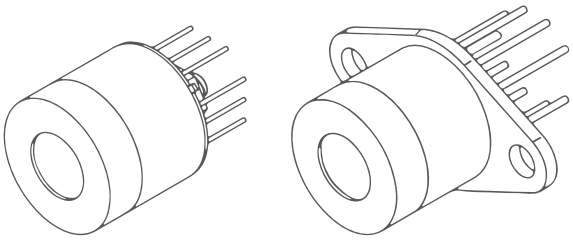
PC-10.6 SERIES

HgCdTe thermoelectrically cooled photoconductive infrared detectors



4TE-TO8 4TE-TO66

FEATURES

- Spectral range: over 10.3 µm
- Front-side illuminated
- No minimum order quantity required

RELATED PRODUCTS

- **LabM-I-10.6** detection module (p. 107)
- **UM-I-10.6** detection module (p. 113)
- **microM-10.6** detection module (p. 110)
- **PVIA-10.6-1×1-TO39-NW-36** RoHS-compliant detector (p. 22)
- **PVIA-4TE-10.6-1×1-TO8-wZnSeAR-36** RoHS-compliant detector (p. 22)

APPLICATIONS

- Gas detection, monitoring and analysis: SO_2, NH_3, SF_6
- CBRN threats detection
- CO_2 laser measurements: power monitoring and control, beam profiling and positioning, calibration
- Free-space optical communication
- FTIR spectroscopy
- Medical bacteria identification
- Dentistry
- Glucose sensing

SERIES DESCRIPTION

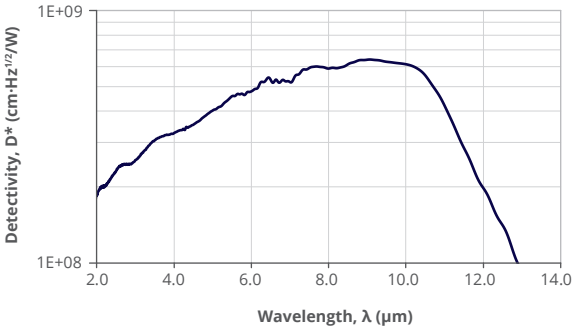
Detector symbol	Cooling (p. 191)	Temperature sensor (p. 192)	Active area, A, mm×mm	Optical immersion	Package	Acceptance angle, Φ, deg.	Window (p. 193)
PC-4TE-10.6-1×1-TO8-wZnSeAR-70	4TE T_{chip}≅200K	thermistor	1×1	no	TO8	~70	wZnSeAR (3 deg. zinc selenide, anti-reflection coating
PC-4TE-10.6-1×1-TO66-wZnSeAR-70					TO66		

SPECIFICATION (T_{amb} = 293 K, V_b = 0.4 V)

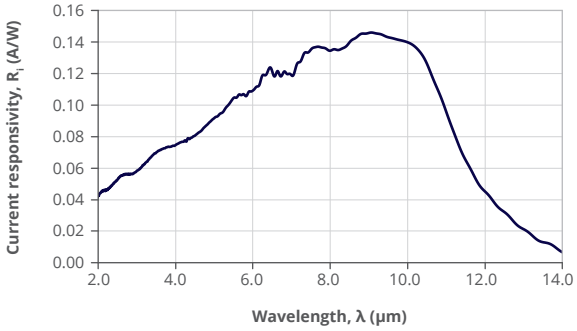
Detector symbol	Peak wavelength	Specific wavelength	Cut-off wavelength (10%)	Detectivity			Current reponsivity			Time constant	Dynamic resistance	Bias voltage	1/f corner frequency
	λ_{peak}	λ_{spec}	$\lambda_{cut-off}$	$D^*(\lambda_{peak}, 20kHz)$	$D^*(\lambda_{spec}, 20kHz)$		$R_i(\lambda_{peak})$	$R_i(\lambda_{spec})$		τ	R	V_b	f_c
	µm	µm	µm	cm·Hz$^{1/2}$/W	cm·Hz$^{1/2}$/W		A/W	A/W		ns	Ω	V	kHz
	Typ.	Typ.	Typ.	Typ.	Min.	Typ.	Typ.	Min.	Typ.	Typ.	Max.	Typ.	Typ.
PC-4TE-10.6-1×1-TO8-wZnSeAR-70	8.5±0.6	10.6	13	6.5×10^8	3.5×10^8	4.0×10^8	0.06	0.03	0.06	30	250	0.4	20
PC-4TE-10.6-1×1-TO66-wZnSeAR-70													

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

PC-4TE-10.6-1×1-TO8/TO66-wZnSeAR-70



PC-4TE-10.6-1×1-TO8/TO66-wZnSeAR-70



MECHANICAL LAYOUT AND PINOUT

- 4TE-TO8 package
  – Technical drawing (p. 209)
- 4TE-TO66 package
  – Technical drawing (p. 211)

RECOMMENDED AMPLIFIERS

Detector symbol	Amplifier type
PC-4TE-10.6-1×1-TO8-wZnSeAR-70	AIP series (p. 126) PIP series (p. 129) MIP series (p. 132) SIP-TO8 series (p. 135)

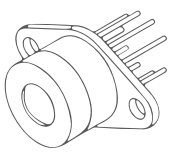
ABSOLUTE MAXIMUM RATINGS

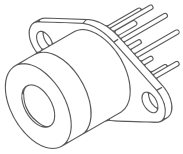
Parameter	Test conditions/remarks	Value	Unit
Ambient operating temperature, T_{amb}	Operation at T_{amb} >30°C may increase the active element temperature and reduce the performance of the detector below specified parameters	-20 to 30	°C
Storage temperature, T_{stg}		-20 to 50	°C
Soldering temperature	Within 5 s or less	≤300	°C
Storage humidity	No dew condensation	10 to 90	%
Maximum incident optical power density	Continuous wave (CW) or single pulses >1 μs duration	100	W/cm²
	Single pulses <1 μs duration	1	MW/cm²
Maximum bias voltage, $V_{b\ max}$		2.0	V
Maximum TEC voltage, $V_{TEC\ max}$	4TE	8.3	V
Maximum TEC current, $I_{TEC\ max}$	4TE	0.4	A

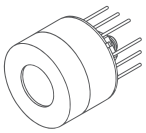
Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device. Constant or repeated exposure to absolute maximum rating conditions may affect the quality and reliability of the device.

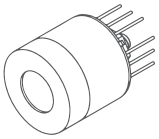
PCI-10.6 SERIES

HgCdTe thermoelectrically cooled optically immersed photoconductive infrared detectors


2TE-TO66


4TE-TO66


2TE-TO8


4TE-TO8

FEATURES

- Spectral range: up to 12.8 µm
- Back-side illuminated
- Unique immersion lens technology applied
- No minimum order quantity required

RELATED PRODUCTS

- **LabM-I-10.6** detection module (p. 107)
- **UM-I-10.6** detection module (p. 113)
- **microM-10.6** detection module (p. 110)
- **PVIA-10.6-1×1-TO39-NW-36** RoHS-compliant detector (p. 22)
- **PVIA-4TE-10.6-1×1-TO8-wZnSeAR-36** RoHS-compliant detector (p. 22)

APPLICATIONS

- Gas detection, monitoring and analysis: SO_2, NH_3, SF_6
- CBRN threats detection
- CO_2 laser measurements: power monitoring and control, beam profiling and positioning, calibration
- Free-space optical communication
- FTIR spectroscopy
- Medical bacteria identification
- Dentistry
- Glucose sensing

SERIES DESCRIPTION

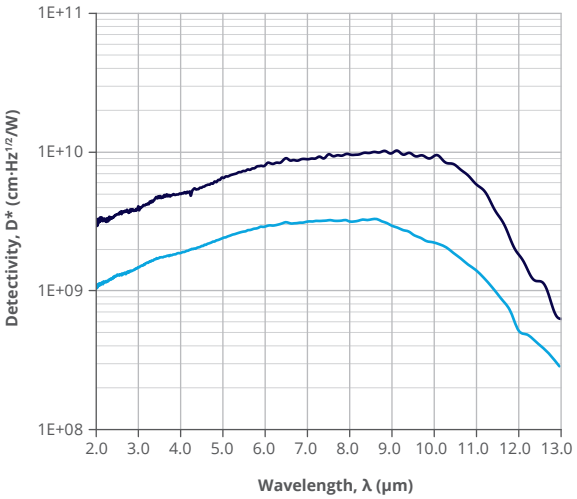
Detector symbol	Cooling (p. 191)	Temperature sensor (p. 192)	Optical area, A_o, mm×mm	Optical immersion (p. 188)	Package	Acceptance angle, Φ, deg.	Window (p. 193)
PCI-2TE-10.6-1×1-TO8-wZnSeAR-36	2TE T_{chip}≅230K	thermistor	1×1	hyperhemi-sphere	TO8	~36	wZnSeAR (3 deg. zinc selenide, anti-reflection coating)
PCI-2TE-10.6-1×1-TO66-wZnSeAR-36					TO66		
PCI-4TE-10.6-1×1-TO8-wZnSeAR-36	4TE T_{chip}≅200K				TO8		
PCI-4TE-10.6-1×1-TO66-wZnSeAR-36					TO66		

SPECIFICATION (T_{amb} = 293 K)

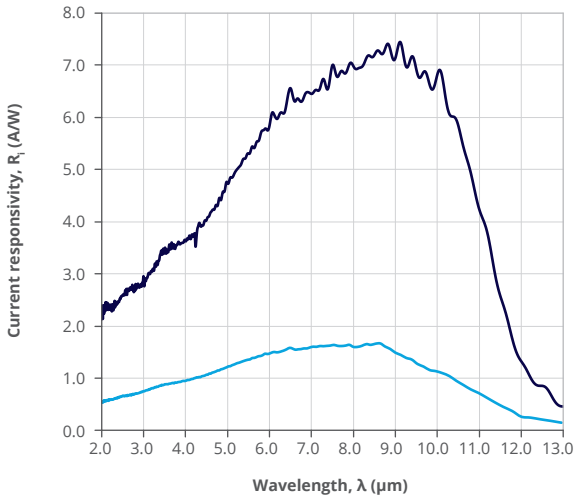
Detector symbol	Peak wavelength	Specific wavelength	Cut-off wavelength (10%)	Detectivity			Current responsivity			Time constant	Dynamic resistance	Bias voltage	1/f corner frequency
	λ_{peak}	λ_{spec}	$\lambda_{cut-off}$	$D^*(\lambda_{peak}, 20kHz)$	$D^*(\lambda_{spec}, 20kHz)$		$R_i(\lambda_{peak})$	$R_i(\lambda_{spec})$		τ	R	V_b	f_c
	µm	µm	µm	cm·Hz$^{1/2}$/W	cm·Hz$^{1/2}$/W		A/W	A/W		ns	Ω	V	kHz
	Typ.	Typ.	Typ.	Typ.	Min.	Typ.	Typ.	Min.	Typ.	Typ.	Max.	Typ.	Typ.
PCI-2TE-10.6-1×1-TO8-wZnSeAR-36	8.2±0.8	10.6	12.8	2.2×10^9	1.0×10^9	1.5×10^9	0.6	0.1	0.3	10	200	0.3	20
PCI-2TE-10.6-1×1-TO66-wZnSeAR-36													
PCI-4TE-10.6-1×1-TO8-wZnSeAR-36	9.5±0.6	10.6	12.5	4.1×10^9	3.0×10^9	3.0×10^9	0.7	0.2	0.4	30		0.24	
PCI-4TE-10.6-1×1-TO66-wZnSeAR-36													

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

PCI-2TE-10.6-1×1-TO8/TO66-wZnSeAR-36
PCI-4TE-10.6-1×1-TO8/TO66-wZnSeAR-36



PCI-2TE-10.6-1×1-TO8/TO66-wZnSeAR-36
PCI-4TE-10.6-1×1-TO8/TO66-wZnSeAR-36



MECHANICAL LAYOUT AND PINOUT

- 2TE-TO8 package
  – Technical drawing (p. 204)
- 2TE-TO66 package
  – Technical drawing (p. 206)
- 4TE-TO8 package
  – Technical drawing (p. 210)
- 4TE-TO66 package
  – Technical drawing (p. 212)

RECOMMENDED AMPLIFIERS

Detector symbol	Amplifier type
PCI-2TE-10.6-1×1-TO8-wZnSeAR-70	AIP series (p. 126) PIP series (p. 129) MIP series (p. 132) SIP-TO8 series (p. 135)
PCI-4TE-10.6-1×1-TO8-wZnSeAR-70	

ABSOLUTE MAXIMUM RATINGS

Parameter	Test conditions/remarks	Value	Unit
Ambient operating temperature, T_{amb}	Operation at T_{amb} >30°C may increase the active element temperature and reduce the performance of the detector below specified parameters	-20 to 30	°C
Storage temperature, T_{stg}		-20 to 50	°C
Soldering temperature	Within 5 s or less	≤300	°C
Storage humidity	No dew condensation	10 to 90	%
Maximum incident optical power density	Continuous wave (CW) or single pulses >1 µs duration	2.5	W/cm²
	Single pulses <1 µs duration	10	kW/cm²
Maximum bias voltage, $V_{b\,max}$		1.5	V
Maximum TEC voltage, $V_{TEC\,max}$	2TE	1.3	V
	4TE	8.3	
Maximum TEC current, $I_{TEC\,max}$	2TE	1.2	A
	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.