

Position Sensors

Advanced Optoelectronics has both lateral effect cells and segmented detectors. These devices are used to measure angle and displacement, optical alignment, and laser positioning.

Lateral effect cells are offered in single-axis and dual-axis configurations providing extremely accurate position measurement over a large area with a wide dynamic range. Accuracy and responsivity are not affected by the size, shape, or position of the light as long as the image remains in the active area of the detector.

Segmented detectors include both dual and quad-element photodiodes. These devices are designed for laser positioning and other null applications which require detection of the relative position of a light spot.

Ultra-Low Capacitance Photodiodes

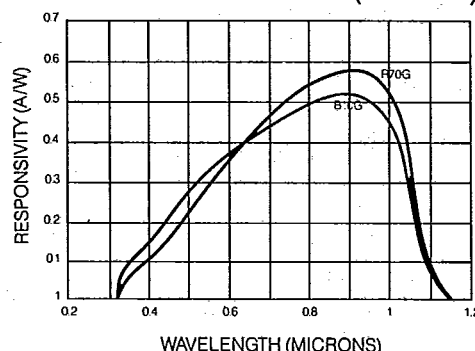
When extremely low light levels are measured by photodiodes, the capacitance of the detector often deteriorates the system's signal-to-noise ratio because of its influence on the frequency response of the first stage of amplification.

To meet this new demand, Advanced Optoelectronics has developed and patented a unique photodiode structure which offers much improved shunt resistance and lower capacitance over conventional approaches. This product line has exceptionally large detectivity (D^*), and when capacitance is considered, can give twenty times the performance of the most expensive standard photodiodes at a fraction of the cost. Capacitances as low as 8 pf, combined with shunt resistances of over 1,000 megohms, can be specified for a 0.2 cm² device. The data table describes two standard devices. Custom geometries and packages are readily available.

Plastic Packages

For high volume, lower cost requirements, the 1RPE, 11BHPE, and 22BHPE planar silicon photodiodes are available in a clear plastic package. This low-cost, high-performance approach allows arrays up to six elements long in a 16-pin, dual-in-line configuration. These packages can be easily soldered to printed circuit boards or socketed.

RESPONSIVITY CURVES (TYPICAL)



POSITION SENSORS

PRODUCT		MECHANICAL PARAMETERS				TYPICAL OPTICAL PARAMETERS						
TYPE NUMBER	PACKAGE OUTLINE	NO. OF ELEMENTS	ELEMENT DIMENSIONS (mm)	PHOTO- SENSITIVE AREA (mm ²)	RESPONSE	PEAK		RESPONSIVITY ¹⁾			Isc ²⁾ (mA)	
					CURVE TYPE	RANGE (nm)	WAVE- LENGTH (nm)	254 nm (A/W)	550 nm (A/W)	PEAK (A/W)		
110PS1D	C14	1	13 x 13	169	B10G	320-1060	900	—	0.34	0.52	—	
110PS2D	C15	1	13 x 13	169	B10G	320-1060	900	—	0.34	0.52	—	
45PQU05M	T05/5	2 x 2	1.3 x 1.3	1.7	R70G	320-1100	950	—	0.31	0.57	—	
25PDU05M	T05/3	2	2.5 x 1.3	3.3	R70G	320-1100	950	—	0.31	0.57	—	

ULTRA LOW CAPACITANCE

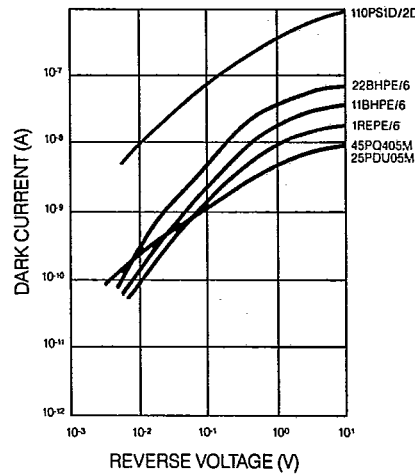
PRODUCT	MECHANICAL PARAMETERS				TYPICAL OPTICAL PARAMETERS						
	TYPE NUMBER	PACKAGE OUTLINE	ELEMENT DIMENSION (mm)	PHOTO-SENSITIVE AREA (mm ²)	RESPONSE CURVE TYPE	RESPONSE RANGE (nm)	PEAK WAVE-LENGTH (nm)	254 nm (A/W)	550 nm (A/W)	RESPONSIVITY ¹⁾ PEAK (A/W)	Isc ²⁾ (mA)
	ULC240	C1	3.0 x 25.4	76.2	ULC	200-1100	>950	.06	0.35	0.57	2.4
	ULC230	C2	2.8 x 27.1	75.9	ULC	200-1100	>950	.06	0.35	0.57	1.83

PLASTIC DIP PACKAGE

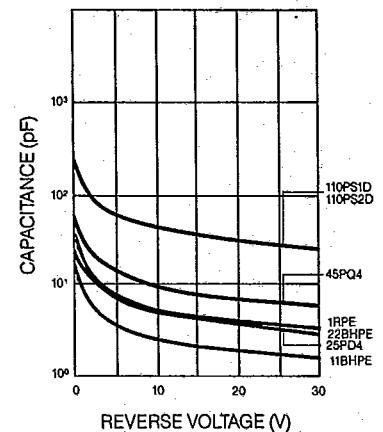
PRODUCT	MECHANICAL PARAMETERS				TYPICAL OPTICAL PARAMETERS						
	TYPE NUMBER	PACKAGE OUTLINE	ELEMENT DIMENSION (mm)	PHOTO-SENSITIVE AREA (mm ²)	RESPONSE CURVE TYPE	RESPONSE RANGE (nm)	PEAK WAVE-LENGTH (nm)	254 nm (A/W)	550 nm (A/W)	RESPONSIVITY ¹⁾ PEAK (A/W)	Isc ²⁾ (mA)
	1RPE	PDIP1	1.0 Diam.	0.79	AD101P	350-1060	875	—	0.27	0.40	24
	1RPE6	PDIP2	1.0 Diam.	0.79	AD101P	350-1060	875	—	0.27	0.40	24
	11BHPE	PDIP1	1.0 x 1.0	1.03	B70P	350-1100	950	—	0.32	0.52	31
	11BHPE6	PDIP2	1.0 x 1.0	1.03	B70P	350-1100	950	—	0.32	0.52	31
	22BHPE	PDIP1	1.5 x 1.5	2.3	B70P	350-1100	950	—	0.32	0.52	69
	22BHPE6	PDIP2	1.5 x 1.5	2.3	B70P	350-1100	950	—	0.32	0.52	69

1) MINIMUM RESPONSIVITY IS 90% OF TYPICAL RESPONSIVITY. 2) SHORT CIRCUIT CURRENT (Isc) IS MEASURED WITH 10 mW/cm² OF OPTICAL POWER FROM A TUNGSTEN LIGHT SOURCE OPERATED AT 2800 degK TEMPERATURE.

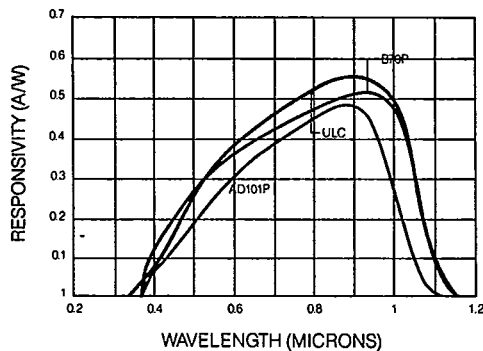
DARK CURRENT vs. VOLTAGE



CAPACITANCE vs. VOLTAGE



RESPONSIVITY CURVES (TYPICAL)



ELECTRICAL PARAMETERS

$V_R = -0.01V$ MAX. (nA)	DARK CURRENT		BREAKDOWN VOLT. $I_{DR} = 10\mu A$ MIN. (V)	SHUNT RESISTANCE TYP. (Mohm)	TYPICAL CAPACITANCE		
	$V_R = -1.0V$ MAX. (nA)	$V_R = -10V^4$ MAX. (nA)			$V_R = 0V$ (pF)	$V_R = -1V$ (pF)	$V_R = -10V^4$ (pF)
10	500	1000	12	1	2800	1345	478
0.10	500	1000	12	1	2800	1345	478
0.2	5	10	50	100	37	18	6
0.3	5	10	100	100	72	35	12

ADDITIONAL PERFORMANCE PARAMETERS

TYP. RISE TIME ³⁾		NEP TYP. (W/√Hz)	D* TYP. (cm√Hz/W)
$V_R = 0$ (ns)	$V_R = -10V^4$ (ns)		
20000	10000	1.3E-13	1.0E+13
20000	10000	1.3E-13	1.0E+13
450	5	1.3E-14	1.0E+13
450	5	1.3E-14	1.4E+13

ELECTRICAL PARAMETERS

$V_R = -0.01V$ MAX. (nA)	DARK CURRENT		BREAKDOWN VOLT. $I_{DR} = 10\mu A$ MIN. (V)	SHUNT RESISTANCE TYP. (Mohm)	TYPICAL CAPACITANCE		
	$V_R = -1.0V$ MAX. (nA)	$V_R = -10V^4$ MAX. (nA)			$V_R = 0V$ (pF)	$V_R = -1V$ (pF)	$V_R = -10V^4$ (pF)
100	—	—	10	200	290	—	—
350	—	—	10	50	220	—	—

ADDITIONAL PERFORMANCE PARAMETERS

TYP. RISE TIME ³⁾		NEP TYP. (W/√Hz)	D* TYP. (cm√Hz/W)
$V_R = 0$ (ns)	$V_R = -10V^4$ (ns)		
—	—	8.9E-15	1.0E+14
—	—	1.8E-14	4.4E+14

ELECTRICAL PARAMETERS

$V_R = -0.01V$ MAX. (nA)	DARK CURRENT		BREAKDOWN VOLT. $I_{DR} = 10\mu A$ MIN. (V)	SHUNT RESISTANCE TYP. (Mohm)	TYPICAL CAPACITANCE		
	$V_R = -1.0V$ MAX. (nA)	$V_R = -10V^4$ MAX. (nA)			$V_R = 0V$ (pF)	$V_R = -1V$ (pF)	$V_R = -10V^4$ (pF)
0.1	10	20	70	335	35	17	6
0.1	10	20	70	335	35	17	6
0.15	20	40	70	200	25	11	4
0.15	20	40	70	200	25	11	4
0.30	40	80	70	100	55	25	9
0.30	40	80	70	100	55	25	9

ADDITIONAL PERFORMANCE PARAMETERS

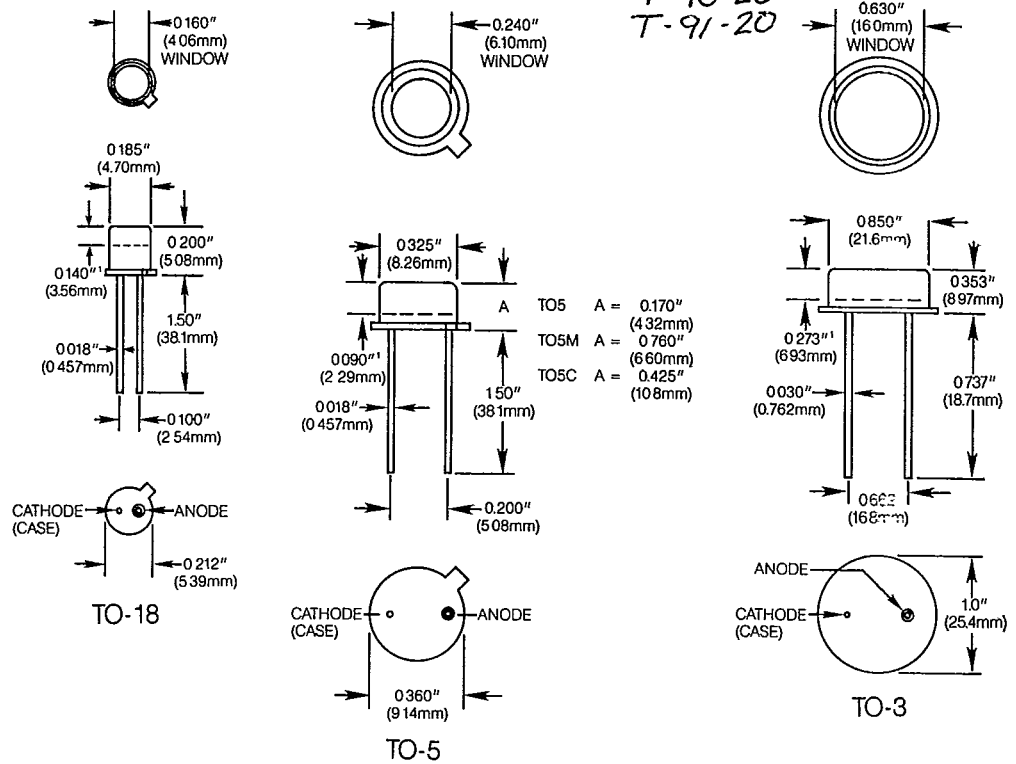
TYP. RISE TIME ³⁾		NEP TYP. (W/√Hz)	D* TYP. (cm√Hz/W)
$V_R = 0$ (ns)	$V_R = -10V^4$ (ns)		
450	2	6.9E-15	1.3E+13
450	2	1.5E-14	1.2E+14
450	2	1.5E-14	9.4E+13
450	2	1.5E-14	9.4E+13
450	2	1.5E-14	6.6E+13
450	2	1.5E-14	6.6E+13

3) 50 OHM LOAD, $\lambda = 800$ nm

4) OR AT 1/2 BREAKDOWN VOLTAGE, WHICHEVER IS LESS

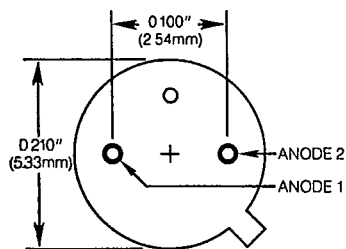
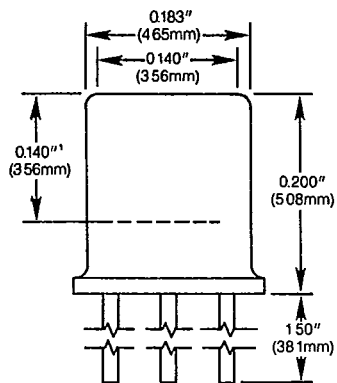
Package Outlines

Advanced Optoelectronics offers a complete line of industry-standard TO-packages, as well as other package types. If your design requirements call for a package type beyond those in the catalog, Advanced Optoelectronics can accommodate your needs. Just give us a call.

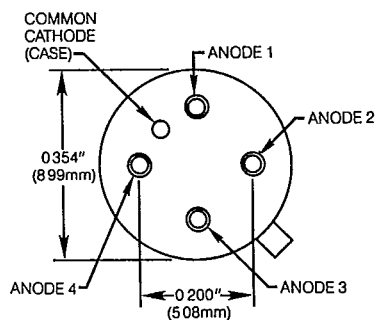
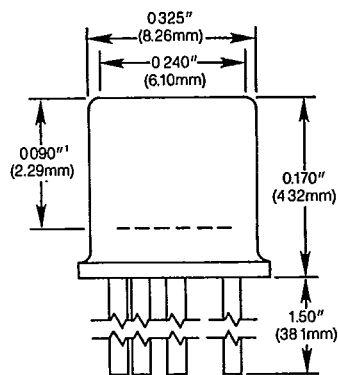


Warranty Information

All product specifications herein may be modified at any time by Advanced Optoelectronics. All Advanced Optoelectronics standard products are fully warranted for a period of one year from date of shipment against defects in material and workmanship. Uncapped detectors are warranted to be free of defects in materials or workmanship for a period of 60 days. Damage caused by mishandling is excepted. Warranty claims for visual and mechanical failures must be requested within 45 days of receipt of product. No claims will be processed without prior authorization.

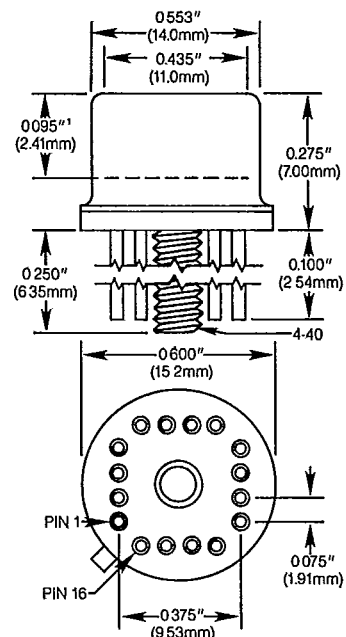


TO-18/3

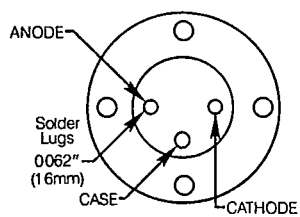
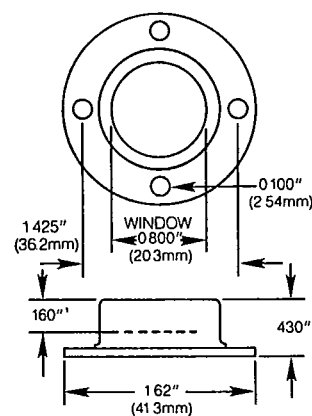


TO-5/5

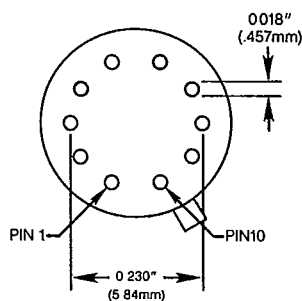
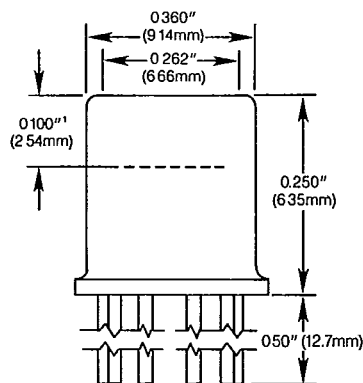
T-90-20
T-91-20



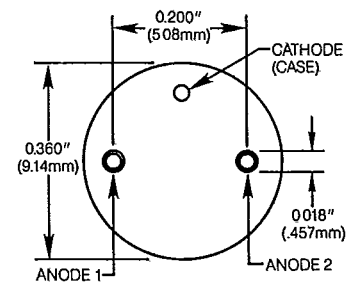
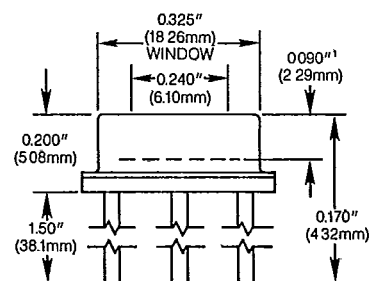
TO-8/16



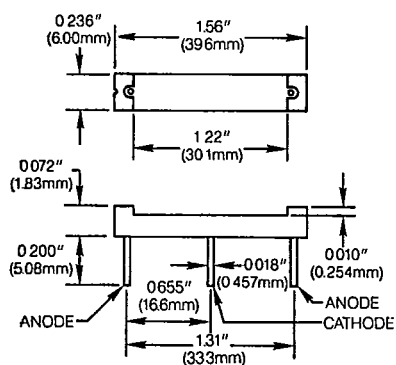
TO-3/3



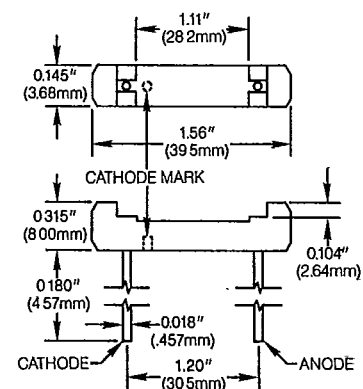
C-17



TO-5/3 (Modified)



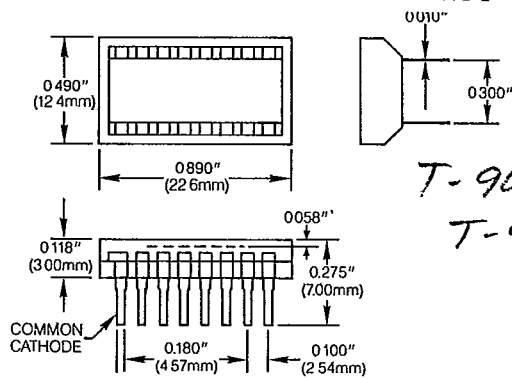
C-1



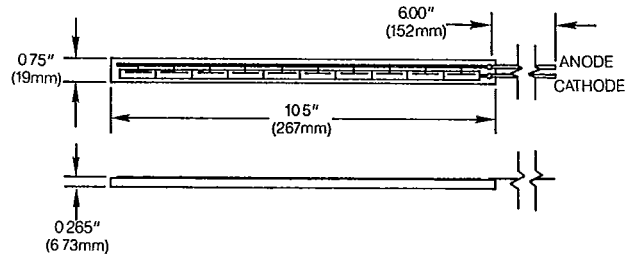
C-2

Advanced Optoelectronics... The Future

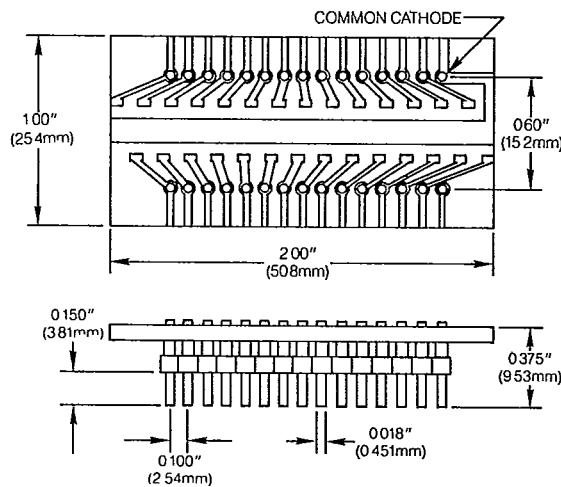
Advanced Optoelectronics is committed to product excellence and growth. A myriad of new products are in development. Our product expansion will reach beyond photo-sensor technology, giving you a broad range of choices for all of your optoelectronics requirements. During 1990, Advanced Optoelectronics will be introducing a family of diode-pumped solid state lasers and semiconductor laser arrays.



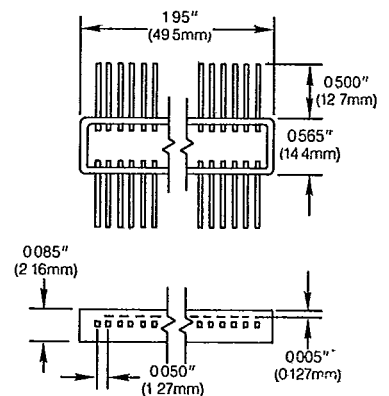
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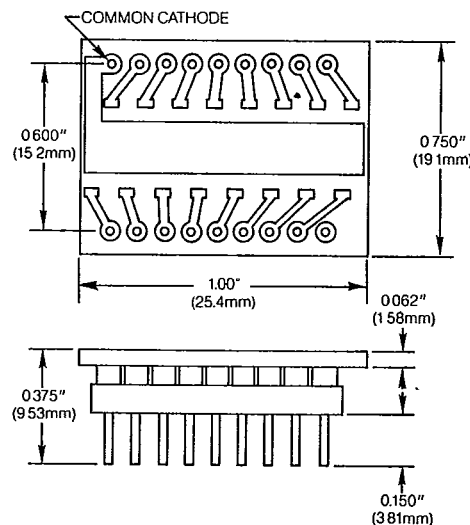
C-8



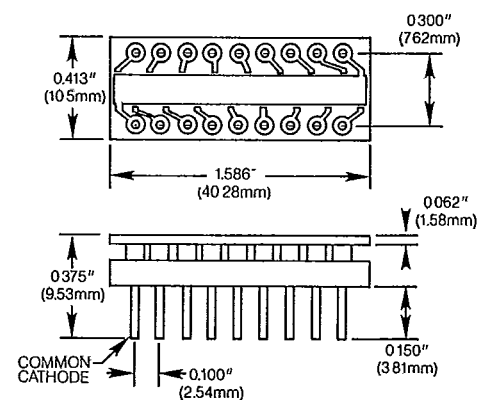
C-9



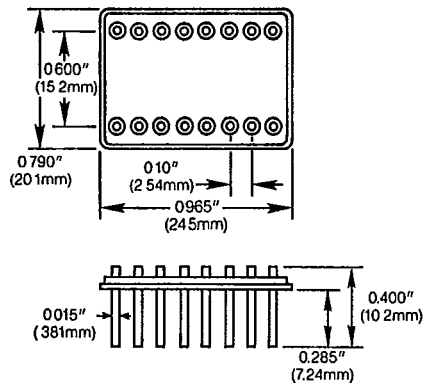
C-5



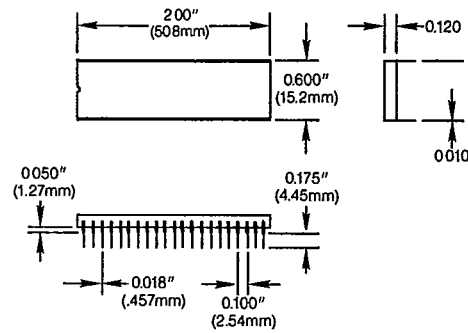
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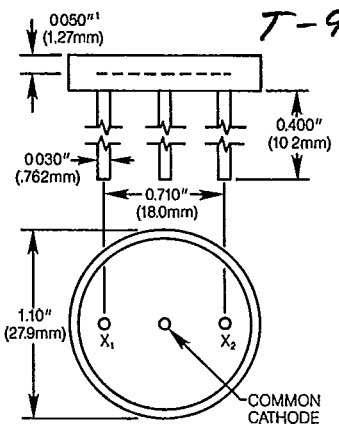
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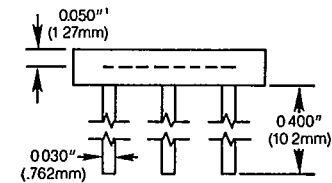
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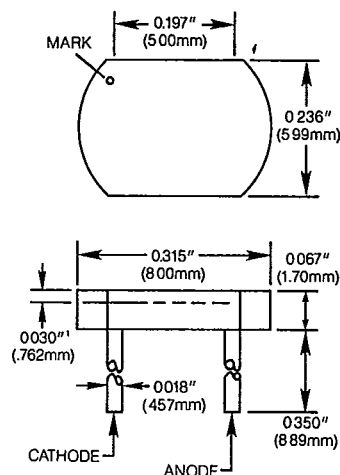
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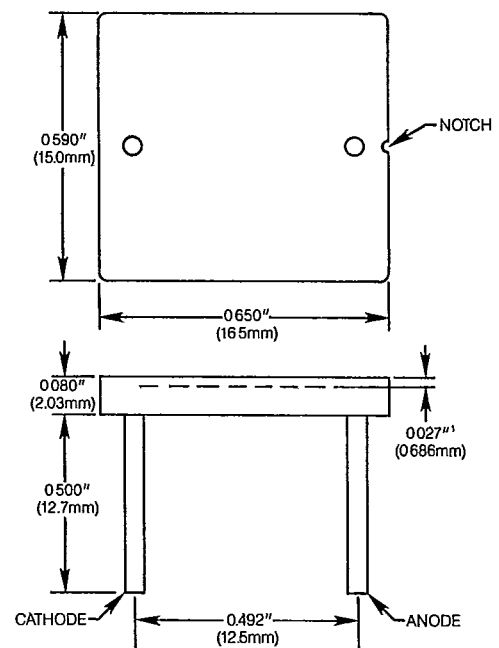
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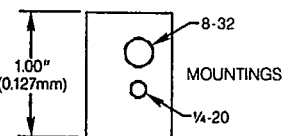
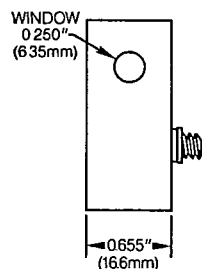
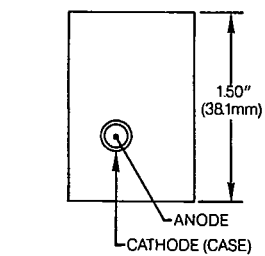
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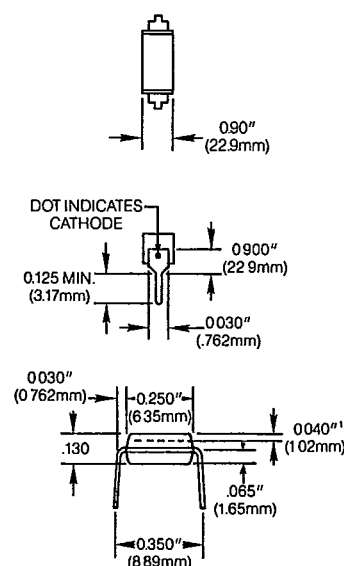
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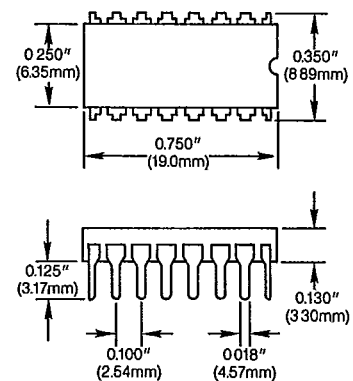
P11



C-4



PDIP-1



PDIP-2