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Solenoid, Relay, Valve Driver with Current Regulation

SKU: EL141008

# Solenoid, Relay, Valve Driver with Current Regulation

The project presented here is a PWM current driver for solenoids, Relays, and valves. The board will regulate the current with a well-controlled waveform to activate and reduce power dissipation at the same time. The solenoid current is ramped up fast to ensure the opening of the valve or relay. After the initial ramping, the solenoid current is kept at peak value to ensure the correct operation, after which it is reduced to a lower hold level in order to avoid thermal problems and reduce power dissipation.

The peak current duration is set at 78ms with an external capacitor C2. The current ramp peak level can be adjusted using the PR1 trimmer potentiometer in the range 83mA to 250mA, the default PWM frequency is 20KHz, PWM frequency can be changed between 20Khz to 60Khz using the external resistor R4. The enable pin has an internal pull-up, so normally chip is enabled, pulling down the enable pin brings the chip into disable mode.

FEATURES

- Power Supply 6V to 24V DC
- Load Current up to 250mA
- Peak Current Duration 78mS
- Peak Current Adjustable range 83mA to 250mA
- Start Up Delay Approx 25uS
- PWM Frequency 20Khz
- On Board Switch to disable the output
- Enable Pin for External Connector
- Header Connector for Power and Solenoid
- Fast Ramp-Up of Solenoid Current to Guarantee Activation
- Integrated Sense Resistor for Regulating Solenoid Current
- Solenoid Current is Reduced in Hold Mode for Lower Power and Thermal Dissipation
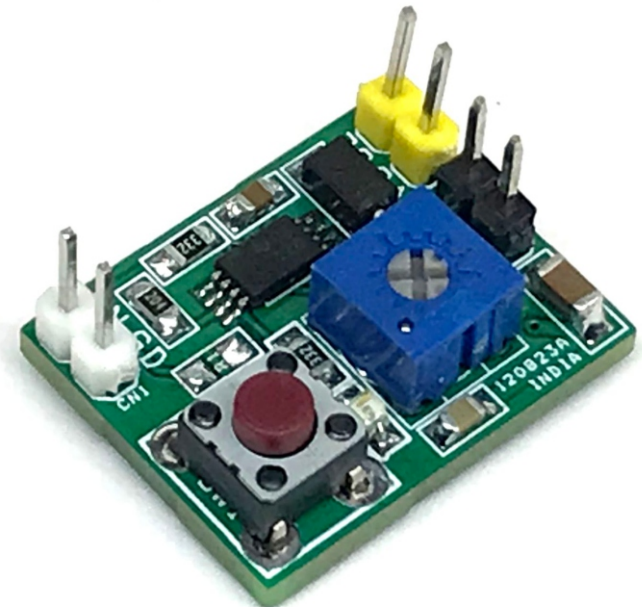
FEATURES

- Solenoid Current is Reduced in Hold Mode for Lower Power and Thermal Dissipation
- Internal Supply Voltage Regulation
- Thermal Shutdown, Threshold 160 Degree Centigrade
- Undervoltage Lockout (UVLO), Threshold 4.6V
- Compact Design
- PCB Dimensions 22.23 X 17.78MM
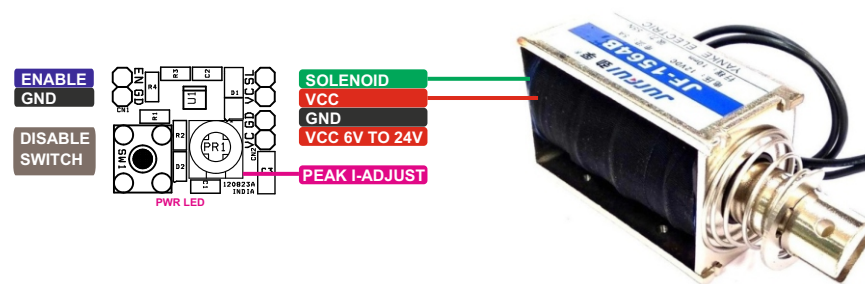
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Schematic
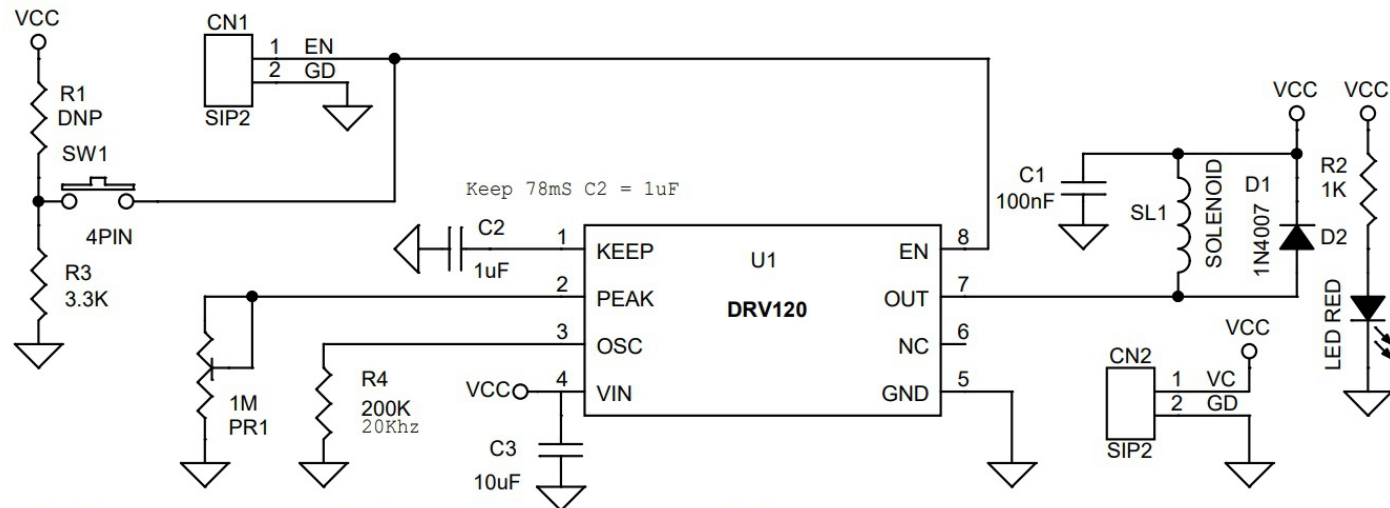
R4 200K = Frequency 20Khz , 50K = Frequency 60Khz
Keep Capacitor C2 1uF = 78mS
PR1 Trimmer Potentiometer : 50K Ohms = 250mA, 200K Ohms = 83mA (Peak Current)
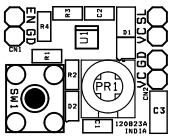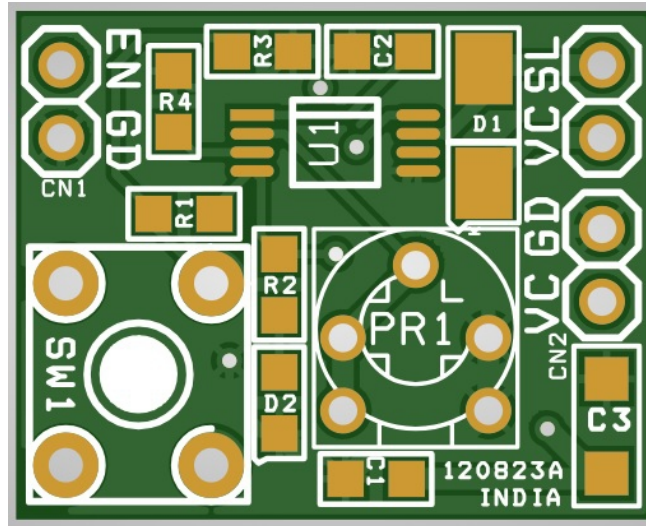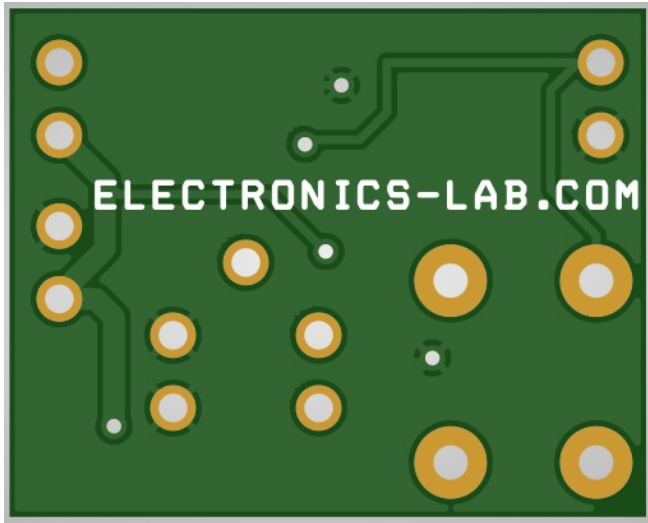Delay between EN going high until driver enabled 20uS

Connections

Connections and Other Details
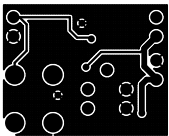
- CN1: Pin 1 Enable (High = Enable, Low = Disable) High = 4V to 7V, Pin 2 = GND
- CN2: Pin 1 VCC 6V to 24V DC, Pin 2 = GND
- SL1: Pin 1 = Solenoid, Pin 2 VCC (Connections for Solenoid)
- D2: Power LED
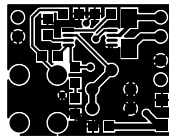- Sw1: Disable Switch Push to Disable

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PCB

PCB GERBER FILES AVAILABLE

SILK SCREEN TOP

BOTTOM LAYER

TOP LAYER

PCB DIMENSIONS 22.23 X 17.78MM

Parts List

NO.	QNTY.	DESC.	REF.	MANUFACTURER	SUPPLIER	SUPPLIER PART NO
			BOM			
1	2	CN1,CN2	2 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5315-ND
2	1	C1	100nF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
3	1	C2	1uF/35V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
4	1	C3	10uF/35V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
5	1	D1	1N4007 SMD DIODE	DIODE INC	DIGIKEY	S1MBDITR-ND
6	1	D2	LED RED SMD SIZE 0805	OSRAM	DIGIKEY	475-1278-1-ND
7	1	PR1	1M TRIMMER POTENTIOMETER	BOURNS	DIGIKEY	3362P-105LF-ND
8	1	R1	DNP			
9	1	R2	1K 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
10	1	R3	3.3K 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
11	1	R4	200K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
12	1	SL1	2 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5315-ND
13	1	SW1	TACTILE SWITCH	C&K	DIGIKEY	CKN9085CT-ND
14	1	U1	DRV120	TI	DIGIKEY	296-34777-1-ND

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Notes

APP

Android App

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