

## 450 MHz Dual-Balanced InGaAs Low Noise Photodetector

### Features

- High transimpedance gain: 3 500 V/W
- Low noise: below  $-130$  dBm/Hz
- NEP:  $20 \text{ pW}/\sqrt{\text{Hz}}$  typ.
- 460 MHz bandwidth
- AC coupled; low cutoff below 300 kHz (30 kHz to 5 MHz on request)
- Wavelength range: 1000 nm to 1650 nm
- Fiber Coupled: FC receptables
- Output:  $50 \Omega$  SMA plug
- Wide range single supply: 11 to 15 V



(Photo shows mechanically equivalent product.)

### Typical Application

- Interferometry
- Swept-Source OCT imaging
- Balanced (differential) detection
- Can be used single-ended as well

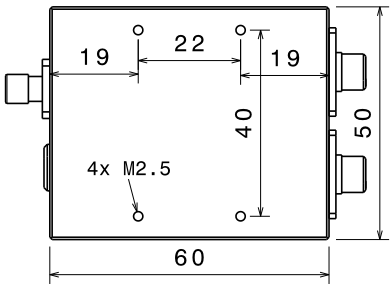
### General Description

The WL-BPD450MA is an AC-coupled high-speed dual-balanced (differential) InGaAs photoreceiver. Due to its high transimpedance gain, its very low noise, and its bandwidth of typically 460 MHz, it is ideally suited for high speed swept-source OCT systems with depth scan line rates up to above 200 kHz.

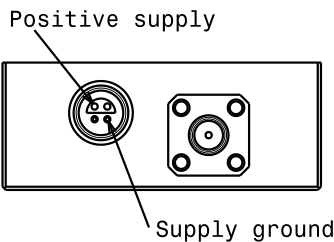
The WL-BPD450MA comes in a rugged aluminum case with two FC fiber receptables and a  $50 \Omega$  SMA output. It operates from a single 11–15 V DC supply. OEM versions are available upon request.

### Mechanical Properties

- Fiber coupling: FC receptables for FC/PC and FC/APC connectors
- RF output: SMA (female)
- Supply voltage input: Push-pull LEMO plug (included with diode)
- Small form factor:  $50 \times 60 \times 20$  mm (weight: 105 g without cable)
- Mounting: 4x M2.5 threaded holes on bottom (screw length 4 mm)



### Electrical Connectors



Supply connector (front view). The case is electrically connected to ground. There are two types of supply cable, one has 2 wires (new cable) and one has 5 wires (old). The corresponding color scheme of these cables is:

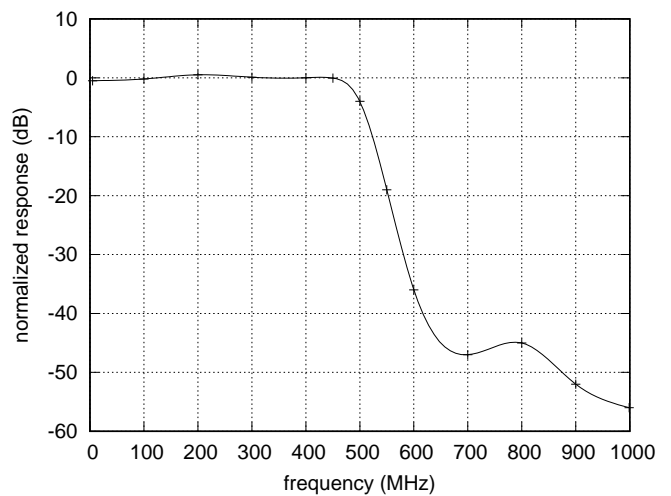
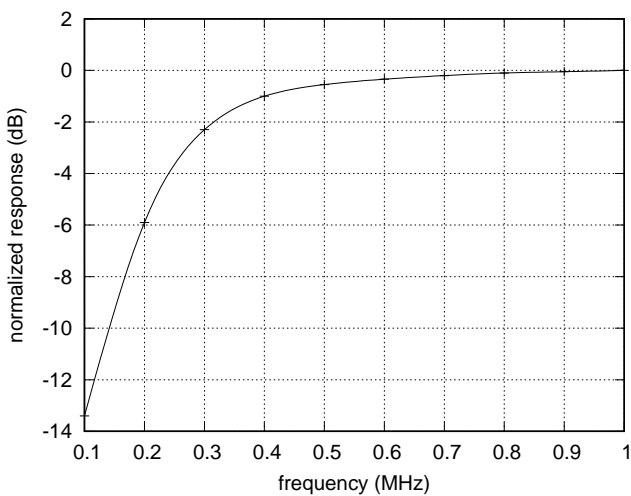
Cable type	Positive supply	Supply ground
2-wire	white	brown, shield
5-wire	yellow	grey, shield

## Specifications

Parameter	Conditions	Min	Typ	Max	Units
DC Characteristics					
Supply Voltage (+ $V_S$ )		11	12	15	V
Supply Current			110		mA
AC Characteristics					
3dB Bandwidth		440	460	480	MHz
AC Low Frequency Cutoff			260	300	kHz
Output IP3			28		dBm
2nd Harmonic	$P_{out} = 0$ dBm		-40		dBc
	$P_{out} = -10$ dBm		-53		dBc
3rd Harmonic	$P_{out} = 0$ dBm		-45		dBc
	$P_{out} = -10$ dBm		-47		dBc
Noise Spectral Density	1 MHz – 500 MHz		-130	-125	dBm/Hz
	> 500 MHz			-150	dBm/Hz
Noise Equivalent Power (NEP)	1 MHz – 460 MHz, 1550 nm		20	35	pW/ $\sqrt{\text{Hz}}$
Output Impedance			50		$\Omega$
Optical Characteristics					
Input Wavelength Range		1000		1650	nm
Transimpedance Gain	wavelength 1550 nm		3 500		V/ $W_{optic}$
	wavelength 1310 nm		3 300		V/ $W_{optic}$
Common Mode Rejection Ratio		25	30		dB
Maximum Input Power	(damage threshold)	10			mW
Environmental Characteristics					
Operating Temperature Range <sup>1</sup>	non-condensing	-20		+80	°C
Storage Temperature Range	non-condensing	-20		+120	°C

## Typical Performance Characteristics

### Frequency response: RF output power versus frequency



Test conditions: Light input 100  $\mu\text{W}$  at 1550 nm, modulated via EOM.

<sup>1</sup>Test show operation up to 120°C ambient temperature for multiple days without failure, contact us for more information.