

## Product Specification

preliminary

### Applications

- Microwave photonics
- Light wave characterization

### Features

- 0.01...35 GHz electrical bandwidth
- Integrated amplifier
- Supports 1310 nm and 1550 nm
- Compact size



### Description

The P40AR is a high-speed PIN photoreceiver module suitable for both communication systems up to 40 Gb/s and RF-over-fiber applications including antenna remoting, phased arrays and delay lines in the frequency range from 0.01 to 35 GHz. Integrated amplifier allows to create compact and effective link.

### Absolute Maximum Ratings

**Warning:** stresses outside the ranges specified in this section can cause permanent damage to the device.

Parameter	Symbol	Min.	Max.	Units	Conditions / Comments
Optical Input Power	$P_{OPT}$		10	dBm	CW, $V_{BIAS} = +4$ V
Bias Voltage	$V_{BIAS}$	0	+6	V	
ESD	$V_{ESD}$	-250	250	V	100 pF, 1.5 k $\Omega$ HBM
Fiber Bend Radius	$R_{FB}$	20		mm	
Fiber Pull Force	$F_{FP}$		10	N	

### Environmental Specifications

**Warning:** stresses outside the ranges specified in this section can cause permanent damage to the device.

Parameter	Symbol	Min.	Max.	Units	Conditions / Comments
Operating Case Temperature	$T_{CASE}$	-40	+85	$^{\circ}$ C	
Storage Temperature	$T_{STG}$	-40	+85	$^{\circ}$ C	
Operating Humidity	RH	0	90	%	non condensing

# P40AR

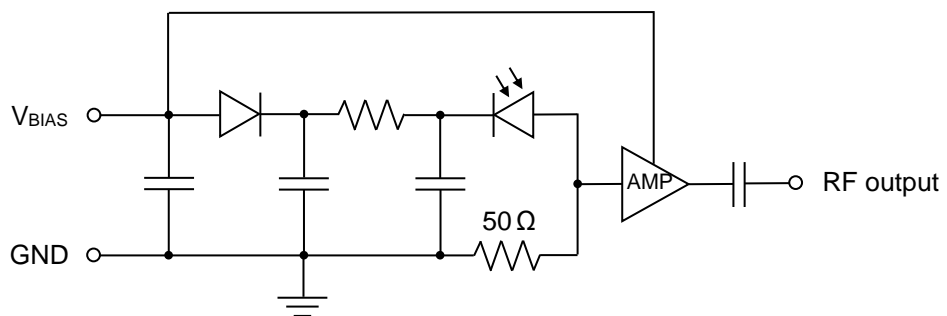
Photoreceiver Module

## Electro-Optical Specifications

**Note:** all parameters are measured at  $T_{CASE} = 25^{\circ}C$  and  $V_{BIAS} = +4 V$  unless otherwise specified.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Optical Wavelength Range	$\lambda$		1260		1620	nm
Photodiode DC Responsivity	R	$\lambda = 1310 \text{ nm}$	0.60	0.65		A/W
		$\lambda = 1550 \text{ nm}$	0.55	0.60		
Polarization Dependent Loss	PDL	$\lambda = 1310 \text{ nm}$		TBD	TBD	dB
		$\lambda = 1550 \text{ nm}$		TBD	TBD	
Optical Return Loss	ORL	$\lambda = 1310 \text{ nm}$	33	40		dB
		$\lambda = 1550 \text{ nm}$	33	40		
Frequency Range	$\Delta f$	$\lambda = 1550 \text{ nm}$ $P_{OPT} = 0 \text{ dBm}$	0.01		35	GHz
Amplifier Gain	G		10		13	dB
Amplifier Noise Figure	NF				5	dB
Output Reflection Coefficient	$ S_{22} $				-10	dB
Photodiode Dark Current	$I_{DARK}$			10	50	nA
Risetime	$T_R$			TBD		ps
Group Delay	$T_{GD}$			TBD		ps
Operating Bias Voltage	$V_{BIAS}$		+3.5	+4	+4.5	V
Bias Current	$I_{BIAS}$			63	70	mA

## Block Diagram

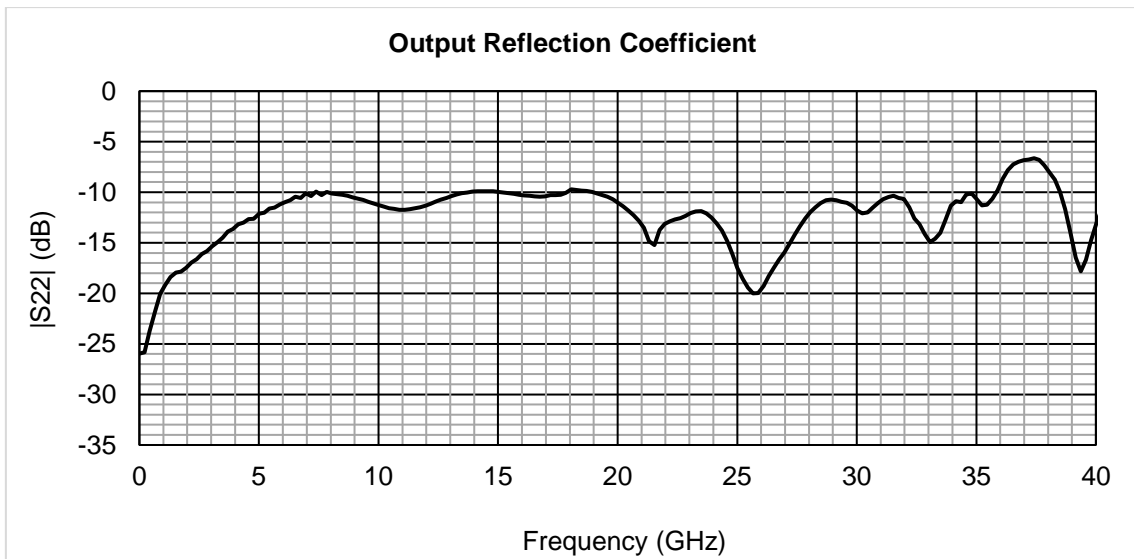
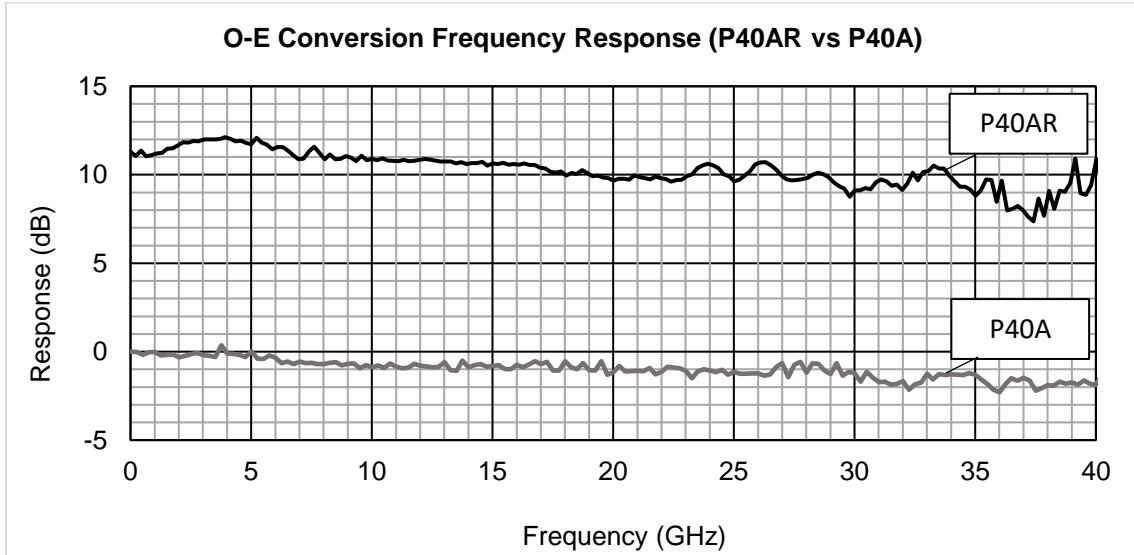


- Notes:**
1.  $GND$  pin is electrically connected to the module case.
  2. RF output is AC coupled.

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Photoreceiver Module

## Typical Performance Curves

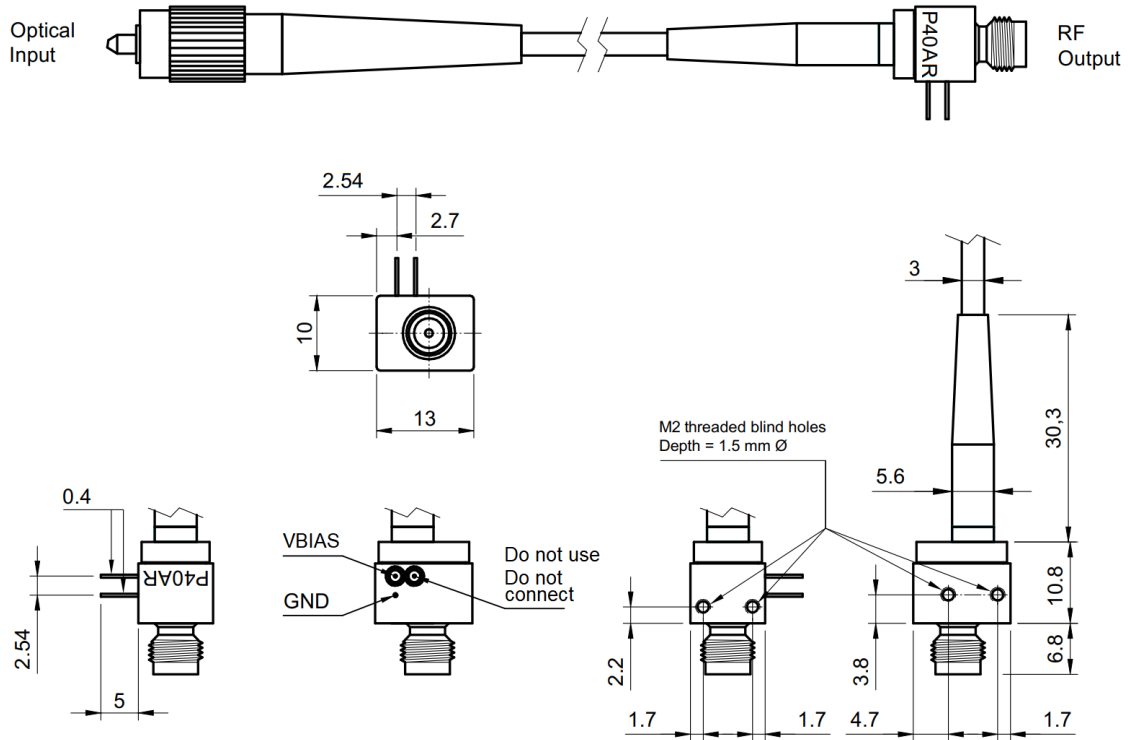


# P40AR

Photoreceiver Module

## Outline Drawings and Mechanical Specifications

- Notes:** 1. All dimensions are in millimeters (mm).  
2. Drawings represent the standard configuration of connectors and fiber.



### Mechanical Specifications

Parameter	Standard value	Available upon request (see Ordering Information)
Optical Connector	FC/APC, 2 mm narrow key	FC/PC, LC/APC or LC/PC
RF Output Connector	50 Ω, 2.4 mm female, M7×0.75 thread	2.4 mm male (inch or metric thread); 3.5 mm <sup>1</sup> female or male (inch or metric thread)
Fiber Type	single mode	
Fiber Length	(1130 ± 20) mm	specified when ordering
Fiber Tubing	900 μm buffer in 3.0 mm LSZH tube	900 μm buffer
Module package	hermetic sealed	
Case coating	plated gold	
Bias pins coating	plated gold	

<sup>1</sup> – These types of connector limit the RF performance of the device. Usable for frequencies 20 GHz and below.

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Photoreceiver Module

## Application Notes



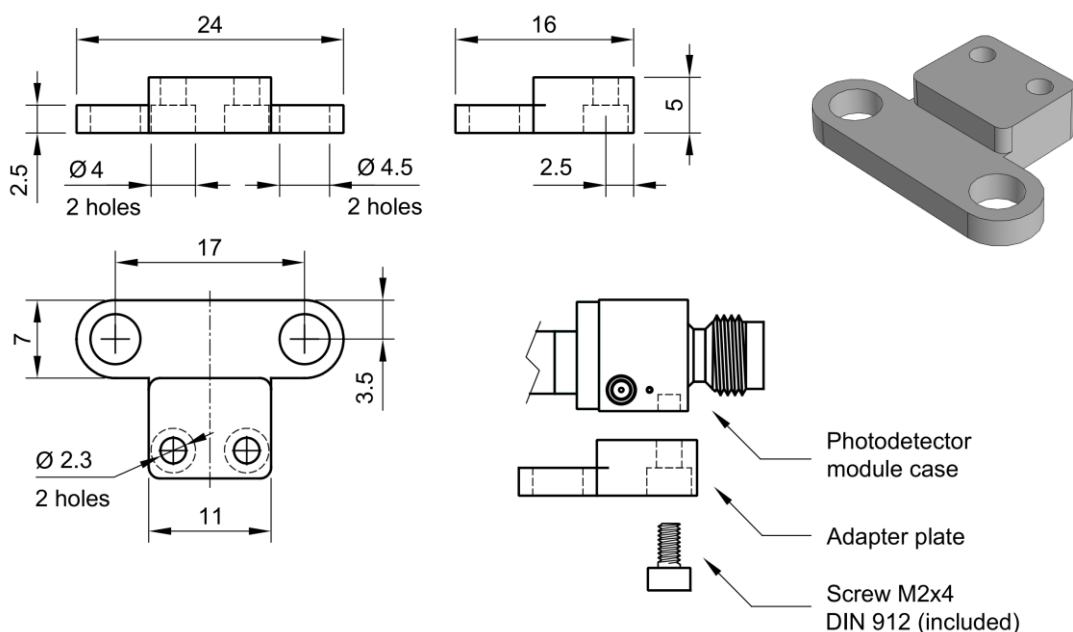
- ESD protection:** the device is sensitive to electrostatic discharge (ESD). To prevent the damage caused by ESD take appropriate precautions when handling the device.
- Lead soldering:** 250 °C for no more than 10 seconds per lead.

## Accessories

P40AR photoreceiver module can be delivered with standard accessories listed below (upon request, see Ordering Information).

### 1. Adapter plate

This accessory can be used to expand the product mounting capabilities. Adapter plate is attached to the module case using M2 screws (included).



### 2. Bias cord

This accessory can be used for establishing electrical connection between DC power supply and photodetector module without  $V_{BIAS}$  and GND pins soldering.

Parameter	Value
Length	(1 ± 0.05) m
The first end	2-pin connector, 2.54 mm spacing, female housing
The second end	2 stripped and tinned wires

**Note:** Though the P40AR module has a built-in reverse polarity protection and bias cord has different-colored wires, make sure that connection has correct polarity when using bias cord.

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Photoreceiver Module

## Ordering Information

Use the following record when ordering the product:

**P40AR-a-b-c-d-e-f-g-h-i**

Letter in record	Allowable value	Description
a =	F	FC type optical connector
	L	LC type optical connector
b =	P	PC polishing style
	A	APC polishing style
c =	20	3.5 mm high-speed electrical connector at RF output
	40	2.4 mm high-speed electrical connector at RF output
d =	F	Female type of high-speed electrical connector
	M	Male type of high-speed electrical connector
e =	M	Metric thread at electrical connector
	I	Inch thread at electrical connector
f =	1	Optical fiber tubing is 900 µm buffer
	3	Optical fiber tubing is 3.0 mm LSZH tube
g =	specified by customer	Optical fiber length in meters (consider ±0.02 m tolerance)
h =	AP	Include "Adapter Plate" accessory
	N	Not include "Adapter plate" accessory
i =	BC	Include "Bias cord" accessory
	N	Not include "Bias cord" accessory

**Example:** the record **P40AR-F-A-40-F-M-3-1.13-AP-BC** denotes the standard variant of P40AX module with FC/APC optical connector, 3.5 mm high-speed electrical connector at RF output (female, metric thread), 1.13 m fiber in 3.0 mm LSZH tube, adapter plate and bias cord included.

## Custom Design

The manufacturer can provide custom designed photoreceiver modules. Send your requirements and specifications to the product distributor.