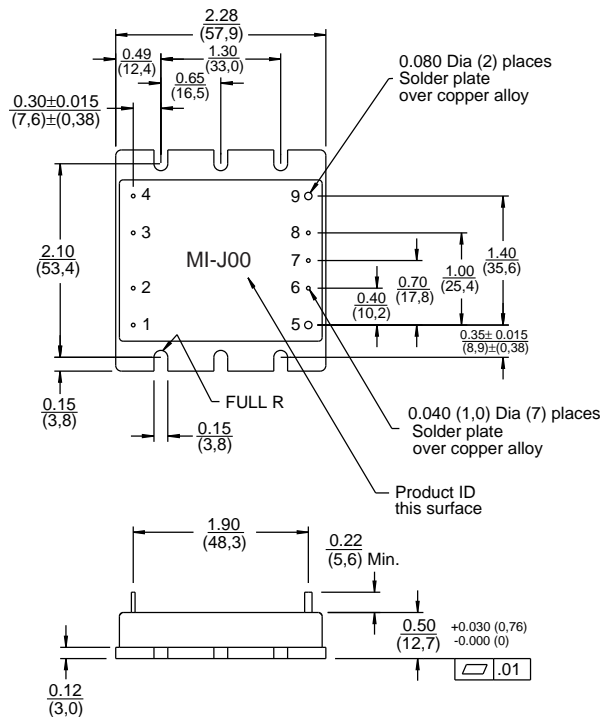
Output Power/Current	
	≥5V <5V
A =	10W —
Z =	25W 5A
Y =	50W 10A

# Product Grade Specifications

PARAMETER	PRODUCT GRADE	
	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, 25 cycles	96 hours, 200 cycles
Temperature cycled with power off	48 hours, 12-16 cycles -55°C to +100°C	48 hours, 12-16 cycles -65°C to +100°C
Test data supplied at these temperatures*	-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

\*Test data available for review or download from vicorpower.com

# Mechanical Drawing



Pin #	Function
1	+In
2	Gate In
3	Gate Out
4	-In
5	+Out
6	+Sense
7	Trim
8	-Sense
9	-Out

