

WIDE DYNAMIC RANGE PMT MODULE H13126-01/-02

FEATURES

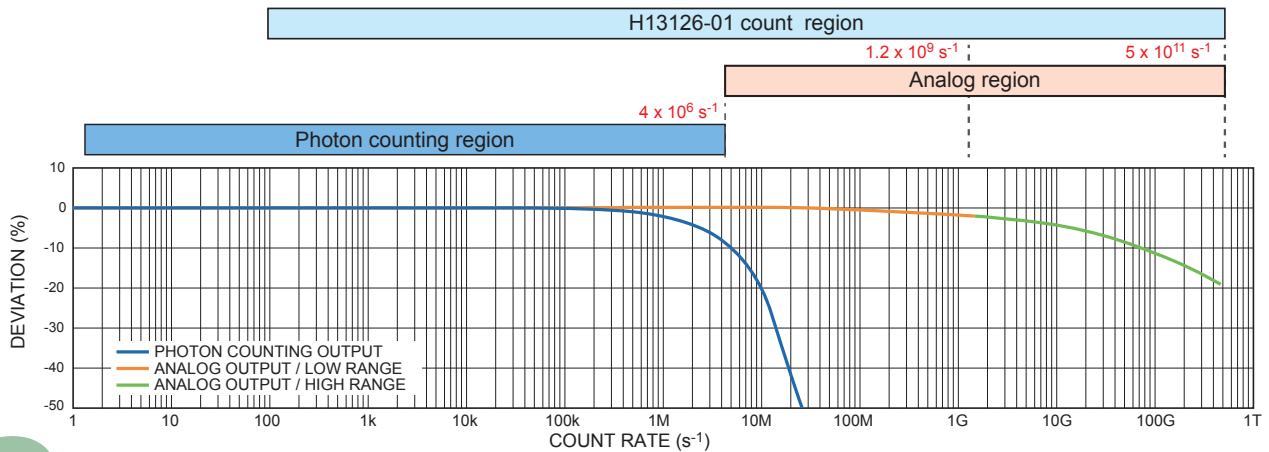
- **Maximum counting rate > $5 \times 10^{11} \text{ s}^{-1}$**
- Compact body
- Low dark count type

APPLICATIONS

- **Laser Lidar**
- **Fluorescence**
- **Chemiluminescence**



MEASUREMENT REGION



SPECIFICATIONS

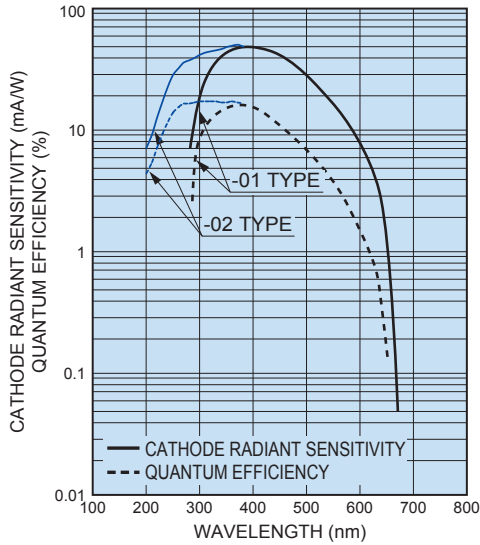
| Parameter | | -01 | -02 | Unit | Parameter | -01 | -02 | Unit |
|----------------------------------|-----------------------------------|-------------------|-------------------|-------------------|--------------------------------------|--------------------------------|-----|---|
| Input voltage | | ±15 | | V | Low range analog (AMP) output | Count-analog conversion factor | | $1 \text{ V} / 4 \times 10^8 \text{ s}^{-1}$ |
| Maximum input current (at +15 V) | | 200 | | mA | | Frequency bandwidth | | DC to 20 |
| Maximum input current (at -15 V) | | 50 | | mA | | Maximum output signal | | +3 (at 1 kΩ load) |
| Effective photocathode area | | φ 22 | | mm | | Offset | | ±1 |
| PMT | Spectral response range | | 300 to 650 | 185 to 650 | nm | DC linearity *2 | | ±2.5 |
| | Wavelength of maximum sensitivity | | 375 | | nm | Output impedance | | 50 |
| | Typical counting sensitivity | 200 nm | - | 1.5×10^5 | $\text{s}^{-1} \cdot \text{pW}^{-1}$ | Count-analog conversion factor | | $1 \text{ V} / 1.7 \times 10^{11} \text{ s}^{-1}$ |
| | | 300 nm | 1.4×10^5 | 2.5×10^5 | | Frequency bandwidth | | DC to 20 |
| | | 400 nm | 2.7×10^5 | 3.4×10^5 | | Maximum output signal | | +3 (at 1 kΩ load) |
| 500 nm | | 1.7×10^5 | 2.2×10^5 | Offset | | ±1 | | |
| 600 nm | 4.6×10^4 | 5.8×10^4 | DC linearity *2 | | ±20 | | | |
| Counting linearity | | 5×10^6 | | s^{-1} | Output impedance | | 50 | |
| Photon counting output | Dark count (Typ.) *1 | | 50 | | s^{-1} | Operating ambient temperature | | +5 to +40 |
| | Output pulse width | | 8 | | ns | Storage temperature | | -20 to +50 |
| | Output pulse height | | 2.5 | | V | Weight | | 400 |
| | Recommended load resistance | | 50 | | Ω | Cable length | | 1000 |
| | | | | | | | | mm |

*1: Measured after 30 minutes storage in the dark.

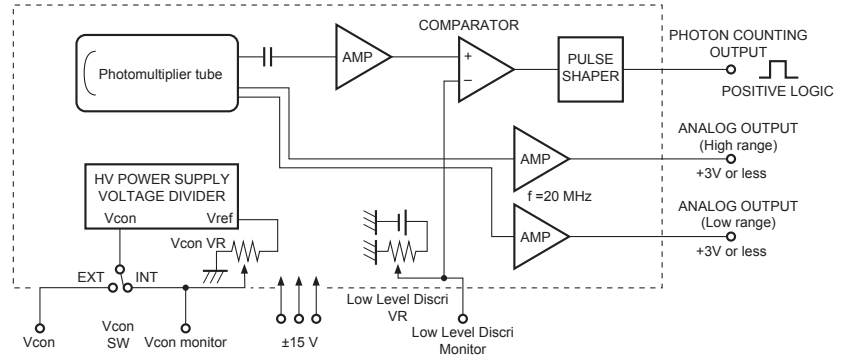
*2: Total 10-digit linearity of photon counting to analog output is within ±20 %.

CHARACTERISTICS

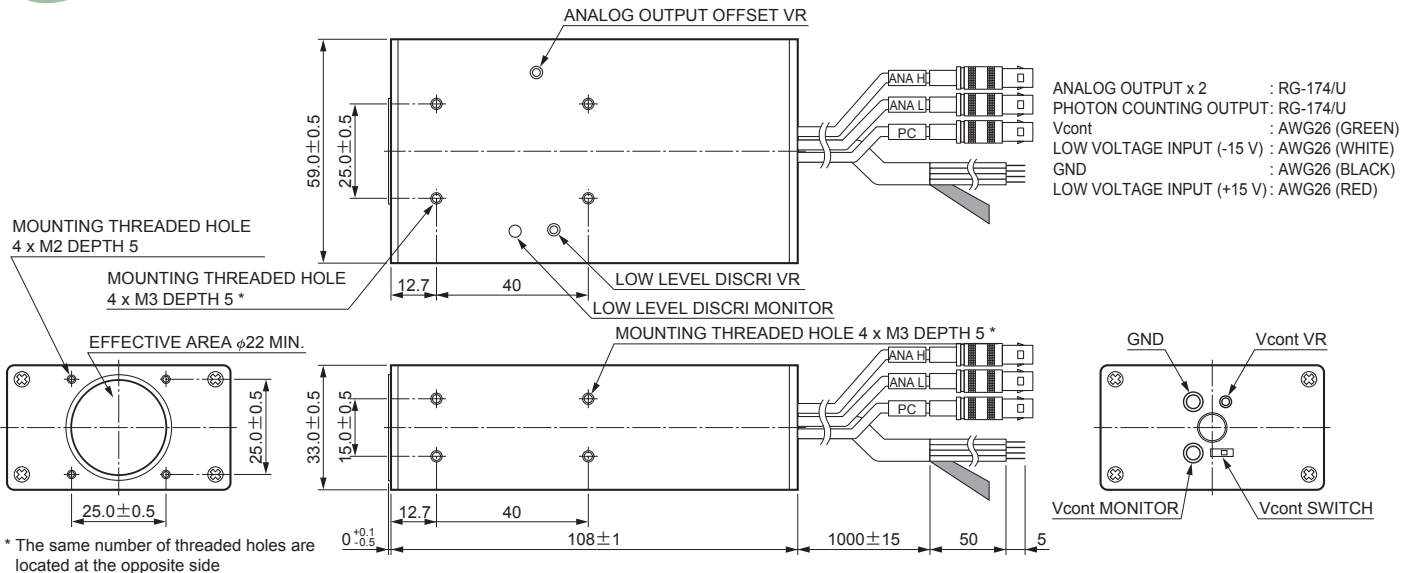
•Typical spectral response



BLOCK DIAGRAM



DIMENSIONAL OUTLINE (Unit: mm)



CONVERSION TABLE TO COUNT VALUE

Analog output / high range

| Analog output (V) | Count (s ⁻¹) | Frequency (GHz) | Count at 50 ns |
|-------------------|--------------------------|-----------------|----------------|
| 3 | 510,000,000 k | 510 | 25,500 |
| 2 | 340,000,000 k | 340 | 17,000 |
| 1 | 170,000,000 k | 170 | 8,500 |
| 0.5 | 85,000,000 k | 85 | 4,250 |
| 0.1 | 17,000,000 k | 17 | 850 |
| 0.05 | 8,500,000 k | 8.5 | 425 |
| 0.01 | 1,700,000 k | 1.7 | 85 |
| 0.005 | 850,000 k | 0.85 | 42.5 |
| 0.001 | 170,000 k | 0.17 | 8.5 |

Example) ADC Sampling rate : 20 MHz(50 ns)
•Analog output = 1.75 V → Count data = 14,450 (1.7 V) + 425 (0.05 V) = 14,875 count / 50 ns

Analog output / low range

| Analog output (V) | Count (s ⁻¹) | Frequency (MHz) | Count at 50 ns |
|-------------------|--------------------------|-----------------|----------------|
| 3 | 1,200,000 k | 1,200 | 60.0 |
| 2 | 800,000 k | 800 | 40.0 |
| 1 | 400,000 k | 400 | 20.0 |
| 0.5 | 200,000 k | 200 | 10.0 |
| 0.1 | 40,000 k | 40 | 2.0 |
| 0.05 | 20,000 k | 20 | 1.0 |
| 0.01 | 4,000 k | 4 | 0.2 |
| 0.005 | 2,000 k | 2 | 0.1 |
| 0.001 | 400 k | 0.4 | 0.02 |

Example) ADC Sampling rate : 20 MHz(50 ns)
•Analog output = 2.25 V → Count data = 44.0 (2.2 V) + 1.0 (0.05 V) = 45 count / 50 ns

Subject to local technical requirements and regulations, availability of products included in this promotional material may vary. Please consult with our sales office. Information furnished by HAMAMATSU is believed to be reliable. However, no responsibility is assumed for possible inaccuracies or omissions. Specifications are subject to change without notice. No patent rights are granted to any of the circuits described herein. ©2018 Hamamatsu Photonics K.K.

HAMAMATSU PHOTONICS K.K. www.hamamatsu.com

HAMAMATSU PHOTONICS K.K., Electron Tube Division
314-5, Shimokanzo, Iwata City, Shizuoka Pref., 438-0193, Japan, Telephone: (81)539/62-5248, Fax: (81)539/62-2205
E-mail : techinfo@etd.hpk.co.jp