



# Data Sheet

## VI-200, VE-200

### DC-DC Converters

#### 50 to 200 Watts



#### Features

- RoHS compliant (VE-200)
- Up to 50 W/in<sup>3</sup>
- cULus, cTUVus
- Up to 90% efficiency
- Size: 4.6" x 2.4" x 0.5" (116,8 x 61,0 x 12,7mm)
- Remote sense and current limit
- OVP, thermal shutdown
- Logic disable
- Wide range output adjust
- Compatible power booster modules
- ZCS power architecture
- Low noise FM control
- CE Marked

#### Product Highlights

The VI-200 family, with over 12 million units shipped, is Vicor's broad series of "zero-current-switching" component-level DC-DC converters.

Operating at frequencies up to 2 MHz, VI-200 family converters offer exceptional power density, efficiency, noise performance, reliability and ease of use. Booster modules (VI-Bxx) provide a simple, cost-effective, off-the-shelf solution for higher power output requirements. One or more boosters may be used to create synchronous arrays capable of supplying several kilowatts of output power.

The flexibility of Vicor's power components is also available in half-size, half-power VI-J00 MiniMods.

#### Packaging Options

SlimMods™, high power density, flangeless devices and FinMods™, featuring integral finned heatsinks.

**SlimMod:** Option suffix: - S

Example: VI - 2XX - XX - S

**FinMod:** Option suffix: - F1, - F2, -F3 or -F4

Examples:

VI - 2XX - XX -F1, 0.25" fins, longitudinal

VI - 2XX - XX -F2, 0.50" fins, longitudinal

VI - 2XX - XX -F3, 0.25" fins, transverse

VI - 2XX - XX -F4, 0.50" fins, transverse

**BusMod:** Option suffix: -B1

**MegaMod:** VI - LXX - XX

#### Converter Selection Chart



[a] E for RoHS compliant

#### Input Voltage

Nominal	Input Range Full Power	Max Power [b]	Low Line 75% Max Power	Transient [c]
<b>0</b> = 12 V	10 – 20 V	(1)	n/a	22 V
<b>V</b> = 24 V	10 – 36 V	(7)	n/a	n/a
<b>1</b> = 24 V	21 – 32 V	(4)	18	36 V
<b>W</b> = 24 V	18 – 36 V	(2)	n/a	n/a
<b>2</b> = 36 V	21 – 56 V	(3)	18	60 V
<b>3</b> = 48 V	42 – 60 V	(4)	36	72 V
<b>N</b> = 48 V	36 – 76 V	(4)	n/a	n/a
<b>4</b> = 72 V	55 – 100 V	(4)	45	110 V
<b>T</b> = 110 V	66 – 160 V	(2)	n/a	n/a
<b>5</b> = 150 V	100 – 200 V	(5)	85	215 V
<b>6</b> = 300 V	200 – 400 V	(4)	170	425 V
<b>7</b> = 150/300 V	100 – 375 V	(6)	90	n/a

[b] Maximum Power	5 V Outputs	>5 V Outputs	<5 V Outputs
(1)	75 W	75 W	15 A
(2)	150 W	150 W	30 A
(3)	100 W	100 W	20 A
(4)	200 W	200 W	40 A
(5)	150 W	200 W	40 A
(6)	75 W	100 W	20 A
(7)	50 W	75 W [d]	15 A

[c] Transient voltage for 1 second.

[d] X, V, and T outputs are 50 W max.

#### Output Voltage

<b>Z</b> = 2.0 V	<b>2</b> = 15 V
<b>Y</b> = 3.3 V	<b>N</b> = 18.5 V
<b>0</b> = 5.0 V	<b>3</b> = 24 V
<b>X</b> = 5.2 V	<b>L</b> = 28 V
<b>W</b> = 5.5 V	<b>J</b> = 36 V
<b>V</b> = 5.8 V	<b>K</b> = 40 V
<b>T</b> = 6.5 V	<b>4</b> = 48 V
<b>R</b> = 7.5 V	<b>H</b> = 52 V
<b>M</b> = 10 V	<b>F</b> = 72 V
<b>1</b> = 12 V	<b>D</b> = 85 V
<b>P</b> = 13.8 V	<b>B</b> = 95 V

#### Product Grade Temperatures (°C)

Operating	Storage
<b>E</b> = -10 to +85	<b>E</b> = -20 to +100
<b>C</b> = -25 to +85	<b>C</b> = -40 to +100
<b>I</b> = -40 to +85	<b>I</b> = -55 to +100
<b>M</b> = -55 to +85	<b>M</b> = -65 to +100

Overtemperature shutdown 95°C typical (recycle power to restart)

#### Output Power/Current Vout

≥ 5 V	< 5 V
<b>Y</b> = 50 W	<b>Y</b> = 10 A
<b>X</b> = 75 W	<b>X</b> = 15 A
<b>W</b> = 100 W	<b>W</b> = 20 A
<b>V</b> = 150 W	<b>V</b> = 30 A
<b>U</b> = 200 W	<b>U</b> = 40 A

For additional output power use "Boosters".  
Change (VI-2xx-xx) to (VI-Bxx-xx)

## CONVERTER SPECIFICATIONS

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

### INPUT SPECIFICATIONS

Parameter	VI-200 E-Grade			VI-200 C-, I-, M-Grade			Units	Test Conditions
	Min	Typ	Max	Min	Typ	Max		
Inrush charge		$120 \times 10^{-6}$			$120 \times 10^{-6}$	$200 \times 10^{-6}$	Coulombs	Nominal line
Input reflected ripple current – pp		10%			10%		$I_{IN}$	Nominal line, full load
Input ripple rejection		$25 + 20 \text{Log}\left(\frac{V_{in}}{V_{out}}\right)$		$30 + 20 \text{Log}\left(\frac{V_{in}}{V_{out}}\right)$			dB	120 Hz, nominal line
				$20 + 20 \text{Log}\left(\frac{V_{in}}{V_{out}}\right)$				
No load power dissipation		1.35	2		1.35	2	Watts	

### OUTPUT CHARACTERISTICS

Parameter	VI-200 E-Grade			VI-200 C-, I-, M-Grade			Units	Test Conditions							
	Min	Typ	Max	Min	Typ	Max									
Setpoint accuracy		1%	2%		0.5%	1%	$V_{NOM}$								
Load/line regulation			0.5%		0.05%	0.2%	$V_{NOM}$	LL to HL, 10% to Full Load							
Load/line regulation			1%		0.2%	0.5%	$V_{NOM}$	LL to HL, No Load to 10%							
Output temperature drift		0.02			0.01	0.02	% / $^{\circ}\text{C}$	Over rated temp.							
Long term drift		0.02			0.02		%/1K hours								
Output ripple – pp:			150		60	100	mV	20 MHz bandwidth							
									2 V, 3.3 V						
									5 V		5%		2%	3%	$V_{NOM}$
			3%		0.75%	1.5%	$V_{NOM}$	20 MHz bandwidth							
Trim range <sup>[a]</sup>	50%		110%	50%		110%	$V_{NOM}$								
Total remote sense compensation	0.5			0.5			Volts	0.25 V max. neg. leg							
OVP set point		125% <sup>[b]</sup>		115%	125% <sup>[b]</sup>	135%	$V_{NOM}$	Recycle power							
Current limit	105%		135%	105%		125%	$I_{NOM}$	Automatic restart							
Short circuit current <sup>[c]</sup>	20%		140%	20%		130%	$I_{NOM}$								

<sup>[a]</sup> 10 V, 12 V, 15 V outputs, and V input range (10 – 36 V) standard trim range  $\pm 10\%$ . Consult factory for wider trim range.  
3.3 V output trim range 2.20 to 3.63 V, 95 V output  $-50 + 0\%$  trim range.

<sup>[b]</sup> 131% nominal for booster modules.

<sup>[c]</sup> Output voltages of 3.3 V or 5 V incorporate foldback current limiting; all other outputs provide constant current limiting.

### CONTROL PIN SPECIFICATIONS

Parameter	VI-200 E-Grade			VI-200 C-, I-, M-Grade			Units	Test Conditions
	Min	Typ	Max	Min	Typ	Max		
Gate out impedance		50			50		Ohms	
Gate in impedance		1000			1000		Ohms	
Gate in open circuit voltage		6			6		Volts	Use open collector
Gate in low threshold	0.65			0.65			Volts	
Gate in low current			6			6	mA	
Power sharing accuracy	0.95		1.05	0.95		1.05		

## CONVERTER SPECIFICATIONS (cont.)

### ■ DIELECTRIC WITHSTAND CHARACTERISTICS

Parameter	VI-200 E-Grade			VI-200 C-, I-, M-Grade			Units	Test Conditions
	Min	Typ	Max	Min	Typ	Max		
Input to output	3,000			3,000			V <sub>RMS</sub>	Baseplate earthed
Output to baseplate	500			500			V <sub>RMS</sub>	
Input to baseplate	1,500			1,500			V <sub>RMS</sub>	

### ■ THERMAL CHARACTERISTICS

Parameter	VI-200 E-Grade			VI-200 C-, I-, M-Grade			Units	Test Conditions
	Min	Typ	Max	Min	Typ	Max		
Efficiency		78 – 88%			80 – 90%			
Baseplate to sink thermal impedance		0.07			0.07		°C/Watt	With Vicor P/N 20266
Thermal shutdown <sup>[d]</sup> (Drivers only)	90	95	105	90	95	105	°C	Cool and recycle power to restart

<sup>[d]</sup> No overtemp protection in booster modules.

### ■ MECHANICAL SPECIFICATIONS

Parameter	VI-200 E-, C-Grade			VI-200 I-, M-Grade			Units	Test Conditions
	Min	Typ	Max	Min	Typ	Max		
Weight	6.2 (176)	6.3 (178)	6.4 (181)	7.2 (205)	7.3 (208)	7.4 (210)	Ounces (Grams)	

# MECHANICAL DRAWING



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