Beijing University of Posts and Telecommunications
No.10 Xitucheng Road,
Haidian District,
Beijing, China
010-67374537

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Yang Qixuan
2013213059@bupt.edu.cn

Transistor amplifying circuit

Experiment equipment

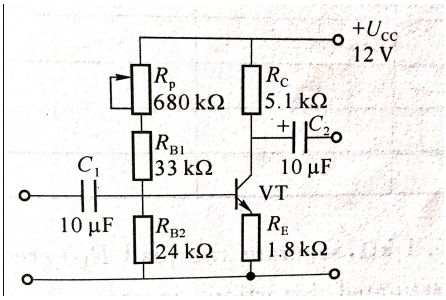
1. Digital multi-tester
2. DC stabilized voltage power supply.
3. Function signal generating device
4. AC millivolt
5. Double-trace oscilloscope

Preparation requirements

1. Transistor amplifying circuit's principle of working.
2. Amplifying circuit static state working point measuring and debugging
3. Research amplifying circuit's dynamic working principle.

Experience content

1. The measurement of the amplifying circuit static state working point.
   (1) Judgetriode's polarity and the quality with the multi-tester.
   (2) According to Figure junction circuit, connect direct –current power supply, measure V_B, V_E, V_C, R_P, with the multi-tester, and calculate U_{CE}, I_B, I_C and fill in table 9.1



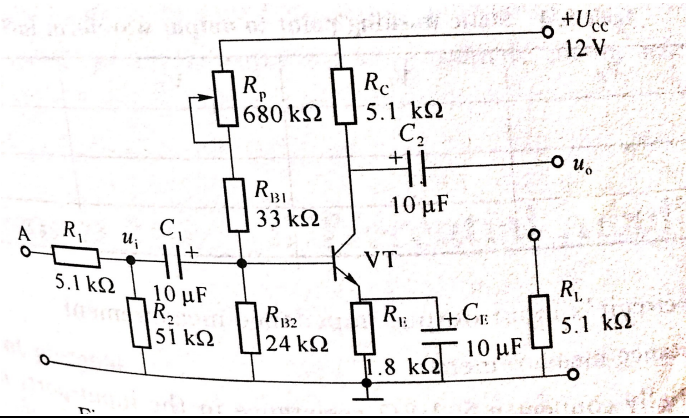
Measured value				Calculate value		
V_B	V_E	V_C	R_P	U_{CE} (v)	I_B (mA)	I_C (mA)
2.0596	1.4430	7.828	7.545	5.7684	0.0163	0.8180

2. Dynamic research

(1) According to Figure junction circuit, adjusts R_P to cause V_C to be equal to 6V

(2) Adjust signal generator's output for the sinusoidal signal of f=1KHZ U_S = 500mV and connect to table electric circuit's A spot, through R_1, R_2 attenuation 100 times, the signal which the u_i obtain 5mV,and observe u_i, u_o signal, pay attention to phase relation, and draw u_i, u_o waveform.

(3) Maintain the signal generating device output signal frequency invariable, increase the signal scope gradually, observe the most greatly not distorted voltage u_o and fill in table.



Measuring		Calculating	Estimating
u_i (mV)	u_o (V)	Au	Au
6.20	-0.890	-143.5	-170.4
8.20	-1.290	-157.3	-183.2

10.1	-1.590	-157.4	-185.2

(4)Maintain u_i =5mV to be invariable, when idling tune V_C =6V,and the load is connected to the amplifying circuit, according to parameter condition table, which assign measurement, and the computed result will fill in the table.

Assigns the parameter		Measuring		Calculating	Estimating
R_C (K Ω)	R_L(K Ω)	u_i(mV)	u_o(mV)	Au	Au
5.1	5.1	5	-388	-77.6	-87.66
5.1	2.2	5	-236	-47.2	-58.82
2	5.1	5	-218	-43.6	-52.27
2	2.2	5	-152	-30.4	-40.45

(5) u_i =5mV reduced R_P, cause V_C<4v may observe the saturated distortion, increase R_P, cause V_C>9v may observe the saturated distortion may observe to cut off distorts, the measurement result will fill in table.

R_P	V_B	V_C	V_E	Output waveform situation
Small	3.84	3.20	3.18	Saturated distortion
Appropriate	2.76	5.90	2.13	Normal
Big	1.361	11.055	1.06	Cut off distorts

Conclusion

1. Grasp the measuring method of the amplifying circuit static state working point and analyze the influence of the static state working point to the amplifier performance.
2. Grasp the measuring method of the amplifying circuit voltage amplification gain and the most greatly not distorted voltage.
3. Grasp the measuring method of the amplifying circuit input resistance and output impedance.

I will call you this week to discuss our study and any possible follow-up you wish us to do.

Sincerely,
Yang Qixuan