

## DS1200HE

1200 Watts

### Distributed Power System

Front-end Bulk Power

Total Output Power:

180 to 264Vac: 1200W continuous

90 to 140Vac: 1000W/1200W<sup>1</sup> continuous



### Special Features

- 1200W output power
- High-power
- 1U x 2U power supply
- High-density design: 21.66W/in<sup>3</sup>
- Active Power Factor Correction
- EN61000-3-2 Harmonic compliance
- Inrush current control
- 80plus Platinum Efficiency
- N+1 or N+N Redundant
- Hot plug operation
- N + 1 redundant
- Active current sharing
- Full Digital control
- PMBus Compliant
- Input power reporting
- Compatible with Emerson's Universal PMBus GUI
- Reverse airflow option
- Two-year Warranty

### Compliance

- Conducted/Radiated EMI Class B
- ROHS

### Safety

- UL/cUL 60950 (UL Recognized)
- NEMKO+ CB Report EN60950
- CE Mark
- China CCC

## Electrical Specifications

| Input                |                                                            |
|----------------------|------------------------------------------------------------|
| Input Voltage range: | 90-140Vac: 1000W / 1200W <sup>1</sup><br>180-264Vac: 1200W |
| Frequency:           | 47Hz - 63 Hz                                               |
| Efficiency:          | 94.0% peak                                                 |
| Max Input Current:   | 15 Arms                                                    |
| Inrush Current:      | 55Apk at 240Vac, cold start                                |
| Conducted EMI:       | Class B                                                    |
| Radiated EMI:        | Class B                                                    |
| Power Factor:        | 0.9 typical                                                |
| ITHD:                | 10%                                                        |
| Leakage Current:     | 1.4mA                                                      |
| Hold-up Time:        | 12ms                                                       |

<sup>1</sup> 1000W at forward air, 1200W at reverse air. See power derating table

| Ordering Information |                            |
|----------------------|----------------------------|
| DS1200-3             | 3.3V Stby, Forward airflow |
| DS1200-3-002         | 5.0V Stby, Forward airflow |
| DS1200-3-003         | 3.3V Stby, Reverse airflow |
| DS1200-3-004         | 5.0V Stby, Reverse airflow |

## Electrical Specifications

### OUTPUTS

| Main DC Output                 | MIN                              | NOM | MAX      |
|--------------------------------|----------------------------------|-----|----------|
| Nominal Setting:               | -0.50%                           | 12  | 0.50%    |
| Total Output Regulation Range: | 11.4V                            |     | 12.6V    |
| Dynamic Load Regulation Range: | 11.4V                            |     | 12.6V    |
| Output Ripple:                 |                                  |     | 120mVp-p |
| Output Current:                | 0A <sup>4</sup>                  |     | 100.0A   |
| Current Sharing:               | Within +/-5% of full load rating |     |          |
| Capacitive Loading:            | 2,000uF                          |     | 40,000uF |
| Start-up from AC to Output:    |                                  |     | 2000ms   |
| Output Rise Time:              | 5ms                              |     | 50ms     |

### Standby DC Output (VSB)

|                                |     |             |           |
|--------------------------------|-----|-------------|-----------|
| Output Setpoint Range:         | -1% | 3.3V (5.0V) | 1%        |
| Total Output Regulation Range: | +5% |             | -5%       |
| Dynamic Load Regulation Range: | +5% |             | -5%       |
| Output Ripple:                 |     |             | 50mVp-p   |
| Output Current:                | 0   |             | 6.0A (4A) |
| Current Sharing:               |     | N/A         |           |
| Capacitive Loading:            | 0uF |             | 680uF     |
| Start-up from AC to Output:    |     |             | 1000ms    |
| Output Rise Time:              | 2ms |             | 50ms      |

### PROTECTIONS

#### Main Output

|                                        |       |     |       |
|----------------------------------------|-------|-----|-------|
| Over-Current Protection <sup>2</sup> : | 120%  |     | 150%  |
| Over-Voltage Protection <sup>1</sup> : | 13.5V |     | 15.0V |
| Under-Voltage Protection:              | 10.5V |     | 11.0V |
| Over-Temperature Protection:           |       | Yes |       |
| Fan Fault Protection:                  |       | Yes |       |

#### Standby Output

|                                        |  |  |  |
|----------------------------------------|--|--|--|
| Over-Current Protection <sup>3</sup> : |  |  |  |
| Over-Voltage Protection <sup>3</sup> : |  |  |  |

<sup>1</sup>Latch mode

<sup>2</sup>Autorecovery if the overcurrent is less than 130% and last only for <1000ms. Otherwise, latch mode

<sup>3</sup>Standby protection is auto-recovery

<sup>4</sup>For output transient testing, the minimum load shall be at 10A

# Electrical Specifications

## CONTROL AND STATUS SIGNALS

### Input Signals

PSON\_L

Active LOW signal which enables/disables the main output. Pulling this signal LOW will turn-on the main output. A 100pF decoupling capacitor is recommended at the system side.

|              |                                                   | MIN  | MAX   |
|--------------|---------------------------------------------------|------|-------|
| $V_{IL}$     | Input logic level LOW                             |      | 0.8V  |
| $V_{IH}$     | Input logic level HIGH                            | 2.0V | 5.0V  |
| $I_{SOURCE}$ | Current that may be sourced by this pin           |      | 2mA   |
| $I_{SINK}$   | Current that may be sunk by this pin at low state |      | 0.5mA |

PSKILL\_L

First break/Last Mate active LOW signal which enables/disables the main output. This signal will have to be pulled to ground at the system side with a 220ohm resistor. A 100pF decoupling capacitor is also recommended.

|              |                                                   | MIN  | MAX   |
|--------------|---------------------------------------------------|------|-------|
| $V_{IL}$     | Input logic level LOW                             |      | 0.8V  |
| $V_{IH}$     | Input logic level HIGH                            | 2.0V | 5.0V  |
| $I_{SOURCE}$ | Current that may be sourced by this pin           |      | 2mA   |
| $I_{SINK}$   | Current that may be sunk by this pin at low state |      | 0.5mA |

VSENSE+, VSENSE-, STBY\_VSENSE+

VSENSE+, VSENSE-, and STBY\_VSENSE+ lines are the remote sense lines for regulation. Each line will compensate for a maximum of 100mV.

### Output Signals

ACOK\_L

Signal used to indicate the presence of AC input to the power supply. A logic level LOW will indicate that the AC input to the power supply is within the operating range while a logic level HIGH will indicate that AC has been lost.

This is an open collector/drain output. This pin is pulled high by a 1.0kohm resistor connected to 3.3V inside the power supply. It is recommended that this pin be connected to a 100pF decoupling capacitor and pulled down by a 100kohm resistor at the system side.

|              |                                                   | MIN  | MAX   |
|--------------|---------------------------------------------------|------|-------|
| $V_{IL}$     | Output logic level LOW                            |      | 0.6V  |
| $V_{IH}$     | Output logic level HIGH                           | 2.0V | 5.0V  |
| $I_{SOURCE}$ | Current that may be sourced by this pin           |      | 3.3mA |
| $I_{SINK}$   | Current that may be sunk by this pin at low state |      | 0.7mA |

PWR\_GOOD / PWOK\_H

"Signal used to indicate that main output voltage is within regulation range. The PWR\_GOOD/PWOK\_H signal will be driven HIGH when the output voltage is valid and will be driven LOW when the output falls below the under-voltage threshold.

This signal also gives an advance warning when there is an impending power loss due to loss of AC input or system shutdown request. More details in the Timing Section. This is an open collector/drain output. This pin is pulled high by a 1.0kohm resistor connected to 3.3V inside the power supply. It is recommended that this pin be connected to a 100pF decoupling capacitor and pulled down by a 10kohm resistor."

|              |                                         | MIN  | MAX   |
|--------------|-----------------------------------------|------|-------|
| $V_{IL}$     | Output logic level LOW                  |      | 0.8V  |
| $V_{IH}$     | Output logic level HIGH                 | 2.0V | 5.0V  |
| $I_{SOURCE}$ | Current that may be sourced by this pin |      | 3.3mA |
| $I_{SINK}$   | Current that may be sunk by this pin    |      | 0.7mA |

# Electrical Specifications

## CONTROL AND STATUS SIGNALS

### Output Signals

|                                                                                                                                                                                                                                                                                                       |                                                   |      |      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|------|------|
| PS_PRESENT                                                                                                                                                                                                                                                                                            |                                                   |      |      |
| Signal used to indicate to the system that a power supply is inserted in the power bay. This signal is pulled down to ground within the power supply.                                                                                                                                                 |                                                   |      |      |
| PS_INTERRUPT                                                                                                                                                                                                                                                                                          |                                                   |      |      |
| Active low signal used by the power supply to indicate to the system that a change in power supply status has occurred. This event can be triggered by faults such as OVP, OCP, OTP, and fan fault. This signal can be cleared by a CLEAR_FAULT command. A 100pF decoupling capacitor is recommended. |                                                   |      |      |
|                                                                                                                                                                                                                                                                                                       |                                                   | MIN  | MAX  |
| V <sub>IL</sub>                                                                                                                                                                                                                                                                                       | Output logic level LOW                            |      | 0.8V |
| V <sub>IH</sub>                                                                                                                                                                                                                                                                                       | Output logic level HIGH                           | 2.0V | 5.0V |
| I <sub>SOURCE</sub>                                                                                                                                                                                                                                                                                   | Current that may be sourced by this pin           |      | 4mA  |
| I <sub>SINK</sub>                                                                                                                                                                                                                                                                                     | Current that may be sunk by this pin at low state |      | 4mA  |

### BUS Signals

|                                                                                                                                                                                           |                                                                                                                  |      |      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|------|------|
| ISHARE                                                                                                                                                                                    |                                                                                                                  |      |      |
| Bus signal used by the power supply for active current sharing. All power supplies configured in the system for n+n sharing will refer to this bus voltage inorder to load share.         |                                                                                                                  |      |      |
| VOLTAGE RANGE                                                                                                                                                                             | The range of this signal for active sharing will be up to 8.0V, which corresponds to the maximum output current. |      |      |
|                                                                                                                                                                                           |                                                                                                                  | MIN  | MAX  |
| I <sub>SHARE</sub> Voltage                                                                                                                                                                | Voltage at 100% load, stand-alone unit                                                                           | 7.65 | 8.35 |
|                                                                                                                                                                                           | Voltage at 50% load, stand-alone unit                                                                            | 3.65 | 4.35 |
|                                                                                                                                                                                           | Voltage at 0% load, stand-alone unit                                                                             | 0    | 0.5  |
| I <sub>SOURCE</sub>                                                                                                                                                                       | Current that may be sourced by this pin                                                                          |      | 80mA |
| SCL, SDA                                                                                                                                                                                  |                                                                                                                  |      |      |
| Clock and data signals defined as per I2C requirements. It is recommended that these pins be pulled-up to a 2.2kohm resistor to 3.3V and a 100pF decoupling capacitor at the system side. |                                                                                                                  |      |      |
|                                                                                                                                                                                           |                                                                                                                  | MIN  | MAX  |
| V <sub>L</sub>                                                                                                                                                                            | Logic level LOW                                                                                                  |      | 0.8V |
| V <sub>H</sub>                                                                                                                                                                            | Logic level HIGH                                                                                                 | 2.0V | 5.0V |
|                                                                                                                                                                                           |                                                                                                                  |      |      |

Note: All signal noise levels are below 400mVpk-pk from 0-100MHz.

### I2C Addressing Table

| PMBUS ADDRESSING |      |         |
|------------------|------|---------|
| A1               | A0   | Address |
| LOW              | LOW  | 0xB0    |
| LOW              | HIGH | 0xB2    |
| HIGH             | LOW  | 0xB4    |
| HIGH             | HIGH | 0xB6    |

## Electrical Specifications

### LED INDICATORS

A single bi-color LED is used to indicate the power supply status.

|                                            | Status LED     |
|--------------------------------------------|----------------|
| NO AC INPUT TO PSU                         | Off            |
| AC PRESENT, STBY ON, MAIN OUTPUT OFF       | Blinking GREEN |
| MAIN OUTPUT ON                             | Solid GREEN    |
| OVER-VOLTAGE/UNDER-VOLTAGE FAILURE         | Blinking AMBER |
| POWER SUPPLY FAILURE (OCP, OTP, FAN FAULT) | Solid AMBER    |

### FIRMWARE REPORTING AND MONITORING

|                |                                 |            |             |
|----------------|---------------------------------|------------|-------------|
| OUTPUT LOADING | 5 to 20%                        | 20% to 50% | 50% to 100% |
| INPUT VOLTAGE  | +/-5%                           |            |             |
| INPUT CURRENT  | +/-0.7A fixed error             | +/-5%      |             |
| INPUT POWER    | +/-10W at <125W input           | +/-5%      |             |
| OUTPUT VOLTAGE | +/-4%                           |            |             |
| OUTPUT CURRENT | 0.5A fixed error                | +/-5%      |             |
| TEMPERATURE    | +/-5degC on the operating range |            |             |
| FAN SPEED      | Actual +/-250RPM                |            |             |
|                |                                 |            |             |
| PMBUS          | YES                             |            |             |
| REMOTE ON/OFF  | YES                             |            |             |

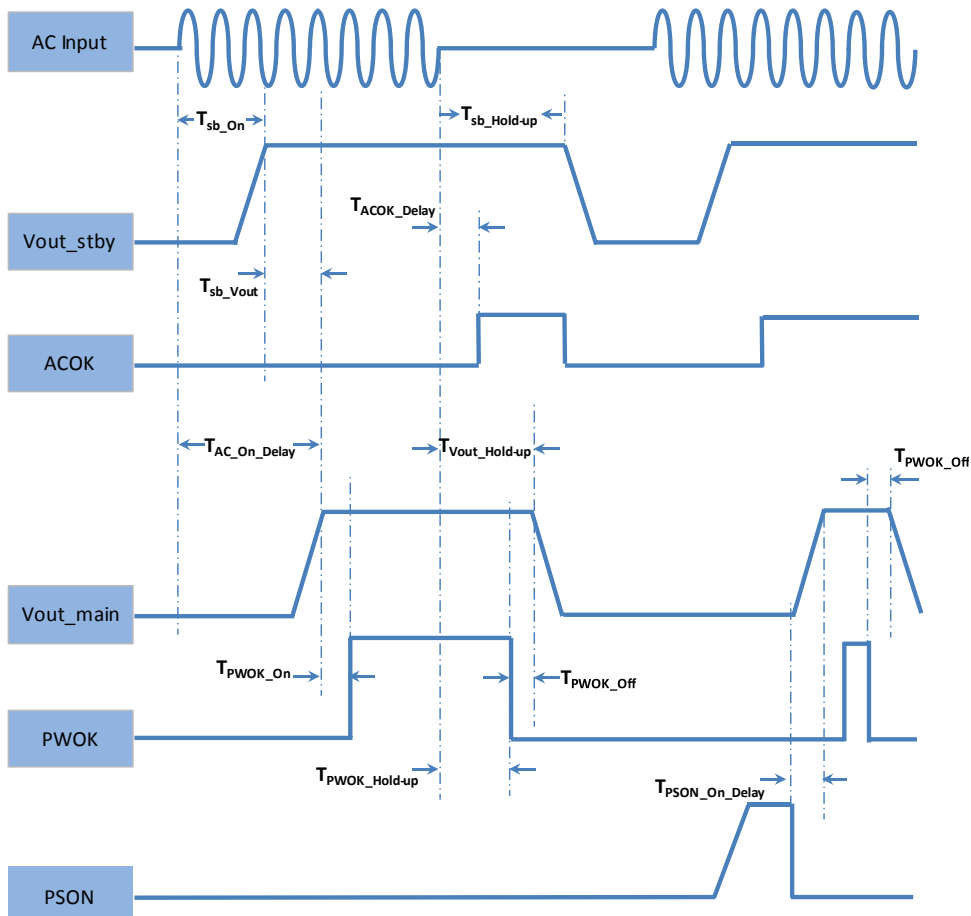
## Electrical Specifications

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### Timing Specifications

|                       | DESCRIPTION                                                           | MIN | MAX  | UNIT |
|-----------------------|-----------------------------------------------------------------------|-----|------|------|
| $T_{sb\_On}$          | Delay from AC being applied to standby output being within regulation |     | 1700 | ms   |
| $T_{AC\_On\_Delay}$   | Delay from AC being applied to main output being within regulation    |     | 2000 | ms   |
| $T_{PWOK\_On}$        | Delay from output voltages within regulation limits to PWOK asserted  | 100 | 1000 | ms   |
| $T_{ACOK\_Delay}$     | Delay from loss of AC to deassertion of ACOK                          | 7   | 14   | ms   |
| $T_{PWOK\_Hold-up}$   | Delay from loss of AC to deassertion of PWOK                          | 11  |      | ms   |
| $T_{Vout\_Hold-up}$   | Delay from loss of AC to main output falling out of regulation        | 12  |      | ms   |
| $T_{sb\_Hold-up}$     | Delay from loss of AC to standby output falling out of regulation     | 400 |      | ms   |
| $T_{PWOK\_Off}$       | Delay from deassertion of PWOK to output falling out of regulation    | 1   |      | ms   |
| $T_{PSON\_On\_Delay}$ | Delay from PSON assertion to output being within regulation           |     | 350  | ms   |
| $T_{PWOK\_Off}$       | Delay from deassertion of PWOK to output falling out of regulation    | 1   |      | ms   |
| $T_{PSON\_On\_Delay}$ | Delay from PSON assertion to output being within regulation           |     | 350  | ms   |

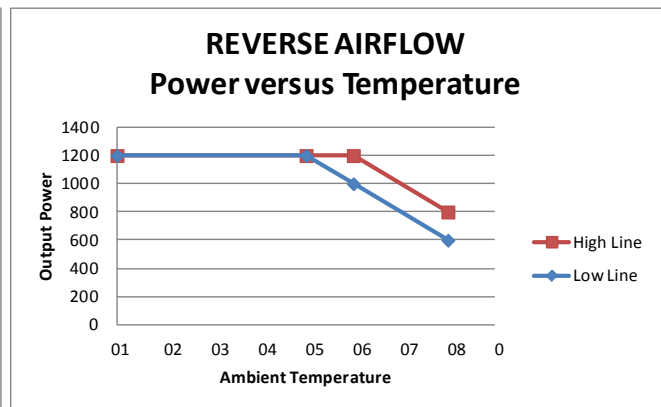
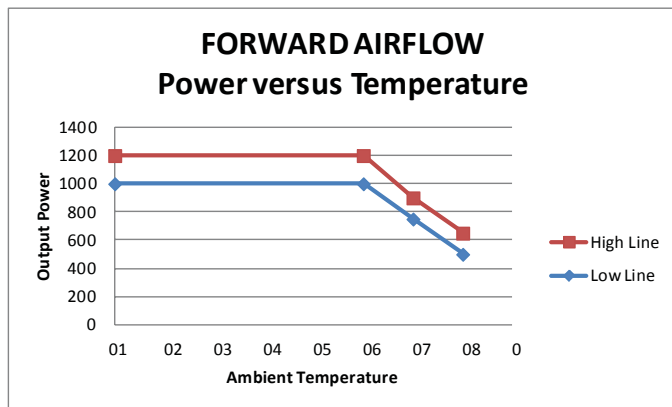
### TIMING DIAGRAM



## Environmental Specifications

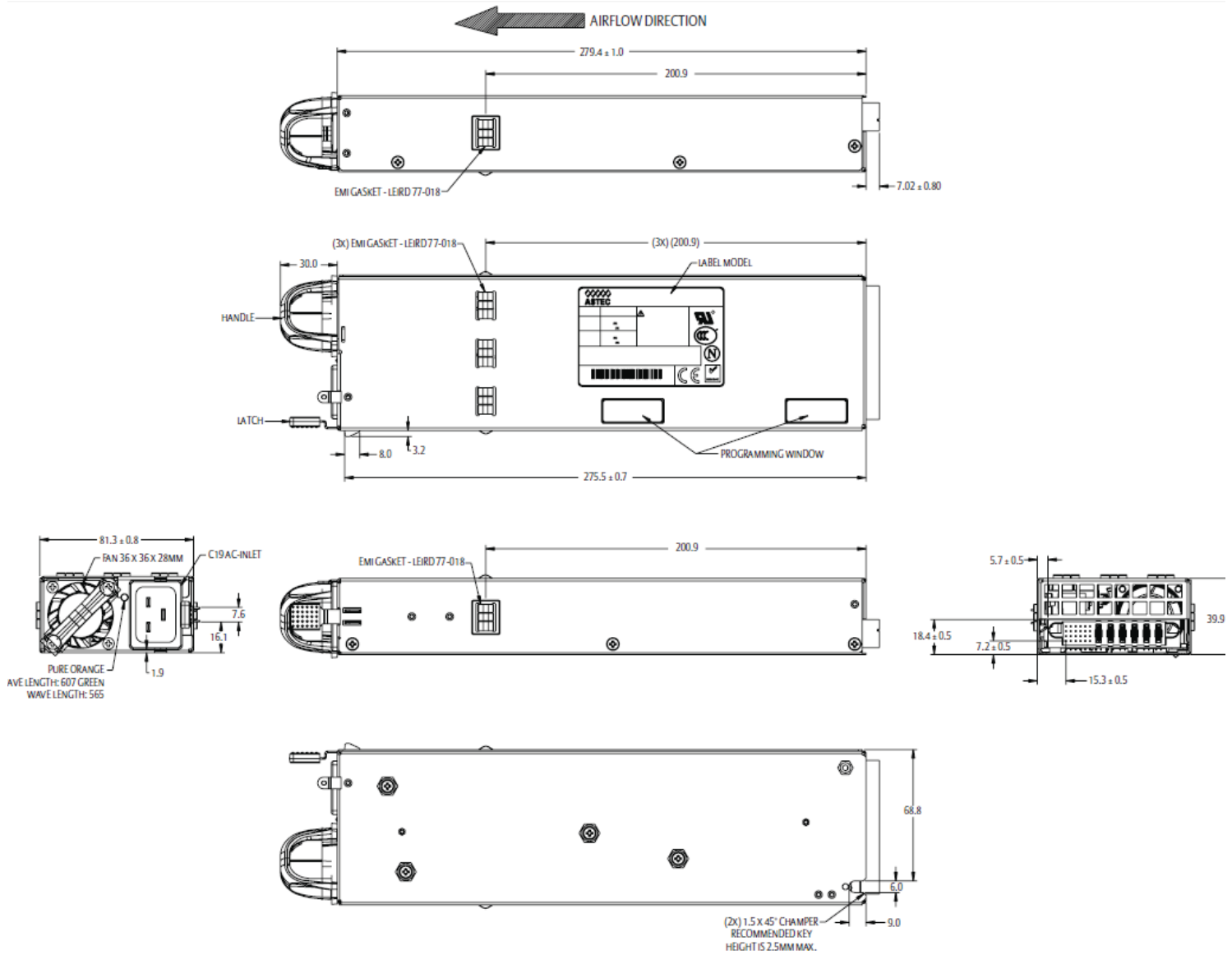
|                                  |                                                                                                                                                                          |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating Temperature:           | -10 to 50°C, can provide derated power up to 70°C. See power derating curve                                                                                              |
| Operating Altitude:              | up to 10,000 feet                                                                                                                                                        |
| Operating Relative Humidity:     | 10% to 90% non-condensing                                                                                                                                                |
| Non-operating Temperature:       | -40 to 85°C                                                                                                                                                              |
| Non-operating Relative Humidity: | 10% to 95% non-condensing                                                                                                                                                |
| Non-operating Altitude:          | up to 50,000 feet                                                                                                                                                        |
| Vibration and Shock:             | Standard operating/non-operating random shock and vibration                                                                                                              |
| ROHS Compliance:                 | Yes                                                                                                                                                                      |
| MTBF                             | 200,000 hours using Bell Core TR-332, issue 6 specification, Method 1 Case 3 at 25degC ambient at full load.                                                             |
| Operating Life                   | Minimum of 5 years                                                                                                                                                       |
| Reliability                      | All electronic component derating analysis and capacitor life calculation is done as per Emerson Network Power standards. The QAV report will be available upon request. |

### POWER DERATING CURVE



# Mechanical Specifications

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## Mechanical Specifications

### DC Output Connector Pinout Assignment

Male connector as viewed from the rear of the supply:

|    |    |    |    |    |    |     |     |     |     |     |     |
|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|
| D1 | D2 | D3 | D4 | D5 | D6 |     |     |     |     |     |     |
| C1 | C2 | C3 | C4 | C5 | C6 | PB1 | PB2 | PB3 | PB4 | PB5 | PB6 |
| B1 | B2 | B3 | B4 | B5 | B6 |     |     |     |     |     |     |
| A1 | A2 | A3 | A4 | A5 | A6 |     |     |     |     |     |     |

### Power Supply Side

1. FCI Power Blade 51721 series  
51721-10002406AA
2. Molex Power Connector  
SD-87667 series  
87667-7002

### Mating Connector (System Side)

1. FCI Power Blade  
51741-10002406CC  
Straight Pins
2. FCI Power Blade  
51761-10002406AALF  
Right Angle
3. Any other approved equivalent

### Pin Assignments

| Pin  | Signal Name                                 |
|------|---------------------------------------------|
| PB 1 | Main output return                          |
| PB 2 | Main output return                          |
| PB 3 | Main output return                          |
| PB 4 | + Main output                               |
| PB 5 | + Main output                               |
| PB 6 | + Main output                               |
| A1   | PS_ON_L                                     |
| A2   | Main output remote sense return,<br>VSENSE- |
| A3   | Spare                                       |
| A4   | PS_PRESENT                                  |
| A5   | STAND-BY, +VSB                              |
| A6   | STAND-BY RETURN, -VSB                       |
| B1   | ACOK_H (AC Input Present)                   |
| B2   | Main output remote sense, VSENSE+           |
| B3   | ISHARE                                      |
| B4   | PS_INHIBIT / PSKILL_LI                      |
| B5   | STAND-BY                                    |
| B6   | STAND-BY RETURN                             |
| C1   | SDA (I <sup>2</sup> C Data Signal)          |
| C2   | SCL (I <sup>2</sup> C Clock Signal)         |
| C3   | POWER GOOD/ PWOK_H                          |
| C4   | Spare                                       |
| C5   | STAND-BY, +VSB                              |
| C6   | STAND-BY RETURN                             |
| D1   | A0 (I <sup>2</sup> C Address BIT 0 Signal)  |
| D2   | A1 (I <sup>2</sup> C Address BIT 1 Signal)  |
| D3   | PS_INTERRUPT (Alarm)                        |
| D4   | STAND-BY RMT SENSE, VSENSE_STBY             |
| D5   | STAND-BY, +VSB                              |
| D6   | STAND-BY RETURN, -VSB                       |

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