



Actual size:
4.6 x 2.2 x 0.5in
117 x 56 x 12,7mm

Maxi Family 110V Input



DC-DC Converter Module

Features & Benefits

- DC input range: 66 – 154V (continuous)
- Isolated output
- Encapsulated circuitry for shock and vibration resistance
- Extended temperature range (-55 to +100°C)
- Input surge withstand: 250V for 100ms
- DC output: 3.3 – 48V
- Programmable output: 10 to 110%
- Regulation: ±0.2% no load to full load
- Efficiency: Up to 90%
- Maximum operating temp: 100°C, full load
- Power density: up to 80W per cubic inch
- Height above board: 0.43in. (10,9mm)
- Parallelable, with N+M fault tolerance
- Low noise ZCS/ZVS architecture
- RoHS Compliant (with F or G pin option)

Applications

Railway/Transportation system applications including communications systems, information display, lighting, control systems, ticket machines, passenger entertainment, public address systems, door control, industrial power systems and power generation systems.

For details on proper operation please refer to the: [Design Guide & Applications Manual for Maxi, Mini, Micro Family.](#)

Absolute Maximum Ratings

| Parameter | Rating | Unit | Notes |
|---------------------------|--------------|------------------|---------------------|
| +In to -In voltage | -0.5 to +260 | V _{DC} | |
| PC to -In voltage | -0.5 to +7.0 | V _{DC} | |
| PR to -In voltage | -0.5 to +7.0 | V _{DC} | |
| SC to -Out voltage | -0.5 to +1.5 | V _{DC} | |
| -Sense to -Out voltage | 1.0 | V _{DC} | |
| Isolation voltage | | | |
| in to out | 3000 | V _{RMS} | Test voltage |
| in to base | 1500 | V _{RMS} | Test voltage |
| out to base | 500 | V _{RMS} | Test voltage |
| Operating Temperature | -55 to +100 | °C | M-Grade |
| Storage Temperature | -65 to +125 | °C | M-Grade |
| Pin soldering temperature | 500 (260) | °F (°C) | <5 sec; wave solder |
| | 750 (390) | °F (°C) | <7 sec; hand solder |
| Mounting torque | 5 (0.57) | in-lbs (N-m) | 6 each |

Product Overview

These DC-DC converter modules use advanced power processing, control and packaging technologies to provide the performance, flexibility, reliability and cost effectiveness of a mature power component.

High frequency ZCS/ZVS switching provides high power density with low noise and high efficiency.

Part Numbering

e.g. V110A24C400BL



| | | | | | |
|---|--|--|--|--|--|
| Product Type V = Standard S = Enhanced efficiency (avail. ≤12 V _{out} only) | Output Voltage 3V3 = 3.3V 5 = 5V 8 = 8V 12 = 12V 15 = 15V 24 = 24V 28 = 28V 36 = 36V 48 = 48V | Product Grade Temperatures (°C) Grade Operating Storage E = -10 to +100 -20 to +125 C = -20 to +100 -40 to +125 T = -40 to +100 -40 to +125 H = -40 to +100 -55 to +125 M = -55 to +100 -65 to +125 | Output Power V _{OUT} P _{OUT} 3.3V 150W, 200W 5V 200W, 300W 8V 200W, 300W 12V 300W, 400W 15V 300W, 400W 24V 300W, 400W 28V 300W, 400W 36V 300W, 400W 48V 300W, 400W | Pin Style Blank : Short L : Long S : Short ModuMate N : Long ModuMate F : Short RoHS G : Long RoHS K : Extra Long RoHS Finish Tin/Lead Gold Gold Gold Gold Gold | Baseplate Blank : Slotted 2 : Threaded 3 : Through-hole |
|---|--|--|--|--|--|

Module Family Electrical Characteristics

Electrical characteristics apply over the full operating range of input voltage, output load (resistive) and baseplate temperature, unless otherwise specified. All temperatures refer to the operating temperature at the center of the baseplate.

MODULE INPUT SPECIFICATIONS

| Parameter | Min | Typ | Max | Unit | Notes |
|-------------------------|-------|-------|-------|-----------------|---------------------------|
| Operating input voltage | 66 | 110 | 154 | V _{DC} | Per EN50155 and GBT-25119 |
| Input surge withstand | | | 250 | V _{DC} | <100ms |
| Undervoltage turn-on | | 64 | 65.4 | V _{DC} | |
| Undervoltage turn-off | 54 | 56 | | V _{DC} | |
| Overvoltage turn-off/on | 155.5 | 161.7 | 169.4 | V _{DC} | |
| Disabled input current | | | 1.3 | mA | PC pin low |

MODULE OUTPUT SPECIFICATIONS

| Parameter | Min | Typ | Max | Unit | Notes |
|--|-----|--------|--------------|-------------------------|---|
| Output voltage setpoint | | | ±1 | % V _{out} nom. | Nominal input; full load; 25°C |
| Line regulation | | ±0.02 | ±0.20 | % | Low line to high line; full load |
| Temperature regulation | | ±0.002 | ±0.005 | % / °C | Over operating temperature range |
| Power sharing accuracy | | ±2 | ±5 | % | 10 to 100% of full load |
| Programming range | 10 | | 110 | % | Of nominal output voltage. For trimming below 90% of nominal, a minimum load of 10% of maximum rated power may be required. |
| +Out to -Out, +Sense to -Out — Absolute Maximum Ratings | | | | | |
| 3.3V | | | -0.5 to 4.7 | V _{DC} | Externally applied |
| 5V | | | -0.5 to 7.0 | V _{DC} | Externally applied |
| 8V | | | -0.5 to 10.9 | V _{DC} | Externally applied |
| 12V | | | -0.5 to 16.1 | V _{DC} | Externally applied |
| 15V | | | -0.5 to 20.0 | V _{DC} | Externally applied |
| 24V | | | -0.5 to 31.7 | V _{DC} | Externally applied |
| 28V | | | -0.5 to 36.9 | V _{DC} | Externally applied |
| 36V | | | -0.5 to 47.4 | V _{DC} | Externally applied |
| 48V | | | -0.5 to 62.9 | V _{DC} | Externally applied |

Note: For important information relative to applications where the converter modules are subject to continuous dynamic loading, contact Vicor applications engineering at 800-927-9474.

THERMAL RESISTANCE AND CAPACITY

| Parameter | Min | Typ | Max | Unit |
|--|-----|------|-----|-------------|
| Baseplate to sink; flat, greased surface | | 0.08 | | °C/Watt |
| Baseplate to sink; thermal pad (P/N 20263) | | 0.07 | | °C/Watt |
| Baseplate to ambient | | 4.9 | | °C/Watt |
| Baseplate to ambient; 1000 LFM | | 1.1 | | °C/Watt |
| Thermal capacity | | 165 | | Watt-sec/°C |

Module Family Electrical Characteristics (Cont.)

MODULE CONTROL SPECIFICATIONS

| Parameter | Min | Typ | Max | Unit | Notes |
|---|------|-------|------|------------------|--|
| Primary Side (PC = Primary Control; PR = Parallel) | | | | | |
| PC bias voltage | 5.50 | 5.75 | 6.00 | V _{DC} | PC current = 1.0mA PC voltage = 5.5V During normal operation |
| current limit | 1.5 | 2.1 | 3.0 | mA | |
| PC module disable | 2.3 | 2.6 | 2.9 | V _{DC} | Switch must be able to sink ≥4mA. See Fig. 2 |
| PC module enable delay | | 4 | 7 | ms | |
| PC module alarm | | | 0.5 | V _{avg} | UV, OV, OT, module fault. See Figs. 3 and 5 |
| PC resistance | 0.9 | 1.0 | 1.1 | MΩ | See Fig. 3, converter off or fault mode |
| PR emitter amplitude | 5.7 | 5.9 | 6.1 | Volts | PR load >30Ω, <30pF |
| PR emitter current | 150 | | | mA | |
| PR receiver impedance | 375 | 500 | 625 | Ω | 25°C |
| PR receiver threshold | 2.4 | 2.5 | 2.6 | Volts | Minimum pulse width: 20ns |
| PR drive capability | | | 12 | modules | Without PR buffer amplifier |
| Secondary Side (SC = Secondary Control) | | | | | |
| SC bandgap voltage | 1.21 | 1.23 | 1.25 | V _{DC} | Referenced to –Sense |
| SC resistance | 990 | 1000 | 1010 | Ω | |
| SC capacitance | | 0.033 | | μF | |
| SC module alarm | | 0 | | V _{DC} | With open trim; referenced to –Sense. See Fig. 7 |

MODULE GENERAL SPECIFICATIONS

| Parameter | Min | Typ | Max | Unit | Notes |
|---------------------------------------|----------------|-------------------|----------------|-------------------|--|
| Remote sense (total drop) | | | 0.5 | V _{DC} | 0.25V per leg (sense leads must be connected to respective, output terminals) |
| Isolation test voltage (in to out)* | 3000 | | | V _{RMS} | Complies with reinforced insulation requirements |
| Isolation test voltage (in to base)* | 1500 | | | V _{RMS} | Complies with basic insulation requirements |
| Isolation test voltage (out to base)* | 500 | | | V _{RMS} | Complies with operational insulation requirements |
| Isolation resistance | | 10 | | MΩ | in to out, in to baseplate, out to baseplate |
| Weight (E, C, T grade) | 6.5 (184.3) | 7.3 (207.5) | 8.1 (230.7) | ounces (grams) | |
| Weight (H, M grade) | 7.4 (209.3) | 8.2 (232.5) | 9.0 (255.7) | ounces (grams) | |
| Temperature limiting | 100 | 115 | | °C | See Figs. 3 and 5. Do not operate coverter >100C. |
| Agency approvals | | cURus, cTÜVus, CE | | | UL60950-1, EN60950-1, CSA60950-1, IEC60950-1. With appropriate fuse in series with the +Input |

* Isolation test voltage, 1 minute or less.

Note: Specifications are subject to change without notice.

MODULE SPECIFIC OPERATING SPECIFICATIONS

3.3V_{OUT}, 200W (e.g. S110A3V3C200BL, V110A3V3C200BL)

| Parameter | Min | Typ | Max | Unit | Notes |
|--------------------------------------|------|-------|------|-------|---|
| Efficiency | | | | | |
| S110A3V3C200BL (enhanced efficiency) | 82.3 | 86.5 | | % | Nominal input; full load; 25°C |
| V110A3V3C200BL (standard efficiency) | 81.0 | 82.0 | | | |
| Ripple and noise | | 90 | 113 | mV | p-p; Nominal input; full load; 20MHz bandwidth |
| Output OVP setpoint | 4.14 | 4.3 | 4.46 | Volts | 25°C; recycle input voltage or PC to restart (>100ms off) |
| Dissipation, standby | | 6.1 | 8.2 | Watts | No load |
| Load regulation | | ±0.02 | ±0.2 | % | No load to full load; nominal input |
| Load current | 0 | | 60.6 | Amps | |
| Current limit | 61.8 | 69.7 | 81.9 | Amps | Output voltage 95% of nominal |
| Short circuit current | 42.4 | 69.7 | 81.9 | Amps | Output voltage <250mV |

3.3V_{OUT}, 150W (e.g. S110A3V3C150BL, V110A3V3C150BL)

| Parameter | Min | Typ | Max | Unit | Notes |
|--------------------------------------|------|-------|-------|-------|---|
| Efficiency | | | | | |
| S110A3V3C150BL (enhanced efficiency) | 82.0 | 86.0 | | % | Nominal input; full load; 25°C |
| V110A3V3C150BL (standard efficiency) | 80.5 | 81.8 | | | |
| Ripple and noise | | 85 | 107 | mV | p-p; Nominal input; full load; 20MHz bandwidth |
| Output OVP setpoint | 4.14 | 4.3 | 4.46 | Volts | 25°C; recycle input voltage or PC to restart (>100ms off) |
| Dissipation, standby | | 6.1 | 7 | Watts | No load |
| Load regulation | | ±0.02 | ±0.2 | % | No load to full load; nominal input |
| Load current | 0 | | 45.45 | Amps | |
| Current limit | 46.4 | 52.3 | 61.5 | Amps | Output voltage 95% of nominal |
| Short circuit current | 31.8 | 52.3 | 61.5 | Amps | Output voltage <250mV |

5V_{OUT}, 300W (e.g. S110A5C300BL, V110A5C300BL)

| Parameter | Min | Typ | Max | Unit | Notes |
|------------------------------------|------|-------|------|-------|---|
| Efficiency | | | | | |
| S110A5C300BL (enhanced efficiency) | 85.2 | 88.1 | | % | Nominal input; full load; 25°C |
| V110A5C300BL (standard efficiency) | 83.0 | 84.9 | | | |
| Ripple and noise | | 80 | 100 | mV | p-p; Nominal input; full load; 20MHz bandwidth |
| Output OVP setpoint | 6.03 | 6.25 | 6.47 | Volts | 25°C; recycle input voltage or PC to restart (>100ms off) |
| Dissipation, standby | | 12.1 | 13.1 | Watts | No load |
| Load regulation | | ±0.02 | ±0.2 | % | No load to full load; nominal input |
| Load current | 0 | | 60 | Amps | |
| Current limit | 61.2 | 69 | 81 | Amps | Output voltage 95% of nominal |
| Short circuit current | 42 | 69 | 81 | Amps | Output voltage <250mV |

5V_{OUT}, 200W (e.g. S110A5C200BL, V110A5C200BL)

| Parameter | Min | Typ | Max | Unit | Notes |
|------------------------------------|------|-------|------|-------|---|
| Efficiency | | | | | |
| S110A5C200BL (enhanced efficiency) | 86.3 | 88.5 | | % | Nominal input; full load; 25°C |
| V110A5C200BL (standard efficiency) | 84.5 | 85.5 | | | |
| Ripple and noise | | 166 | 208 | mV | p-p; Nominal input; full load; 20MHz bandwidth |
| Output OVP setpoint | 6.03 | 6.25 | 6.47 | Volts | 25°C; recycle input voltage or PC to restart (>100ms off) |
| Dissipation, standby | | 8.3 | 9.7 | Watts | No load |
| Load regulation | | ±0.02 | ±0.2 | % | No load to full load; nominal input |
| Load current | 0 | | 40 | Amps | |
| Current limit | 40.8 | 46 | 54 | Amps | Output voltage 95% of nominal |
| Short circuit current | 28 | 46 | 54 | Amps | Output voltage <250mV |

MODULE SPECIFIC OPERATING SPECIFICATIONS (CONT.)

8V_{OUT}, 300W (e.g. S110A8C300BL, V110A8C300BL)

| Parameter | Min | Typ | Max | Unit | Notes |
|------------------------------------|------|-------|------|-------|---|
| Efficiency | | | | | |
| S110A8C300BL (enhanced efficiency) | 86.5 | 88.5 | | % | Nominal input; full load; 25°C |
| V110A8C300BL (standard efficiency) | 84.5 | 86.5 | | | |
| Ripple and noise | | 215 | 269 | mV | p-p; Nominal input; full load; 20MHz bandwidth |
| Output OVP setpoint | 9.36 | 9.7 | 10.1 | Volts | 25°C; recycle input voltage or PC to restart (>100ms off) |
| Dissipation, standby | | 9 | 10 | Watts | No load |
| Load regulation | | ±0.02 | ±0.2 | % | No load to full load; nominal input |
| Load current | 0 | | 37.5 | Amps | |
| Current limit | 38.2 | 43.1 | 50.7 | Amps | Output voltage 95% of nominal |
| Short circuit current | 26.2 | 43.1 | 50.7 | Amps | Output voltage <250mV |

8V_{OUT}, 200W (e.g. S110A8C200BL, V110A8C200BL)

| Parameter | Min | Typ | Max | Unit | Notes |
|------------------------------------|------|-------|------|-------|---|
| Efficiency | | | | | |
| S110A8C200BL (enhanced efficiency) | 87.7 | 89.0 | | % | Nominal input; full load; 25°C |
| V110A8C200BL (standard efficiency) | 86.8 | 87.7 | | | |
| Ripple and noise | | 220 | 275 | mV | p-p; Nominal input; full load; 20MHz bandwidth |
| Output OVP setpoint | 9.36 | 9.7 | 10.1 | Volts | 25°C; recycle input voltage or PC to restart (>100ms off) |
| Dissipation, standby | | 5.4 | 6.4 | Watts | No load |
| Load regulation | | ±0.02 | ±0.2 | % | No load to full load; nominal input |
| Output Current | 0 | | 25 | Amps | |
| Current limit | 25.5 | 28.8 | 33.8 | Amps | Output voltage 95% of nominal |
| Short circuit current | 6 | 28.8 | 33.8 | Amps | Output voltage <250mV |

12V_{OUT}, 400W (e.g. S110A12C400BL, V110A12C400BL)

| Parameter | Min | Typ | Max | Unit | Notes |
|-------------------------------------|------|-------|-------|-------|---|
| Efficiency | | | | | |
| S110A12C400BL (enhanced efficiency) | 86.7 | 88.5 | | % | Nominal input; full load; 25°C |
| V110A12C400BL (standard efficiency) | 85.0 | 86.2 | | | |
| Ripple and noise | | 240 | 300 | mV | p-p; Nominal input; full load; 20MHz bandwidth |
| Output OVP setpoint | 13.7 | 14.3 | 14.9 | Volts | 25°C; recycle input voltage or PC to restart (>100ms off) |
| Dissipation, standby | | 12.7 | 13.5 | Watts | No load |
| Load regulation | | ±0.02 | ±0.2 | % | No load to full load; nominal input |
| Load current | 0 | | 33.33 | Amps | |
| Current limit | 33.9 | 38.3 | 45 | Amps | Output voltage 95% of nominal |
| Short circuit current | 23.3 | 38.3 | 45 | Amps | Output voltage <250mV |

12V_{OUT}, 300W (e.g. S110A12C300BL, V110A12C300BL)

| Parameter | Min | Typ | Max | Unit | Notes |
|-------------------------------------|------|-------|------|-------|---|
| Efficiency | | | | | |
| S110A12C300BL (enhanced efficiency) | 87.9 | 90.0 | | % | Nominal input; full load; 25°C |
| V110A12C300BL (standard efficiency) | 86.0 | 87.0 | | | |
| Ripple and noise | | 240 | 300 | mV | p-p; Nominal input; full load; 20MHz bandwidth |
| Output OVP setpoint | 13.7 | 14.3 | 14.9 | Volts | 25°C; recycle input voltage or PC to restart (>100ms off) |
| Dissipation, standby | | 7.9 | 9 | Watts | No load |
| Load regulation | | ±0.02 | ±0.2 | % | No load to full load; nominal input |
| Load current | 0 | | 25 | Amps | |
| Current limit | 25.5 | 28.8 | 33.8 | Amps | Output voltage 95% of nominal |
| Short circuit current | 17.5 | 28.8 | 33.8 | Amps | Output voltage <250mV |

MODULE SPECIFIC OPERATING SPECIFICATIONS (CONT.)

15V_{OUT}, 400W (e.g. S110A15C400BL, V110A15C400BL)

| Parameter | Min | Typ | Max | Unit | Notes |
|-------------------------------------|------|-------|-------|-------|---|
| Efficiency | | | | | |
| S110A15C400BL (enhanced efficiency) | 84.5 | 88.0 | | % | Nominal input; full load; 25°C |
| V110A15C400BL (standard efficiency) | 87.0 | 88.6 | | | |
| Ripple and noise | | 184 | 230 | mV | p-p; Nominal input; full load; 20MHz bandwidth |
| Output OVP setpoint | 17.1 | 17.8 | 18.5 | Volts | 25°C; recycle input voltage or PC to restart (>100ms off) |
| Dissipation, standby | | 12.9 | 13.4 | Watts | No load |
| Load regulation | | ±0.02 | ±0.2 | % | No load to full load; nominal input |
| Load current | 0 | | 26.67 | Amps | |
| Current limit | 27.2 | 30.7 | 36.1 | Amps | Output voltage 95% of nominal |
| Short circuit current | 10 | 30.7 | 36.1 | Amps | Output voltage <250mV |

15V_{OUT}, 300W (e.g. V110A15C300BL)

| Parameter | Min | Typ | Max | Unit | Notes |
|-----------------------|------|-------|------|-------|---|
| Efficiency | 87.0 | 87.8 | | % | Nominal input; full load; 25°C |
| Ripple and noise | | 250 | 313 | mV | p-p; Nominal input; full load; 20MHz bandwidth |
| Output OVP setpoint | 17.1 | 17.8 | 18.5 | Volts | 25°C; recycle input voltage or PC to restart (>100ms off) |
| Dissipation, standby | | 10 | 11.7 | Watts | No load |
| Load regulation | | ±0.02 | ±0.2 | % | No load to full load; nominal input |
| Load current | 0 | | 20 | Amps | |
| Current limit | 20.4 | 23 | 27 | Amps | Output voltage 95% of nominal |
| Short circuit current | 14 | 23 | 27 | Amps | Output voltage <250mV |

24V_{OUT}, 400W (e.g. V110A24C400BL)

| Parameter | Min | Typ | Max | Unit | Notes |
|-----------------------|------|-------|-------|-------|---|
| Efficiency | 85.6 | 86.6 | | % | Nominal input; full load; 25°C |
| Ripple and noise | | 140 | 175 | mV | p-p; Nominal input; full load; 20MHz bandwidth |
| Output OVP setpoint | 27.1 | 28.1 | 29.1 | Volts | 25°C; recycle input voltage or PC to restart (>100ms off) |
| Dissipation, standby | | 14.6 | 15.4 | Watts | No load |
| Load regulation | | ±0.02 | ±0.2 | % | No load to full load; nominal input |
| Load current | 0 | | 16.67 | Amps | |
| Current limit | 17 | 19.2 | 22.6 | Amps | Output voltage 95% of nominal |
| Short circuit current | 11.6 | 19.2 | 22.6 | Amps | Output voltage <250mV |

24V_{OUT}, 300W (e.g. V110A24C300BL)

| Parameter | Min | Typ | Max | Unit | Notes |
|-----------------------|------|-------|------|-------|---|
| Efficiency | 87.5 | 88.9 | | % | Nominal input; full load; 25°C |
| Ripple and noise | | 195 | 244 | mV | p-p; Nominal input; full load; 20MHz bandwidth |
| Output OVP setpoint | 27.1 | 28.1 | 29.1 | Volts | 25°C; recycle input voltage or PC to restart (>100ms off) |
| Dissipation, standby | | 7.9 | 10.3 | Watts | No load |
| Load regulation | | ±0.02 | ±0.2 | % | No load to full load; nominal input |
| Load current | 0 | | 12.5 | Amps | |
| Current limit | 12.7 | 14.4 | 16.9 | Amps | Output voltage 95% of nominal |
| Short circuit current | 8.75 | 14.4 | 16.9 | Amps | Output voltage <250mV |

MODULE SPECIFIC OPERATING SPECIFICATIONS (CONT.)

28V_{OUT}, 400W (e.g. V110A28C400BL)

| Parameter | Min | Typ | Max | Unit | Notes |
|-----------------------|------|-------|-------|-------|---|
| Efficiency | 87.0 | 87.7 | | % | Nominal input; full load; 25°C |
| Ripple and noise | | 160 | 200 | mV | p-p; Nominal input; full load; 20MHz bandwidth |
| Output OVP setpoint | 31.5 | 32.7 | 33.9 | Volts | 25°C; recycle input voltage or PC to restart (>100ms off) |
| Dissipation, standby | | 14.4 | 15.4 | Watts | No load |
| Load regulation | | ±0.02 | ±0.2 | % | No load to full load; nominal input |
| Load current | 0 | | 14.28 | Amps | |
| Current limit | 14.5 | 16.4 | 20 | Amps | Output voltage 95% of nominal |
| Short circuit current | 10 | 16.4 | 20 | Amps | Output voltage <250mV |

28V_{OUT}, 300W (e.g. V110A28C300BL)

| Parameter | Min | Typ | Max | Unit | Notes |
|-----------------------|------|-------|-------|-------|---|
| Efficiency | 86.7 | 87.7 | | % | Nominal input; full load; 25°C |
| Ripple and noise | | 225 | 282 | mV | p-p; Nominal input; full load; 20MHz bandwidth |
| Output OVP setpoint | 31.5 | 32.7 | 33.9 | Volts | 25°C; recycle input voltage or PC to restart (>100ms off) |
| Dissipation, standby | | 10.9 | 11.8 | Watts | No load |
| Load regulation | | ±0.02 | ±0.2 | % | No load to full load; nominal input |
| Load current | 0 | | 10.71 | Amps | |
| Current limit | 10.9 | 12.3 | 14.5 | Amps | Output voltage 95% of nominal |
| Short circuit current | 7.49 | 12.3 | 14.5 | Amps | Output voltage <250mV |

36V_{OUT}, 400W (e.g. V110A36C400BL)

| Parameter | Min | Typ | Max | Unit | Notes |
|-----------------------|------|-------|-------|-------|---|
| Efficiency | 88.0 | 88.8 | | % | Nominal input; full load; 25°C |
| Ripple and noise | | 160 | 200 | mV | p-p; Nominal input; full load; 20MHz bandwidth |
| Output OVP setpoint | 40.4 | 41.9 | 43.4 | Volts | 25°C; recycle input voltage or PC to restart (>100ms off) |
| Dissipation, standby | | 10.1 | 12.5 | Watts | No load |
| Load regulation | | ±0.01 | ±0.2 | % | No load to full load; nominal input |
| Load current | 0 | | 11.11 | Amps | |
| Current limit | 11.3 | 12.8 | 15 | Amps | Output voltage 95% of nominal |
| Short circuit current | 3.2 | 12.8 | 15 | Amps | Output voltage <250mV |

36V_{OUT}, 300W (e.g. V110A36C300BL)

| Parameter | Min | Typ | Max | Unit | Notes |
|-----------------------|------|-------|------|-------|---|
| Efficiency | 87.0 | 89.0 | | % | Nominal input; full load; 25°C |
| Ripple and noise | | 140 | 175 | mV | p-p; Nominal input; full load; 20MHz bandwidth |
| Output OVP setpoint | 40.4 | 41.9 | 43.4 | Volts | 25°C; recycle input voltage or PC to restart (>100ms off) |
| Dissipation, standby | | 7.9 | 8.5 | Watts | No load |
| Load regulation | | ±0.02 | ±0.2 | % | No load to full load; nominal input |
| Load current | 0 | | 8.33 | Amps | |
| Current limit | 8.49 | 9.58 | 11.3 | Amps | Output voltage 95% of nominal |
| Short circuit current | 5.83 | 9.58 | 11.3 | Amps | Output voltage <250mV |

MODULE SPECIFIC OPERATING SPECIFICATIONS (CONT.)

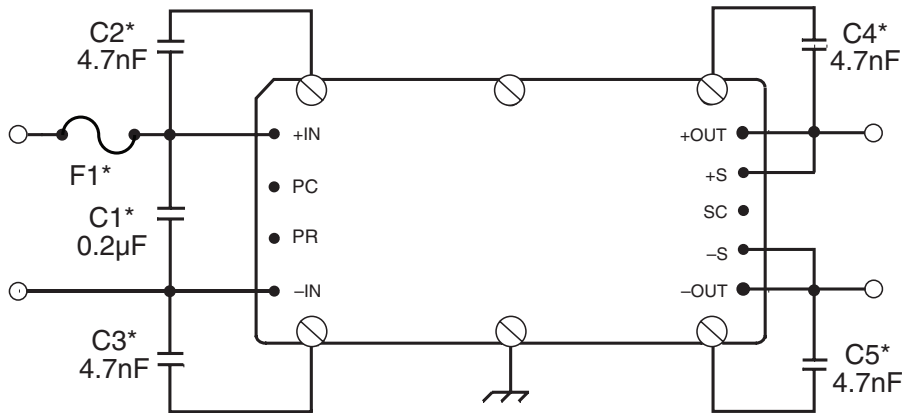
48V_{OUT}, 400W (e.g. V110A48C400BL)

| Parameter | Min | Typ | Max | Unit | Notes |
|-----------------------|------|-------|------|-------|---|
| Efficiency | 88.4 | 89.9 | | % | Nominal input; full load; 25°C |
| Ripple and noise | | 150 | 188 | mV | p-p; Nominal input; full load; 20MHz bandwidth |
| Output OVP setpoint | 53.7 | 55.7 | 57.7 | Volts | 25°C; recycle input voltage or PC to restart (>100ms off) |
| Dissipation, standby | | 11.6 | 12.8 | Watts | No load |
| Load regulation | | ±0.02 | ±0.2 | % | No load to full load; nominal input |
| Load current | 0 | | 8.33 | Amps | |
| Current limit | 8.49 | 9.58 | 11.3 | Amps | Output voltage 95% of nominal |
| Short circuit current | 5.83 | 9.58 | 11.3 | Amps | Output voltage <250mV |

48V_{OUT}, 300W (e.g. V110A48C300BL)

| Parameter | Min | Typ | Max | Unit | Notes |
|-----------------------|------|-------|------|-------|---|
| Efficiency | 86.0 | 87.5 | | % | Nominal input; full load; 25°C |
| Ripple and noise | | 300 | 375 | mV | p-p; Nominal input; full load; 20MHz bandwidth |
| Output OVP setpoint | 53.7 | 55.7 | 57.7 | Volts | 25°C; recycle input voltage or PC to restart (>100ms off) |
| Dissipation, standby | | 7.7 | 10.5 | Watts | No load |
| Load regulation | | ±0.02 | ±0.2 | % | No load to full load; nominal input |
| Load current | 0 | | 6.25 | Amps | |
| Current limit | 6.37 | 7.19 | 8.44 | Amps | Output voltage 95% of nominal |
| Short circuit current | 4.37 | 7.19 | 8.44 | Amps | Output voltage <250mV |

Basic Module Operation



For C1 – C5, keep leads and connections short.

Figure 1 — Basic module operation requires fusing, grounding, bypassing capacitors.* See Maxi, Mini, Micro Design Guide.

Comprehensive Online Application Information



The Design Guide and Applications Manual includes:

- Application circuits
- Design requirements
- EMC considerations
- Current sharing in power arrays
- Thermal performance information
- Recommended soldering methods
- Accessory modules – filtering, rectification, front-ends
- Mounting options
- ...and more.

[CLICK HERE TO VIEW DESIGN GUIDE](#)

Also at vicorpower.com

- PowerBench online configurators
- Over 20 Application Notes
- Online calculators – thermal, trimming, hold-up
- PDF data sheets for ALL Vicor products

Primary Control - PC PIN

Module Enable/Disable

The module may be disabled by pulling PC below 2.3V with respect to the -Input. This may be done with an open collector transistor, relay, or optocoupler. Multiple converters may be disabled with a single transistor or relay either directly or via "OR'ing" diodes. See Figure 2.

Primary Auxiliary Supply

At 5.7V, PC can source up to 1.5mA. In the example shown in Figure 4, PC powers a module enabled LED.

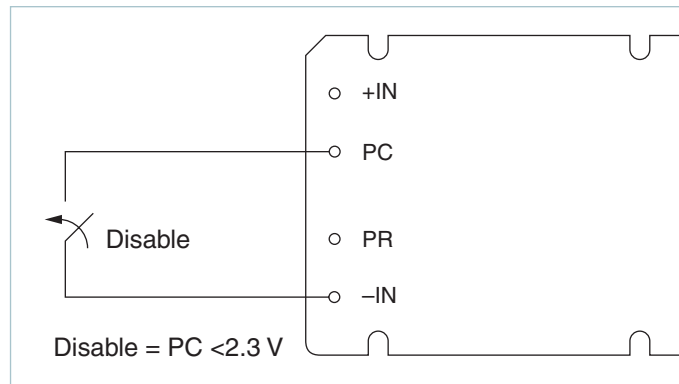


Figure 2 — Module enable/disable

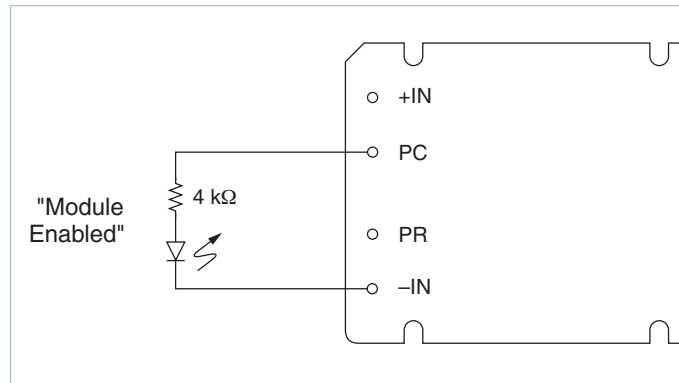


Figure 4 — LED on-state indicator

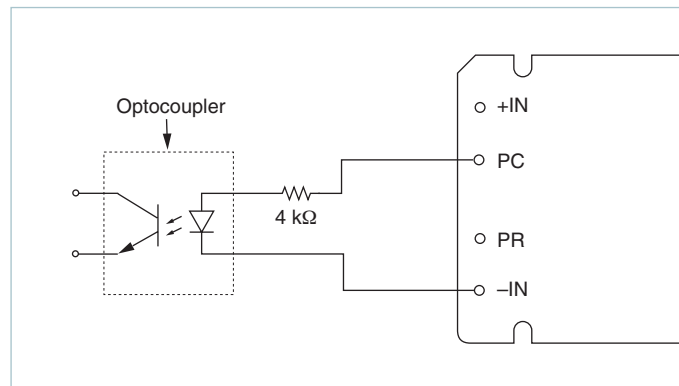


Figure 6 — Isolated on-state indicator

Module Alarm

The module contains "watchdog" circuitry which monitors input voltage, operating temperature and internal operating parameters. In the event that any of these parameters are outside of their allowable operating range, the module will shut down and PC will go low. PC will periodically go high and the module will check to see if the fault (as an example, overtemperature) has cleared. If the fault has not been cleared, PC will go low again and the cycle will restart. The SC pin will go low in the event of a fault and return to its normal state after the fault has been cleared. See Figures 3 and 5.

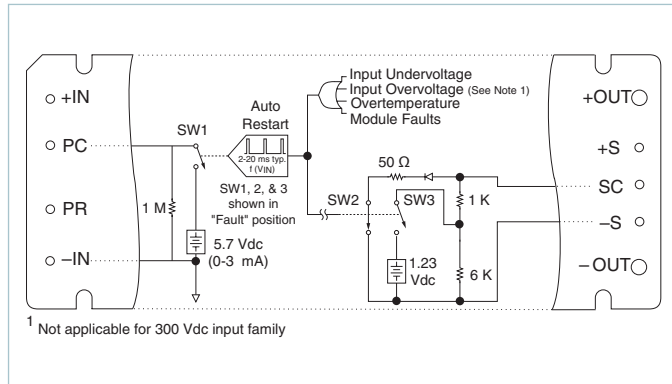


Figure 3 — PC/SC module alarm logic

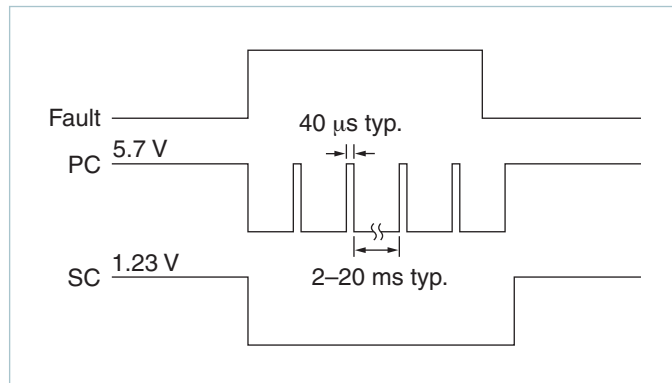


Figure 5 — PC/SC module alarm timing

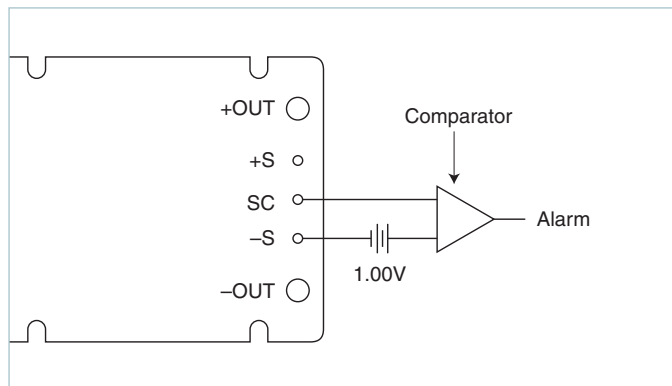


Figure 7 — Secondary side on-state indicator

Secondary Control - SC PIN

Output Voltage Programming

The output voltage of the converter can be adjusted or programmed via fixed resistors, potentiometers or voltage DACs. See Figure 8.

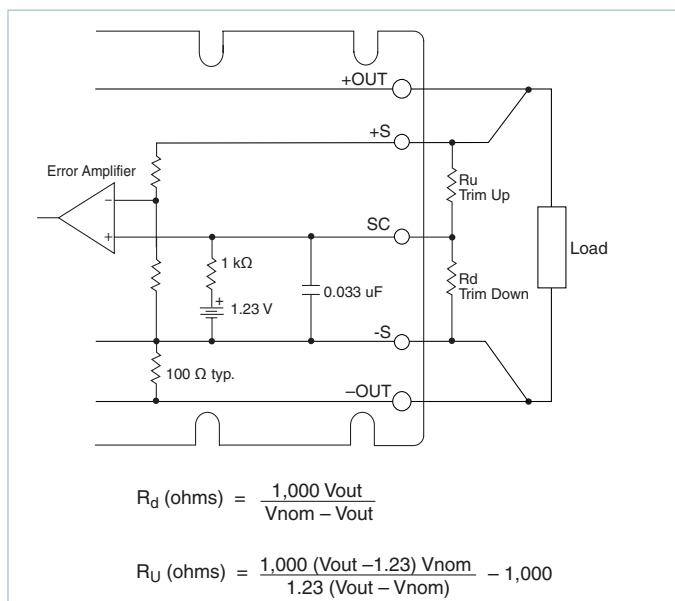


Figure 8 — Output voltage trim down and trim up circuit

Trim Down

1. This converter is not a constant power device – it has a constant current limit. Hence, available output power is reduced by the same percentage that output voltage is trimmed down. Do not exceed maximum rated output current.
2. The trim down resistor must be connected between the SC and -S pins. Do not bypass the SC pin directly with a capacitor.

Trim Up

1. The converter is rated for a maximum delivered power. To ensure that maximum rated power is not exceeded, reduce maximum output current by the same percentage increase in output voltage.
2. The trim up resistor must be connected between the SC and +S pins. Do not bypass the SC pin directly with a capacitor.
3. Do not trim the converter above maximum trim range (typically +10%) or the output over voltage protection circuitry may be activated.

Trim resistor values calculated automatically:

On-line calculators for trim resistor values are available on the vicor website at:

asp.vicorpower.com/calculators/calculators.asp?calc=1
Resistor values can be calculated for fixed trim up, fixed trim down and for variable trim up or down.

Parallel Bus - PR PIN

Parallel Operation

The PR pin supports paralleling for increased power with N+1 (N+M) redundancy. Modules of the same input voltage, output voltage, and power level will current share if all PR pins are suitably interfaced.

Compatible interface architectures include the following:

AC coupled single-wire interface. All PR pins are connected to a single communication bus through 0.001µF (500V) capacitors. This interface supports current sharing and is fault tolerant except for the communication bus. Up to three converters may be paralleled by this method. See Figure 9.

Transformer coupled interface. For paralleling four or more converters a transformer coupled interface is required. See Figure 10.

For details on parallel operation please refer to the

[Design Guide & Applications Manual for Maxi, Mini, Micro Family.](#)

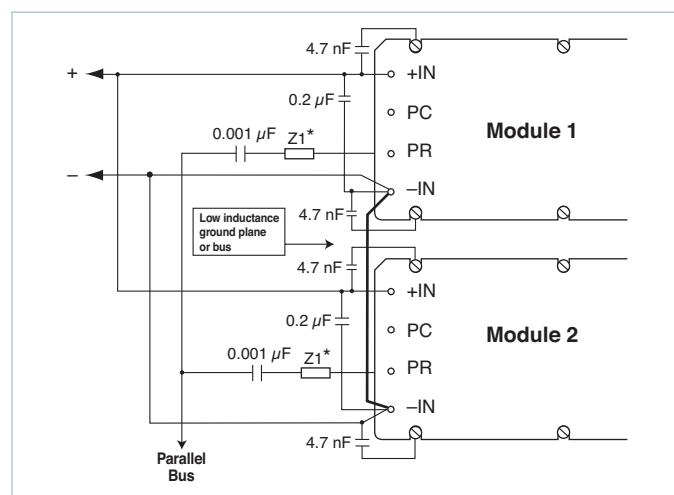


Figure 9 — AC coupled single-wire interface

* See Maxi, Mini, Micro Design Guide

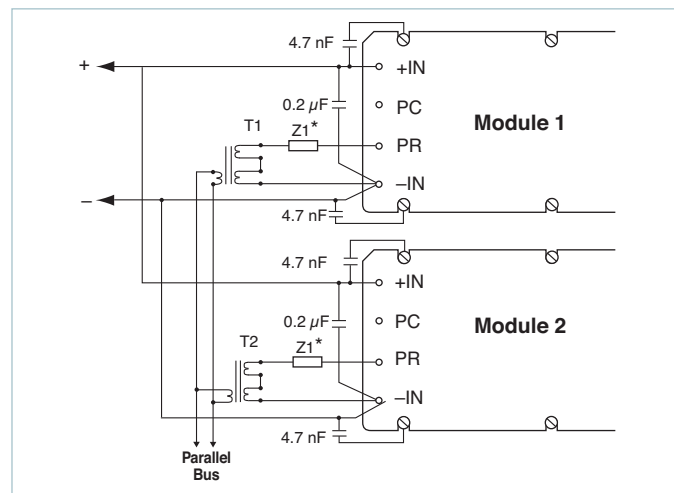


Figure 10 — Transformer-coupled interface

Parallel Bus Output

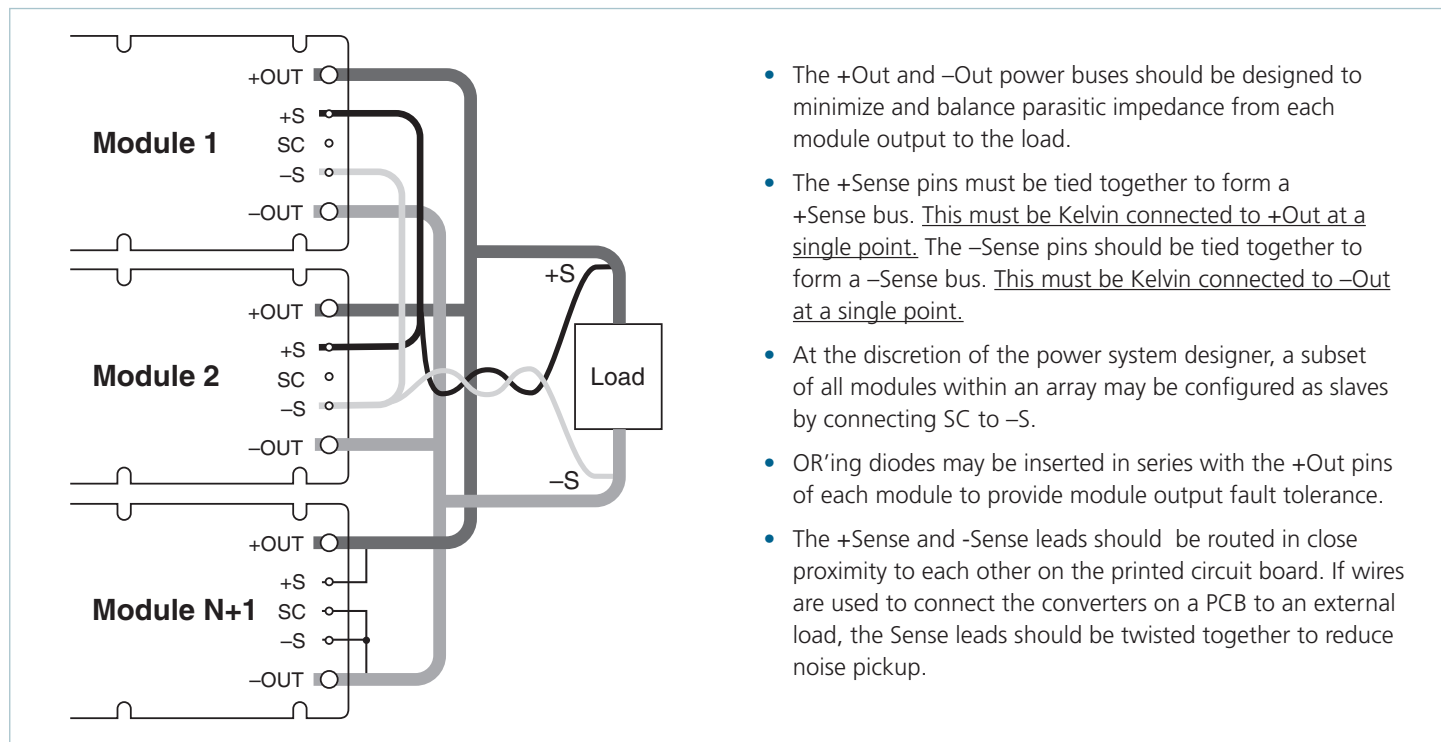


Figure 11 — N+1 module array output connections

PIN STYLES*

| Designator | Description | Finish | Notes |
|------------|-----------------|----------|--|
| (None) | Short | Tin/Lead | Requires in-board, mounting |
| L | Long | Tin/Lead | On-board mounting for 0.065" boards |
| S | Short ModuMate | Gold | SurfMate or in-board socket mounting |
| N | Long ModuMate | Gold | On-board socket mounting |
| F | Short RoHS | Gold | Select for RoHS compliant in-board solder, socket, or SurfMate mounting |
| G | Long RoHS | Gold | Select for RoHS compliant on-board solder or socket mounting |
| K | Extra Long RoHS | Gold | Select for RoHS compliance on-board mounting for thicker PCBs (not intended for socket or Surfmate mounting) |

* Pin style designator follows the "B" after the output power and precedes the baseplate designator.
Ex. V48A12T500BN2 — Long ModuMate Pins

Mechanical Drawings

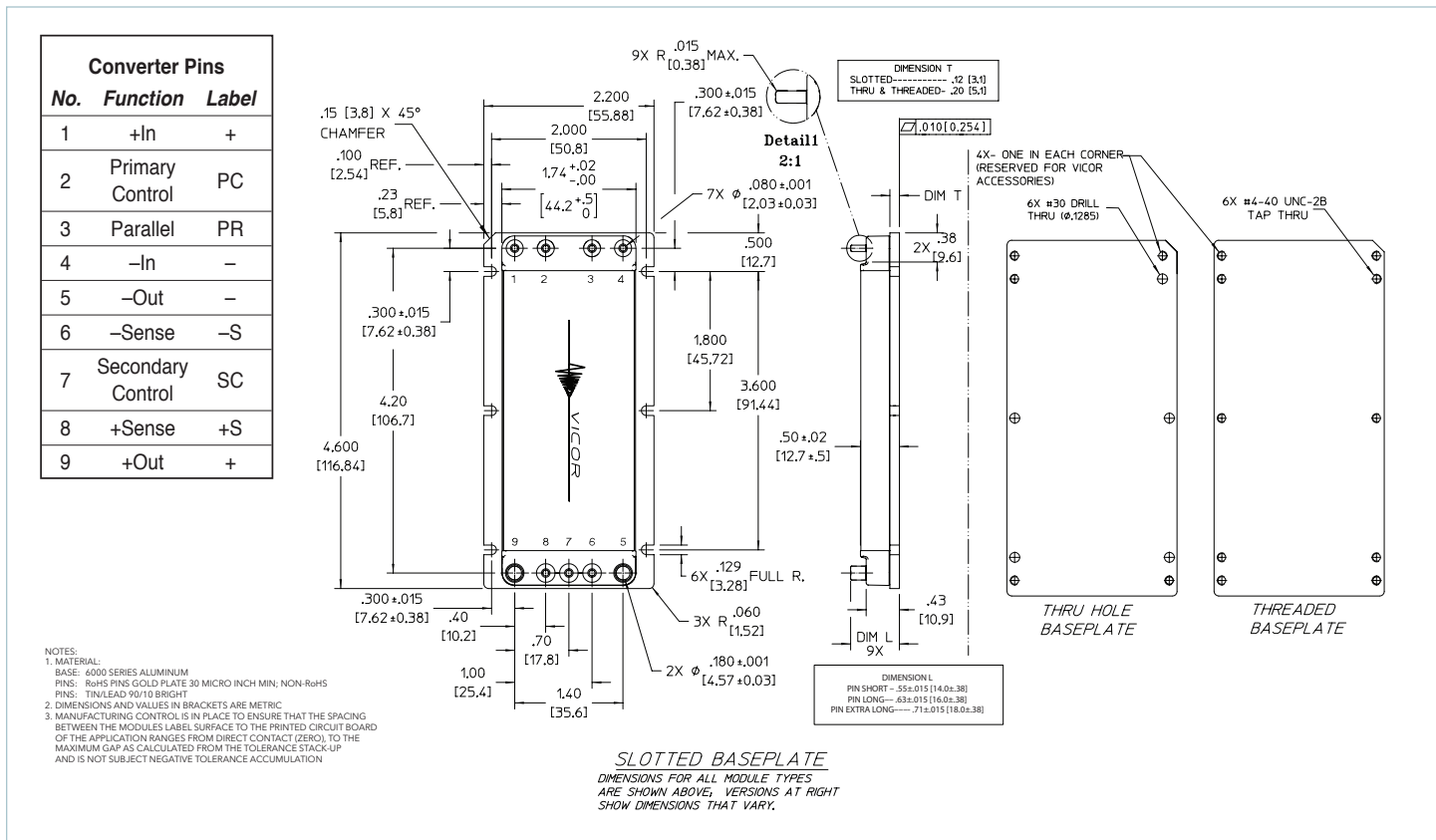


Figure 12 — Module outline

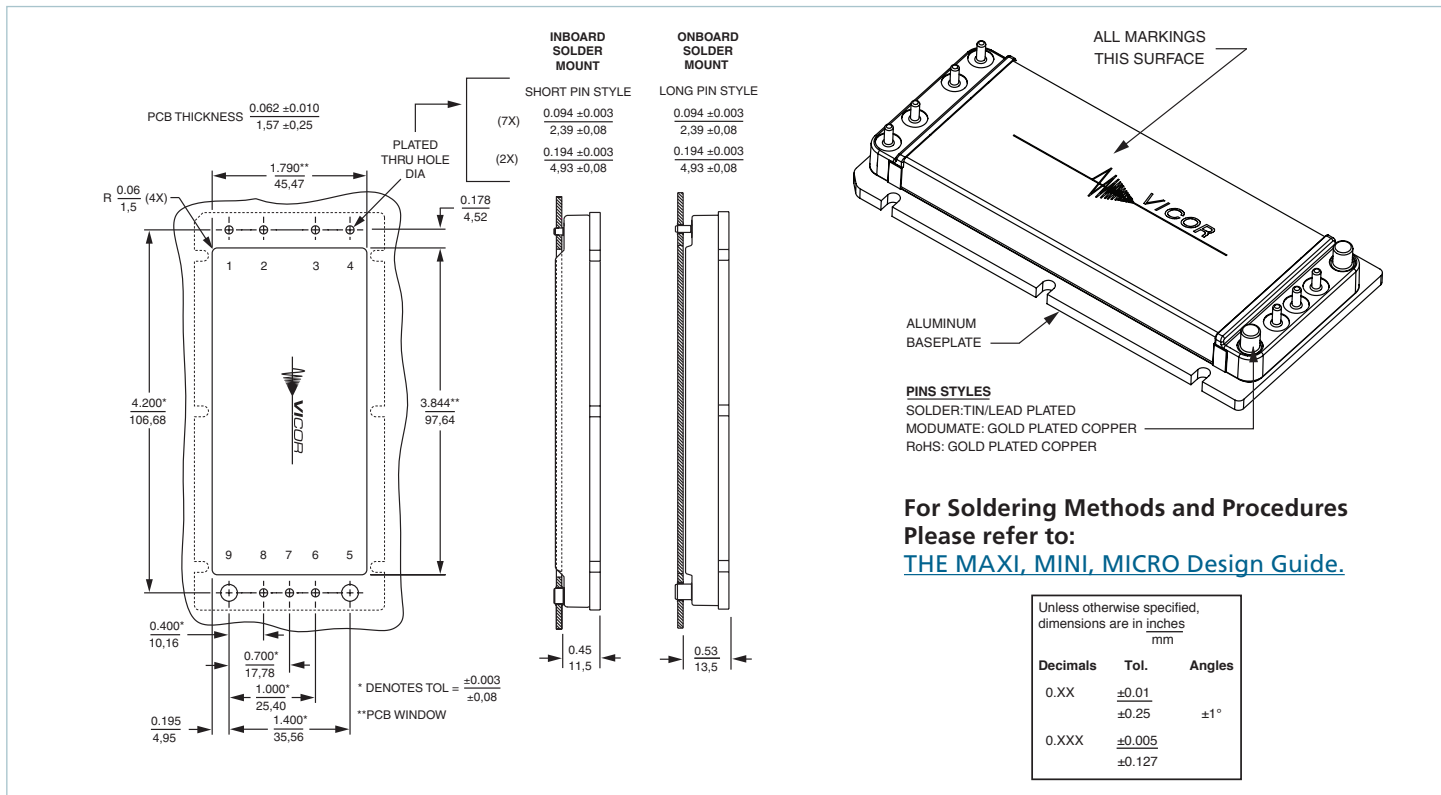


Figure 13 — PCB mounting specifications

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.

Information furnished by Vicor is believed to be accurate and reliable. However, no responsibility is assumed by Vicor for its use. Vicor makes no representations or warranties with respect to the accuracy or completeness of the contents of this publication. Vicor reserves the right to make changes to any products, specifications, and product descriptions at any time without notice. Information published by Vicor has been checked and is believed to be accurate at the time it was printed; however, Vicor assumes no responsibility for inaccuracies. Testing and other quality controls are used to the extent Vicor deems necessary to support Vicor's product warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

Specifications are subject to change without notice.

Vicor's Standard Terms and Conditions

All sales are subject to Vicor's Standard Terms and Conditions of Sale, which are available on Vicor's webpage or upon request.

Product Warranty

In Vicor's standard terms and conditions of sale, Vicor warrants that its products are free from non-conformity to its Standard Specifications (the "Express Limited Warranty"). This warranty is extended only to the original Buyer for the period expiring two (2) years after the date of shipment and is not transferable.

UNLESS OTHERWISE EXPRESSLY STATED IN A WRITTEN SALES AGREEMENT SIGNED BY A DULY AUTHORIZED VICOR SIGNATORY, VICOR DISCLAIMS ALL REPRESENTATIONS, LIABILITIES, AND WARRANTIES OF ANY KIND (WHETHER ARISING BY IMPLICATION OR BY OPERATION OF LAW) WITH RESPECT TO THE PRODUCTS, INCLUDING, WITHOUT LIMITATION, ANY WARRANTIES OR REPRESENTATIONS AS TO MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, INFRINGEMENT OF ANY PATENT, COPYRIGHT, OR OTHER INTELLECTUAL PROPERTY RIGHT, OR ANY OTHER MATTER.

This warranty does not extend to products subjected to misuse, accident, or improper application, maintenance, or storage. Vicor shall not be liable for collateral or consequential damage. Vicor disclaims any and all liability arising out of the application or use of any product or circuit and assumes no liability for applications assistance or buyer product design. Buyers are responsible for their products and applications using Vicor products and components. Prior to using or distributing any products that include Vicor components, buyers should provide adequate design, testing and operating safeguards.

Vicor will repair or replace defective products in accordance with its own best judgment. For service under this warranty, the buyer must contact Vicor to obtain a Return Material Authorization (RMA) number and shipping instructions. Products returned without prior authorization will be returned to the buyer. The buyer will pay all charges incurred in returning the product to the factory. Vicor will pay all reshipment charges if the product was defective within the terms of this warranty.

Life Support Policy

VICOR'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS PRIOR WRITTEN APPROVAL OF THE CHIEF EXECUTIVE OFFICER AND GENERAL COUNSEL OF VICOR CORPORATION. As used herein, life support devices or systems are devices which (a) are intended for surgical implant into the body, or (b) support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in a significant injury to the user. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system or to affect its safety or effectiveness. Per Vicor Terms and Conditions of Sale, the user of Vicor products and components in life support applications assumes all risks of such use and indemnifies Vicor against all liability and damages.

Intellectual Property Notice

Vicor and its subsidiaries own Intellectual Property (including issued U.S. and Foreign Patents and pending patent applications) relating to the products described in this data sheet. No license, whether express, implied, or arising by estoppel or otherwise, to any intellectual property rights is granted by this document. Interested parties should contact Vicor's Intellectual Property Department.

Vicor Corporation
25 Frontage Road
Andover, MA, USA 01810
Tel: 800-735-6200
Fax: 978-475-6715

email

Customer Service: custserv@vicorpower.com
Technical Support: apps@vicorpower.com