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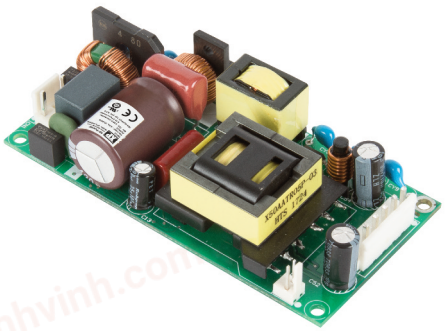
# EPL150 Series

AC-DC Power Supplies

XP Power

## 150 Watts

- 100 W Convection/150 W Forced-cooled Ratings
- 2″ by 4″ Footprint
- Low 0.99″ Profile
- Class I & Class II Operation
- 12 V Fan Output
- High Efficiency, up to 95%
- ITE & Medical (BF) Approvals
- High Power Density
- Less than 0.5 W No Load Input Power
- 3 Year Warranty



**Dimensions:**

**EPL150:**
4.00 x 2.00 x 0.99″ (101.6 x 50.8 x 25.1 mm)

The EPL150 series maximises efficiency across the load range and minimises no load power consumption minimising heat dissipation, reducing running costs and enabling compliance with the latest environmental goals and legislation. Fully approved as Class I & Class II for ITE, Industrial and Medical applications the EPL150 provides up to 100 W when convection cooled and up to 150 W when force cooled at just 10 CFM. A 12 V 0.5 A fan supply is included to support force cooled applications. The small footprint, low profile, low noise and comprehensive safety agency approvals allow this versatile product to be used in a wide range of ITE and industrial applications.

## Models & Ratings

| Output Power | Output Voltage | Output Current | | Fan Output | Efficiency[2] | Model Number |
|---|---|---|---|---|---|---|
| | | Convection-cooled | Forced-cooled[1] | | | |
| 150 W | 12.0 V | 8.33 A | 12.50 A | 12 V/0.5 A | 93% | EPL150PS12 |
| 150 W | 15.0 V | 6.67 A | 10.00 A | 12 V/0.5 A | 93% | EPL150PS15 |
| 150 W | 18.0 V | 5.56 A | 8.33 A | 12 V/0.5 A | 93% | EPL150PS18 |
| 150 W | 24.0 V | 4.17 A | 6.25 A | 12 V/0.5 A | 93% | EPL150PS24 |
| 150 W | 28.0 V | 3.50 A | 5.40 A | 12 V/0.5 A | 93% | EPL150PS28 |
| 150 W | 36.0 V | 2.78 A | 4.17 A | 12 V/0.5 A | 93% | EPL150PS36 |
| 150 W | 48.0 V | 2.08 A | 3.10 A | 12 V/0.5 A | 93% | EPL150PS48 |

### Notes

*1. Requires 10 CFM.*
*2. Minimum average efficiencies measured at 25%, 50%, 75% & 100% of 150 W load and 230 VAC input.*

## Summary

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|---|---|---|---|---|---|
| Input Range | 80 | 115/230 | 264 | VAC | Derate load from 100% at 90 VAC to 90% at 85 VAC and 85% at 80 VAC |
| No Load Input Power | | | 0.5 | W | |
| Efficiency | | 95 | | % | 230 VAC (see fig.1 & 2) |
| Operating Temperature | -20 | | +70 | °C | See derating curve (fig.3) |
| EMC | Conducted: EN55011/32, Class B, Radiated: EN55011/32, Class A (Class B with external core, see EMC Emissions for details) | | | | |
| Safety Approvals | CB/EN/UL/CSA for ITE and Medical | | | | |

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## Input

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|---|---|---|---|---|---|
| Input Voltage - Operating | 80 | 115/230 | 264 | VAC | Derate output from 100% at 90 VAC to 90% at 85 VAC and 85% at 80 VAC |
| Input Frequency | 47 | 50/60 | 63 | Hz | |
| Power Factor | | >0.9 | | | 230 VAC, 100% load EN61000-3-2 class A |
| 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 | |
| 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 |
| Output Voltage Adjustment-V1 | | | | % | None |
| Minimum Load | 0 | | | A | |
| 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 100W/150W |
| 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 | | | 7 | % | Full load |
| Ripple & Noise | | | 1 | % pk-pk | 20 MHz bandwidth and 10 µF electrolytic capacitator in parallel with 0.1 µF ceramic capacitator. |
| Overvoltage Protection | 110 | | 140 | % | Vnom, recycle input to reset |
| Overload Protection | 110 | | 170 | % I nom | |
| Short Circuit Protection | | | | | Trip & Restart |
| Temperature Coefficient | | | 0.02 | %/°C | |
| Overtemperature Protection | | | | °C | Measured internally, Auto Resetting |

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## General

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|---|---|---|---|---|---|
| Efficiency | | 94 | | % | 230 VAC (see fig. 1 & 2) |
| Isolation: Input to Output | 4000 | | | VAC | 2 MOPP |
| Input to Ground | 1500 | | | VAC | 1 MOPP |
| Output to Ground | 1500 | | | VAC | 1 MOPP |
| Patient Leakage | | | 50 | µA | At 264 VAC, 50 Hz |
| Switching Frequency | 40 | | 130 | kHz | PFC |
| | 50 | | 95 | kHz | Main converter |
| Power Density | | | 18.9/12.6 | W/in³ | Forced/convection-cooled |
| Mean Time Between Failure | | 300 | | kHrs | MIL-HDBK-217F, Notice 2 +25 °C GB |
| Weight | | 0.43(195) | | lb(g) | |

### Efficiency Vs Load

Figure 1
EPL150PS24
100 W

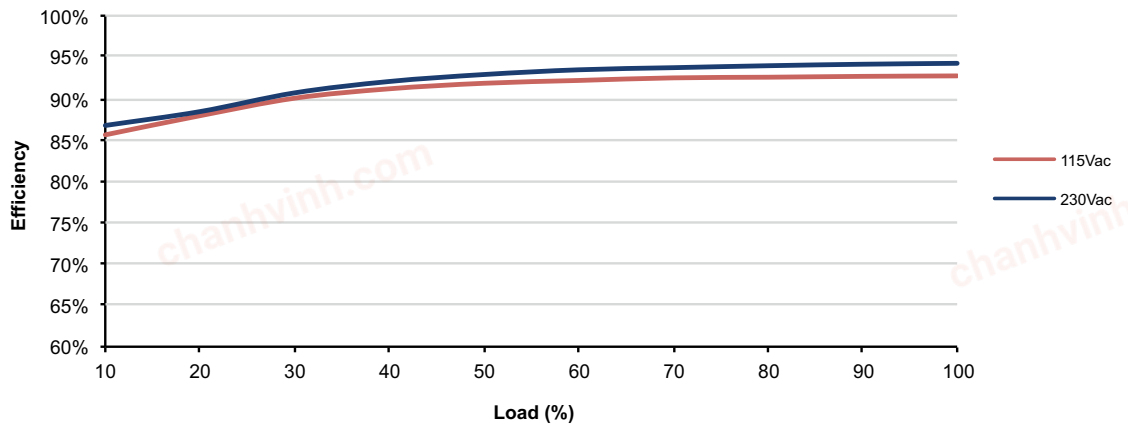
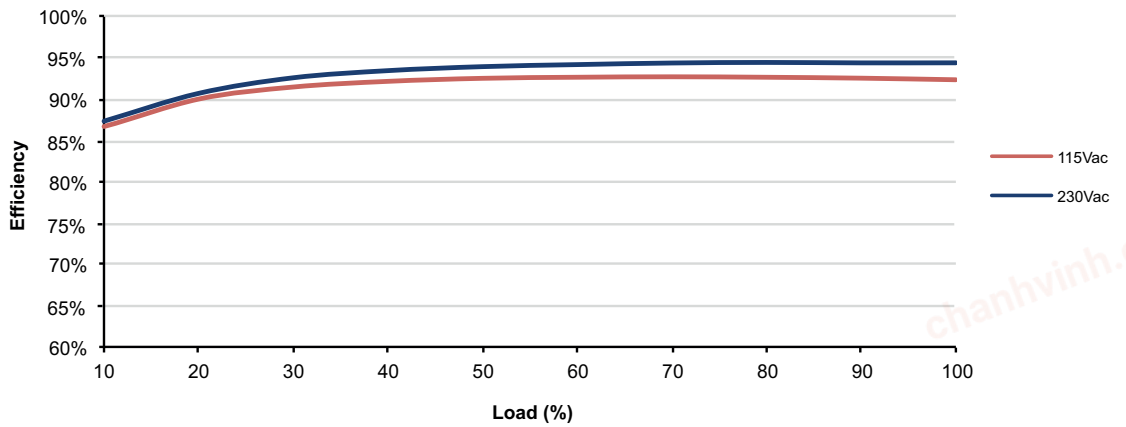



Figure 2
EPL150PS24
150 W



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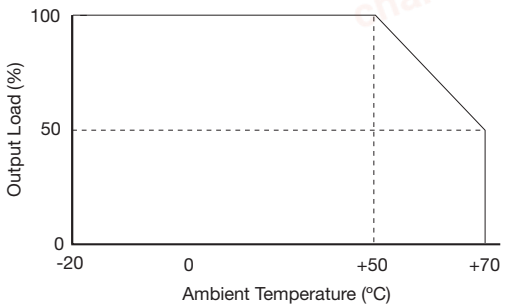


## Environmental

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|---|---|---|---|---|---|
| Operating Temperature | -20 | | +70 | °C | See derating curve, fig.3 |
| Storage Temperature | -40 | | +85 | °C | |
| Cooling | 10 | | | CFM | Forced-cooled > 150W |
| Humidity | 5 | | 95 | %RH | Non-condensing |
| Operating Altitude | | | 5000 | m | |
| 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 Curve

Figure 3




## EMC: Emissions

| Phenomenon | Standard | Test Level | Criteria | Notes & Conditions |
|---|---|---|---|---|
| Conducted | EN55011/22 | Class B | | |
| Radiated | EN55011/22 | Class A | | Class B with King Core<br>KSB RC 13 x 23 x 7 on input cable and<br>KSB + 25 x 12 x 5 on output cable. |
| Harmonic Current | EN61000-3-2 | Class A | | Meet Class C for loads above XX W |
| 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 | |
| | | Dip 60% (40 VAC), 100 ms | B | |
| | | Dip 30% (70 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 | |
| | | Dip 60% (96 VAC), 100 ms | A | |
| | | Dip 30% ( 168 VAC), 500 ms | A | |
| | | Dip 100% (0 VAC), 5000 ms | B | |

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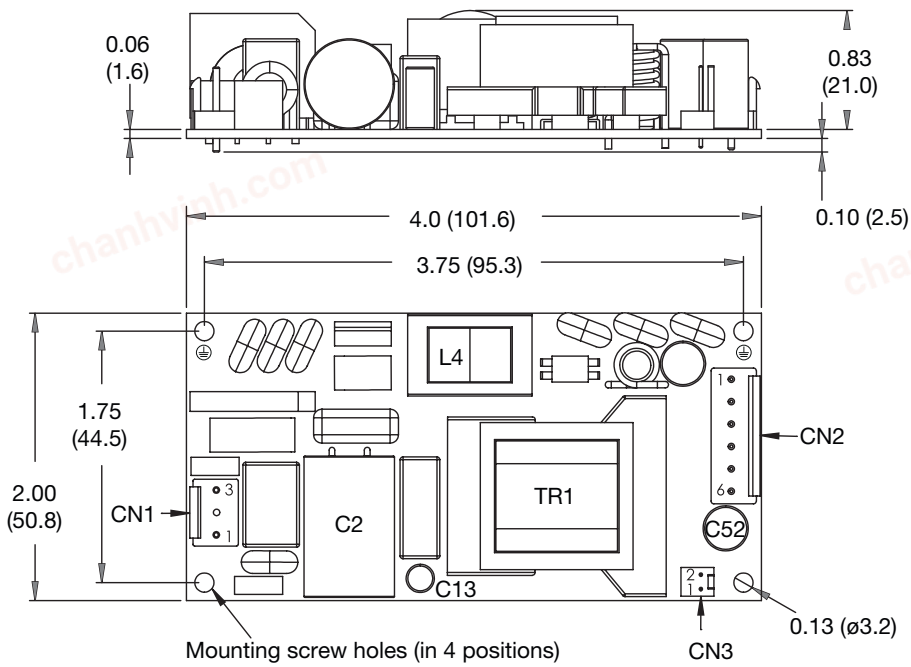


## Safety Approvals

| Safety Agency | Safety Standard | Notes & Conditions |
|---|---|---|
| CB Report | IEC60950-1-1, IEC62368-1 | Information Technology |
| UL | UL60950-1, UL62368-1 | Information Technology |
| TUV | EN62368-1 | Information Technology |
| CB Report | IEC60601-1 | Medical |
| UL | ES60601-1 | Medical |
| EN | EN60601-1 | Medical |

| Isolation | Safety Standard | Notes & Conditions |
|---|---|---|
| Primary to Secondary | 2 x MOPP (Means of Patient Protection) | |
| Primary to Earth | 1 x MOPP (Means of Patient Protection) | |
| Secondary to Earth | 1 x MOPP (Means of Patient Protection) | Suitable for use as BF applied part application |

## Mechanical Details




| CN1 | |
|---|---|
| Pin 1 | AC-L |
| Pin 2 | |
| Pin 3 | AC-N |

Mates with JST VHR-3N housing and SVH-21T-P1.1 crimps

| CN2 | |
|---|---|
| Pin 1 | +Vo |
| Pin 2 | +Vo |
| Pin 3 | +Vo |
| Pin 4 | Com |
| Pin 5 | Com |
| Pin 6 | Com |

Mates with JST VHR-6N housing and SVH-21T-P1.1 crimps

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

Mates with Molex 22-01-1022 housing and 2759 crimps

Mounting holes marked with ⏚ must be connected to safety earth in Class I application or connected together in Class II application.

### Notes

1. All dimensions shown in inches (mm).
   Tolerance: ±0.02 (0.5)
2. Weight: XXX lbs (XXX g) approx.

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## 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 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 | 120°C |
| L4 Coil | 120°C |
| C13 | 105°C |
| C52 | 105°C |
| C2 | 105°C |

## Service Life

The estimated service life of the EPL150 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 key capacitors with in the product when installed by the end application,

The graph below expresses the estimated lifetime based on the temperature of these key components based on the average temperature over the lifetime of the equipment.

### Estimated Service Life vs Component Temperature

Figure 4

