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Test Report GAP1101 and GAP1124

InGaAs Photodiodes with 1mm active area and no slow tail

General

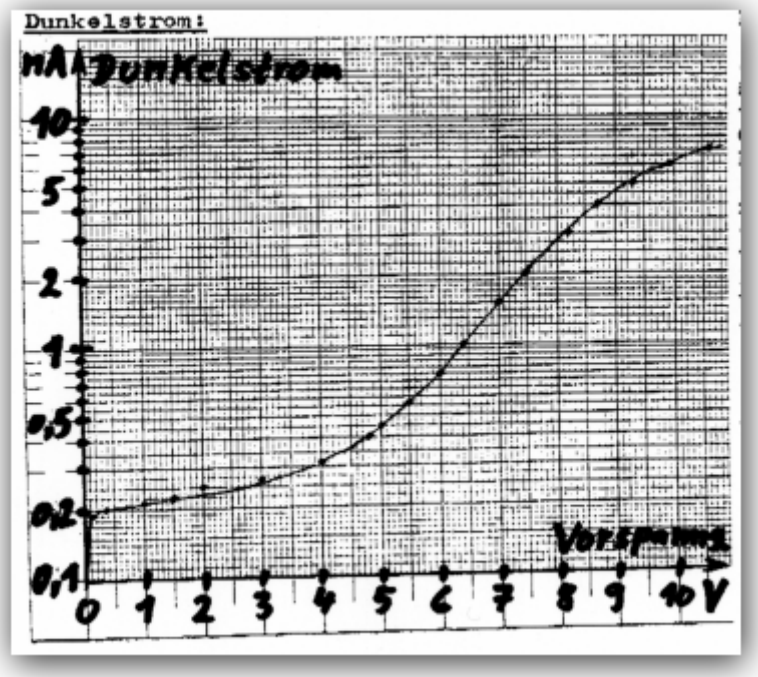
The difference between GAP1101 and GAP1124 is that the GAP1101 is not selected for R-Shunt min 100 MOhm. Here it happened to be that the GAP1101 fulfils the additional requirement as well; therefore below statement are valid for both devices.

1. Shunt Resistance

Catalogue data	min 10 MOhm, typically 50 MOhm
Test data	130 MOhm

2. Dark Current

The dark currents are acceptably and comparatively low, see diagram below:



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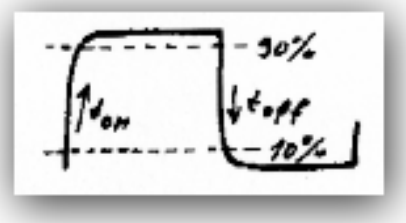
3. Noise

Measured by taking samples in the range between 100 – 300 Hz and 300 – 1000 Hz, without bias voltage and as well at 1nA dark current level @ 6,4V Bias.
Result:
No significant increase in noise compared to the thermal noise of the Shunt resistance or the Schrot noise of the dark current.

4. Capacitance

73 pF without bias voltage
62 pF @ 1V bias voltage
49 pF @ 3V bias voltage
46 pF @ 5V bias voltage
39 pF @ 10V bias voltage



The data is well within what can be expected.

5. Slow Tail

Measured with fast trans-impedance amplifier with a t_{on} and t_{off} time of about 15-20ns and fast 900nm LED with a 10ns rise time. The geometrical sum of the rise times are between 18 and 22ns

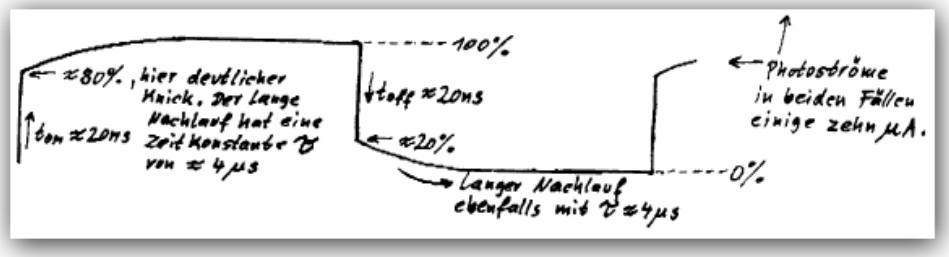
a) Test with the GAP1101 (GAP1124)

With different step function signals there is no slow tail recognizable. As far as can be seen on an oscilloscope there is a purely e-type function shape transient response only with t_{on} and t_{off} time of about 20ns. The detector is operated at 5V bias.

Within the measurement accuracy given and the fact that the rise times of amp and LED are different from "0" (zero) one can conclude that the rise and fall time of the photodiode are less than 10 – 15 ns.

b) Test with the G8370-01 (Hamamatsu)

The same test and operating condition are applied to the detector as for the GAP1101. The photocurrent created are a few dozen µA.



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Now on the oscilloscope a clear break in the curve can be seen at the 80 % level with t_{on} of about 20ns and a slow tail of about 4µs. The same applies for the t_{off} time.

c) Conclusion:

The no “slow tail” aperture of the GAP1101 (GAP1124) is very effective and works as intended to do.

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