

PhysTech GmbH

Hall, DLTS, Customized Physical Measurement Equipment
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HERA-DLTS System FT 1230 (! new specifications !)

specifications:

Bias-/Pulsvoltagesources

3 sources can be used and set by software:

1 Standard bias, 3 ranges selectable

2 Auxiliary sources Aux 1 and Aux 2.

Voltage ranges and voltage resolution

Bias range set :	resolution :	Voltage range :	Voltage resolution
Bias range 1:	16 Bit,	+/-10V,	1 Digit = 0.305mV
Bias range 2:	16 Bit,	+/-20V,	1 Digit = 0.61mV
Bias range 3:	16 Bit,	+/-40V,	1 Digit = 1.22mV (40V option, standard)
Bias-100V :	16 Bit,	+/-100V,	1 Digit = 3.05mV (with 100V option attached only)
Aux :	16 Bit,	+/-10V,	1 Digit = 0.305mV
Aux x-2 :	16 Bit,	+/-10V,	1 Digit = 0.305mV

Potential-free source or grounded source with rectangular, **Gauss and arbitrary pulseform**
Optional: Aux, Aux2, voltage extension to : +/-20V/+/-40V

Standard Bias-Pulse widths

Min. width: >1us, slew rate 1V/us
Max. width: 12000s, hardware trigger
Max. width: >100h, software trigger

Fast Pulse Bias Pulse widths

(Keysight 33519) voltage range: +/- 10V
min. widths: 20ns slew rate selectable at pulsegenerator
max. widths: app. 1 s

Aux Pulse modi:

- 0: No pulse
- 1: Only aux pulse, trigger at end of pulse
- 2: Only aux pulse, trigger at start of pulse
- 3: Before standard pulse
- 4: Simultaneously with standard pulse

Optical pulse modi (Laser or LED trigger)

1 optical standard output, 1 additional for DLOS
low/high active and 5V/3.3V selectable by jumper
3 connections at 2 connectors
Default max. 250mA
Min. width: 20ns
Max. width: 12000s, hardware trigger
Max. width: >100h, software trigger

Pulse modes

0: No pulse	No pulse applied
1: Normal	1 electrical pulse applied
2: DoublePulse	2 defined electrical pulses applied
3: FastPulse	pulse supplied by external fast pulse generator
4: Double Fast Pulse	only available with double fast pulse generator
5: Optical Pulse	No electrical pulse, only rev. bias voltage applied , optical trigger pulse applied
6: Electrical and optical together	Both, electrical pulse and optical puls applied at same time
7: First: electrical, Second: optical	Both, electrical pulse and optical puls applied one after the other
8: First: optical, Second: electrical	Both, electrical pulse and optical puls applied one after the other
9: First: optical, Second: FastPulse	Both, optical pulse and electrical pulse with fast puls generator applied
10: Optical Dlos Pulses	Special DLOS pulse mode
12: First: double, Second: optical	(optional, special pulse mode)

Disconnection of the sample from capacitance meter during pulse is available . All selections by software

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Phystech FT 1235 combined Capacitancemeter and current meter

Capacitance meter

with automatic reverse bias capacitance compensation and automatic range setting

Compensation range : **1 pF - 3500 pF**
HF - frequency : **1 MHz**
HF signal (6 effective selectable HF voltages) : **20mV, 40 mV, 100mV, 200mV, 210mV, 400mV**
4 capacitance ranges : **3 pF - 8000 pF (4 ranges, selectable full range scale)**

features:

larger capacitance range selectable for
higher capacitances or higher DC sensitivity

more HF amplitudes for selection of
higher sensitivity or higher depths sensitivity

higher capacitance compensation range

Current meter

**with automatic reverse bias current compensation
and automatic range setting**

Current measurement amplifier with automatic range and amplification setting

max. measurement current : **15 mA**

current resolution : **<1pA**

NEW! reverse bias current compensation : 20pA to 10 mA

faster recovery mode selectable by software

**This amplifier can be used for I/V measurements as well as for
current transient (I-DLTS) measurements and
Charge (Q-DLTS) measurements**

features:

higher sensitivity for I/V and I(t) measurements

reverse bias current compensation

for better I(t) sensitivity @ higher reverse bias currents e.g. FET, 2D FET

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Digital values for FT-1230 HERA DLTS

Transient recorder (automatic time dependant measurement of C,G,I)

16 Bit, +-10V, 1 Digit = 0.305mV

Min. sampling interval : 850ns

Timing resolution : 20ns

Max. sampling points : 2000000 no streaming

: 2000000000 streaming

Computer controlled Amplifier with automatic gain setting

gain range : **1 - 100 000**

Anti-aliasing filter

Digital transient recorder **with variable oversampling technic**

max. samplings per transient : **2E6 (buffered), 2E9 (streaming)**

fastest sampling intervall : **850 ~~ns~~ seconds**

shortest period width : **27 micro seconds**

longest periodwidth : **110 h**

HERA-DLTS System FT1230

available DLTS modes

- C-DLTS (Capacitance DLTS)
- CC-DLTS (Constant Capacitance DLTS , with CC option)
- I-DLTS (Current DLTS)
- Q-DLTS (Charge -DLTS)
- FET DLTS (3 term DLTS 2nd voltage source included as a standard)
- DD-DLTS (Transient difference DLTS)
- ITS (Isothermal Transient (C or I) Spectroscopy)
- PICS (Photon induced transient (C or I) spectroscopy)
- Capture DLTS (capturing transient measurement)
- Laplace-DLTS (Logarithmic transient measurements and evaluations)
- MIS - Nss DLTS (Surface states density measurement and evaluations)
- MIS - Zerst DLTS (Minorier carrier generation / lifetime measurements)
- C(V), I(V), C(t),I(t) (also T- dependant. during tempescan, Richardson plot)

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Evaluation modes:

- Correlation DLTS

28 different correlators (software) are used

only **one temperature scan is needed** for 28 tempscans and 28 Arrhenius plot points for one measurement parameter set

18 different measurement parameter sets (bias voltage, pulse voltage/width/mode, etc.) can be defined to be measured in one temperature scan

- Fourier evaluation

our direct timeconstant evaluation

- Laplace evaluation

inverse Laplace transformation for evaluating one or more timeconstants in a measured transient (C,CC,I,Q etc.)

- HERA DLTS

deconvolution of strongly overlapping tempscan or ITS signals with a special refolding mathematics.