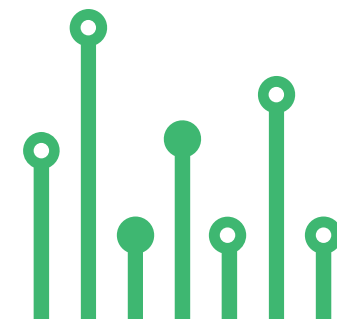


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POWER SUPPLY



**Universal Input
AC/DC Switching
Buck Regulator ,
85V-265V AC Input,
5V/150mA DC
Output**



SKU: EL135230

Universal Input AC/DC Switching Buck Regulator, 85V-265V AC Input, 5V/150mA DC Output



The project presented here is a universal input AC/DC switching buck regulator with ultra-low standby power that is capable of delivering up to 2.5W output power. The RAA223012 chip is the heart of the project which combines constant off-time control for heavy load and Pulse Frequency Modulation (PFM) for light-load operation. Constant off-time controls switching frequency above the audible frequency of approximately 50kHz. PFM eliminates any potential audible noises while offering superior light-load efficiency and ultra-low power consumption (<10mW at no load). Efficiency is achieved up to 75%. The built-in frequency dithering further reduces the EMI noise spectrum. The RAA223012 also features input brownout protection that prevents input circuitry from the overcurrent at low input voltage, and hiccup protections for output fault conditions such as short-circuit, overload, and open feedback.

Features

-
- Universal Input 85V to 265V AC 50/60Hz
- Output 5V DC, 150mA
- Output Short Circuit Protection
- Overload Protection (OLP)
- Short-Circuit Protection (SCP)
- Open Feedback Protection
- Over-Temperature Protection (OTP)
- 4x2.5mm Mounting Holes
- PCB dimensions 52.07 x 28.58 mm



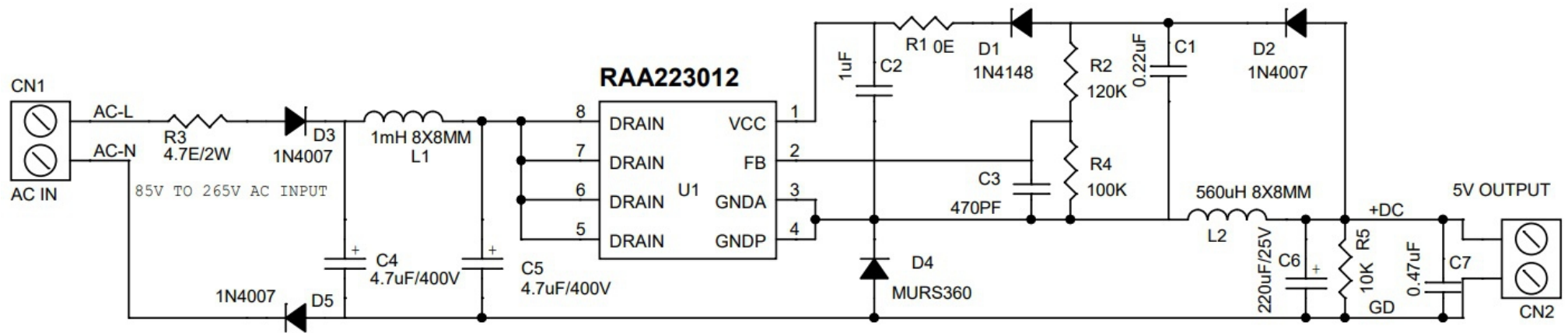


HIGH VOLTAGE: Dangerous voltage exists until the power is OFF. This power supply uses hazardous voltage. The PCB must be installed in an enclosure that prevents accidental contact. Use Plastic screws to mount the PCB. Wait for a few minutes after the input power is disconnected before touching the board. Make sure the bulk capacitor fully discharges.

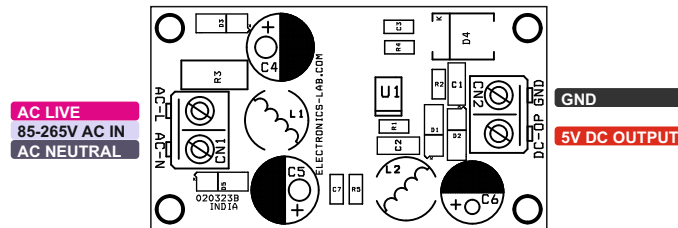
Short-Circuit Protection

When the output is shorted, $V_{OUT} = 0$, V_{FB} drops to zero because of the feedback network, introducing a delay. Before V_{FB} drops to $V_{FB_TOFFMIN}$, the RAA223012 operates with T_{ONMAX} and T_{OFFMIN} , which quickly builds up a high current ($>I_{PK}$) because the inductor peak current does not get reset. When the current reaches I_{SC_TH} , a timer is started. If the inductor current reaches I_{SC_TH} for four consecutive cycles, the RAA223012 determines that a short-circuit is present and immediately shuts off the switching. The IC then quickly charges V_{CC} up to 5.9V and discharges it with a 19 μ A current source to 3.4V. When V_{CC} drops to 3.4V, a 1.6mA current source charges V_{CC} back to 5.9V where the IC resumes switching. When the RAA223012 resumes switching, assuming V_{FB} drops to zero, the IC operates with the increased T_{OFFMIN_MAX} so the inductor current can fully reset below the maximum peak limit. The RAA223012 operates in CCM with the inductor peak current being limited at I_{PK} , with an average current around 240mA during the short. The part remains in hiccup mode until the short is removed. When the short is removed, V_{OUT} returns to normal.

Schematic



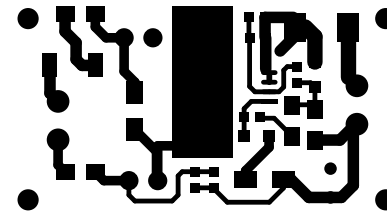
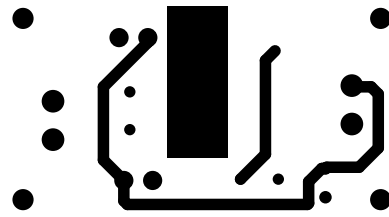
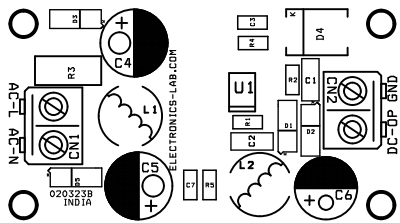
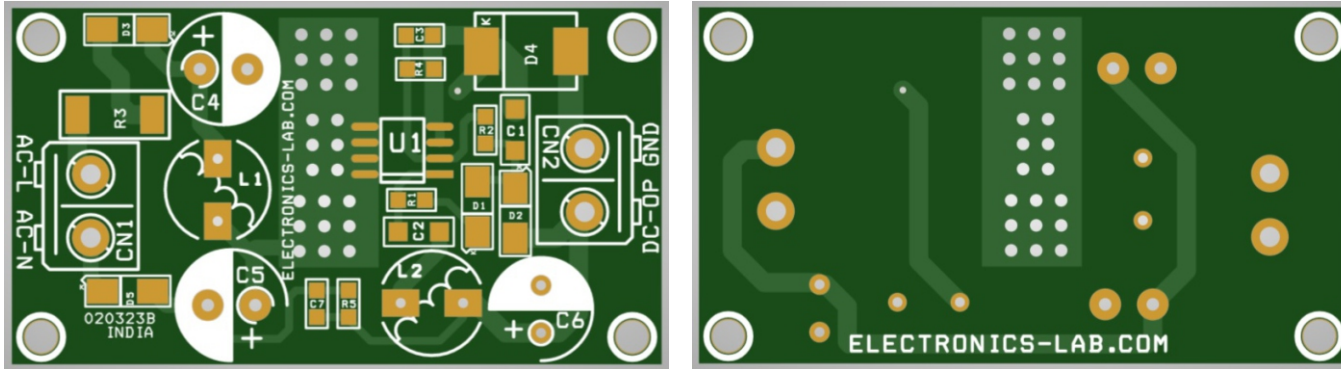
Connections



CONNECTIONS AND OTHER DETAILS

- CN1: Pin1 = AC Live Input, Pin2 = AC Neutral Input (85V to 265V AC Range)
- CN2: Pin 1 = +5V DC Output, Pin 2 = GND

PCB



PCB DIMENSIONS 52.07 X 28.58 MM

Parts List

BOM						
NO	QNTY	REF.	DESC	MANUFACTURER	SUPPLIER	SUPPLIER'S PART NO
1	1	CN1	2 PIN SCREW TERMINAL PITCH 5.08MM	PHOENIX	DIGIKEY	277-1247-ND
2	1	CN2	2 PIN SCREW TERMINAL PITCH 5.08MM	PHOENIX	DIGIKEY	277-1247-ND
3	1	C1	0.22uF/25V CERAMIC SMD SIZE 1206	YAGEO/MURATA	DIGIKEY	
4	1	C2	1uF/25V CERAMIC SMD SIZE 1206	YAGEO/MURATA	DIGIKEY	
5	1	C3	470PF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
6	2	C4,C5	4.7uF/400V	WURTH	DIGIKEY	732-8689-3-ND
7	1	C6	220uF/25V	PANASONIC	DIGIKEY	P10271-ND
8	1	C7	0.47uF/25V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
9	1	D1	1N4148 SMD	MICROCHIP	DIGIKEY	1N4148UR-1-ND
10	3	D2,D3,D5	1N4007 SMD	DIODE INC.	DIGIKEY	S1MBDITR-ND
11	1	D4	MURS360 SMD	DIODE INC.	DIGIKEY	31-MURS360CT-ND
12	1	L1	1mH 8X8MM SMD OR THT	WURTH	DIGIKEY	732-3261-ND
13	1	L2	560uH 8X8MM SMD OR THT	BOURNS	DIGIKEY	RLB0914-561KL-ND
14	1	R1	0E SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
15	1	R2	120K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
16	1	R3	4.7E OR 5.1E 2W 5% SMD 2512	YAGEO/MURATA	DIGIKEY	
17	1	R4	100K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
18	1	R5	10K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
19	1	U1	RAA223012 SOIC8	RENESAS	DIGIKEY	20-RAA2230124GSP#HAOCT-ND



Keep
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