

Photodetector/Photodiode/Photoreceiver Tester for New Generation Semiconductor: PD-QE

Introduction

The total solution of new generation photodetector/photodiode/photo-receiver testing. Conventional quantum efficiency systems face many testing challenges in novel photodetectors. Such as:

1. The bias voltage cannot exceed 12V: The traditional quantum efficiency system uses a lock-in amplifier, and its withstand DC voltage cannot be too large. Therefore, in a general quantum efficiency tester, the electric bias cannot be applied to exceed 12V.
2. Unable to do noise frequency analysis.
3. NEP and D^* cannot be measured directly.



Enlitech provides a complete solution for the new generation of photodetectors (PD), named PD-QE. The PD-QE system is a product developed by Enlitech based on the small light spot (power mode) in the past ten years. It can be applied to the EQE quantum efficiency test of PV and the research of new light sensor.

On the new software platform SW-XQE, PD-QE has convenient expansibility. In addition to measuring EQE, it can also integrate various SMUs and measure IV curves. At the same time, it has various analysis functions, such as D^* , NEP, Noise current frequency spectrum.

Application

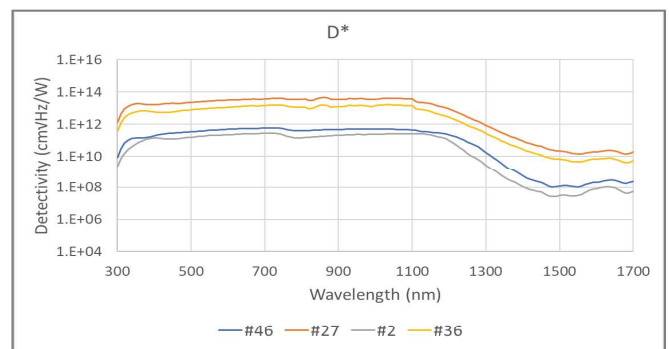
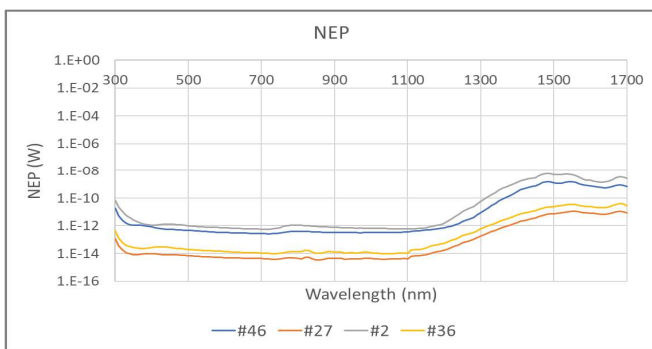
- ◆ OPD, Organic Photodiode
- ◆ PPD, Perovskite Photodiode
- ◆ QDPD, Quantum Dots Photodiode
- ◆ New type photodiodes/ photodetectors

Specification

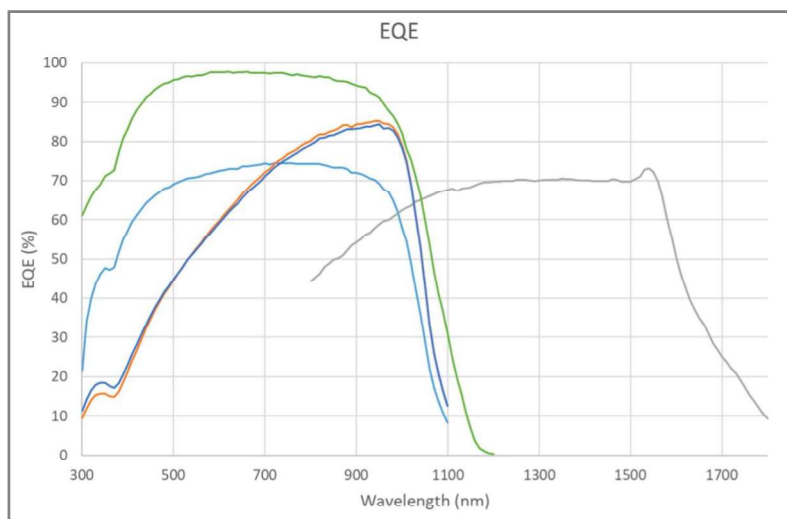
- ◆ PD-QE has different modules, and the bias voltage range can be from 20 V to 1000 V. At the same time, the measuring resolution of photocurrent is very high (10^{-16} Amp achievable).
- ◆ Wavelength extension up to 1800 nm
- ◆ Option: Software upgradable for controlling Keithley 4200 SMU

Testing Results / Publications

NEP/ D^*

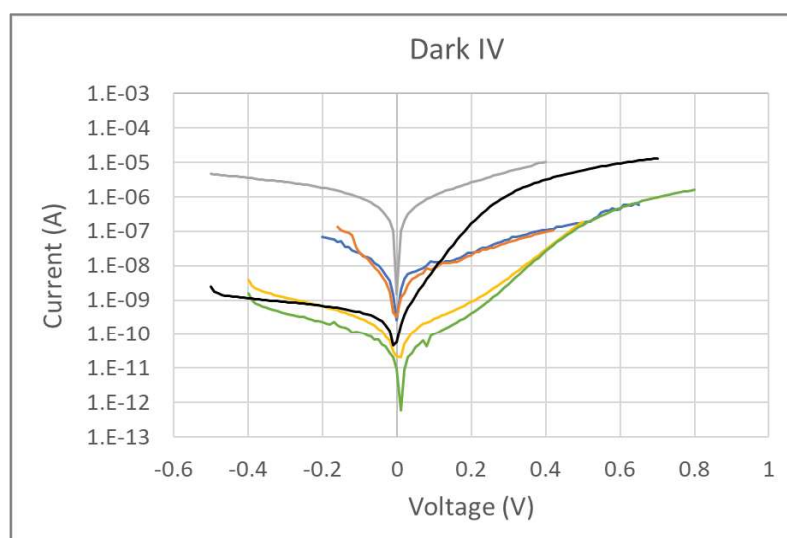


PD-QE can directly perform spectral measurement and analysis of NEP and D^* on the device, which accelerates related research and development.



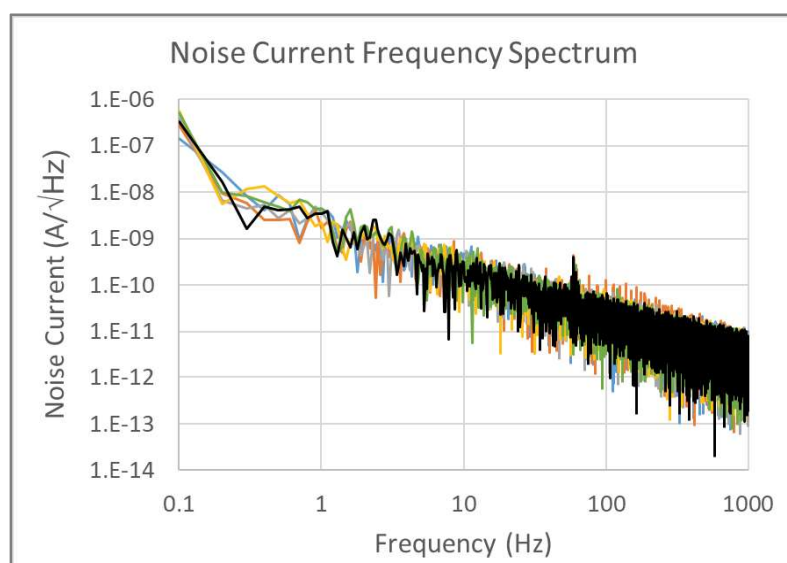
EQE spectra measured by PD-QE

PD-QE can perform EQE testing. In addition to the standard 300 nm ~ 1100 nm wavelength range, it can be extended to 1800nm. The figure shows the measured EQE quantum efficiency spectra of different photodiode/ photodetector devices by PD-QE system.



Integrated SMU to perform IV curve testing

PD-QE has integrated various SMUs from Keithley and Keysight to perform various IV curve scans. Users do not need to find or integrate IV curve testing solution separately. The IV curves of different samples tested by PD-QE are shown in the figure and displayed in multiple graphs.



Noise-current-Frequency spectrum

With advanced digital signal acquisition and processing technology, PD-QE can directly grab the noise current patterns of various photodiode/ photodetectors at different frequencies. Users do not need to purchase additional spectrum analyzers for this testing! And the software can analyze the characteristics of various frequency bands, such as Shot Noise, Johnson Noise, 1/f Noise, etc. PD-QE is a complete solution for next-generation PD testing.

