Transistor Tester User Guide

I Introduction

This meter is an intelligent semiconductor device analyzer, it can measure most of the diodes, bipolar transistors, Junction/MOS FETs and low power thyristors. It automatically identifies the type of devices and pin outs, measures the current gain HFE, gate threshold and FET junction capacitance, a typical application is to pair two transistors or identifies an unknown SMD device. The test clips can be connected any way round, the pin out can be identified and displayed on screen vs. test clip numbers. Beside the semiconductor device analyzer, this meter can also work as an ESR meter, the ESR accuracy may not be able to compete with the professional one, but it definitely meets the needs for most of the applications.

II Specification

Working power: DV 9V
Operating current: 25mA
Capacitor Range: 25pF-100000uF
Standby current: 0.02uA
Resistor Range: 0.1Ω-50MΩ
Inductance Range: 0.01mH - 20H

Instructions

1. There are some digit codes like 1, 2, and 3 on back of test jig. Insert the DUT on test jig and press the button to start, the meter will identify and display the pin out vs. the clip numbers on the screen.
2. When the DUT has two pins, you can choose different jig combination as test terminal, i.e. 1-2, 1-3 or 2-3.When the DUT has polar, the polar can be detected and shown accordingly.
3. When the DUT has three pins, you can choose different triple-jig combinations as test terminal, i.e. 1-2-3, 2-3-1 or 3-2-1.

III Features

1. Operates with ATmega328 microcontrollers.
2. One key operation with automatic power shutdown.
3. Shutdown current is only about 20mA.
4. Automatic detection of NPN and PNP bipolar transistors, N- and P-Channel MOSFETs, JFETs, diodes, double diodes, Thyristors and Triacs.
5. Automatic detection of pin layout of the detected part.
6. Measuring of current amplification factor and Base-Emitter threshold voltage of bipolar transistors.
7. Darlington transistors can be identified by the threshold voltage and high current amplification factor.
8. Detection of the protection diode of bipolar transistors and MOSFETs.
9. Measuring of the Gate threshold voltage and Gate capacity value of MOSFETs.
10. Up to two Resistors are measured and shown with symbols and values with up to four decimal digits in the right dimension. All symbols are surrounded by the probe numbers of the Tester (1-3). So Potentiometer can also be measured. If the Potentiometer is adjusted to one of its ends, the Tester cannot differentiate the middle pin and the end pin.
11. Resolution of resistor measurement is now up to 0.01_, values up to 50M_ are detected.
12. One capacitor can be detected and measured. It is shown with symbol and value with up to four decimal digits in the right dimension. The value can be from 25pF to 100mF. The resolution can be up to 1pF.
13. For capacitors with a capacity value above 2µF the Equivalent Serial Resistance (ESR) is measured with a resolution of 0.01_ and is shown with two significant decimal digits.
14. Up to two diodes are shown with symbol or symbol in correct order. Additionally the flux voltages are shown.
15. LED is detected as diode; the flux voltage is much higher than normal. Two-in-one LEDs are also detected as two diodes.
16. Zener-Diodes can be detected, if reverse break down Voltage is below 4.5V. These are shown as two diodes, you can identify this part only by the voltages. The outer probe numbers, which surround the diode symbols, are identical in this case. You can identify the real Anode of the diode only by the one with break down(threshold) Voltage nearby 700mV!
17. Only one measurement is needed to find out the connections of a bridge rectifier.
18. Capacitors with value below 25pF are usually not detected, but can be measured together with a parallel diode or a parallel capacitor with at least 25pF. In this case you must subtract the capacity value of the parallel connected part.
19. For resistors below 2100also the measurement of inductance will be done, if your ATmega has at least 16K flash memory. The range will be from about 0.01mH to more than 20H, but the accuracy is not good. The measurement result is only shown with a single component connected.
20. Thyristors and Triacs can only be detected, if the test current is above the holding current. Some Thyristors and Triacs need as higher gate trigger current, than this Tester can deliver. The available testing current is only about 7mA!

IV Special Caution:

1. Discharge the capacitors completely before you measure it, otherwise, it could damage your meter.
2. Considering the accuracy of testing, please replace batteries when battery power is low.
3. Brightness Adjustment: Keep pressing the power button and enter into the interface of contrast adjustment.
Note: When the brightness contrast digit is over 50, nothing can be read vertically, but you could tilt the screen to view the screen content. If the contrast value is up to maximum digit 63 and press button to enter the minium value 0, then keep press button 20 times, you can read it now.
4. Error Correction: Please prepare your own necessities and refer to the following procedure.

Calibration Method:

1) Turn off the meter. Use 2 wires to shortcircuit the little metal sheet marked with 1, 2 and 3; don't release the shortcircuit wires until step 3.
2) Push the start button to turn on the meter. The screen will show self test mode, the 2nd line will show ? Mark. Push the start button again quickly and Calibration will start.
3) When screen shows T4 isolate Probe, remove the shortcircuit wires.
4) When screen shows 1-II-3 >100nf, connect a non-polar capacitor (>100nf) to the meter, the calibration procedure will keep going until completion.

V Test examples

1.

It shows that no device is connected on test terminals or an unknown part. It may also be that the devise was damaged.

2. Test a resistor

It shows the DUT is an 195.6Ω resistor, between terminal 1 and 2.

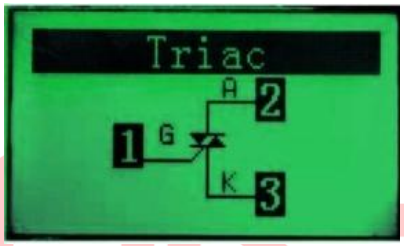
3. Test a diode

It shows that the DUT is a diode, test terminal 1 is connected to cathode, and test terminal 2 is connected to anode. The forward voltage is 1.91mV. Junction capacitance is 4pF.

4. Test a capacitor

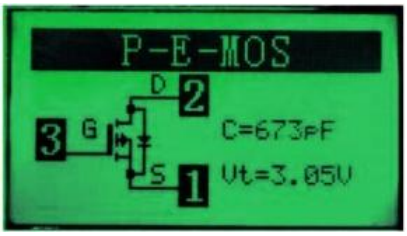
It shows that the DUT between terminal 2 and 3 is a capacitor. Capacitance =991.7uF, ESR=0.02 ohm and Voltage loss is 1.5%.

5. Test a triac



It shows that the DUT is a triac, test terminals 1, 2 and 3 are connected to control gate G, anode A, Anode K.

6. Test a MOS FET



It shows that the DUT is PMOS FET, test terminals 1, 2 and 3 are connected to pin S, D and G. There is a protect diode between S and D, the anode of the diode is connected to D, and the cathode of the diode is connected to S.Junction capacitance is 673pF; the gate threshold voltage is 3.05V.