BostonElectronics

VS18 Detector Set

Sensitive, MWIR set for <3.5 to 6+ microns with DC to 1MHz bandwidth. Fully integrated package with detector, preamplifier and TEC controller.

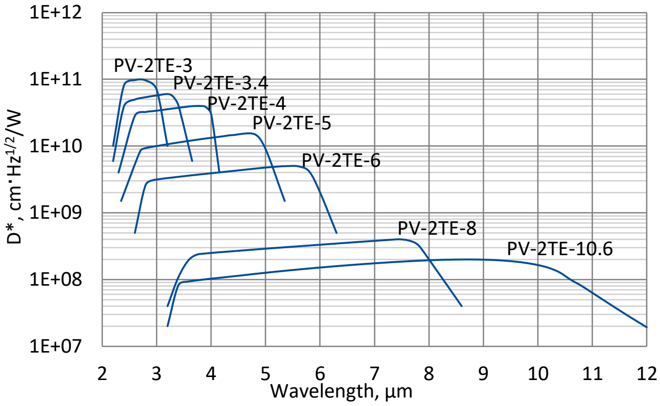
- PV-2TE-6
- AIP-DC-1M-S

PV-2TE series

2 – 12 µm HgCdTe two-stage thermoelectrically cooled photovoltaic detectors

PV-2TE series features two-stage thermoelectrically cooled IR photovoltaic detectors based on sophisticated HgCdTe heterostructures for the best performance and stability. The devices are optimized for the maximum performance at λ_{opt}. Cut-on wavelength can be optimized upon request. Reverse bias may significantly increase response speed and dynamic range. It also results in improved performance at high frequencies, but 1/f noise that appears in biased devices may reduce performance at low frequencies. 3° wedged sapphire (wAl_2O_3) or zinc selenide anti-reflection coated (wZnSeAR) window prevents unwanted interference effects.

Spectral response (T_a = 20°C, V_b = 0 mV)



Exemplary spectral detectivity, the spectral response of delivered devices may differ.

2TE-TO66 2TE-TO8

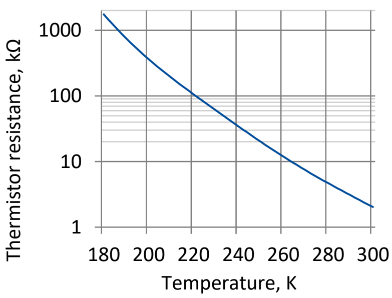
Specification (T_a = 20°C, V_b = 0V)

Parameter	Detector type						
	PV-2TE-3	PV-2TE-3.4	PV-2TE-4	PV-2TE-5	PV-2TE-6	PV-2TE-8	PV-2TE-10.6
Active element material	epitaxial HgCdTe heterostructure						
Optimum wavelength λ_{opt}, µm	3.0	3.4	4.0	5.0	6.0	8.0	10.6
Detectivity $D^*(\lambda_{peak})$, cm·Hz$^{1/2}$/W	$\geq 1.0\times10^{11}$	$\geq 6.0\times10^{10}$	$\geq 4.0\times10^{10}$	$\geq 1.5\times10^{10}$	$\geq 5.0\times10^{9}$	$\geq 4.0\times10^{8}$	$\geq 2.0\times10^{8}$
Detectivity $D^*(\lambda_{opt})$, cm·Hz$^{1/2}$/W	$\geq 7.0\times10^{10}$	$\geq 4.0\times10^{10}$	$\geq 3.0\times10^{10}$	$\geq 9.0\times10^{9}$	$\geq 2.0\times10^{9}$	$\geq 2.0\times10^{8}$	$\geq 1.0\times10^{8}$
Current responsivity $R_i(\lambda_{opt})$, A/W	≥0.5	≥0.8	≥1.0	≥1.3	≥1.5	≥0.8	≥0.4
Time constant τ, ns	≤280	≤200	≤100	≤80	≤50	≤45	≤10
Resistance-active area product R·A, Ω·cm^2	≥150	≥3	≥2	≥0.1	≥0.02	≥0.0002	≥0.0001
Active element temperature T_{det}, K	~230						
Active area A, mm×mm	0.05×0.05, 0.1×0.1						0.05×0.05
Package	TO8, TO66						
Acceptance angle Φ	~70°						
Window	wAl_2O_3				wZnSeAR		

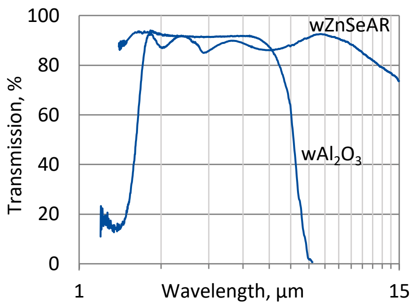
Two-stage thermoelectric cooler parameters

Parameter	Value
T_{det}, K	~230
V_{max}, V	1.3
I_{max}, A	1.2
Q_{max}, W	0.36

Thermistor characteristics

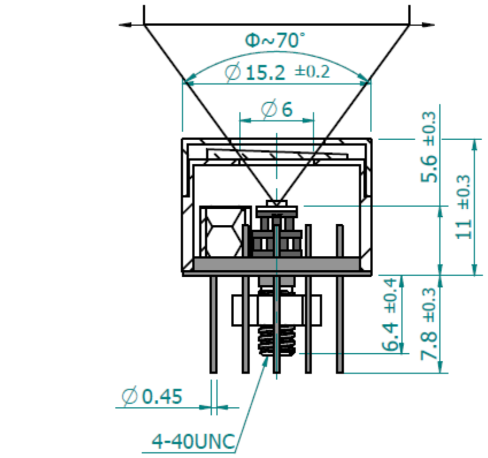


Spectral transmission of wAl_2O_3 and wZnSeAR windows (typical example)



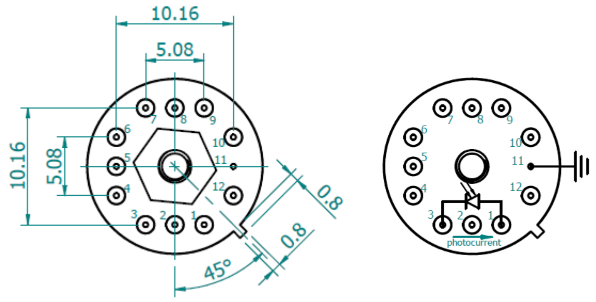
Mechanical layout, mm

2TE-TO8 package



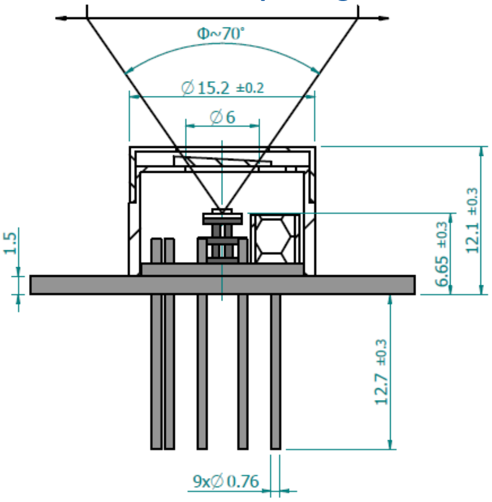
Φ – acceptance angle

Bottom view



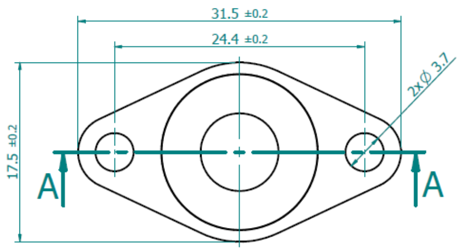
Function	Pin number
Detector	1, 3
Reverse bias (optional)	1(–), 3(+)
Thermistor	7, 9
TE cooler supply	2(+), 8(–)
Chassis ground	11
Not used	4, 5, 6, 10, 12

2TE-TO66 package

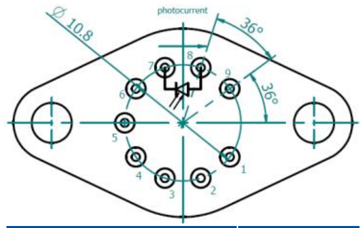


Φ – acceptance angle

Top view



Bottom view



Function	Pin number
Detector	7, 8
Reverse bias (optional)	7(+), 8(–)
Thermistor	5, 6
TE cooler supply	1(+), 9(–)
Not used	2, 3, 4

Dedicated preamplifiers

„all-in-one” AIP

programmable PIP

standard MIP

small SIP-TO8

fast FIP

AIP series

AIP is a new generation of transimpedance, AC or DC coupled preamplifiers. It is designed to operate with either biased or non-biased VIGO detectors. AIP is „all-in-one" device – a preamplifier is integrated with a fan and a thermoelectric cooler controller in a compact housing. It is very convenient and user-friendly device, thus can be easily used in a variety of applications.

Features

- Integrated TEC controller and fan
- Frequency bandwidth up to 250 MHz
- Single power supply
- DC monitor
- Optimised for effective heat dissipation
- Compatible with optical accessories
- Cost effective OEM version available
- Universal and flexible

Specification (T_a = 20°C)

Parameter	Typical value	Conditions, remarks
Low cut-off frequency f_{lo}, Hz	DC, 10, 100, 1k, 10k	
High cut-off frequency f_{hi}, Hz	100k, 1M, 10M, 100M, 250M	
Transimpedance K_i, V/A	up to 200k	fixed
Output impedance R_{out}, Ω	50	
Output voltage swing V_{out}, V	±2 ±1	$f_{hi} \leq$ 1 MHz, R_L = 1 MΩ*) f_{hi} > 1 MHz, R_L = 50 Ω*)
Output voltage offset V_{off}, mV	max ±20**)	
Power supply voltage V_{sup}, V	+5 +12	with 2TE and 3TE cooled detectors with 4TE cooled detectors
Power supply current I_{sup}, mA	max ±50	
Ambient operating temperature T_a, °C	10 to 30	
Signal output socket	SMA	RF output
DC output socket	SMA	DC monitor
Supply socket	DC 2.1/5.5 DC 2.5/5.5	V_{sup} = +12 V V_{sup} = +5 V
Mounting hole	M4	
Fan	yes	

*) R_L – load resistance
**) Measured with equivalent resistor at the input instead of the detector, it is to avoid the environmental thermal radiation impact.

Types of VIGO detectors that can be integrated with AIP preamplifier

- **Photoconductive**
  PC-2TE, PC-3TE, PC-4TE
- **Phtoconductive optically immersed**
  PCI-2TE, PCI-3TE, PCI-4TE
- **Photovoltaic**
  PV-2TE, PVA-2TE, PV-3TE, PV-4TE
- **Photovoltaic optically immersed**
  PVI-2TE, PVIA-2TE, PVI-3TE, PVI-4TE
- **Photovoltaic multiple junction**
  PVM-2TE
- **Photovoltaic multiple junction optically immersed**
  PVMI-2TE, PVMI-3TE, PVMI-4TE

Code description

Type		f_{lo}, Hz		f_{hi}, Hz		Version
AIP	–	**DC** **10** **100** **1k** **10k**	–	**100** **1M** **10M** **100M** **250M**	–	**S***) (with package)

*) OEM version available upon request.

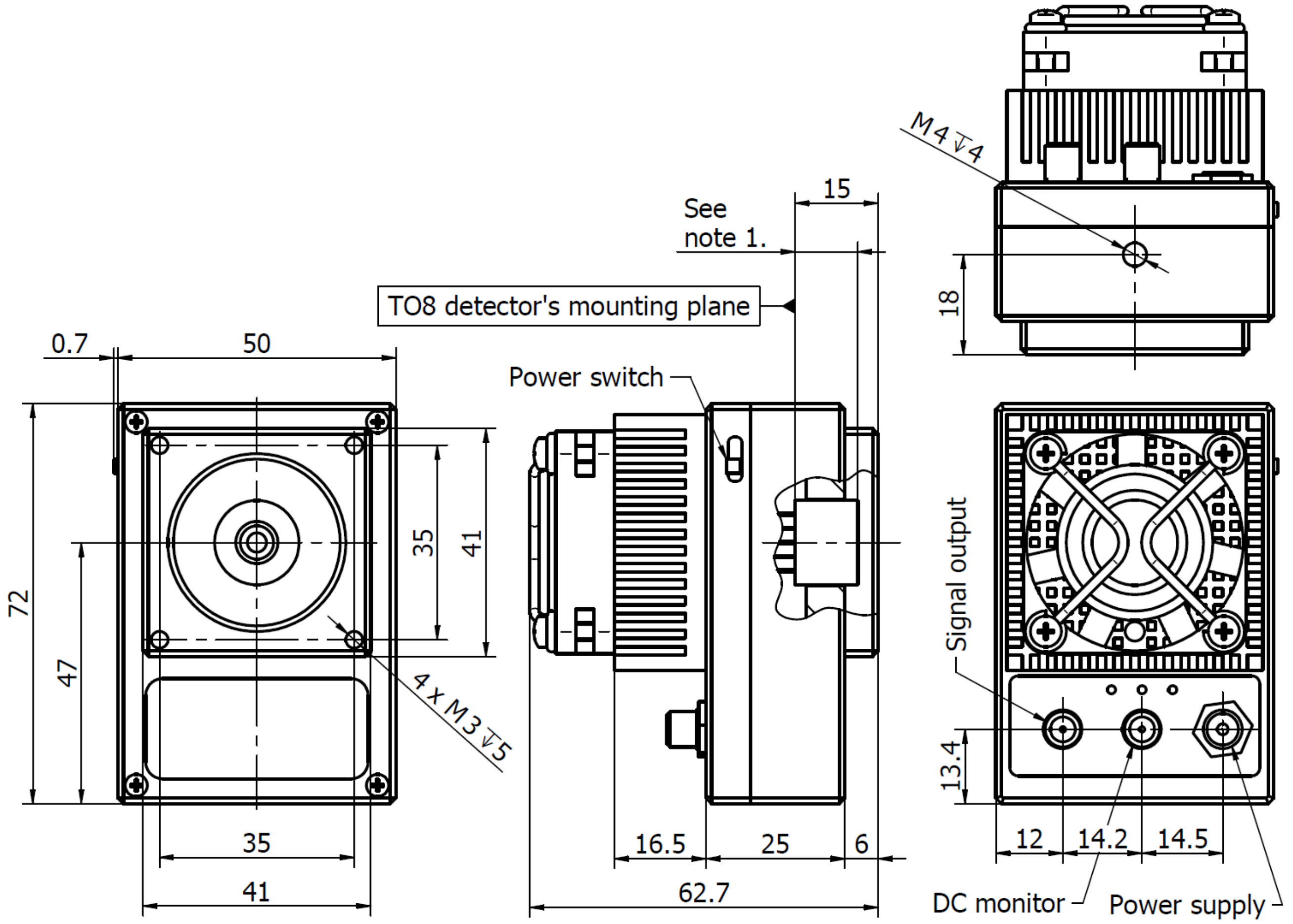
Included accessories

- 2×**SMA-BNC** cables + **AC adaptor**

Dedicated accessories

- **OTA** optical threaded adapter
- **DRB-2** base mounting system

Mechanical layout, mm



Notes:

1. TO8 detector dimensions in the "TO8 technical drawing".