

# VI-200

## DC-DC Converters 50 to 200 Watts

### Converter Selection Chart

#### VI-2

#### Features

- Up to 50W/Cubic Inch
- UL, CSA, TÜV, VDE, BABT, AUSTEL
- Up to 90% Efficiency
- Size: 4.6" x 2.4" x 0.5" (116,8 x 61,0 x 12,7)
- 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 8 million shipped, is Vicor's first generation 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. Power Boosters 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. (pg. 72)

#### Packaging Options

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

**SlimMod:** Option suffix: - **S**

Example: VI - 2XX - XX - **S**

**FinMod:** Option suffix: - **F1** and - **F2**

Examples:

VI - 2XX - XX - **F1**, 0.75" height

VI - 2XX - XX - **F2**, 1.00" height

| Nominal      | Input Voltage Range |     | Brownout/Transient* | Output Voltage |                    |
|--------------|---------------------|-----|---------------------|----------------|--------------------|
|              |                     |     |                     |                |                    |
| 0 = 12V      | 10 - 20V            | (1) | n/a                 | 2V             | 2 = 15V            |
| 1 = 24V      | 21 - 32V            | (4) | 18V                 | 36V            | Y = 3.3V N = 18.5V |
| W = 24V      | 18 - 36V            | (2) | n/a                 | n/a            | 0 = 5V 3 = 24V     |
| 2 = 36V      | 21 - 56V            | (3) | 18V                 | 60V            | X = 5.2V L = 28V   |
| 3 = 48V      | 42 - 60V            | (4) | 36V                 | 72V            | W = 5.5V J = 36V   |
| N = 48V      | 36 - 76V            | (4) | n/a                 | n/a            | V = 5.8V K = 40V   |
| 4 = 72V      | 55 - 100V           | (4) | 45V                 | 110V           | T = 6.5V 4 = 48V   |
| T = 110V     | 66 - 160V           | (2) | n/a                 | n/a            | R = 7.5V H = 52V   |
| 5 = 150V     | 100 - 200V          | (5) | 85V                 | 215V           | M = 10V F = 72V    |
| 6 = 300V     | 200 - 400V          | (4) | 170V                | 425V           | 1 = 12V D = 85V    |
| 7 = 150/300V | 100 - 375V          | (6) | 90V                 | n/a            | P = 13.8V B = 95V  |

| Product Grade/<br>Operating Temp. | Product Grade/<br>Storage Temp. |
|-----------------------------------|---------------------------------|
| E = -10°C to +85°C                | E = -20°C to +100°C             |
| C = -25°C to +85°C                | C = -40°C to +100°C             |
| I = -40°C to +85°C                | I = -55°C to +100°C             |
| M = -55°C to +85°C                | M = -65°C to +100°C             |

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

| Output Power/Current  |                       |
|-----------------------|-----------------------|
| V <sub>OUT</sub> ≥ 5V | V <sub>OUT</sub> < 5V |
| Y = 50W               | Y = 10A               |
| X = 75W               | X = 15A               |
| W = 100W              | W = 20A               |
| V = 150W              | V = 30A               |
| U = 200W              | U = 40A               |

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

| Max. Output For | 5V Outputs | > 5V Outputs | < 5V Outputs |
|-----------------|------------|--------------|--------------|
| (1)             | 75W        | 75W          | 15A          |
| (2)             | 150W       | 150W         | 30A          |
| (3)             | 100W       | 100W         | 20A          |

| Max. Output For | 5V Outputs | > 5V Outputs | < 5V Outputs |
|-----------------|------------|--------------|--------------|
| (4)             | 200W       | 200W         | 40A          |
| (5)             | 150W       | 200W         | 40A          |
| (6)             | 75W        | 100W         | 20A          |

\* Brownout 75% of rated load; transient voltage for 1 second.

#### Mechanical Drawing



## Converter Specifications

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

| PARAMETER                                       | VI-200 E-Grade |                                      |        | VI-200 C-, I-, M-Grade               |                      |      | UNITS            | TEST CONDITIONS                   |
|---|----------------|--------------------------------------|--------|--------------------------------------|----------------------|------|------------------|-----------------------------------|
|   | MIN.           | TYP.                                 | MAX.   | MIN.                                 | TYP.                 | MAX. |                  |                                   |
| <b>Input Characteristics</b>                    |                |                                      |        |                                      |                      |      |                  |                                   |
| Inrush charge                                   |                | 120x10 <sup>-6</sup>                 |        | 120x10 <sup>-6</sup>                 | 200x10 <sup>-6</sup> |      | Coulombs         | Nominal line                      |
| Input reflected ripple current – pp             |                | 10%                                  |        | 10%                                  |                      |      | I <sub>IN</sub>  | Nominal line, full load           |
| Input ripple rejection                          |                | 25+20Log( $\frac{V_{in}}{V_{out}}$ ) |        | 30+20Log( $\frac{V_{in}}{V_{out}}$ ) |                      |      | dB               | 120 Hz, nominal line              |
|   |                |                                      |        | 20+20Log( $\frac{V_{in}}{V_{out}}$ ) |                      |      | dB               | 2400 Hz, nominal line             |
| No load power dissipation                       |                | 1.35                                 | 2      |                                      | 1.35                 | 2    | Watts            |                                   |
| <b>Output Characteristics</b>                   |                |                                      |        |                                      |                      |      |                  |                                   |
| Setpoint accuracy                               |                | 1%                                   | 2%     |                                      | 0.5%                 | 1%   | V <sub>NOM</sub> |                                   |
| Load/line regulation                            |                |                                      | 0.5%   |                                      | 0.05%                | 0.2% | V <sub>NOM</sub> | LL to HL, 10% to Full Load        |
| Load/line regulation                            |                |                                      | 1%     |                                      | 0.2%                 | 0.5% | V <sub>NOM</sub> | LL to HL, No Load to 10%          |
| Output temperature drift                        |                | 0.02                                 |        | 0.01                                 | 0.02                 |      | % / °C           | Over rated temp.                  |
| Long term drift                                 |                | 0.02                                 |        | 0.02                                 |                      |      | %/1K hours       |                                   |
| Output ripple - pp:                             |                |                                      |        |                                      |                      |      |                  |                                   |
| 2V, 3.3V  |                |                                      | 150 mV | 60 mV                                | 100 mV               |      |                  | 20 MHz bandwidth                  |
| 5V  |                |                                      | 5%     | 2%                                   | 3%                   |      |                  | 20 MHz bandwidth                  |
| 10-48V  |                |                                      | 3%     | 0.75%                                | 1.5%                 |      |                  | 20 MHz bandwidth                  |
| Trim range <sup>1</sup>                         | 50%            |                                      | 110%   | 50%                                  |                      | 110% |                  |                                   |
| Total remote sense compensation                 | 0.5            |                                      |        | 0.5                                  |                      |      | Volts            | 0.25V max. neg. leg               |
| OVP set point                                   |                | 125% <sup>2</sup>                    |        | 115%                                 | 125% <sup>2</sup>    | 135% | V <sub>NOM</sub> | Recycle power                     |
| Current limit                                   | 105%           |                                      | 135%   | 105%                                 |                      | 125% | I <sub>NOM</sub> | Automatic restart                 |
| Short circuit current <sup>3</sup>              | 20%            |                                      | 140%   | 20%                                  |                      | 130% | I <sub>NOM</sub> |                                   |
| <b>Control Pin Characteristics</b>              |                |                                      |        |                                      |                      |      |                  |                                   |
| Gate out impedance                              |                | 50                                   |        | 50                                   |                      |      | Ohms             |                                   |
| Gate in impedance                               |                | 10 <sup>3</sup>                      |        | 10 <sup>3</sup>                      |                      |      | 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 |                  |                                   |
| <b>Dielectric Withstand Characteristics</b>     |                |                                      |        |                                      |                      |      |                  |                                   |
| 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> |                                   |
| <b>Thermal Characteristics</b>                  |                |                                      |        |                                      |                      |      |                  |                                   |
| Efficiency                                      |                | 78-88%                               |        | 80-90%                               |                      |      |                  |                                   |
| Baseplate to sink                               |                | 0.2                                  |        | 0.2                                  |                      |      | °C/Watt          | With Vicor P/N 01777              |
| Thermal shutdown <sup>4</sup><br>(Drivers only) | 90             | 95                                   | 105    | 90                                   | 95                   | 105  | °C               | Cool and recycle power to restart |
| <b>Mechanical Specifications</b>                |                |                                      |        |                                      |                      |      |                  |                                   |
| Weight  |                | 6.0 (170)                            |        | 6.0 (170)                            |                      |      | Ounces (Grams)   |                                   |

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

<sup>2</sup> 131% nominal for booster modules.

<sup>3</sup> Output voltages of 3.3V or 5V incorporate foldback current limiting; all other outputs provide constant current limiting.

<sup>4</sup> No overtemp protection in booster modules.