



ACQ100 Series

100W & 150W / Quarter Brick AC/DC

Applications



Medical



Railway



Industry



Automation



emiconductor



Network
/ Telecom



Military



Boat



Aviation



Automobile



Charger



3

Years Warranty



Features

1/4
Brick

90~264VAC
Input range

150W
Active PFC

Long Hold-
up Time

-40~100°C
Case
Temperature

±5%
Output
Trimming

3000 VAC
Insulation

91 %
High
efficiency

Base plate
cooled

ON / OFF
REMOTE
(optional)

OCP

OVP

OTP

SCP

Model Number Structure

AC

Q

100

-

050

S

-

150

Series Name	Package	Watt	Output Voltage (VDC)	Output Quantity	Actual Watt
AC series	Quarter Brick	100	050 : 5	S : Single	Actual Watt
			120 : 12		
			190 : 19		
			240 : 24		
			280 : 28		
			360 : 36		
			480 : 48		

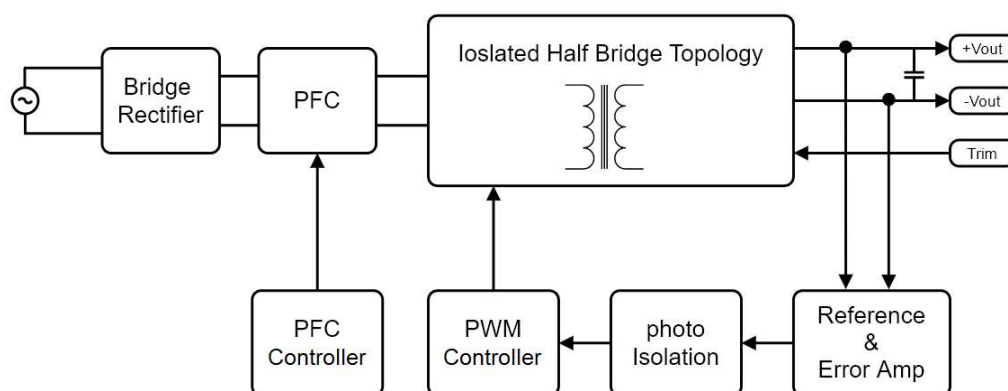
Model Selection Guide

Typical @ Ta=+25 °C under nominal line voltage conditions unless noted

Model	Input			Output			Efficiency
	Voltage (V)		Current (A)	Voltage	Current	Power	
	Range	Nominal	Full load	(V)	(A)	(W)	Typ.(%)
ACQ100-050S-100	90-264	230	0.49	5	20	100	87
ACQ100-120S-100	90-264	230	0.48	12	8.33	100	90
ACQ100-190S-100	90-264	230	0.48	19	5.26	100	90
ACQ100-240S-100	90-264	230	0.48	24	4.16	100	91
ACQ100-280S-100	90-264	230	0.48	28	3.57	100	91
ACQ100-360S-100	90-264	230	0.48	36	2.77	100	90
ACQ100-480S-100	90-264	230	0.48	48	2.08	100	90
ACQ100-120S-150	90-264	230	0.75	12	12.5	150	90
ACQ100-240S-150	90-264	230	0.75	24	6.25	150	91
ACQ100-280S-150	90-264	230	0.75	28	5.35	150	91
ACQ100-360S-150	90-264	230	0.75	36	4.16	150	90
ACQ100-480S-150	90-264	230	0.75	48	3.13	150	90

Description

AC series - Quarter Brick 100 converter is a 100W / 150W isolated, regulated ac/dc converter with active PFC in quarter brick package and long hold-up time setting by external capacitors. It features a high efficiency up to 91%, wide working case temperature range -40~+100°C, no minimum load required, 3kVac reinforced insulation, OVP, OCP, SCP, OTP, etc. These power modules use advanced power processing, control and packaging technologies and are suitable for many applications with harsh environments where wide temperature variation and space limitations, etc.



ACQ100 Series Block Diagram

Electrical Specifications

(Typical @ Ta=+25°C under nominal line voltage conditions unless noted.)

Input Specifications

Parameter	Notes and Conditions	Min.	Typ.	Max.	Unit
Operating Input Voltage Ranges		90	230	264	VAC
Operating Input Frequency Ranges		47	50/60	63	Hz
Input Current	at 115VAC 100% load at 230VAC 100% load		1 0.5		A
Inrush Current	cold start at 230VAC, 25°C	Limited by external components (Thermistor)			
Power Factor	at 115VAC 100% load at 230VAC 100% load		0.99 0.98		
Leakage Current	at 240VAC 60Hz 100% load			0.75	mA

Output Specifications

Parameter	Notes and Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	100% Load			±1.5	%
Line Regulation	High Line to Low Line			±0.5	%
Load Regulation	0% to 100% Load			±1	%
Output Ripple & Noise Voltage	Output Power: 100W Bandwidth 20MHz and with 10uF MLCC Output Capacitor			2	%V _{pk-pk}
	Output Power: 150W Bandwidth 20MHz and with 10uF MLCC Output Capacitor			2.5	%V _{pk-pk}
Output Voltage Adjustment Range	adjustable by external resistor			±5	%
Minimum Load		0			A
Hold Up Time	at full load & 115 VAC	Setting by external capacitors between +BC & -BC			
Over Voltage Protection		120		140	%
Over current Protection	Hiccup mode	120		140	%
Short-circuit Protection	Hiccup mode	Auto-Recovery			

General Specifications & Environmental Specifications

Parameter	Notes and Conditions	Min.	Typ.	Max.	Unit
Switching Frequency	PFC/AC-DC		100/130		kHz
Storage Temperature Range	All models	-55		125	°C
Over temperature Protection	Auto Recovery		110		°C
Operating Case Temperature	on aluminum base plate	-40		100	°C
Humidity (non condensing)	All models			95	%
Isolation Voltage	Input to Output		3000		VAC
	Input to Base		1500		VAC
	Output to Base		500		VAC
Calculated MTBF	BellCore-TR-332@ 50°C G.B	1.2			M HR
Weight		72 (2.54)			g (oz.)
Dimensions		2.36" x 1.57" x 0.50" (60.0 x 40.0 x 12.7mm)			
Case Material	Aluminum base with plastic case				

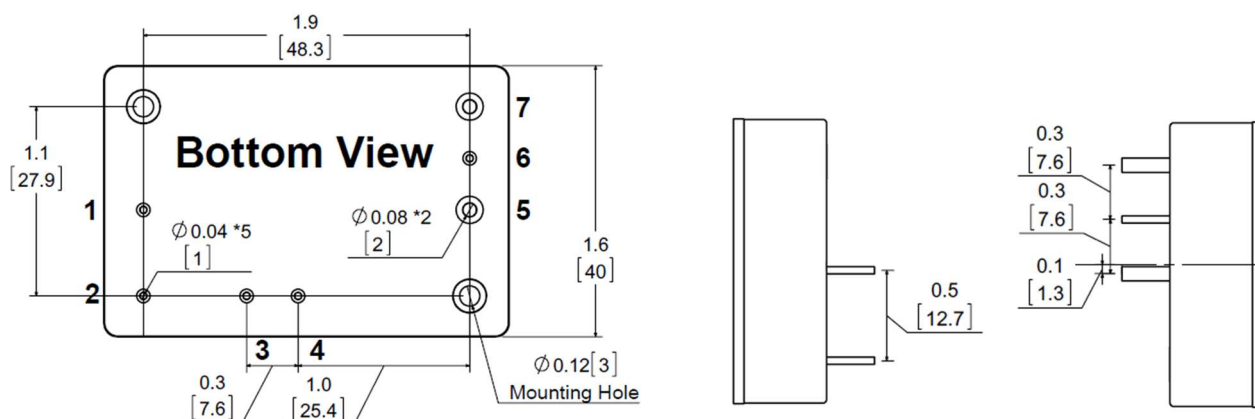
It is recommended to protect the input by fuses or other protection devices.

Modules could meet EN55022 Class A and Class B standard with external components.

The information and specifications contained in this data sheet are believed to be correct at time of publication. All specifications are subject to change without notice. No rights under any patent accompany the sale of any such products or information contained herein.

Mechanical Dimensions & Pin Assignments

Shape



Pin Assignments:

Pin#	Function
1	AC1
2	AC2
3	BC+
4	BC-
5	+VO
6	Trim
7	-VO

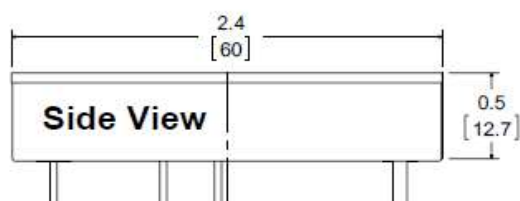
Note:

Pin Material: Copper Alloy

Pin Plating: Gold

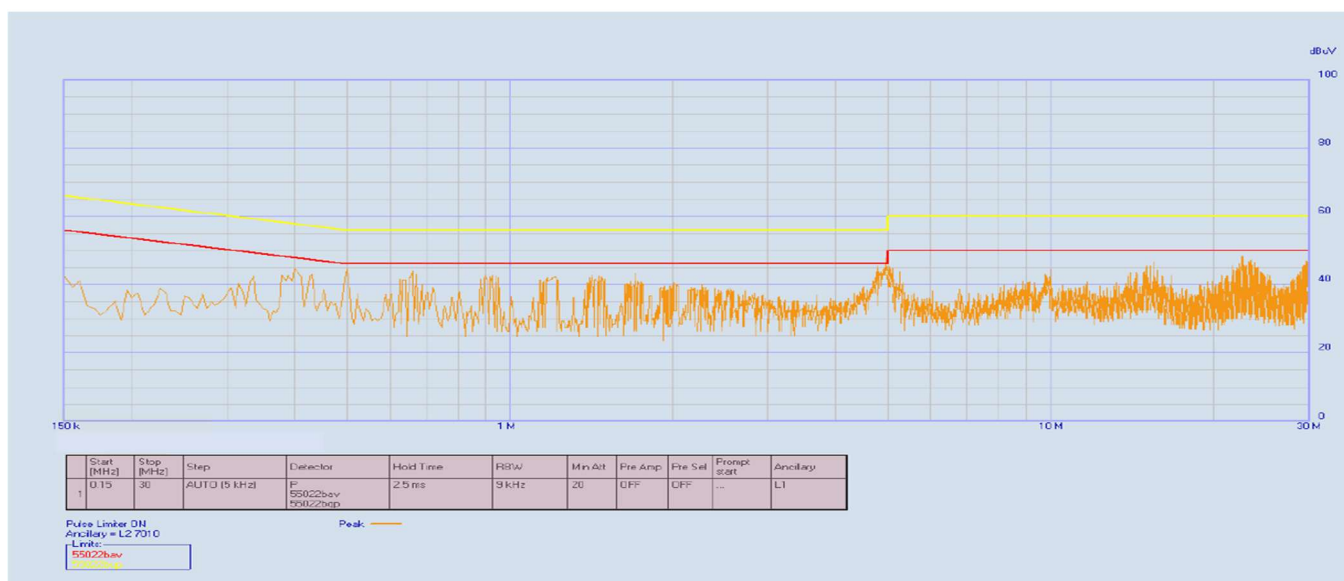
Dimensions in inches [mm]

Tolerances: .XX±0.02 [.X±0.5mm]



Conducted EMI

Input terminal value (typ.) ACQ100-120S-100 @Vin = 230VDC, Iout = 8.3A



The fundamental switching frequency of the module is 100 kHz.

Characteristic Curves

Testing conditions are at typical input, $T_a = +25^\circ\text{C}$, full load (horizontal mount) Unless otherwise indicated

The figures of ACQ100-120S-100

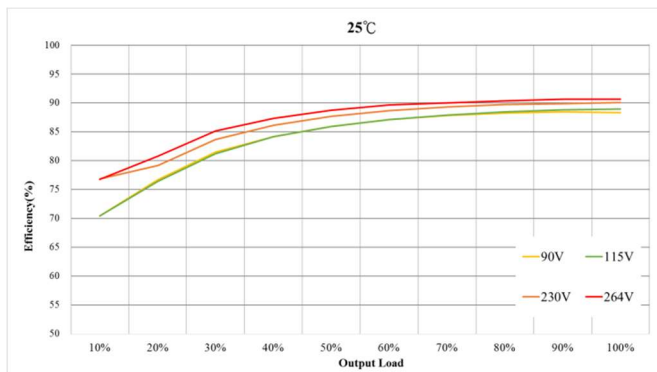


Figure 1 : Efficiency at Minimum, Nominal and Maximum Input Voltages VS. Output Load.

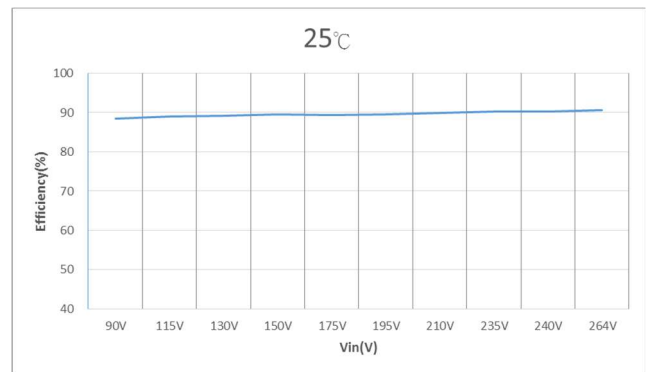


Figure 2 : Efficiency VS. Input Voltages at 100% rated power

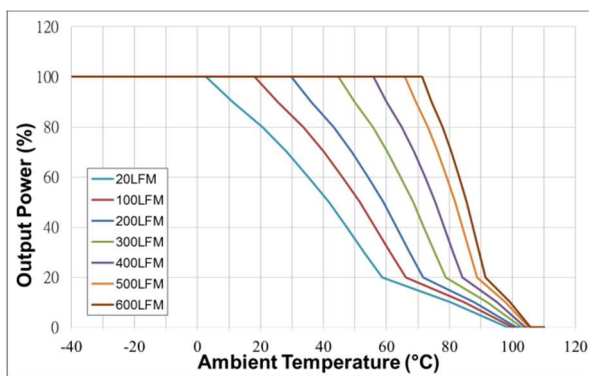


Figure 3 : Ambient Temperature VS. Output Power Derating Curves (Note: 20LFM=Free Air)

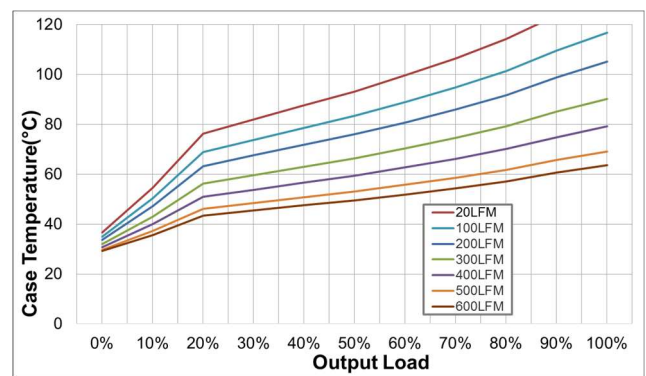


Figure 4 : Case Temperature VS. Output rated Power (Note: 20LFM=Free Air)

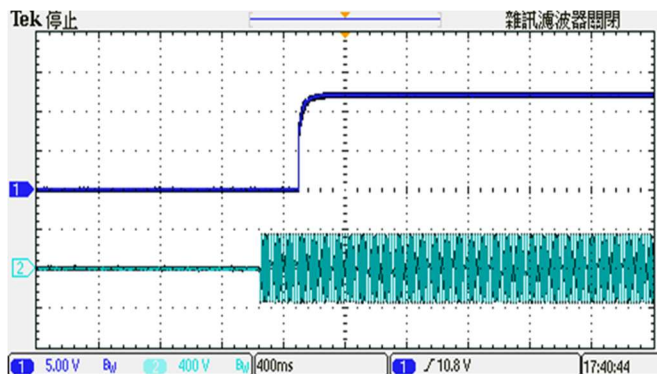


Figure 5 : CH1 = Vout, CH3 = Nominal Input
Typical Start-up waveform at Full load.

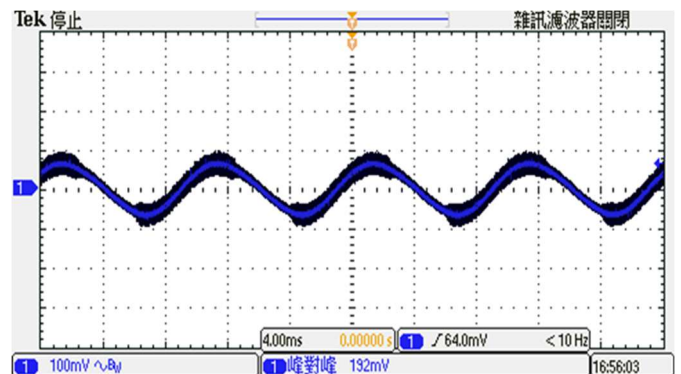


Figure 6 : Output Voltage Ripple & Noise at full load.
(Vin: Typical, With Output Capacitor to add 1uF MLCC)

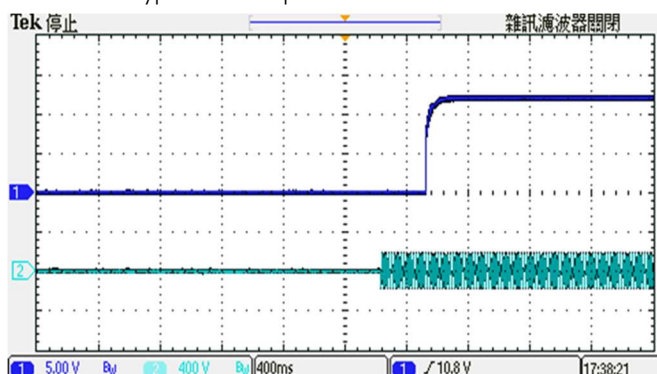


Figure 7 : CH1 = Vout, CH3 = 115V Input
Typical Start-up waveform at Full load.

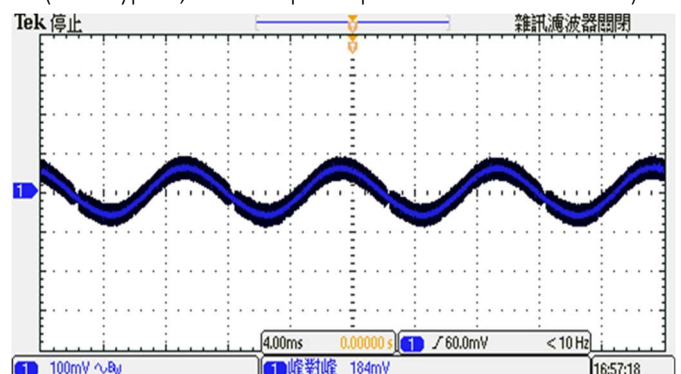


Figure 8 : Output Voltage Ripple & Noise at full load.
(Vin: 115V, With Output Capacitor to add 1uF MLCC)

Trimming Output Voltage – for Single output models

Only the single output converters have a trim function. That allows users to adjust the output voltage from +5% to -5%, please refer to the trim table that follow for details. Adjustments to the output voltage can be used with a simple fixed resistor as shown in Figures 1 and 2. A single fixed resistor can increase or decrease the output voltage depending on its connection.

Note:

- ✂ Trim adjustments higher than the specified range can have an adverse effect on the converter's performance and are not recommended.
- ✂ If the trim function is not used, leave the trim pin open.

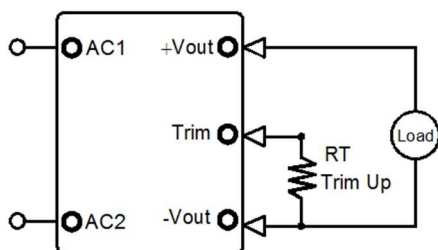


Figure 1. Trim Connections To increase Output Voltages Using Fixed Resistors

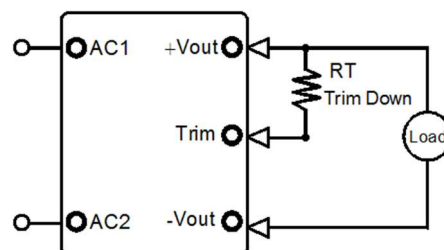


Figure 2. Trim Connections To Decrease Output Voltages Using Fixed Resistors

Vout	Trim up resistor value(KΩ)				
	1%	2%	3%	4%	5%
5	195.82	72.36	31.21	10.63	0.00
12	198.23	73.56	32.01	11.23	0.00
19	1921.13	745.57	353.71	157.78	0.00
24	228.91	83.45	34.97	10.73	0.00
28	693.51	246.76	97.84	23.38	0.00
36	545.73	197.87	81.91	23.93	0.00
48	1407.66	537.83	247.89	102.91	0.00

Vout	Trim down resistor value(KΩ)				
	-1%	-2%	-3%	-4%	-5%
5	691.98	315.44	189.93	127.17	89.52
12	887.57	412.24	253.79	174.57	127.03
19	14840.87	7116.43	4541.62	3254.22	2481.77
24	2419.09	1164.55	746.36	537.27	411.82
28	8806.49	4253.24	2735.50	1976.62	1521.30
36	9054.27	4402.13	2851.42	2076.07	1610.85
48	30796.34	15066.17	9822.78	7201.09	5628.07

Output Ripple Noise

The two copper strips simulate real-world PCB impedances between the converter and its load. Scope measurements should be made using BNC connectors or the probe ground should be less than 1/2 inch and soldered directly to the fixture.

All external capacitors should have appropriate voltage ratings and be located as close to the converter as possible.

Temperature variations for all relevant parameters should be taken into consideration. The most effective combination of external I/O capacitors will be a function of line voltage and source impedance, as well as particular load and layout conditions. See Figure 3.

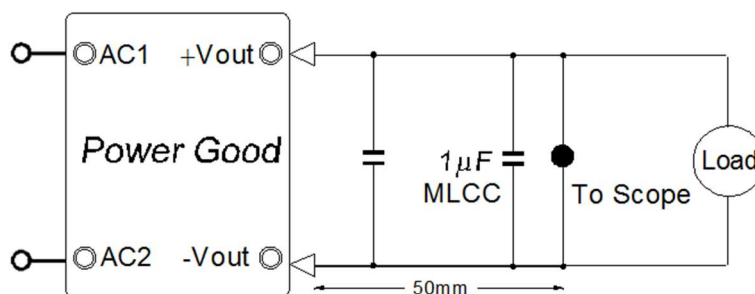
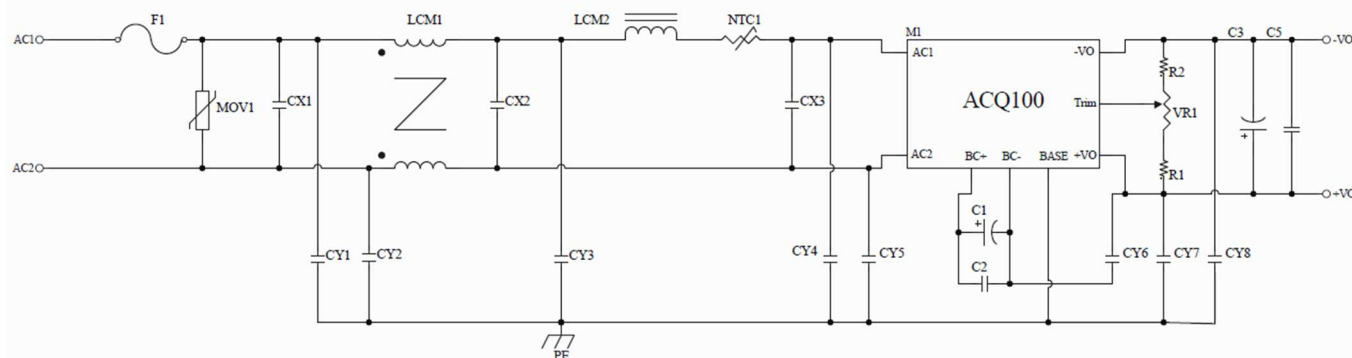


Figure 3. Measuring Output Ripple/Noise (20MHz bandwidth)

Recommended Circuit Diagram



Bill of Materials

No.	Sch Symbol	Description	Rating		Manufacturer / Part Number
1	F1	Fuse	3.15A/250Vac		Bel 0HAAL3150-01
2	MOV1	Varistor	620V		Panasonic ERZ-V10D621
3	CX1、CX2	X Capacitor	0.47uF/310Vac		KEMET R49AN34700001K
4	LCM1	Common Mode Choke	25mH		Amogreentech A121T14*8*7C with ψ 0.4mm*54 turns
5	LDM1	Differential Mode Choke	56uH		SELMAG CH112147 with ψ 0.4mm*30 turns
6	CY1、CY2	Y Capacitor	4700pF/250Vac		KEMET C781U472MTWDBAW35
7	CY6、CY7	Y Capacitor	3300pF/250Vac		Murata DE1E3RA332MA4BN01F
8	NTC1	Thermistor	5R		TDK B57211P0509M351
9	C1	PFC boost capacitor	120uF/420Vdc		NIPPON CHEMI-CON EKXL421ELL121MM30S
10	C3	Output Capacitor	5V	1000uF/35Vdc	KYOCERA AVX RPF1018102M035K
			12V	470uF/50Vdc	KYOCERA AVX RPF1018471M050K
			19V	470uF/50Vdc	KYOCERA AVX RPF1018471M050K
			24V	220uF/50Vdc	KEMET A750MV227M1HA AE020
			28V	220uF/50Vdc	KEMET A750MV227M1HA AE020
			36V	180uF/50Vdc	KEMET A7C5MW187M1JAAS013
			48V	100uF/63Vdc	KEMET A7C0MS107M1JAAS30
11	C2	Bypass Capacitor	0.1uF/630Vdc		Murata RDER72J104K4K1H03B
	C5		1uF/100Vdc		Murata GRJ31CR72A105

*Note:

1. CY3,CY4,CY5 ,CY8 are reserved positions for EMI filter design adjustment and not listed in BOM.
2. C1 capacitor is needed, PSU will not normally work without C1.
3. BASE can be connected to PE (FG) through M3 mounting screw holes.
4. If the ripple at 150W does not meet the specified requirement, additional output capacitance may be added as necessary.

