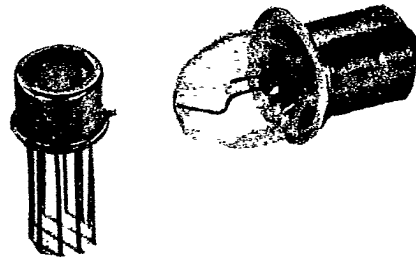
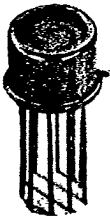


DEVAR

TYPE 509

Photo Diode Optical Detector with Integral Amplifier



A high performance Photo Diode and Microcircuit Amplifier housed in a single TO-5 package.

The integrated photo-detector/amplifier combination offers lowest noise, greatest precision, and smallest size in comparison with conventional optical detectors.

- Sensitivities to 10^{-12} watts
- Silicon Photo Detector offers Spectral Range 0.35 to 1.12 microns
- 7 Decade Linear Dynamic Range
- Bandwidths from DC to 10 MHz
- Output Noise less than 1 millivolt over full bandwidth
- NEP's to 10^{-12} watts/ $\sqrt{\text{Hz}}$
- Large Detector Active Area, 10 mm^2

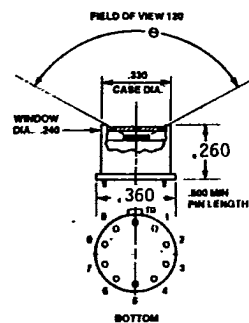
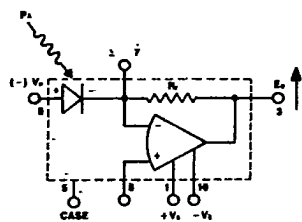
CUSTOM FILTER OPTION AVAILABLE

PHOTO DETECTOR WITH AMPLIFIER

T-41-67

DEVAR

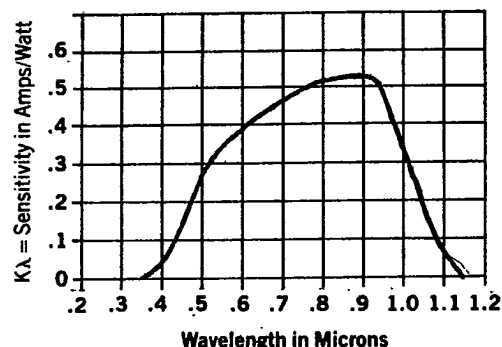
TYPE 509



TO-5 CASE

ALL DIMENSIONS ARE IN INCHES

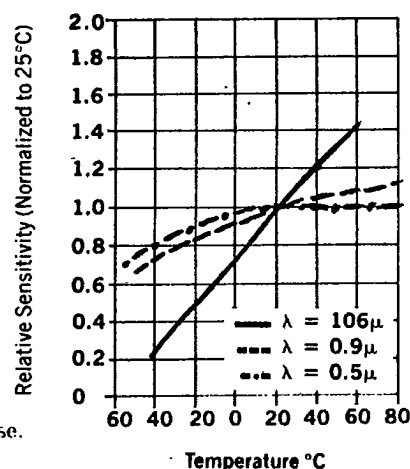
SPECTRAL RESPONSE vs. WAVELENGTH



APPLICATION NOTES

- Return Pins 8 and 5 to Supply Common for lowest noise.
- Offset may be zeroed with a Pot or Divider at Pin 8.
- Output at Pin 3 is Positive going with light.
- Return Pin 9 to Common or to a Minus Bias Voltage only.
- A small C_f (across R_f) may be required to reduce overshoot on some applications.

RELATIVE SENSITIVITY vs. AMBIENT TEMPERATURE

CHARACTERISTICS $T_A = 25^\circ\text{C}$ $V_S = +15\text{V}$.

PARAMETER	UNITS	509-01	509-1	509-10	509-50	CONDITIONS
Feedback Resistor R_F	Megohms	0.1	1	10	50	
Responsivity R	Volts/Watt	4×10^4	4×10^5	4×10^6	2×10^7	$\lambda = 0.8 \text{ MICRON}$ $V = 0\text{V}$
Bandwidth, 3dB BW	Hertz	—	40K	10K	4K	$V_D = 0\text{V}$
		1000K	100K	15K	—	$V_D = -15\text{V}$
Risetime, 10-90% T_R	Micro-seconds	—	8	30	90	$V_D = 0\text{V}$
		0.3	3	20	—	$V_D = -15\text{V}$
Slew Rate dE_0/dt	Volts/ μsec	35	0.3	0.3	0.3	LARGE SIGNAL, $R_L = 2\text{K OHMS}$
Output Noise e_{n0}	Millivolts, RMS	—	0.6	0.7	0.8	$V_D = 0\text{V}$
		0.8	0.4	0.6	—	$V_D = -15\text{V}$
Dark Offset E_{0D}	Millivolts	—	2	10	50	$V_D = 0\text{V}$
		10	8	100	—	$V_D = -15\text{V}$
Dark Offset Temp. Coeff. (Avg.)	Millivolts per $^\circ\text{C}$	—	0.06	0.6	3	$V_D = 0\text{V}$
		0.4	4	40	—	$V_D = -15\text{V}$
Output Impedance, R_0	Ohms	<0.1	<0.1	<0.1	<0.1	0 TO 100 Hz
Output Current, I_0	Milli-amperes	± 15	± 5	± 5	± 5	$E_0 \pm 10\text{V}$
Bias Voltage, V_D	Volts	← 0 TO - 50 VOLTS MAX. →				
Supply Current, I_S	Milli-amperes	≤ 4	≤ 0.8	≤ 0.8	≤ 0.8	$V_S \pm 5 \text{ TO } \pm 20\text{V}$
Temperature T_A	$^\circ\text{C}$	← 0 to + 70° OPERATING - 25 to + 100° STORAGE →				

DEVAR

Devar Inc.
Control Products Division
706 Bostwick Avenue
Bridgeport CT 06605
(203) 368-6751