MI-J00™

Military DC-DC Converters 10 to 50W

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/in³
- 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)

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.)

Converter Specifications

(At T_{BP} = 25°C, nominal line and 75% load, unless otherwise specified)

PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Characteristics					
Input voltage range		*See input voltage chart*			
No load power dissipation		1.35	2.0	Watts	
Output Characteristics					
Set point accuracy		0.5	1.0	% Vnom	
Load/line regulation		0.05	0.2	% 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
		100	150	mV	20MHz BW
Output voltage trimming(1)	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	
Control Pin Characteristics					
Gate-in high threshold		6		Vdc	
Gate-in low threshold	0.65			Vdc	
Gate-in low current			6	mA	
Isolation Characteristics					
Isolation (input to output)	3,000			V_{rms}	
Isolation (output to baseplate)	500			V_{rms}	
Isolation (input to baseplate)	1,500			V_{rms}	
Input/output capacitance		50	75	pF	
Environmental (MIL-STD-810)					
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
Reliability (MIL-HDBK-217F)					
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	
Thermal Characteristics					
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
Mechanical Specifications					
Weight		3.0 (85)		ounces (grams)	

(1) *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(1)	60V
5 = 155V	100 – 210V	230V
6 = 270V	125 – 400V(2)	475V
7 = 165V	100 – 310V	

Output Voltage

Z = 2V	T = 6.5V	N = 18.5V
Y = 3.3V	R = 7.5V	3 = 24V
0 = 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

I	=	-40°C to +100°C
M	=	-55°C to +100°C

Output Power / Current

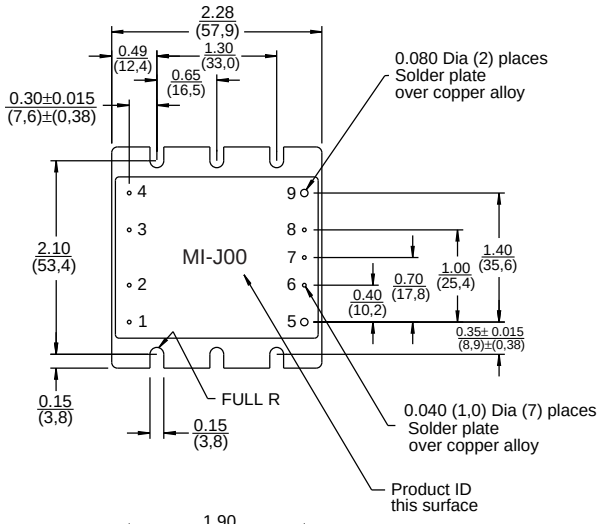
		≥5V	<5V
A	=	10W	—
Z	=	25W	5A
Y	=	50W	10A

Product Grade Specifications

PARAMETER	PRODUCT GRADE I-Grade	PRODUCT 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