

PVT 110 – Pulsed VCSEL Tester

Driving & Sensing Module

Key features at a glance

- ▲ High spectral resolution (≥ 0.12 nm)
- ▲ Very short pulse trains down to 1 ns and up to 24 A driving pulses
- ▲ Test pulse trains with more than 100 MHz repetition rate
- ▲ Optical measurements traceable to the PTB (German National Laboratory)
- ▲ Flexible pulse trains
- ▲ LIV sweeps and detailed pulse train analysis mode
- ▲ Temperature tuning of DUT

\\ MEASUREMENT RESULTS

» Spectral data

Full spectral information of the DUT (e.g. peak wavelength, average optical power, spectral bandwidth)

» Temporal optical data

Pulse shape, pulse peak power, pulse energy, pulse duration, duty cycle, frame pattern

» Temporal electrical data (driver)

Pulse shape, pulse peak current, pulse duration, duty cycle, frame pattern

\\ TECHNICAL SPECIFICATIONS

PVT 110 - Detection	
Optical spectrum ¹⁾	
Spectral range	800 - 1000 nm
Spectral resolution (typical)	0.12 - 0.4 nm
Data point interval (typical)	0.05 - 0.16 nm
Filter wheel with optical density filters (typical)	OD 0.5/1/1.5/2/2.5
Measuring ranges (typical)	80 - 160 nm
Wavelength accuracy	± 0.05 nm
Integration time	4 ms - 65 s
Temporal behaviour (electrical driving & optical pulses)	
Max. sampling rate	10 GSa/s/ch (4 channel mode)
Memory depth	400 MSa/ch (4 channel mode)
Max. measurable pulse train at max. sampling rate	40 ms/ch
Signal resolution	10 Bit
Max. SNR	30 dBc
Max. radiant power on photodiode	> 20 W/sr ²⁾
Fastest detectable rise/fall time (10 % - 90 %) of optical signals	250 ps

PVT 110 - Driving	
Electrical parameters	
Supply voltage (max.)	15 V ³⁾
Peak current (max.)	24 A
Average current (max.)	1.5 A
Rise/fall time driving pulse (10 % - 90 %)	< 300 ps
Pulse train	
Driving pulse duration (min. - max. FWHM)	1 ns - 50 μ s ⁴⁾
Pulse duration increment	~ 83 ps (12 GHz)
Driving repetition period (min. - max.)	< 10 ns - 100 μ s ⁴⁾
Repetition period increment	< 10 ns - 400 ns: ~ 83 ps (12 GHz)
	400 ns - 4 μ s: ~ 670 ps (1.5 GHz)
	4 μ s - 100 μ s: ~ 5.3 ns (0.1875 GHz)
Duty cycle	0.01 % - 50 % ⁵⁾
Measurement uncertainties (for typical operation parameters) ⁶⁾	
Average optical power	2.2 % (k = 2)
LIV mode: Peak current	7.4 % (k = 2)
LIV mode: Optical peak power	7.6 % (k = 2)
LIV mode: VCSEL forward voltage (peak)	7.4 % (k = 2)
Analysis mode: Optical power uncertainty	3.4 % (k = 2)
Analysis mode: Electrical power uncertainty	10.6 % (k = 2)
Operating conditions	
Temperature tuning of DUT (min. - max.)	20 °C – 70 °C
Min. DUT threshold current	50 mA
PVT 110 - Mechanical	
ISP Integrating Sphere	
Max. DUT beam divergence	120°
Inner diameter of ISP	100 mm
ISP DUT port diameter	33 mm

¹⁾ Exact specifications depend on the chosen high-resolution CAS model.

²⁾ Corresponds to max. 10 mW on PD with 2.5 mm aperture in an ISP 100.

³⁾ Corresponds typically to a forward voltage of 7 V at the DUT.

⁴⁾ Longer pulse durations possible upon customer request.

⁵⁾ For pulse durations in the range of 1 – 5 ns, the max. duty cycle is 15%.

⁶⁾ Pulse duration = 10 ns; duty cycle = 1%; temporal resolution = 10 GS/s; number of pulses = 100; peak current = 8 A; peak power = 7 W; VCSEL forward voltage = 3.5 V; VCSEL with diffuser; ISP with standard protection window.

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