

LM2676

This article contains two parts, one is electrical parameters measurement and the other is temperature measurement. All measurements are based on the schematic diagram below, see Fig1.0.

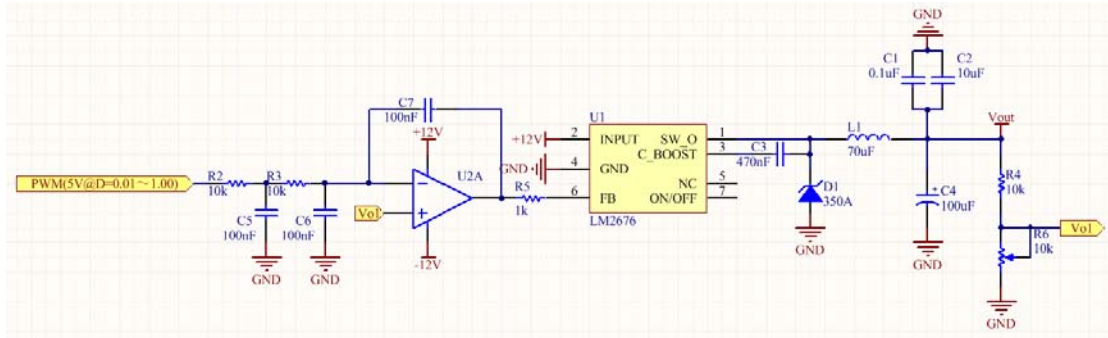


Fig 1.0 schematic diagram

Part one Electrical parameters measurement

1.1 The relative parameters measurement

The test circuit of LM2676 is built according to figure 1.0, and the test points are shown in the figure1.1.0

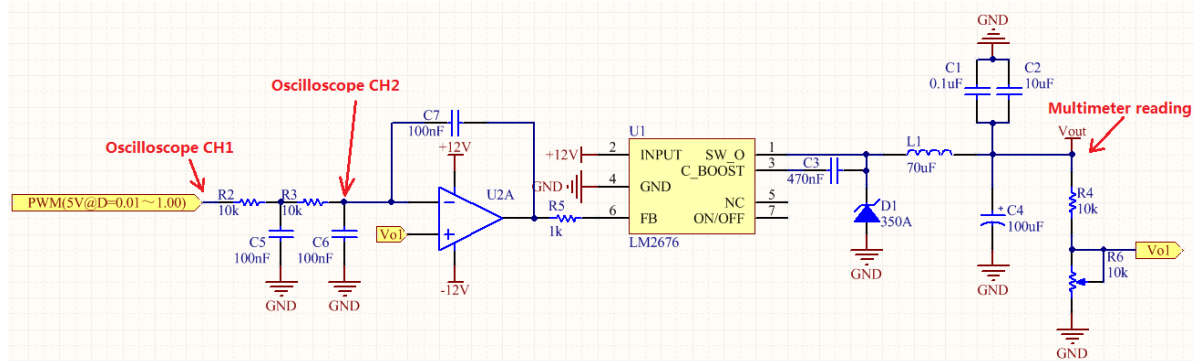


Fig 1.1.0 LM2676 Testpoints I

Note, CH1 is PWM setting voltage, CH2 is the operational amplifier's inverter input voltage

1.1.1 The measurement of the initial state

1.1.1a The initial output voltage is set to 0V, and the output voltage is 0.0642V with multimeter. See Fig1.1.1a

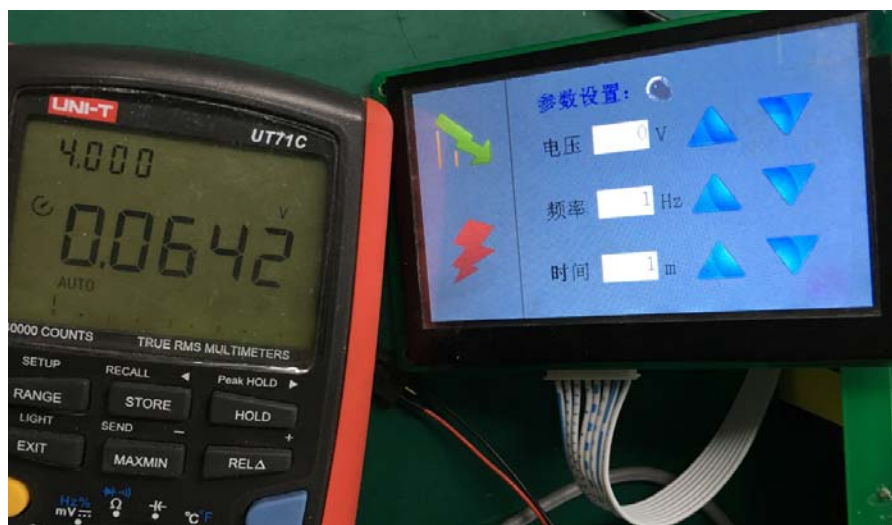


Fig1.1.1a initial state parameters

1.1.1b CH1 is 0V, and CH2 is 0.0343V, See Fig1.1.1b.

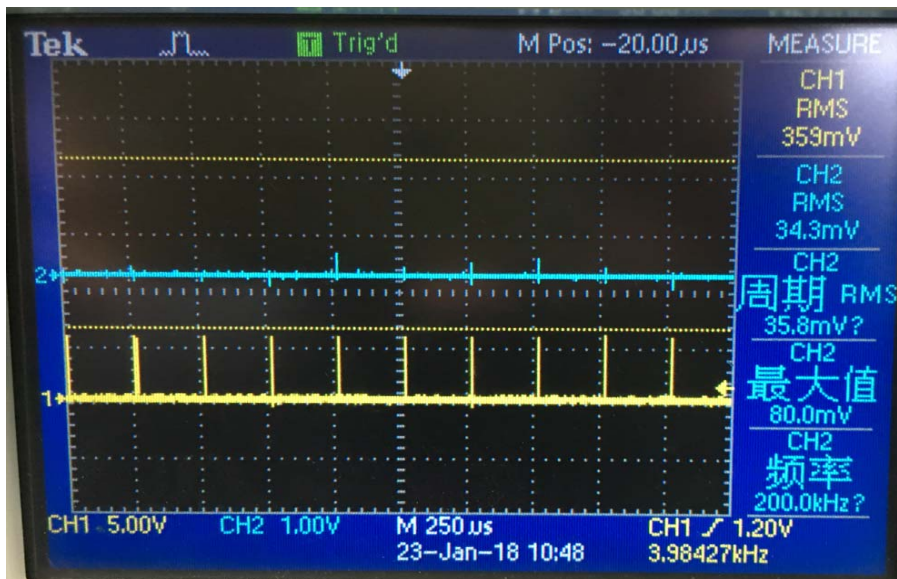


Fig1.1.1b The oscilloscope display of initial state

1.1.2 Adjust the output voltage 1 (for example, 3.7V) with relevant parameters.

1.1.2a The output voltage is set to 3.7V, and the measured output voltage of multimeter is 3.7168V. See Fig1.1.2a.



Fig1.1.2a Output voltage1 parameters

1.1.2b CH1 is 3.7V, and CH2 is 1.46V, see Fig1.1.2b.

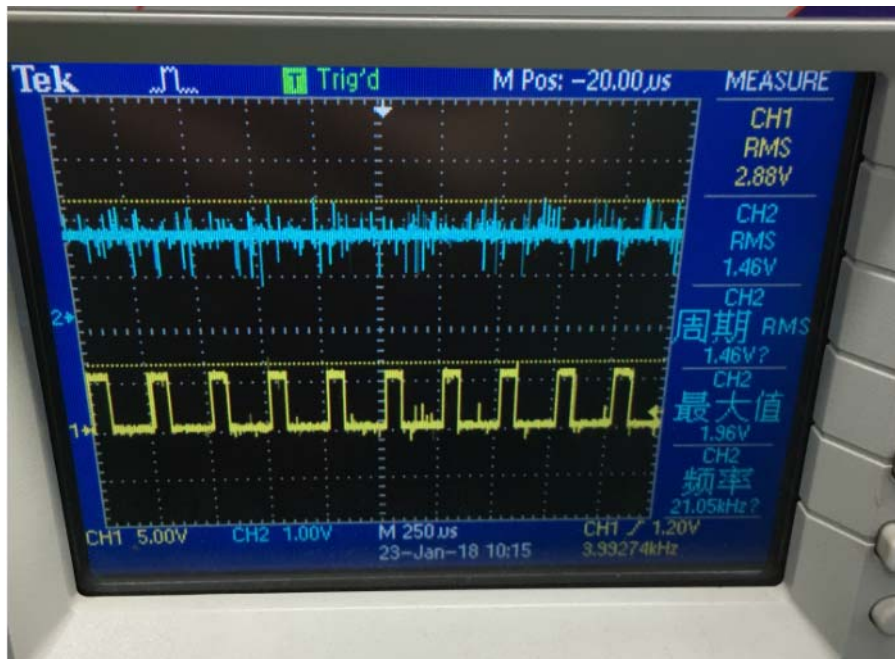


Fig1.1.2b The oscilloscope display of output voltage1

After 30 to 50 seconds, the relevant parameters are as follows.

1.1.2c The output voltage is still set to 3.7V, but the measured output voltage of multimeter is 0.0009V. See Fig1.1.2c.



Fig1.1.2c Output voltage1+ parameters

1.1.2d CH1 is 3.7V, and CH2 is 0.676V, See Fig1.1.2d.

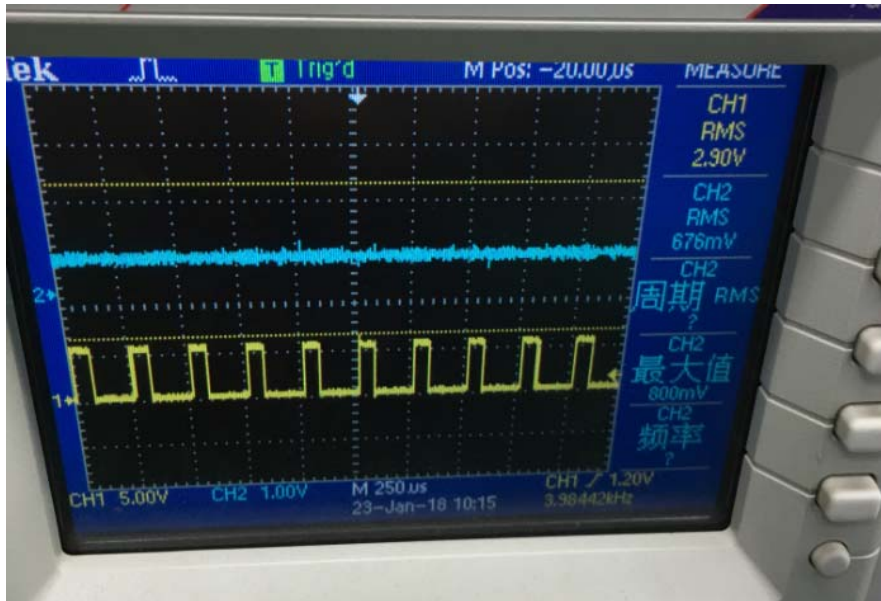


Fig1.1.2d The oscilloscope display of output voltage1+

1.1.3 Adjust the output voltage 2 (e.g 0.3V) with relevant parameters.

1.1.3a The output voltage is set to 0.3V, and the measured output voltage of multimeter is 0.3594V. See Fig1.1.3a.



Fig1.1.3a Output voltage2 parameters

1.1.3b CH1 is 0.3V, and CH2 is 0.138V, See Fig1.1.3b.

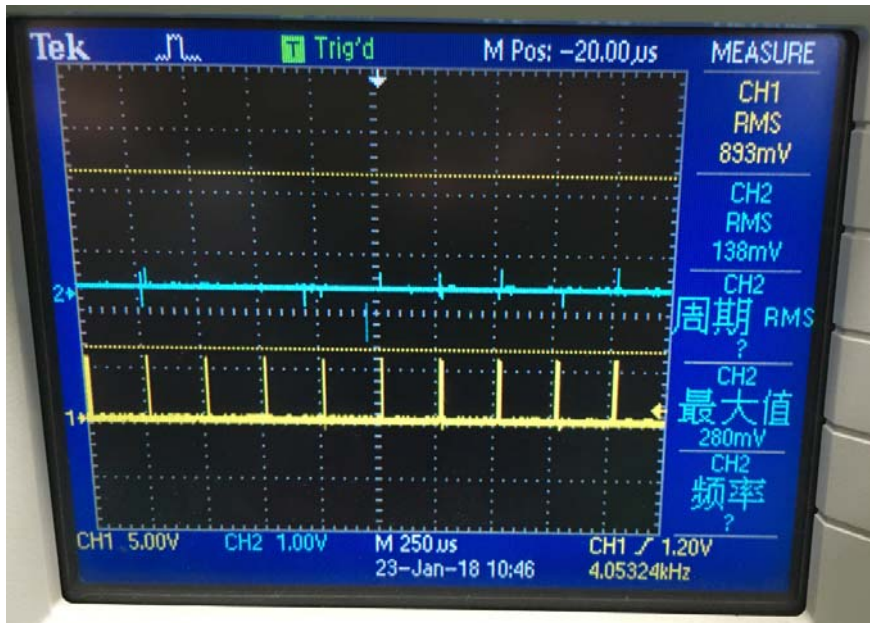


Fig1.1.3b The oscilloscope display of output voltage₂
After 30 to 50 seconds, the relevant parameters are as follows.

1.1.3c The output voltage is still set to 0.3V, but the measured output voltage of multimeter is 0.0009V. See Fig1.1.3c



Fig1.1.3c Output voltage₂+ parameters
1.1.3d CH1 is 0.3V , and CH2 is 0.136V,See Fig1.1.3d.

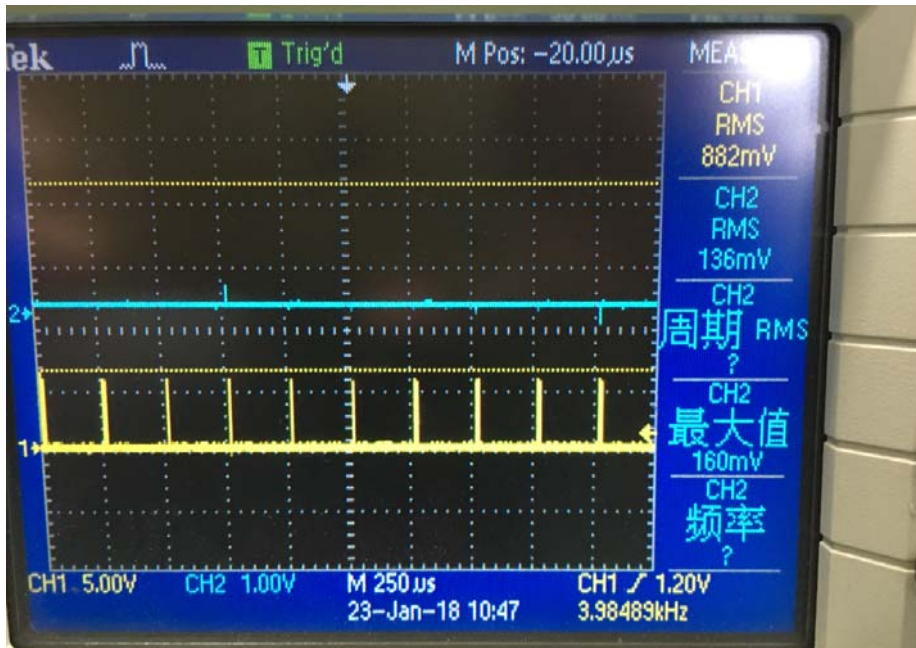


Fig1.1.3d The oscilloscope display of output voltage2+

1.2 The parameters of measurement

The test circuit of LM2676 is built according to figure 1.0, and the test points are shown in the figure1.2.0

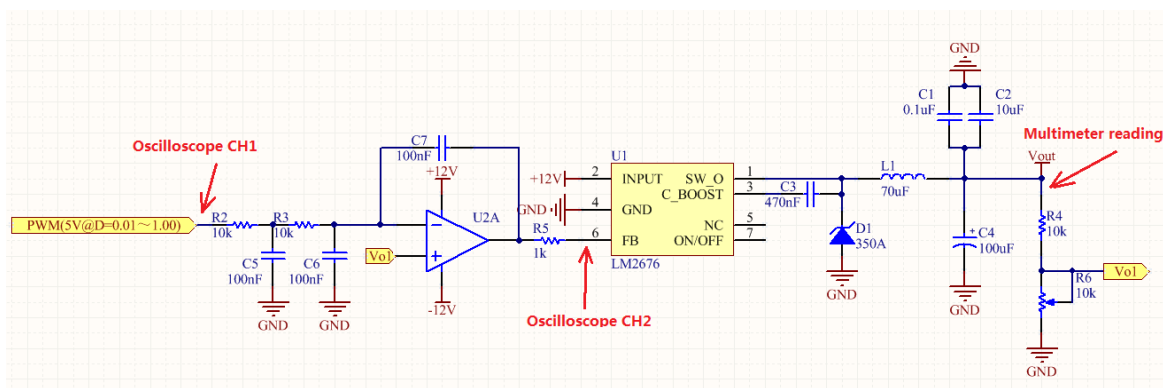


Fig 1.2.0 LM2676 Testpoints I

Note,CH1 is PWM setting voltage, CH2 is the FB pin voltage of LM2676

1.2.1 The measurement of the initial state

1.2.1a The initial output voltage is set to 0V, and the output voltage is 0.0651V with multimeter. See Fig1.2.1a



Fig1.2.1a initial state parameters

1.2.1b CH1 is 0V, and CH2 is FB pin voltage, See Fig1.2.1b.

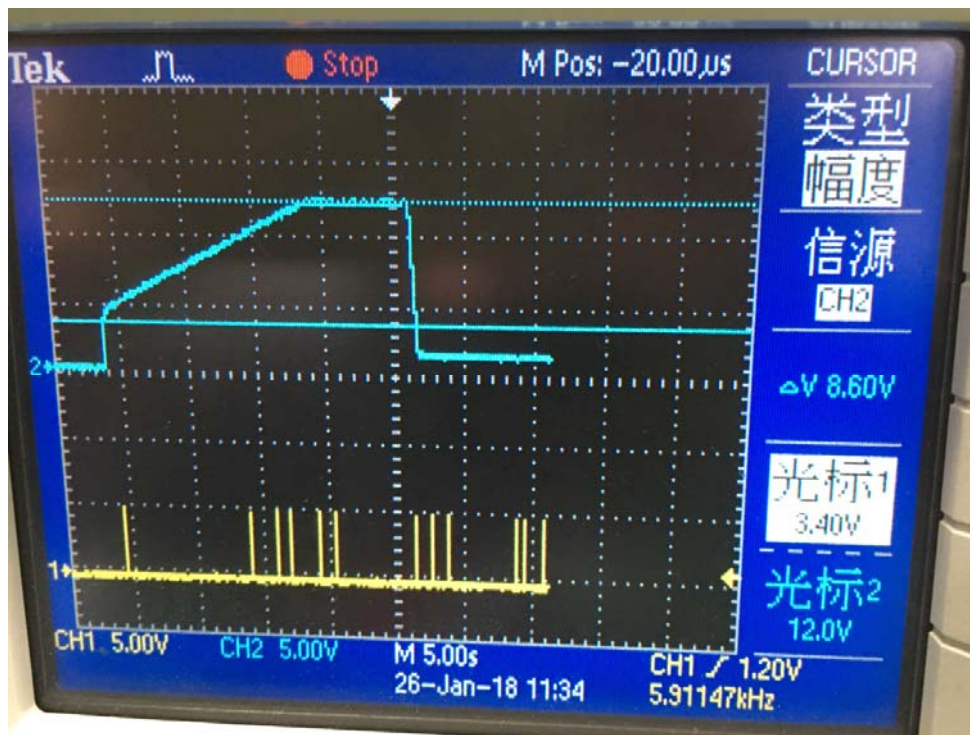


Fig1.2.1b FB pin voltage

When the power is supplied ,the voltage of FB pin changed from 0V to about 3.4V(3.0~5.0V) immediately, then gradually increased to 12V, keep steady.

it last about 15 seconds from 3.4V to 12V,the duration depends on the capacitance value of the transboundary in the reverse input and output of the operational amplifier,that is C7. The larger the value of capacitance, the longer the duration.

Once set the output voltage,even one step 0.1V,on the small touch screen,the FB pin voltage dropped immediately from 12V to about 1.46V. In subsequent debugging,that is setting the output voltage to 0.1~10V,the FB pin voltage is maintained at this level. Unless the output voltage shuts off to 0V,the FB pin voltage drop to about 0.61V,see fig Fig 1.2.1c .

Any attempt to adjust the output voltage is futile once the chip is shuts off,and the FB pin voltage will not change(keep 0.61V) till restart the circuit.

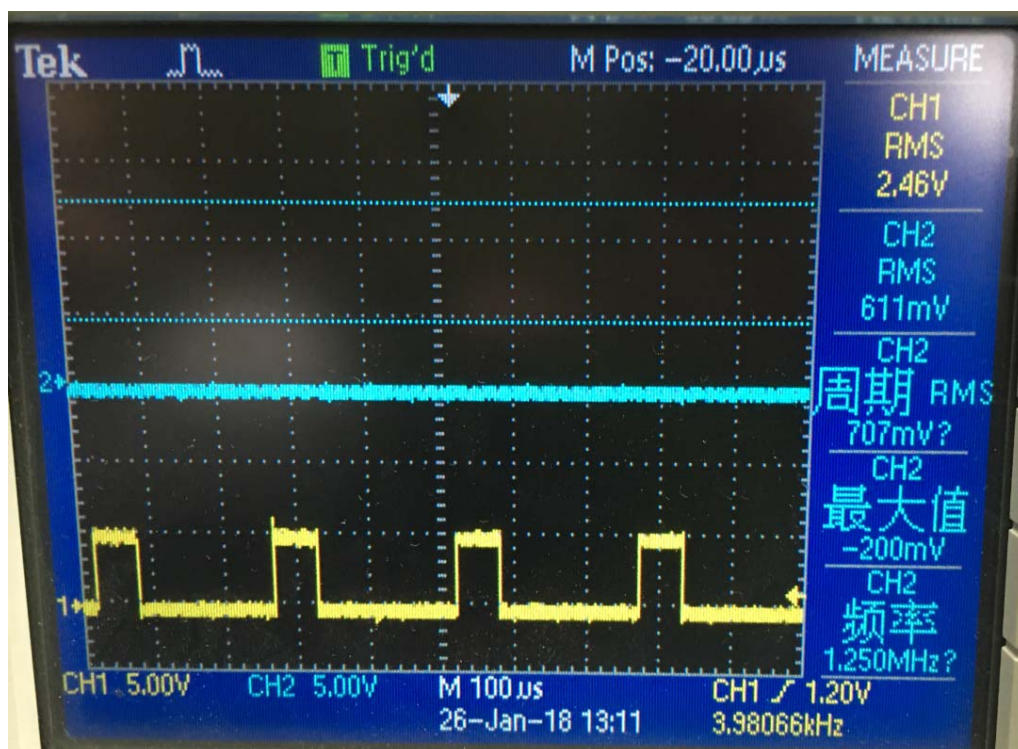


Fig 1.2.1c FB pin voltage

Part two temprature measurement

2.1 The Measurement devices

There three sets of temperature measuring equipment, one is a high precision infrared temperature measurement equipment, one is the low precision of the infrared device, one is a digital device with thermocouple,see table1. I use the latter two devices to measure temperature.

high precision infrared device	low precision infrared device
	
digital device with thermocouple(the ambient temperature is 20.8°C)	
	

Table 1 the temperature measurement devices

2.2 The measured chip

The LM2676 is away from heatsink, see Fig 2.2.



Fig 2.2 LM2676 without heatsink

There was measurement error between the two devices, infrared device's reading is 19.4~19.5 °C , the other is about 25.0 °C .There was no rapid change in temperature during the operation,see fig and fig2.3 .

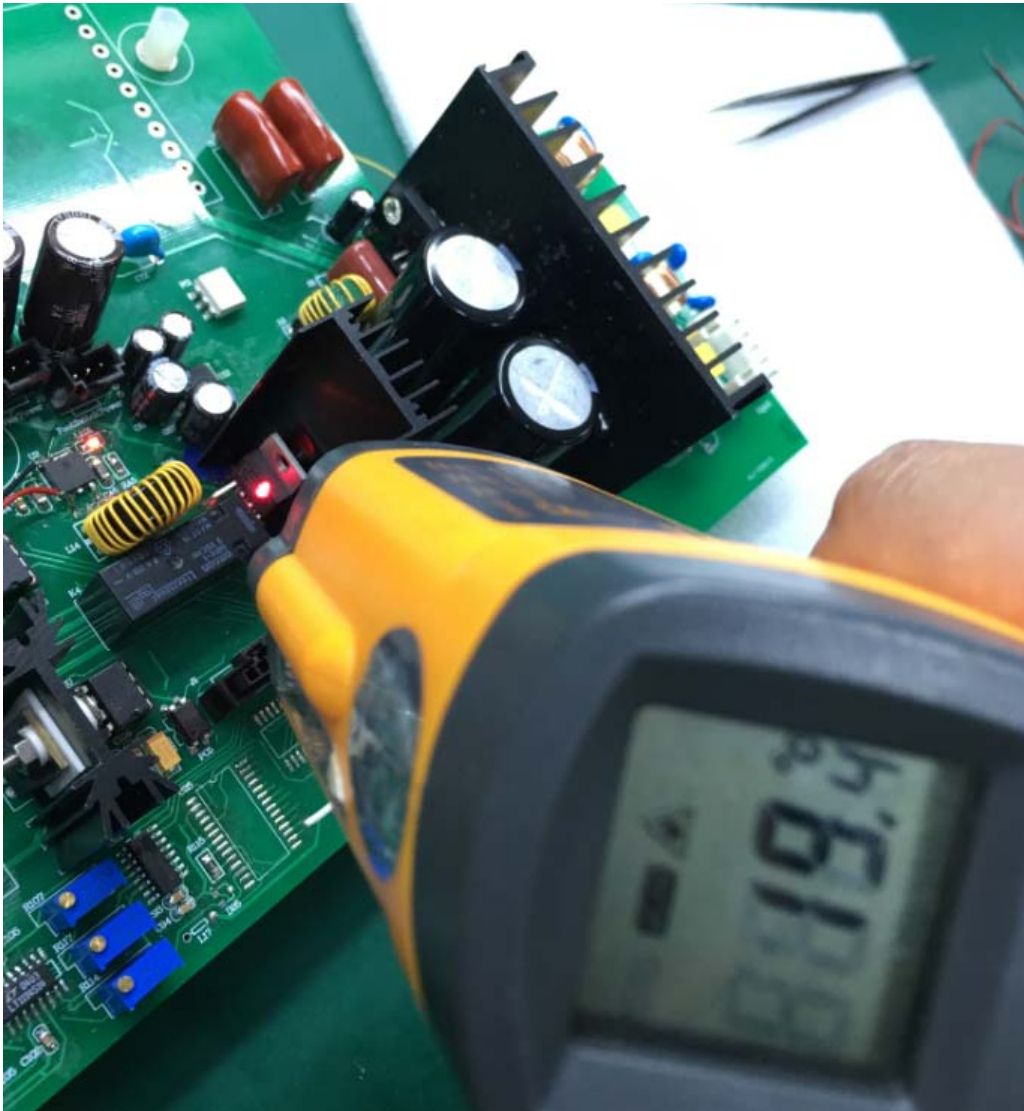


Fig 2.3 infrared device reading

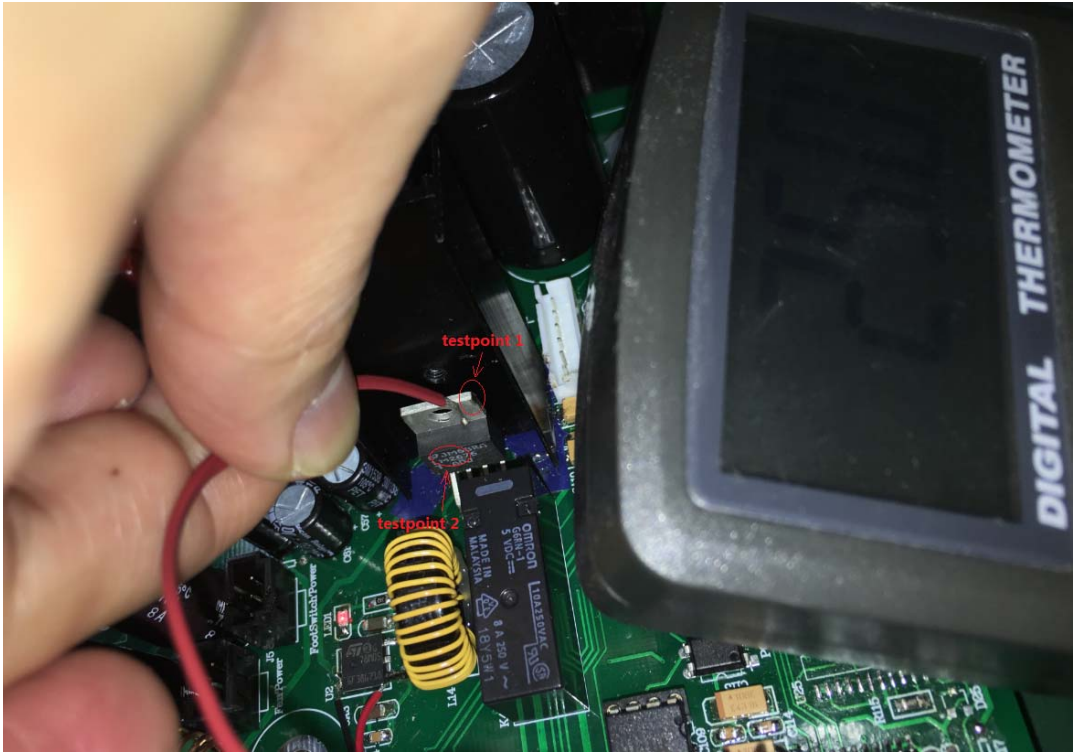


Fig 2.4 digital device reading

the metal part(testpoint 1) and plastic part(testpoint 2) of the IC are measured,see fig 2.4