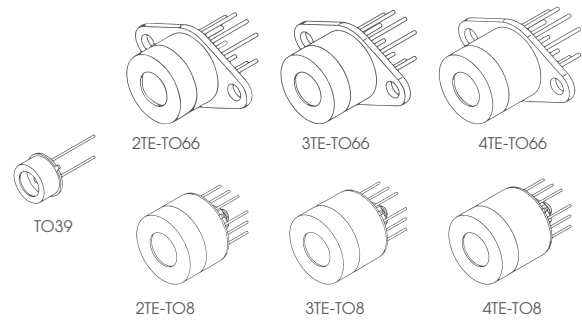


# PVI-5 SERIES

## HgCdTe room temperature and thermoelectrically cooled photovoltaic optically immersed infrared detectors



### FEATURES

- Spectral range: 2.7 to 5.6  $\mu\text{m}$
- Back-side illuminated
- Unique immersion lens technology applied
- No minimum order quantity required
- Detector **PVI-5-1x1-TO39-NW-36** is a **Selected Line product**

### RELATED PRODUCTS

- **LabM-I-5** detection module (p. 101)
- **PVIA-5-1x1-TO39-NW-36** RoHS-compliant detector (p. 16)
- **PVMA-1TE-5-1x1-TO39-pSiAR-70** RoHS-compliant detector (p. 18)
- **AMS3140-01** RoHS-compliant detection module (p. 86)

### APPLICATIONS

- Contactless temperature measurement: railway transport, industrial and laboratory processes monitoring
- Flame and explosion detection
- Threat warning systems
- Heat-seeking, thermal signature detection
- Dentistry
- Gas detection, monitoring and analysis:  $\text{CH}_4$ ,  $\text{C}_2\text{H}_2$ ,  $\text{CH}_2\text{O}$ ,  $\text{HCl}$ ,  $\text{NH}_3$ ,  $\text{SO}_2$ ,  $\text{C}_2\text{H}_6$ ,  $\text{CO}$ ,  $\text{CO}_2$ ,  $\text{NO}_x$
- Breath analysis:  $\text{C}_2\text{H}_6$ ,  $\text{CH}_2\text{O}$ ,  $\text{NH}_3$ ,  $\text{NO}$ ,  $\text{OCS}$
- Gas leak detection
- Combustion process control
- Non-destructive material testing

### SERIES DESCRIPTION

Detector symbol	Cooling (p. 191)	Temperature sensor (p. 192)	Optical area, $A_o$ , mm $\times$ mm	Optical immersion (p. 188)	Package	Acceptance angle, $\Phi$ , deg.	Window (p. 193)
PVI-5-1x1-TO39-NW-36	no	n/a	1x1	hyperhemisphere	TO39 (3 pins)	~36	no
PVI-2TE-5-1x1-TO8-wAl <sub>2</sub> O <sub>3</sub> -36	2TE $T_{\text{chip}} \approx 230\text{K}$	thermistor			TO8		
PVI-2TE-5-1x1-TO66-wAl <sub>2</sub> O <sub>3</sub> -36					TO66		
PVI-3TE-5-1x1-TO8-wAl <sub>2</sub> O <sub>3</sub> -36	3TE $T_{\text{chip}} \approx 210\text{K}$				TO8		
PVI-3TE-5-1x1-TO66-wAl <sub>2</sub> O <sub>3</sub> -36					TO66		
PVI-4TE-5-1x1-TO8-wAl <sub>2</sub> O <sub>3</sub> -36	4TE $T_{\text{chip}} \approx 198\text{K}$				TO8		
PVI-4TE-5-1x1-TO66-wAl <sub>2</sub> O <sub>3</sub> -36					TO66		
							wAl <sub>2</sub> O <sub>3</sub> (3 deg. wedged sapphire)

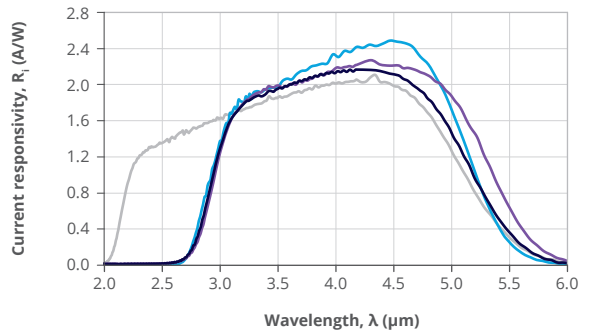
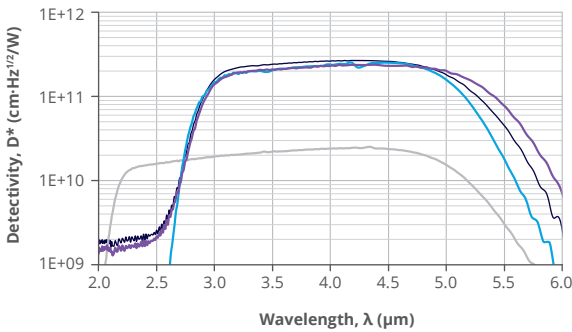
SPECIFICATION ( $T_{amb} = 293\text{ K}$ ,  $V_b = 0\text{ V}$ )

Detector symbol	Cut-on wavelength (10%)	Peak wavelength	Specific wavelength	Cut-off wavelength (10%)	Detectivity			Current responsivity			Time constant	Dynamic resistance	
	$\lambda_{cut-on}$	$\lambda_{peak}$	$\lambda_{spec}$	$\lambda_{cut-off}$	$D^*(\lambda_{peak}, 20\text{kHz})$		$R_i(\lambda_{peak})$	$R_i(\lambda_{spec})$		$\tau$	$R_d$		
	$\mu\text{m}$	$\mu\text{m}$	$\mu\text{m}$	$\mu\text{m}$	$\text{cm}\cdot\text{Hz}^{1/2}/\text{W}$		$\text{A}/\text{W}$	$\text{A}/\text{W}$		$\text{ns}$	$\Omega$		
	Typ.	Typ.	Typ.	Typ.	Typ.	Min. Typ.	Typ.	Typ.	Min. Typ.	Typ.	Min. Typ.	Typ.	
PVI-5-1x1-TO39-NW-36	2.0			5.4	$2.5 \times 10^{10}$	$1.0 \times 10^{10}$ $1.5 \times 10^{10}$	2.0	1.0	1.2	120	100	250	
PVI-2TE-5-1x1-TO8-wAl <sub>2</sub> O <sub>3</sub> -36				5.6	$1.8 \times 10^{11}$	$9.0 \times 10^{10}$ $1.2 \times 10^{11}$					2 000	5 000	
PVI-2TE-5-1x1-TO66-wAl <sub>2</sub> O <sub>3</sub> -36								1.2					
PVI-3TE-5-1x1-TO8-wAl <sub>2</sub> O <sub>3</sub> -36		4.4±0.2	5.0										
PVI-3TE-5-1x1-TO66-wAl <sub>2</sub> O <sub>3</sub> -36	2.7			5.5	$2.3 \times 10^{11}$	$8.0 \times 10^{10}$ $1.5 \times 10^{11}$	2.1		1.5	80	4 000	15 000	
PVI-4TE-5-1x1-TO8-wAl <sub>2</sub> O <sub>3</sub> -36													
PVI-4TE-5-1x1-TO66-wAl <sub>2</sub> O <sub>3</sub> -36				5.2	$2.5 \times 10^{11}$	$1.0 \times 10^{11}$ $1.5 \times 10^{11}$		1.3			10 000	50 000	

SPECTRAL RESPONSE ( $\text{Typ.}$ ,  $T_{amb} = 293\text{ K}$ )

- PVI-5-1x1-TO39-NW-36
- PVI-2TE-5-1x1-TO8/TO66-wAl<sub>2</sub>O<sub>3</sub>-36
- PVI-3TE-5-1x1-TO8/TO66-wAl<sub>2</sub>O<sub>3</sub>-36
- PVI-4TE-5-1x1-TO8/TO66-wAl<sub>2</sub>O<sub>3</sub>-36

- PVI-5-1x1-TO39-NW-36
- PVI-2TE-5-1x1-TO8/TO66-wAl<sub>2</sub>O<sub>3</sub>-36
- PVI-3TE-5-1x1-TO8/TO66-wAl<sub>2</sub>O<sub>3</sub>-36
- PVI-4TE-5-1x1-TO8/TO66-wAl<sub>2</sub>O<sub>3</sub>-36



## MECHANICAL LAYOUT AND PINOUT

- TO39 (3 pins) package (without window)
  - Technical drawing (p. 198)
- 2TE-TO8 package
  - Technical drawing (p. 204)
- 2TE-TO66 package
  - Technical drawing (p. 206)
- 3TE-TO8 package
  - Technical drawing (p. 207)
- 3TE-TO66 package
  - Technical drawing (p. 208)
- 4TE-TO8 package
  - Technical drawing (p. 210)
- 4TE-TO66 package
  - Technical drawing (p. 212)

## RECOMMENDED AMPLIFIERS

Detector symbol	Amplifier type
PVI-5-1x1-TO39-NW-36	SIP-TO39 series (p. 138)
PVI-2TE-5-1x1-TO8-wAl <sub>2</sub> O <sub>3</sub> -36	AIP series (p. 126) PIP series (p. 129) MIP series (p. 132) SIP-TO8 series (p. 135) FIP series <sup>1)</sup> (p. 141)
PVI-3TE-5-1x1-TO8-wAl <sub>2</sub> O <sub>3</sub> -36	
PVI-4TE-5-1x1-TO8-wAl <sub>2</sub> O <sub>3</sub> -36	

<sup>1)</sup> Only for biased detectors

## ABSOLUTE MAXIMUM RATINGS

Parameter	Test conditions/remarks	Value	Unit
Ambient operating temperature, $T_{amb}$	Operation at $T_{amb} > 30^{\circ}\text{C}$ may increase the active element temperature and reduce the performance of the detector below specified parameters	-20 to 30	$^{\circ}\text{C}$
Storage temperature, $T_{stg}$		-20 to 50	$^{\circ}\text{C}$
Soldering temperature	Within 5 s or less	$\leq 300$	$^{\circ}\text{C}$
Storage humidity	No dew condensation	10 to 90	%
Maximum incident optical power density	Continuous wave (CW) or single pulses $> 1 \mu\text{s}$ duration	2.5	$\text{W}/\text{cm}^2$
	Single pulses $< 1 \mu\text{s}$ duration	10	$\text{kW}/\text{cm}^2$
Maximum bias voltage, $V_{b \max}$		-800	mV
Maximum TEC voltage, $V_{TEC \max}$	2TE	1.3	V
	3TE	3.6	
	4TE	8.3	
Maximum TEC current, $I_{TEC \max}$	2TE	1.2	A
	3TE	0.45	
	4TE	0.4	

Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device. Constant or repeated exposure to absolute maximum rating conditions may affect the quality and reliability of the device.