12W LED DIMMER WITH SOFT START

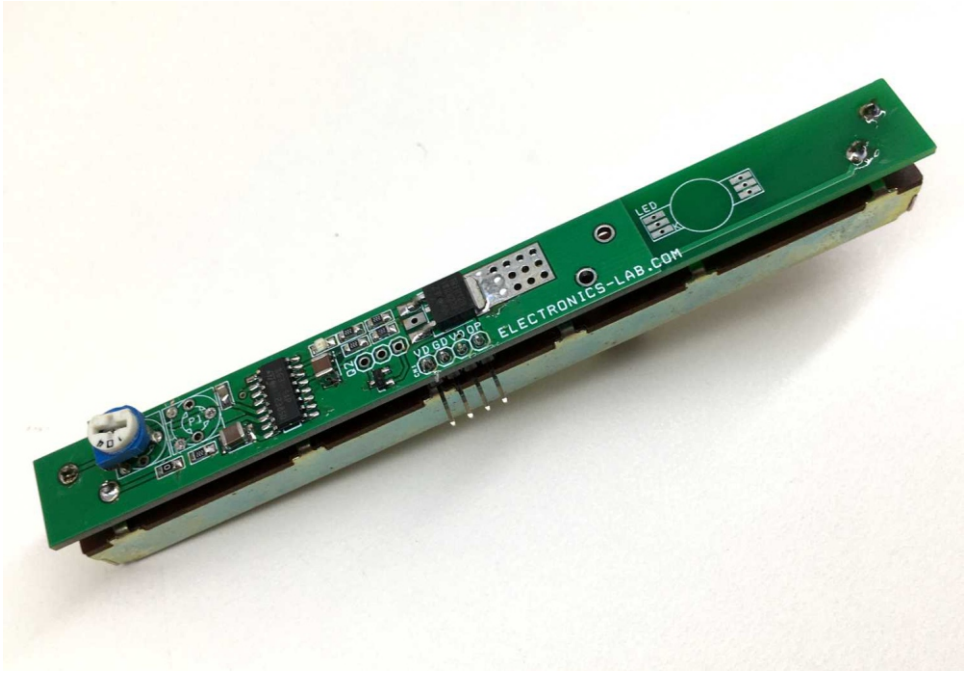
Circuit presented here is a LED dimmer with soft start, the project can drive LED up to 12W, the circuit can manage load up to 1Amp continues with 12V Supply. Circuit is built using SG3525 PWM IC and MOSFET IRFR120, SG3525 generates PWM and IRFR120 MOSFET drives 12W Load. BC847 is used to invert the PWM signal from SG3525 to create soft start circuit. SG3525 has soft start function, soft start timing can be Slower down by increasing capacitor C2 value to 22uF/16V. Trimmer pot PR1 provided to adjust the frequency 210 Hz to 6.5Khz. Keeping PWM frequency lower is advisable for LED. Intensity of LED can be adjust using slide potentiometer P1. Optional small trimmer pot is provided in case slide pot is not available. I have used LOG slide pot which is used in audio applications, linear pot will have better linear dimming. Duty cycle upper limit can be restricted by changing R2. Use R2 0 Ohms or 1 Ohms for normal 0-100% duty output.

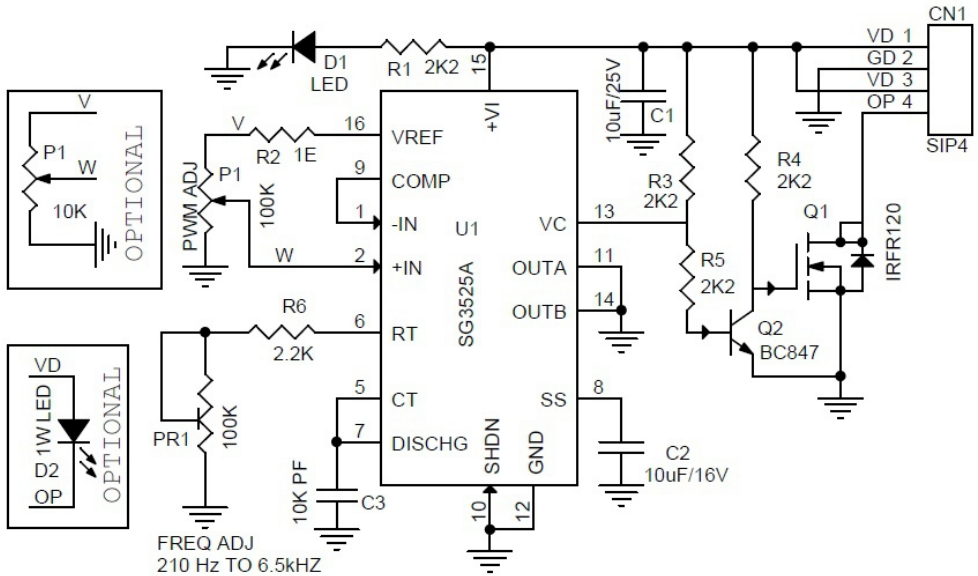
The circuit is designed to driver 12V LED or LED panels, don't connect any LED directly to this drive, as LED forward voltage is 3.5V and they need series resistor to control the current. Any LED, LED Panel, Light Pad of 12V and current 10mA to 1Amp can be connected to this drive directly.

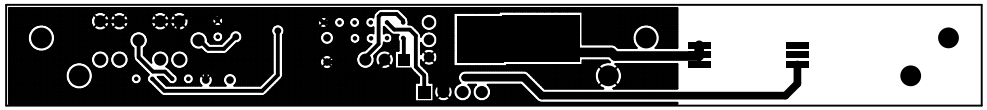
Direct drive of LED without series resistor is possible by limiting the maximum current, choose appropriate resistor value of R2 to achieve this.

Features

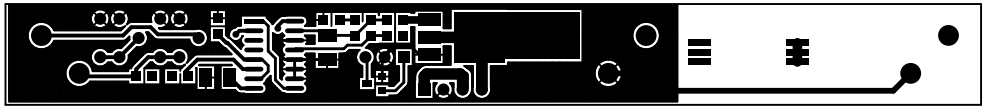
- Supply 12V-15V DC
- LED Load 10mA to 1Amp Continues
- Frequency range 210Hz to 6.5Khz
- Duty Cycle Span 0 to 100 %
- D1 Power LED




CN1
VD 1
GD 2
VD 3
OP 4
SIP4
D1
LED
R1 2K2
15
+VI
10uF/25V
C1
R3
2K2
R4
2K2
Q1
IRFR120
R5
2K2
Q2
BC847
V
P1
W
10K
OPTIONAL
PWM ADJ
P1
100K
V
R2 1E
16
VREF
9
COMP
1
-IN
U1
VC
13
W
2
+IN
SG3525A
OUTA
11
OUTB
14
R6
2.2K
6
RT
5
CT
SS
8
7
DISCHG
SHDN
GND
10
12
C2
10uF/16V
VD
1W LED
D2
OP
OPTIONAL
PR1
100K
10K PF
C3
FREQ ADJ
210 Hz TO 6.5kHZ

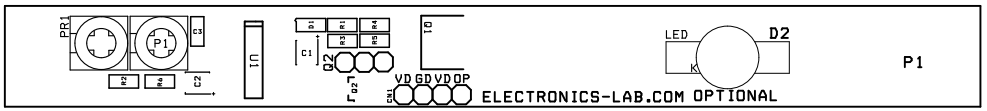


BOTOM LAYER



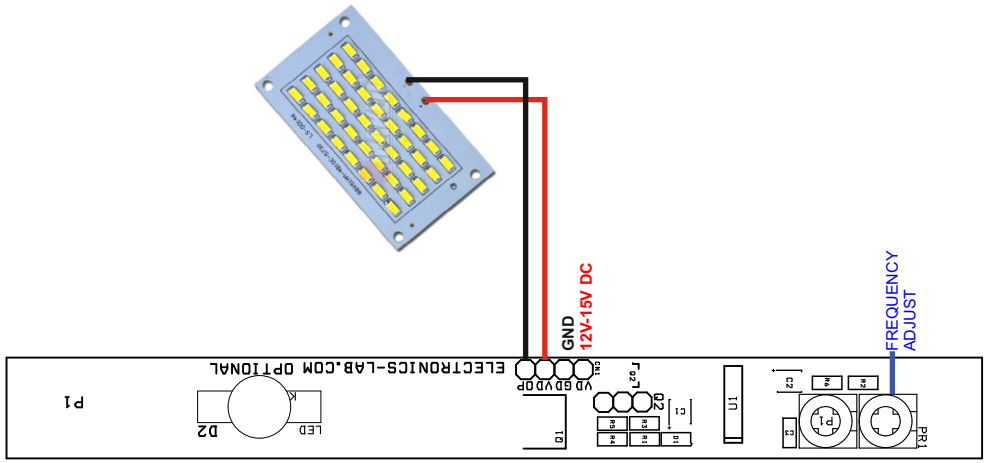
TOP LAYER

SILK SCREEN BOTTOM



SILK SCREEN TOP

PCB DIMENSIONS 129MM X 13.50MM



SR.	QNTY.	REF.	DESC.
1	1	CN1	4 PIN HEDAER MALE 2.54MM
2	1	C1	10uF/25V SMD 1210
3	1	C2	10uF/16V SMD 1210
4	1	C3	10K PF /50V SMD 0805
5	1	D1	LED RED SMD 0805
6	1	D2	DNP
7	1	PR1	100K
8	1	P1	10K SLIDE POT
9	1	Q1	IRFR120 SMD DPAK
10	1	Q2	BC847 SMD SOT23
11	5	R1,R3,R4,R5,R6	2K2 SMD 0805
12	1	R2	1E SMD 0805
14	1	U1	SG3525A SMD SO16