

**LOW PROFILE 2X3", FORCED AIR CONDUCTION CONVECTION COOLING, 200 W AC-DC POWER SUPPLY**

# LPD200 Series



## Certifications



## Applications



## FEATURES

- » 85 – 264 V<sub>AC</sub> universal input voltage range
- » 200 W rated power
- » 1.00" (25.4 mm) low profile package (28.4 W/in<sup>3</sup>)
- » High efficiency (up to 94%)
- » No-load low power consumption: <0.3 W for 12, 24, V<sub>DC</sub>; <0.4W for 48 V<sub>DC</sub> standard output variants.
- » Low earth leakage current: <300 μA
- » Over temperature protection, auto recovery
- » Output over voltage protection, latch off
- » Overload and short circuit protections, auto recovering
- » Metallic protecting cage on semi-potted PWA
- » IEC safety installation Class I
- » Certified to the latest IEC/EN/UL 62368-1 edition
- » Compliant to EN 55032 and certified to CISPR-FCC Class B
- » Meet IEC/EN 60335-1 requirements for household appliances
- » Operating Altitude up to 5000 m (OVC II), up to 2000 m (OVC III)
- » RoHS-3 compliant (EU directive 2015/863)
- » 5 years warranty

## MARKET SEGMENTS AND APPLICATIONS

- » Integrated Wireless Backhaul Mobile LTE-A, 5G
- » Desktop 3D Scanners / Printers
- » LED Signage / Lighting Systems
- » Voice and Data Center Solution
- » Fiber Optics Telecommunication Systems
- » Video/Imaging Systems

## PRODUCT DESCRIPTION

The LPD200 is a series of Audio/Video IT/Industrial grade power supplies designed to offer the high-power density and high efficiency that space constrained and power demanding systems need. Available in 12, 24, and 48 V<sub>DC</sub> outputs, this series of high-performance AC-DC power supplies provides up to 200 W steady output power with moving air, or from 190 W upwards with convection cooling over the 110 – 240 V<sub>AC</sub> nominal input voltage range, all in a compact 2.28 x 3.09 x 1.00" form factor package. The semi-potted base-plate package allows thermal management through conduction cooling particularly needed in those installations where the heat can be dispelled solely through solid thermal path. The series also includes 15, 28, 30, 36 and 54V versions whose availability will be assessed upon demand. With 94% typical efficiency and extremely low (< 0.3 / 0.4 W) power consumption at no-load, the LPD200 facilitates thermal management and equipment design, including compatibility with the latest environmental legislations. The LPD200 series meets the latest IEC/EN/UL 62368-1 safety standards, including the EMC standard EN55032 and CISPR/FCC Class B specifications for conducted noise emissions, and EN55035 / EN 61000-6-2 / EN 61204-3 for EMC immunity, making the series suitable for use in a wide range of Audio/Video, IT / Industrial applications worldwide. The series comes configured in the IEC protective Class I.

## Model Coding and Output Ratings

Model Number	Output Voltage $V_{OUT}$ [V]	Voltage Accuracy (1) [%]	$I_{OUT}$ Current Forced Air (2) [A]	$I_{OUT}$ Current Convection [A]	$I_{OUT}$ Current Conduction (3) [A]	$V_{OUT}$ Ripple (4) [mV]	Typical Efficiency (5) [%]
LPD200-12-SP	12	±1	17.12	9.12	14.12	150	92
LPD200-15-SP	15	±1	13.12	7.12	11.12	150	92
LPD200-24-SP	24	±1	8.12	4.12	7.12	200	94
LPD200-28-SP	28	±1	7.12	4.12	6.12	200	93
LPD200-30-SP	30	±1	7.12	4.12	6.12	200	93
LPD200-36-SP	36	±1	5.12	3.12	5.12	200	94
LPD200-48-SP	48	±1	4.12	2.12	3.12	200	94
LPD200-54-SP	54	±1	4.12	2.12	3.12	200	93

### Notes:

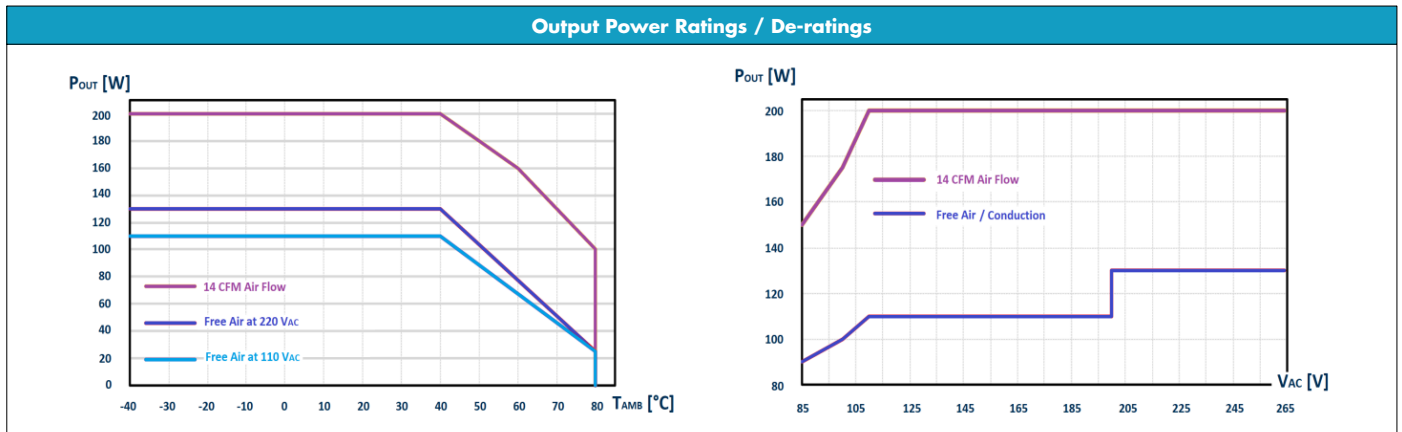
1. At full load
2. 14 CFM forced air cooling at  $>110 V_{AC}$
3. Thermal contact with 177.8 x 177.8 x 2.0 mm (7.00 x 7.00 x 0.08 in) metallic plate
4. 0.1  $\mu$ F ceramic capacitor and 10  $\mu$ F electrolytic capacitor in parallel at load, 20 MHz BW
5. Typical values at 230  $V_{AC}$ , full load, 25 °C ambient temperature

## Input Specifications

Specification	Test Conditions / Notes	Min.	Nominal	Max.	Units
AC Input Voltage		85	100-240	264	$V_{AC}$
Input Frequency		47	50/60	63	Hz
Input Current	RMS at 100 $V_{AC}$ , maximum load	-	-	3.12	A
Inrush Current (peak)	240 $V_{AC}$ , 25 °C ambient, cold start	-	-	85	A
Fusing	Time Lag, 3.15 A, 250 V on both L and N	-	5	-	A
Efficiency	At 230 $V_{AC}$ , 100 % rated load, 25 °C $T_{AMB}$ 12, 15 $V_{DC}$ 24, 36, 48 $V_{DC}$ 28, 30, 54 $V_{DC}$	-	92 94 93	-	%
No-load Power Consumption	At 115-230 $V_{RMS}$ , no load, 12, 15, 24, 28, 30, 36 V 48, 54 V variants	-	-	0.3 0.4	W
Power Factor	At full rated load, 230 $V_{AC}$ , 50 Hz input voltage	1.12	1.12	-	-
Harmonic Current Fluctuations and Flicker	Complies with EN-61000-3-2, Classes A, D Complies with EN-61000-3-3 at nominal voltages and full load				
Earth Leakage Current	Normal conditions, 264 $V_{AC}$ , 60 Hz	-	-	300	$\mu$ A
Touch Leakage Current	Normal conditions, 264 $V_{AC}$ , 60 Hz	-	-	100	$\mu$ A

# Output Specifications

Specification	Test Conditions / Notes	Min.	Nom.	Max.	Units
Output Voltage	±1 % set point accuracy for all voltage variants.	-	12	-	V
	At 100 % load, 25 °C T <sub>AMB</sub> , 100-240 V <sub>AC</sub>	-	15	-	
		-	24	-	
		-	28	-	
		-	30	-	
		-	36	-	
		-	48	-	
Output Voltage Adjustment	P <sub>OUT</sub> ≤ P <sub>RATED</sub> , Through potentiometer	5	-	5	%
Rated Currents	<b>≥ 110 V<sub>AC</sub>, 14 CFM air flow</b>	-	-	16.67	A
	12 V <sub>DC</sub>	-	-	13.33	
	15 V <sub>DC</sub>	-	-	8.33	
	24 V <sub>DC</sub>	-	-	7.14	
	28 V <sub>DC</sub>	-	-	6.66	
	30 V <sub>DC</sub>	-	-	5.55	
	36 V <sub>DC</sub>	-	-	4.16	
	48 V <sub>DC</sub>	-	-	3.70	
	54 V <sub>DC</sub>	-	-	-	
	See output power de-rating curves below	-	-	-	
<b>≥ 110 V<sub>AC</sub>, free air</b>	-	-	9.17	A	
12 V <sub>DC</sub>	-	-	7.33		
15 V <sub>DC</sub>	-	-	4.58		
24 V <sub>DC</sub>	-	-	3.93		
28 V <sub>DC</sub>	-	-	3.67		
30 V <sub>DC</sub>	-	-	3.06		
36 V <sub>DC</sub>	-	-	2.29		
48 V <sub>DC</sub>	-	-	2.04		
54 V <sub>DC</sub>	-	-	-		
See output power de-rating curves below	-	-	-		
<b>≥ 110 V<sub>AC</sub>, Conduction (18 x 18 x 2 mm plate)</b>	-	-	14.17	A	
12 V <sub>DC</sub>	-	-	11.33		
15 V <sub>DC</sub>	-	-	7.08		
24 V <sub>DC</sub>	-	-	6.07		
28 V <sub>DC</sub>	-	-	5.67		
30 V <sub>DC</sub>	-	-	4.72		
36 V <sub>DC</sub>	-	-	3.54		
48 V <sub>DC</sub>	-	-	3.15		
54 V <sub>DC</sub>	-	-	-		
See output power de-rating curves below	-	-	-		
Load Regulation	90 – 264 V <sub>AC</sub> 10 – 100 % rated load	-	-	±0.5	%V <sub>OUT</sub>
Line Regulation	Full load V <sub>AC</sub> : 90 – 264 V <sub>RMS</sub>	-	-	±0.2	%V <sub>OUT</sub>
Transient Response	25% load changes at 1 A/μs 12 V <sub>DC</sub> at 2200 μF Load / I <sub>OUT</sub> > 0.5 A 24 V <sub>DC</sub> at 1000 μF Load / I <sub>OUT</sub> > 0.5 A 48 V <sub>DC</sub> at 560 μF Load / I <sub>OUT</sub> > 0.5 A	-	-	±5	%V <sub>OUT</sub>
Ripple and Noise	12, 15 V <sub>DC</sub> 24, 28, 30, 36, 48, 54 V <sub>DC</sub> Peak-to-peak, 20 MHz BW. 100 nF ceramic and 10 μF electrolytic caps at the load	-	-	150 200	mV
Turn-on Overshoot		-	-	TBV	%V <sub>OUT</sub>
Hold-up Time	At 115 V <sub>IN</sub> , full load, for all models	10	12	-	ms
Minimum Load	All models	0	-	-	A
Maximum Load Capacitance	At nominal V <sub>IN</sub> , 25 °C ambient, max load	-	-	6800	μF
	12 V <sub>DC</sub>	-	-	5360	
	15 V <sub>DC</sub>	-	-	3440	
	24 V <sub>DC</sub>	-	-	3440	
	28 V <sub>DC</sub>	-	-	3220	
	30 V <sub>DC</sub>	-	-	2680	
	36 V <sub>DC</sub>	-	-	2000	
	48 V <sub>DC</sub>	-	-	1560	
54 V <sub>DC</sub>	-	-	-		
Temperature Drift		-1.55.00	-	+0.05	%V/°C
Output Power Ratings / De-ratings					



## Protection Features

Specification	Test Conditions / Notes	Min.	Nominal	Max.	Units
Input Fuse	Time Lag, 3.15 A, 250 V on L1 and L2	-	5	-	A
Over Current	At nominal input voltages Hiccup mode, auto-recovering	125	145	165	%I <sub>MAX</sub>
Short Circuit	At nominal input voltages Hiccup mode, auto-recovering	-	-	-	
Over Voltage	12 V <sub>DC</sub> 15 V <sub>DC</sub> 24 V <sub>DC</sub> 28 V <sub>DC</sub> 30 V <sub>DC</sub> 36 V <sub>DC</sub> 48 V <sub>DC</sub> 54 V <sub>DC</sub> Unit shut down and latch off (AC recycle)	-	16 20 32 35 35 45 55 63	-	V
Over Temperature	Hiccup mode, auto-recovering	-	-	-	
Isolation Primary-to- Secondary	Reinforced	4250	-	-	V <sub>AC</sub>
Isolation Input-to-PE	Basic	2000	-	-	V <sub>AC</sub>
Isolation Output-to-PE	Basic	2000	-	-	V <sub>AC</sub>

## Environmental Specifications

Specification	Test Conditions / Notes	Min	Nominal	Max	Units
Operating Temperature Range	Ambient temperature Case Temperature (TC centre of base plate)	-40 -40	- -	80 90	°C
Storage Temperature Range		-40	-	85	°C
Humidity	RH, Non-condensing Operating Non-operating	-	-	93 95	%
Operating Altitude	OVC II OVC III	-	-	5000 3000	m
Shock	Meet MIL-STD-810F Table 516.5, Table 516.5-I 10 ms, each axis (±X, ±Y, ±Z), 3 times				
Vibration	Meet MIL-STD-810F Table 514.5C-VIII, 15±2000 Hz, X-Y-Z axis, 1 hour each, total 3 hour				
MTBF	Full Load, 115 V <sub>AC</sub> , 25 °C ambient GB, MIL-HDBK-217F	450	-	-	K hours
Useful Life	Within nominal input voltage range, 75% rated load, 40 °C ambient, 100% duty	26	-	-	K hours
Thermal Considerations	The output power derating curves relevant to forced and free air cooling are herein provided. These curves can be used as a guideline to assess the limit in performance of a power supply once installed in a system providing controlled air flow at a certain input voltage and ambient temperature. Conduction cooling installation thermal performance should be verified and assessed physically in any specific case.				

## Electromagnetic Compatibility (EMC) – Emissions

Phenomenon	Conditions / Notes	Standard	Equipment Performance Class
Conducted	115 VRMS, 230 V <sub>RMS</sub> . Maximum load.	EN 55032 (ITE) 47 CFR FCC Part 15 EN 55011 (IMS)	B
Radiated		EN 55032 (ITE) 47 CFR FCC Part 15 EN 55011 (IMS)	B
Line Voltage Fluctuation and Flicker	At 2 0%, 50 % and 100 % maximum load. Nominal input voltages.	EN 61000-3-3	A
Harmonic Current Emission	At nominal input voltages	EN 61000-3-2	A, C, D

## Electromagnetic Compatibility (EMC) – Immunity

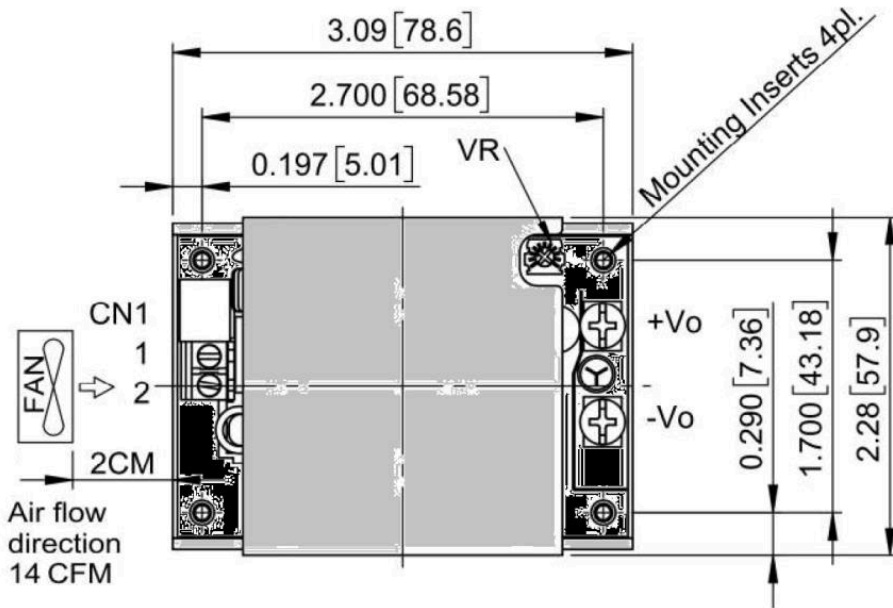
Phenomenon	Conditions / Notes	Standard	Test Level	Performance criteria
<b>Reference standard for IT equipment: EN 55035, EN 61000-6-2, EN 61204-3</b>				
ESD	8 kV air discharge, 4 kV contact, at any point of the system.	EN 61000-4-2	3	A
Radiated Field	10 V/m, 80-1000 MHz, 1 KHz 80% AM	EN 61000-4-3	3	A
Electric Fast Transient	±2 kV on AC power port for 1 minute; ±1 kV on signal/control lines	EN 61000-4-4	3	A
Surge	± 2 kV line to line; ± 4 kV line to earth; on AC power port	EN 61000-4-5	3	A A
Conducted RF Immunity	10 V <sub>RMS</sub> , 0,15-80 MHz, 1 KHz, 80 % AM	EN 61000-4-6	3	A
Dips and Interruptions	<b>100 – 240 V<sub>AC</sub></b> 30% Dip, 10 ms 60% Dip, 100 ms >95% Dip, 5000 5s Interruptions > 95 % for 5 s	EN61000-4-11 EN61000-4-11 EN61000-4-11 EN61000-4-11		A A A B

## Safety Agencies Approvals

Certification Body	Safety Standards and file numbers	Category
CSA/UL	UL 63268-1	Audio Video and Information Technology Equipment
IEC IECEE CB Certification	IEC/EN 62368-1	Audio Video and Information Technology Equipment
CE	Directive 2014/35/EU: Electrical Safety: Low Voltage electrical equipment (LVD)	Audio Video and Information Technology Equipment
	Directive 2014/30/EU: Electromagnetic Compatibility (EMC)	
	Directive EU 2015/863 (RoHS 3)	

## Outline Drawing and Connections

**OVERALL DIMENSIONS:** 57.9 x 78.6 x 25.4 mm (2.28 x 3.09 x 1.00 in)  
**WEIGHT:** 195 g (0.43 lb)



Dimensions: in [mm]

Tolerance in: x.xx=±0.03, x.xxx=±0.020

mm: x.x=±0.7, x.xx=±0.50

AC Input Connector(CN1):ECE ETB22

Pin	Function	Mating Wire Range
1	ACL	14~18 AWG
2	ACN	

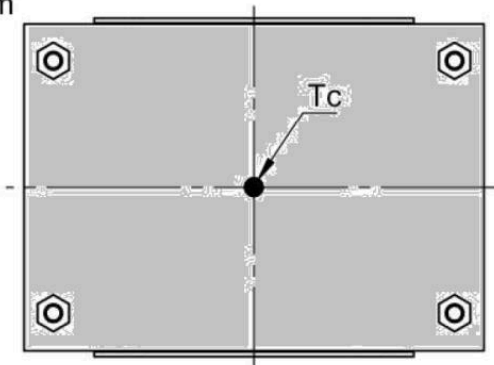
DC Output Connector:KANG YANG PCB-58M4

Function	The screw locked torque
+Vo	M4 7kgf-cm
-Vo	

Mounting Inserts

Option
∅3.2 Through depth 10.5mm
M3x0.5 Threaded depth 10.5mm

FG  
M3.5x0.6  
depth 2mm  
7kgf-cm



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