Diode optopair tester (DOT)

Diode optopair tester (DOT) is designed to investigate basic features of the optically coupled pairs consisting of III-V mid-IR LED and photoddiodes (PD).

DOT enables to realize several operating conditions for LED whose intensity is recorded by two PDs. PD signal is amplified and transferred through COM port to the PC. The obtained data is recorded by standard procedures and can be used for accumulation of data on the diode optopair performance at different pumping, temperature and environmental conditions.

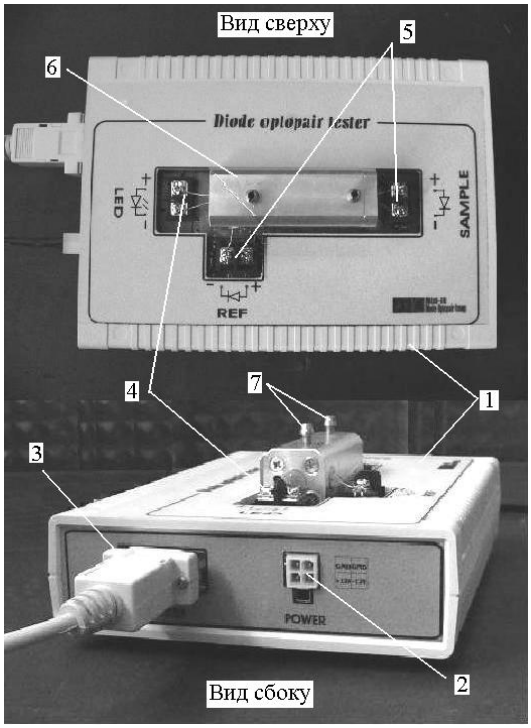

Fig.1 General view of the DOT

The DOT is equipped with the 50 mm long gas cell that enable to perform preliminary evaluation of the diode pair sensitivity with respect to different gases such as CO (λ=4.7 μm), CO2 (λ=4.3 μm) and CH4 (λ=3.3 μm). The LED beam is splitted into the SAMPLE and REFERENCE beams by a silicon plate, sapphire windows separate inner volume form the ambient. A sensor installed onto the gas cell controls the temperature.

Fig.1 demonstrates general view of the DOT where the numbers indicate the following:

1. Case
2. Power supply sockets
3. COM port for the cable
4. LED sockets
5. PD sockets

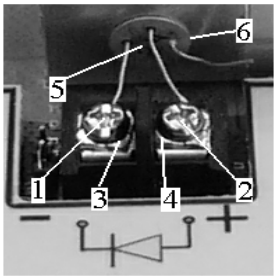

Fig.2 Connection/sockets for the diodes

6. Gas cell
7. Input/output of the gas flow

The installation of the diodes into the DOT as well as connection of the DOT with the PC should be made at the NONACTIVATED (that is, without power supply) mode of the DOT! The polarity of the connection is printed onto the DOT case as shown in Fig.2, where numbers indicate the following: 1,2 – screws, 3,4 – insertions, 5- anode pin of the TO-39 header, 6 – TO-39 header. Please, pay attention that the connection configurations for LED and PDs are different.

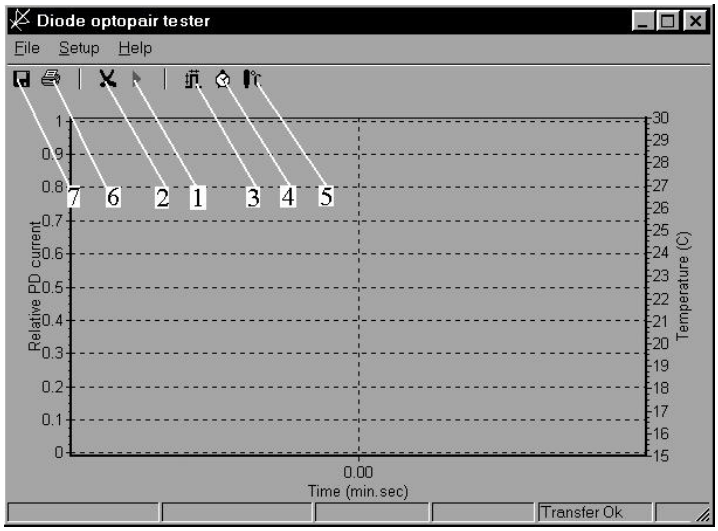

Fig.3 Main DOT software window

Apply power to the DOT through the use of power supply +/-15 V and activate the DOT software ("Plnk.exe") on the PC with the installed Windows 98 or Windows ME or Windows XP. The window of the software is shown in Fig.3 where "Transfer OK" at the right low corner indicates that tester operation is normal. Sign "Transfer Error" indicate communication or another error. The function of the software interface is the following : 1- start/stop of the recording, 2 – clear screen, elimination of the data without recording, 3- pulse parameter set up, 4 – time scaling, 5- temperature scaling, 6 – print, 7 – (File) data recording to the files "***.dat" (ASCII format) for further use in the MS Excel, Origin programs.

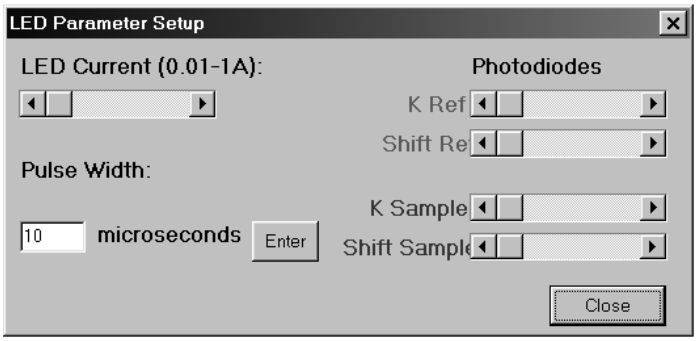

Fig.4 Subwindow for the LED/PD set up

The LED parameter set up icon is shown in Fig.4. "LED current" regulator is activated by the mouse and produces current tunability in the 0.01- 1 A range. For the sake of security each activation of the regulator/current amplitude change returns pulse duration value to the lowest value – 10 microseconds. Pulse duration is changing

through the entering of the desired pulse width and pressing the “Enter” button. The DOT has limited number of pulse duration values.

K_{ref} and K_{sample} – are the regulators that change the amplification in the reference and sample channels correspondingly. Similarly the SHIFT regulators refer to the position of the corresponding curves on the screen.

The time scaling regulation on the activation of the button 4 (“Time”) enable to change the time interval displayed in the window. “Full screen” option means that all data from the very beginning are shown in the screen. Another option – is to show data within curtain interval defined in Hour:min:sec. The “Averaging Interval” numbers indicate the number of integrated points during the recording.

Regulator “Temperature” (button 5) enables to define temperature interval for temperature recording by setting maximum and minimum values of the expected temperature.

The closing of the DOT program is performed through the “File” (button “Exit”) or Alt+F4 or though the activation of the cross (right up corner of the window).

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