

# A < D\* ) \$!%\$\$\$ SERIES

5C/DC Single Output: \*) \$ r %\$\$\$ K UHtg



## Features

- Rugged Construction
- Variable Fan Speed for Noise Reduction
- -20 °C to +70 °C Operation
- AC OK, Remote On/Off and Active Current Share
- 5 V Standby
- Screw Terminals
- 3 Year Warranty
- T ^ a 2 a 0 ] | | c a

## Specification

### Input

|                       |  |
|-----------------------|--|
| Input Voltage         | • 650 W: 80-264 VAC, derate output power 10% <90 VAC, and 20% <85 VAC, 1000 W: 85-264 VAC, derate output power 10% <90 VAC   |
| Input Frequency       | • 47-63 Hz   |
| Input Current         | • 650 W: 6.5 A at 115 VAC typical, 3.2 A at 230 VAC full load, 1000 W: 10.9 A at 115 VAC typical, 5.1 A at 230 VAC full load |
| Inrush Current        | • 650 W: 40 A max at 264 VAC 1000 W: 60 A max at 264 VAC   |
| Power Factor          | • >0.9   |
| Earth Leakage Current | • 250 µA max at 264 VAC/60 Hz  |
| Input Protection      | • 650 W: T16 A/250 V, 1000 W: T20 A/250 V internal fuse in line and neutral  |

### Output

|                            |   |
|----------------------------|---|
| Output Voltage             | • 12-48 VDC (see tables)  |
| Output Voltage Trim        | • ±10% V1   |
| Initial Set Accuracy       | • 650 W: ±1% V1, ±5% V3, 1000 W: ±1% V1, ±5% V2   |
| Minimum Load               | • No minimum load required  |
| Start Up Delay             | • 500 ms max  |
| Start Up Rise Time         | • 50 ms typical   |
| Hold Up Time               | • 20 ms minimum   |
| Drift                      | • ±0.2% after 20 min warm up  |
| Line Regulation            | • ±0.5%   |
| Load Regulation            | • 650 W: ±1% V1, ±5% V3, 1000 W: ±1% V1, ±5% V2   |
| Transient Response         | • 4% max. deviation, recovery to within 1% in 500 µs for a 50-75-50% load change                  |
| Ripple & Noise             | • 1% pk-pk V1, 20 MHz bandwidth   |
| Overvoltage Protection     | • 115-145% Vnom, recycle input to reset   |
| Overload Protection        | • 110-140%, V1 only   |
| Overtemperature Protection | • Auto reset  |
| Short Circuit Protection   | • Constant current characteristic   |
| Temp. Coefficient          | • 0.05% / °C  |
| Remote Sense               | • Compensates for 0.5 V total voltage drop  |
| Remote On/Off              | • Uncommitted isolated optocoupler diode, powered diode inhibits V1 and fan supply <sup>(1)</sup> |
| Current Share              | • Single wire current share <sup>(1)</sup>  |

<sup>(1)</sup> See longform datasheet for more information

### General

|                     |  |
|---------------------|--|
| Efficiency          | • 85% typical  |
| Isolation           | • 4000 VAC input to output, 1500 VAC input to ground, 500 VDC output to ground |
| Switching Frequency | • PFC 70 kHz, main converter 200 kHz, standby 130 kHz typical                  |
| Power Density       | • 650 W: 8.2 W/in <sup>3</sup> , 1000 W: 8.9 W/in <sup>3</sup>                 |
| Signals             | • AC OK, remote on/off, current share <sup>(1)</sup>                           |
| MTBF                | • 260 KHrs to MIL-HDBK-217F at 25 °C, GB                                       |

### Environmental

|                       |  |
|-----------------------|--|
| Operating Temperature | • -20 °C to +70 °C, derate linearly from +50 °C at 2.5% / °C to 50% at +70 °C, 1000 W: -40 °C start up   |
| Cooling               | • 650 W: Forced cooled, '-TF' & '-EF' models have integral dual voltage level fan, which is load dependant, U Channel requires 5.5 m/s minimum airflow, 1000 W: Forced cooled via integral quad voltage level fan which is load dependant <sup>(1)</sup> |
| Operating Humidity    | • 95% RH, non-condensing   |
| Storage Temperature   | • -40 °C to +85 °C   |
| Operating Altitude    | • 3000 m   |
| Shock                 | • 3 g pk, half sine, 6 axes  |
| Vibration             | • 2 g rms, 5 Hz to 500 kHz, 3 axes   |

### EMC & Safety

|                      |  |
|----------------------|--|
| Emissions            | • EN55022/EN55011 class B conducted EN55022/EN55011 class A radiated   |
| Harmonic Currents    | • EN61000-3-2 class A, 650 W: class C for loads ≥20% 1000 W: class C for loads ≥10%  |
| Voltage Flicker      | • EN61000-3-3  |
| ESD Immunity         | • EN61000-4-2, level 3 contact, level 3 air, Perf Criteria A   |
| Radiated Immunity    | • EN61000-4-3, level 3 Perf Criteria A   |
| EFT/Burst            | • EN61000-4-4, level 3 Perf Criteria A   |
| Surge                | • EN61000-4-5, installation class 3, Perf Criteria A   |
| Conducted Immunity   | • EN61000-4-6, level 3, Perf Criteria A  |
| Dips & Interruptions | • EN61000-4-11, 30% 10 ms, 60% 100 ms, 100% 5000 ms, Perf Criteria A, B, EN60601-1-2, 30% 500 ms, 60% 100 ms, 100% 10 ms, 100% 5000 ms, Perf Criteria A, A, A, B. Consult longform for 115 VAC operation |
| Safety Approvals     | • IEC60601-1 CB report, CSA 22.2 No.60601-1, UL60601-1, TUV, EN60601-1   |

# Models and Ratings

| Output Voltage V1 | Output Current V1 | Fan Supply V2 <sup>(4)</sup> | Standby Supply V3 | Output Power <sup>(3)</sup> | Model Number <sup>(1,2)</sup> |
|-------------------|-------------------|------------------------------|-------------------|-----------------------------|-------------------------------|
| 12 V              | 50 A              | 12 V / 0.5 A                 | 5 V / 0.2 A       | 607 W                       | MHP650PS12-EF†^               |
| 15 V              | 40 A              | 12 V / 0.5 A                 | 5 V / 0.2 A       | 607 W                       | MHP650PS15-EF†^               |
| 24 V              | 27 A              | 12 V / 0.5 A                 | 5 V / 0.2 A       | 655 W                       | MHP650PS24-EF†^               |
| 28 V              | 23 A              | 12 V / 0.5 A                 | 5 V / 0.2 A       | 655 W                       | MHP650PS28-EF†^               |
| 36 V              | 18 A              | 12 V / 0.5 A                 | 5 V / 0.2 A       | 655 W                       | MHP650PS36-EF†^               |
| 48 V              | 13.5 A            | 12 V / 0.5 A                 | 5 V / 0.2 A       | 655 W                       | MHP650PS48-EF†^               |

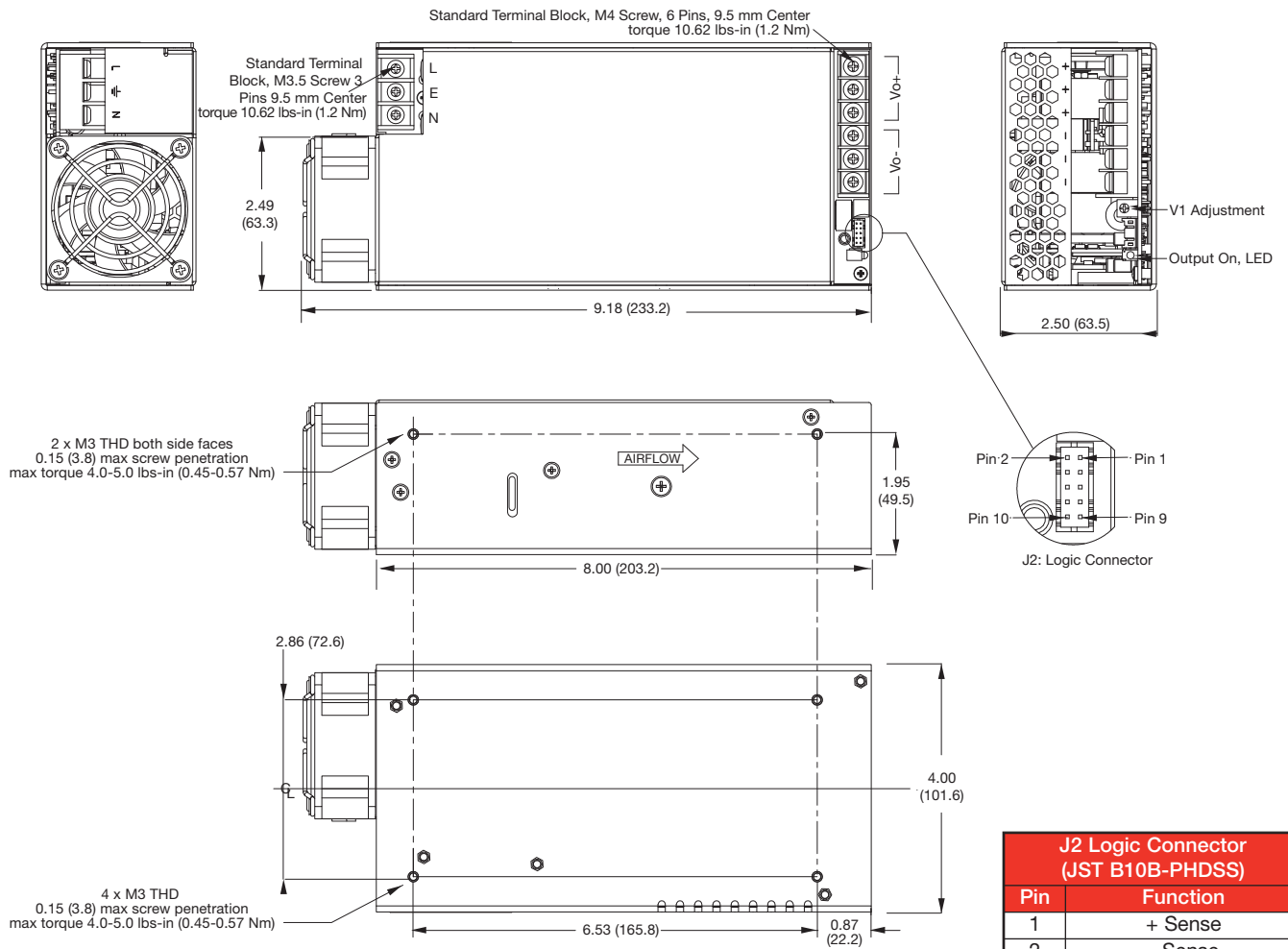
**Notes**

1. For top fan version replace '-EF' in model number with '-TF', e.g. MHP650PS12-TF
2. For U Channel version remove suffix.

3. U Channel models require a minimum of 5.5 m/s airflow from the system.
4. Not available for '-TF' and '-EF' models as used by integral fan.

# Mechanical Details

**End Fan (See Longform Datasheet for U-Channel Version)**



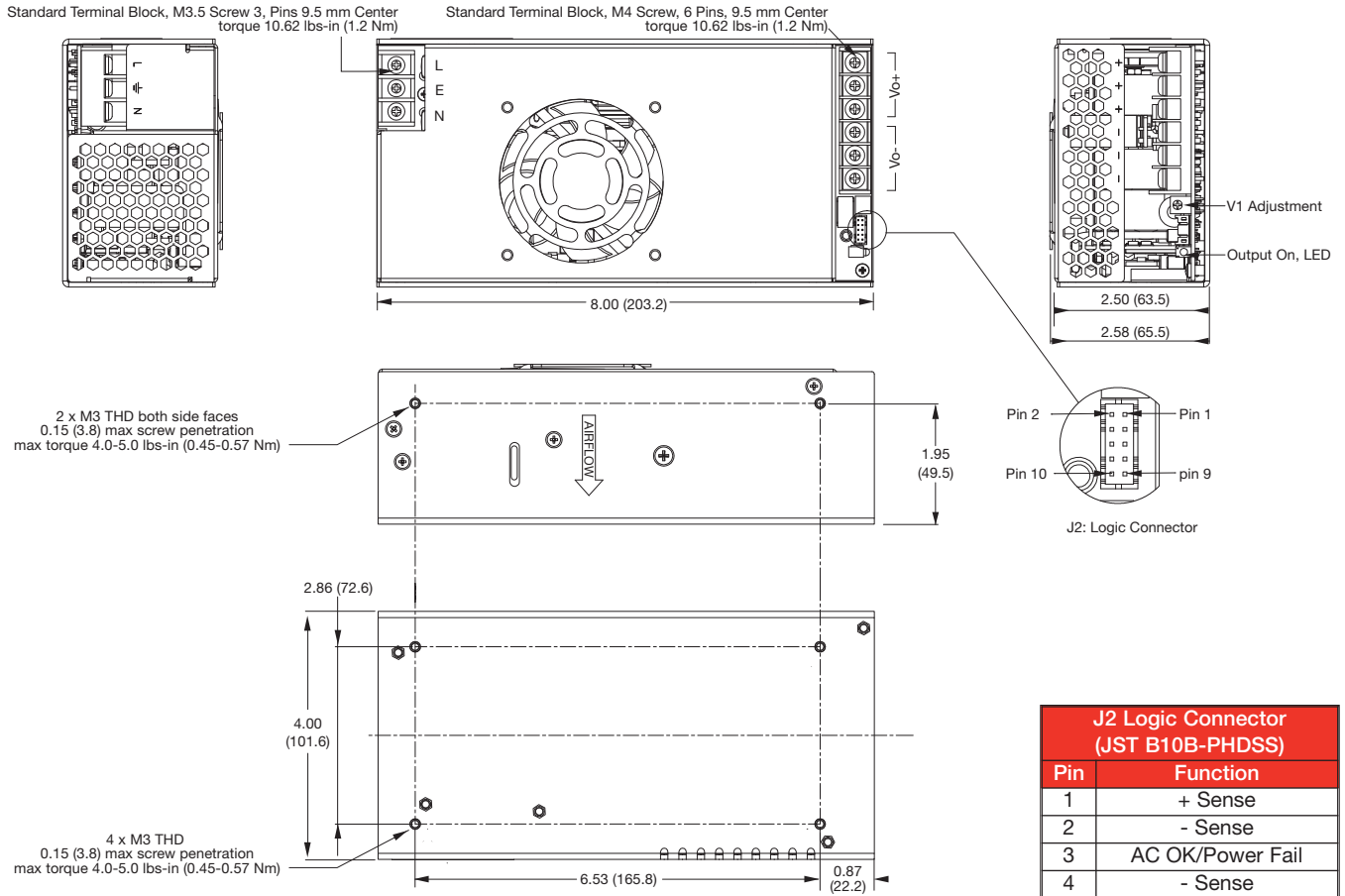
| J2 Logic Connector (JST B10B-PHDSS) |                         |
|-------------------------------------|-------------------------|
| Pin                                 | Function                |
| 1                                   | + Sense                 |
| 2                                   | - Sense                 |
| 3                                   | AC OK/Power Fail        |
| 4                                   | - Sense                 |
| 5                                   | Current Share           |
| 6                                   | Current Share           |
| 7                                   | + Inhibit (Anode)       |
| 8                                   | - Inhibit (Cathode)     |
| 9                                   | +5 V Standby (V3)       |
| 10                                  | 5 V Standby Return (V3) |

**Notes**

1. Dimensions shown in inches (mm).
2. Weight: 2.8 lb (1.27 kg).
3. J2 Mating plug: JST part no. PHDR-10VS, contact: 26-22 AWG JST part no. SPHD-001T-P0.5.

# Mechanical Details

## Top Fan (Suffix -TF)



| J2 Logic Connector (JST B10B-PHDSS) |                         |
|-------------------------------------|-------------------------|
| Pin                                 | Function                |
| 1                                   | + Sense                 |
| 2                                   | - Sense                 |
| 3                                   | AC OK/Power Fail        |
| 4                                   | - Sense                 |
| 5                                   | Current Share           |
| 6                                   | Current Share           |
| 7                                   | + Inhibit (Anode)       |
| 8                                   | - Inhibit (Cathode)     |
| 9                                   | +5 V Standby (V3)       |
| 10                                  | 5 V Standby Return (V3) |

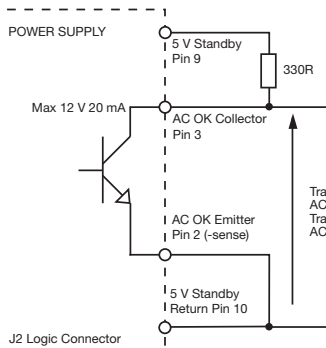
### Notes

- Dimensions shown in inches (mm).
- Weight: 2.8 lb (1.27 kg).

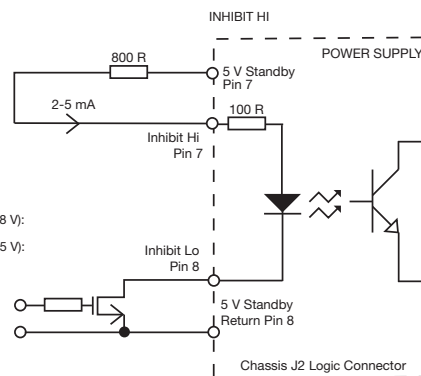
- J2 Mating plug: JST part no. PHDR-10VS, contact: 26-22 AWG JST part no. SPHD-001T-P0.5.

## Signals

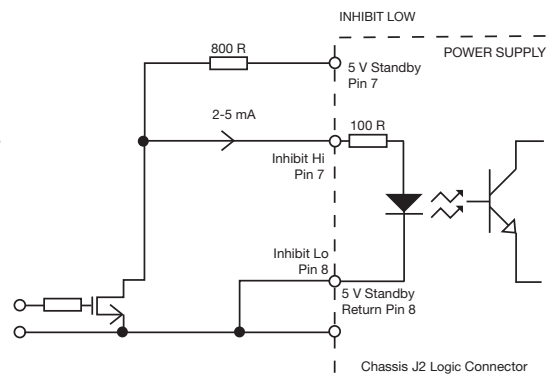
### AC OK/Power Fail



### Remote On/Off (Inhibit)



Signal High: Power Supply OFF  
Low or Floating: Power Supply ON

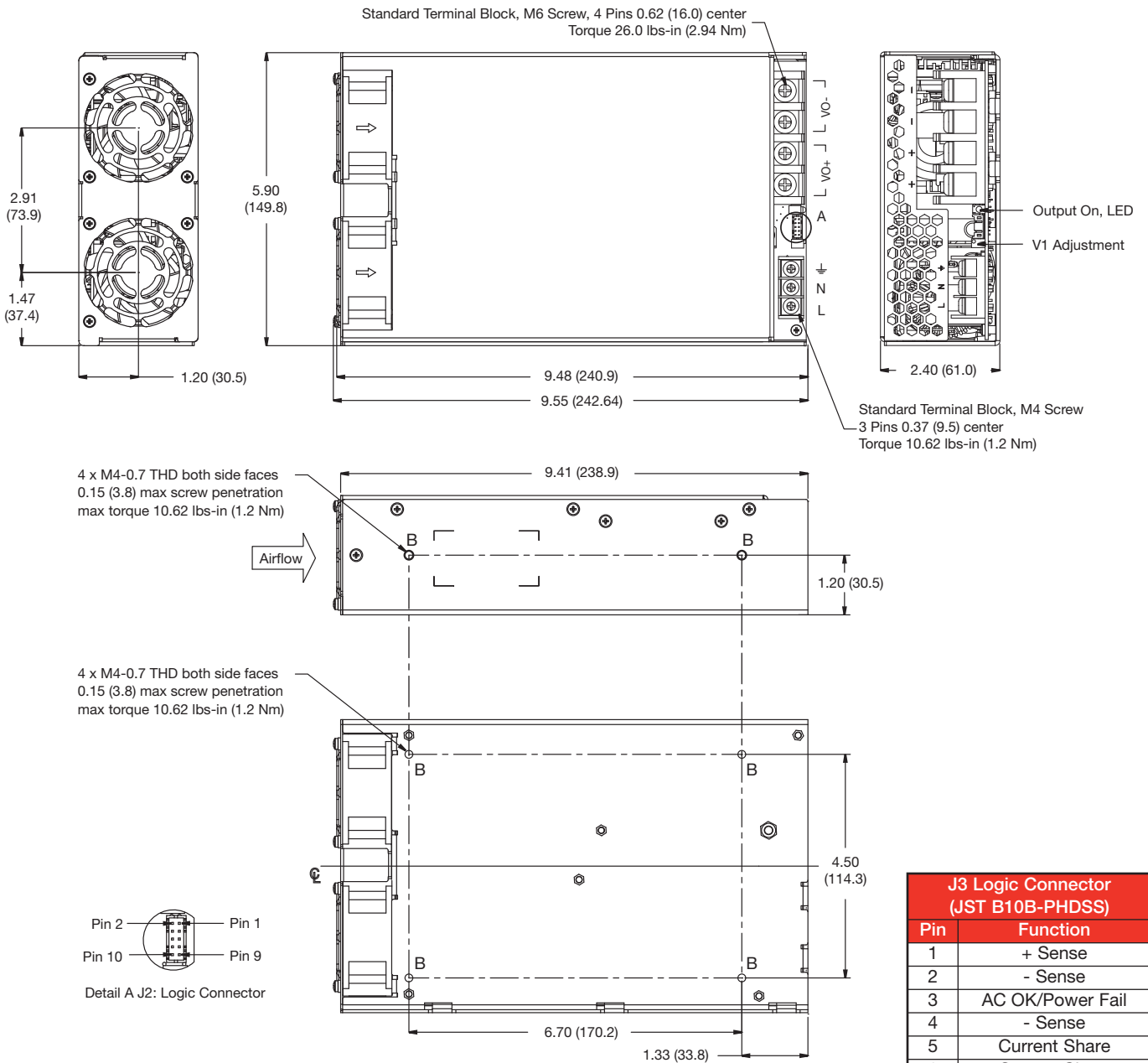


Signal High: Power Supply ON  
Low or Floating: Power Supply OFF

# Models and Ratings

| Output Voltage V1 | Output Current V1 |          | Standby Supply V2 | Output Power |          | Model Number  |
|-------------------|-------------------|----------|-------------------|--------------|----------|---------------|
|                   | <180 VAC          | >180 VAC |                   | <180 VAC     | >180 VAC |               |
| 12 V              | 83.0 A            |          | 5 V / 1.0 A       | 1000 W       |          | MHP1000PS12†^ |
| 15 V              | 67.0 A            |          | 5 V / 1.0 A       | 1010 W       |          | MHP1000PS15†^ |
| 24 V              | 42.0 A            | 50.0 A   | 5 V / 1.0 A       | 1013 W       | 1200 W   | MHP1000PS24†^ |
| 28 V              | 36.0 A            | 43.0 A   | 5 V / 1.0 A       | 1013 W       | 1200 W   | MHP1000PS28†^ |
| 36 V              | 28.0 A            | 34.0 A   | 5 V / 1.0 A       | 1013 W       | 1200 W   | MHP1000PS36†^ |
| 48 V              | 21.0 A            | 25.0 A   | 5 V / 1.0 A       | 1013 W       | 1200 W   | MHP1000PS48†^ |

# Mechanical Details



| J3 Logic Connector (JST B10B-PHDSS) |                  |
|-------------------------------------|------------------|
| Pin                                 | Function         |
| 1                                   | + Sense          |
| 2                                   | - Sense          |
| 3                                   | AC OK/Power Fail |
| 4                                   | - Sense          |
| 5                                   | Current Share    |
| 6                                   | Current Share    |
| 7                                   | + Inhibit        |
| 8                                   | - Inhibit        |
| 9                                   | +5 V Standby     |
| 10                                  | -5 V Standby     |

### Notes

- Dimensions shown in inches (mm).
- Weight: 4.6 lb (2.08 kg)

- J2 Mating plug: JST part no. PHDR-10VS, contact: 26-22 AWG JST part no. SPHD-001T-P0.5.