

## 225 Watts

- Low 1.18" Profile U Channel Construction
- -40 °C to +70 °C Operation
- 3.12" by 5.0" Footprint
- 150 W Convection/ 225 W Forced Cooled Ratings
- Optional 5 V Standby and Remote On/Off
- 12 V Fan Output
- Medical and ITE Approvals
- High Efficiency, up to 95%
- Less than 0.5 W No Load Input Power



The UCP225 series is designed to minimize the no load power consumption and maximize efficiency to facilitate equipment design to meet the latest environmental legislation. Approved for medical and ITE applications, this range of single output AC/DC power supplies are packaged in an ultra-low profile 1.18" height with a foot print of just 3.12" by 5.0". The UCP225 provides up to 225 W force-cooled or 150 W convection-cooled leading to very high power densities of 12.2 W/in<sup>3</sup> or 8.1 W/in<sup>3</sup> respectively. A 12 V, 500 mA fan supply is included in the design which can also be delivered with an optional 5 V/2 A standby output. The power supply contains two fuses and low leakage currents as required by medical applications and is safety approved to operate in a 70 °C ambient. The low profile and safety approvals covering ITE and medical standards along with conducted emissions to EN55011/22 level B allow the versatile UCP225 series to be used in a vast range of applications.

### Dimensions:

**UCP225:**  
5.00 x 3.12 x 1.18" (127.0 x 79.2 x 29.2 mm)

## Models & Ratings

| Output Voltage | Output Current    |                              | Optional Standby Output |                              | Fan Output | Efficiency <sup>(2)</sup> | Model Number <sup>(3, 4, 5, 6)</sup> |
|----------------|-------------------|------------------------------|-------------------------|------------------------------|------------|---------------------------|--------------------------------------|
|                | Convection-cooled | Forced-cooled <sup>(1)</sup> | Convection-cooled       | Forced-cooled <sup>(1)</sup> |            |                           |                                      |
| 12.0 V         | 12.50 A           | 18.75 A                      | 5 V/1.0 A               | 5 V/2.0 A                    | 12 V/0.5 A | 92%                       | UCP225PS12                           |
| 15.0 V         | 10.00 A           | 15.00 A                      | 5 V/1.0 A               | 5 V/2.0 A                    | 12 V/0.5 A | 92%                       | UCP225PS15                           |
| 18.0 V         | 8.33 A            | 12.50 A                      | 5 V/1.0 A               | 5 V/2.0 A                    | 12 V/0.5 A | 92%                       | UCP225PS18                           |
| 24.0 V         | 6.25 A            | 9.38 A                       | 5 V/1.0 A               | 5 V/2.0 A                    | 12 V/0.5 A | 92%                       | UCP225PS24                           |
| 28.0 V         | 5.36 A            | 8.04 A                       | 5 V/1.0 A               | 5 V/2.0 A                    | 12 V/0.5 A | 92%                       | UCP225PS28                           |
| 36.0 V         | 4.16 A            | 6.25 A                       | 5 V/1.0 A               | 5 V/2.0 A                    | 12 V/0.5 A | 92%                       | UCP225PS36                           |
| 48.0 V         | 3.10 A            | 4.69 A                       | 5 V/1.0 A               | 5 V/2.0 A                    | 12 V/0.5 A | 92%                       | UCP225PS48                           |

## Notes

1. Requires 10 CFM or optional top fan cover, -TF
2. Minimum average efficiencies measured at 25%, 50%, 75% & 100% of 225 W load and 230 VAC input
3. Add suffix -T for input and output screw terminals e.g. UCP225PS24-T
4. Add suffix -TF for fan cover version e.g. UCP225PS24-TF
5. Add suffix -C for vented cover version e.g. UCP225PS24-C
6. Add suffix -A for optional 5 V, 2 A standby and remote on/off e.g. UCP225PS24-A

## Input

| Characteristic            | Minimum   | Typical | Maximum | Units | Notes & Conditions                                     |
|---------------------------|---|---------|---------|-------|--|
| Input Voltage - Operating | 85  | 115/230 | 264     | VAC   | Derate output from 100% at 90 VAC to 90% at 85 VAC     |
| Input Frequency           | 47  | 50/60   | 63      | Hz    |  |
| Power Factor              |   | >0.9    |         |       | 230 VAC, 100% load. EN61000-3-2 class A, class C >145W |
| Input Current - Full Load |   | 2.2/1.1 |         | A     | 115/230 VAC  |
| Inrush Current            |   | 120     |         | A     | 230 VAC cold start, 25 °C                              |
| Earth Leakage Current     |   | 80/140  | 230     | µA    | 115/230 VAC/50 Hz (Typ), 264 VAC/60 Hz (Max)           |
| No load Input Power       |   |         | 0.5     | W     | When main output is Inhibited                          |
| Input Protection          | F3.15 A/250 V Internal fuse fitted in line and neutral. |         |         |       |  |

### Output - Main Output

| Characteristic             | Minimum | Typical | Maximum | Units   | Notes & Conditions   |
|----------------------------|---------|---------|---------|---------|--|
| Output Voltage - V1        | 12      |         | 48      | VDC     | See Models and Ratings table   |
| Initial Set Accuracy       |         |         | ±1      | %       | 50% load, 115/230 VAC  |
| Minimum Load               | 0       |         |         | A       | No minimum load required   |
| Start Up Delay             |         |         | 2       | s       | 115/230 VAC full load.   |
| Hold Up Time               | 10      | 20/13   |         | ms      | Min at full load, 115 VAC. Typical at 150W/ 225W   |
| Drift                      |         |         | ±0.02   | %       | After 20 min warm up   |
| Line Regulation            |         |         | ±0.5    | %       | 90-264 VAC   |
| Load Regulation            |         |         | ±0.5    | %       | 0-100% load.   |
| Transient Response         |         |         | 4       | %       | Recovery within 1% in less than 500 µs for a 50-75% and 75-50% load step                     |
| Over/Undershoot            |         | 5       | 9       | %       | Full load  |
| Ripple & Noise             |         |         | 1       | % pk-pk | 20 MHz bandwidth and 10 µF electrolytic capacitor in parallel with 0.1 µF ceramic capacitor. |
| Overvoltage Protection     | 110     |         | 140     | %       | Vnom, recycle input to reset   |
| Overload Protection        | 110     |         | 175     | % I nom |  |
| Short Circuit Protection   |         |         |         |         | Trip & Restart   |
| Temperature Coefficient    |         |         | 0.02    | %/°C    |  |
| Overtemperature Protection |         |         |         |         | Measured internally, Auto Resetting  |

### Output - Optional 5 V Standby Output

| Characteristic           | Minimum   | Typical | Maximum | Units   | Notes & Conditions  |
|--------------------------|---|---------|---------|---------|---|
| Output Voltage           |   | 5.0     |         | VDC     |   |
| Initial Set Accuracy     |   |         | ±1      | %       | 50% load, 115/230 VAC   |
| Minimum Load             | 0   |         |         | A       |   |
| Start Up Delay           |   |         | 0.5     | s       | 115/230 VAC full load.  |
| Hold Up Time             | 300   |         |         | ms      | Min at full load, 115 VAC.  |
| Drift                    |   |         | ±0.02   | %       | After 20 min warm up  |
| Line Regulation          |   |         | ±0.5    | %       | 90-264 VAC  |
| Load Regulation          |   |         | ±0.5    | %       | 0-100% load.  |
| Transient Response       |   |         | 4       | %       | Recovery within 1% in less than 500 µs for a 50-75% and 75-50% load step                    |
| Over/Undershoot          |   |         | 5       | %       | Full load   |
| Ripple & Noise           |   |         | 1.2     | % pk-pk | 20 MHz bandwidth and 10 µF electrolytic capacitor in parallel with 0.1 µF ceramic capacitor |
| Overload Protection      |   | 2.4     | 4.0     | A       |   |
| Short Circuit Protection |   |         |         |         | Trip & Restart  |
| Temperature Coefficient  |   |         | 0.02    | %/°C    |   |
| Remote On/Off            | Connect pin 3 of CN2 to pin 1 to turn main output off. Connect to pin 2 or leave open to turn main output on. |         |         |         |   |

### General

| Characteristic  | Minimum | Typical    | Maximum  | Units             | Notes & Conditions                  |
|---|---------|------------|----------|-------------------|-------------------------------------|
| Efficiency  |         | 94         |          | %                 | 230 VAC Full load (see fig. 1 to 4) |
| Isolation: Input to Output<br>Input to Ground<br>Output to Ground | 4000    |            |          | VAC               | 2 MOPP                              |
|   | 1500    |            |          | VAC               | 1 MOPP                              |
|   | 1500    |            |          | VAC               | 1 MOPP                              |
| Switching Frequency   | 40      |            | 130      | kHz               | PFC                                 |
|   | 50      |            | 80       | kHz               | Main converter                      |
|   |         | 65         |          | kHz               | For optional standby output         |
| Power Density   |         |            | 12.2/8.1 | W/in <sup>3</sup> | Forced/convection-cooled            |
| Mean Time Between Failure   |         | 300        |          | kHrs              | MIL-HDBK-217F, Notice 2 +25 °C GB   |
| Weight  |         | 0.71 (320) |          | lb(g)             | For U channel version               |

### Efficiency Vs Load

Figure 1  
UCP225PS12

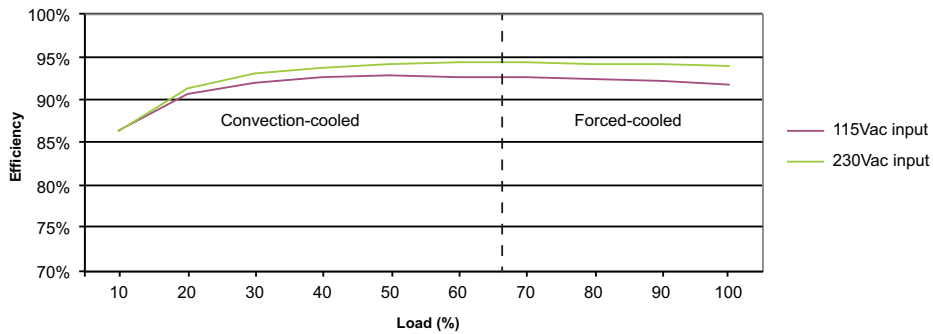
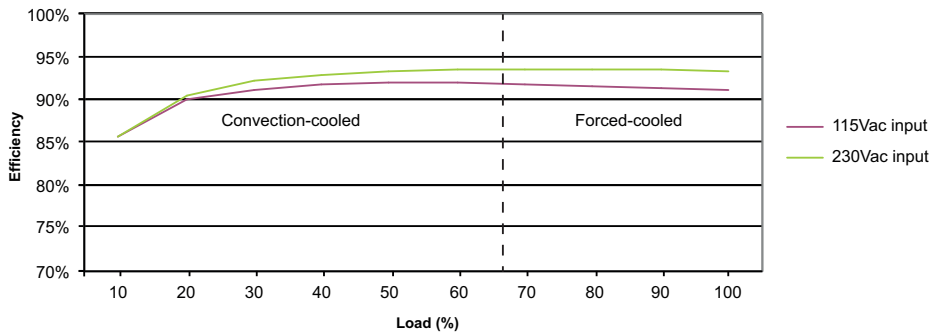


Figure 2  
UCP225PS12-A



### Efficiency Vs Load

Figure 3  
UCP225PS24

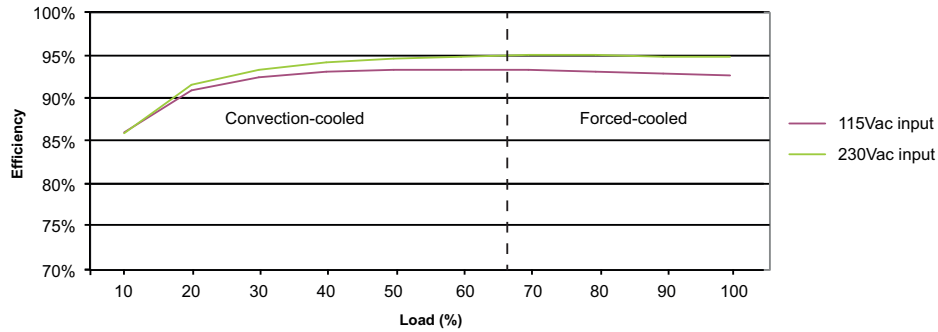
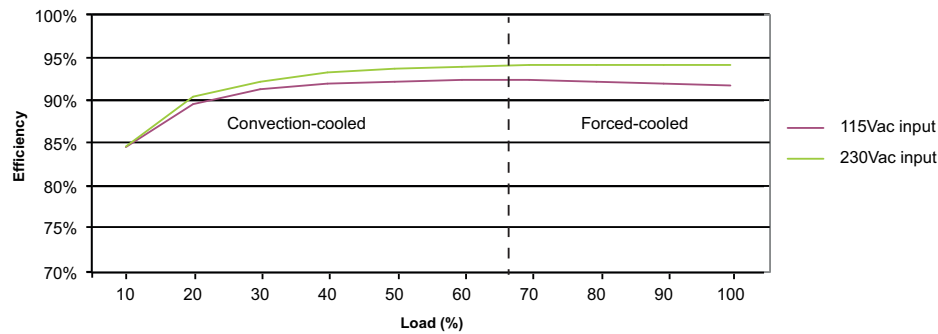


Figure 4  
UCP225PS24-A



### Environmental

| Characteristic        | Minimum  | Typical | Maximum   | Units | Notes & Conditions  |
|-----------------------|--|---------|-----------|-------|---|
| Operating Temperature | -40  |         | +70       | °C    | -40 °C for 150 W load, -25 °C for 225 W load, See derating curve, fig.5 and fig.6 |
| Storage Temperature   | -40  |         | +85       | °C    |   |
| Cooling               | 10   |         |           | CFM   | Forced-cooled > 150W  |
| Humidity              | 5  |         | 95        | %RH   | Non-condensing  |
| Operating Altitude    |  |         | 5000/4000 | m     | ITE/Medical   |
| Shock                 | ±3 x 30g shocks in each plane, total 18 shocks. 30g = 11ms (+/- 0.5msecs), half sine. Conforms to EN60068-2-27 |         |           |       |   |
| Vibration             | Single axis 10-500 Hz at 2g sweep and endurance at resonance in all 3 planes. Conforms to EN60068-2-6          |         |           |       |   |

### Temperature Derating Curves

Figure 5 - 150 W Convection Cooled

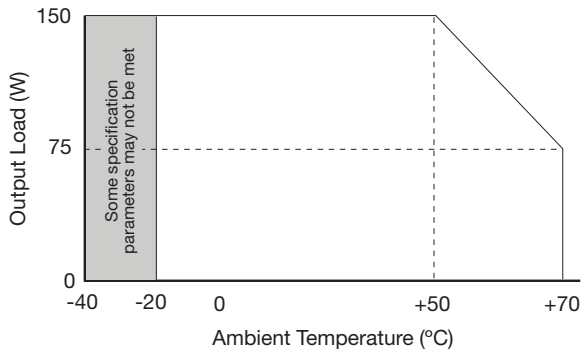
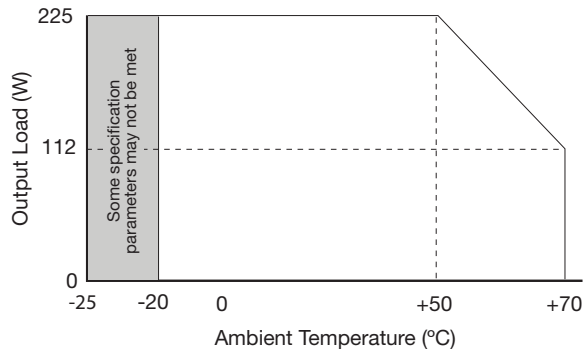


Figure 6 - 225 W Forced Cooled



### EMC: Emissions

| Phenomenon        | Standard    | Test Level | Criteria | Notes & Conditions  |
|-------------------|-------------|------------|----------|---|
| Conducted         | EN55011/32  | Class B    |          |   |
| Radiated          | EN55011/32  | Class A    |          | Class B with King Core ferrites<br>Output cable: KCF-130-B<br>Input cable for 150W load: K5B RC 14x28.5x7-M for all models with additional KCF-130-B on 48V version.<br>Input cable for 225W load: K5B RC 14x28.5x7-M plus KCF-130-B. |
| Harmonic Current  | EN61000-3-2 | Class A    |          | Meet Class C for loads above 145W   |
| Voltage Functions | EN61000-3-3 |            |          |   |

### EMC: Immunity

| Phenomenon                | Standard              | Test Level                | Criteria | Notes & Conditions   |
|---------------------------|-----------------------|---------------------------|----------|--|
| Medical Device EMC        | IEC60601-1-2          | Ed.4.0 : 2014             | as below |  |
| Low Voltage PSU EMC       | EN61204-3             | High severity level       | as below |  |
| ESD                       | EN61000-4-2           | 4                         | A        | ±8kV contact, ±15kV air  |
| Radiated                  | EN61000-4-3           | 3                         | A        |  |
| EFT                       | EN61000-4-4           | 3                         | A        |  |
| Surges                    | EN61000-4-5           | Installation class 3      | A        |  |
| Conducted                 | EN61000-4-6           | 3                         | A        |  |
| Magnetic Fields           | EN61000-4-8           | 4                         | A        |  |
| Dips and Interruptions    | EN55024 (100 VAC)     | Dip >95% (0 VAC), 8.3 ms  | A        |  |
|                           |                       | Dip 30% (70 VAC), 416 ms  | A        |  |
|                           |                       | Dip >95% (0 VAC), 4160 ms | B        |  |
|                           | EN55024 (240 VAC)     | Dip >95% (0 VAC), 10.0 ms | A        |  |
|                           |                       | Dip 30% (168 VAC), 500 ms | A        |  |
|                           |                       | Dip >95% (0 VAC), 5000 ms | B        |  |
|                           | EN60601-1-2 (100 VAC) | Dip 100% (0 VAC), 10.0 ms | A        |  |
|                           |                       | Dip 100% (0 VAC), 20 ms   | B        | Performance criteria A <60 W for 15 V & 18 V versions, <100 W for others |
|                           |                       | Dip 60% (40 VAC), 100 ms  | A        | Derate Output Power to 40 W  |
|                           |                       | Dip 30% (40 VAC), 500 ms  | A        |  |
|                           |                       | Dip 100% (0 VAC), 5000 ms | B        |  |
|                           | EN60601-1-2 (240 VAC) | Dip 100% (0 VAC), 10.0 ms | A        |  |
|                           |                       | Dip 100% (0 VAC), 20 ms   | B        | Performance criteria A <60 W for 15 V & 18 V versions, <100 W for others |
|                           |                       | Dip 60% (96 VAC), 100 ms  | A        |  |
| Dip 30% (168 VAC), 500 ms |                       | A                         |          |  |
| Dip 100% (0 VAC), 5000 ms |                       | B                         |          |  |

### Safety Approvals

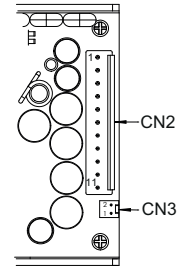
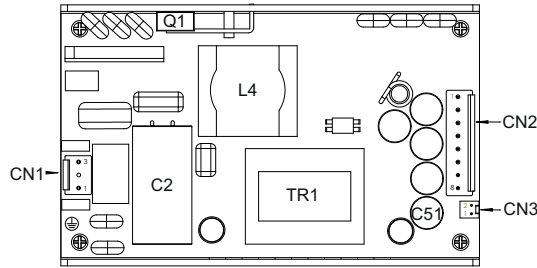
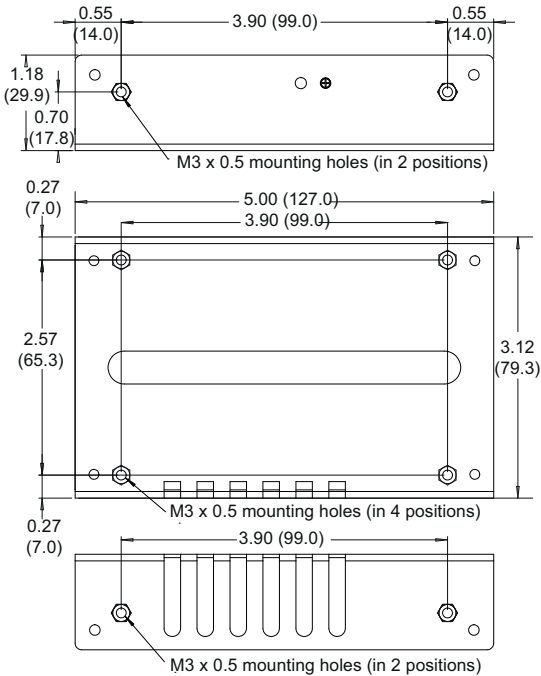
| Safety Agency | Safety Standard                                   | Notes & Conditions     |
|---------------|---|------------------------|
| CB Report     | IEC60950-1:2005 + A1:2009 + A2: 2013              | Information Technology |
| UL            | UL60950-1 (2011), CSA 22.2 No.60950-1-11 Ed 2     | Information Technology |
| TUV           | EN60950-1: 2006 + A11: 2009 + A1:2010 + A12: 2012 | Information Technology |
| CE            | LVD   |                        |

| Safety Agency | Safety Standard                                    | Notes & Conditions |
|---------------|--|--------------------|
| CB Report     | IEC60601-1 Ed 3 Including Risk Management          | Medical            |
| UL            | ANSI/AAMI ES60601-1: 2005 & CSA C22.2 No.6061-1:08 | Medical            |
| CE            | EN60601-1:2006                                     | Medical            |

| Isolation            | Safety Standard                        | Notes & Conditions |
|----------------------|--|--------------------|
| Primary to Secondary | 2 x MOPP (Means of Patient Protection) | IEC60601-1 Ed 3.1  |
| Primary to Earth     | 1 x MOPP (Means of Patient Protection) |                    |
| Secondary to Earth   | 1 x MOPP (Means of Patient Protection) |                    |

### Mechanical Details

#### Standard U-Channel Version



**Optional Standby Output & Remote On/Off Version, -A**

| CN1 - Input Connector |            |
|-----------------------|------------|
| Pin 1                 | Neutral    |
| Pin 2                 | Not Fitted |
| Pin 3                 | Line       |

Mates with JST housing  
VHR-3N and JST Series  
SVH-21T-P1.1 crimp terminals

| CN3 - Fan Connector |       |
|---------------------|-------|
| Pin 1               | Fan - |
| Pin 2               | Fan + |

Mates with Molex housing  
22-01-1022 and 2759 crimp terminals

| CN2 - Output Connector for standard models |       |
|--|-------|
| Pin 1                                      | +Vout |
| Pin 2                                      | +Vout |
| Pin 3                                      | +Vout |
| Pin 4                                      | +Vout |
| Pin 5                                      | -Vout |
| Pin 6                                      | -Vout |
| Pin 7                                      | -Vout |
| Pin 8                                      | -Vout |

Mates with JST housing  
VHR-8N and JST Series  
SVH-21T-P1.1 crimp terminals

| CN2 - Output Connector for optional -A version |               |
|--|---------------|
| Pin 1  | +5 V Standby  |
| Pin 2  | RTN           |
| Pin 3  | Remote On/Off |
| Pin 4  | +Vout         |
| Pin 5  | +Vout         |
| Pin 6  | +Vout         |
| Pin 7  | +Vout         |
| Pin 8  | -Vout         |
| Pin 9  | -Vout         |
| Pin 10   | -Vout         |
| Pin 11   | -Vout         |

Mates with JST housing  
VHR-11N and JST Series  
SVH-21T-P1.1 crimp terminals

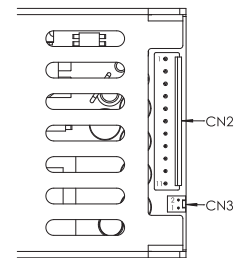
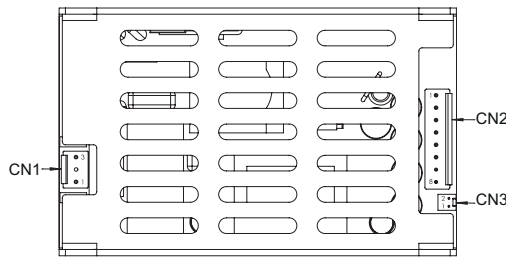
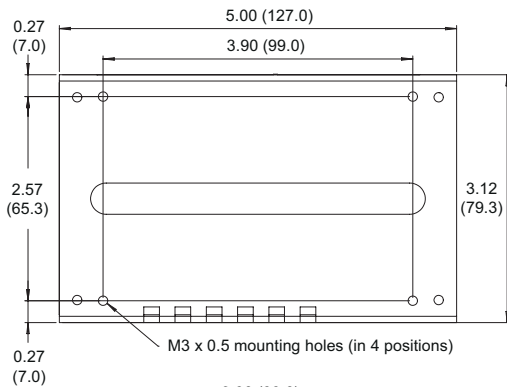
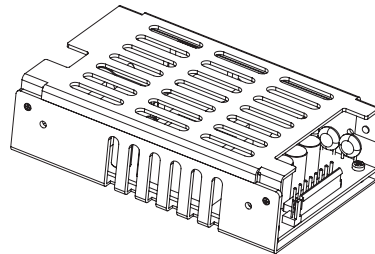
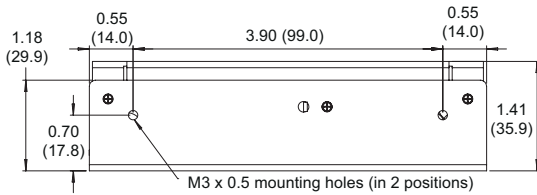
#### Notes

- All dimensions shown in inches (mm).  
Tolerance:  $\pm 0.02$  (0.5)
- Weight: 0.71 lbs (320 g) approx.

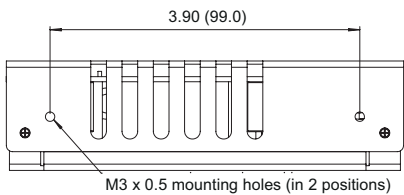
- A kit is available containing the housings and crimps for CN1, CN2 and CN3 for the -A version with optional standby, order part ECP\_UCP-A CON KIT

### Mechanical Details

#### Covered Version (-C suffix)



**Optional Standby Output & Remote On/Off Version, -A-C**



| CN1 - Input Connector |            |
|-----------------------|------------|
| Pin 1                 | Neutral    |
| Pin 2                 | Not Fitted |
| Pin 3                 | Line       |

Mates with JST housing  
VHR-3N and JST Series  
SVH-21T-P1.1 crimp terminals

| CN3 - Fan Connector |       |
|---------------------|-------|
| Pin 1               | Fan - |
| Pin 2               | Fan + |

Mates with Molex housing  
22-01-1022 and 2759 crimp terminals

| CN2 - Output Connector for standard models |       |
|--|-------|
| Pin 1                                      | +Vout |
| Pin 2                                      | +Vout |
| Pin 3                                      | +Vout |
| Pin 4                                      | +Vout |
| Pin 5                                      | -Vout |
| Pin 6                                      | -Vout |
| Pin 7                                      | -Vout |
| Pin 8                                      | -Vout |

Mates with JST housing  
VHR-8N and JST Series  
SVH-21T-P1.1 crimp terminals

| CN2 - Output Connector for optional -A version |               |
|--|---------------|
| Pin 1  | +5 V Standby  |
| Pin 2  | RTN           |
| Pin 3  | Remote On/Off |
| Pin 4  | +Vout         |
| Pin 5  | +Vout         |
| Pin 6  | +Vout         |
| Pin 7  | +Vout         |
| Pin 8  | -Vout         |
| Pin 9  | -Vout         |
| Pin 10   | -Vout         |
| Pin 11   | -Vout         |

Mates with JST housing  
VHR-11N and JST Series  
SVH-21T-P1.1 crimp terminals

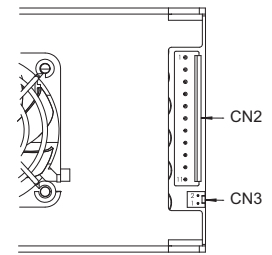
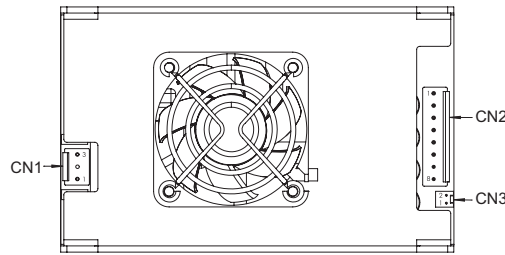
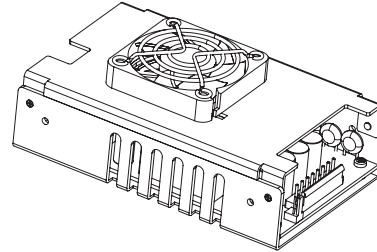
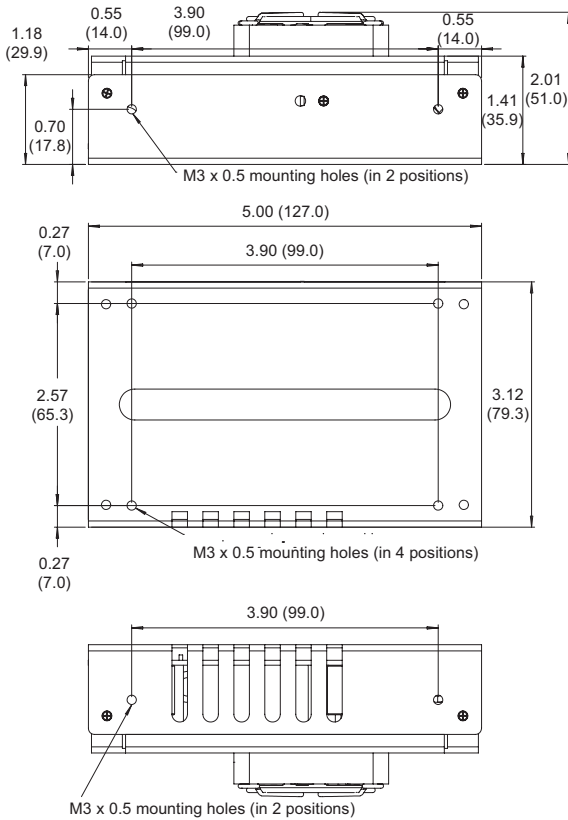
#### Notes

- All dimensions shown in inches (mm).  
Tolerance:  $\pm 0.02$  (0.5)
- Weight: 0.78 lbs (355 g) approx.

- A kit is available containing the housings and crimps for CN1, CN2 and CN3 for the -A version with optional standby, order part ECP225\_UCP225-A CON KIT.

### Mechanical Details

#### Top Fan Version (-TF suffix)



Optional Standby Output & Remote On/Off Version, -A-TF

| CN1 - Input Connector |            |
|-----------------------|------------|
| Pin 1                 | Neutral    |
| Pin 2                 | Not Fitted |
| Pin 3                 | Line       |

Mates with JST housing  
VHR-3N and JST Series  
SVH-21T-P1.1 crimp terminals

| CN3 - Fan Connector |       |
|---------------------|-------|
| Pin 1               | Fan - |
| Pin 2               | Fan + |

Mates with Molex housing  
22-01-1022 and 2759 crimp terminals

| CN2 - Output Connector for standard models |       |
|--|-------|
| Pin 1                                      | +Vout |
| Pin 2                                      | +Vout |
| Pin 3                                      | +Vout |
| Pin 4                                      | +Vout |
| Pin 5                                      | -Vout |
| Pin 6                                      | -Vout |
| Pin 7                                      | -Vout |
| Pin 8                                      | -Vout |

Mates with JST housing  
VHR-8N and JST Series  
SVH-21T-P1.1 crimp terminals

| CN2 - Output Connector for optional -A version |               |
|--|---------------|
| Pin 1  | +5 V Standby  |
| Pin 2  | RTN           |
| Pin 3  | Remote On/Off |
| Pin 4  | +Vout         |
| Pin 5  | +Vout         |
| Pin 6  | +Vout         |
| Pin 7  | +Vout         |
| Pin 8  | -Vout         |
| Pin 9  | -Vout         |
| Pin 10   | -Vout         |
| Pin 11   | -Vout         |

Mates with JST housing  
VHR-11N and JST Series  
SVH-21T-P1.1 crimp terminals

#### Notes

- All dimensions shown in inches (mm).  
Tolerance:  $\pm 0.02$  (0.5)
- Weight: 0.86 lbs (390 g) approx.

- A kit is available containing the housings and crimps for CN1, CN2 and CN3 for the -A version with optional standby, order part ECP225\_UCP225-A CON KIT.



### Thermal Considerations

In order to ensure safe operation of the PSU in the end-use equipment, the temperature of the components listed in the table below must not be exceeded. Temperature should be monitored using K type thermocouples placed on the hottest part of the component (out of direct air flow). See Mechanical Details for component locations.

| Temperature Measurements (At Maximum Ambient) |                    |
|---|--------------------|
| Component                                     | Max Temperature °C |
| TR1 Coil                                      | 110°C              |
| L4 Coil                                       | 120°C              |
| Q1 Body                                       | 120°C              |
| C2  | 105°C              |
| C51   | 105°C              |

### Service Life

The estimated service life of the UCP225 is determined by the cooling arrangements and load conditions experienced in the end application. Due to the uncertain nature of the end application this estimated service life is based on the actual measured temperature of a key capacitor with in the product when installed by the end application,

The graph below expresses the estimated lifetime of a given component temperature and assumes continuous operation at this temperature.

#### Estimated Service Life vs Component Temperature

Figure 5

