

EFFICIENCY AND NOISE LEVEL CERTIFICATIONS

Deepcool PN850M

Lab ID#: DC85002313 Receipt Date: Dec 12, 2023 Test Date: Dec 22, 2023

DUT INFORMATION

Brand	Deepcool
Manufacturer (OEM)	CWT
Series	PN-M
Model Number	PN850M-FC
Serial Number	
DUT Notes	

Report: 23PS2313A

Report Date: Jan 3, 2024

DUT SPECIFICATIONS			
Rated Voltage (Vrms)	100-240		
Rated Current (Arms)	10-5		
Rated Frequency (Hz)	50-60		
Rated Power (W)	850		
Туре	ATX12V		
Cooling	120mm Rifle Bearing Fan (DF1202512SEHN)		
Semi-Passive Operation	×		
Cable Design	Fully Modular		

TEST EQUIPMENT

Electronic Loads	Chroma 63601-5 x2 Chroma 63600-2 63640-80-80 x10 63610-80-20
AC Sources	Chroma 6530, APM SP300VAC4000W-P
Power Analyzers	RS HMC8015, N4L PPA1530, N4L PPA5530
Oscilloscopes	Picoscope 4444, Rigol DS7014, Siglent SDS2104X PLUS
Sound Analyzer	Bruel & Kjaer 2270 G4
Microphone	Bruel & Kjaer Type 4955-A
Temperature Logger	Picoscope TC-08
Tachometer	UNI-T UT372
Multimeters	Keysight 34465A, Keithley 2015 - THD
UPS	FSP Champ Tower 3kVA, CyberPower OLS3000E 3kVA
Isolation Transformer	4KVA

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Deepcool PN850M

RESULTS	
Temperature Range (°C /°F)	30-32 / 86-89.6
ErP Lot 3/6 Ready	1
(EU) No 617/2013 Compliance	1
ALPM (Alternative Low Power Mode) compatible	1
ATX v3.1 PSU Power Excursion	1

115V		230V		
Average Efficiency	88.943%	Average Efficiency	91.024%	
Efficiency With 10W (≤500W) or 2% (>500W)	69.192	Average Efficiency 5VSB	78.224%	
Average Efficiency 5VSB	78.500%	Standby Power Consumption (W)	0.1168000	
Standby Power Consumption (W)	0.0553000	Average PF	0.933	
Average PF	0.978	Avg Noise Output	34.09 dB(A)	
Avg Noise Output	35.19 dB(A)	Efficiency Rating (ETA)	GOLD	
Efficiency Rating (ETA)	GOLD	Noise Rating (LAMBDA)	Standard++	
Noise Rating (LAMBDA)	Standard+			

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
May Dawar	Amps	20	20	70.5	3	0.3
Max. Power	Watts	110		846	15	3.6
Total Max. Power (W)		850				

HOLD-UP TIME & POWER OK SIGNAL (230V)

Hold-Up Time (ms)	20.3
AC Loss to PWR_OK Hold Up Time (ms)	19.1
PWR_OK Inactive to DC Loss Delay (ms)	1.2

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CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (550mm)	1	1	18AWG	No
4+4 pin EPS12V (700mm)	2	2	18AWG	No
6+2 pin PCIe (550mm)	3	3	18AWG	No
12+4 pin PCle (600mm) (450W)	1	1	16-24AWG	No
SATA (480mm+120mm+120mm+120mm) / 4-pin Molex (+120mm)	2	8/2	18AWG	No

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Deepcool PN850M

General Data	-
Manufacturer (OEM)	CWT
Platform Model	GPX
PCB Type	Double-Sided
Primary Side	-
Transient Filter	2x Y caps, 1x X caps, 2x CM chokes, 1x MOV , 1x CAP200DG (Discharge IC)
Inrush Protection	NTC Thermistor SCK056 (5 Ohm @ 25°C) & Relay
Bridge Rectifier(s)	1x Yangjie Electronic GBU1506 (600V, 15A @ 100°C)
APFC MOSFETs	2x Great Power GP28S50 (500V, 28A, Rds(on): 0.125Ohm) & 1x SPN5003 FET (for reduced no-load consumption)
APFC Boost Diode	1x CRXI06D065G2
Bulk Cap(s)	1x Nippon Chemi-Con (400V, 680uF, 2000h @ 105°C, KMW)
Main Switchers	4x Silan MicroelectronicsSVF20N50F (500V, 12.6A @ 100°C, Rds(on): 0.27Ohm)
APFC Controller	Champion 6500UNX
Resonant Controller	Champion CM6901X
Topology	Primary side: APFC, Full-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	-
+12V MOSFETs	6x IPS 014N04SA
5V & 3.3V	DC-DC Converters: 4x UBIQ QM3054M6 (30V, 97A @ 25°C, Rds(on): 4.8mOhm) PWM Controller(s): ANPEC APW7159C
Filtering Capacitors	Electrolytic: 15x Chengx (2,000 @ 105°C, GR) Polymer: 27x FCAP
Supervisor IC	IN15429I - DCG
Fan Model	MARTECH DF1202512SEHN (120mm, 12V, 0.42A, Rifle Bearing Fan)
5VSB Circuit	
Rectifier	-
Standby PWM Controller	Power Integrations TNY287PG

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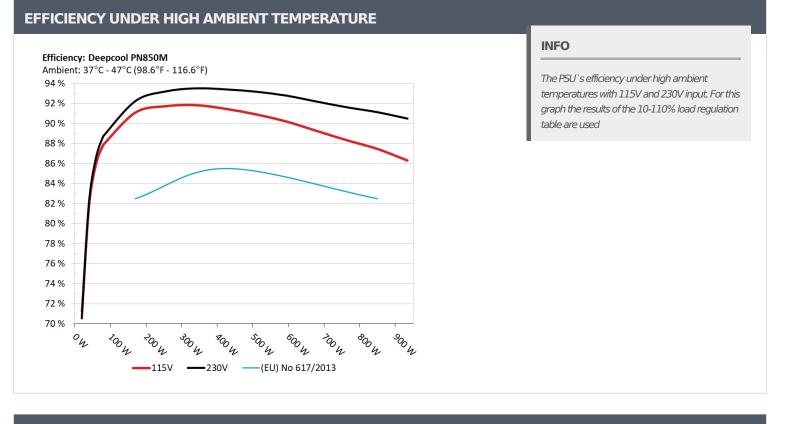
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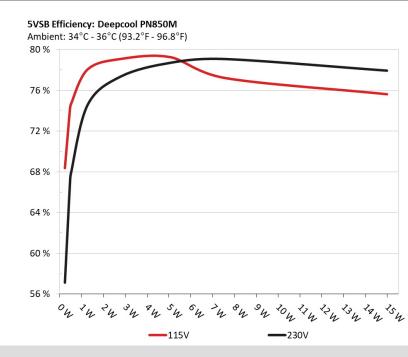


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5VSB EFFICIENCY



INFO

This graph depicts the efficiency levels of the 5VSB rail with 115V and 230V input

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5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)				
Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.229W	- CO 0000/	0.032
1	5.091V	0.333W	68.883%	114.86V
2	0.09A	0.458W	74 (110/	0.058
2	5.09V	0.614W	74.611%	114.85V
	0.55A	2.792W	79.596%	0.261
3	5.076V	3.508W		114.85V
	1A	5.061W	79.775%	0.361
4	5.061V	6.345W		114.85V
-	1.5A	7.565W		0.409
5	5.043V	9.733W	77.723%	114.85V
6	ЗА	14.985W	761000	0.48
	4.995V	19.683W	76.133%	114.85V

5VSB EFFICIENCY -230V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
-	0.045A	0.229W	57 (10)	0.011
1	5.093V	0.398W	57.613%	229.87V
2	0.09A	0.458W	67 7740/	0.019
2	5.091V	0.682W	67.274%	229.86V
3	0.55A 2.791W		0.097	
5	5.075V	3.585W	77.847%	229.86V
	1A	5.061W	79.191%	0.163
4	5.061V	6.391W		229.87V
F	1.5A	7.567W		0.204
5	5.044V	9.511W	79.558%	229.87V
6	3A	14.983W	70 400/	0.317
	4.994V	19.107W	78.42%	229.86V

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EFFICIENCY AND NOISE LEVEL CERTIFICATIONS

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115V

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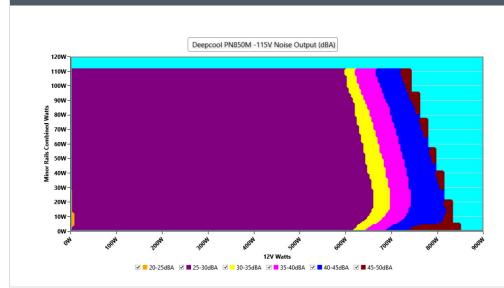
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EFFICIENCY GRAPH 115V Deepcool PN850M -115V Overall Efficiency 120W 110W 100W 90W Combined Watts 80W 70W 60W slig 50W linor 40W 30W 20W 10W ow 20014 and here .00M Noo. NOD. and the second 12V Watts ☑ 90-92% ☑ 85-90% ☑ 80-85% ☑ 75-80% ☑ 70-75% ☑ 60-70% ☑ <60%

INFO

This graph depicts the PSU's efficiency throughout its entire operational range. For the generation of the efficiency and noise graphs we set our loaders to auto mode through our custom-made software before trying thousands of possible load combinations

NOISE GRAPH 115V



INFO

The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

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VAMPIRE POWER -115V

Detailed Results										
	Average	Min	Limit Min	Мах	Limit Max	Result				
Mains Voltage RMS:	114.87 V	114.78 V	113.85 V	114.97 V	116.15 V	PASS				
Mains Frequency:	60.00 Hz	59.97 Hz	59.40 Hz	60.03 Hz	60.60 Hz	PASS				
Mains Voltage CF:	1.422	1.419	1.340	1.424	1.490	PASS				
Mains Voltage THD:	0.15 %	0.11 %	N/A	0.29 %	2.00 %	PASS				
Real Power:	0.055 W	0.039 W	N/A	0.074 W	N/A	N/A				
Apparent Power:	11.362 W	11.328 W	N/A	11.402 W	N/A	N/A				
Power Factor:	0.005	N/A	N/A	N/A	N/A	N/A				

INFO

This graph is generated by the PPA Standby Power Analysis software which takes full control of the power analyzer during the whole procedure. This application features all of the EN50564 & IEC62301 test limits for standby power software testing

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10-1	10% LOA	D TESTS	115V							
Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
100/	5.279A	1.986A	1.968A	0.991A	85.001	07 2710/	1105	26.7	40.08°C	0.96
10%	12.011V	5.035V	3.353V	5.048V	97.286	87.371%	1105	26.7	44.36°C	114.83V
20%	11.582A	2.979A	2.954A	1.192A	169.93	90.581%	1111	26.7	40.59°C	0.974
2076	12.004V	5.036V	3.352V	5.033V	187.603	90.30170		20.7	45.09°C	114.8V
30%	18.245A	3.476A	3.447A	1.395A	254.931	01 210%	1116	26.7	41.25°C	0.978
50%	11.997V	5.034V	3.35V	5.018V	279.469	91.219%	1116	26.7	46.28°C	114.77V
40%	24.923A	3.973A	3.941A	1.599A	340.015	01 2250/	1110	26.8	41.94°C	0.98
40%	11.990V	5.034V	3.349V	5.003V	372.316	91.325%	1118	20.0	47.45°C	114.74V
E00/	31.238A	4.967A	4.929A	1.805A	424.794	00.0510/	1100	26.0	42.5°C	0.98
50%	11.982V	5.034V	3.347V	4.987V	467.058	90.951%	1123	26.9	48.58°C	114.71V
60%	37.539A	5.96A	5.918A	2A	509.271	00 402%	1128	26.9	42.86°C	0.981
00%	11.975V	5.034V	3.346V	4.971V	563.336	90.403%		20.9	49.41°C	114.69V
70%	43.915A	6.951A	6.906A	2.221A	594.666	89.687%	1122	27.0	43.32°C	0.983
7076	11.968V	5.035V	3.345V	4.953V	663.062	09.007 /0	1133		50.33°C	114.64V
80%	50.299A	7.947A	7.898A	2.327A	679.467	88.749%	1602	39.3	44.55°C	0.984
00%	11.960V	5.033V	3.342V	4.941V	765.604	00.749%	1693		52.59°C	114.63V
00%	57.095A	8.449A	8.384A	2.435A	764.894	07.0150/	2216	47.0	44.58°C	0.986
90%	11.952V	5.029V	3.339V	4.928V	871.024	87.815%	2316	47.0	53.65°C	114.58V
100%	63.634A	8.952A	8.901A	3.062A	849.674	06 0500/	2211	47.0	45.39°C	0.987
100%	11.943V	5.026V	3.337V	4.899V	977.107	86.958%	2311	47.0	55.45°C	114.55V
1100/	70.047A	9.948A	9.985A	3.068A	934.281	85.799%	2212	47.0	46.58°C	0.988
110%	11.935V	5.026V	3.335V	4.889V	1088.925	85.799%	2312	47.0	57.49°C	114.53V
0.1	0.115A	13.14A	13.08A	0A	111.289	02.0500/	1120	N 7 1	41.34°C	0.97
CL1	12.010V	5.038V	3.341V	5.07V	134.148	82.959%	1139	27.1	46.85°C	114.81V
CL2	0.115A	19.796A	0A	0A	101.331	80.686%	1127	27.1	40.14°C	0.968
ULZ	12.017V	5.049V	3.361V	5.075V	125.589	00.000%	1137	27.1	47.23°C	114.82V
(1.2	0.115A	0A	19.754A	0A	67.379	75 5500/	1006	26.6	40.22°C	0.96
CL3	12.006V	5.059V	3.341V	5.076V	89.173	75.558%	1096	26.6	49.25°C	114.83V
CLA	71.096A	0A	0A	0A	849.46	07 0700/	2205	46.9	45.73°C	0.987
CL4	11.949V	5.049V	3.361V	5.009V	966.641	87.879%	2305	46.8	56.7°C	114.56V

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20-80W LOAD TESTS 115V										
Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
2014/	1.237A	0.496A	0.492A	0.197A	19.994	70 7450/	70.745% 1085	26.1	36.57°C	0.847
20W	12.002V	5.036V	3.356V	5.083V	28.262	70.745%		26.1	39.62°C	114.85V
4014/	2.724A	0.695A	0.688A	0.295A	39.996	01.0700/	1001	26.5	37.38°C	0.924
40W	12.002V	5.037V	3.356V	5.078V	49.154	81.372%	1091		40.66°C	114.84V
COM	4.209A	0.893A	0.885A	0.394A	59.996	05 5100/	1000	26.6	38.38°C	0.94
60W	12.004V	5.037V	3.356V	5.072V	70.159	85.519%	1096	26.6	42.21°C	114.84V
0011/	5.687A	1.092A	1.082A	0.493A	79.934	07 42 60/	1101		39.11°C	0.961
80W	12.011V 5.038V 3.356V 5.067V 91.432	87.426%	1101	26.7	43.08°C	114.82V				

RIPPLE MEASUREMENTS 115V

12V	5V	3.3V	5VSB	Pass/Fail
24.96mV	14.11mV	15.60mV	8.26mV	Pass
27.77mV	13.55mV	15.03mV	8.82mV	Pass
26.60mV	14.22mV	15.49mV	12.01mV	Pass
19.59mV	14.68mV	15.70mV	10.62mV	Pass
16.47mV	14.17mV	15.80mV	11.90mV	Pass
17.90mV	14.52mV	15.49mV	14.78mV	Pass
16.67mV	14.94mV	15.08mV	15.39mV	Pass
20.26mV	15.86mV	17.55mV	17.04mV	Pass
20.00mV	16.22mV	18.73mV	15.45mV	Pass
32.08mV	16.78mV	20.29mV	18.42mV	Pass
31.82mV	17.67mV	19.33mV	18.38mV	Pass
43.05mV	15.88mV	20.51mV	9.64mV	Pass
32.48mV	21.92mV	18.52mV	10.01mV	Pass
28.03mV	14.32mV	20.06mV	7.75mV	Pass
29.57mV	15.87mV	16.86mV	11.67mV	Pass
	24.96mV 27.77mV 26.60mV 19.59mV 16.47mV 16.47mV 16.67mV 20.26mV 20.26mV 20.00mV 32.08mV 31.82mV 43.05mV 32.48mV 28.03mV	24.96mV 14.11mV 27.77mV 13.55mV 26.60mV 14.22mV 19.59mV 14.68mV 19.59mV 14.68mV 16.47mV 14.17mV 16.67mV 14.52mV 16.67mV 14.94mV 20.26mV 15.86mV 20.00mV 16.22mV 32.08mV 16.78mV 31.82mV 17.67mV 32.48mV 21.92mV 28.03mV 14.32mV	24.96mV 14.11mV 15.60mV 27.77mV 13.55mV 15.03mV 26.60mV 14.22mV 15.49mV 19.59mV 14.68mV 15.70mV 16.47mV 14.17mV 15.80mV 16.47mV 14.17mV 15.80mV 16.67mV 14.52mV 15.49mV 16.67mV 14.94mV 15.08mV 20.26mV 15.86mV 17.55mV 20.00mV 16.22mV 18.73mV 32.08mV 16.78mV 20.29mV 31.82mV 15.88mV 20.51mV 32.48mV 21.92mV 18.52mV 28.03mV 14.32mV 20.06mV	24.96mV 14.11mV 15.60mV 8.26mV 27.77mV 13.55mV 15.03mV 8.82mV 26.60mV 14.22mV 15.49mV 12.01mV 19.59mV 14.68mV 15.70mV 10.62mV 16.47mV 14.17mV 15.80mV 11.90mV 16.47mV 14.17mV 15.80mV 11.90mV 16.67mV 14.94mV 15.08mV 14.78mV 20.26mV 15.86mV 15.08mV 15.39mV 20.20mV 16.22mV 18.73mV 15.45mV 31.82mV 16.78mV 20.29mV 18.42mV 31.82mV 15.88mV 20.51mV 9.64mV 32.08mV 15.88mV 20.51mV 10.01mV 32.48mV 21.92mV 18.52mV 10.01mV

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230V

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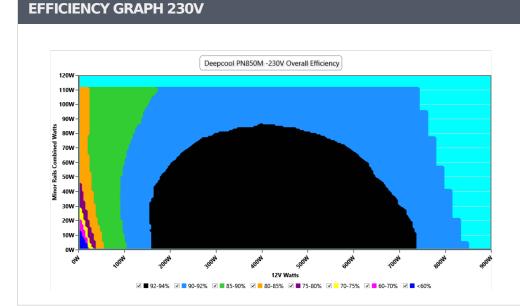
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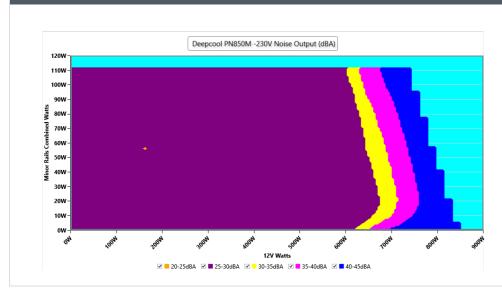
Anex



INFO

This graph depicts the PSU's efficiency throughout its entire operational range. For the generation of the efficiency and noise graphs we set our loaders to auto mode through our custom-made software before trying thousands of possible load combinations

NOISE GRAPH 230V



INFO

The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

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VAMPIRE POWER -230V

Detailed Results										
	Average	Min	Limit Min	Max	Limit Max	Result				
Mains Voltage RMS:	229.88 V	229.76 V	227.70 V	229.99 V	232.30 V	PASS				
Mains Frequency:	50.00 Hz	49.99 Hz	49.50 Hz	50.02 Hz	50.50 Hz	PASS				
Mains Voltage CF:	1.419	1.417	1.340	1.420	1.490	PASS				
Mains Voltage THD:	0.17 %	0.13 %	N/A	0.30 %	2.00 %	PASS				
Real Power:	0.117 W	0.078 W	N/A	0.166 W	N/A	N/A				
Apparent Power:	39.346 W	39.292 W	N/A	39.419 W	N/A	N/A				
Power Factor:	0.004	N/A	N/A	N/A	N/A	N/A				

INFO

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10-1	10% LOA	D TESTS	230V							
Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
100/	5.279A	1.985A	1.968A	0.991A	85.005	00 0000/	1004	265	40.42°C	0.81
10%	12.011V	5.038V	3.354V	5.047V	96.367	88.209%	1094	26.5	44.66°C	229.85V
200/	11.583A	2.979A	2.954A	1.192A	169.944	01 7010/	1007	26.6	40.95°C	0.901
20%	12.004V	5.036V	3.352V	5.032V	185.281	91.721%	1097	26.6	45.54°C	229.84V
200/	18.247A	3.476A	3.448A	1.395A	254.952	02 60 40/	1100	26.7	41.48°C	0.931
30%	11.996V	5.035V	3.35V	5.018V	275.047	92.694%	1102	26.7	46.48°C	229.82V
400/	24.925A	3.973A	3.942A	1.599A	340.042	02.000%	1100	26.7	41.74°C	0.946
40%	11.989V	5.034V	3.349V	5.002V	365.614	93.006%	1106	26.7	47.31°C	229.81V
F00/	31.246A	4.966A	4.929A	1.805A	424.878	02.000%	1104	26.0	42.02°C	0.953
50%	11.982V	5.035V	3.348V	4.986V	457.335	92.899%	1124	26.9	48.03°C	229.79V
666	37.548A	5.96A	5.919A	2A	509.346	00.070/			42.85°C	0.957
60%	11.974V	5.034V	3.346V	4.97V	549.632	92.67%	1131	27.0	49.41°C	229.78V
	43.925A	6.954A	6.908A	2.221A	594.735	00 0 7 00/			42.98°C	0.959
70%	11.966V	5.034V	3.344V	4.952V	644.514	92.276% 1134	27.0	49.99°C	229.76V	
000/	50.313A	7.948A	7.9A	2.328A	679.55	01.0700/		39.2	43.9°C	0.962
80%	11.958V	5.032V	3.342V	4.94V	741.232	91.679%	1684		51.94°C	229.75V
000/	57.112A	8.451A	8.386A	2.436A	764.975	0		46.8	44.09°C	0.964
90%	11.950V	5.029V	3.339V	4.927V	839.644	91.107%	2303		53.19°C	229.73V
	63.652A	8.955A	8.903A	3.063A	849.745	00 0000 <i>/</i>			45°C	0.967
100%	11.941V	5.025V	3.336V	4.898V	937.684	90.622%	2305	46.8	55.09°C	229.72V
	70.064A	9.949A	9.987A	3.07A	934.35				46.57°C	0.969
110%	11.933V	5.025V	3.334V	4.887V	1038.36	89.983%	2305	46.8	57.5℃	229.7V
	0.117A	13.145A	13.084A	0A	111.298	00.0470/	11.40	07.0	40.47°C	0.862
CL1	12.010V	5.036V	3.34V	5.07V	132.583	83.947%	1143	27.2	45.98°C	229.84V
	0.115A	19.791A	0A	0A	101.348	01 410/	1100	07.1	40.62°C	0.854
CL2	12.018V	5.051V	3.361V	5.075V	124.492	81.41%	1139	27.1	47.64°C	229.84V
	0.115A	0A	19.755A	0A	67.383	76 1 620/	1102	26.7	42.11°C	0.793
CL3	12.007V	5.059V	3.341V	5.076V	88.468	76.163%	1103	26.7	51.14°C	229.85V
	71.106A	0A	0A	0A	849.531	01.400/	2207	10.0	46.11°C	0.967
CL4	11.948V	5.049V	3.361V	5.007V	928.652	91.48%	2307	46.9	57.09°C	229.72V

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Anex

Deepcool PN850M

20-80W LOAD TESTS 230V										
Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
2014	1.237A	0.496A	0.492A	0.197A	19.998	70.0000/	1078	26	36.59°C	0.482
20W	12.002V	5.037V	3.356V	5.083V	28.56	70.022%		26	39.64°C	229.87V
40144	2.724A	0.695A	0.688A	0.295A	39.999	01.400/	1000	26.5	37.3℃	0.643
40W	12.002V	5.038V	3.357V	5.077V	49.084	81.49%	1092		40.62°C	229.86V
C014/	4.210A	0.893A	0.885A	0.394A	60	00.000/	86.08% 1080	.080 26.1	38.46°C	0.736
60W	12.004V	5.039V	3.356V	5.071V	69.715	80.08%			41.98°C	229.86V
00144	5.688A	1.091A	1.082A	0.493A	79.943	00.2420/	1000		39.11°C	0.798
80W	12.011V	✓ 5.039∨ 3.356∨ 5.066∨ 90.592 88.243% 1086	1080	26.2	42.91°C	229.85V				

RIPPLE MEASUREMENTS 230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	29.82mV	14.42mV	15.91mV	8.21mV	Pass
20% Load	28.64mV	13.81mV	14.98mV	8.31mV	Pass
30% Load	26.50mV	14.11mV	15.39mV	13.80mV	Pass
40% Load	19.33mV	14.32mV	15.96mV	10.52mV	Pass
50% Load	14.27mV	13.35mV	13.54mV	10.11mV	Pass
60% Load	18.26mV	15.09mV	15.70mV	13.65mV	Pass
70% Load	18.92mV	15.09mV	16.73mV	20.16mV	Pass
80% Load	21.12mV	15.29mV	17.70mV	16.16mV	Pass
90% Load	19.59mV	15.45mV	16.72mV	15.39mV	Pass
100% Load	32.40mV	17.15mV	19.11mV	18.09mV	Pass
110% Load	33.70mV	17.62mV	21.77mV	18.88mV	Pass
Crossload1	38.87mV	15.29mV	19.14mV	9.03mV	Pass
Crossload2	28.03mV	20.07mV	18.37mV	9.60mV	Pass
Crossload3	32.69mV	14.68mV	18.01mV	8.26mV	Pass
Crossload4	30.38mV	15.42mV	18.89mV	11.61mV	Pass

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Anex

Deepcool PN850M



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