



6694

PHOTOCONDUCTIVE CELL

Cadmium-Sulfide Type

TENTATIVE DATA

RCA-6694 is a very tiny, cadmium-sulfide photoconductive cell of the head-on type. It features high luminous sensitivity, very low dark current, extremely low background noise, and signal output which is directly proportional to the incident light intensity. Furthermore, the characteristics of the 6694 are not substantially affected by wide change in operating temperature.



Actual Size

Because of its tiny size and high sensitivity, the 6694 is especially useful in those light applications where a single tiny photosensitive device is desired, in light-controlled relay applications, in computer applications utilizing a modulated light input to the cell to provide a modulated output signal for use with an ac amplifier, and in light meters for measuring the brightness of small luminous spots. It also finds application in x-ray intensity measurements.

The spectral response of the 6694 covers the visible range from about 3500 to 5500 angstroms, as shown in Fig. 1. Maximum response occurs at about 5000 angstroms. The 6694, therefore, has high sensitivity to blue-green light. The sensitivity is directly proportional to the applied voltage between terminals within the ratings of the cell.

The frequency response of the 6694 falls off with increase in frequency. Its upper limit is about 500 cycles per second. A somewhat more extended response is obtained with high light levels than with low light levels.

DATA

General:

Spectral Response S-12
Wavelength of Maximum Response . . . 5000 $\pm$ 500 angstroms
Sensitive Area:
Shape Rectangular
Dimensions (Minimum) 0.020" x 0.018"
Maximum Overall Length 0.387"
Maximum Seated Length 0.190"
Width 0.320" $\pm$ 0.020"

Depth 0.165" $\pm$ 0.020"
Base Small-Oblong Linotetrar 3-Pin (JETEC No. E3-14)
Mounting Position Any

Maximum Ratings, Absolute Values:

POLARIZING VOLTAGE 200 max. volts
POWER DISSIPATION 30 max. mw
AMBIENT TEMPERATURE -40 to +70 °C

Characteristics:

Under conditions with polarizing voltage of 90 volts and at ambient temperature of 25°C

	Min.	Median	Max.
Sensitivity:			
Radiant, at 5000 angstroms	-	250	- μ amp/ μ watt
Luminous*, at 0 cps.	0.3	0.6	- amp/lumen
Luminous Intensity [▲] , at 0 cps	1.6	3	- μ amp/ft-c
Dark Current	-	-	0.1 μ amp
Frequency Response:			
At 30 cps, as arbitrary reference	-	100	- per cent
At 300 cps	-	20	- per cent
Dark Noise	Essentially lower than that of associated circuit		
Photocurrent Decay	See Fig. 5		

* For conditions where the light source is a tungsten-filament lamp operated at a color temperature of 2870°K. A light flux of about 200 microlumens is used.

▲ For conditions the same as shown under (*) except that an incident light intensity of 73 foot-candles is used.

DEFINITIONS

Radiant Sensitivity. The quotient of output current by incident radiant power of a given wavelength, at constant electrode voltages.

Luminous Sensitivity. The quotient of output current by incident luminous flux, at constant electrode voltages.

Luminous Intensity Sensitivity. The quotient of output current by the incident luminous intensity, at constant electrode voltages.

OPERATING CONSIDERATIONS

The *maximum ratings* in the tabulated data are limiting values above which the serviceability of the 6694 may be impaired from the viewpoint of life and satisfactory performance. Therefore, in order not to exceed these absolute ratings, the equipment designer has the responsibility of determining an average design value for each rating below the absolute value of that rating by an amount such that the absolute values will never be exceeded under any usual condition of supply-voltage variation, load variation, or manufacturing variation in the equipment itself.

The *base pins* of the 6694 fit the linotetrar, 3-pin socket, such as Cinch Part No. 46AZ20248,

or equivalent. The socket should be made of high-grade, low-leakage material and should be installed so that the incident light falls on the face end of the cell.

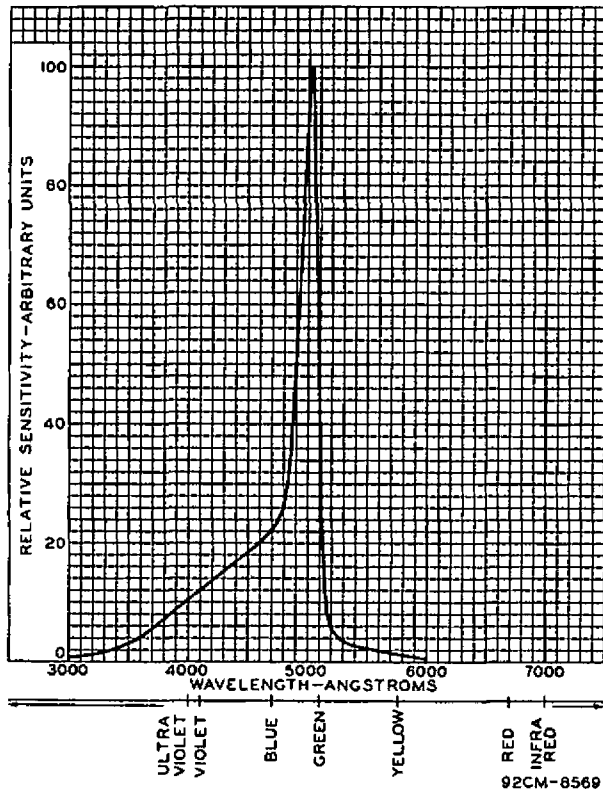


Fig. 1 - Spectral Sensitivity Characteristic of Photoconductive Cell Having S-12 Response. Curve is shown for Equal Values of Radiant Flux at All Wavelengths.

The polarizing voltage for the 6694 may be applied without regard to polarity. Within the maximum voltage rating of the cell, the sensitivity is directly proportional to the applied voltage.

A simple lens arrangement for focusing the incident light onto the small area of the photosensitive surface is suggested, especially when the incident light level is low. It is to be noted, however, that the area of the focused light spot must not be less than the area of the photosensitive surface. Otherwise, a blocking action produced by the unilluminated area of the cell will occur and cause unsatisfactory operation. To obtain the full sensitivity of the cell, it is essential that its entire photosensitive area be illuminated.

The frequency response of the 6694 falls off rapidly with increase in frequency from zero to about 500 cycles per second. The decrease is somewhat more rapid with low light levels than

with high light levels. The operating frequency range may be extended appreciably by simultaneously irradiating the photosensitive area with red or near-infrared radiation. The amount of such irradiation may be less than or equal to the amount of the controlling light input. The effect of such irradiation is a quenching action which shortens the decay time of the cell and thus permits more rapid response to incident modulated-light fluctuations.

Exposure of the 6694 to intense light, such as direct sunlight, may decrease the cell's sensitivity even though there is no voltage applied. The magnitude and duration of the de-

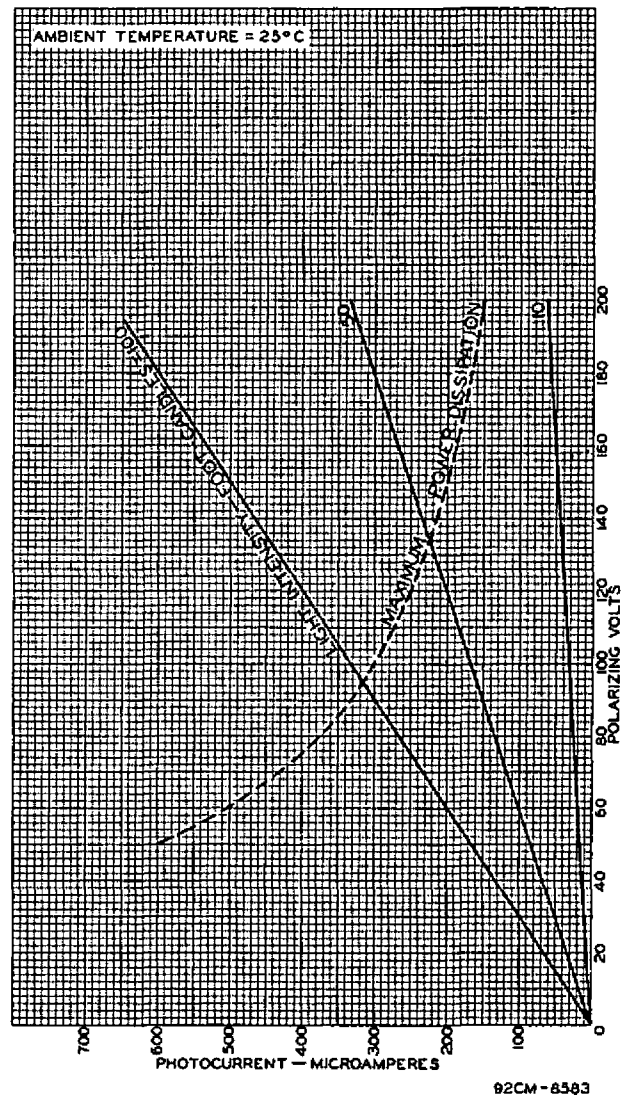
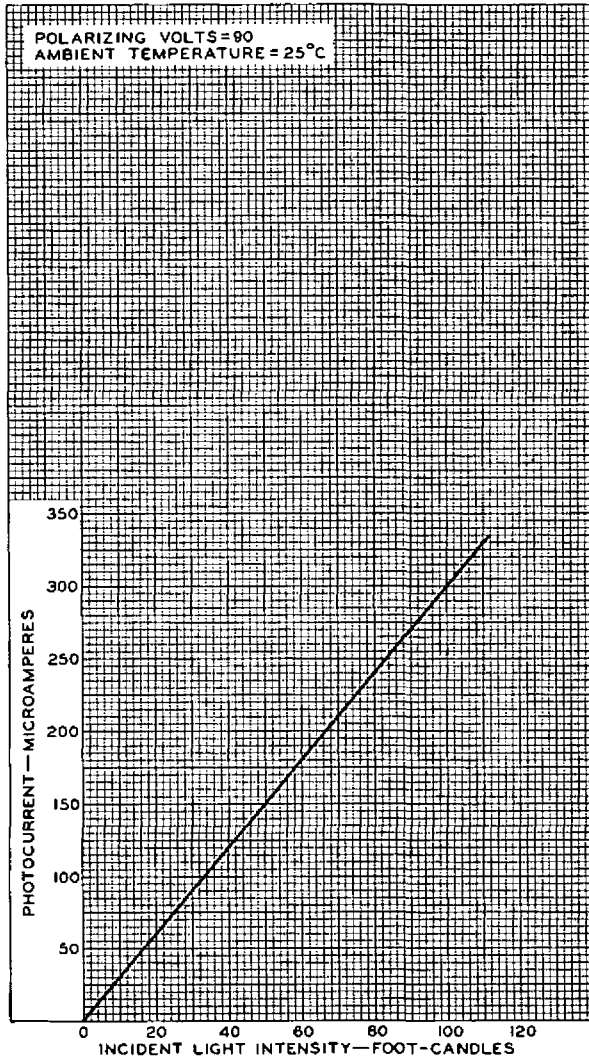


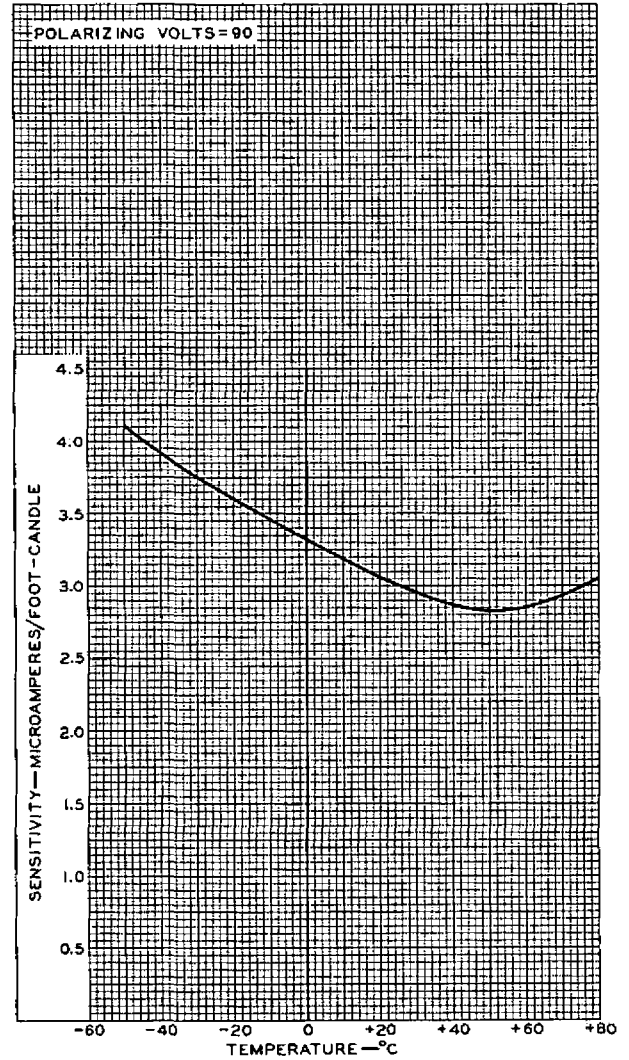
Fig. 2 - Average Characteristics of Type 6694.

crease depend on the length of exposure. Permanent damage to the cell may result if it is exposed to radiant energy so intense as to cause excessive heating of the cell.



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Fig.3 - Typical Characteristic of Type 6694.



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Fig.4 - Typical Characteristic of Type 6694.

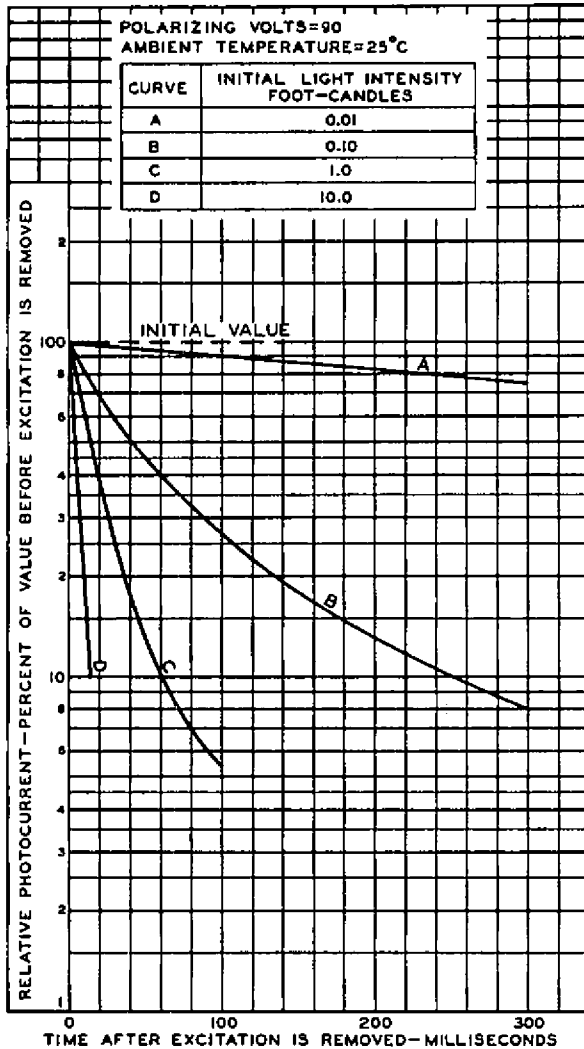
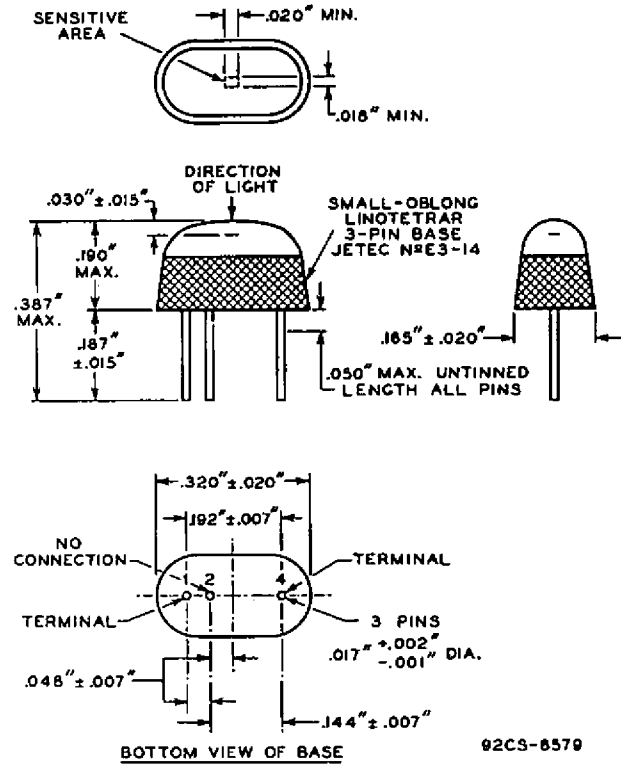
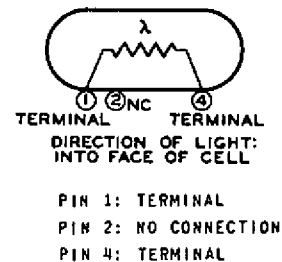


Fig. 5 - Typical Decay Characteristics
of Type 6694.

DIMENSIONAL OUTLINE



SOCKET CONNECTIONS



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