

Toshiba TECHNICAL DATA

ELECTRON TUBE

TOSHIBA VIDICON
(CHALNICON)
E5022

TENTATIVE

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)
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Net Weight (Approx.)	25	g
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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.

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MAXIMUM RATINGS

(Absolute-Maximum Values: For scanned area of $8.8 \times 6.6 \text{ mm}^2$)

Grid No. 4 Voltage	750	Vdc
Grid No. 3 Voltage	750	Vdc
Grid No. 2 Voltage	350	Vdc
Grid No. 1 Voltage		
Negative-bias value	300	Vdc
Positive-bias value	0	Vdc
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 $8.8 \times 6.6 \text{ mm}^2$

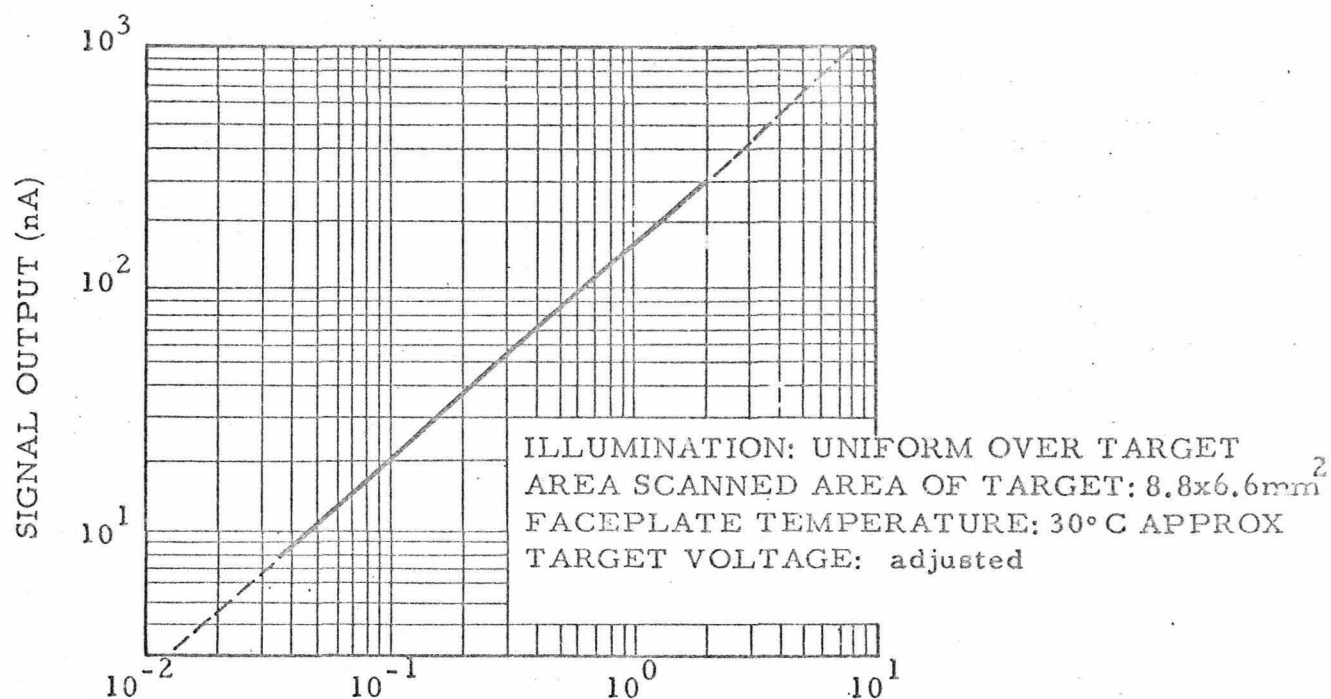
	Standard Operation	High Voltage Operation	
Faceplate Temperature (Note 3)	25~35	25~35	°C
Grid No. 4 Voltage (Note 4)	400	500	Vdc
Grid No. 3 (Beam Focus Electrode) Voltage	240	300	Vdc
Grid No. 2 Voltage	300	300	Vdc
Grid No. 1 Voltage for Picture Cutoff (Note 5)	-45~100	-45~-100	Vdc
Minimum peak-to-peak Blanking Voltage			
When applied to Grid No. 1	75	75	Vp-p
When applied to Cathode	20	20	Vp-p
Field strength at the Center of Focusing Coil	50	55	Gauss
Field Strength of Adjustable Alignment Coil	0~4	0~4	Gauss
Target Voltage (Note 6)	Adjusted	Adjusted	V
Highlight Signal Current	200	200	nA
Dark Current (Note 3)	1	1	nA
Sensitivity to Tungsten Light Source (Note 7)			
Faceplate Illumination	1	1	lx
Signal Output Current	160	160	nA
Signal Uniformity	15	15	%
Average "Gamma"	0.95	0.95	
Lag (Note 8)	10	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



2854 °K TUNGSTEN ILLUMINATION ON FACEPLATE (1x)

FIGURE 2. TYPICAL TEMPERATURE CHARACTERISTICS

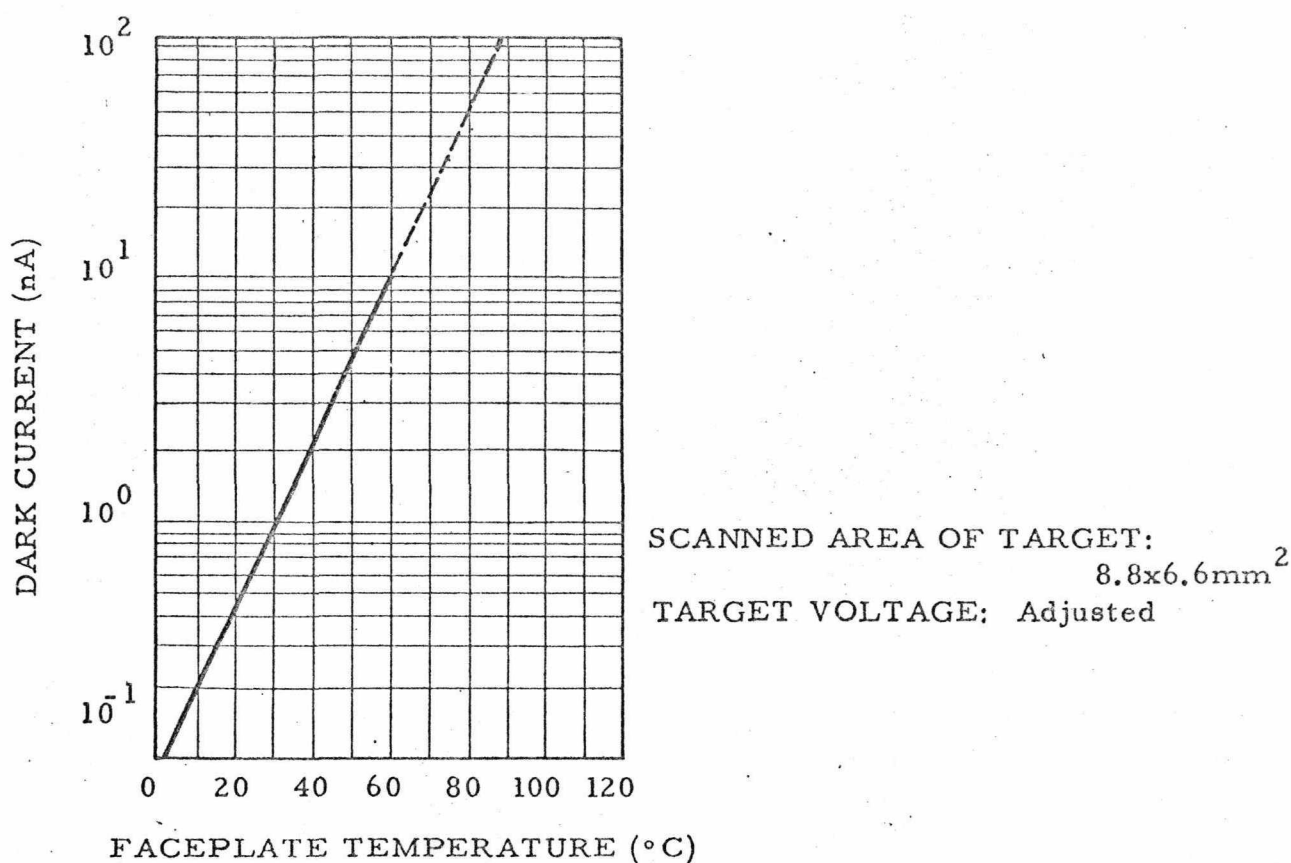


FIGURE 3. TYPICAL SPECTRAL RESPONSE CHARACTERISTICS

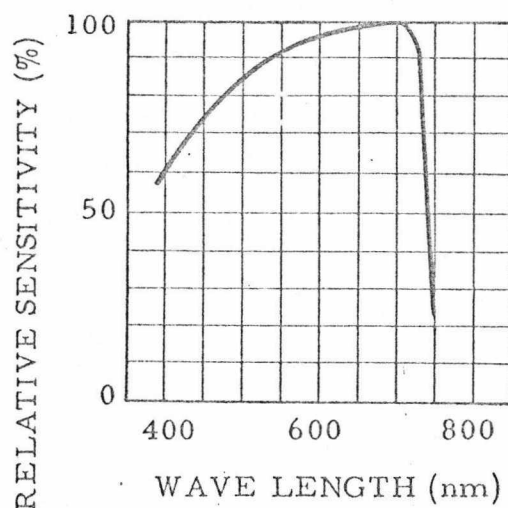
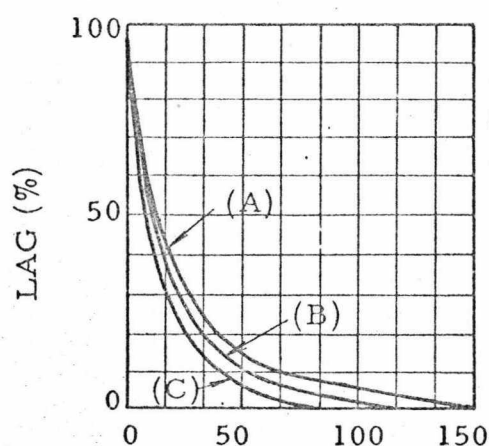


FIGURE 4. TYPICAL LAG CHARACTERISTICS



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

CURVE	SIGNAL CURRENT
	(nA)
A	100
B	200
C	400

TIME AFTER ILLUMINATION IS REMOVED (ms)

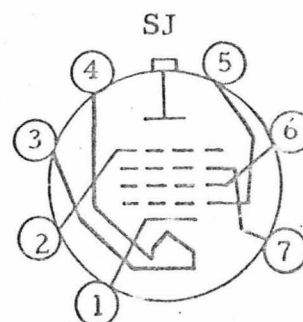
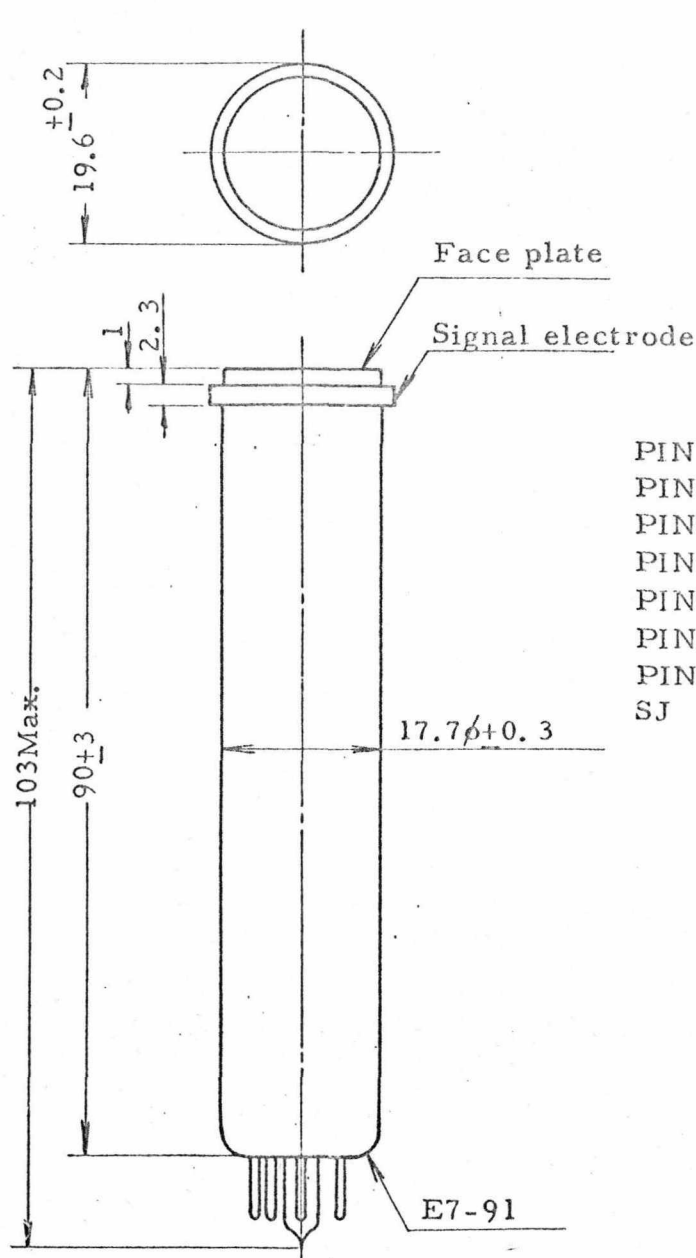
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OUTLINE

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.