Toshiba CHALNICON E5022 is a 18-mm (2/3 inch) diameter magnetic-focus and deflection vidicon-type camera tube having Cadmium Selenide photoconductive target. This tube has extremely high sensitivity, low dark current, high resolution and no burn-in.

CHALNICON is very useful for color TV use. Any CHALNICON is suited for use in any color channel or in luminance channel.

The electron-gun structure of Toshiba CHALNICON E5022 is the same as that of the 8844.

FEATURES
* EXTREMELY HIGH SENSITIVITY
* WIDE SPECTRAL RESPONSE OVER THE WHOLE RANGE OF VISIBLE WAVELENGTHS
* HIGH RESOLUTION
* NO BURN-IN
* VERY LOW DARK CURRENT
* LOW LAG
* NEGLIGIBLE FLARE EFFECT (TIP FREE)

GENERAL DATA

Electrical:
- Cathode
  - Heater Voltage ........................................ 6.3±10 % V
  - Heater Current .......................................... 95 mA
- Direct Interelectrode Capacitance (Note 1)
  - Target to all other electrodes ....................... 2 pF
- Spectral Sensitivity ...................................... See Fig. 3
- Focusing Method ............................................. Magnetic
- Deflecting Method .......................................... Magnetic

Mechanical:
- Base ......................................................... Small-Button Miniature 7-pin (JEDEC No. E7-91 with exhaust pipe)

Dimensions:
- Overall Length ........................................... 103 mmMax.
- Maximum Diameter ......................................... 19.6±0.2 mm

- Maximum useful Size of Rectangular Image (4x3 aspect ratio) .............. 11 mm (diagonal)
- Net Weight (Approx.) ....................................... 25 g

Orientation:
Proper orientation is obtained when the horizontal scan is essentially parallel to the plane passing through the tube axis and pin 4.

This information applies to a contemplated laboratory tube design and is subject to change. No obligations are assumed as to future manufacture unless otherwise arranged.
**MAXIMUM RATINGS**

(Absolute-Maximum Values: For scanned area of 8.8 x 6.6 mm²)

<table>
<thead>
<tr>
<th>Component</th>
<th>Maximum Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid No. 4 Voltage</td>
<td>750</td>
<td>Vdc</td>
</tr>
<tr>
<td>Grid No. 3 Voltage</td>
<td>750</td>
<td>Vdc</td>
</tr>
<tr>
<td>Grid No. 2 Voltage</td>
<td>350</td>
<td>Vdc</td>
</tr>
<tr>
<td>Grid No. 1 Voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Negative bias value</td>
<td>300</td>
<td>Vdc</td>
</tr>
<tr>
<td>- Positive bias value</td>
<td>0</td>
<td>Vdc</td>
</tr>
</tbody>
</table>

Peak Heater to Cathode Voltage
- Heater Negative with respect to Cathode: 125 V
- Heater Positive with respect to Cathode: 10 V

Target Voltage: 50 Vdc

Peak Target Current: 800 nA

**FACEPLATE:**
- Illumination (Note 2): 10^5 lx
- Temperature: -20~60 °C

**TYPICAL OPERATION**

For scanned area of 8.8 x 6.6 mm²

<table>
<thead>
<tr>
<th>Component</th>
<th>Standard Operation</th>
<th>High Voltage Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faceplate Temperature</td>
<td>25~35 °C</td>
<td>25~35 °C</td>
</tr>
<tr>
<td>Grid No. 4 Voltage</td>
<td>400 Vdc</td>
<td>500 Vdc</td>
</tr>
<tr>
<td>Grid No. 3 (Beam Focus)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrode Voltage</td>
<td>240 Vdc</td>
<td>300 Vdc</td>
</tr>
<tr>
<td>Grid No. 2 Voltage</td>
<td>300 Vdc</td>
<td>300 Vdc</td>
</tr>
<tr>
<td>Grid No. 1 Voltage for</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Picture Cutoff (Note 5)</td>
<td>-45~100 Vdc</td>
<td>-45~100 Vdc</td>
</tr>
<tr>
<td>Minimum peak-to-peak Blanking Voltage</td>
<td>75 Vp-p</td>
<td>75 Vp-p</td>
</tr>
<tr>
<td>When applied to Grid No. 1</td>
<td>20 Vp-p</td>
<td>20 Vp-p</td>
</tr>
</tbody>
</table>

Field strength at the Center of Focusing Coil: 50 Gauss
Field Strength of Adjustable Alignment Coil: 0~4 Gauss

Target Voltage (Note 6): Adjusted
Highlight Signal Current: 200 nA
Dark Current (Note 3): 1 nA

Sensitivity to Tungsten Light Source (Note 7)
- Faceplate Illumination: 1 lx
- Signal Output Current: 160 nA

Signal Uniformity: 15 %
Average "Gamma": 0.95 %
Lag (Note 8): 10 %
Center Resolution 700 750 TV lines
Corner Resolution 550 550 TV lines

Amplitude Response to a 400 TV Line Square-wave Test Pattern at Center of the Picture (Note 9) 25 30 %

Notes:
1. The capacitance, effectively the output impedance of this tube, will increase when the tube is mounted in the deflecting-yoke and focusing-coil assembly. The resistive component of the output impedance is several 100 megohms.

2. The E5022 can withstand the illumination contained in a focused image of the sun without damage.

3. The dark current of the E5022 is about 1 nA at room temperature. The deterioration of picture quality due to the increase of dark current is not seen until up to 60°C of face-plate temperature. (See Fig. 2)

4. The recommended ratio of grid No. 4 to grid No. 3 voltage is from 1.5 to 1.7 (The ratio is changeable depending on the characteristics of coil assemblies.)

5. With no blanking voltage on grid No. 1.

6. Adjust the target voltage to the optimum voltage where after image with "negative" pictures does not remain when an incident pattern is removed and the target is illuminated uniformly.

7. The tungsten lamp with the color temperature of 2854°K. (See Fig. 1)

8. The ratio of residual current at 50 msec after the cessation of illumination to the initial signal current of 200 nA with the target voltage adjusted by Note 6. (See Fig. 4)

9. Amplitude response is the signal amplitude from a given TV line number (fine picture detail) expressed as a percent of the signal amplitude from a very-low-frequency (large-area) picture element. In practice, the large-detail reference is usually 15 TV lines with signal amplitude set equal to 100 percent. Amplitude response is measured using a test pattern (a slant-line burst pattern) with horizontal center response balanced on the 400 line chevrons. (See Fig. 5)
FIGURE 1. TYPICAL LIGHT TRANSFER CHARACTERISTICS

ILLUMINATION: UNIFORM OVER TARGET
AREA SCANNED AREA OF TARGET: 8.8x6.6mm²
FACEPLATE TEMPERATURE: 30°C APPROX
TARGET VOLTAGE: adjusted

2854 °K TUNGSTEN ILLUMINATION ON FACEPLATE (lx)

FIGURE 2. TYPICAL TEMPERATURE CHARACTERISTICS

SCANNED AREA OF TARGET: 8.8x6.6mm²
TARGET VOLTAGE: Adjusted
FIGURE 3. TYPICAL SPECTRAL RESPONSE CHARACTERISTICS

![Graph showing typical spectral response characteristics.](image)

FIGURE 4. TYPICAL LAG CHARACTERISTICS

![Graph showing typical lag characteristics.](image)

TARGET VOLTAGE: Adjusted
SCANNED AREA OF TARGET: 8.8x6.6mm²
FACEPLATE TEMPERATURE: 30°C APPROX.

<table>
<thead>
<tr>
<th>CURVE</th>
<th>SIGNAL CURRENT (nA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100</td>
</tr>
<tr>
<td>B</td>
<td>200</td>
</tr>
<tr>
<td>C</td>
<td>400</td>
</tr>
</tbody>
</table>

TIME AFTER ILLUMINATION IS REMOVED (ms)
BASE CONNECTIONS (BOTTOM VIEW)

PIN 1 .......... CATHODE
PIN 2 .......... GRID NO. 4
PIN 3 .......... HEATER
PIN 4 .......... HEATER
PIN 5 .......... GRID NO. 1
PIN 6 .......... GRID NO. 2
PIN 7 .......... GRID NO. 3
SJ .......... TARGET

Dimensions are in millimeters unless otherwise stated.