



Low-Noise Photoreceiver Variable-Gain Mini-Module

Features

- Compact 40 x 44 x 22 mm
- Switchable Gain 10M / 10G V/A
- Low Noise
- Wide Spectral Response Range: 190 – 1100 nm

The A139-008 is a low-noise transimpedance amplifier module with integrated photodiode. It provides easy detection of low level UV, visible and infrared light over a very high dynamic range.

Applications

- Low Level Light Detection
- High Dynamic Range Photometry

The Module is equipped with a S1336-44BQ silicon photodiode for high sensitivity in UV to near infrared range. It provides low dark current with 3.6 x 3.6 mm active area. Optical Input is Free Space.

| Characteristics | | |
|--|---|---|
| | Gain Control Input Low | Gain Control Input High |
| Transimpedance Gain $\pm 1\%$ | 10^7 V/A | 10^{10} V/A |
| Bandwidth $\pm 10\%$ | DC – 900 Hz | DC – 400 Hz |
| Conversion Gain (typ.) | 1.2×10^6 V/W @ 200 nm 5×10^6 V/W @ 960 nm 2×10^6 V/W @ 1064 nm | 1.2×10^9 V/W @ 200 nm 5×10^9 V/W @ 960 nm 2×10^9 V/W @ 1064 nm |
| Max. Optical Input Power for linear Gain | 2.2 μ W @ 960 nm | 2.2 nW @ 960 nm |
| Noise Equivalent Input Power (@ 200 Hz, typ.) | 180 fW/Hz ^{1/2} @ 960 nm | 18 fW/Hz ^{1/2} @ 960 nm |
| Integral Output Voltage Noise (typ.) | 0.5 mV Peak-Peak | 30 mV Peak-Peak |
| Spectral Response Range | 190 to 1100 nm | |
| Active Area | 3.6 x 3.6 mm ² | |
| 10^7 to 10^{10} V/A Optical Gain Switching Consistency | 0.5 % typ. | |
| Dark Current (Photodiode and Input Stage) | 3 pA typ. | |
| Output Voltage Range | 0 - 11 V (> 1 k Ω Load) | |
| Output Offset Voltage (dark, low Gain) | < 200 μ V | |
| Output Impedance | 50 Ω | |
| Max. Output Current | 10 mA (for linear operation) | |
| Integral Nonlinearity | < 0.1% | |

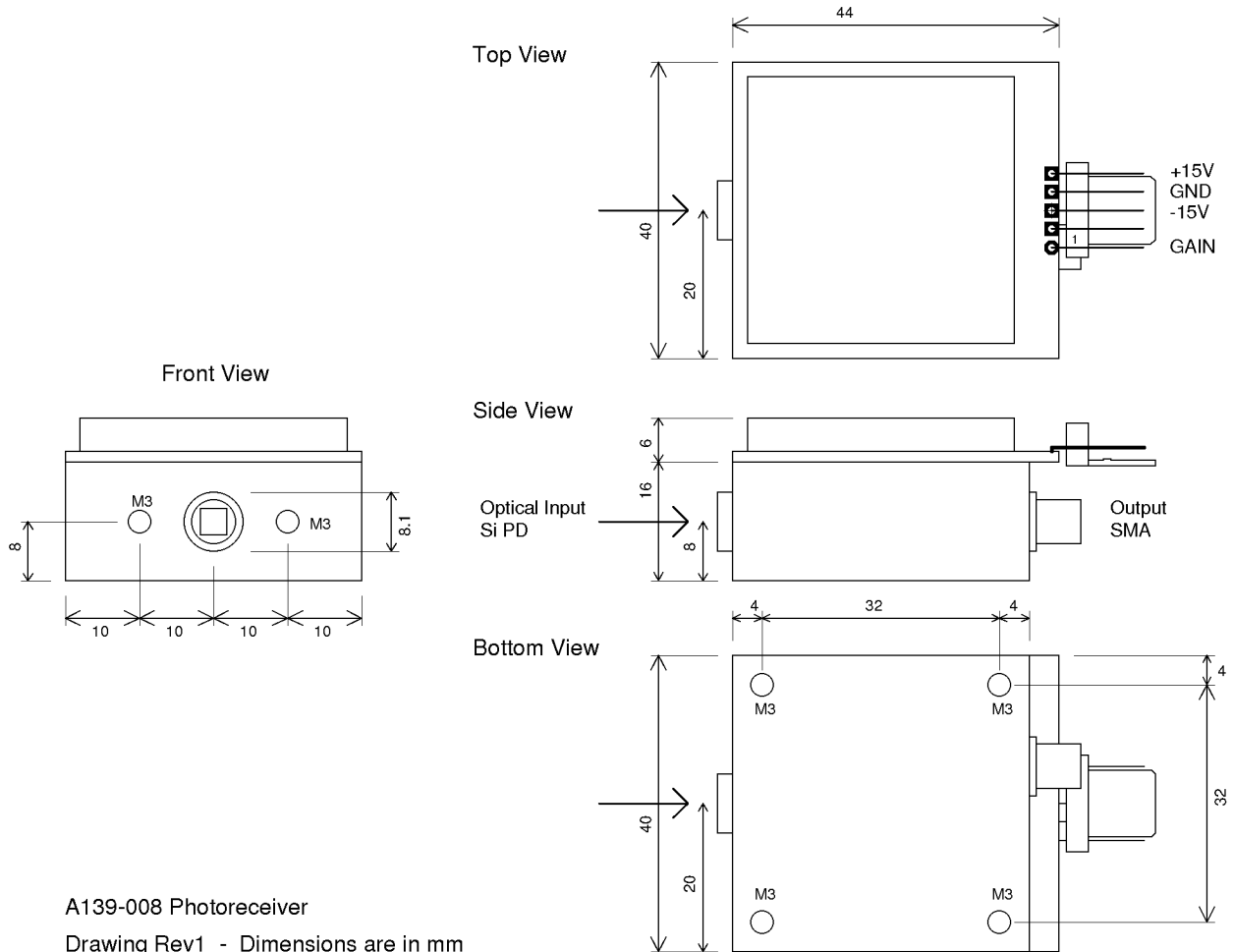
| Characteristics | |
|--|---|
| Gain Control Input (has internal 10 kΩ Pull-Up to +5 V) | Low Level Voltage = 0 – 1 V High Level Voltage = 3.5 – 5 V |
| Power Supply Voltage | ± 15 V |
| Power Supply Current | +20/-12 mA typ. (no signal) |
| Case | Machined Aluminum / Tin-Plated Steel |
| Weight | 45 g |
| Storage Temperature | -20 .. +80 °C |
| Operating Temperature | 10 .. 40 °C (non-condensing) |

All characteristics are for ±15 V power supply and 25 °C ambient temperature.

| Absolute Maximum Ratings | |
|----------------------------------|--------------|
| Optical Input Power | 10 mW |
| Power Supply Voltage | ± 20 V |
| Gain Control Input Voltage Range | -5 V to 15 V |

| Connections | |
|-------------------------------|--|
| Input | Free Space Optical In |
| Output | SMA Connector |
| Power Supply and Gain Control | 5 Pin Header (2.54 mm Pitch): Pin 1 = Gain Control Input Pin 2 = Not connected Pin 3 = -15V Negative Supply Pin 4 = Ground Pin 5 = +15V Positive Supply |

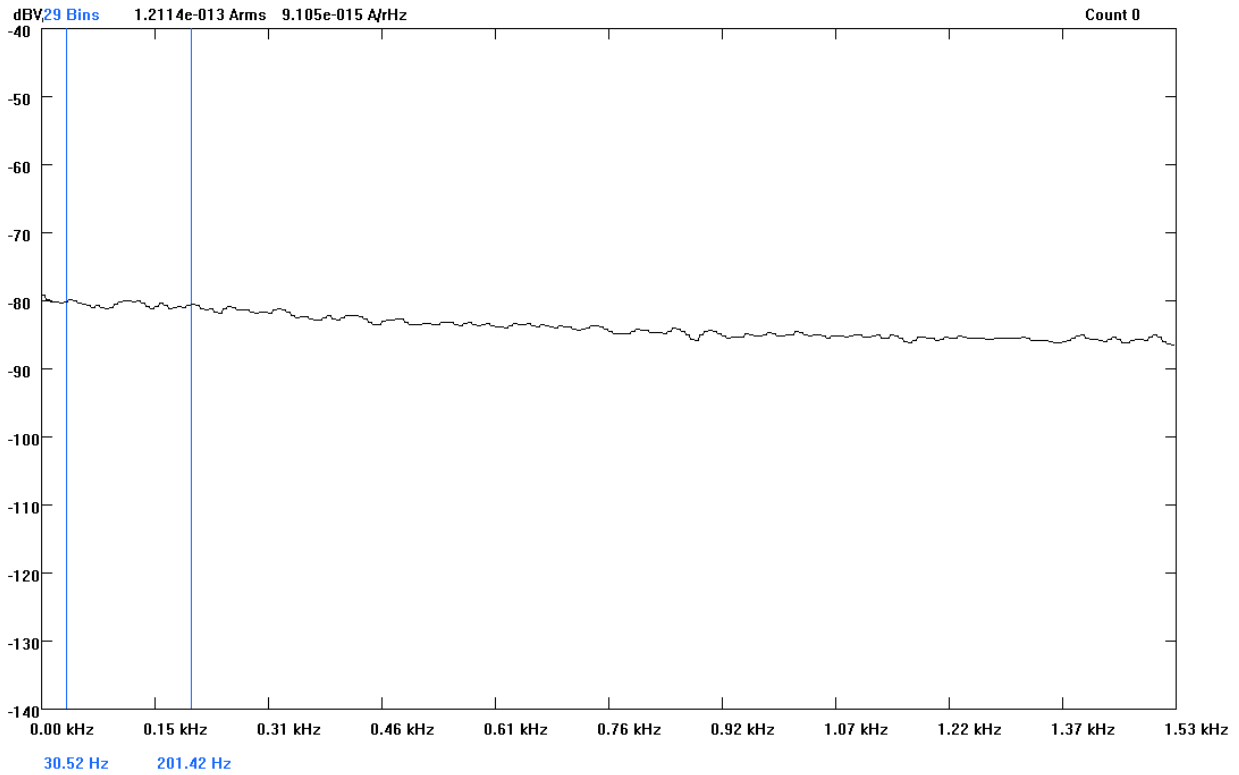
Dimensions



A139-008 Photoreceiver
 Drawing Rev1 - Dimensions are in mm

The module can be fastened by means of four M3 threads on the bottom or two on the front. Do not drive the screws in more than 6 mm, otherwise mechanical damage may occur.
 The supply header 5 pin 2.54 mm pitch with friction lock is Molex KK compatible.

Typical Spectral Noise Current Density in High Gain Mode (10^{10} V/A)
(including Photodiode, dark)



The Noise Spectrum is flat from DC to 200 Hz with an equivalent input noise current density of $9 \text{ fA}/\text{Hz}^{1/2}$, then slowly decreasing with higher frequencies.