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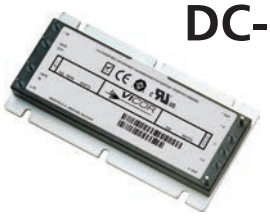
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Find the *Vicor VI-260-CU* at our website: ***Click HERE***

# DC-DC Converters

## VI-200
## VE-200



50 to 200 Watts

## Features & Benefits

- Isolated output
- Up to 50W/in$^3$
- cURus, cTÜVus
- 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
- RoHS compliant (VE-200)

## Product Highlights

The VI-200 family, with over 14 million units shipped, is Vicor's broad series of "zero-current-switching" component-level DC-DC converters.

Operating at frequencies up to 2MHz, 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.

## Part Numbering

VI – 2 6 1 – C W

**Family**
**VI** = Non-RoHS
**VE** = RoHS

**Series**
**2** = 200
**B** = Booster

**Input**

| | |
|---|---|
| **0** = 12V | **N** = 48V |
| **V** = 24V | **4** = 72V |
| **1** = 24V | **T** = 110V |
| **W** = 24V | **5** = 150V |
| **2** = 36V | **6** = 300 V |
| **3** = 48V | **7** = 150/300V |

**Output**

| | | |
|---|---|---|
| **Z** = 2V | **M** = 10V | **K** = 40V |
| **Y** = 3.3V | **1** = 12V | **4** = 48V |
| **0** = 5V | **P** = 13.8V | **H** = 52V |
| **X** = 5.2V | **2** = 15V | **F** = 72V |
| **W** = 5.5V | **N** = 18.5V | **D** = 85V |
| **V** = 5.8V | **3** = 24V | **B** = 95V |
| **T** = 6.5V | **L** = 28V | |
| **R** = 7.5V | **J** = 36V | |

**Grade**
**E** = –10 to 85°C
**C** = –25 to 85°C
**I** = –40 to 85°C
**M** = –55 to 85°C

**Power**

| ≥ 5V | < 5V |
|---|---|
| **U** = 200W | **U** = 40A |
| **V** = 150W | **V** = 30A |
| **W** = 100W | **W** = 20A |
| **X** = 75W | **X** = 15A |
| **Y** = 50W | **Y** = 10A |

**Note:** For additional packaging options, please see page 5.

## Maximum Power Available for VI-2xx-xx [a]

| Input | | | | Output | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Voltage Nom. (Range) | Low Line 75% Max Power | Transient [b] | $V_{IN}$ Designators | $V_{OUT}$ Designators | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 2 | 3.3 | 5 | 5.2 | 5.5 | 5.8 | 6.5 | 7.5 | 10 | 12 | 13.8 | 15 | 18.5 | 24 | 28 | 36 | 40 | 48 | 52 | 72 | 85 | 95 |
| | | | | Z | Y | 0 | X | W | V | T | R | M | 1 | P | 2 | N | 3 | L | J | K | 4 | H | F | D | B |
| **12 (10 – 20)** | n/a | 22 | **0** | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| **24 (10 – 36)** | n/a | n/a | **V** | -- | X | Y | Y | Y | Y | Y | X | X | X | X | X | X | X | X | X | X | X | -- | -- | -- | -- |
| **24 (21 – 32)** | 18 | 36 | **1** | U | U | U | U | U | U | V | V | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| **24 (18 – 36)** | n/a | n/a | **W** | V | V | V | V | V | V | W | W | V | V | V | V | V | V | V | V | V | V | V | V | V | V |
| **36 (21 – 56)** | 18 | 60 | **2** | W | V | W | W | W | W | W | W | W | W | W | W | W | W | W | W | W | W | W | -- | -- | -- |
| **48 (42 – 60)** | 36 | 72 | **3** | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| **48 (36 – 76)** | n/a | n/a | **N** | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| **72 (55 – 100)** | 45 | 110 | **4** | v | U | U | U | U | U | V | V | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| **110 (66 – 160)** | n/a | n/a | **T** | V | V | V | V | V | V | W | W | V | V | V | V | V | V | V | V | V | V | V | V | -- | -- |
| **150 (100 – 200)** | 85 [c] | 215 | **5** | U | U | V | V | V | V | V | V | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| **150 (100 – 375)** | n/a | n/a | **7** | W | W | Y | Y | Y | Y | W | W | W | W | W | W | W | W | W | W | W | W | W | -- | -- | -- |
| **300 (200 – 400)** | 170 [d] | 425 | **6** | U | U | U | U | U | U | V | V | U | U | U | U | U | U | U | U | U | U | U | U | U | U |

[a] For additional output power, "booster" modules are available. (VI-Bxx-xx).
[b] Transient voltage for 1 second.
[c] $12V_{OUT}$, $13.8V_{OUT}$, $15V_{OUT}$, 200W models are limited to $90V_{DC}$.
[d] $15V_{OUT}$, 200W models are limited to $185V_{DC}$.

## Converter Specifications

(Typical at $T_{BP}$ = 25°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 | 120Hz, nominal line |
| | | | | | $20+20 \text{ Log } \left(\frac{V_{IN}}{V_{OUT}}\right)$ | | dB | 2400Hz, nominal line |
| No load power dissipation | | 1.35 | 2 | | 1.35 | 2 | Watts | |

## Converter Specifications (Cont.)

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

### 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 | % / °C | Over rated temp. |
| Long term drift | | 0.02 | | | 0.02 | | %/1K hours | |
| Output ripple – pp: 2V, 3.3V | | | 150 | | 60 | 100 | mV | 20MHz bandwidth |
| 5V | | | 5% | | 2% | 3% | $V_{NOM}$ | 20MHz bandwidth |
| 10 – 95V | | | 3% | | 0.75% | 1.5% | $V_{NOM}$ | 20MHz bandwidth |
| Trim range [a] | 50% | | 110% | 50% | | 110% | $V_{NOM}$ | |
| Total remote sense compensation | 0.5 | | | 0.5 | | | Volts | 0.25V max. neg. leg |
| OVP set point | | 125% [b] | | 115% | 125% [b] | 135% | $V_{NOM}$ | Recycle power |
| Current limit | 105% | | 135% | 105% | | 125% | $I_{FULL\ LOAD}$ | Automatic restart |
| Short circuit current [c] | 20% | | 140% | 20% | | 130% | $I_{FULL\ LOAD}$ | Automatic restart |

[a] 10V to 15V outputs, or "V" input range have standard trim range ±10%. Consult factory for wider trim range.
3.3V output trim range 2.20 to 3.63V, 95V output –50 + 0% trim range.
[b] 131% nominal for booster modules.
[c] Output voltages of 3.3V or 5V incorporate foldback current limiting; For output voltages from 5.2V to 7.5V consult factory;
All other outputs provide constant current limiting.

**Note:** The permissible load current must never be exceeded during normal, abnormal or test conditions. For additional output related application information, please refer to output connections on page 5.

### 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.)

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

### 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 | | | $V_{RMS}$ | Baseplate earthed |
| Output to baseplate | 500 | | | 500 | | | $V_{RMS}$ | |
| Input to baseplate | 1,500 | | | 1,500 | | | $V_{RMS}$ | |

### 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 [d] (Drivers only) | 90 | 95 | 105 | 90 | 95 | 105 | °C | Cool and recycle power to restart |

[d] No overtemp protection in booster modules.

### Mechanical Specifications

| Parameter | VI-200 E-Grade | | | VI-200 C-, I-, M-Grade | | | Units | Test Conditions |
|---|---|---|---|---|---|---|---|---|
| | Min | Typ | Max | Min | Typ | Max | | |
| Weight | 5.7 (160.2) | 6.3 (178) | 6.9 (195.8) | 6.6 (187.2) | 7.3 (208) | 8.1 (228.8) | Ounces (Grams) | |

### Product Grade Temperatures

| Parameter | Storage | Operating | Units | Notes |
|---|---|---|---|---|
| E | -20 to +100 | -10 to + 85 | °C | Overtemperature shutdown 95°C typical (recycle power to restart) |
| C | -40 to +100 | -25 to + 85 | °C | |
| I | -55 to +100 | -40 to + 85 | °C | |
| M | -65 to +100 | -55 to + 85 | °C | |

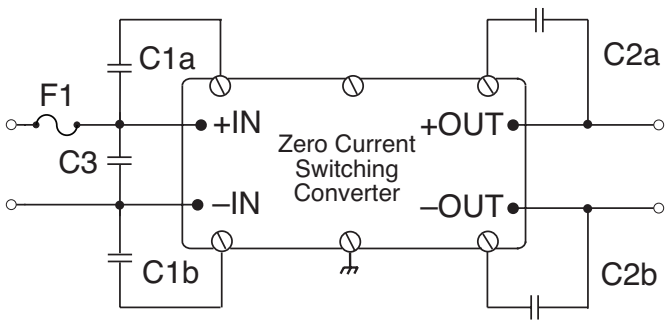
### Maximum Capacitance, Rated Output Voltage <5V

| Rated $V_{OUT}$ (V) | $I_{OUT}$ Rating (A) | $C_{MAX}$ (µF) | $I_{OUT}$ Rating (A) | $C_{MAX}$ (µF) |
|---|---|---|---|---|
| 2 to <3 | ≤10 | 1500 | >10 to 40 | 5000 |
| 3 to <5 | ≤10 | 1000 | >10 to 40 | 5000 |

### Maximum Capacitance, Rated Output Voltage ≥5V

| Rated $V_{OUT}$ (V) | $P_{OUT}$ Rating (W) | $C_{MAX}$ (µF) | $P_{OUT}$ Rating (W) | $C_{MAX}$ (µF) |
|---|---|---|---|---|
| 5 to <7.5 | ≤50 | 1000 | >50 to 200 | 1500 |
| 7.5 to <10 | ≤50 | 400 | >50 to 200 | 700 |
| 10 to <28 | ≤50 | 400 | >50 to 200 | 500 |
| >28 | ≤50 | 150 | >50 to 200 | 250 |

## Basic Module Operation




$$C3\ (\mu F) = \frac{400}{V_{IN}\ Minimum}$$

***Figure 1 —*** *Basic module operation requires fusing, grounding, bypassing capacitors.* See Design Guide & Applications Manual.*

### Output Connections and Considerations

The permissible load current[e] must never be exceeded during normal, abnormal or test conditions. Converters subject to dynamic loading exceeding 25% of rated current must be reviewed by Vicor Applications Engineering to ensure that the converter will operate properly.

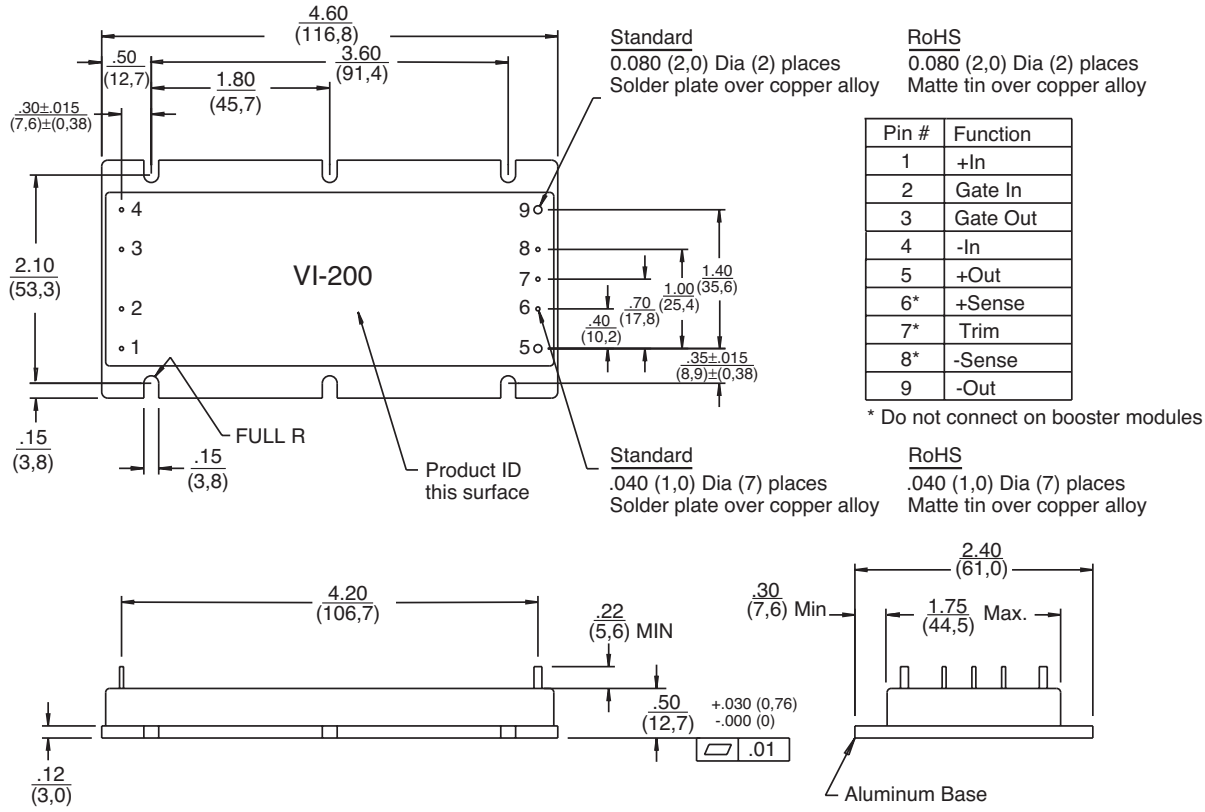
Under dynamic load, light load, or no load conditions, the converter may emit audible noise. Converters that utilize remote sense may require compensation circuitry to offset the phase lag caused by the external output leads and load impedance. Remote Sense leads must be protected for conditions such as lead reversal, noise pickup, open circuit, or excessive output lead resistance between the sense point and the converters output terminals. For applications that may draw more than the rated current, a fast acting electronic circuit breaker must be utilized to protect the converter. Under no circumstance should the rated current be exceeded. Utilizing or testing of current limit or short circuit current will damage the converter. Ensure that the total output capacitance connected to the converter does not exceed the limits on Page 4.

[e] Permissible load current: $\frac{Nominal\ Power\ Rating}{Nominal\ V_{OUT}}$

## Storage

Vicor products, when not installed in customer units, should be stored in ESD safe packaging in accordance with ANSI/ESD S20.20, "Protection of Electrical and Electronic Parts, Assemblies and Equipment" and should be maintained in a temperature controlled factory/warehouse environment not exposed to outside elements controlled between the temperature ranges of 15°C and 38°C. Humidity shall not be condensing, no minimum humidity when stored in an ESD compliant package.

## Mechanical Drawing




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

* Do not connect on booster modules

### Packaging Options

#### SlimMod

Flangeless package



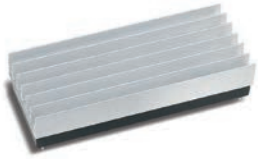
4.60"L x 1.80"W x 0.50"H
(116,8 x 45,7 x 12,7mm)

*To order the SlimMod configuration add the suffix "–S" to the standard module part number.*

*Qty (2) grounding clips are included with each SlimMod P/N 32187*

#### FinMod

Flangeless package with integral heat sink



Longitudinal, 0.25"(6.35mm) fins — add suffix "–F1"
Longitudinal, 0.50"(12.7mm) fins — add suffix "–F2"



Transverse, 0.25"(6.35mm) fins — add suffix "–F3"
Transverse, 0.50"(12.7mm) fins — add suffix "–F4"

*Available with longitudinal or transverse fins of 0.25"(6.35 mm) or 0.50"(12.7mm) height. Add the appropriate suffx to the module part number.*

*Qty (4) grounding clips are included with each FinMod*
*F1, F2 P/N 32185*
*F3, F4 P/N 32186*

#### MegaMod

Chassis mount alternatives, one, two, or three outputs: up to 600W



1 up – 4.9" x 2.5" x 0.62" (124,4 x 63,5 x 15,7mm)
2 up – 4.9" x 4.9" x 0.62" (124,4 x 124,4 x 15,7mm)
3 up – 4.9" x 7.3" x 0.62" (124,4 x 185,4 x 15,7mm)

#### BusMod



4.60"L x 2.40"W x 1.08"H
(116,8 x 61,0 x 27,4mm)

*To order the BusMod fully assembled, add suffix "–B1" to the standard module part number.*

***To order the BusMod separately:***
*Full-sized BusMod — P/N 06322*

See BusMod Mechanical Drawings for more details.

**Vicor's comprehensive line of power solutions includes high density AC-DC and DC-DC modules and accessory components, fully configurable AC-DC and DC-DC power supplies, and complete custom power systems.**

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