Step-Down DC-DC Converter with Current Limit

The step-down DC-DC Converter project presented here provides 3.3V @ 1A output from an input range of 8V to 36V DC. The adjustable current limit is an important feature of the project, which prevents the device from accidental output short circuits avoiding excessive load damage. The internal limiting current (latched function) has a typical value of 2.5 A. The project is built around the L6902 chip from ST. The L6902D is a complete and simple step-down switching regulator with an adjustable current limit. Based on a voltage mode structure it integrates a current error amplifier to have a constant voltage and constant current control. By means of an onboard current sense resistor R1 and R2, current limit programming is very simple and accurate (±5%). Refer to the datasheet of the chip for R1 and R2 values about the current limit adjustment. The project can be used to charge NiMH and NiCad batteries due to its constant current feature. The project operates with a fixed switching frequency of 250Khz. If the temperature of the chip goes higher than a fixed internal threshold (150°C with 20°C hysteresis), the power stage is turned off. Other protections besides thermal shutdown complete the device for a safe and reliable application: overvoltage protection, frequency foldback overcurrent protection, and protection vs. feedback disconnection.

Note: The default output of the project is 3.3V @ 1A. The current limit can be set using R1 and R2, and Output Voltage is adjustable using resistors R4 and R5, refer to the datasheet for more info.

Connections

CN1: Pin 1 = 3.3V – 1Amp Output, Pin 2 = GND **CN2:** Pin 1 = + DC 8 to 36V Input, Pin 2 = GND **D2:** Power LED Input Side

Features

- Output 3.3V DC, Current up to 1 A (Output voltage adjustable from 1.235 V to 34 V) Read Note
- Operating input voltage from 8 V to 36 V
- Precise 3.3 V (±2%) reference voltage
- 5% output current accuracy
- 250 kHz internally fixed frequency
- 5% output current accuracy
- Voltage feedforward
- Zero load current operation
- Adjustable current limit
- Protection against feedback Disconnection
- Thermal shutdown
- PCB Dimensions 34.93 x 20.48mm
- 4 x 2.5mm Mounting Holes



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BOM						
NO	QNTY	REF	DESC	MANUFACTURER	SUPPLIER	SUPPLIER PART NO
1	1	CN1	2 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5315-ND
2	1	CN2	2 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5315-ND
3	1	C1	100uF/16V OR 6V LOW ESR ELECTROLYTIC	KEMET	DIGIKEY	399-13668-2-ND
4	1	C2	10uF/50V CERAMIC OR ELECTROLYTIC-THT SMD 12010/1206	MURATA/YAGEO	DIGIKEY	
5	1	C3	22KPF/50V CERAMIC SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
6	1	C4	220PF/50V CERAMIC SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
7	1	D1	MBRS360T3G	ON SEMI	RS COMP	545-2096
8	1	D2	LED RED MSD SIZE 0805	OSRAM	DIGIKEY	475-1278-1-ND
9	1	L1	22uH/2A SMD OR THT SIZE 6-8MM	KEMET	DIGIKEY	399-MPXV1D0530L220TR-ND
10	2	R1,R2	0.2E 1% SMD SIZE 1206	MURATA/YAGEO	DIGIKEY	
11	2	R3,R5	3.3K 5% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
12	1	R4	5.6K 5% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
13	1	R6	5.1K 1% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
14	1	U1	L6902 SOIC8	ST	DIGIKEY	497-18707-ND







07005







SILK SCREEN TOP

BOTTOM LAYER

TOP LAYER

PCB DIMENSIONS 34.93MM X 20.48MM



