

PT-12G Photoreceiver

12.5 Gb/s



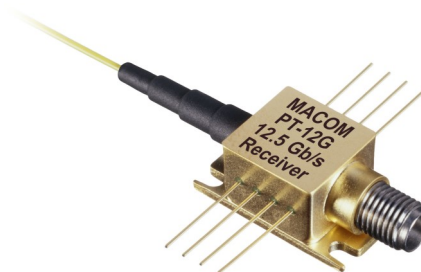
MARP-PT12G-01
Rev. V1

Features

- PIN/TIA Receiver
- High Data Rate, Up to 12.5 Gb/s
- Broad Wavelength Range, 750-1650 nm
- 62.5 μm Multimode Fiber Input
- SMA Output Connector

Applications

- Extinction Ratio Testing
- Test & Measurement Instrumentation



Description

The PT-12G is a single-output receiver module for up to 12.5 Gb/s short wavelength applications. The receiver couples a high responsivity (1.00 A/W), front-illuminated PIN photodiode, usable from 750 nm to 1650 nm, with an internal amplifier to produce a receiver with a 15 GHz bandwidth and conversion gain of 350 V/W at 1310 nm. The PT-12G is configured with a True DC Option that allows offset adjustment and/or stabilization of the DC output to enable accurate extinction ratio measurements.

The single-coaxial output module is available with an SMA output connector in a compact, 8-pin butterfly package with multimode fiber input and is RoHS* compliant.

Optical Characteristics: Wavelength Range = 750 – 1650 nm

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Responsivity	850 nm, multimode 1310 nm, single-mode 1550 nm, single-mode	A/W	0.45 0.85 0.80	0.55 1.00 0.95	—
Conversion Gain	850 nm, multimode 1310 nm, single-mode 1550 nm, single-mode	A/W	175 330 310	215 400 380	—
Noise Equivalent Input Power	RMA, 850 nm, multimode RMS, 1310/1550 nm, single-mode	μW	—	4.2 2.3	—
Maximum Linear Input	1 dB compression at 1550 nm, single-mode	dBm	-3.0	-2.0	—
Optical Input Return Loss	850 nm, multimode 1310/1550 nm, single-mode	dB	—	-16 -30	-14 -27

* Restrictions on Hazardous Substances, compliant to current RoHS EU directive.

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DC Electrical Specifications

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Bandwidth	-3dB electrical	GHz	11	14	—
Low Frequency Cutoff	DC-coupled	kHz	DC	—	—
Electrical Return Loss	0.1 to 8 8 to 10 GHz	dB	—	-20 -19	-15 -10
Maximum Output Swing	50Ω to AC-ground	mV	—	400	—
DC Output Offset	50Ω DC	V	—	0	—
Photodiode Dark Current	25°C 55°C	nA	—	<10 <50	50 100
Output Logic Sense	—	—	Inverting		
Internal Output Coupling	—	—	DC		

Absolute Maximum Ratings¹

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Storage Temperature	—	°C	-40	—	+85
Operating Temperature	—	°C	+10	—	+55
Photodiode Supply Voltage	—	V	0	—	+12
Photodiode Reverse Current	—	mA	—	—	5
Amplifier Gate Voltage	Reference to V_{REF} Voltage	V	0	—	1
Amplifier Drain Voltage	Reference to V_{REF} Voltage	V	0	—	4
Amplifier Control Voltage	Reference to V_{REF} Voltage	V	0.8	—	2
Optical Input Power, Peak	1310 nm	dBm	—	—	+7
ESD Threshold	—	V	250/500	—	—

1. Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

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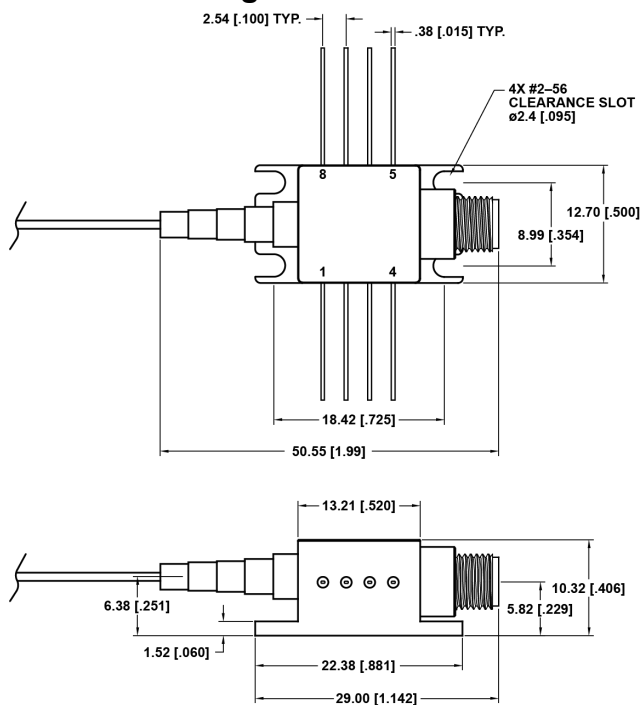
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Module Drawing



Pinout

Pin	Description
1	No connection
2	V_{PD}
3	V_G
4	Ground
5	V_{REF}
6	V_D
7	V_{CTRL}
8	NC

Power Up / Operating Sequence

1. Power the gate voltage; V_G (-2.38 V)
2. Power the reference voltage; V_{REF} (-3 V)
3. Power the remaining pins
4. Apply optical sign to fiber
5. Reverse the sequence for powering down

Pins 3, 5, 6 and 7 require stable, noise filtered power supplies. Any low frequency voltage fluctuation will result in low frequency noise of DC offset level fluctuation.

Power Requirements (25°C)²

Parameter	Reference	Units	Min.	Typ.	Max.
Photodiode Supply Voltage	V_{PD}	V	+5	+6	+9
Amplifier Reference Voltage	V_{REF}	V	—	-3	—
Amplifier Reference Current	—	mA	—	70	—
Amplifier Gate Voltage ³	V_G	V	—	-2.38	—
Amplifier Drain Voltage ⁴	V_D	V	—	+3.45	—
Amplifier Drain Current	—	mA	—	70	—
Amplifier Control Voltage	V_{CTRL}	V	—	-1.8	—
Power Dissipation	—	mW	—	450	—

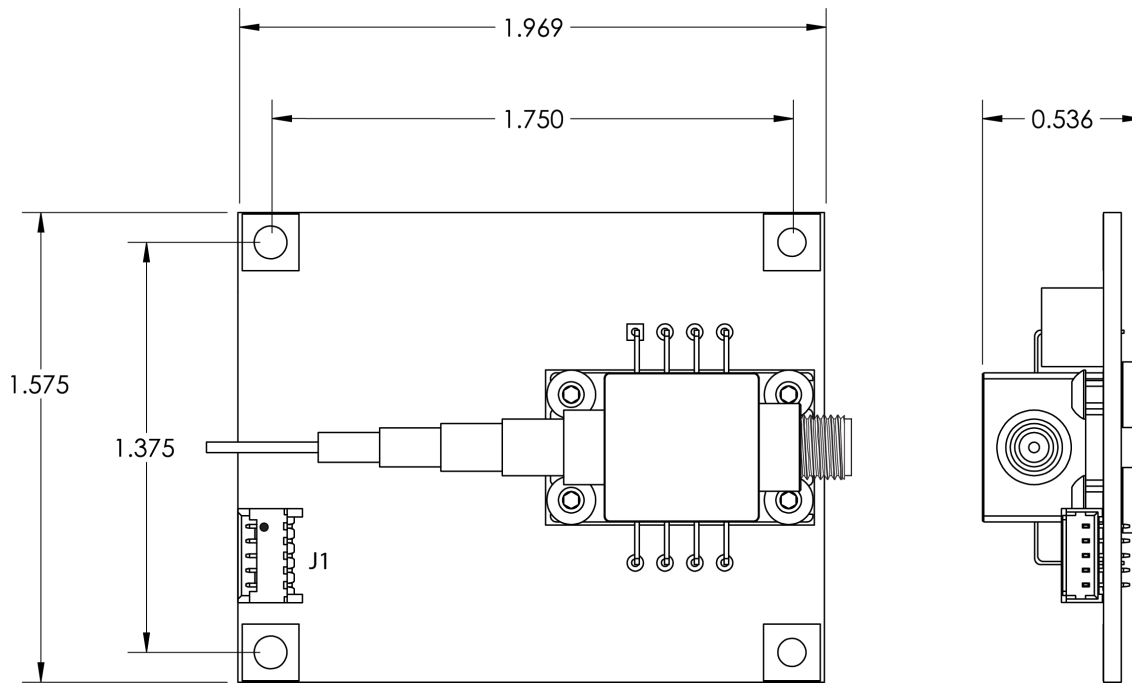
2. All supply voltages assume V_{REF} is set to -3 V.
3. Adjust V_G value to achieve 70 mA for drain current.
4. V_D is adjustable to change DC offset.

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Module on Bias Board Drawing



Pinout (Molex 53048-0510)

Pin	Description
J1-1	PD Current Monitor
J1-2	No Connection
J1-3	Bias Voltage Positive
J1-4	GND
J1-5	Bias Voltage Negative

Power Requirements (25°C)

Parameter	Reference	Units	Min.	Typ.	Max.
Bias Voltage Positive	J1-3	V	+8	—	+12
Bias Voltage Negative	J1-5	V	-8	—	-12
Amplifier Reference Current	—	mA	—	70	—

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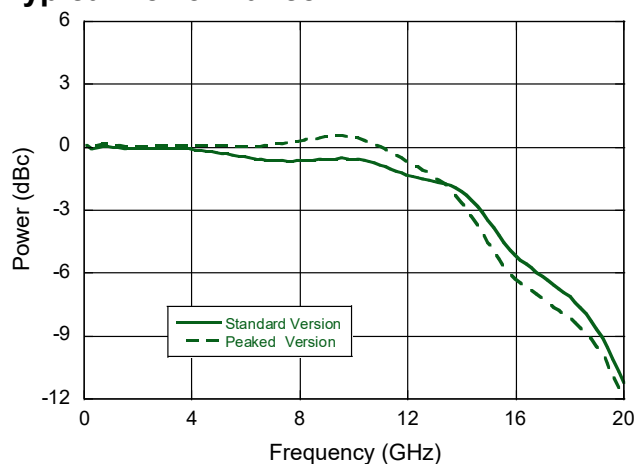


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Mechanical Characteristics

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Package Style	—	—	8-pin Butterfly		
Output Connector	—	—	SMA		
Input Fiber Connector	—	—	FC		
Input Fiber Length	—	m	0.95	1.00	1.05
Input Fiber Type	Graded-index, Loose Buffered	μm	62.5/125/250/900		
Package Seal	—	—	Hermetic, Seam-sealed		
Fiber Bend Radius	—	cm	2.5	—	—
Lead Soldering Temperature	For 10 Seconds	°C	—	—	250

Typical Performance



Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Ordering Information

Part Number	Description
MARP-PT12G-01	PT-12G/8SMA/FC
MARP-PT12G-01EV	Eval, PT-12G-8SMA/FC
MARP-PT12G-02	PT-12G/PK/8SMA/FC
MARP-PT12G-02EV	Eval, PT-12G/PK/8SMA/FC

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