PHOTOJUNCTION CELL

GERMANIUM P-N ALLOY JUNCTION, SIDE-ON TYPE
HAVING S-14 RESPONSE
For sound pickup-from-film, computer, punched-tape, and punched-card applications

**DATA**

**General:**
- Spectral Response: S-14
- Wavelength of Maximum Response: 15000 angstroms

**Sensitive Area:**
- Shape: Circular
- Diameter (Minimum): 0.045" ± 0.045"
- Length (Excluding flexible leads): 0.46" ± 0.045"
- Seated Length to Center of Sensitive Area: 0.330" ± 0.050"
- Maximum Diameter: 0.300"
- Envelope: Glass with Metal Collar
- Envelope Seals: Hermetic
- Operating Position: Any
- Weight (Approx.): 1 gram
- Leads, Flexible: 2
- Minimum length: 1.25"
- Diameter and polarity: See Dimensional Outline

**Maximum Ratings, Absolute Values:**
- POLARIZING VOLTAGE: 50 max. volts
- POWER DISSIPATION: 0.03 max. watt
- AMBIENT-TEMPERATURE RANGE: (-40 to +50) °C
- STORAGE-TEMPERATURE RANGE: (-65 to +75) °C

**Characteristics:**

Under conditions with polarizing voltage of 45 volts and ambient temperature of 250°C

<table>
<thead>
<tr>
<th>Sensitivity:</th>
<th>Min.</th>
<th>Median</th>
<th>Max.</th>
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</thead>
<tbody>
<tr>
<td>Radiant, at 15000 angstroms</td>
<td>-</td>
<td>0.52</td>
<td>- μA/μW</td>
</tr>
</tbody>
</table>

**TENTATIVE DATA**

2-59

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
PHOTOJUNCTION CELL

<table>
<thead>
<tr>
<th>Min.</th>
<th>Median</th>
<th>Max.</th>
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</thead>
<tbody>
<tr>
<td>Luminous#</td>
<td>14</td>
<td>ma/lumen</td>
</tr>
<tr>
<td>Illumination†</td>
<td>0.5</td>
<td>0.7</td>
</tr>
<tr>
<td>Dark Current</td>
<td>35</td>
<td>µa</td>
</tr>
</tbody>
</table>

Photocurrent:
- Rise: See Curve
- Decay: See Curve

# For conditions where the light source is a tungsten-filament lamp operated at a color temperature of 2870° K.
† The value of illumination incident on the sensitive area is 75 footcandles.

OPERATING CONSIDERATIONS

The flexible leads of the 7224 are usually soldered to the circuit elements. Soldering of the leads may be made close to the glass stem provided care is taken to conduct excessive heat away from the lead seals. Otherwise, the heat of the soldering operation will crack the glass seals of the leads and damage the cell.

A clamp around the glass envelope may be used to hold the cell in position. However, care must be taken in clamping to avoid cracking the metal-collar-to-envelope seal. Do not solder or braze directly to the metal collar of the cell.

The cell must be polarized by connecting the positive voltage to the lead indexed by the red dot on the metal collar.

The use of an optical system to focus the incident radiation onto the sensitive area of the cell is suggested, especially when the incident-radiation level is low. For high values of incident radiation, the entire side of the cell may be irradiated, but only that radiation intercepted by the sensitive area is effective in producing photocurrent.

Exposure of the 7224 to intense radiation, such as focused sunlight, should be avoided under all conditions including the condition when no voltage is applied to the cell. Permanent damage to the cell may result if it is exposed to radiant energy so intense as to cause excessive heating of the cell.

With no radiation on the sensitive area of the cell, some dark current will flow across the junction. This current can be reduced, as shown in the accompanying curve, by operation of the cell at reduced ambient temperature.

SPECTRAL-SENSITIVITY CHARACTERISTIC of Photojunction Cell having S-14 Response is shown at the front of this Section
AMBIENT TEMPERATURE = 25°C
LIGHT SOURCE IS A TUNGSTEN-FILAMENT LAMP OPERATED AT 2870° K.

PHOTOCURRENT + DARK CURRENT
DARK CURRENT

CURRENT - MICROAMPERES

Polarizing Volts

ILLUMINATION - FOOTCANDLES = 500
TYPICAL RISE CHARACTERISTIC

Curves are independent of polarizing voltage. Ambient temperature = 25°C

TYPICAL DECAY CHARACTERISTIC

Curves are independent of polarizing voltage. Ambient temperature = 25°C

92CS-9654

92CS-9655
TYPICAL CHARACTERISTIC

Polarizing Volts = 5
Ambient Temperature = 25°C
Dark Current = 25 Microamperes
Light Source is a Tungsten-Filament Lamp Operated at a Color Temperature of 2870°K.

TYPICAL DARK-CURRENT CHARACTERISTIC

Polarizing Volts = 5
No radiation on photojunction cell.
EQUIVALENT-NOISE-INPUT CHARACTERISTIC

POLARIZING VOLTAGE = 22.5 VOLTS
AMBIENT TEMPERATURE = 25° C
BANDWIDTH = 1 CPS
TUNGSTEN LIGHT SOURCE AT 2870° K.