



Applications:

- NDIR Spectroscopy
- Medical Gas Analysis
- Optical Pyrometry
- Laser Definition
- Environmental Analysis
- Flame Spectroscopy

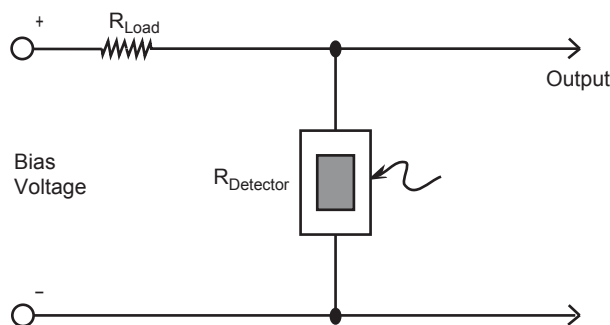
General

Teledyne Judson Technologies J13 Series Lead Sulfide detectors are thin film photoconductors which are chemically deposited onto a quartz substrate. Photolithographic techniques are employed to define the active areas and gold electrodes provide noise-free contact between the lead-out wires and the PbS film.

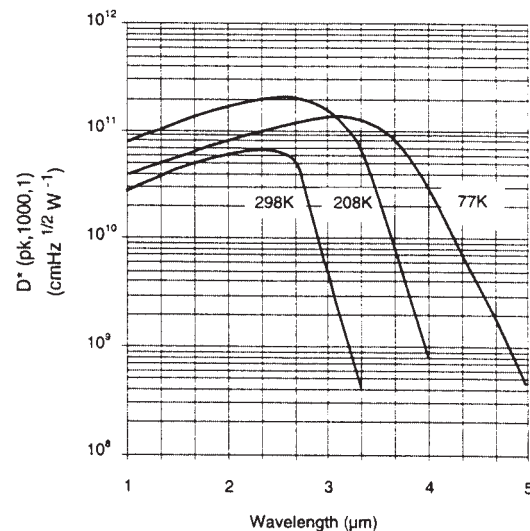
The detectors convert incident infrared energy into an electrical signal which can then be utilized for many functions. They are particularly suited for use in the 1 μm to 3 μm spectral region and provide an economical means of obtaining high performance in a rugged and compact package.

These detectors are offered in single and multi-element configurations and are available in flat plate cells, TO packages and dewars. Cooling is provided by thermoelectric coolers and liquid nitrogen. Package designs are provided which can incorporate standard and custom apertures, filters and windows. Low cost, high performance Lead Sulfide detectors are routinely supplied from stock.

J13 Series detectors meet and exceed demanding specifications for a wide range of applications including analytical, environmental, industrial and medical instrumentation as well as space and defense systems.



SPECTRAL DETECTIVITY AT TEMPERATURE



Teledyne Judson's room temperature Lead Sulfide (PbS) detectors are offered as standard products with performance characteristics as shown in the following table and graphs.

The basic detecting element is the sensitized PbS film on a substrate with two electrical leads for

external connection. Standard detector sizes include 1mm x 1mm, 2mm x 2mm, 3mm x 3mm, 6mm x 6mm and 10mm x 10mm and are available in flat plate cells or in TO packages.

Other sizes, configurations, packages and arrays will be provided on request.

Model Number	Part Number	Active Size (mm)	Wavelength λ_p (μm)	D* ($\lambda_p, 750, 1$) (min.) ($\text{cmHz}^{-1/2}\text{W}^{-1}$)	Blackbody D* (500K, 750, 1) (min.) ($\text{cmHz}^{-1/2}\text{W}^{-1}$)	Responsivity @ λ_p (min.) (V/W)	Resistance (M Ω)	Time Constant (μsec)	Operating Temperature (K)	Standard Package
J13P Series Room Temperature PbS										
PS3-0-01	1100012	1 x 1	2.5	7.7×10^{10}	7.7×10^8	3×10^5	0.5 - 2.5	150 - 350	298	Plate
PS3-0-02	1100020	2 x 2				1.5×10^5				
PS3-0-03	1100025	3 x 3				1×10^5				
PS3-0-06	1100160	6 x 6				5×10^4				
PS3-0-10	1100190	10 x 10				3×10^4				
J13TO Series Room Temperature TO Package PbS										
PS3-0-51	1200045	1 x 1	2.5	7.7×10^{10}	7.7×10^8	3×10^5	0.5 - 2.5	150 - 350	298	TO-5
PS3-0-52	1200075	2 x 2				1.5×10^5				
PS3-0-53	1200090	3 x 3				1×10^5				
PS3-0-86	1200135	6 x 6				5×10^4				TO-8
J13TE Series Thermoelectrically Cooled PbS										
PS3-1-71	1200285	1 x 1	2.5	1.5×10^{11}	1.5×10^9	7×10^5	0.5 - 8	500 - 1000	253	Single Stage TO-37
PS3-1-72	1200295	2 x 2				3.5×10^5				
PS3-1-73	1200305	3 x 3				2.3×10^5				
PS3-1-310	1200306	10 x 10				0.7×10^5				
PS3-1-81	1200367	1 x 1	2.5	1.5×10^{11}	1.5×10^9	7×10^5	0.5 - 8	500 - 1000	253	One-Stage TO-8
PS3-1-82	1200368	2 x 2				3.5×10^5				
PS3-1-83	1200369	3 x 3				2.3×10^5				
PS3-2-71	1200325	1 x 1	2.6	2.5×10^{11}	2.3×10^9	9×10^5	1 - 10	700 - 1200	243	Two-Stage TO-37
PS3-2-72	1200345	2 x 2				4.5×10^5				
PS3-2-73	1200365	3 x 3				3×10^5				
PS3-2-81	1200328	1 x 1	2.6	2.5×10^{11}	2.3×10^9	9×10^5	1 - 10	700 - 1200	243	Two-Stage TO-8
PS3-2-82	1200338	2 x 2				4.5×10^5				
PS3-2-83	1200358	3 x 3				3×10^5				
PS3-3-31	1200371	1 x 1	2.7	3×10^{11}	1.8×10^9	1×10^6	2 - 25	2500 - 3500	208	Three-Stage TO-3
PS3-3-32	1200372	2 x 2				5×10^5				
PS3-3-33	1200373	3 x 3				3.5×10^5				

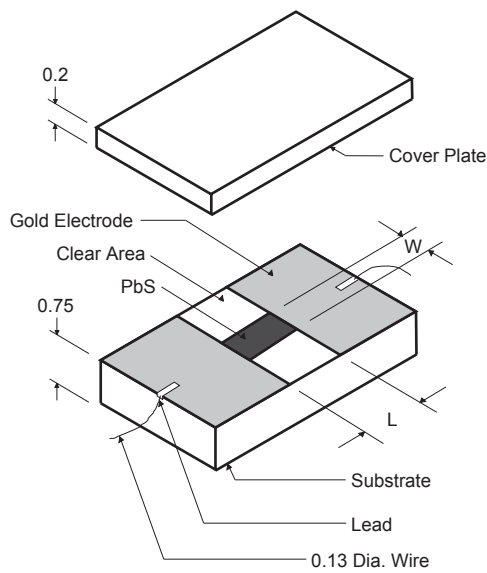
Teledyne Judson's cooled Lead Sulfide (PbS) detectors are offered as standard products with performance characteristics as shown in the following table and graphs. Cooling increases the D^* performance of PbS and allows the detectors to be utilized within a wide range of thermal conditions.

The basic detecting element is the sensitized PbS film on a substrate with two electrical leads for external connection. A thermistor is incorporated into the package for temperature monitoring and for closed loop temperature control. Soldered and

welded windows and caps are used to hermetically seal the cooled packages. The assemblies are backfilled with inert gas to increase cooler efficiency and are leak checked to ensure hermeticity.

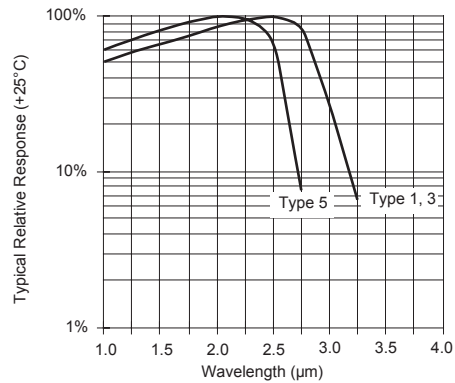
Standard detector sizes include 1mm x 1mm, 2mm x 2mm, 3mm x 3mm and 10mm x 10mm and are available in thermoelectrically cooled TO packages and in liquid nitrogen cooled dewars. Other sizes, configurations, packages and arrays will be provided on request.

Basic Plate Type Detector

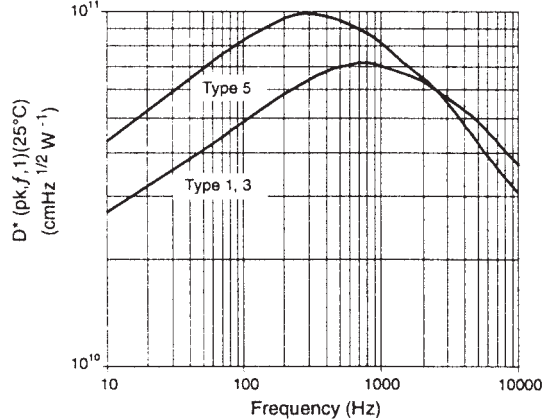


NOTE: Dimensions in millimeters (mm)

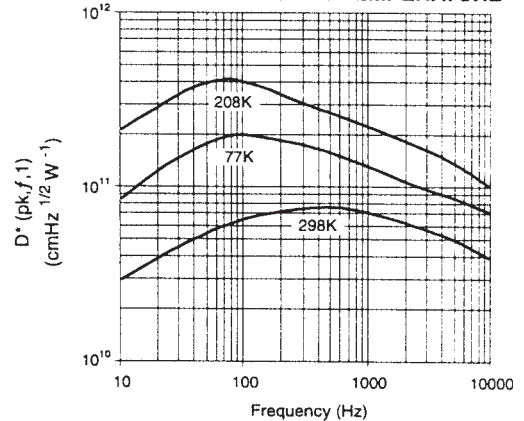
PbS Relative Responsivity vs Wavelength



PbS D^* vs FREQUENCY

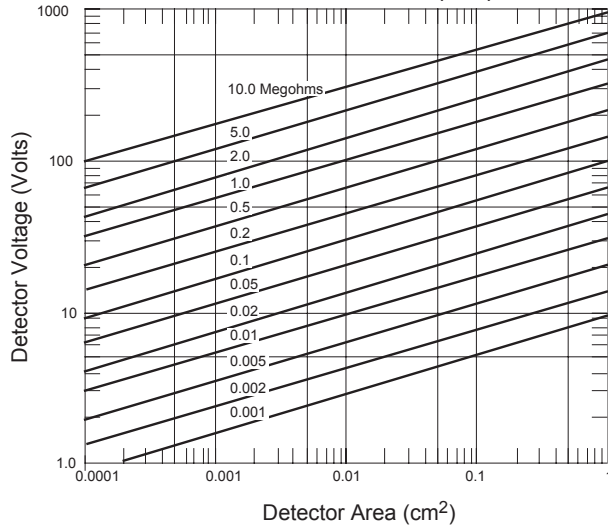


D^* VS FREQUENCY AT TEMPERATURE



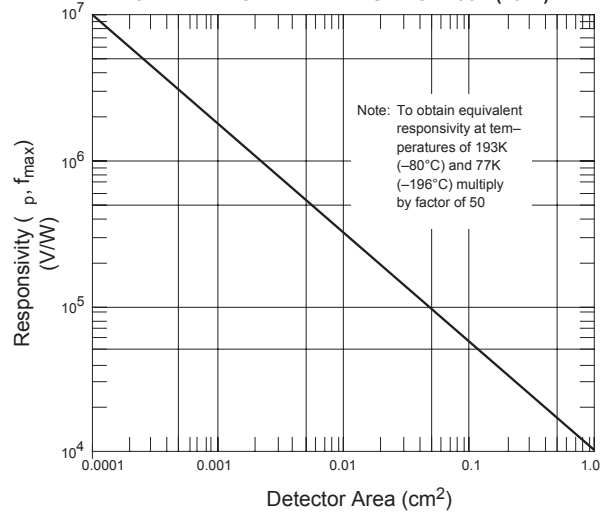


RECOMMENDED MAXIMUM DETECTOR VOLTAGE vs DETECTOR AREA AND RESISTANCE FOR DETECTOR TEMPERATURE OF 298K (25°C)

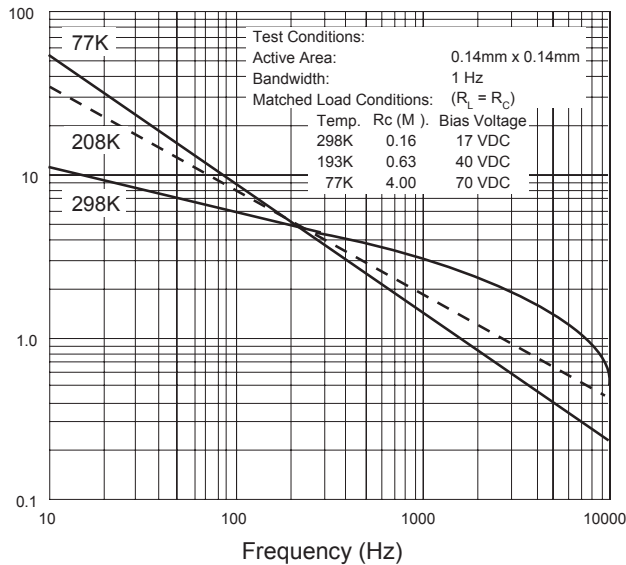


- NOTES: 1. Detector Voltage is bias voltage across detector terminals.
 2. Use factor of 2 less for maintaining optimum D^*
 3. At other temperatures, high and low, the bias voltage depends on methods of heat sinking which affect the power dissipation. At temperatures equal to or lower than 193K (-80°C) and for equivalent resistance values, the bias voltage is normally a factor of two greater than shown here. Refer to the bias voltage data supplied with detectors.

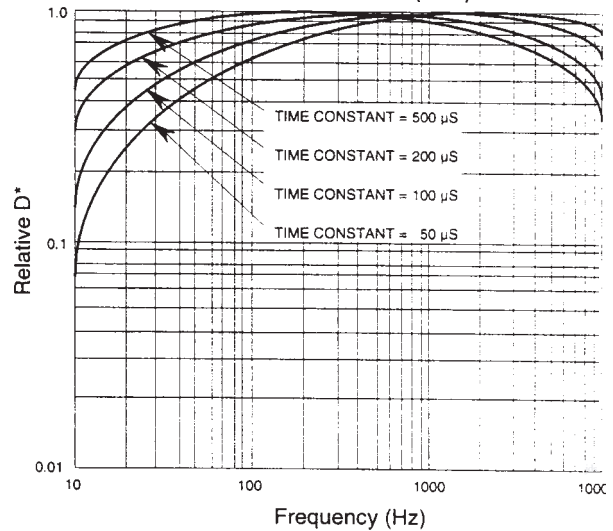
TYPICAL PEAK RESPONSIVITY vs ACTIVE AREA FOR DETECTOR TEMPERATURE OF 298K (25°C)



EXAMPLE OF NOISE vs FREQUENCY AS A FUNCTION OF DETECTOR TEMPERATURE



RELATIVE DETECTIVITY vs FREQUENCY FOR VARIOUS TIME CONSTANT DETECTORS WHEN OPERATING AT 298K (25°C)



Information in this document is believed to be reliable. However, no responsibility is assumed for possible inaccuracies or omission. Specifications are subject to change without notice.

