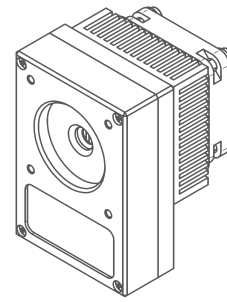


# UHSM-10.6

## Ultra-high-speed IR detection module based on HgCdTe TE cooled photovoltaic detector



### FEATURES

- Spectral range: 2.0 to 13.0  $\mu\text{m}$
- Frequency bandwidth: 300 Hz to 1.25 GHz (typ.)
- High performance and reliability
- DC monitor
- Single power supply
- Integrated TEC controller and fan
- M4 mounting hole
- Compatible with optical accessories
- Quantity discounted price
- Fast delivery
- No minimum order quantity required

### APPLICATIONS

- Dual-comb spectroscopy
- Heterodyne detection
- Characterization of pulsed laser sources
- LIDARs
- Object scanners
- Time-resolved fluorescence spectroscopy systems
- Free-space optical communication
- Telemetry

### INCLUDED ACCESSORIES

- 2 pcs of SMA-BNC cable
- 1 pc of AC adaptor

### DEDICATED ACCESSORIES

- OTA optical threaded adapter (p. 155)
- DRB-2 base mounting system (p. 152)

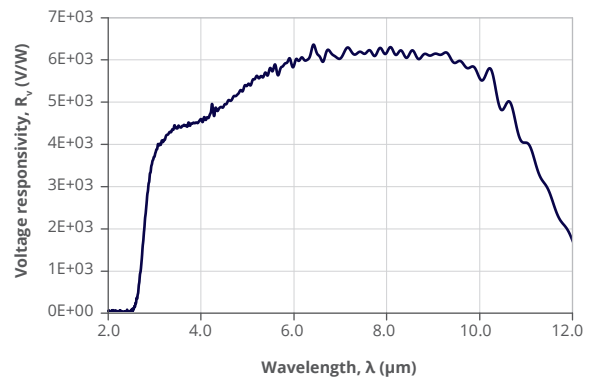
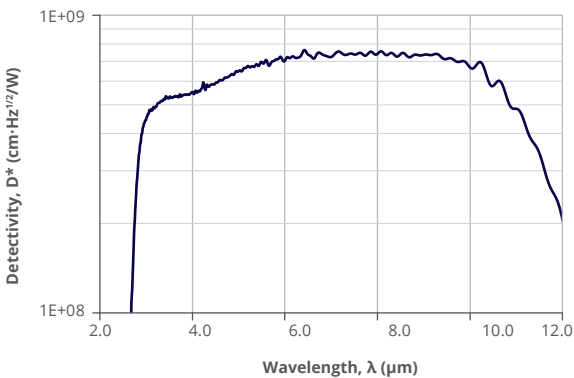
### DETECTION MODULE CONFIGURATION

Detection module symbol	UHSM-10.6
Detector type	photovoltaic
Active element material	epitaxial HgCdTe heterostructure
Active area, A	0.05 mm $\times$ 0.05 mm
Immersion	no
Cooling	4TE
Acceptance angle, $\Phi$	$\sim$ 80 deg.
Window	wZnSeAR (3 deg. wedged zinc selenide, anti-reflection coating)
Preamplifier type	transimpedance
Signal output socket	SMA
DC monitor output socket	SMA
Power supply socket	DC 2.1/5.5

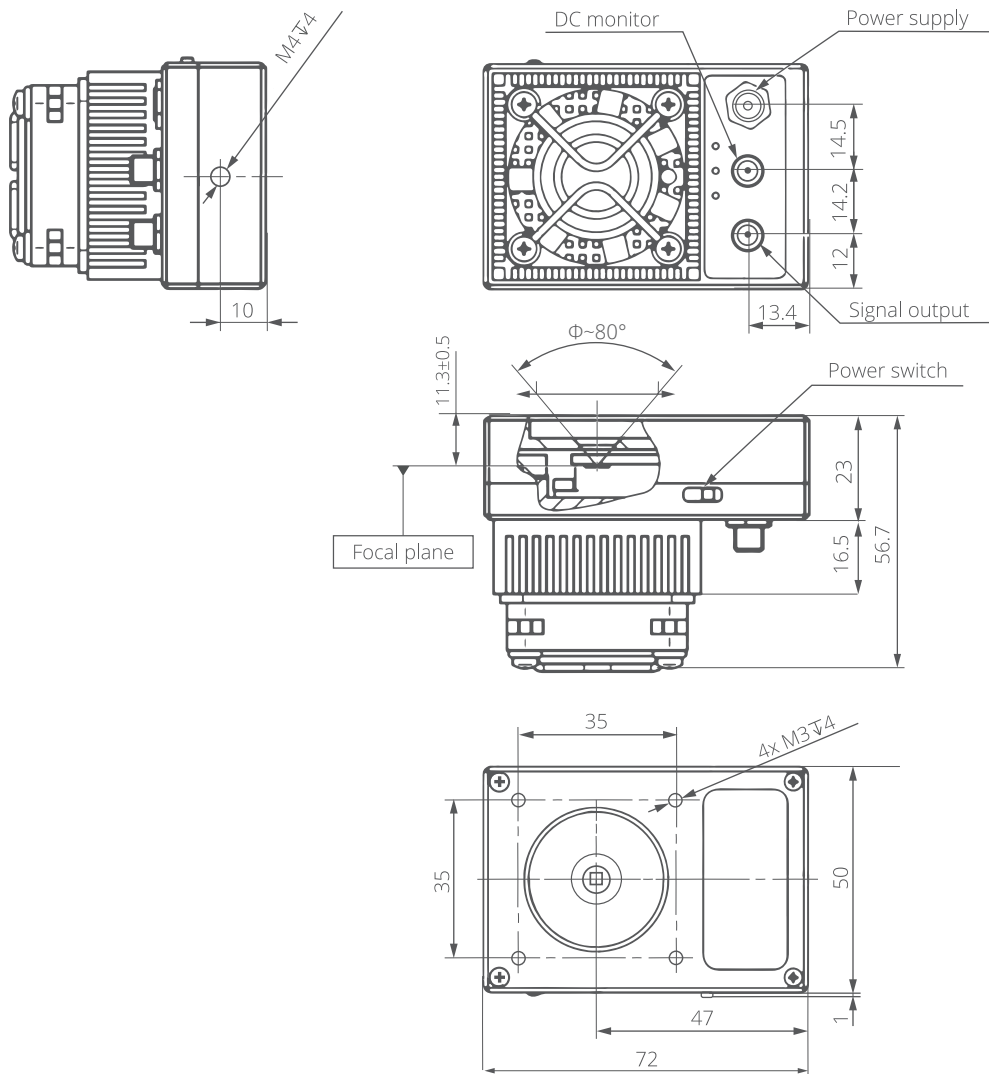
SPECIFICATION ( $T_{amb} = 293\text{ K}$ ,  $R_{load} = 50\ \Omega$ , unless otherwise noted)

Parameter	Test conditions/remarks	Value			Unit
		Min.	Typ.	Max.	
Active element temperature, $T_{chip}$		-	215	-	K
Cut-on wavelength, $\lambda_{cut-on}$ (10%)	At 10% of peak responsivity	-	3.0	-	$\mu\text{m}$
Peak wavelength, $\lambda_{peak}$		7.0	8.0	9.0	$\mu\text{m}$
Specific wavelength, $\lambda_{spec}$		-	10.6	-	$\mu\text{m}$
Cut-off wavelength, $\lambda_{cut-off}$ (10%)	At 10% of peak responsivity	-	12.0	-	$\mu\text{m}$
Detectivity, $D^*$	At $\lambda = \lambda_{peak}$ , $f = 100\text{ MHz}$	-	$7.6 \times 10^8$	-	$\text{cm}\cdot\text{Hz}^{1/2}/\text{W}$
	At $\lambda = \lambda_{spec}$ , $f = 100\text{ MHz}$	$3.0 \times 10^8$	$6.0 \times 10^8$	-	$\text{cm}\cdot\text{Hz}^{1/2}/\text{W}$
Output noise voltage density, $v_n$	At $f = 100\text{ MHz}$	-	-	70	$\text{nV}/\text{Hz}^{1/2}$
Voltage responsivity, $R_v$	At $\lambda = \lambda_{peak}$	-	$6.4 \times 10^3$	-	$\text{V}/\text{W}$
	At $\lambda = \lambda_{spec}$	$2.5 \times 10^3$	$5.0 \times 10^3$	-	$\text{V}/\text{W}$
Low cut-off frequency, $f_{lo}$		-	300	-	Hz
High cut-off frequency, $f_{hi}$		0.9	1.25	-	GHz
Output impedance, $R_{out}$		-	50	-	$\Omega$
Output voltage swing, $V_{out}$		-	-	$\pm 1$	V
1/f corner frequency, $f_c$		-	-	10	MHz
Voltage responsivity, $R_v$	At $\lambda = \lambda_{peak}$ , DC monitor	$1.3 \times 10^3$	-	-	$\text{V}/\text{W}$
	At $\lambda = \lambda_{spec}$ , DC monitor	$1.0 \times 10^3$	-	-	$\text{V}/\text{W}$
Low cut-off frequency, $f_{lo}$	DC monitor	-	0	-	Hz
High cut-off frequency, $f_{hi}$	DC monitor	-	260	-	Hz
Output voltage offset, $V_{off}$		-	-	$\pm 20$	mV
Power supply voltage, $V_{sup}$		-	9	-	V
Power supply current consumption, $I_{sup}$		-	-	1.2	A
Weight		-	235	-	g

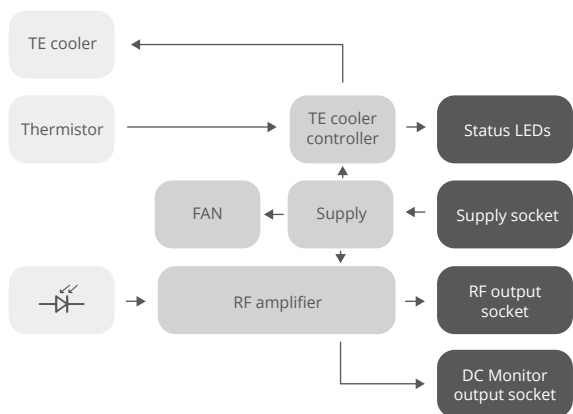
SPECTRAL RESPONSE (Typ.,  $T_{amb} = 293\text{ K}$ ,  $T_{chip} = 215\text{ K}$ )



## MECHANICAL LAYOUT (Unit: mm)



## SCHEMATIC DIAGRAM



## ABSOLUTE MAXIMUM RATINGS

Parameter	Test conditions/remarks	Value	Unit
Ambient operating temperature, $T_{amb}$		10 to 30	°C
Storage temperature, $T_{stg}$		-20 to 50	°C
Humidity	No dew condensation	10 to 90	%
Maximum incident optical power density	Continuous wave (CW) or single pulses >1 $\mu$ s duration	100	W/cm <sup>2</sup>
	Single pulses <1 $\mu$ s duration	1	cm <sup>2</sup>

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.