CLP0312DC Open Frame Power Supply

48V_{DC} Input; 12V_{DC} Output; 300W Output Power

In a small 2 x 4 inch footprint, the 12V_{DC} single-output CLP0312DC open frame power supply delivers high efficiency. With its small size, the CLP series is specifically designed to handle power challenges associated with tight space and low airflow. Offering a 25.86W/in^3 power density in a 1U high, fan- less form factor, the CLP series addresses a broad range of applications in new products from communications, computing and data storage original equipment manufacturers (OEMs). It delivers greater than 90 percent typical power efficiency and full load output at +65°C with 600 lfm, higher temperature operation possible at derated output. The CLP series utilizes a unique design approach at this power level, leveraging zero voltage switching techniques. Protection features include overcurrent (OCP), overvoltage (OVP), and overtemperature (OTP).

Applications

- Telecommunications Equipment
- Embedded Computing
- Storage Systems
- Industrial Equipment

Features

- Reverse input voltage protection
- Compact size 50.8 mm x 101.6 mm x 36.8 mm (2 in x 4 in x 1.45 in) with density of 25.86W/in^3
- DC Input Range (37 – 75V_{DC})
- Output voltage of 12V
- Maximum output current of 25A@ 12Vout (300W)
- Full load capability at +65°C and 600LFM of airflow with derating at higher temperatures or lower airflows
- Output overcurrent protection (non-latching)
- Overtemperature protection
- Output overvoltage protection
- Up to 0.7ms of holdup time
- Efficiency of 94.5% at 36V_{IN}
- Conducted EMI - meets CISPR32 (EN55032) Class B requirements
- Compliant to RoHS II EU “Directive 2011/65/EU” and amended Directive (EU) 2015/863.
- Compliant to REACH Directive (EC) No 1907/2006
- UL and cUL approved to UL/CSA62368-1, TUV (EN62368-1), CE Mark (for LVD) and CB Report available
- ISO** 9001 and ISO 14001 certified manufacturing facilities
- BSMI certified
- Conformal coated

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only; functional operation of the device is not implied at these or any other conditions in excess of those given in the operations sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect the device reliability.

Parameter	Device	Min	Max	Unit
Input Voltage* Continuous		–	75	V_{DC}
Operating Ambient Temperature (see Thermal Considerations section)	All	-40	85	°C
Storage Temperature	All	-40	85	°C
Humidity (non-condensing)	All	5	95	%
Altitude	All		5000	m

* Input over voltage protection will shut down the output voltage, when the input voltage exceeds threshold level

Electrical Specifications

Parameter	Device	Min	Typ.	Max	Unit
Operating Input Voltage	All	35	48	75	V_{DC}
Input Current	All		9.5		A_{DC}
Inrush Transient Current (T_{amb} = 25°C)	All			100	A Peak
Operating Output Voltage			12		V_{DC}
Output Voltage Tolerance (due to set point, temperature variations, load and line regulation)	All	-2		+2	%
Output Load Regulation	All	-2		+2	%
Output Line Regulation	All	-0.5		+0.5	%
Output Ripple and Noise – measured with 0.1µF ceramic capacitor in parallel with 10µF tantalum capacitor, at -40°C to 85°C Peak-to-peak (20MHz Bandwidth)	All			180	mV_{p-p}
Dynamic Load Response – 50% to 100% load transient, 1A/µs slew rate Output voltage deviation Settling Time	 All All			 5 500	 % µs
Output Current	All	0		25	A_{DC}
Output Current Limit	All	110		140	%
Maximum Output Capacitance	All			5000	µF
Efficiency: V_{IN} = 48V_{DC}, 20% load 50% load 100% load (at 25°C)	All	— — —	92.24 94.78 94.30	— — —	% % %
Holdup Time – 100% load[1] (Vout≥ 10.8V_{DC}, Tamb = 25°C, 300W, V_{IN} = 48V_{DC})	All	0.7			ms

[1] Holdup time is reduced at cold temperatures

Isolation Specifications

Parameter	Device	Min	Max	Unit
Isolation Voltage – Input to output			1500	V_{DC}
– Input to ground			1500	V_{DC}
– output to ground			100	V_{DC}

General Specifications

Parameter	Device	Symbol	Typ.	Unit
Calculated Reliability based on Telcordia SR-332 Issue 2: Method 1 Case 3 (V_{IN}=48V_{DC}, 80% full load, T_A = 40°C, airflow 600LFM, 90% confidence)	All	MTBF	988276	Hours
Weight	All		195 6.88	g oz.

Feature Specifications

Parameter	Device	Min	Typ.	Max	Unit
Delay from Input being applied to output being in regulation	All			2	s
Output Overvoltage Protection	All	13.8		16	V_{DC}
Input Undervoltage Protection	All	32		35	V_{DC}
Input Overvoltage Protection	All	77	78	79	V_{DC}

Environmental Specifications

Parameter	Device	Specification
Conducted Emissions	All	CISPR32 (EN55032) Class B with 6dB margin
Radiated Emissions*	All	CISPR32 (EN55032) Class B with 3db margin
Input Harmonics	All	EN61000-3-2
ESD	All	IEC 61000-4-2, Level 3, Contact ±8kV & Air Discharge ±15kV Criteria A
Radiated Immunity*	All	IEC 61000-4-3, Level 2, 10V/m
Electrical Fast Transient Common Mode	All	IEC 61000-4-4, Level 3, ±2kV Criteria A
Surge Immunity	All	IEC 61000-4-5; ±1kV common mode and ±500V differential mode, unit passes criteria A
Conducted RF Immunity	All	IEC 61000-4-6, Level 3, 10Vrms
Voltage Dips, Interruptions	All	53Vin, 80% load, dip 100% duration 1ms, Vo within 90% EN61000-4-29
Shock and Vibration	All	IPC 9592B, Class II

* Radiated Emissions/Immunity is met when the power supply is tested in a suitable enclosure.

Safety Specifications

Parameter	Device	Specification
Dielectric Withstand Voltage (between input and output)	All	Minimum of 1500V_{DC} for 1 minute
Insulation Resistance (between input and output)	All	Minimum of 5 MW
Safety Standards	All	Class 1, UL/CSA62368-1, TUV (EN62368-1), CE Mark (for LVD) and BSMI

Characteristic Curves

The following figures provide typical characteristics for the power supply.

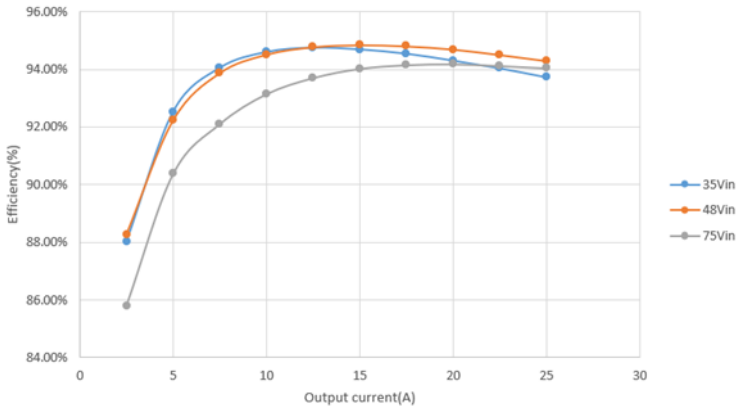


Figure 1. Power Supply Efficiency versus Output Current

Power Derating for Forced Air Flow Application – CLP0312DC

The following charts show derating under longitudinal airflow for various input voltages.

(Air flow Direction: **Long Side, Refer to Fig.2. Preferred Airflow Direction for Cooling**.)

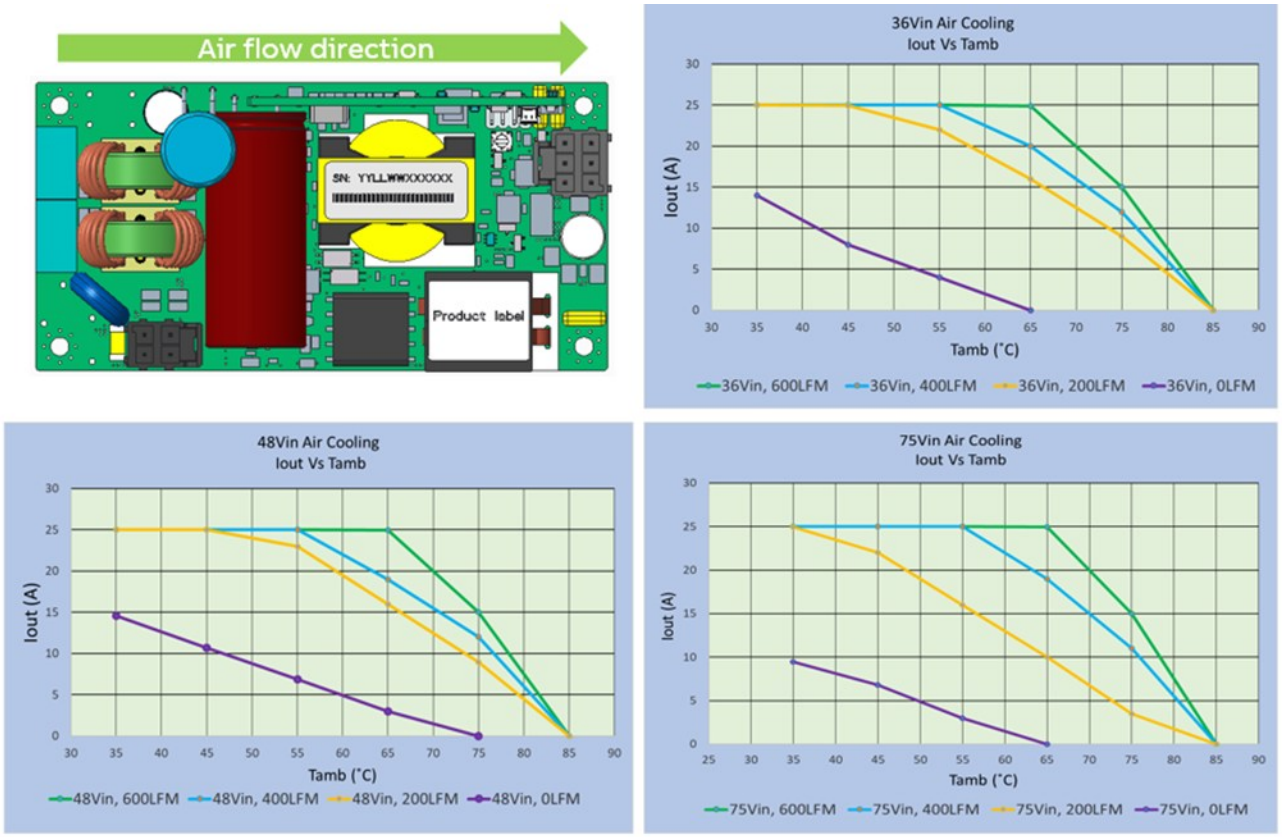


Figure 2. Power Derating under longitudinal airflow for various input voltages

Safety Considerations

The power supply is intended for inclusion in other equipment and the installer must ensure that it follows all the requirements of the end application. This product is only for inclusion by professional installers within other equipment and must not be operated as a stand-alone product

Overcurrent Protection

To provide protection in a fault condition (output overload), the power supply is equipped with internal current-limiting circuitry and can endure current limiting continuously. At the point of current-limit inception, the unit enters hiccup mode. The power supply operates normally once the output current is brought back into its specified range.

Overvoltage Protection

Overvoltage protection is a feature of the power supply that protects both the load and the power supply from an output overvoltage condition. When an overvoltage occurs, the power supply shuts down and goes into auto-restart model.

Reverse Input Voltage Protection

Reverse Input Voltage Protection is a feature of the power supply that protects the power supply from damage if a reverse voltage is applied to the input.

Overtemperature Protection

The power supply also features overtemperature protection in order to provide additional protection in a fault condition.

The PSU will automatically restart upon cool-down to a safe temperature.

Input Undervoltage Lockout

At input voltages below the input undervoltage lockout limit, power supply operation is disabled. The power supply will begin to operate at an input voltage above the undervoltage lockout turn-on threshold. Note that the undervoltage lockout limits are load dependent and the power supply turns ON and can operate at much lower input voltage levels when at light or no load.

Thermal Considerations

The power supply can be operated in a variety of thermal environments; however enough cooling should be provided to ensure reliable operation.

Considerations include ambient temperature, airflow, power supply dissipation and the need for increased reliability. A reduction in the operating temperature of the power supply will result in increased reliability. The thermal data presented here is based on measurements taken in a wind tunnel.

Heat Transfer via Convection

Increased airflow through the power supply enhances the heat transfer via convection. Figure 3 shows the preferred airflow direction. Contact your OmniOn Power™ representative for derating information in other airflow directions.

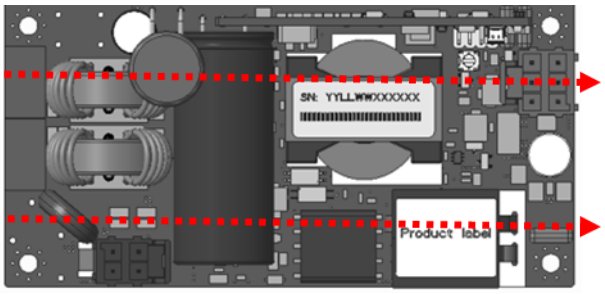


Figure 3. Preferred airflow direction for cooling

Assembling

- Please use metal screw to mount the unit and make sure 4 mounting holes connected to Earth well.
- In Applications where the power supply is enclosed, special attention to clearances between the supply and the enclosure should be a min. 3.5mm on all sides for improved safety. For additional protection, a layer of Kapton tape, 3 mil in thickness covering the whole surface under the supply is recommend. If a cover is used a 3 mil Kapton Tape covering the whole cover is also recommended. Please contact your local OmniOn Power™ FAE if further information is need.

CLP0312DC Mechanical Specifications

Dimensions are in millimeters.

Tolerances: x.x mm ± 0.5mm [unless otherwise indicated]

x.xx mm ± 0.25mm

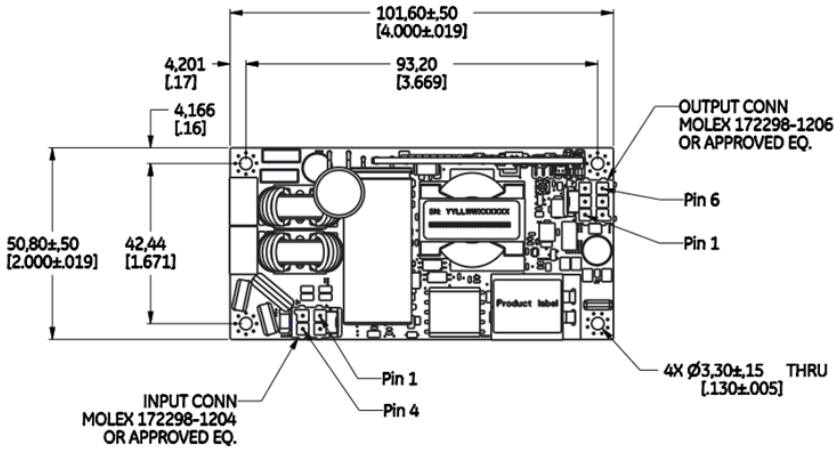


Figure 4. TOP VIEW

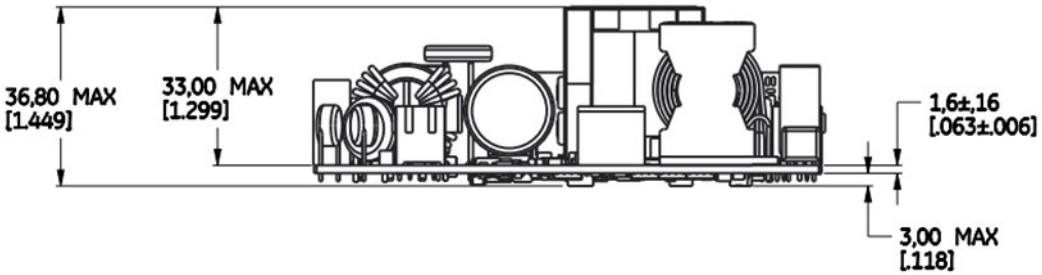


Figure 5. Front VIEW

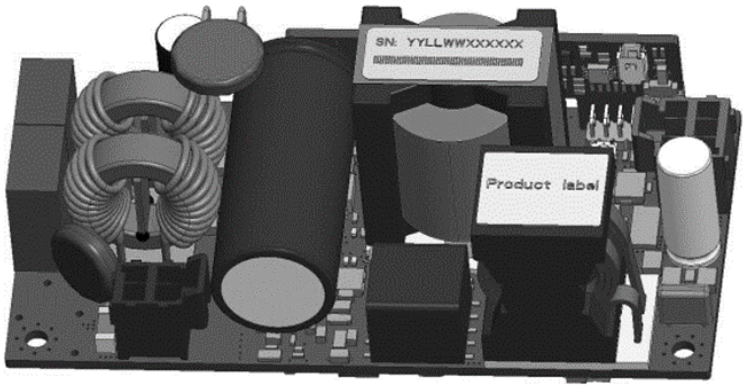


Figure 6. 3D VIEW

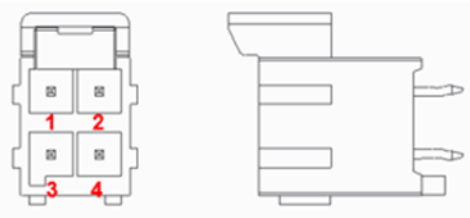
Connector Information

Connector	Connector on Power Supply	Mating Connector
DC Input Connector	Molex 172298-1204	Molex 172258-3104
DC Output Connector	Molex 172298-1206	Molex 172258-3106

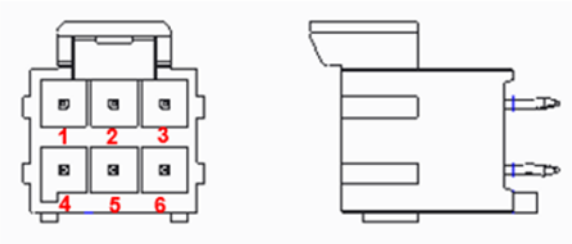
Pinout Information

DC Input Connector (HDR200)		DC Output Connector (HDR300)		
PIN 1 → V_{IN} +	PIN 2 → V_{IN} +	PIN 1 → V_{OUT} -	PIN 2 → V_{OUT} -	PIN 3 → V_{OUT} -
PIN 3 → V_{IN} -	PIN 4 → V_{IN} -	PIN 4 → V_{OUT} +	PIN 5 → V_{OUT} +	PIN 6 → V_{OUT} +

CLP0312DC DC Input Connector Pin Definition



CLP0312DC DC Output Connector Pin Definition



CLP0312DC Ordering Information

Please contact your OmniOn Power™ Sales Representative for pricing, availability, and optional features.

Device Code	Input Voltage Range	Output Voltage	Output Current	On/Off Control	Standby Supply	Temperature Range	Ordering code
CLP0312DCXXXZ01A	35 – 75V_{DC}	12.0V_{DC}	25A	NA	NA	-40 to 85°C	CLP0312DCXXXZ01A

Contact Us

For more information, call us at

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+1-972-244-9288 (Int'l)

Change History (excludes grammar & clarifications)

Revision	Date	Description of the change
1.0	08/24/2023	Initial release
1.1	04/23/2025	Updated as per OmniOn Power™

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