BostonElectronics


# VS10 Detector Set

Room temp fast 1x1 mm LWIR set, micro sized preamp, for < 2 to 11+ microns, DC to 10MHz.

- PVM-10.6-1x1
- uIP-DC-10M-S
- PPS-03

# Photovoltaic multiple junction detectors PVM

**PVM series** features room temperature and TE cooled IR multiple junction photovoltaic detectors.

| Detector type | Cooling, operating temperature $T[K]$ | Optimal wavelength*) $\lambda_{opt}[\mu m]$ | Detectivity**) $D^*\left[\frac{cm\cdot\sqrt{Hz}}{W}\right]$ @$\lambda_{peak}$ | Detectivity**) $D^*\left[\frac{cm\cdot\sqrt{Hz}}{W}\right]$ @$\lambda_{opt}$ | Current responsivity length product $R_i\cdot L\left[\frac{A\cdot mm}{W}\right]$ | Time constant $\tau[ns]$ | Resistance $R[\Omega]$ | Acceptance angle $\varnothing\left[^\circ\right]_{\frac{1}{2}NA}$ | Optical area***) $[mm\times mm]$ | Package | Window****) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PVM | uncooled, ~300 | 8 | ≥1.2×10⁸ | ≥6.0×10⁷ | ≥0.008 | ≤4 | 50 to 300 | ≥90, 0.71 | 0.1×0.1<br>0.2×0.2<br>1×1<br>2×2<br>3×3<br>4×4[1)] | BNC, TO39 | no window |
| | | 10.6 | ≥2.0×10⁷ | ≥1.0×10⁷ | ≥0.002 | ≤1.5 | 20 to 150 | | | | |
| | two-stage TE-cooled (2TE), ~230 | 8 | ≥6.0×10⁸ | ≥3.0×10⁸ | ≥0.015 | ≤4 | 150 to 1000 | ~70, 0.87 | | TO8, TO66 | wedged ZnSe AR coated |
| | | 10.6 | ≥2.0×10⁸ | ≥1.0×10⁸ | ≥0.006 | ≤3 | 90 to 350 | | | | |

*) *Other optimal wavelengths available upon request.*
**) *Data sheet states minimum guaranteed D* values for each detector model. Higher performance detectors can be provided upon request.*
***) *Other optical area available upon request.*
****) *Other windows available upon request.*
1) *Optical area available only for uncooled detectors.*

# Photovoltaic detectors optically immersed PVMI

**PVMI series** features room temperature and TE cooled IR multiple junction photovoltaic detectors, optically immersed (achieved by using high refractive index micro lenses) in order to improve performance of the devices, different acceptance angle and saturation level. Both PVM and PVMI devices are optimized for the maximum performance at opt. Highest performance and stability are achieved by application of variable gap HgCdTe semiconductor, optimized doping and sophisticated surface processing.

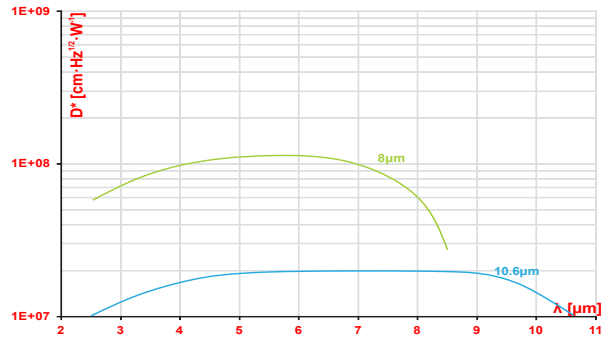
| Detector type | Cooling, operating temperature $T[K]$ | Optimal wavelength*) $\lambda_{opt}[\mu m]$ | Detectivity**) $D^*\left[\frac{cm\cdot\sqrt{Hz}}{W}\right]$ @$\lambda_{peak}$ | Detectivity**) $D^*\left[\frac{cm\cdot\sqrt{Hz}}{W}\right]$ @$\lambda_{opt}$ | Current responsivity length product $R_i\cdot L\left[\frac{A\cdot mm}{W}\right]$ | Time constant $\tau[ns]$ | Resistance $R[\Omega]$ | Acceptance angle $\varnothing\left[^\circ\right]_{\frac{1}{2}NA}$ | Optical area***) $[mm\times mm]$ | Package | Window****) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PVMI | uncooled, ~300 | 8 | ≥6.0×10⁸ | ≥3.0×10⁸ | ≥0.04 | ≤4 | 50 to 300 | ~36, 1.62 | 1×1<br>2×2 | BNC, TO39 | no window |
| | | 10.6 | ≥2.0×10⁸ | ≥1.0×10⁸ | ≥0.01 | ≤1.5 | 20 to 150 | | | | |
| | two-stage TE-cooled (2TE), ~230 | 8 | ≥2.5×10⁹ | ≥2.0×10⁹ | ≥0.10 | ≤4 | 150 to 1000 | | | TO8, TO66 | wedged ZnSe AR coated |
| | | 10.6 | ≥1.5×10⁹ | ≥1.0×10⁹ | ≥0.05 | ≤3 | 90 to 350 | | | | |
| | three-stage TE-cooled (3TE), ~210 | 8 | ≥4.0×10⁹ | ≥3.0×10⁹ | ≥0.15 | ≤4 | 200 to 1500 | | | | |
| | | 10.6 | ≥2.0×10⁹ | ≥1.5×10⁹ | ≥0.10 | ≤3 | 100 to 400 | | | | |
| | four-stage TE-cooled (4TE), ~195 | 8 | ≥8.0×10⁹ | ≥6.0×10⁹ | ≥0.20 | ≤4 | 500 to 2000 | | | | |
| | | 10.6 | ≥2.5×10⁹ | ≥2.0×10⁹ | ≥0.15 | ≤3 | 120 to 500 | | | | |

*) *Other optimal wavelengths available upon request.*
**) *Data sheet states minimum guaranteed D* values for each detector model. Higher performance detectors can be provided upon request.*
***) *Other optical area available upon request.*
****) *Other windows available upon request.*

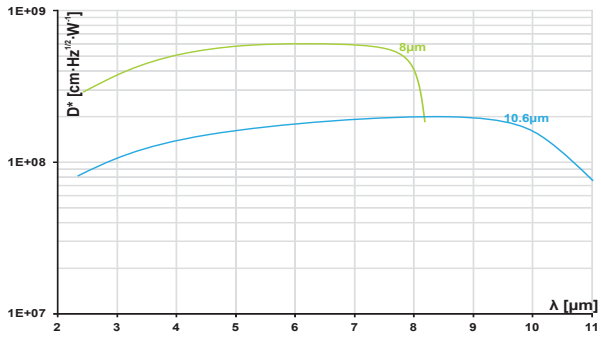



# Spectral characteristics*)

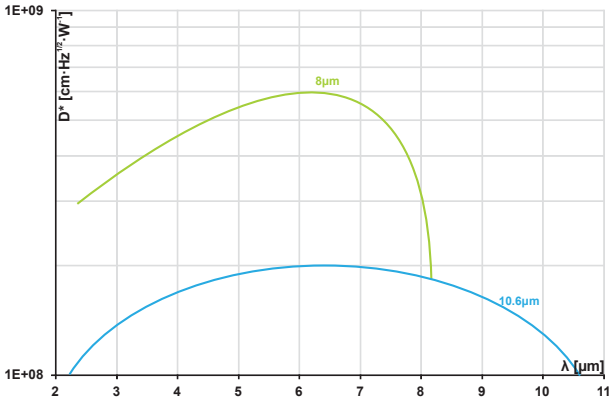
## PVM



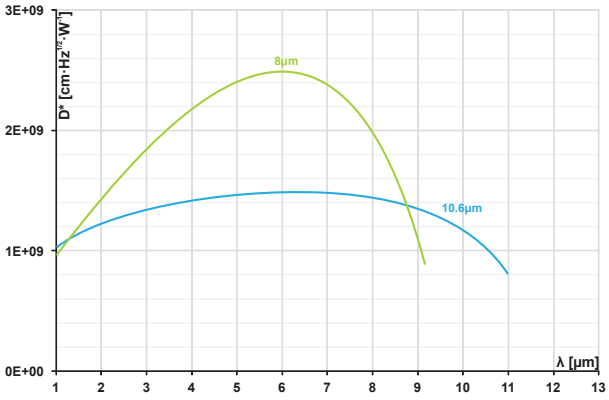

## PVM-2TE



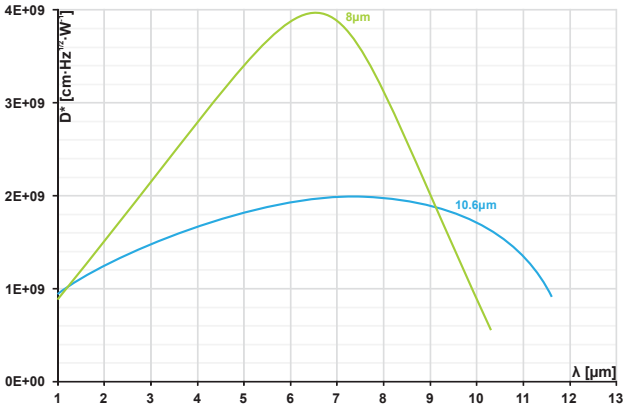

## PVMI



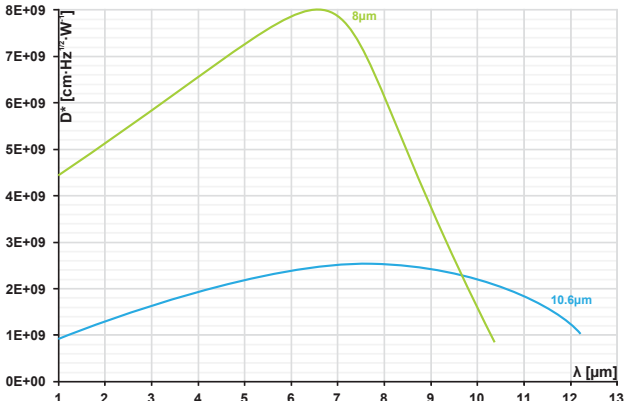

## PVMI-2TE




## PVMI-3TE

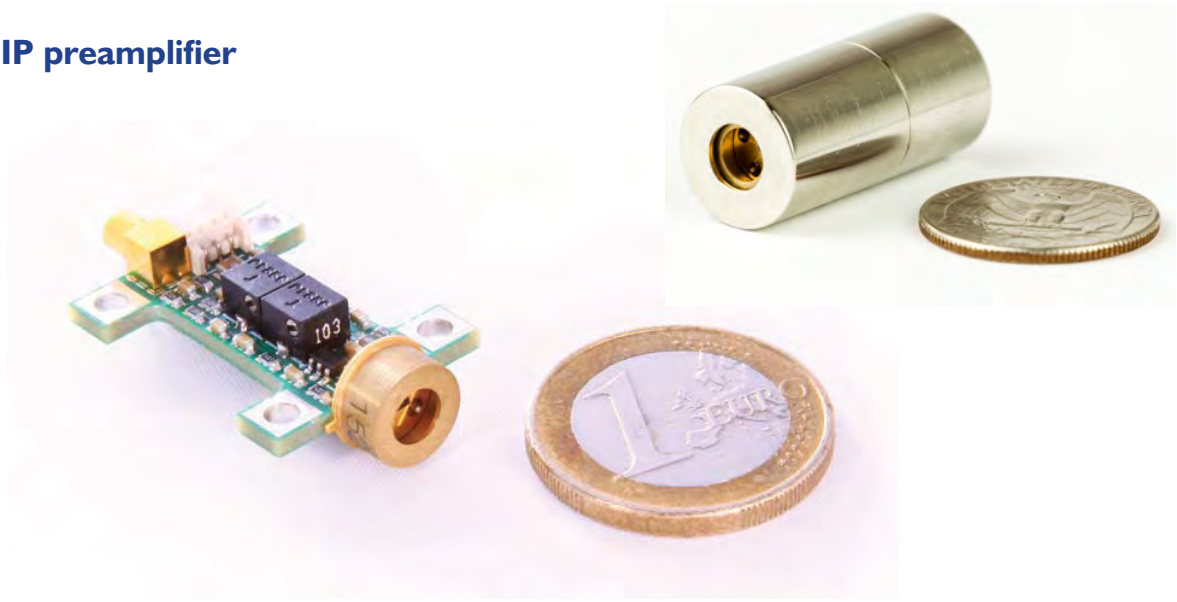



## PVMI-4TE




*)Example of D* vs wavelength λ for HgCdTe detectors.
*Spectral characteristics of individual detectors may vary from those shown on the chart.*

# μIP preamplifier



μIP is the transimpedance, AC or DC coupled, micro-size preamplifier. It is available in two versions: S – standard with package and O – OEM without package. μIP is intended to operation with either biased or non-biased uncooled detectors in TO39 package.

## Code description

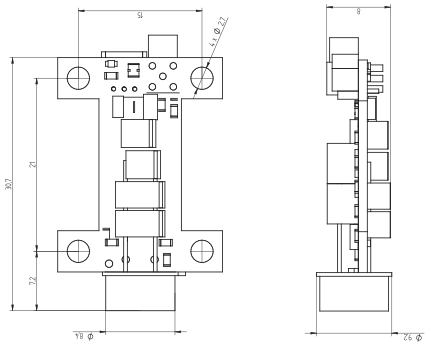
**μIP - DC - 10M - S**

- **μIP** – VIGO preamplifier type
- **DC** – Low cut-off frequency $f_{lo}$ [Hz]:
  DC
  10
  100
  1k
  10k
- **10M** – High cut-off frequency $f_{hi}$ [Hz]:
  100k
  300k
  1M
  5M
  10M
  20M
  50M
  100M
  200M
- **S** – Version:
  S - standard - with package
  OEM - without package

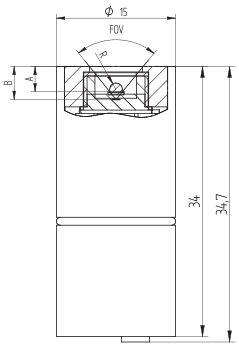
*see the preamplifier specification table for additional information*

## Dimensions [mm]

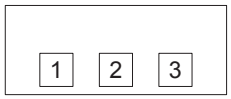
μIP OEM



μIP-S




Power supply connector - MOLEX1x3 conector female




| Pin number | Symbol | Function |
|---|---|---|
| 1 | $-V_{sup}$ | power supply input (-) |
| 2 | GND | power ground |
| 3 | $+V_{sup}$ | power supply input (+) |

| Preamplifier type | Main feature | Detector package | Detector type | Detector cooling | Radiator, cooling, TEC controlling | Input noise voltage density | Input noise current density | Low cut-off frequency |
|---|---|---|---|---|---|---|---|---|
| | | | | | | $e_n\left[\frac{nV}{\sqrt{Hz}}\right]$ | $i_n\left[\frac{pA}{\sqrt{Hz}}\right]$ | $f_{lo}[Hz]$ |
| VIP | standalone | BNC | PV, PVI, PVM, PVMI | uncooled | not needed | 0.97 – 8.0[1)] | 0.02 – 3.5[1)] | DC, 10, 100, 1k, 10k |
| µIP | micro-size | TO39 | PC, PCI, PV, PVI, PVM, PVMI | uncooled | not needed | 0.97 – 8.0[1)] | 0.02 – 3.5[1)] | DC, 10, 100, 1k, 10k |
| QIP | four-channel | TO8 | PCQ, PVQ, PVMQ | uncooled | on board radiator and TEC controller, fan | 0.97 – 8.0[1)] | 0.02 – 3.5[1)] | DC, 10, 100, 1k, 10k |
| SIP | ultra-small, OEM | TO39 TO8 | PC, PCI, PV, PVI, PVM, PVMI | uncooled 2TE, 3TE, 4TE | external heatsink needed | 0.97 – 8.0[1)] | 0.02 – 3.5[1)] | DC, 10, 100, 1k, 10k |
| FIP | very fast | TO8 | PC, PCI, PV, PVI, PVM, PVMI | 2TE, 3TE, 4TE | on board radiator, fan | 1.1 | 5.0 | 1k, 10k |
| MIP | standard | TO8 | PC, PCI, PV, PVI, PVM, PVMI | 2TE, 3TE, 4TE | on board radiator, fan | 0.97 – 8.0[1)] | 0.02 – 3.5[1)] | DC, 10, 100, 1k, 10k |
| PIP | programmable | TO8 | PC, PCI, PV, PVI, PVM, PVMI | 2TE, 3TE, 4TE | on board radiator, fan | 0.95 | 4.5 7.0 | DC/10 |
| AIP | on board TEC controller | TO8 | PC, PCI, PV, PVI, PVM, PVMI | 2TE, 3TE, 4TE | on board radiator and **TEC controller**, fan | 0.97 – 8.0[1)] | 0.02 – 3.5[1)] | DC, 10, 100, 1k, 10k |

1) *noise measurement frequency* $f_0 = 10kHz$
2) *first stage transimpedance* $= 1k\Omega$
3) *first stage transimpedance* $= 5k\Omega$
4) *transimpedance range* $\frac{K_{imax}}{K_{imin}}$ up to 5 (dependent on $f_{hi}$)
5) $f_{hi} \leq 1MHz$, *load resistance* $R_L = 1M\Omega t$
6) $f_{hi} > 1MHz$, *load resistance* $R_L = 50M\Omega$

| High cut-off frequency | Transimpedance | Output impedance | Output voltage swing | Output voltage offset | Power supply voltage | Power supply current | Supply connector | Signal output |
|---|---|---|---|---|---|---|---|---|
| $f_{hi}[Hz]$ | $K_i\left[\frac{V}{A}\right]$ | $R_{out}[\Omega]$ | $V_{out}[V]$ | $V_{off}[mV]$ | $V_{sup}[V]$ | $I_{sup}[mA]$ | | |
| 100k, 300k, 1M, 5M, 10M, 20M | fixed up to $1.0\times10^5$ | 50 | ±10[5] ±2[6] | max ±20[9] | ±15[12] ±9[13] | max ±25 | DB9 | BNC |
| 100k, 300k, 1M, 5M, 10M, 100M, 200M | fixed up to $1.0\times10^5$ | 50 | ±2[5] ±1[6] | max ±20[9] | ±9 | max ±50 | MOLEX1×3 | MMCX |
| 100k, 300k, 1M, 5M, 10M, 100M | fixed up to $2.0\times10^5$ | 50 | ±2[5] ±1[6] | max ±20[9] | +5 | max ±50 | DC 2.1/5.5 | **4×MCX** |
| 100k, 300k, 1M, 5M, 10M, 100M, 250M | tunable[4] up to $1.0\times10^5$ | 50 | ±10[5] ±1[6] | max ±20[9] | ±15[12] ±9[13] | max ±50 | AMP2×4 | MMCX |
| **1G** | fixed up to $8.5\times10^3$ | 50 | ±1 | - | +12/-5 | +100 -50 | LEMO | SMA ( **DC monitor as an option**) |
| 100k, 300k, 1M, 5M, 10M, 100M, 250M | fixed up to $2.0\times10^5$ | 50 | ±10[5] ±2[7] ±1[8] | max ±20[9] | ±15[12] ±9[13] | max ±50 | LEMO | SMA |
| 150k/1.5M/20M 1.5M/15M/200M | digitally adjustable 500 – 30k[2] 2.5k – 150k[3] | 50 | ±1 | max ±20[9] (DC) max ±10 (AC) | ±9 | typ ±80 max ±100 | LEMO | SMA |
| 100k, 300k, 1M, 5M, 10M, 100M, 250M | fixed up to $2.0\times10^5$ | 50 | ±2[5] ±1[6] | max ±20[9] | +5[10] +12[11] | max ±50 | DC 2.1/5.5 | 2×SMA ( **DC monitor as an option**) |

7) $1MHz < f_{hi} \leq 20MHz$, *load resistance* $R_L = 1M\Omega$
8) $20MHz < f_{hi} \leq 250MHz$, *load resistance* $R_L = 50M\Omega$
9) *Measured with equivalent resistor at the input instead of the detector. It's to avoid the environmental thermal radiation's impast*
10) *with uncooled,* 2TE *and* 3TE *detectors*
11) *with* 4TE *detectors*
12) $f_{hi} \leq 1MHz$
13) $f_{hi} > 1MHz$


PPS-03 is a small size preamplifier power supply, designed to operate with VIGO IR detection modules with uncooled detectors (VIP, SIP-TO39, uIP)

## Specification

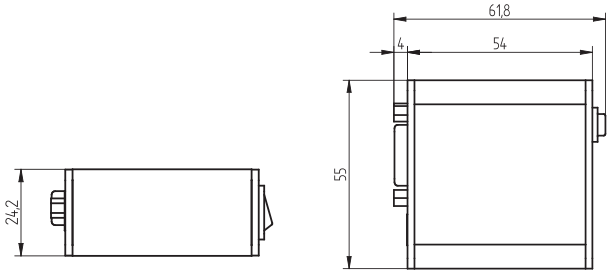
| Parameter | Vaule |
|---|---|
| **Power supply voltage $V_{sup}$ [V AC]** | 100 to 240 (50Hz to 60Hz) |
| **Output voltage [V DC]** | ±15, ±9,+12, -5 |
| **Output current [mA]** | ±100 |
| **Weight [g]** | 100 |

## Code description

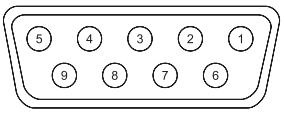
PPS-03-09

- VIGO preamplifier power supply type
- Power supply:
  09 - ±9V
  15 - ±15V
  G1 - combined +12V, -5V

## Dimensions [mm]




## Power supply connector - DB9 connector female




| Pin number | Symbol | Function |
|---|---|---|
| 1 | N.C. | not connected |
| 2 | N.C. | not connected |
| 3 | GND | power ground |
| 4 | N.C. | not connected |
| 5 | N.C. | not connected |
| 6 | $-V_{sup}$ | power supply output (–) |
| 7 | N.C. | not connected |
| 8 | N.C. | not connected |
| 9 | $+V_{sup}$ | power supply output (+) |
| metal cover | GND-SH | shield |