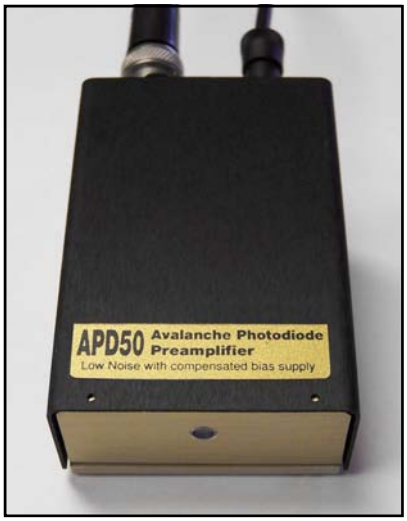
DATA SHEET APD50

APD AVALANCHE PHOTODIODE PREAMPLIFIER

A Si avalanche photodiode and low noise preamplifier module. A field effect transistor input stage ensures low HF noise and wide bandwidth. The bias voltage supply has temperature compensation to maintain the APD. gain constant.

- **D.c. to 25 MHz (10 MHz for large detector).**
- **Fully DC-coupled with good pulse response.**
- **Various detector sizes are available.**
- **50 Ω output for driving long cables.**
- **The APD50 is fully DC-coupled with dark offset <1 mV and good DC stability for detecting low level signals.**



Preferred detector sizes are dia. 0.5 and 2.5 mm. Alternately a 0.5 mm version with lensed cap magnifies the detector (to ~2 mm for beams converging less than 0.1 N.A.). For other detector diameters — 0.25 to 5 mm in TO52 case, or 0.8 to 2.5 mm in TO5 case, please ask for details.

Dimensions				
Length	Width	Height	Overall Length	Weight
80	56	28	92	150g

The amplifier comes with 1.5 metre supply lead and requires ±15V <100mA.

Specifications (At 22°C into 50 Ω load)		
	0.5 mm Detector	2.5 mm Detector
Gain at 800 nm	2.5 x 10^6 V/W	1.25 x 10^6 V/W
Bandwidth	25 MHz	15 MHz
Risetime <10% overshoot	14 ns	23 ns
Dark noise (NSD)	30 fW/√Hz	300 fW/√Hz

The gain of an APD is temperature sensitive (around –4%/C at gain of 100). A nominal temperature correction is applied to the bias voltage to reduce this to less than ±1%/C. Improved correction can be done at extra cost, or the customer can optimize this himself - e.g. if using a different gain. A procedure for setting gain and temperature correction back to the original values is described in the handbook (all of this assumes a competent person using anti-static precautions).

Because APDs use high voltages, there may be self heating if >uW intensities are continuously present. The bias supply is designed to shut down under these conditions.

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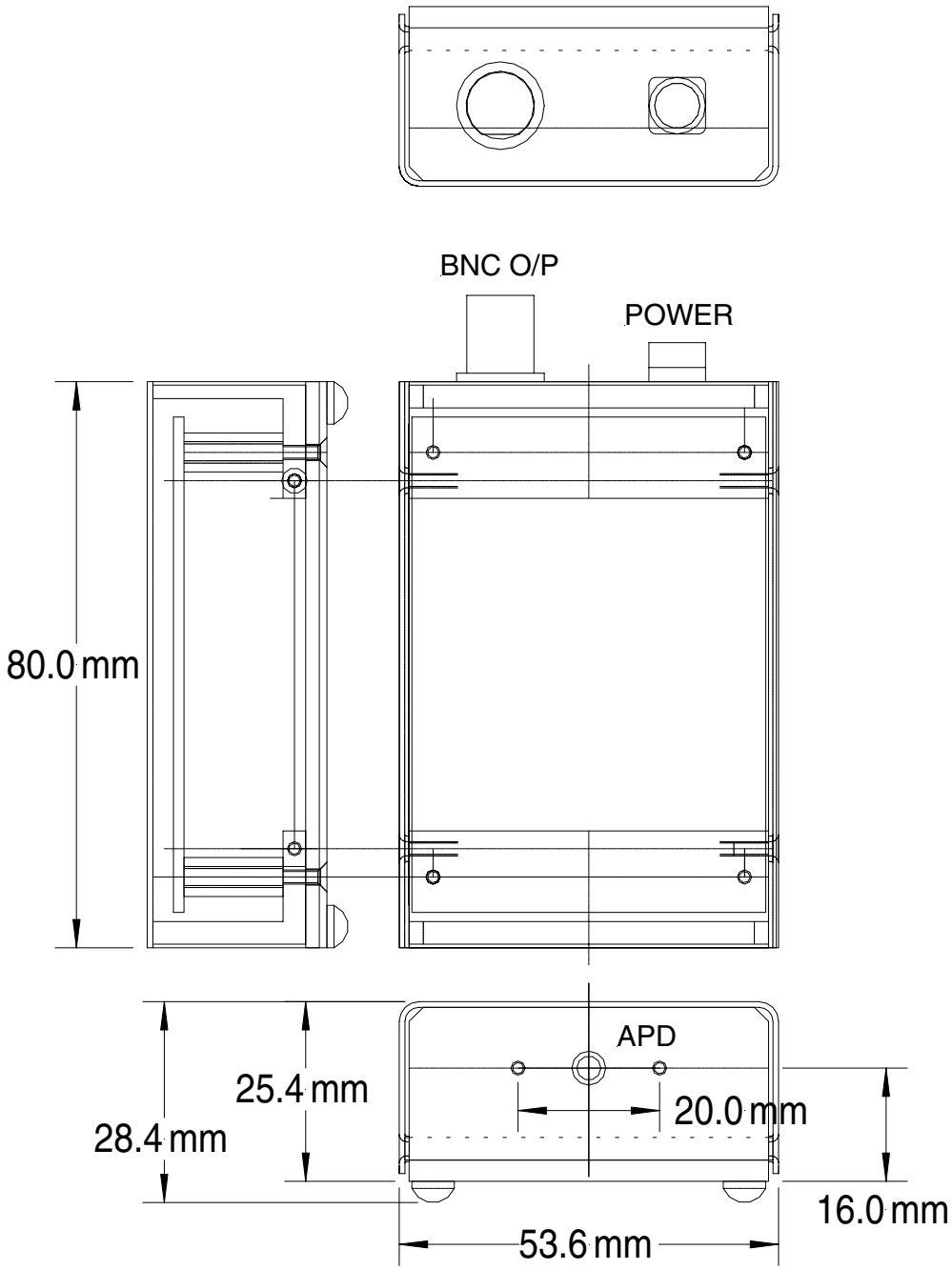
Case Outline Drawing for APD50



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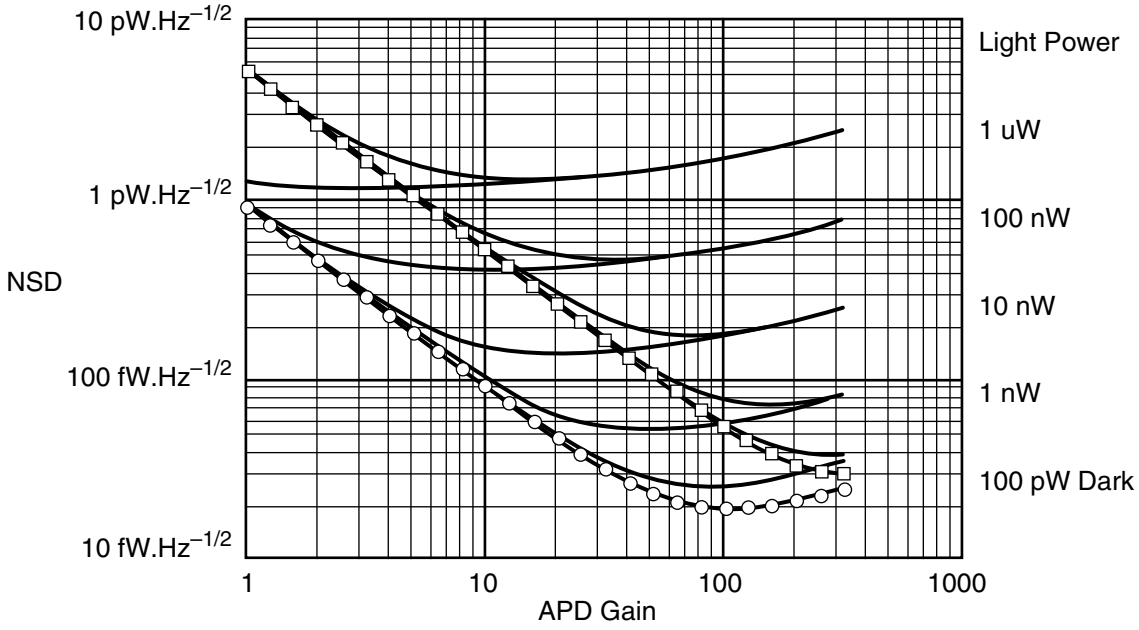
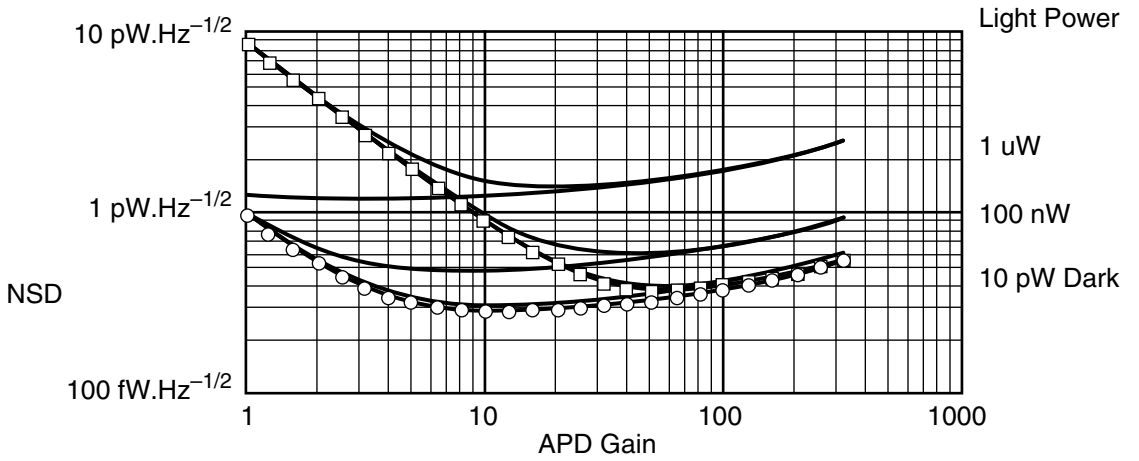
Noise Considerations for APD50

The graphs below show how noise performance is affected by APD gain. They are computed curves for guidance only. Curves are noise spectral density in $W/Hz^{-1/2}$ (the lower the curve, the better the signal-to-noise ration). Lower curves (with circles) are dark noise. Upper curves (with boxes) are NSD at full bandwidth. Modules normally have gain set to 100 for small and 50 for large detectors. Gain adjustments is possible and is explained in the handbook.

Small - 0.5 Detector with ~30 MHz b/w, at 800 nm.



Large - 2.5 dia Detector with ~10 MHz b/w, at 800 nm.



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