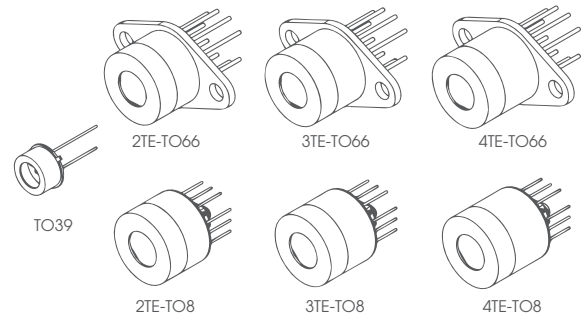


PVI-4 SERIES

HgCdTe room temperature and thermoelectrically cooled photovoltaic optically immersed infrared detectors



FEATURES

- Spectral range: 2.3 to 4.4 μm
- Back-side illuminated
- Unique immersion lens technology applied
- No minimum order quantity required
- Detector **PVI-4-1x1-TO39-NW-36** is a **Selected Line product**

APPLICATIONS

- Gas detection, monitoring and analysis: CH_4 , C_2H_2 , CH_2O , HCl , NH_3 , SO_2 , C_2H_6 , CO_2
- Breath analysis: C_2H_6 , CH_2O , NH_3
- Explosion prevention
- Exhaust gas denitrification
- Emission control (exhaust fumes, greenhouse gases)
- Contactless temperature measurements (metal industry)

RELATED PRODUCTS

- **LabM-I-4** detection module (p. 98)

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, Φ , deg.	Window (p. 193)
PVI-4-1x1-TO39-NW-36	no	n/a	1x1	hyperhemisphere	TO39 (3 pins)	~36	no
PVI-2TE-4-1x1-TO8-wAl ₂ O ₃ -36	2TE $T_{\text{chip}} \approx 230\text{K}$	thermistor			TO8		
PVI-2TE-4-1x1-TO66-wAl ₂ O ₃ -36					TO66		
PVI-3TE-4-1x1-TO8-wAl ₂ O ₃ -36	3TE $T_{\text{chip}} \approx 210\text{K}$				TO8		
PVI-3TE-4-1x1-TO66-wAl ₂ O ₃ -36					TO66		
PVI-4TE-4-1x1-TO8-wAl ₂ O ₃ -36	4TE $T_{\text{chip}} \approx 198\text{K}$				TO8		
PVI-4TE-4-1x1-TO66-wAl ₂ O ₃ -36					TO66		

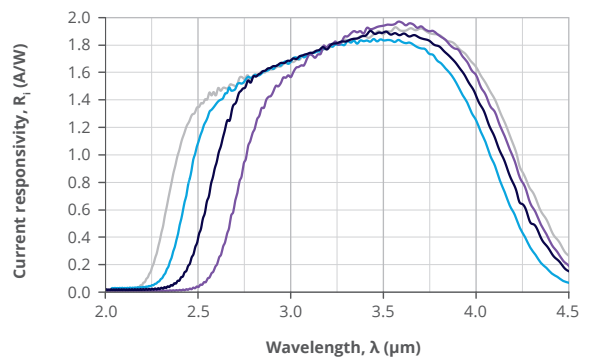
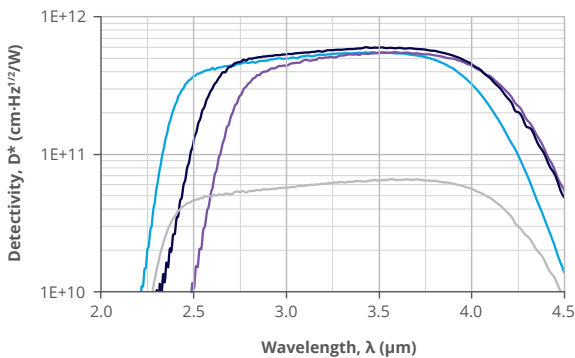
SPECIFICATION ($T_{amb} = 293\text{ K}$, $V_b = 0\text{ V}$)

Detector symbol	Cut-on wavelength (10%)	Peak wavelength	Specific wavelength	Cut-off wavelength (10%)	Detectivity			Current responsivity			Time constant	Dynamic resistance	
	λ_{cut-on}	λ_{peak}	λ_{spec}	$\lambda_{cut-off}$	$D^*(\lambda_{peak}, 20\text{kHz})$	$D^*(\lambda_{spec}, 20\text{kHz})$	$R_i(\lambda_{peak})$	$R_i(\lambda_{spec})$		τ	R_d		
	μm	μm	μm	μm	$\text{cm}\cdot\text{Hz}^{1/2}/\text{W}$	$\text{cm}\cdot\text{Hz}^{1/2}/\text{W}$	A/W	A/W		ns	Ω		
	Typ.	Typ.	Typ.	Typ.	Typ.	Min.	Typ.	Typ.	Min.	Typ.	Typ.	Min.	Typ.
PVI-4-1x1-TO39-NW-36					6.0×10^{10}	3.0×10^{10}	4.0×10^{10}	1.95			150	800	2 000
PVI-2TE-4-1x1-TO8-wAl ₂ O ₃ -36		3.5 ± 0.1			5.0×10^{11}	2.0×10^{11}	3.0×10^{11}					30 000	100 000
PVI-2TE-4-1x1-TO66-wAl ₂ O ₃ -36													
PVI-3TE-4-1x1-TO8-wAl ₂ O ₃ -36	2.3		4.0	4.4					1.0	1.3			
PVI-3TE-4-1x1-TO66-wAl ₂ O ₃ -36		3.6 ± 0.1			5.5×10^{11}		3.5×10^{11}	1.8			100	60 000	150 000
PVI-4TE-4-1x1-TO8-wAl ₂ O ₃ -36						3.0×10^{11}							
PVI-4TE-4-1x1-TO66-wAl ₂ O ₃ -36		3.6 ± 0.15			6.0×10^{11}		4.0×10^{11}					200 000	800 000

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

- PVI-4-1x1-TO39-NW-36
- PVI-2TE-4-1x1-TO8/TO66-wAl₂O₃-36
- PVI-3TE-4-1x1-TO8/TO66-wAl₂O₃-36
- PVI-4TE-4-1x1-TO8/TO66-wAl₂O₃-36

- PVI-4-1x1-TO39-NW-36
- PVI-2TE-4-1x1-TO8/TO66-wAl₂O₃-36
- PVI-3TE-4-1x1-TO8/TO66-wAl₂O₃-36
- PVI-4TE-4-1x1-TO8/TO66-wAl₂O₃-36



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-4-1×1-TO39-NW-36	SIP-TO39 series (p. 138)
PVI-2TE-4-1×1-TO8-wAl ₂ O ₃ -36	AIP series (p. 126) PIP series (p. 129) MIP series (p. 132) SIP-TO8 series (p. 135) FIP series* (p. 141)
PVI-3TE-4-1×1-TO8-wAl ₂ O ₃ -36	
PVI-4TE-4-1×1-TO8-wAl ₂ O ₃ -36	

* 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	≤ 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	W/cm^2
	Single pulses $< 1 \mu\text{s}$ duration	10	kW/cm^2
Maximum bias voltage, V_{bmax}		-800	mV
Maximum TEC voltage, V_{TECmax}	2TE	1.3	V
	3TE	3.6	
	4TE	8.3	
Maximum TEC current, I_{TECmax}	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.