Power steps PCB

Schematic:

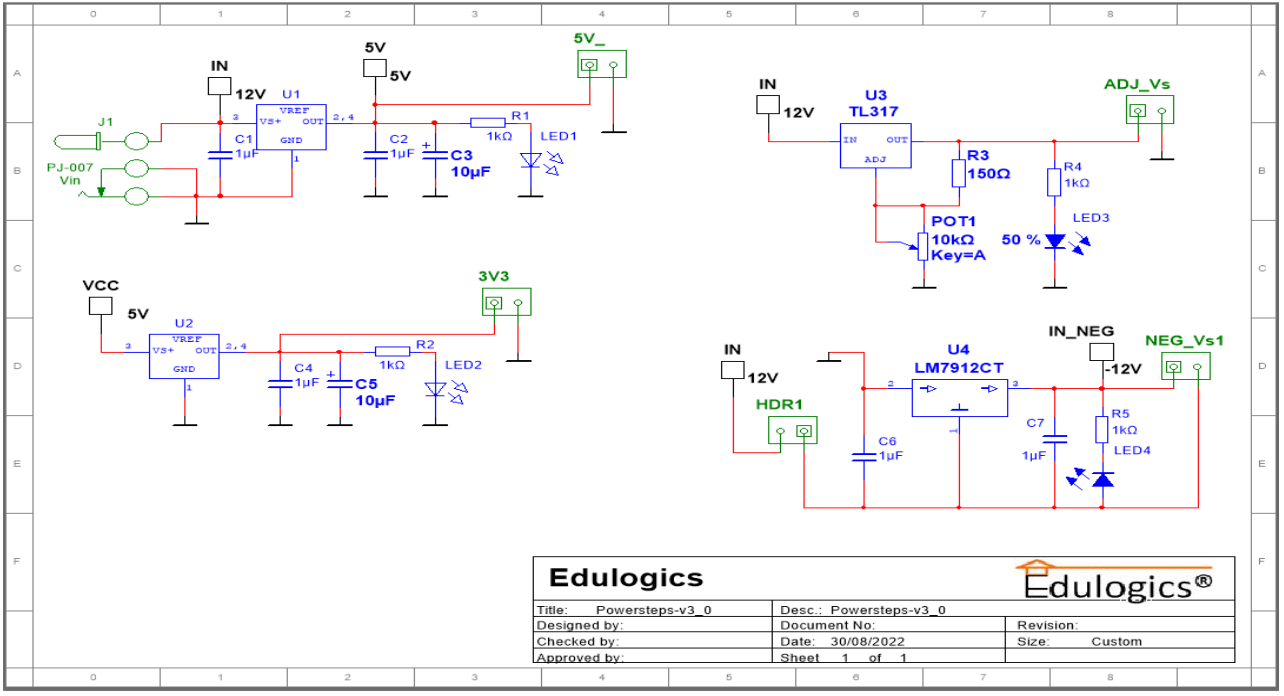
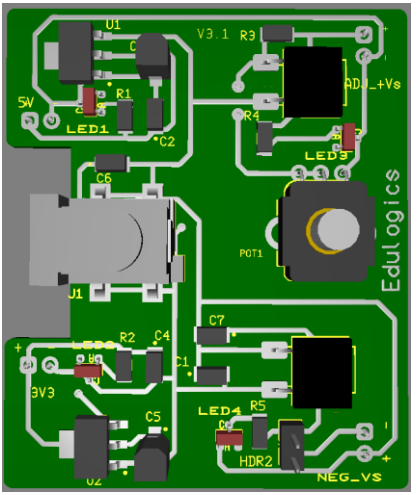


Fig. 1 Schema Power stage Print

Power steps PCB

Lay out:



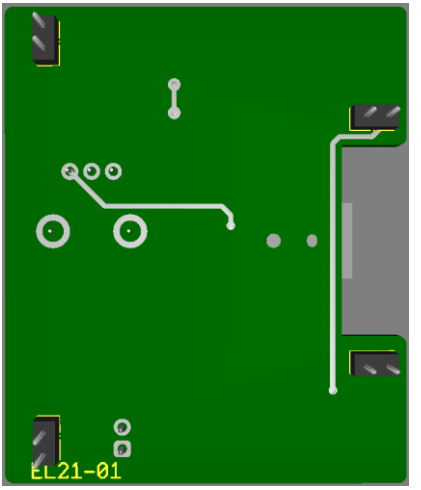
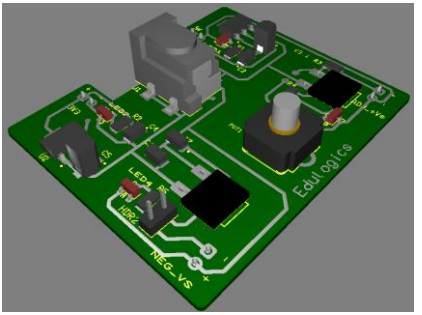


Fig. 2 TOP Side



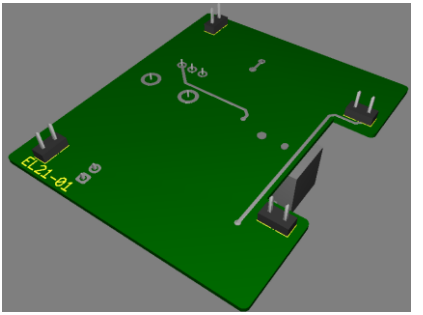


Fig. 3 Bottom Side

WORKING ORDER:

1. Solder Pasta Placing
2. SMD Placing
3. SMD Soldering (Oven)
4. THD soldering
5. Testing main power circuit
6. Testing sub power circuits

Bill of materials:

Design Name : Power steps PCB - Bill of materials

Tabel 1

	VALUE	#	REFDES	SHAPE
Potentiometer	10kOhm	1	POT1	P_RK09K113A4
Resistor	1kOhm	4	R1,R2,R4,R5	RESC3216X84N
Capacitor	1uF	5	C1,C2,C4,C6,C7	CAPC3216X180N
Cap. Electrolit	10uF	2	C3,C5	CAPAE330X540N
Resistor	150Ohm	1	R3	RESC3216X84N
Header	HDR1X2	5	3V3,5V,ADJ_+Vs, NEG_VS	HDR1X2
LED	LED_red	2	LED1, LED2	LED_SOT23
LED	LED_blue/green/Yellow	2	LED3, LED4,	LED_SOT23
-12 Volt, Voltage regulator	LM7912CT	1	U4	TO-252AA
5 Volt, Voltage regulator	LM1117MPX-50NOPB	1	U1	SOT230P700X180-4N
3.3 Volt, Voltage regulator	NCP1117STAT3G	1	U2	SOT230P700X180-4N
Voltage regulator	LM317	1	U3	TO-252AA
Power Jack	PJ-007	1	J1	CUI_PJ-002B-SMT

Pin Configuration SMD and THD Components (Technical Design):

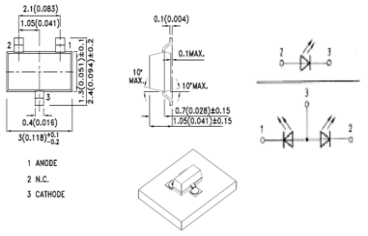


Fig. 9 LED

	MCWR12
L	3.1 ± 0.1
W	1.6 ± 0.1
T	0.6 ± 0.15
Tb	0.45 ± 0.2
Tt	0.5 ± 0.2

Dimensions : Millimetres

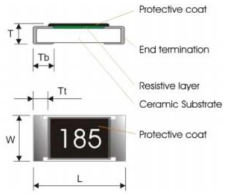
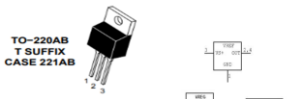
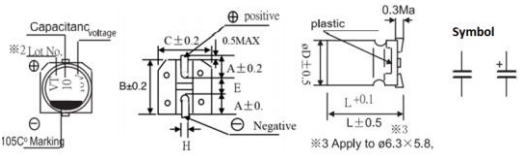


Fig. 10 Type 1206 Resistor



PIN ASSIGNMENT	
1	Adjust
2	V_{out}
3	V_{in}

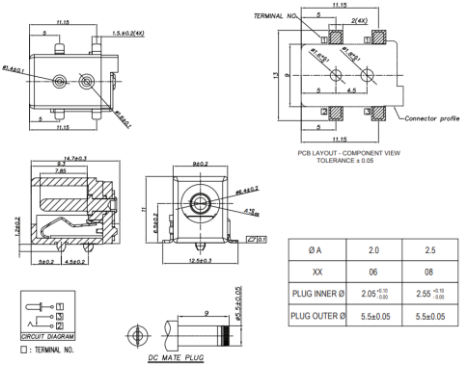
Fig. 11 Voltage Regulators



D×L	4×5.4	5×5.4	6.3×5.4/7.7	8×6.2	8×10.5	10×10.5/13.5	12.5×13.5/16	16×16.5/21.5
A	1.8	2.1	2.4	3.3	2.9	3.2	4.7	5.5
B	4.3	5.3	6.6	8.3	8.3	10.3	13	17
C	4.3	5.3	6.6	8.3	8.3	10.3	13	17
E	1.0	1.5	2.2	2.2	3.1	4.4	4.4	6.7
L	5.4	5.4	5.4/7.7	6.2	10.5	10.5/13.5	13.5/16	16.5/21.5

Dimensions : Millimetres

Fig. 12 One type Capacitor



Ø A	2.0	2.5
XX	06	08
PLUG INNER Ø	2.05 +0.10 0.00	2.55 +0.10 0.00
PLUG OUTER Ø	5.5±0.05	5.5±0.05

Fig. 13 Power Jack

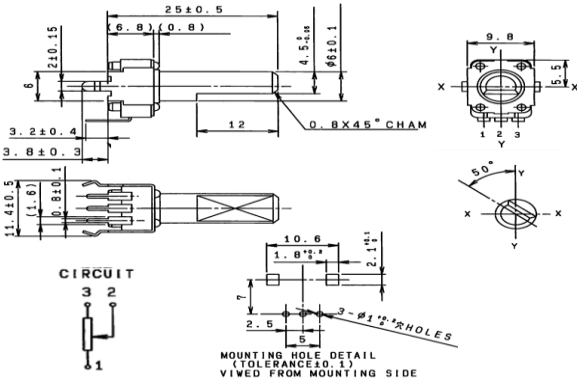


Fig. 14 THD - Potmeter

Mounting Process:

Surface Mounting Process

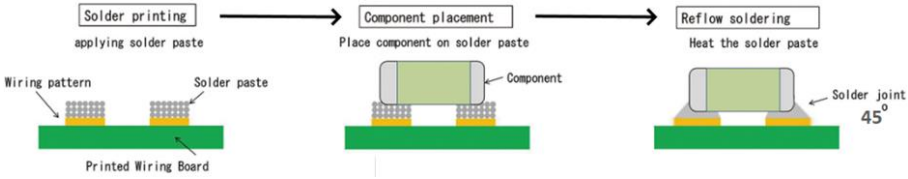


Fig. 4 Surface mounting process

Using Pick and Place Machine

1. Pick a component with a vacuum nozle

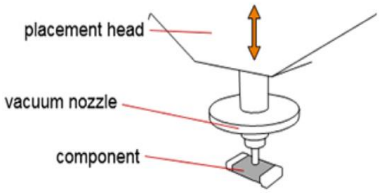


Fig. 5 Pick a component

2. Rotating the component to proper orientation

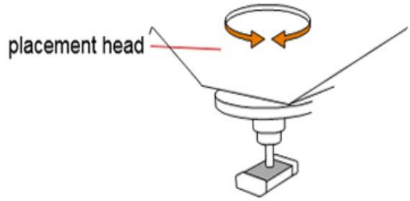


Fig. 6 Rotate component

3. Positioning the component , to its location on the circuit board, placing the component into the solder paste

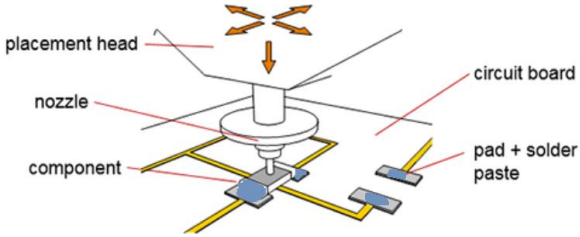


Fig. 7 Positioning and placing the component

Through-Hole Soldering:

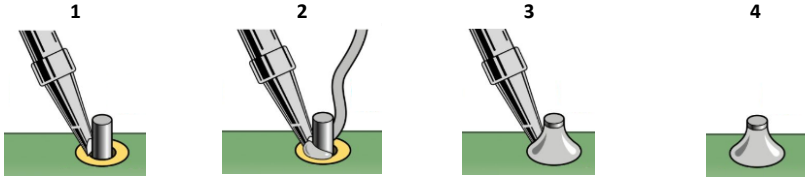


Fig. 7 Soldering THD

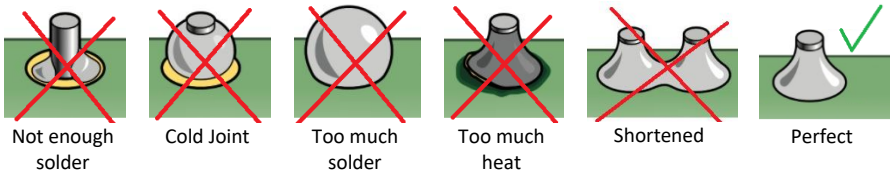


Fig. 8 Perfect Soldering

Power Stages Circuits:

Input (12 Volt) To Fixed 5 Volt

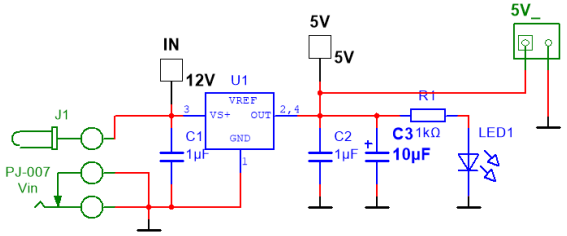
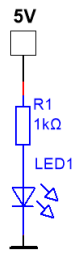


Fig. 5 Circuit 5Volt



LED RED

Maximum DC Forward Current = 20 mA

Tyical LED Voltage, VF
VF = 2,5 Volt

VR1 = Vin - VLED
= 5 - 2,5 = 2,5 Volt

R1 = VR1 / IF = 2,5V / 20mA
= 125 Ohm

Input (5 Volt) To Fixed 3.3 Volt

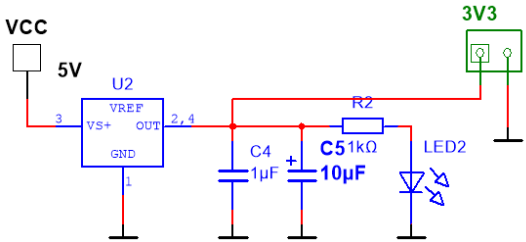
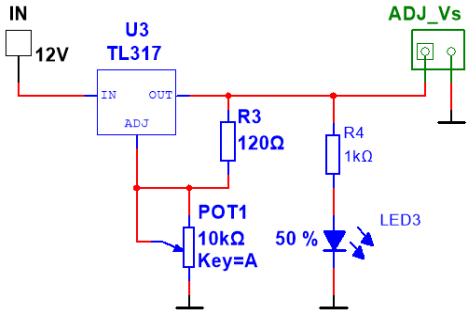


Fig. 6 Circuit 3.3Volt

Input (12 Volt) To Adjustable 12 Volt



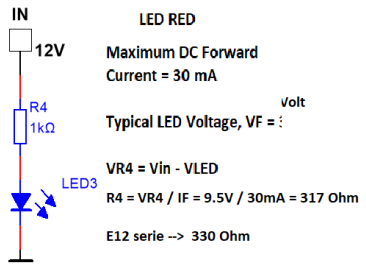


Fig. 7 Circuit 12Volt

Input (12 Volt) To Adjustable Negative 12 Volt

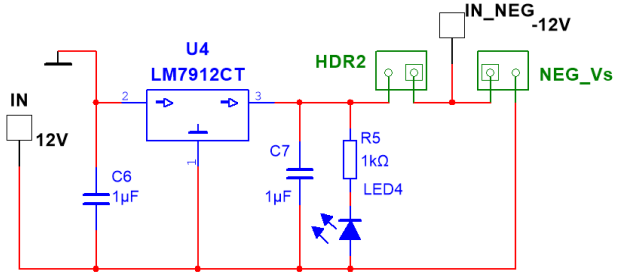


Fig. 8 Circuit -12Volt