

-- preliminary specification --

ELTEC Model 423 - 25

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Pyroelectric Infrared Detector

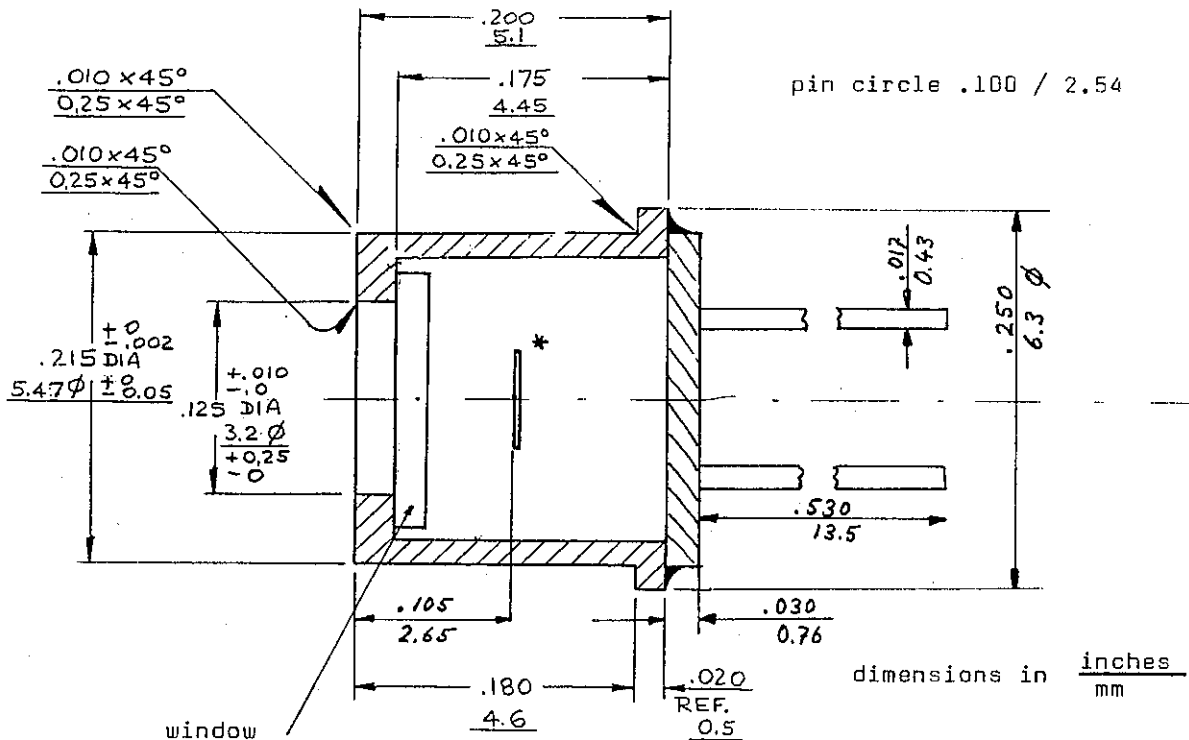
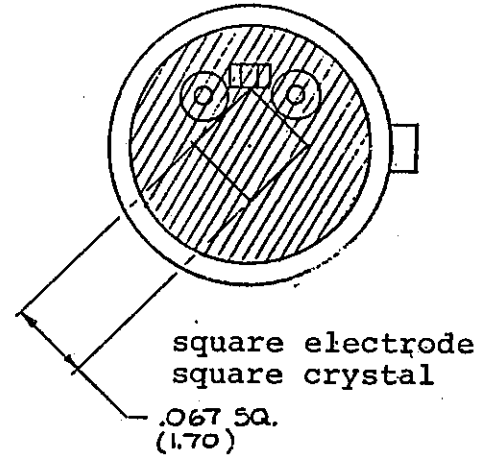
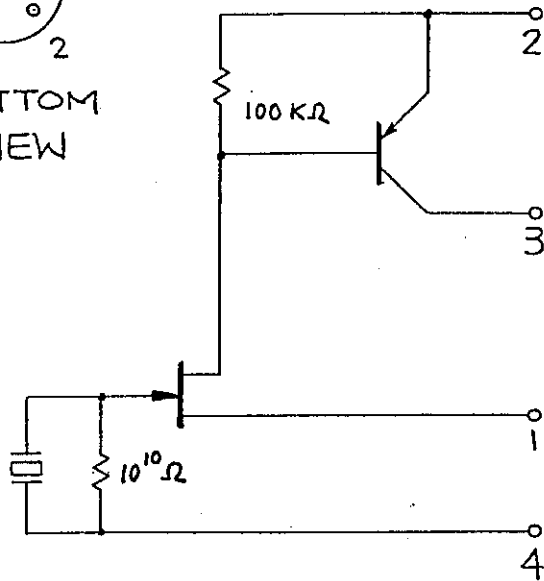
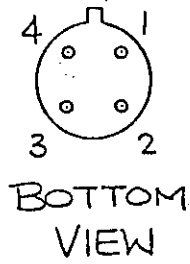
- Designed to withstand extreme shock (40'000 g)
- Optimized Performance in the 100 Hz to 5 kHz range
- High Sensitivity to Thermal Infrared Radiation
- Integral Infrared Filter to Restrict Sensitivity to the Atmospheric Window at 8 to 14 Microns Wavelength
- Integral High-Gain Preamplifier
- Very Small Size (TO 18 Style)



Model 423 contains a Lithium Tantalate sensing element.

Lithium Tantalate has a low temperature coefficient, low microphony and no degradation over time.

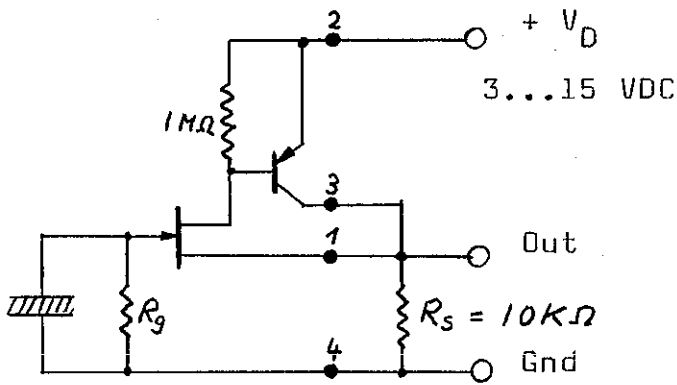
Internal Circuit and
Pin configuration



window

* apparent position of sensing element

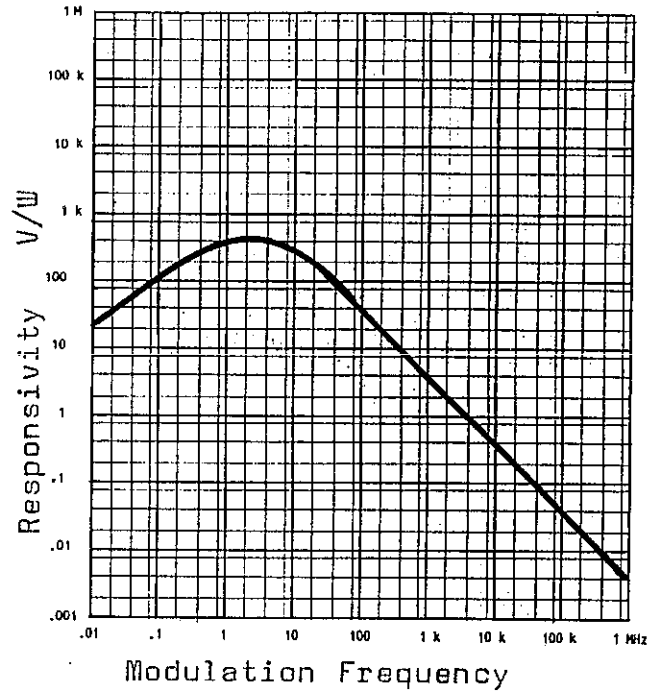
Internal Circuit and Unity Gain Circuit Configuration



$$R_g = 1 \times 10^{10} \text{ Ohms}$$

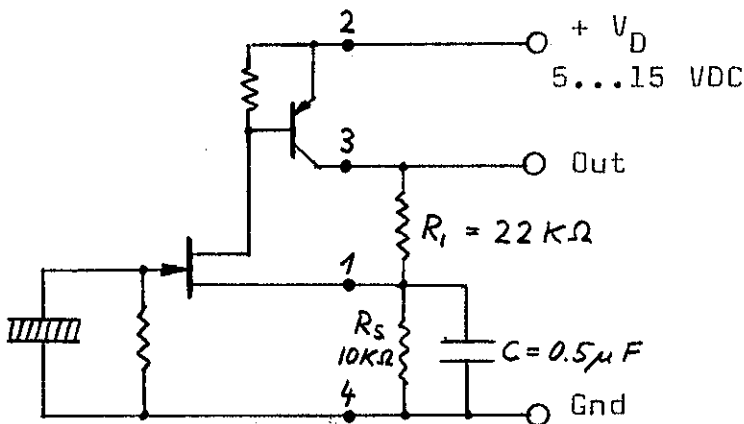
Lower internal load resistors are possible to linearize responsivity, but result in lower D^* performance.

$R_s = 10 \text{ k}\Omega$ to $1 \text{ M}\Omega$ and can be selected to adapt desired current drain and output impedance.



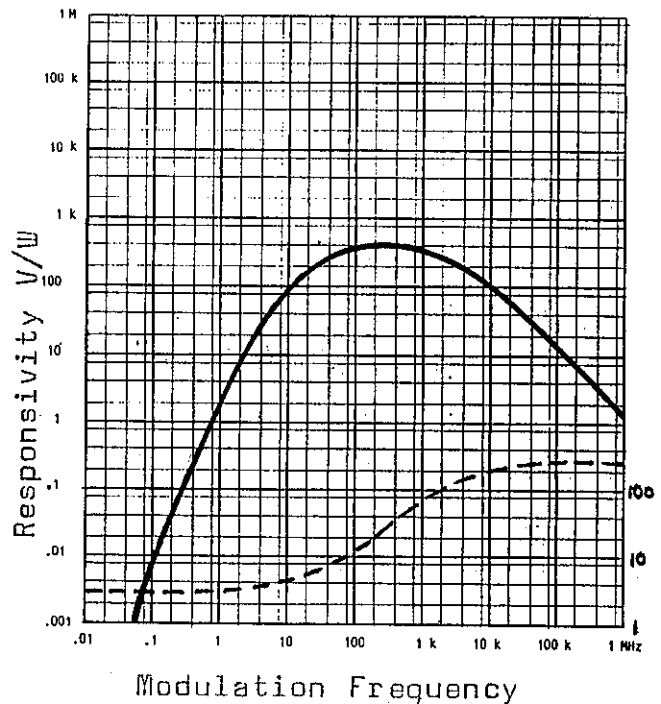
Recommended Gain Configuration

Differentiating amplifier to linearize responsivity from 100 to 1000 Hz.



Open loop gain : 200 ... 400

Input stage is noise limiting. D^* performance remains unchanged in respect to unity gain circuit.



--- Amplifier gain

Specifications Model 423-25:

Element Size	1.7 x 1.7 mm	nominal
Cut-on wavelength	8.0 +/- 5 % μm	
Cut-off wavelength	14.0 +/- 5% μm	
Blocking, 0.2 to 7 μm	1 : 1000	min.
Optical field of view (half power)	60 °	nominal

Process Characteristics *

at 25°C , $V_D = + 5 \text{ VDC}$, Unity gain circuit configuration, including 8 to 14 μm filter window.

Responsivity	at 100 Hz	40	V/W	typ
	1 kHz	4	V/W	typ
Noise limitation	at 100 Hz	100	$\text{nV}/\sqrt{\text{Hz}}$	min
	1 kHz	10	$\text{nV}/\sqrt{\text{Hz}}$	min
NEP , 100 Hz to 1 kHz		2.5×10^{-9}	$\text{W}/\sqrt{\text{Hz}}$	typ
D* 100 Hz to 1 kHz		8×10^7	$\text{cm} \sqrt{\text{Hz}}/\text{W}$	typ
Offset Voltage		0.5 ... 1.5	V	
Thermal breakpoint		10	Hz	typ
Electrical breakpoint		0.6	Hz	typ
Responsivity versus temperature		0.2	%/°C	max
Incident power limit		0.2	W	max
Pressure sensitivity at 1 kHz		200	$\mu\text{V}/\text{bar}$	max
Microphony 10 Hz to 1 kHz		50	$\mu\text{V}/\text{g}$	max
Package Sealing (Helium)		10^{-8}	cm^3/sec	max
Operating temperature (with degraded performance)		-40 ... 90	°C	
Storage temperature		-55 ... 125	°C	
Rate of change		5 °C / sec		max
Acceleration (shock damage threshold)		40'000	g	min

*Note: Actual test specifications and AQL are subject to customer agreement.

Other filter windows are available on request.

