

Power factor correction IC FA1A10N power supply design example : 390V/200W

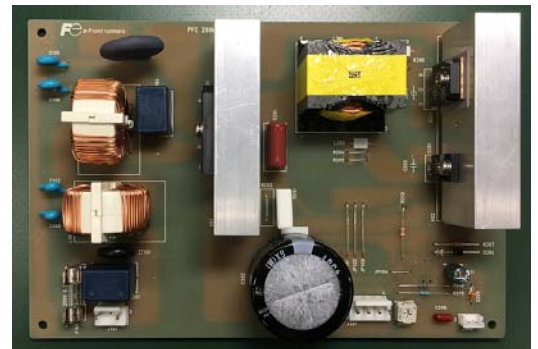
Reference Design

1. Overview

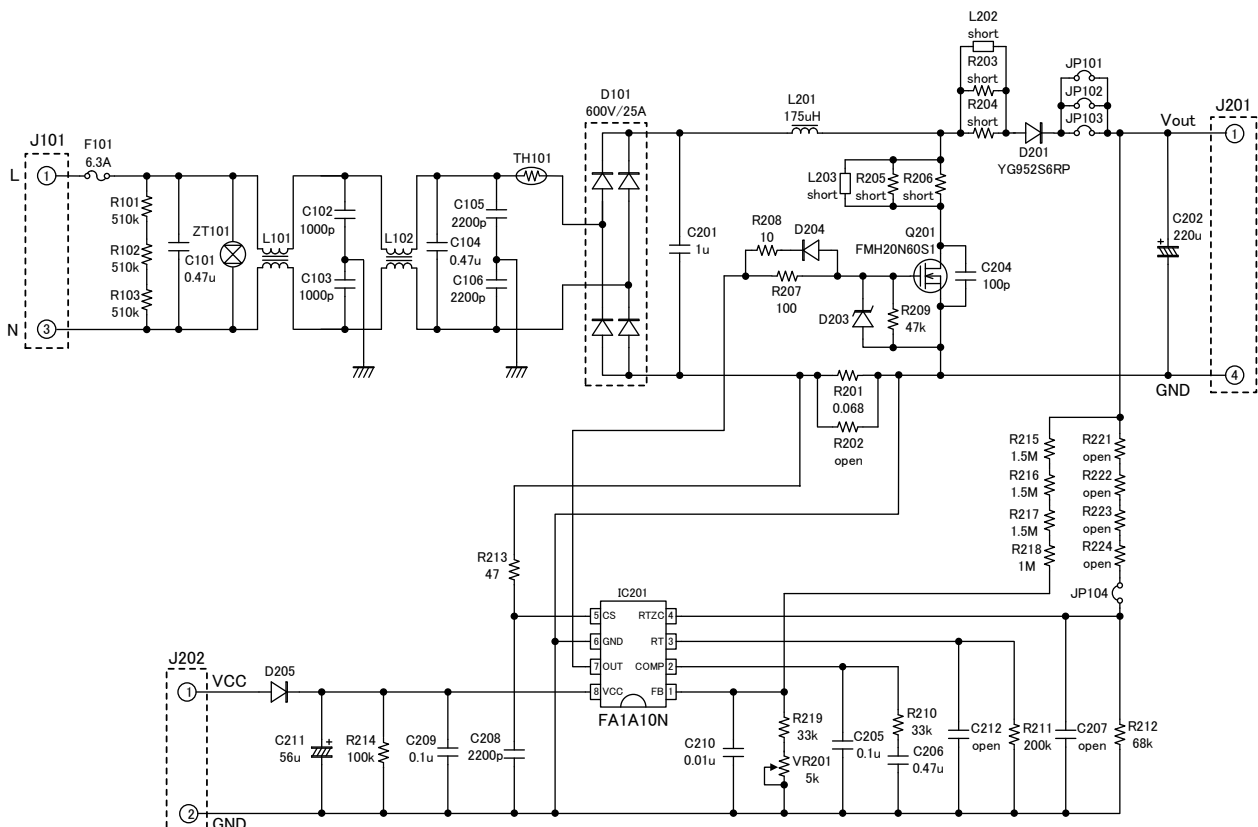
This document describes the design example of PFC circuit using critical conduction mode power-factor correction IC FA1A10N series. The input is universal (85Vac to 264Vac) and the output is 200W.

2. Features

- Low standby power due to no input voltage detection resistors
- High-precision over current protection : $0.6V \pm 2\%$
- Improved power efficiency at light load due to Frequency reduction function
- Power factor improvement function
- Soften Audible Noise at Startup Over Shoot Reduction function
- Low current consumption by CMOS process
- Start-up $500\mu A$ (typ.), Operating $1.5mA$ (typ.)
- Drive circuit for power MOSFET
Output peak current, source : 1000mA, sink : 1000mA
- Short protection at feedback (FB) pin
- Under-voltage Lockout
- Restart timer
- 8-pin package (SOP)

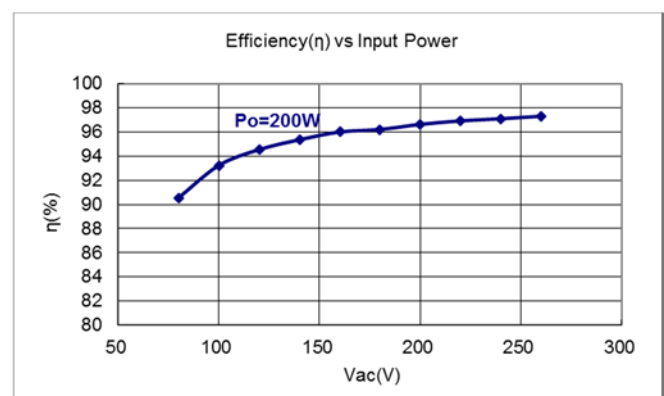
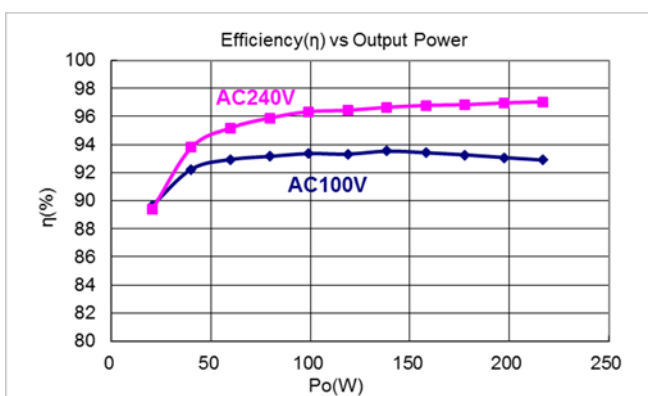
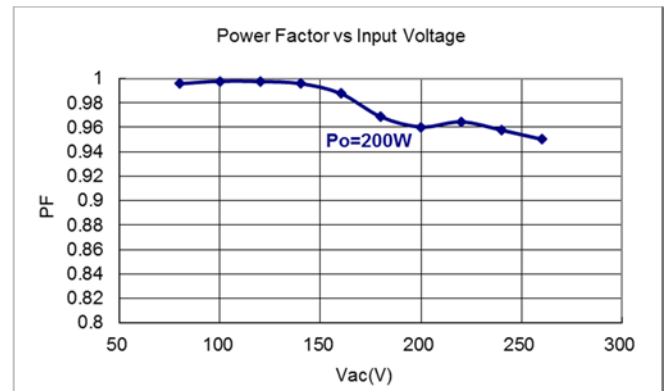
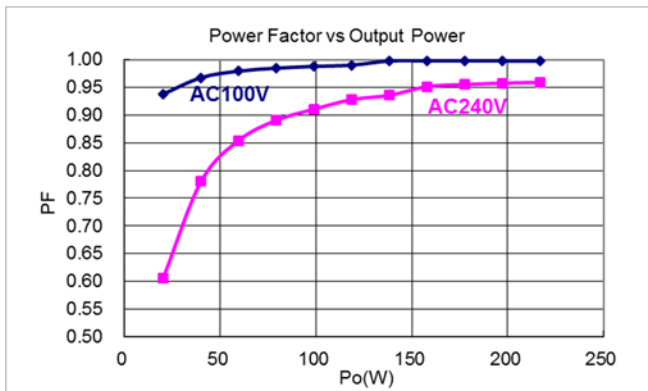
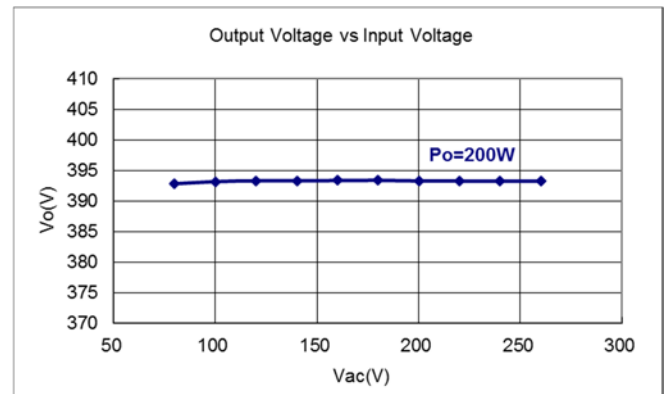
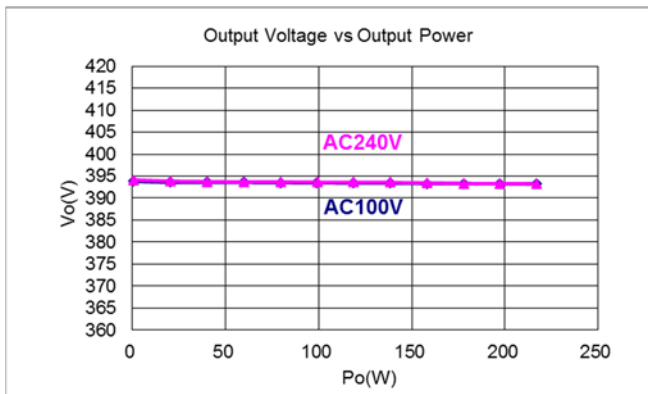


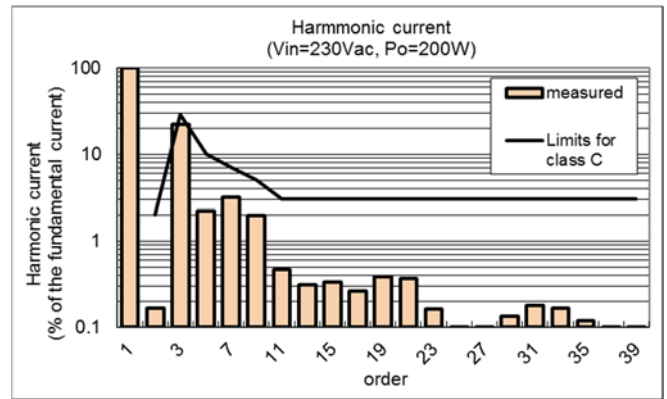
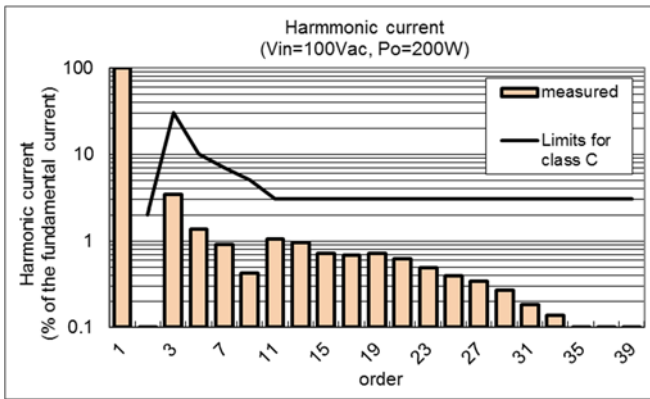
3. Application circuit



4. Specifications of the power supply

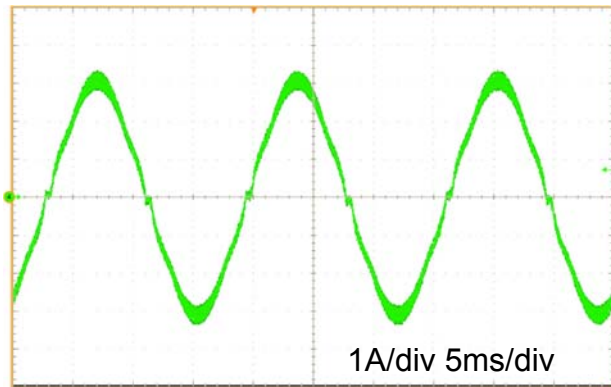
Item	Value	Unit
Input voltage	90 to 264	Vac
Output voltage	390	Vdc
Output power	200	W
Protection function	Overcurrent limiting of power MOSFET Overvoltage limiting Short protection at FB pin Soft Start function	

5. Characteristics


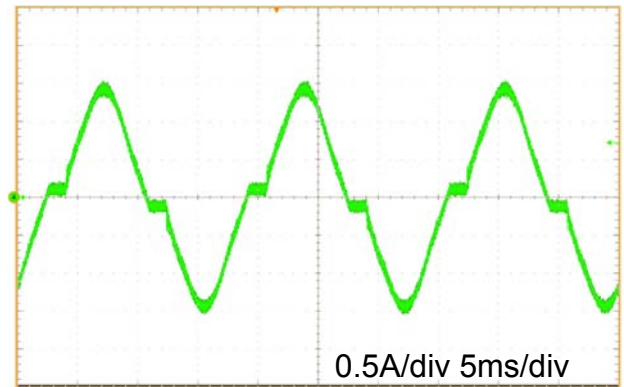


6. Operation waveform (AC input current)

100Vac Po=200W



240Vac Po=200W



FA1A10N Reference Design
9. Bill of material

Component	Item	Value	Part. No	Maker	Note
IC201	PFC IC		FA1A10N / 11N	Fuji	
Q201	MOSFET		FMH20N60S1	Fuji	
D101	Bridge Diode	600V/25A	D25SB60	SHINDENGEN	
D201	Diode		YG952S6RP	Fuji	
D203	Zenner Diode	27V 0.2W			
D204	Diode		ERA91-002	Fuji	
D205	Diode		1SS244	ROHM	
L101,L102	Inductor	15mH 4A			
L201	Inductor	Lp=175uH			PQ32/30
C101	Film capacitor	AC275V,0.47uF	LE474-M	OKAYA	
C102,C103	Ceramic capacitor	AC250V,1000pF	DE1E3KX102MA4BL01	MURATA	
C104	Film capacitor	AC275V,0.47uF	LE474-M	OKAYA	
C105,C106	Ceramic capacitor	AC250V,2200pF	DE1E3KX222MA4BL01	MURATA	
C201	Film capacitor	630V, 1uF			
C202	Electrolytic capacitor	450V, 270uF			
C204	Ceramic capacitor	2kV,100pF			
C205,C209	Ceramic capacitor	50V, 0.1uF			
C206	Ceramic capacitor	50V, 0.47uF			
C207,C210	Ceramic capacitor	50V, 1000pF			
C208	Ceramic capacitor	50V, 2200pF			
C211	Electrolytic capacitor	50V, 56uF			
R101,R102, R103	Resister	1/8W, 510kΩ			
R201	Resister	3W, 0.068Ω			
R207	Resister	1/4W, 100Ω			
R208	Resister	1/4W, 10Ω			
R209	Resister	1/8W, 47kΩ			
R210	Resister	1/8W, 33kΩ			
R211	Resister	1/8W, 200kΩ			
R212	Resister	1/8W, 68kΩ			
R213	Resister	1/8W, 47Ω			
R214	Resister	1/8W, 100kΩ			
R215,R216, R217	Resister	1/8W, 1.5MΩ			
R218	Resister	1/8W, 1MΩ			
R219	Resister	1/8W, 33kΩ			
R221	Resister	1/8W, 2.2MΩ			
R224	Resister	1/8W, 390kΩ			
VR201	Variable Resistor	5kΩ			
F101	Fuse	AC250V 6.3A			
ZT101	Transient/Surge Absorber	SVR471D10			
TH101	Thermistor	3D-22			
J101	Connector	B2P3-VH		JST	
J201	Connector	B4P-VH		JST	
J202	Connector	B2B-EH		JST	

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