

K178 EN Regulated Power Supply

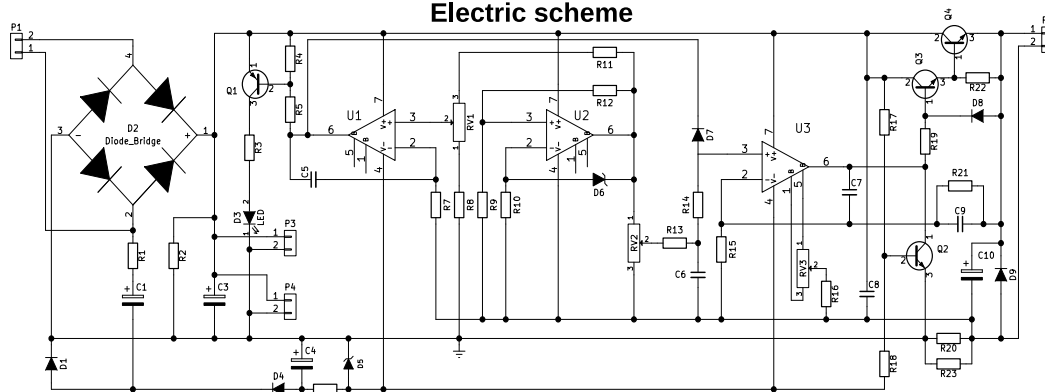
The kit includes:
 printed circuit board; components according to the list, instruction.
 Store under normal climatic conditions
 Shelf-life Unlimited

Specifications

Supply voltage, 12...24VAC;
 Current consumption, <10mA;
 Load current, 0,01...3A

This kit allows you to assemble a laboratory power supply with output current and voltage regulation and short circuit protection.

Electric scheme



The LPS is a linear power supply with a low-noise element base. The circuit consists of 4 functional units: a reference voltage source, on U2 and D6; a current comparison circuit U1 and RV1,3; a voltage setting circuit on RV2 and U3,4; a Darlington regulating pair on Q3, Q4 and Q2. When turned on, the U2 microcircuit, which is a type of Schmitt trigger based on an op amp, self-excites due to the positive feedback signal formed by the resistor R12.

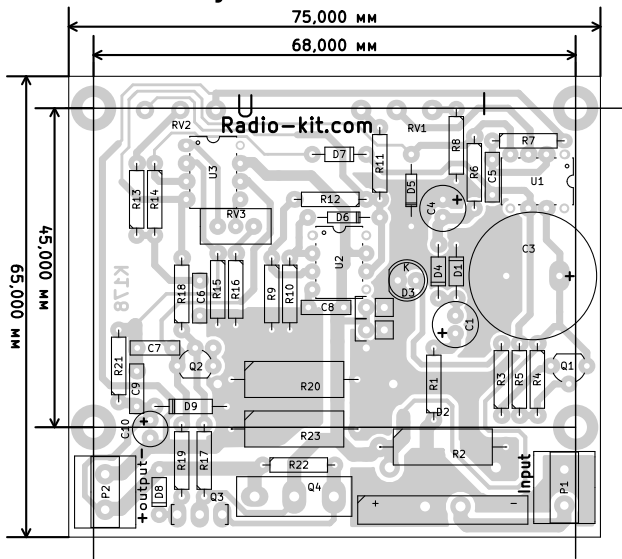
When the voltage becomes sufficient,

the zener diode is turned on, the excitation conditions disappear and the trigger switches and operates in the linear gain mode.

The voltage at the op-amp output is equal to the doubled zener diode voltage. This limits the lower limit of the supply voltage.

The reference voltage powers the circuits that compare the reference voltage with the voltage on the corresponding dividers. Current regulation occurs through regulation of the output voltage, at which the required current limitation is met. The control signal is sent to Q3-Q4, which limits the output voltage.

Layout of elements



List of components:

R2.....	2.2 kOhm, 2 W;	C3	3300-4700uFx50V;
R1.....	82...91 Ohm*;	C1,C4	47-100uFx50V;
R6.....	200...240;	C6	0.1uF, CL21;
R10.....	4.7 kOhm;	C8	0.22uF, CL21;
R5,R7,R9,		C9	100pF;
R12, R17.....	10 kOhm;	C10	10uFx50V;
R20.....	0.82 Ohm 5 W;	C5	330pF;
R13,R15.....	27 kOhm;	C7	91-100pF;
R4,R14.....	2.2 kOhm;	D2	RS807;
R16.....	270 kOhm;	D1,D4	1N4148;
R11, R21.....	56 kOhm;	D5,D6	BZX55C 5V6
R18.....	1.5 kOhm;	D7,D8	1N4148;
R19,R22.....	1 kOhm;	D9	1N4001-4007;
R8.....	33 Ohm;	Q2	BC547-548;
R3.....	3.9 kOhm;	Q3	BD139;
Rv3.....	100 kOhm;	Q1	SS9015;
Rv1,Rv2.....	10 kOhm;	Q4	TIP35C;
Плата	PCB178	U1-U3	TL071, TL081, LM741;
P1,P2.....	2pin terminal	D3	LED 3 or 5mm

* all resistors, unless otherwise stated, are 0.25W

Table for selecting the nominal value of the measuring resistor:

I_H=3A R20,R23 1.2 Ohm
 Transformer from 75VA

I_H=2A R20,R23 1.6 Ohm

Transformer from 50VA
 I_H=1A R20,R23 2 Ohm
 Transformer from 25VA

Notes:

- For better cooling, resistor R20 should be installed with an air gap of approximately 5-10 mm from the board. It is possible to install two resistors: R20, R23 with a power of 2 W each. Their rating should be selected according to the table below.
- Transistors Q3, Q4 should be installed on a heat sink with an area of at least 600 cm with forced air cooling. To power an external cooler, you can use the voltage from contacts P3-P4.
- Forced air circulation should be ensured when installing in a closed case.
- RV1 - current regulation, RV2 - voltage regulation.