

J16PS Room Temperature Germanium Position Sensors

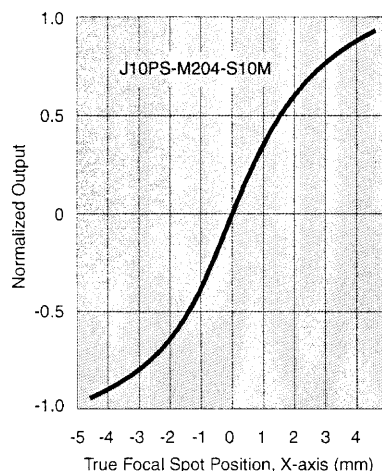


■ J16PS

Position Sensors

A Ge position sensor consists of a single element photodiode with a quadrupole electrode geometry. These devices can provide linear X-Y beam position information for lasers and other infrared beams. Positioning information is determined as shown in Fig. 35-1. The PA6:4C preamplifier is recommended for Judson position sensitive detectors.

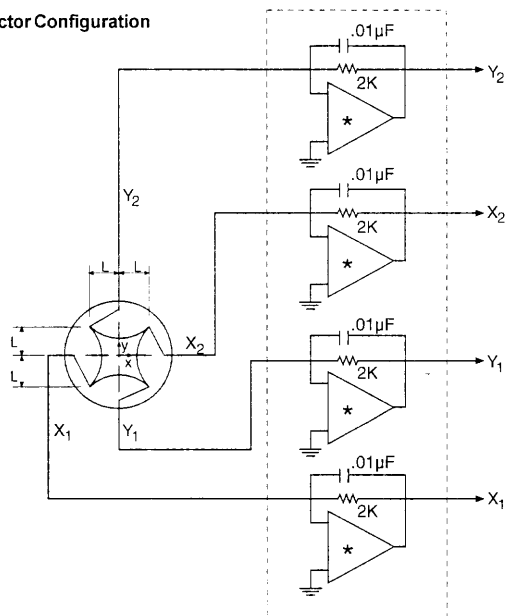
Figure 35-2
Example of Position Linearity



Typical Specifications Linear Position Sensors

Model Number	Part Number	Detector Type	Wavelength Range (μm)	Active Size "2L" (mm)	Linear Position Zone (Dia.) (mm)	Typical Position Resolution (μm)	Typical Interelectrode Resistance (Ω)	Peak Responsivity	Detector Temperature	Package Type
J16PS-P6-S10M-HS	460284	Ge	0.8-1.8	10 x 10	6	5	~ 100	0.6	22°C	TO3
J16PS-8E6-S05M-HS	460743	Ge	0.8-1.8	5 x 5	3	5	~ 100	0.6	22°C	TO8

Figure 35-1
Position Sensor Detector Configuration



Device Options

Judson's unique "-HS" option Ge position sensing device has a p-i-n structure for extremely low capacitance and excellent speed of response, with R_D and noise similar to the standard device. This option is ideal for pulsed laser diode monitoring and general use above ~10 KHz.

$$\frac{x}{L} = \frac{(X_2 + Y_1) - (X_1 + Y_2)}{X_1 + X_2 + Y_1 + Y_2}$$

$$\frac{y}{L} = \frac{(X_2 + Y_2) - (X_1 + Y_1)}{X_1 + X_2 + Y_1 + Y_2}$$

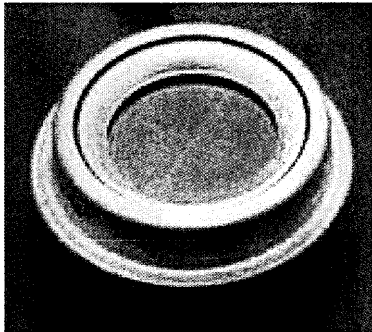
J16PS Room Temperature Germanium Quadrant Arrays



■ J16QUAD

Quadrant Detectors

A Ge quadrant detector consists of four separate detector elements arranged in a quadrant geometry with element separations as noted in the table below. The PA7:4 preamplifier is available for J16Quad detectors.



Device Options

Judson offers three unique Ge device options for optimum performance in different applications (Fig. 6-2).

The "-SC" device is a p-n diode, ideal for low frequency applications and DC-average power meters. It offers the highest shunt resistance available in a Ge photodiode, resulting in the lowest DC drifts. However, its higher capacitance and low reverse bias limit make it less suitable for operation above ~1 KHz (depending on active size).

The "-HS" option has a p-i-n structure for extremely low capacitance and excellent speed of response, with R_D and noise similar to the standard device. This option is ideal for pulsed laser diode monitoring and general use above ~10 KHz.

The standard device (no option) offers excellent performance for general use in applications from ~100Hz to 100KHz.

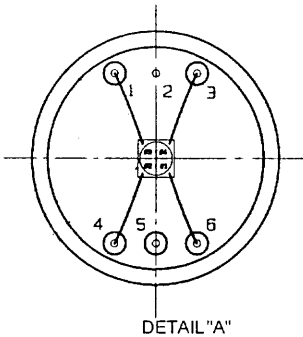
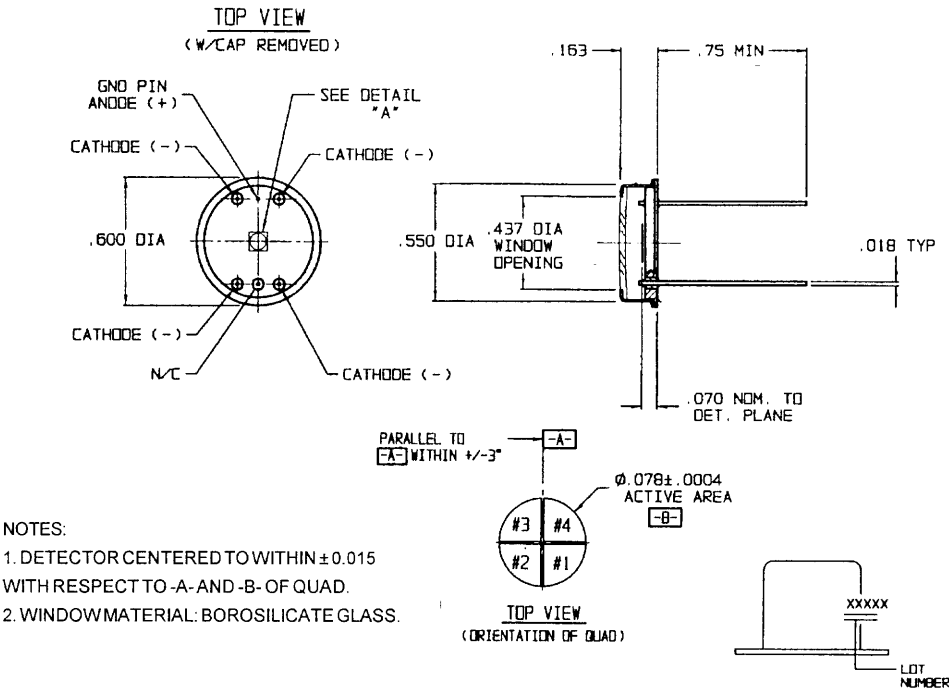
Typical Specifications Quadrant Detectors

Model Number	Total Active Size (dia.)	Shunt Resistance R_D @ $V_R = 10\text{mV}$ (K Ω)		Dark Current I_D @ Maximum V_R (μA)		Maximum Reverse Voltage V_R (V)	Typical NEP @ λ_{peak} and 300Hz (pW/Hz ^{1/2})	Capacitance C_D @ $V_R = 0\text{V}$ (nF)	Cutoff Frequency @ Max. V_R and $R_L = 50\Omega$ (MHz)	Gap Between Quadrants
		Min.	Typ.	Typ.	Max.					
	(mm)									
LOW CAPACITANCE OPTION ("HS")										
J16QUAD-8D6-R02M-HS	2.0	100	200	1	5	10	0.3	0.15	50	10 μm
J16QUAD-8D6-R05M-HS	5.0	20	40	5	15	5	0.8	1	8	40 μm
HIGH SHUNT RESISTANCE OPTION ("SC")										
J16QUAD-8D6-R02M-SC	2.0	250	350	0.1	0.2	0.25	0.2	2	2	10 μm
J16QUAD-8D6-R05M-SC	5.0	55	90	0.35	3	0.25	0.6	14	0.2	40 μm
STANDARD										
J16QUAD-8D6-R02M	2.0	100	200	1	5	5	0.3	1	15	10 μm
J16QUAD-8D6-R05M	5.0	25	50	4	10	5	0.6	4	4	40 μm

J16PS Room Temperature Germanium Quadrant Arrays

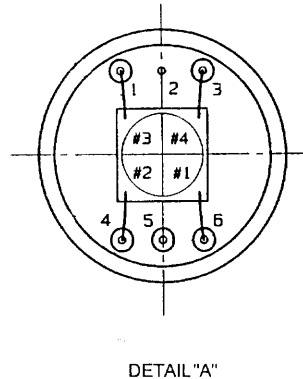
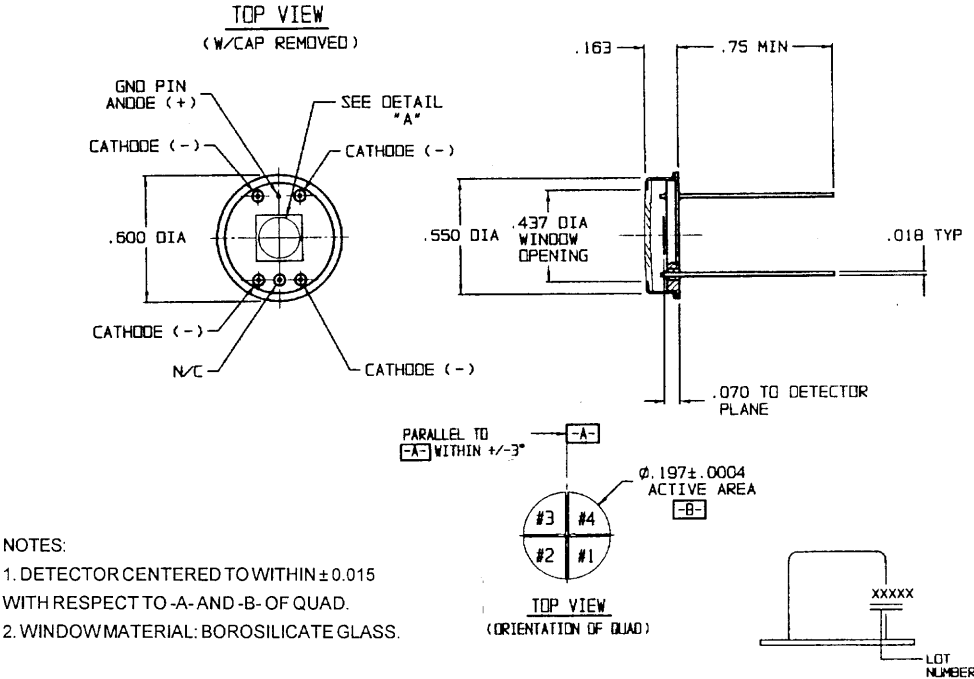


J16QUAD-8D6-R02M



PIN	FUNCTION
1	DET, QUAD ELEM #3, CATHODE (-)
2	DET, GND, ANODE (+)
3	DET, QUAD ELEM #4, CATHODE (-)
4	DET, QUAD ELEM #2, CATHODE (-)
5	N/C
6	DET, QUAD ELEM #1, CATHODE (-)

J16QUAD-8D6-R05M



PIN	FUNCTION
1	DET, QUAD ELEM #3, CATHODE (-)
2	DET, GND, ANODE (+)
3	DET, QUAD ELEM #4, CATHODE (-)
4	DET, QUAD ELEM #2, CATHODE (-)
5	N/C
6	DET, QUAD ELEM #1, CATHODE (-)