

# M4268 SERIES

## DC/DC POWER SUPPLY



### PRODUCT HIGHLIGHTS

- VITA 62 COMPLIANT
- 6U VPX FORM FACTOR
- SIX OUTPUTS
- DC/DC CONVERTER
- UP TO 1200W

## M4268 SERIES VPX DC/DC POWER SUPPLY

### Special Features

- VITA 62 compliant
- Remote sense
- High Efficiency
- Fixed switching frequency (250kHz)
- External synchronization capability
- Indefinite short circuit Protection
- Over-voltage shutdown with auto-recovery
- Reverse battery protection
- Over temperature shutdown without auto-recovery
- EMI filters included
- IPMI communication

### Electrical Specifications

#### DC Input

18 to 48 V<sub>DC</sub>

Operation during transient IAW MIL-STD-704F

#### DC Output\*

PO1: 12 V up to 40 A

PO2: 12 V up to 40 A

PO3: 5 V up to 12 A

+12V\_Aux: +12 V up to 1 A

-12V\_Aux: -12 V up to 1 A

3.3V\_Aux: 3.3 V up to 12 A

#### Isolation

Input to Output:

200 V<sub>DC</sub> Input to

Case: 200 V<sub>DC</sub>

Output to Case:

100 V<sub>DC</sub>

#### Line/Load regulation

See Table 2

#### Efficiency

Up to 90 %

#### EMC

Designed to meet<sup>†</sup> MIL-STD-461F: CE101, CE102, CS101

#### Ripple and Noise

Typically, less than 50mV<sub>p-p</sub> (max.1%<sub>p</sub>). Measured across a 0.1μF capacitor and 10μF capacitor on load at Input Voltage of 18V-48V, all Temperature Range.

#### Load Transient

##### Overshoot and Undershoot

Output dynamic response of less than 5% at load Step of 30%-90%. Output returns to regulation in less than 1mSec

#### Communication

IPMI protocol available for voltages, currents and temperature for all positive voltages (G<sub>Ax</sub>, SCL, SDA)

Notes: Compliance achieved with 50μH LISN, shielded cable and static resistive load.

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### Protections <sup>‡</sup>

#### Input

##### **Input Reverse Polarity:**

Protection for unlimited time

##### **Inrush Current Limiter**

Peak value of 5 x I<sub>IN</sub> for initial inrush currents lasting more than 50 μSec.

##### **Under Voltage**

Unit shuts down when input voltage drops below 16.5 ± 0.5VDC. Automatic restart when input voltage returns to nominal range.

##### **Over Voltage Lock-Out**

Unit shuts down when input steady state voltage rise above 55 ± 2VDC (Can be configured for 100V) Automatic restart when input voltage returns to nominal range.

#### Output

##### **Passive over voltage protection on Aux outputs**

Zener selected at 25% ± 5% above nominal voltage, is placed across the output for passive voltage limit.

##### **Active over voltage protection on VS# outputs**

20% ± 5% above nominal voltage. Automatic recovery when output voltage drops below threshold.

##### **Overload / Short-Circuit Protection**

Continuous protection (10-30% above maximum current) for unlimited time (Hiccup). Automatic recovery when overload/short circuit removed.

#### General

##### **Over Temperature Protection**

Automatic shutdown at temperature of 95 ± 5 °C (at unit edge) Automatic recovery when temperature drops below 90 ± 5 °C. 5 °C Hysteresis guaranteed.

**Note 1: Thresholds and protections can be modified / removed (please consult factory)**

### Environmental <sup>1</sup>

Design to Meet MIL-STD-810G

#### Temperature

Operating: -55 °C to +85 °C at unit edge  
Storage: -55 °C to +125 °C

#### Altitude

Method 500.5, Procedure I & II Storage/Air Transport: 40 kft Operation/Air carriage: 70 kft

#### Salt Fog:

Method 509.5

#### Fungus

Does not support fungus growth, in accordance with the guidelines of MIL-STD-454, Requirement 4.

#### Humidity

Method 507.5, Up to 95% RH

#### Shock

Method 516.6  
40g, 11msec saw-tooth (all directions)

#### Vibration

Shock: Saw-tooth, 20g peak, 11mS.  
Vibration: Figure 514.6E-1. General minimum integrity exposure. (1 hour per axis.)

Note 1: **Environmental Stress Screening (ESS)** Including random vibration and thermal cycles is also available. **Please consult factory for details.**

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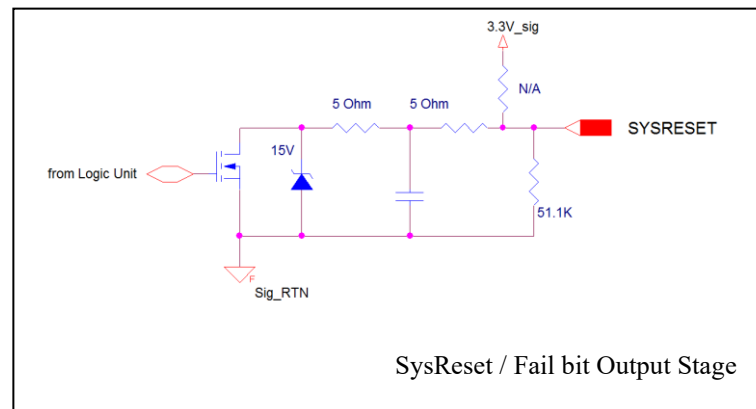
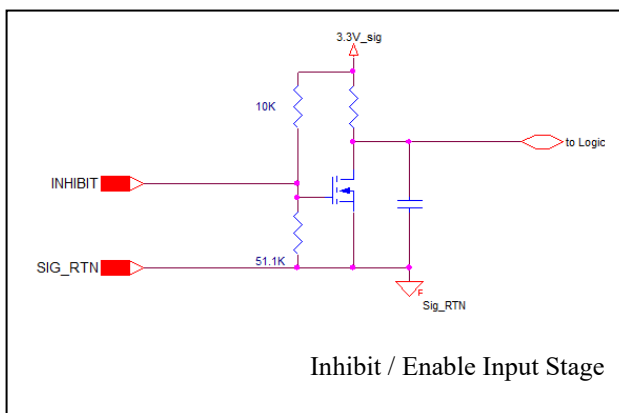
### Functions and Signals - According to VITA 62

| Signal No. | Signal Name                  | Type          | Description   |
|------------|------------------------------|---------------|---|
| 1          | FAIL*                        | Output        | Indicates to other modules in the system that a failure has occurred in the module.<br>Normally Open, Low during failure  |
| 2          | SYSRESET*                    | Output        | Indicates to other modules in the system that all outputs are within their Nominal range. Goes Open when outputs are within their range.  |
| 3          | INHIBIT*                     | Input         | Controls power supply outputs.<br>Connecting this signal to SIG_RTN turns the output power OFF.   |
| 4          | ENABLE*                      | Input         | Controls the input power to the power supply.<br>This signal in conjunction with INHIBIT* turns the output power ON and OFF. Please refer to Table 1 for combination of INHIBIT* & ENABLE*.         |
| 5          | SYSRESET*                    | Input         | Indicates to other modules in the system that all outputs are within their working level.   |
| 6          | PO#_SHARE                    | Bidirectional | Enables current share between two paralleled outputs on two devices. Connect required outputs (same voltage) of both devices in parallel, and their appropriate SHARE signals for proper operation. |
| 7          | PO#_SENSE<br>PO#_SENSE_RTN   | Input         | Used to correct output voltage at regulation point, when voltage droop occurs due to current flowing through output wires. This feature is limited up to approximately 0.5V above nominal voltage.  |
| 8          | GA0*,GA1*,GA2*<br>GA3*& GAP* | Input         | Used for geographical addressing.<br>GA4* is the most significant bit and GA0* is the least significant bit.<br>GAP* indicates the parity.  |
| 9          | SCL                          | Bidirectional | I2C bus Clock   |
| 10         | SDA                          | Bidirectional | I2C bus Data  |
|            |                              |               | Through this bus the voltage and temperature readouts can be shared.  |
| 11         | +/-CLK                       | Input         | The REF_CLK signal is used to allow the power supply frequency to sync with the system frequency.   |

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|                               |            |             |             |             |
|-------------------------------|------------|-------------|-------------|-------------|
| <b>*INHIBIT</b>               | <b>Low</b> | <b>Low</b>  | <b>High</b> | <b>High</b> |
| <b>*ENABLE</b>                | <b>Low</b> | <b>High</b> | <b>Low</b>  | <b>High</b> |
| <b>VS1, VS2, VS3, ±12VAux</b> | OFF        | OFF         | ON          | OFF         |
| <b>3.3V_AUX</b>               | ON         | OFF         | ON          | OFF         |

Table 1



## Detailed Information

### 1. M4268 Input Voltage Operation Range.

The M4268 steady state operation voltage is 18V to 48V, continuously work up to 50V Input line.

#### 1.1 Low Line Turn-on and Turn-off Limits

To avoid Turn-on and Turn-off glitch the unit have about 3.5V Hysteresis. The Turn-on threshold is under 20V and turn- off below 18V.

Those limits can be adjusted, contact Factory for more information.

### 2. Outputs Voltage Regulation

The M4268 contains accurate internal sense lines to keep output voltage at less than 1.5% regulation for all Line/ Load and temperature range (see Table 2).

| Output        | 12V/35A       | 12V/35A       | 5V/12V<br>18A | 3.3VAux/15A | 12VAux/1A      | (-)12VAux/1A        | Remark                               |
|---------------|---------------|---------------|---------------|-------------|----------------|---------------------|--------------------------------------|
| Voltage Range | 11.85 – 12.15 | 11.85 – 12.15 | 4.95 – 5.05   | 3.25 – 3.35 | VS1 – VS1-0.2V | (-)11.85 – (-)12.15 |                                      |
| Voltage Range | 11.8 – 12.2   | 11.8 – 12.2   | 4.8 – 5.2     | 3.2 – 3.4   | 11.7 – 12.2    | (-)11.7 – (-)12.2   | Current Sharing for VS1, VS2 and VS3 |

Table 2: Outputs voltage regulation. VIN 18V – 48V, Temperature -55 °C – 85 °C

#### 2.1. Sense Lines

*Sense Lines* are provided for VS1, VS2 and VS3 output to compensate line voltage drop.

*Sense Lines* proper connection is shown in Figure 1.

Each VSx output has its own *Sense Lines*, additional common *Sense RTN Line* is provided for all VSx Outputs (VITA 62 Standard).

Contact Factory for Sense configuration different than the VITA 62 standard.

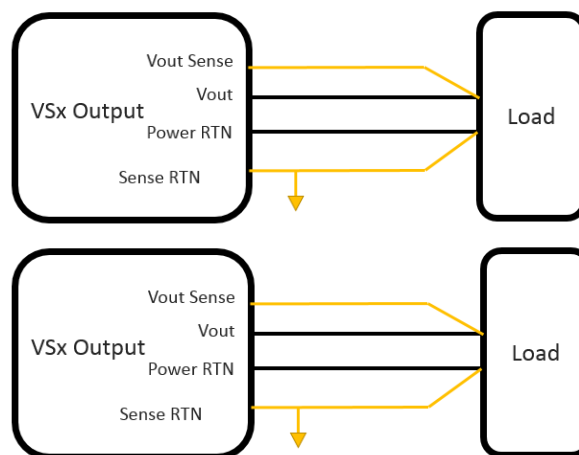


Figure 1: M4268 Sense line connection

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### 3. Output Power

The M4268 can deliver up to 1200 steady State at all temperature and input range.

| Total Power Output | 12V/35A | 12V/35A | 5V/12V<br>18A | 3.3VAux/15A | 12VAux/1A | (-)12VAux/1A |
|--------------------|---------|---------|---------------|-------------|-----------|--------------|
| 1200W              | 35A     | 35A     | 18A           | 15A         | 1A        | 1A           |

Table 3: M4268 Max current per output

#### 3.1 Current Sharing (Optional)

Current sharing is available for VS1, VS2 and VS3 outputs. Load share pins should be connected for Hiccup synchronization. 3.3V Aux and  $\pm 12V$  Aux can be safely paralleled.

To obtain a good current sharing the following steps should be taken

- Connect hiccup pins of desired outputs to guarantee simultaneously Turn-on of paralleled outputs.
- Connect Sense Line of both paralleled outputs to the same point.
- Make sure Power traces are as identical as possible for both current sharing outputs.

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### 4. IPMI Communication

#### Electrical Parameters

Vcc: 3.3VDC  
 Pull-up: 2.2kOhm Input capacitance: 330pf

#### Slave Device Addressing

- 256 address spaces
- Baud rate: 400kHz maximum
- 7 Bit Protocol
- Support Slot Addressing per VITA 62
- Support Global Address 1010101 R/W

| Slot Number    | MSB |    |    |    |    |    |    | LSB<br>R/W |
|----------------|-----|----|----|----|----|----|----|------------|
|                | A6  | A5 | A4 | A3 | A2 | A1 | A0 |            |
| Slot1          | 1   | 0  | 0  | 0  | 0  | 0  | 1  |            |
| Slot2          | 1   | 0  | 0  | 0  | 0  | 1  | 0  |            |
| Slot3          | 1   | 0  | 0  | 0  | 0  | 1  | 1  |            |
| Slot4          | 1   | 0  | 0  | 0  | 1  | 0  | 0  |            |
| Slot5          | 1   | 0  | 0  | 0  | 1  | 0  | 1  |            |
| Slot6          | 1   | 0  | 0  | 0  | 1  | 1  | 0  |            |
| Slot7          | 1   | 0  | 0  | 0  | 1  | 1  | 1  |            |
| Slot8          | 1   | 0  | 0  | 1  | 0  | 0  | 0  |            |
| Slot9          | 1   | 0  | 0  | 1  | 0  | 0  | 1  |            |
| Slot10         | 1   | 0  | 0  | 1  | 0  | 1  | 0  |            |
| Slot11         | 1   | 0  | 0  | 1  | 0  | 1  | 1  |            |
| Slot12         | 1   | 0  | 0  | 1  | 1  | 0  | 0  |            |
| Slot13         | 1   | 0  | 0  | 1  | 1  | 0  | 1  |            |
| Slot14         | 1   | 0  | 0  | 1  | 1  | 1  | 0  |            |
| Slot15         | 1   | 0  | 0  | 1  | 1  | 1  | 1  |            |
| Slot16         | 1   | 0  | 1  | 0  | 0  | 0  | 0  |            |
| Global Address | 1   | 0  | 1  | 0  | 1  | 0  | 1  |            |

\* Slot location is determined by GAX per VITA 62

\* Global Address N/A

Single read request

| S | Physical Address | W | A | Memory Address | A | S | Physical Address | R | A | DATA  | A | P |
|---|------------------|---|---|----------------|---|---|------------------|---|---|-------|---|---|
|   | A6:A0            | 0 | 0 | B7:B0          | 0 |   | A6:A0            | 1 | 0 | D7:D0 | 1 |   |

| S | Physical Address | W | A | Memory Address | A | S | Physical Address | R | A | DATA  | A | DATA  | A | ... | DATA  | A | P |
|---|------------------|---|---|----------------|---|---|------------------|---|---|-------|---|-------|---|-----|-------|---|---|
|   | A6:A0            | 0 | 0 | B7:B0          | 0 |   | A6:A0            | 1 | 0 | D7:D0 | 0 | D7:D0 | 0 |     | D7:D0 | 1 |   |

S – Start, P- Stop  
 W – Write bit  
 A – Acknowledge by master  
 A – Acknowledge by slave, DATA – Slave response

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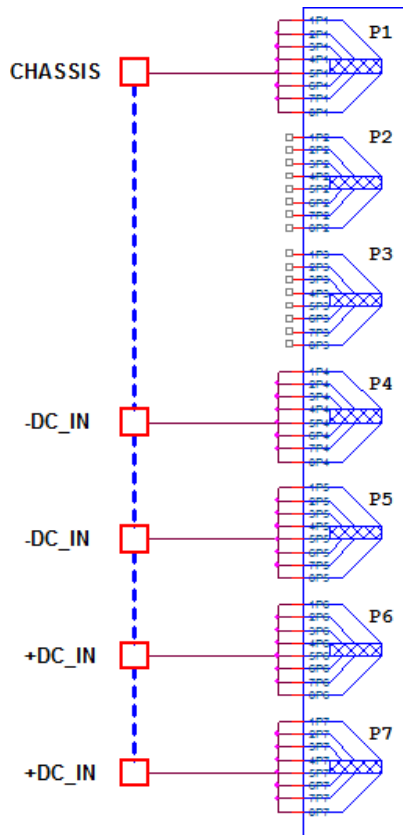
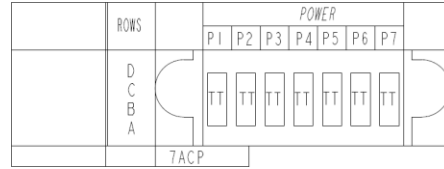
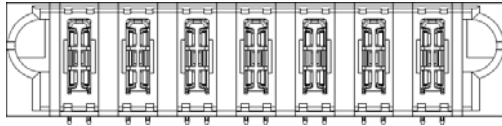
### Memory Space

| Address [8Bit] | Data [8Bit]            | Description [ 00-FF ]   |
|----------------|------------------------|-------------------------|
| 0x00           | Temperature 1          | -55 °C to +120 °C Range |
| 0x01           | Vin                    | 0V to 64V Range         |
| 0x02           | +12V VS1 & VS2         | 0V to 16V Range         |
| 0x03           | +12V Aux               | 0V to 16V Range         |
| 0x04           | +12V VS1 & VS2         | 0V to 16V Range         |
| 0x05           | +5V VS3                | 0V to 16V Range         |
| 0x06           | +3.3V Aux              | 0V to 16V Range         |
| 0x07           | -12V Aux               | 0V to 16V Range         |
| 0x08           | +12V VS1 & VS2 Current | 0A to 80A Range         |
| 0x09           | +12V Aux Current       | 0A to 4A Range          |
| 0x0A           | +12V VS1 & VS2 Current | 0A to 80A Range         |
| 0x0B           | +5V VS3 Current        | 0A to 32A Range         |
| 0x0C           | +3.3V Aux Current      | 0A to 32A Range         |
| 0x0D           | Temperature 2          | -55 °C to +120 °C Range |
| 0x0E           | Software Version       | X,Y Hex                 |
| 0x0F – 0xFF    |                        |                         |

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## Pin Assignment

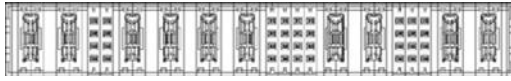
### Connector PO



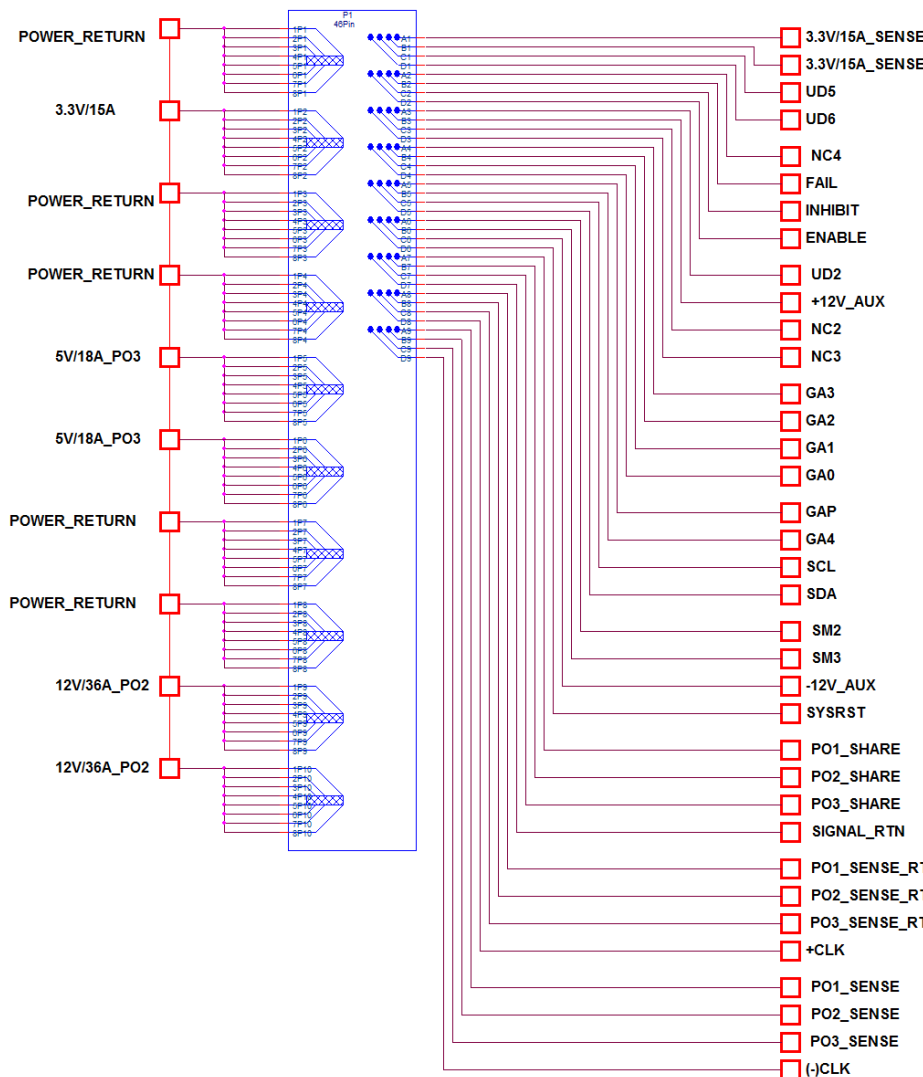
| Pin Number | Signal Name |
|------------|-------------|
| P7         | +DC_IN      |
| P6         | +DC_IN      |
| P5         | -DC_IN      |
| P4         | -DC_IN      |
| P3         |             |
| P2         |             |
| P1         | CHASSIS_GND |

# M4268 SERIES VPX DC/DC POWER SUPPLY

## Connector P1



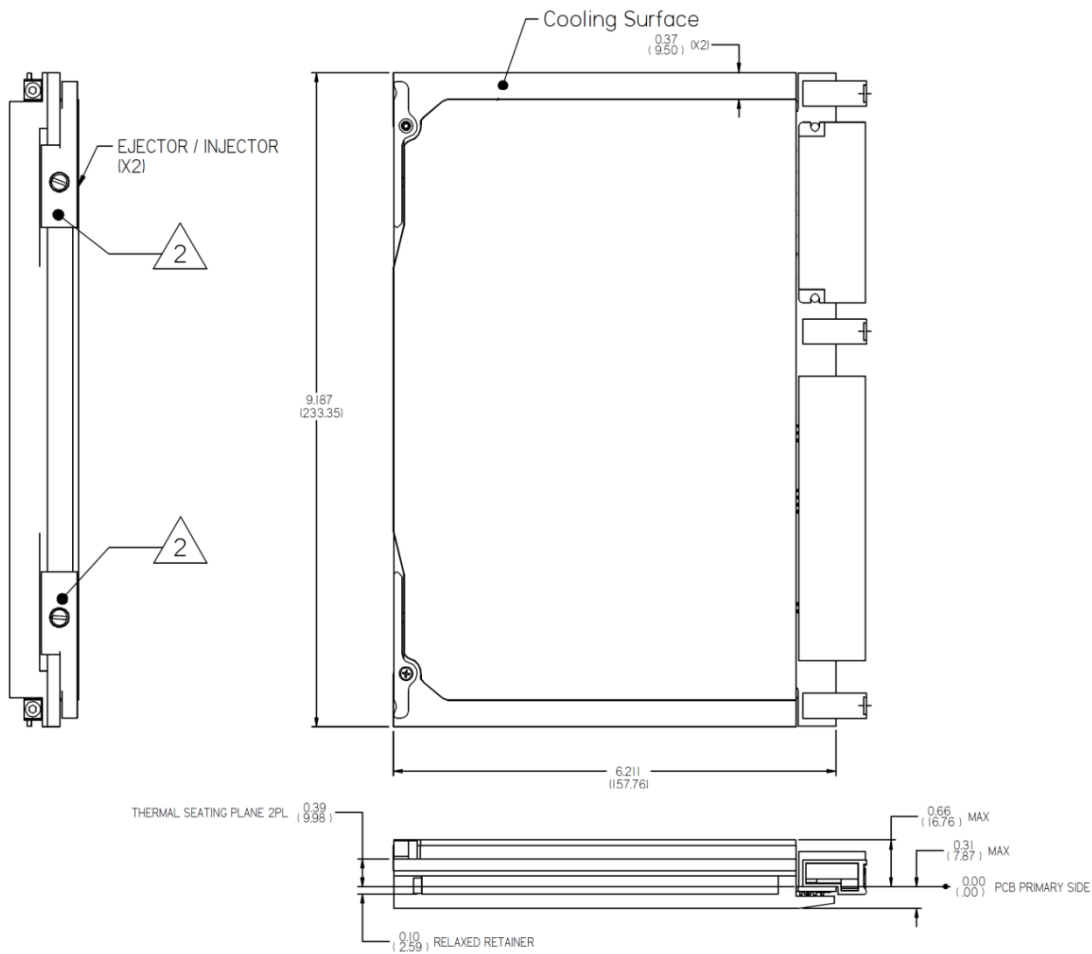
| ROWS                           | POWER |    | SIGNAL               |                      | POWER |    | SIGNAL |                      | POWER                |                      | SIGNAL               |    | POWER |                      |                      |                      |    |    |     |
|--------------------------------|-------|----|----------------------|----------------------|-------|----|--------|----------------------|----------------------|----------------------|----------------------|----|-------|----------------------|----------------------|----------------------|----|----|-----|
|                                | P1    | P2 | 1                    | 2                    | P3    | P4 | P5     | P6                   | 3                    | 4                    | 5                    | 6  | P7    | P8                   | 7                    | 8                    | 9  | P9 | P10 |
| DC<br>B<br>A                   | GS    | GS | Z5<br>Y5<br>R5<br>D5 | Z5<br>Y5<br>R5<br>D5 | GS    | GS | GS     | Z5<br>Y5<br>R5<br>D5 | Z5<br>Y5<br>R5<br>D5 | Z5<br>Y5<br>R5<br>D5 | Z5<br>Y5<br>R5<br>D5 | GS | GS    | Z5<br>Y5<br>R5<br>D5 | Z5<br>Y5<br>R5<br>D5 | Z5<br>Y5<br>R5<br>D5 | GS | GS | GS  |
| 2ACP+8S+4ACP+16S+2ACP+12S+2ACP |       |    |                      |                      |       |    |        |                      |                      |                      |                      |    |       |                      |                      |                      |    |    |     |



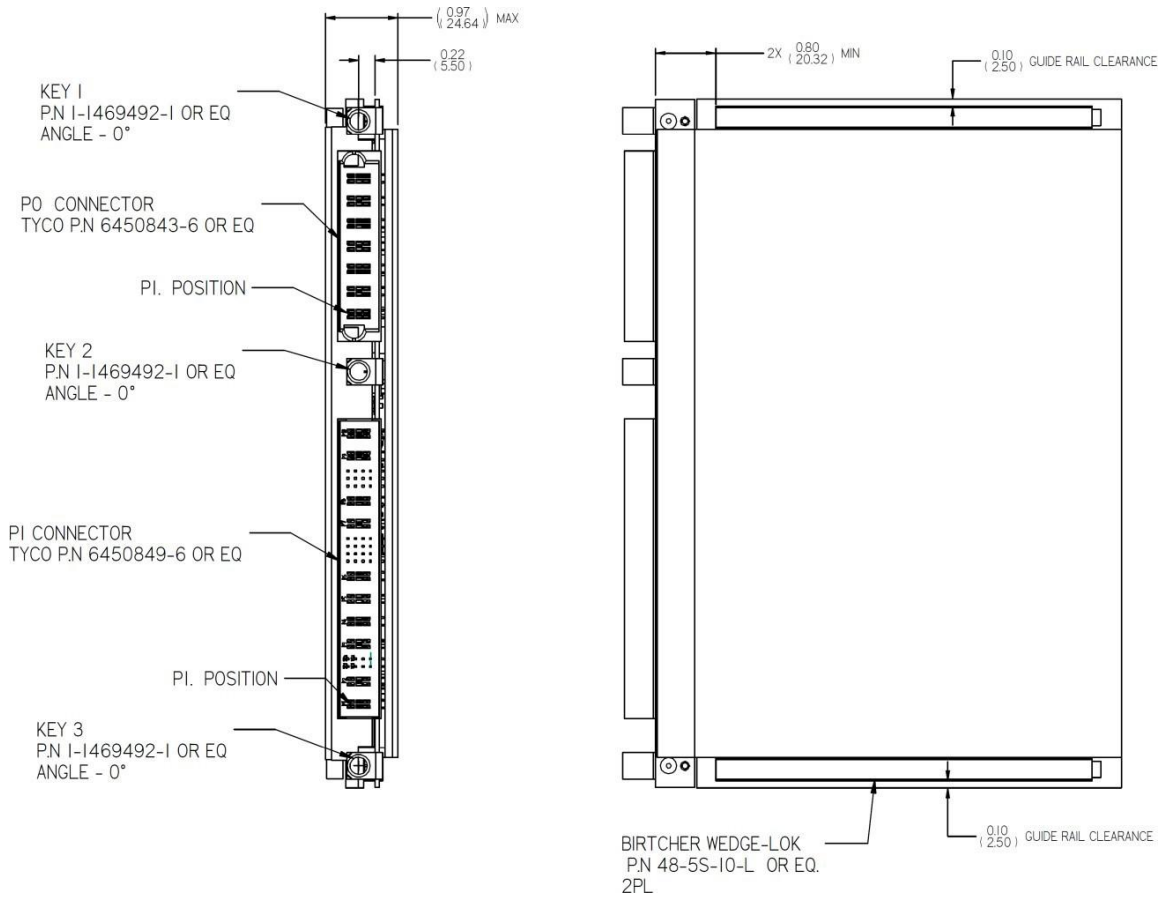
| Pin Number | Pin Name      |
|------------|---------------|
| P10        | 12V/36A PO1   |
| P9         | 12V/36A PO2   |
| A9         | PO1_SENSE     |
| B9         | PO2_SENSE     |
| C9         | PO3_SENSE     |
| D9         | (-)CLK        |
| A8         | PO1_SENSE_RTN |
| B8         | PO2_SENSE_RTN |
| C8         | PO3_SENSE_RTN |
| D8         | +CLK          |
| A7         | PO1_SHARE     |
| B7         | PO2_SHARE     |
| C7         | PO3_SHARE     |
| D7         | SIGNAL_RETURN |
| P8         | POWER_RETURN  |
| P7         | POWER_RETURN  |
| A6         | +CLK          |
| B6         | -CLK          |
| C6         | -12V_AUX      |
| D6         | SYSRESET*     |
| A5         | GAP*          |
| B5         | GA4*          |
| C5         | SCL           |
| D5         | SDA           |
| A4         | GA3*          |
| B4         | GA2*          |
| C4         | GA1*          |
| D4         | GA0*          |
| A3         | UD2           |
| B3         | +12V_AUX      |
| C3         | N.C           |
| D3         | N.C           |
| P6         | 5V/18A PO3    |
| P5         | 5V/18A PO3    |
| P4         | POWER_RETURN  |
| P3         | POWER_RETURN  |
| A2         | N.C           |
| B2         | FAIL*         |
| C2         | INHIBIT*      |
| D2         | ENABLE*       |
| A1         | UD3           |
| B1         | UD4           |
| C1         | UD5           |
| D1         | UD6           |
| P2         | 3.3V/15A      |
| P1         | POWER_RETURN  |

**M4268 SERIES VPX DC/DC POWER SUPPLY**

**Outline Drawing**



# M4268 SERIES VPX DC/DC POWER SUPPLY



### Notes

1. Dimensions are in Inches [mm]
2. Tolerance is:  
    .XX ± 0.01 IN  
    .XXX ± 0.005 IN
3. Weight: Approx. 3.9 lbs

**Note: Specifications are subject to change without prior notice by the manufacturer**