

Deep Level Transient Spectroscopy (DLTS). Measured.

Key Benefits

- Fast: capture of transients on a 10 μ s timescale
- Flexible: probe processes of different timescales with frequencies from 1 MHz to 5 MHz
- Integrated: replaces capacitance meter, ADC card and pulse generator
- Intuitive: LabOne user interface for quick data acquisition set-up and processing



Typical results and schematics

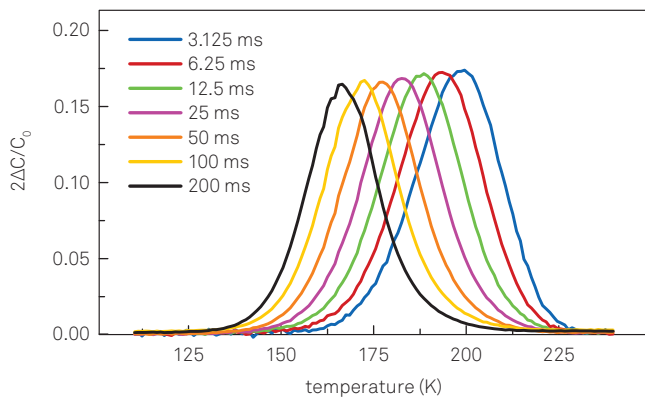


Figure 1. DLTS spectra acquired with a MFIA-based DLTS setup with $V_{\text{bias}} = -2.8$ V and $V_{\text{pulse}} = 2.8$ V. Capacitance was measured at 1 MHz. Curves correspond to the different time window lengths with a maximum for a window length of 3.125 ms.¹

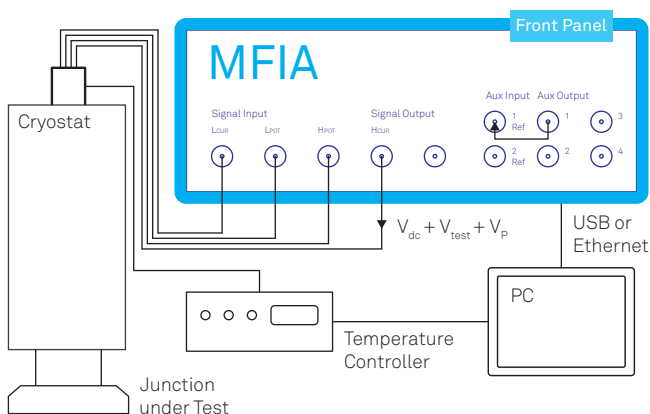


Figure 2. Schematic layout of MFIA-based DLTS setup. The MFIA provides both V_{bias} and V_{pulse} and measures capacitance in four- or two-terminal configuration. The host PC runs both the MFIA and the temperature controller.

Measurement Strategies

For conventional DLTS spectra as shown in figure 1, capacitance transients are measured after a biasing voltage is removed for a short time by a positive voltage pulse. These transients need to be acquired on a fast timescale and also for sufficiently long periods to allow for long rate windows.

Figure 2 shows the MFIA at the heart of the DLTS setup. It provides the voltage pulses and acquires both capacitance and current transients at high time resolution of 10 μ s at 1 MHz. The DAQ Module allows for the full transient to be acquired, and the Sweeper Module enables complementary techniques such as admittance spectroscopy.

Why choose the MFIA?

- Measures the complete transients of capacitance and current simultaneously with high time resolution.
- Ensures reliable acquisition of each transient, thanks to advanced triggering functionality.
- Provides square voltage pulses, simplifying the setup and increasing reliability.
- Offers superior, modern alternative to the Boonton 7200 due to wide capacitance range and flexible frequency.
- Avoids overloads when the reverse bias pulse is re-applied, thanks to eight-stage current input.
- Includes LabOne user Interface for data acquisition and processing; DAQ Module, Sweeper, Plotter and Scope.
- Allows full API remote control and integration into complex lab set-ups, for example, for temperature control.

¹ Data courtesy of R. Schifano, K. Gościński, E. Przeździecka & T. A. Krajewski at the Institute of Physics PAS, Warsaw, Poland