

MI-200™

Military High-Density DC-DC Converters 50 to 100W



Product Highlights

The MI Series is designed for Military applications and is based on Vicor's second generation family of zero-current-switching, component level DC-DC converters. Operating at frequencies in excess of 1MHz, the MI Series offers state-of-the-art performance in terms of power density, efficiency, noise, ease of use, and reliability.

All units are manufactured under a quality system approved to MIL-I-45208 and in ISO 9001-registered facilities. Full epoxy encapsulation in Vicor's industry standard package enables the MI Series to meet MIL-STD-810 environmental requirements for humidity, fungus, salt, fog, explosive atmosphere, acceleration, vibration, and shock.

Standard features such as wide output trimming/programming, current limiting, remote sense, output inhibit and latching OVP and OTP combine to offer a high degree of protection, versatility and reliability for military power systems.

Features:

- Inputs:
 - 28Vdc per MIL-STD-704D/E
 - 155Vdc per DOD-STD-1399A
 - 270Vdc per MIL-STD-704D/E
- Single Output: 1 to 95Vdc
- Up to 23 W/in³
- MIL-STD-810 Environments
- 80-90% Efficiency
- Remote Sense
- Current Limit
- OVP and Thermal Shutdown
- Power Boosters for Higher Power Outputs
- ZCS Power Architecture
- Low Noise FM Control

Converter/Booster Specifications

(Typical at $T_{BP} = 25^{\circ}\text{C}$, 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	Watts	
Output Characteristics					
Set Point Accuracy		0.5%	1%	V_{NOM}	
Load/Line Regulation		0.05%	0.2%	V_{NOM}	LL to HL, 10% to FL
		0.2%	0.5%	V_{NOM}	LL to HL, NL to 10%
Output Temperature Drift		0.01	0.02	%/ $^{\circ}\text{C}$	
Output Noise - pp		1.0%	1.5%	V_{NOM}	Which ever is greater 20MHz BW
		100	150	mV	
Output Voltage Trimming ¹	50%		110%	V_{NOM}	
Remote Sense Compensation	0.5			Volts	
OVP Set Point	115%	125%	135%	V_{NOM}	Latching
Current Limit	105%		125%	I_{NOM}	Auto restart
Short Circuit Current	105%		130%	I_{NOM}	Auto restart
Control Pin Characteristics					
Gate In High Threshold		6		Volts	
Gate In Low Threshold	0.65			Volts	
Gate In Low Current			6	mA	
Power Sharing Accuracy	0.95		1.05		
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-810D)					
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.		864,000		hours	
50°C Naval Sheltered: N.S.		111,000		hours	
65°C Airborne Inhabited Cargo: A.I.C.		81,000		hours	
Thermal Characteristics					
Efficiency		80-90%			
Baseplate to Sink		0.2		$^{\circ}\text{C}/\text{W}$	With Thermal Pads
Shutdown Temperature	90	95	105	$^{\circ}\text{C}$	Latching
Baseplate Operating Temperature			+85	$^{\circ}\text{C}$	See Product Grade
Storage Temperature			+100	$^{\circ}\text{C}$	See Product Grade
Mechanical Specifications					
Volume		4.35		in ³	
Weight		6.0 (170)		Ounces (Grams)	

¹12V and 15V outputs, standard trim range $\pm 10\%$. Consult factory for wider trim range.

Converter Selection Chart

MI-2 ■ ■ - ■ ■

Semi-custom driver and booster modules available: Inputs from 10 to 500Vdc; outputs from 1 to 95Vdc.

(1) 16V operation at 75% load.

(2) These units rated at 75% load from 125-150Vin:

5V @ 100W; 2V and 3.3V @ 30A.

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	

Product Grade	Operating Temp.
I =	-40°C to +85°C
M =	-55°C to +85°C

Output Voltage			
Z =	2V	2 =	15V
Y =	3.3V	3 =	24V
O =	5V	L =	28V
M =	10V	4 =	48V
1 =	12V		

Output Power			
	≥5V	<5V	
Y =	50W	10A	
X =	75W	15A	
W =	100W	20A	
V =	—	30A	

For additional power, 100W and 75W Booster modules available. Change MI-2xx-xx to MI-Bxx-xx.

Product Grade Specifications

Parameter	Product Grade	
	I	M
Storage Temperature	-55°C to +100°C	-65°C to +100°C
Operating Temperature (baseplate)	-40°C to +85°C	-55°C to +85°C
Power Cycling Burn-in	12 hours, 25 cycles	96 hours, 200 cycles
Temperature Cycled with Power Off	48 hours, 12-16 cycles	48 hours, 12-16 cycles
	-55°C to +100°C	-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

Mechanical Drawing

Alternative Mechanical Packaging Available.

