



# MI-MegaMod™ Family

**Military Chassis Mount DC-DC Converters 10 to 300W  
Single, Dual, Triple Outputs**

## Product Highlights

Vicor's MI-MegaMod family of single, dual, and triple output DC-DC converters provide power system designers with cost-effective, high-performance, off-the-shelf solutions to applications that might otherwise require a custom supply.

Incorporating standard MI-200 or MI-J00 family converters in rugged, chassis mount packages, MegaMods can be ordered with single, dual, or triple outputs, having a combined output power of up to 300W. Totally isolated outputs eliminate efficiency penalties and output interaction problems.

## Features

- ✦ Inputs: 28, 155, 165 and 270Vdc
- ✦ Any output: 2 to 48Vdc
- ✦ Up to 13.5W/in<sup>3</sup>
- ✦ High efficiency
- ✦ Remote sense
- ✦ ZVS/ZCS power architecture
- ✦ Low noise FM control
- ✦ Size — 1-up half-size: 2.58" x 2.5" x 0.62" (65,5 x 63,5 x 15,7mm)
- ✦ Size — 1-up full-size: 4.9" x 2.5" x 0.62" (124,5 x 63,5 x 15,7mm)
- ✦ Size — 2-up half-size: 2.58" x 4.9" x 0.62" (65,5 x 124,5 x 15,7mm)
- ✦ Size — 2-up full-size: 4.9" x 4.9" x 0.62" (124,5 x 124,5 x 15,7mm)
- ✦ Size — 3-up half-size: 2.58" x 7.3" x 0.62" (65,5 x 185,4 x 15,7mm)
- ✦ Size — 3-up full-size: 4.9" x 7.3" x 0.62" (124,5 x 185,4 x 15,7mm)

## Configuration Chart

| Full-Size MegaMods        |            |                      |  | Number of Modules |
|---------------------------|------------|----------------------|--|-------------------|
| <b>Single Output</b>      |            |                      |  |                   |
| MI-L                      | 50 – 100W  | 4.9" x 2.5" x 0.62"  |  | 1                 |
| MI-M                      | 150 – 200W | 4.9" x 4.9" x 0.62"  |  | 2                 |
| MI-N                      | 300W       | 4.9" x 7.3" x 0.62"  |  | 3                 |
| <b>Dual Output</b>        |            |                      |  |                   |
| MI-P                      | 100 – 200W | 4.9" x 4.9" x 0.62"  |  | 2                 |
| MI-Q                      | 200 – 300W | 4.9" x 7.3" x 0.62"  |  | 3                 |
| <b>Triple Output</b>      |            |                      |  |                   |
| MI-R                      | 150 – 300W | 4.9" x 7.3" x 0.62"  |  | 3                 |
| <b>Half-Size MegaMods</b> |            |                      |  |                   |
| <b>Single Output</b>      |            |                      |  |                   |
| MI-LJ                     | 10 – 50W   | 2.58" x 2.5" x 0.62" |  | 1                 |
| <b>Dual Output</b>        |            |                      |  |                   |
| MI-PJ                     | 20 – 100W  | 2.58" x 4.9" x 0.62" |  | 2                 |
| <b>Triple Output</b>      |            |                      |  |                   |
| MI-RJ                     | 30 – 150W  | 2.58" x 7.3" x 0.62" |  | 3                 |

| Input Voltage |                           |           |
|---------------|---------------------------|-----------|
| Nominal       | Range                     | Transient |
| 2=28Vdc       | 18 – 50V <sup>(1)</sup>   | 60V       |
| 5=155Vdc      | 100 – 210V                | 230V      |
| 6=270Vdc      | 125 – 400V <sup>(2)</sup> | 475V      |
| 7=165Vdc      | 100 – 310V <sup>(3)</sup> |           |

| Output Voltage |           |           |
|----------------|-----------|-----------|
| Z = 2V         | T = 6.5V  | N = 18.5V |
| Y = 3.3V       | R = 7.5V  | 3 = 24V   |
| O = 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       |
|---------------------|
| <b>Full-Size</b>    |
| I = -40°C to +85°C  |
| M = -55°C to +85°C  |
| <b>Half-Size</b>    |
| I = -40°C to +100°C |
| M = -55°C to +100°C |

| Output Power/Current |             |
|----------------------|-------------|
| Full-Size            | Half-Size   |
| ≥5V <5V              | ≥5V <5V     |
| Y = 50W 10A          | A = 10W —   |
| X = 75W 15A          | Z = 25W 5A  |
| W = 100W 20A         | Y = 50W 10A |
| V = — 30A            |             |

| Output Power/Current |     |
|----------------------|-----|
| ≥5V                  | <5V |
| V = 150W             | 30A |
| U = 200W             | —   |
| S = —                | 60A |

| Output Power/Current |     |
|----------------------|-----|
| ≥5V                  | <5V |
| S = 300W             | —   |
| P = —                | 90A |

<sup>(1)</sup> 16V operation at 75% load.

<sup>(2)</sup> These units rated at 75% load from 125 – 150Vin: Full-size – 5Vout @ 100W; 2Vout and 3.3Vout @ 30A  
Half-Size – 5Vout @ 50W; 2V and 3.3V @ 10A.

<sup>(3)</sup> For use with Vicor's MI-AIM

## Full-Size

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

| PARAMETER                              | MIN   | TYP   | MAX                  | UNITS                          | NOTES                    |
|--|-------|---|----------------------|--------------------------------|--------------------------|
| <b>Input Characteristics</b>           |       |   |                      |                                |                          |
| Inrush charge                          |       | $120 \times 10^{-6}$                                      | $200 \times 10^{-6}$ | Coulombs                       | Nominal line, per module |
| Input reflected ripple current – pp:   |       | 10  |                      | % $I_{in}$                     | Nominal line, full load  |
| Input ripple rejection                 |       | $30 + 20\text{Log} \left( \frac{V_{in}}{V_{out}} \right)$ |                      | 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  | 2.0                  | Watts                          | Per module               |
| <b>Output Characteristics</b>          |       |   |                      |                                |                          |
| Setpoint accuracy                      |       | 0.5   | 1.0                  | % $V_{nom}$                    |                          |
| Load/line regulation                   |       | 0.05  | 0.2                  | % $V_{nom}$                    | LL to HL, 10% to FL      |
| Load/line regulation                   |       | 0.2   | 0.5                  | % $V_{nom}$                    | LL to HL, NL to 10%      |
| Output temperature drift               |       | 0.01  | 0.02                 | % / $^{\circ}\text{C}$         | Over rated temperature   |
| Long term drift                        |       | 0.02  |                      | %/1K hours                     |                          |
| Output ripple – p-p: $\leq 10\text{V}$ |       | 80  | 150                  | mV                             | 20MHz bandwidth          |
| 12-48V                                 |       | 0.75  | 1.5                  | %                              | 20MHz bandwidth          |
| Output voltage trimming <sup>(1)</sup> | 50    |   | 110                  | % $V_{nom}$                    |                          |
| Total remote sense compensation        | 0.5   |   |                      | Vdc                            | 0.25V max. neg. leg      |
| OVP setpoint                           | 115   | 125   | 135                  | % $V_{nom}$                    | Recycle power            |
| Current limit                          | 105   |   | 125                  | % $I_{nom}$                    | Automatic restart        |
| Short circuit current                  |       |   | 130                  | % $I_{nom}$                    |                          |
| <b>Control Pin Characteristics</b>     |       |   |                      |                                |                          |
| Gate out impedance                     |       | 50  |                      | Ohms                           |                          |
| Gate in impedance                      |       | $10^3$  |                      | Ohms                           |                          |
| Gate in open circuit voltage           |       | 6.0   |                      | Vdc                            | Use open collector       |
| Gate in low threshold                  | 0.65  |   |                      | Vdc                            |                          |
| Gate in low current                    |       |   | 6.0                  | mA                             |                          |
| <b>Isolation Characteristics</b>       |       |   |                      |                                |                          |
| Isolation (input to output)            | 3,000 |   |                      | Vrms                           |                          |
| Isolation (output to baseplate)        | 500   |   |                      | Vrms                           |                          |
| Isolation (input to baseplate)         | 1,500 |   |                      | Vrms                           |                          |
| <b>Thermal Characteristics</b>         |       |   |                      |                                |                          |
| Efficiency                             |       | 80-90   |                      | %                              |                          |
| Baseplate to chassis                   |       | 0.1   |                      | $^{\circ}\text{C}/\text{Watt}$ |                          |
| Thermal shutdown                       | 90    | 95  | 105                  | $^{\circ}\text{C}$             |                          |
| <b>Mechanical Specifications</b>       |       |   |                      |                                |                          |
| Weight                                 |       |   |                      |                                |                          |
| 1-up                                   |       | 9.0 (255)   |                      | ounces (grams)                 |                          |
| 2-up                                   |       | 1.2 (525)   |                      | pounds (grams)                 |                          |
| 3-up                                   |       | 1.7 (780)   |                      | pounds (grams)                 |                          |

<sup>(1)</sup> 10V, 12V, and 15V outputs, standard trim range  $\pm 10\%$ . Consult factory for wider trim range.

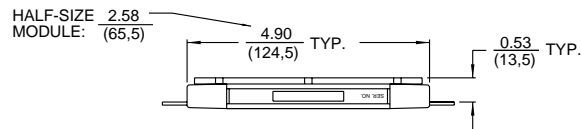
## Half-Size

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

| PARAMETER                              | MIN   | TYP   | MAX                  | UNITS                          | NOTES                    |
|--|-------|---|----------------------|--------------------------------|--------------------------|
| <b>Input Characteristics</b>           |       |   |                      |                                |                          |
| Inrush charge                          |       | $60 \times 10^{-6}$                                       | $100 \times 10^{-6}$ | Coulombs                       | Nominal line, per module |
| Input reflected ripple current – pp:   |       | 10  |                      | % $I_{in}$                     | Nominal line, full load  |
| Input ripple rejection                 |       | $30 + 20\text{Log} \left( \frac{V_{in}}{V_{out}} \right)$ |                      | 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  | 2.0                  | Watts                          | Per module               |
| <b>Output Characteristics</b>          |       |   |                      |                                |                          |
| Setpoint accuracy                      |       | 0.5   | 1.0                  | % $V_{nom}$                    |                          |
| Load/line regulation                   |       | 0.05  | 0.2                  | % $V_{nom}$                    | LL to HL, 10% to FL      |
| Load/line regulation                   |       | 0.2   | 0.5                  | % $V_{nom}$                    | LL to HL, NL to 10%      |
| Output temperature drift               |       | 0.01  | 0.02                 | % / $^{\circ}\text{C}$         | Over rated temperature   |
| Long term drift                        |       | 0.02  |                      | %/1K hours                     |                          |
| Output ripple – p-p: $\leq 10\text{V}$ |       | 80  | 150                  | mV                             | 20MHz bandwidth          |
| 12-48V                                 |       | 0.75  | 1.5                  | %                              | 20MHz bandwidth          |
| Output voltage trimming <sup>(1)</sup> | 50    |   | 110                  | % $V_{nom}$                    |                          |
| Total remote sense compensation        | 0.5   |   |                      | Vdc                            | 0.25V max. neg. leg      |
| Current limit                          | 105   |   | 125                  | % $I_{nom}$                    | Automatic restart        |
| <b>Control Pin Characteristics</b>     |       |   |                      |                                |                          |
| Gate out impedance                     |       | 50  |                      | Ohms                           |                          |
| Gate in impedance                      |       | $10^3$  |                      | Ohms                           |                          |
| Gate in open circuit voltage           |       | 6.0   |                      | Vdc                            | Use open collector       |
| Gate in low threshold                  | 0.65  |   |                      | Vdc                            |                          |
| Gate in low current                    |       |   | 6.0                  | mA                             |                          |
| <b>Isolation Characteristics</b>       |       |   |                      |                                |                          |
| Isolation (input to output)            | 3,000 |   |                      | Vrms                           |                          |
| Isolation (output to baseplate)        | 500   |   |                      | Vrms                           |                          |
| Isolation (input to baseplate)         | 1,500 |   |                      | Vrms                           |                          |
| <b>Thermal Characteristics</b>         |       |   |                      |                                |                          |
| Efficiency                             |       | 80-90   |                      | %                              |                          |
| Baseplate to chassis                   |       | 0.1   |                      | $^{\circ}\text{C}/\text{Watt}$ |                          |
| <b>Mechanical Specifications</b>       |       |   |                      |                                |                          |
| Weight                                 |       |   |                      |                                |                          |
| 1-up                                   |       | 4.5 (127)   |                      | ounces (grams)                 |                          |
| 2-up                                   |       | 8.8 (250)   |                      | ounces (grams)                 |                          |
| 3-up                                   |       | 13.3 (377)  |                      | ounces (grams)                 |                          |

<sup>(1)</sup> 10V, 12V, and 15V outputs, standard trim range  $\pm 10\%$ . Consult factory for wider trim range.

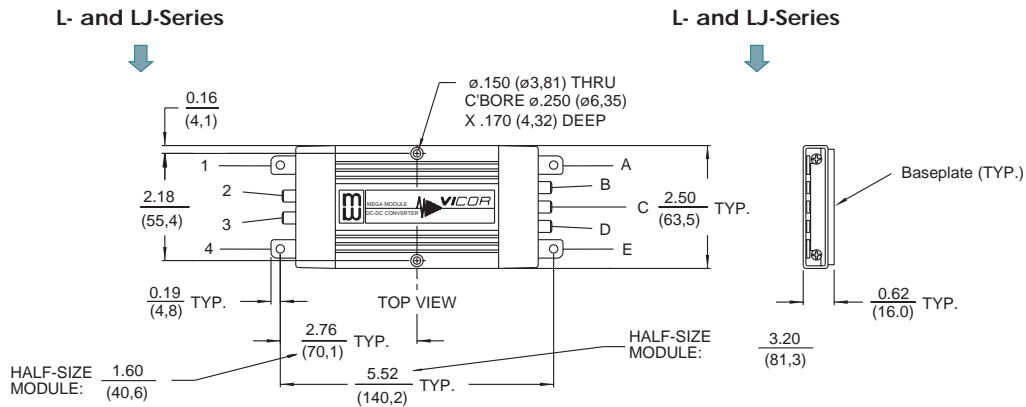
**Inputs**



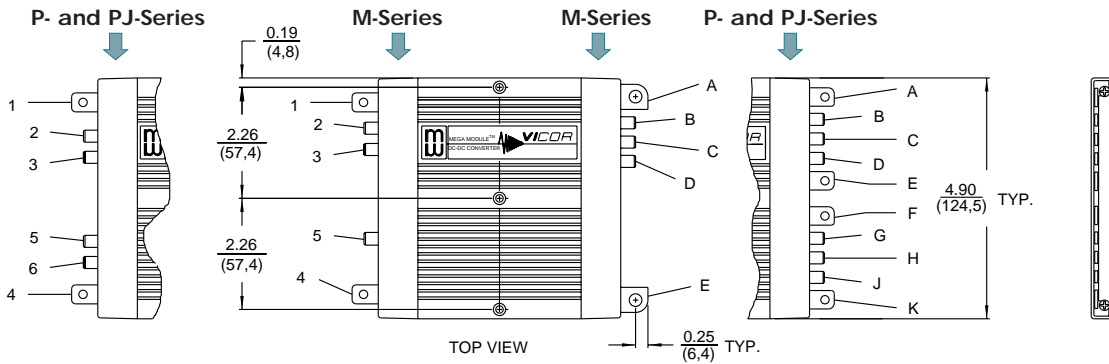
**Outputs**

Side view (all models)

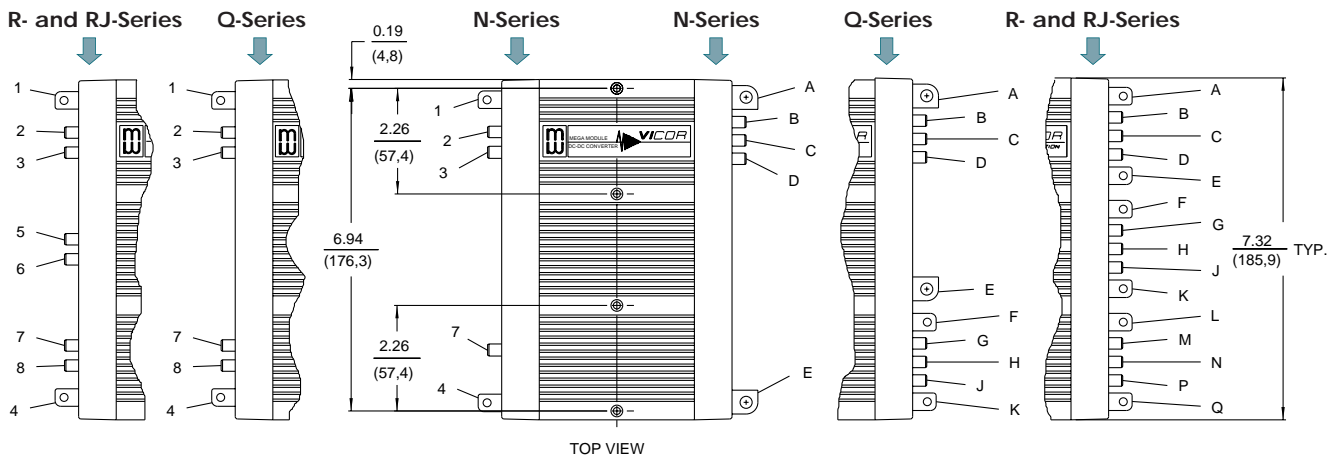
**1-Up**



**2-Up**



**3-Up**



| Inputs        |               | Outputs   |           |           |
|---------------|---------------|-----------|-----------|-----------|
| 1 -Input      | 5 Gate Out #2 | Output #1 | Output #2 | Output #3 |
| 2 Gate Out #1 | 6 Gate In #2  | A -Output | F -Output | L -Output |
| 3 Gate In #1  | 7 Gate Out #3 | B -Sense  | G -Sense  | M -Sense  |
| 4 +Input      | 8 Gate In #3  | C Trim    | H Trim    | N Trim    |
|               |               | D +Sense  | J +Sense  | P +Sense  |
|               |               | E +Output | K +Output | Q +Output |

**Mounting Information**

Use #6 machine hardware torqued to 5-7 in-lbs.