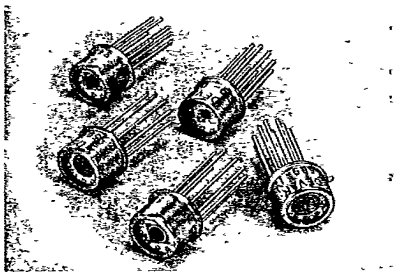
T-41-67

DEVAR Inc.
photo detector with amplifier
type-539



INTRODUCTION

Type 539 Optical Detectors are wide bandwidth light-to-voltage converters specifically designed for fibre optic data links and instruments requiring fast response and maximum signal-to-noise ratio.

539's consist of a planar diffused silicon photo diode, a 100MHz gain-bandwidth current-mode op amp, and a film type gain determining resistor, all integrated in a shielded, hermetically sealed, miniature TO-5 sized package. Compared with an assembly of discrete components, 539's offer a dramatic reduction in mounting space, eliminate a PC board, vastly reduce noise pick-up, and have a wider bandwidth, greater reliability, and lower cost.

Two different size diode active areas are available, and three different sensitivities and bandwidths are obtainable. The pin-out is such as to allow choice of output polarity, gain and offset adjust, response compensation, etc. 539's are responsive to most common light sources, LED's, most lasers, etc. between 400 and 1050 nM wavelengths. Output is a linear function of incident light.

SPECIFICATIONS AT 25°C, Vs = ±15v, V_D = 15v

PARAMETER	SYMBOL	VALUE, TYP.						UNITS	CONDITIONS
Gain Resistor	R_A, R_B	30		50		100		KΩ	
Diode Active Area	$A_{D\lambda}$	0.8	5	0.8	5	0.8	5	mm^2	
Responsivity	e_o/P_λ	18	18	30	30	60	60	mV/μW	GaAs LED λ = 0.9 μM
Responsivity	e_o/P_λ	7	7	11	11	22	22	mV/μW	2870°K Tungsten
Bandwidth, 3db	BW	12	10	9	7	4.5	4	MHz	e_o ≤ 200 mV P-P
Rise Time, 10-90%	T_R	28	35	40	50	80	90	nano sec	e_o ≤ 200 mV P-P
Broad Band Noise	e_{on}	300	400	400	500	500	600	μV, RMS	
Pλ at S/N = 1.0	N.E.P.	5	6	4	5	3	4	X10⁻¹² W/√Hz	λ = 0.9μM, f = DC to π/2 BW
Dark Offset, Max.	E_{OD}	5	5	6	6	8	8	mV	25°C
		8	8	9	9	11	11		0-70°C

COMMON PARAMETERS		SYM.	TYP. VALUE	UNITS	CONDITIONS
Slew Rate		deo/dt	35	V/μsec	e_o = 10 v. Step
Output Current		I_L	18	mA	Max.
Supply Voltage	Min.	Vs	±5	V	
	Max.		±20	V	
Supply Current		I_Q	3	mA	RL = ∞
Diode Voltage		V_D	0-45	V	Reverse Bias
Operating Temp.			0-70	°C.	

PART NO.	RESISTOR	DIODE
539-003-1	30K	0.8 mm^2
539-003-5	30	5.0
539-005-1	50	0 8
539-005-5	50	5.0
539-01-1	100	0.8
539-01-5	100	5.0

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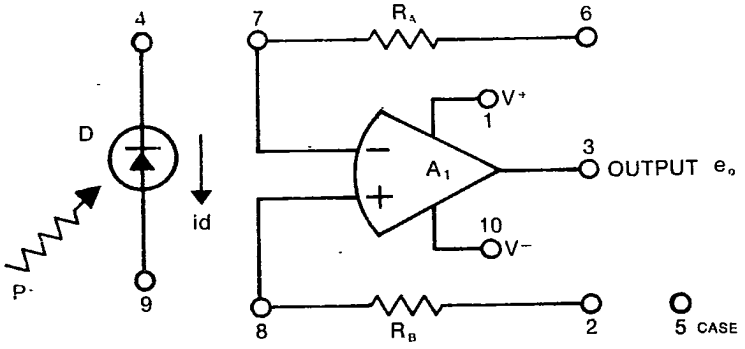
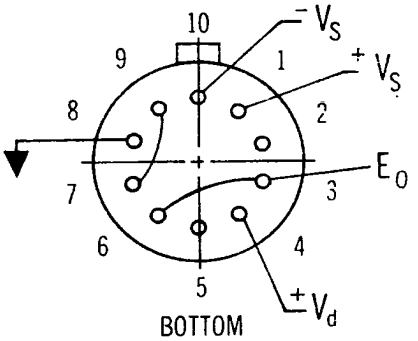
photo detector with amplifier

type 539

CUSTOM FILTER OPTION AVAILABLE

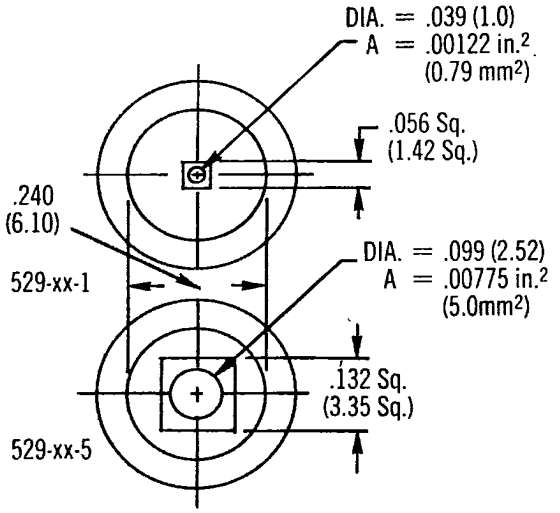
application notes:





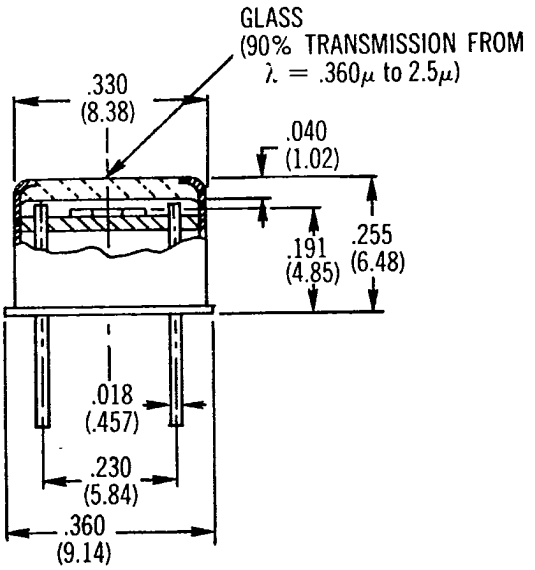
BOTTOM VIEW
TO-5 CASE
SHOWING CONNECTIONS

1. Connect as shown on pin diagram. Units should be hard wired. Circuits are critical to socket and inter-lead capacitance.
2. Connections shown give negative going output with light. For positive going output, reverse pins 9 & 4, and use a negative diode bias supply, Vd.
3. Make no connections to unused pins. Clip pins off short and solder close under header.
4. Do not ground case pin 5 — this slows circuit due to added capacitance to ground.
5. Gain may be increased externally at the expense of bandwidth — see 529 bulletin for connections.
6. Damping may be increased via a very small shunt capacitance across R_A, say two small insulated wires, twisted together from pins 7 & 3.
7. Bypass power supply pins 1 and 10 to ground with good .01 μF ceramic capacitors (Erie "Red Cap" or equiv.). Keep supply leads as short as possible. Do not let load current return through pin 8 ground wire — use separate wire for pin 8 to P.S. common. Diode bias supply (Vd) must be clean, noise free; bypass to ground if necessary or filter.
8. Keep other circuit wires away from the 539, particularly wires carrying switched currents, i.e. logic circuits, comparators, etc.



DIODE CENTERED TO WITHIN .006 (.152)

DIMENSIONS
INCHES
(MILLIMETERS)



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