Teledyne Judson Technologies

InSb Detectors

A Guide to InSb Detectors

LN2 Cooled: To 5.5 µm
Cryocooled

www.teledynejudson.com

InSb LN2 COOLED AND CRYOCOOLED DETECTORS FOR PRECISION APPLICATIONS

Teledyne Judson Technologies' InSb (Indium Antimonide) detectors, available in LN2 cooled and cryocooled configurations, operate at a wavelength from 1.0 µm to 5.5 µm.

KEY TECHNOLOGY FEATURES & APPLICATIONS

Features

- Provides high speed, low noise, excellent uniformity, linearity, and stability due to single crystal p–n junction technology
- Zero-bias operation compatible
- Can operate with either high-sensitivity or high-speed preamp
- Can be ordered integrated with a cryocooler for cryogen-free operation

Applications

- Thermal imaging
- Heat-seeking guidance
- Radiometers
- Spectrometry
- FTIR

PREAMPLIFIERS

For best results, connect the InSb detector to a Teledyne transimpedance gain preamplifier.

CUSTOM DESIGN SERVICES

Custom InSb detectors in any size up to 7 mm diameter and configuration are available. Teledyne offers specifications on quad cells, and two-color (InSb/MCT)detectors.

Please contact us with your special requirements.

InSb LN2 COOLED AND CRYOCOOLED DETECTORS FOR PRECISION APPLICATIONS

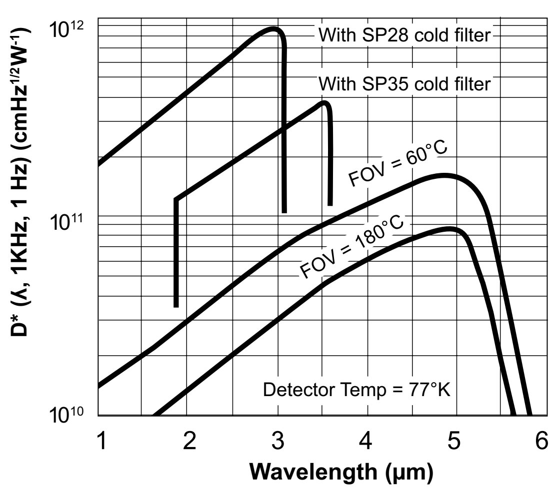
The **J10 series** are high-performance indium antimonide (InSb) detectors that operate with a longwave cutoff near 5.5 µm, are optimized for sensitivity, speed of response, impedance, and peak wavelength by operating at the proper temperature. These detectors offer high reliability and performance in the spectral range from 1.0–5.5 µm.

DEVICE OPTIONS

Teledyne's InSb detectors, the **J10** series, offer high reliability and performance in the spectral range from 1.0 to 5.5 µm. The **J10D** series LN2-cooled dewar ensures optimal performance by maintaining necessary low temperatures to minimize thermal background. The detectors can also be mounted in a cryocooled package for cryogen-free operation.

The diagram below shows the typical response for the **J10D** series at various temperatures.

Detectivity vs. Wavelength for J10 Series



PACKAGE OPTIONS

The **J10D** LN2-cooled sensors and J10 cryocooled sensors offer several packaging options.

The **M204** dewar provides a stable and controlled environment for the detectors, ensuring optimal performance by maintaining the necessary low temperatures:

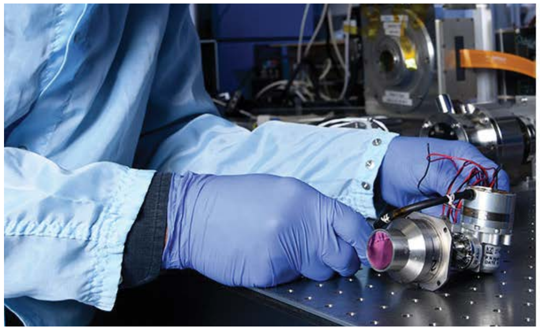
- Hold Time: 8 hours
- Field of View (FOV): Standard 60° field of view
- Temperature: Designed for detectors that require 77 K operating temperatures

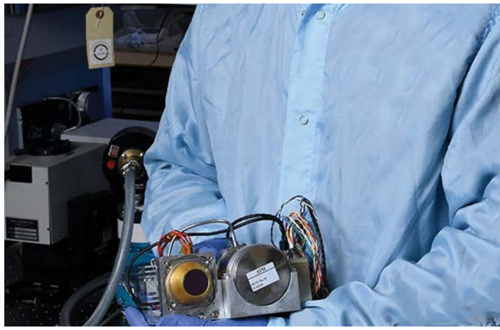
The **J508** is a compact cryocooler that maintains the detector at 77 K without liquid nitrogen. It offers a MTBF of greater than 25,000 hours.

We also offer different window materials, lenses, or optical filter options to enhance the detector's performance by modifying the light that reaches it.

ACCESSORIES

For a complete system, Teledyne Judson offers low-noise transimpedance amplifier modules, either as a standalone unit or with a power supply, to provide the detector's optimal operating condition.





InSb

LN2-COOLED SENSORS

Description	Active Size Diameter (mm)	50% Cutoff Wavelength (µm), ±0.1 µm	Peak Wavelength (µm), ±0.1 µm	Peak Responsivity (A/W) min	Shunt Impedance (Ohm)min	Capacitance (pF) @ 0V typ	Open Circuit Voltage, mV	Dark Current (µA)	Peak D* (cm Hz^1/2 / W) @ 1K Hz min	NE P (W/r t-Hz) @ peak wavelength max
J10D-M204-R100U-60	0.1	5.4	4.8	3	2.50E+07	10	90-120	0.15	1.00E+11	8E-14
J10D-M204-R250U-60	0.25	5.4	4.8	3	1.00E+07	30	90-120	0.4	1.00E+11	2E-13
J10D-M204-R500U-60	0.5	5.4	4.8	3	1.00E+06	100	90-120	2	1.00E+11	4E-13
J10D-M204-R01M-60	1	5.4	4.8	3	5.00E+05	400	90-120	7	1.00E+11	8E-13
J10D-M204-R02M-60	2	5.4	4.8	3	1.50E+05	1600	90-120	30	1.00E+11	1.6E-12
J10D-M204-R04M-60	4	5.4	4.8	3	4.00E+04	6000	90-120	110	1.00E+11	3E-12
J10D-M204-R07M-60	7	5.4	4.8	3	1.00E+04	20000	90-120	350	1.00E+11	6E-12

Note: @ 77 K, 60° FOV

CRYOCOOLED SENSORS

Description	Material	Active Size Diameter (mm)	FOV, deg	Operating Temperature (K)	50% Cutoff Wavelength (µm), ±0.1 µm	Peak Wavelength (µm), ±0.1 µm	Peak Responsivity (A/W) min	Shunt Impedance (Ohm) min	Capacitance (pF) @ 0V typ	Open Circuit Voltage, mV	Dark Current (µA)	Peak D* (cm Hz^1/2 / W) @ 1K Hz min	NE P (W/r t-Hz) @ peak wavelength max
J10D-J508-R01M-60	InSb	1	60	1	5.4	4.8	3	5.00E+05	400	90-120	7	1.00E+11	8E-13
J10D-J508-R02M-60	InSb	2	60	2	5.4	4.8	3	1.50E+05	1600	90-120	30	1.00E+11	1.6E-12
J10D-J508-R04M-60	InSb	4	60	4	5.4	4.8	3	4.00E+04	6000	90-120	110	1.00E+11	3E-12

Note: @ 77 K, 60° FOV

A wealth of knowledge and broad product line to help address today's pressing challenges in the infrared.

All of our semiconductor fabrication and product manufacture operations are located in our Montgomeryville, Pennsylvania facility. We are proud to be a US-based semiconductor company, providing our customers the highest standards of quality, performance, and value.

In addition to Teledyne Judson InSb products, we offer a wide range of high-performance standard, custom and space-qualified detectors and accessories.

FOCUSED ON INFRARED SENSING

Teledyne Judson Technologies is a world leader in the design and manufacture of high-performance infrared (IR) sensors. Some of the most prestigious and challenging scientific space missions, such as the James Webb Space Telescope (JWST) and the Perseverance Mars Rover, benefit from our superior performance and reliability. Beyond these missions, Teledyne sensors have been helping OEMs and researchers solve challenging problems across the infrared spectrum since 1969.

DEVELOPING TOP-QUALITY PRODUCTS FOR LEADING OEMs

When working with Teledyne Judson Technologies, clients benefit from our ability to handle the entire value chain in IR sensor technology, from the wafer substrate to packaging and software. Our customers rely on us for solutions ranging from standard imaging products to custom products integrated with electronics and camera systems.

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