4542

Vidicon

1''-Diameter, Magnetic Focus and Deflection Vidicon for Signal-Storage Applications

GENERAL

Heater, for Unipotential Cathode:

Voltage (AC or DC)	6.3 ± 10%	V
Current at 6.3 volts	0.1	A

Direct Interelectrode Capacitance:[a]

Target to all other electrodes	4.6	pF

Spectral Response . . . . . See *RCA Type IV Spectral Response* at front of this section

Photoconductive Layer:

Maximum useful diagonal of rectangular image (1 x 1 aspect ratio) . . . . . 0.885 in

Orientation of quality rectangle—Proper orientation is obtained when the horizontal scan is essentially parallel to the straight sides of the masked portions of the faceplate. The straight sides are parallel to the plane passing through the tube axis and short index pin. The masking is for orientation only and does not define the proper scanned area of the photoconductive layer.

Focusing Method	Magnetic
Deflection Method	Magnetic
Overall Length	6.250 in ± 0.125 in
Greatest Diameter	1.125 in ± 0.010 in
Bulb	T8
Base	Small-Button Ditetrar 8-Pin, (JEDEC No.E8-11)
Socket	Cinch[b] No.54A18088, or equivalent
Deflecting Yoke-Focusing Coil-Alignment Coil Assembly	Cleveland Electronics[c,d] No.VYFA-355-2, or equivalent
Operating Position	Any
Weight (Approx.)	2 oz

ABSOLUTE-MAXIMUM RATINGS

For scanned area of 5/8" x 5/8"

Grid-No.4 Voltage[f]	1000 max.	V
Grid-No.3 Voltage[f]	1000 max.	V
Grid-No.2 Voltage	350 max.	V
Grid-No.1 Voltage:		
Negative bias value	150 max.	V
Positive bias value	0 max.	V

Peak Heater-Cathode Voltage:		
Heater negative with respect to cathode	125 max.	V
Heater positive with respect to cathode	10 max.	V
Target Voltage	100 max.	V
Dark Current	0.25 max.	μA
Peak Target Current[g]	0.75 max.	μA
Faceplate:		
Illumination[h]	5000 max.	fc
Temperature	71 max.	°C

TYPICAL OPERATION AND PERFORMANCE DATA

For scanned area of 5/8" x 5/8"
Faceplate temperature of 30° to 35° C and Standard TV Scanning Rate

Grid-No.4 (Decelerator) Voltage[f]	750	V
Grid-No.3 (Beam-Focus Electrode) Voltage[f]	450	V
Grid-No.2 (Accelerator) Voltage	300	V
Grid-No.1 Voltage for Picture Cutoff[l]	-45 to -100	V
Average "Gamma" of Transfer Characteristic for Signal-Output Current Between 0.02 μA and 0.2 μA	0.7	
Visual Equivalent Signal-to-Noise Ratio (Approx.)[k]	300:1	
Lag—Per Cent of Initial Value of Signal-Output Current:[m]		
1 second after illumination is removed	45 to 65	%
15 seconds after illumination is removed	10 min.	%
30 seconds after illumination is removed	10 max.	%
Minimum Peak-to-Peak Blanking Voltage:		
When applied to grid No.1	75	V
When applied to cathode	20	V
Limiting Resolution:		
At center of picture	1000	TV Lines

Amplitude Response to a 400 TV Line Square–Wave Test Pattern at Center of Picture[n]	60	%
Field Strength at Center of Focusing Coil[p]	52 ± 4	G
Peak Deflecting-Coil Current:		
Horizontal	225	mA
Vertical	41	mA
Field Strength of Adjustable Alignment Coil[q]	0 to 4	G
High-Sensitivity Operation — 0.1 Footcandle on Faceplate		
Faceplate Illumination (Highlight)	0.1	fc
Target Voltage[r,s]	15 to 65	V
Dark Current[t]	0.02	μA
Signal-Output Current:[u]		
Typical	0.2	μA
Minimum	0.15	μA

[a] This capacitance, which effectively is the output impedance of the tube, is increased when the tube is mounted in the deflecting-yoke and focusing-coil assembly. The resistive component of the output impedance is in the order of 100 megohms.

[b] Made by Cinch Manufacturing Corporation, 1026 S. Homan Avenue, Chicago 24, Illinois.

[c] Made by Cleveland Electronics Inc., 2000 Highland Road, Twinsburg, Ohio 44087.

[d] These components are chosen to provide tube operation with minimum beam-landing error when mounted in the recommended position along the tube axis.

[f] Grid-No.4 voltage must always be greater than grid-No.3 voltage. The maximum voltage difference between these electrodes, however, should not exceed 600 volts. The recommended ratio of grid-No.3 to grid-No.4 voltage is 6/10 to 5/10; best geometry being provided when the ratio is 6/10, and most uniform signal output when the ratio is 5/10. The operator should select the ratio within this range which provides the desired performance.

[g] Video amplifiers must be designed properly to handle target currents of this magnitude to avoid amplifier overload or picture distortion.

[h] For conditions where "white light" is uniformly diffused over entire tube face.

[i] With no blanking voltage on grid No.1.

[k] Measured with high-gain, low-noise, cascode-input-type amplifier having bandwidth of 5 MHz and a peak signal-output current of 0.35 microampere. Because the noise in such a system is predominately of the high-frequency type, the visual equivalent signal-to-noise ratio is taken as the ratio of the highlight video-signal current to rms noise current, multiplied by a factor of 3.

[m] For initial signal-output current of 0.20 microampere and a dark current of 0.02 microampere.

[n] Amplitude response is the signal amplitude from a given TV line number (fine picture detail) expressed as a per cent 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 per cent. The TV-line numbers are determined by the number of equal-width black and white lines that will fit into the physical height of the image focused on the camera-tube faceplate.

[p] The polarity of the focusing coil should be such that a north-seeking pole is attracted to the image end of the focusing coil, with the indicator located outside of and at the image end of the focusing coil.

[q] The alignment coil should be located on the tube so that its center is at a distance of 3-11/16 inches from the face of the tube and be positioned so that its axis is coincident with the axis of the tube, the deflecting yoke, and the focusing coil.

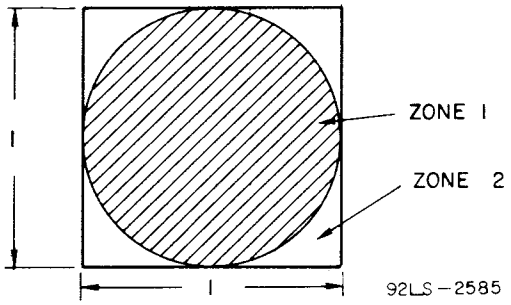
[r] The target voltage for each tube must be adjusted to that value which gives the desired operating dark current.

[s] Indicated range for each type of service serves only to illustrate the operating target-voltage range normally encountered.

[t] The deflecting circuits must provide extremely linear scanning for good signal reproduction because both dark current and signal are proportional to scanning velocity.

[u] Defined as the component of the highlight target current after the dark-current component has been subtracted.

SPURIOUS SIGNAL TEST (Fig. 1)



This test is performed using a uniformly diffused white test pattern that is separated into two zones as shown in *Fig.1*. The target is adjusted to provide a dark current of 0.1 μA with no light on the vidicon faceplate. The test pattern shown in *Fig.1*, is then focused on the vidicon faceplate and the iris is opened to provide a total target current of 0.4 μA (signal current of 0.3 μA). The 4542 is adjusted to provide maximum picture resolution. Spurious signals are evaluated by size which is represented by equivalent numbers of raster lines in a 525 TV line system. Allowable spot size for each zone is shown in Table 1. To be classified as a spot, a contrast ratio of 1.5:1 must exist for both white and black spots. Smudges, streaks, or mottled and grainy background must have a contrast of at least 10% of a 0.3 μA peak signal amplitude to constitute a reject item.

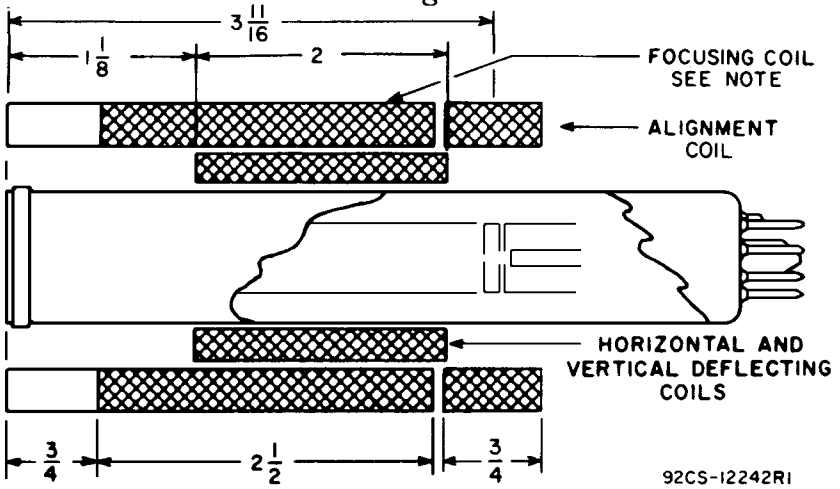
Table 1 *For scanned area of 5/8" x 5/8"*

Equivalent Number of Raster Lines	Zone 1 Allowed Spots	Zone 2 Allowed Spots
over 4	0	Any Number Allowed Under 4 TV Lines (Max.)
4 but not including 3	1	
3 but not including 1	4	
1 or less	■	

Minimum separation between any 2 spots greater than 1 raster line is limited to 16 raster lines.
■Spots of this size are allowed unless concentration causes a smudged appearance.

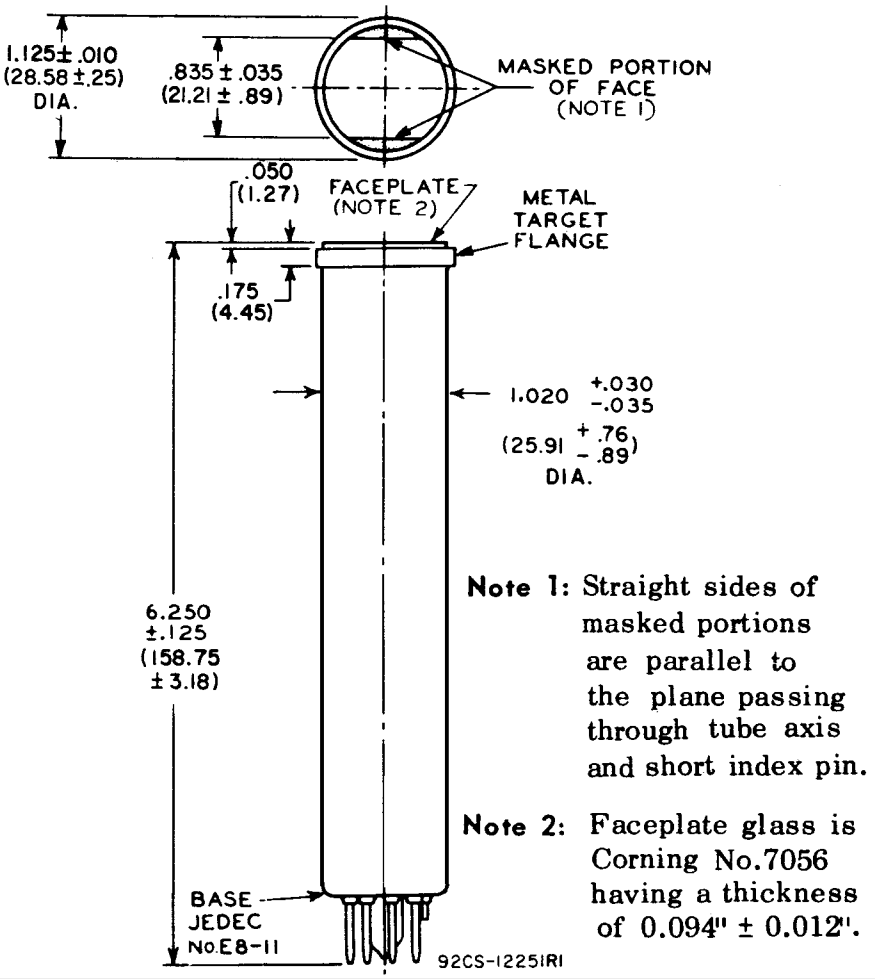
RECOMMENDED LOCATION AND LENGTH OF DEFLECTING, FOCUSING, AND ALIGNMENT COMPONENTS

To obtain minimum beam-landing error



Note: Cross-hatching indicates wound portion of focusing coil.

DIMENSIONAL OUTLINE-Dimensions in Inches (mm)

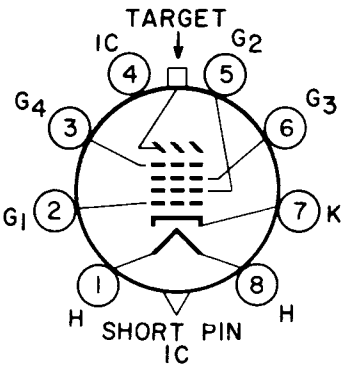


Note 1: Straight sides of masked portions are parallel to the plane passing through tube axis and short index pin.

Note 2: Faceplate glass is Corning No.7056 having a thickness of 0.094" ± 0.012".

TERMINAL DIAGRAM (Bottom View)

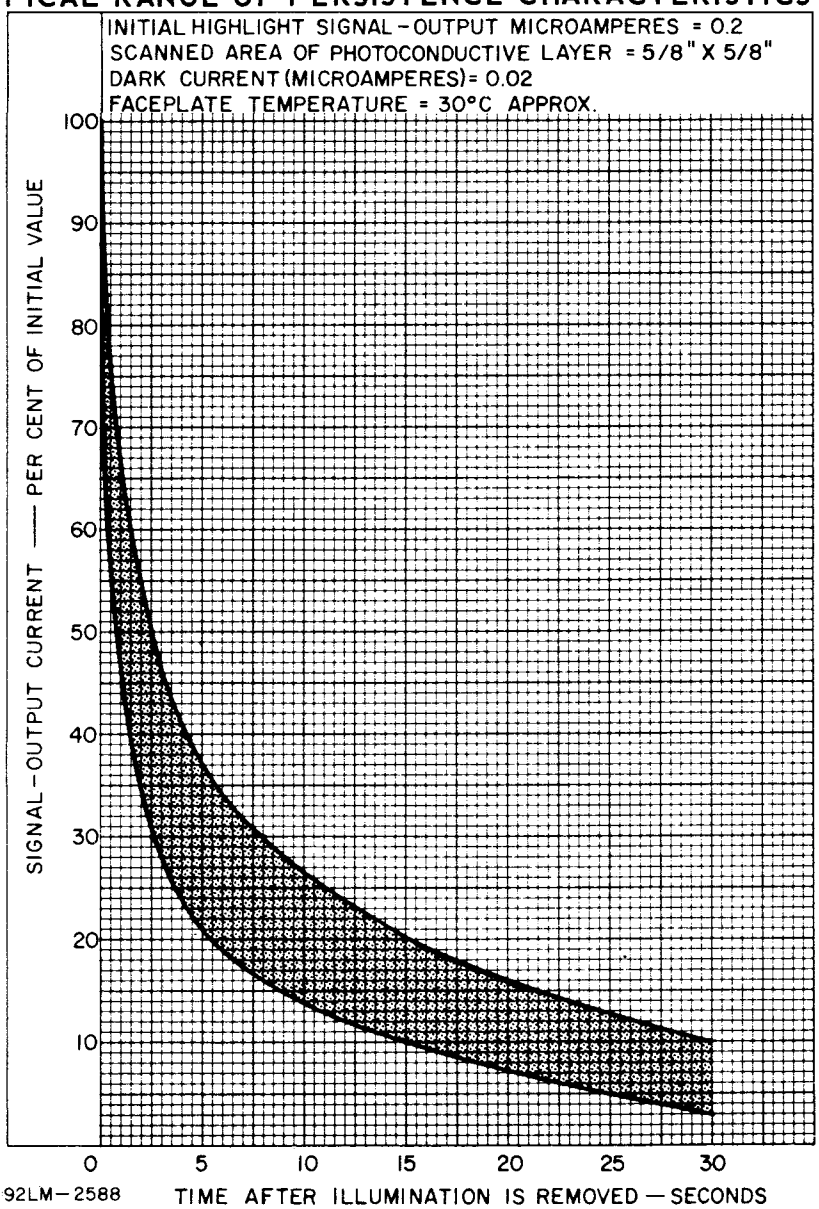
Pin 1: Heater
Pin 2: Grid No.1
Pin 3: Grid No.4
Pin 4: Internal Connection — Do Not Use
Pin 5: Grid No.2
Pin 6: Grid No.3
Pin 7: Cathode
Pin 8: Heater



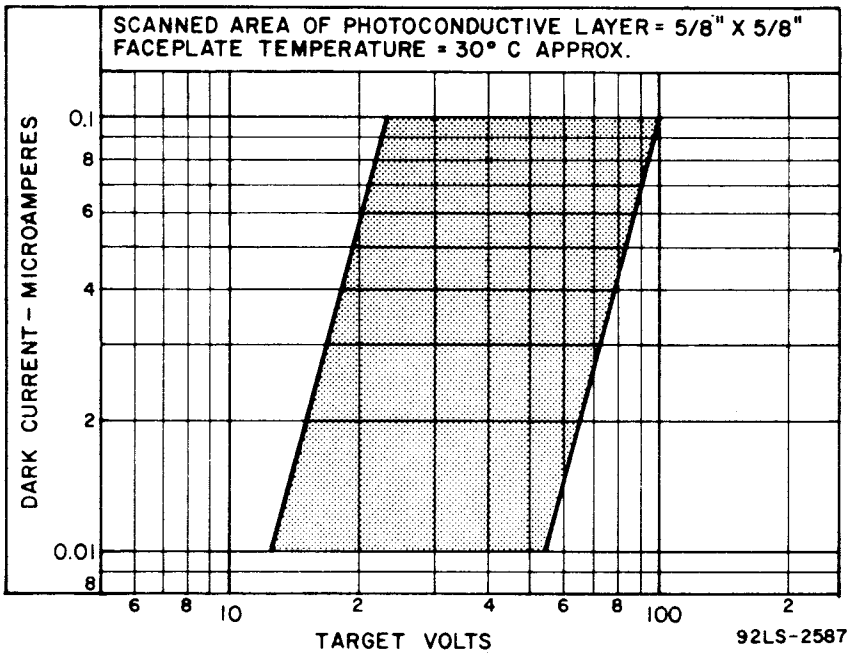
Flange: Target
Short Index Pin — Internal Connection — Make No Connection

DIRECTION OF LIGHT: INTO FACE END OF TUBE

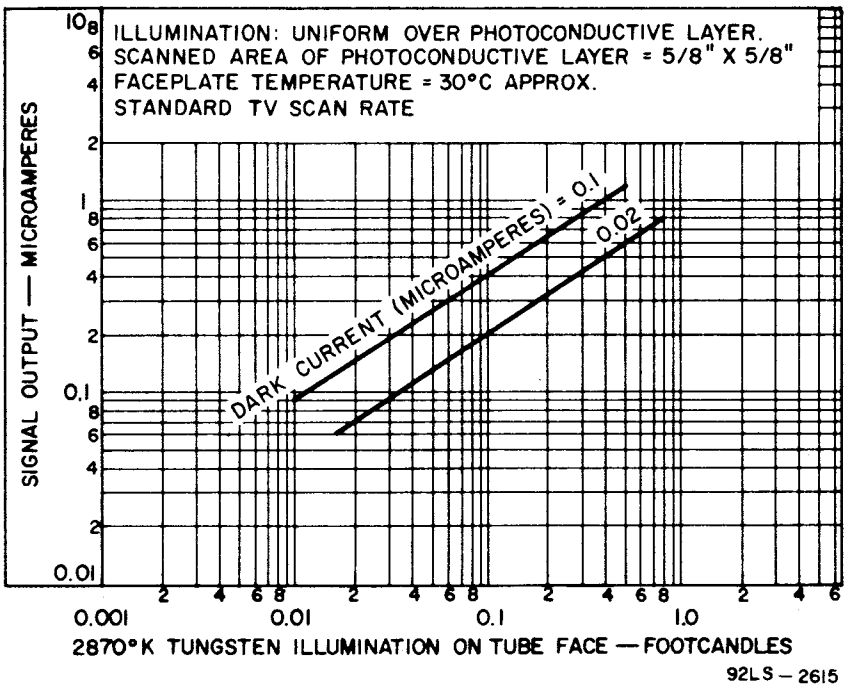
TYPICAL RANGE OF PERSISTENCE CHARACTERISTICS



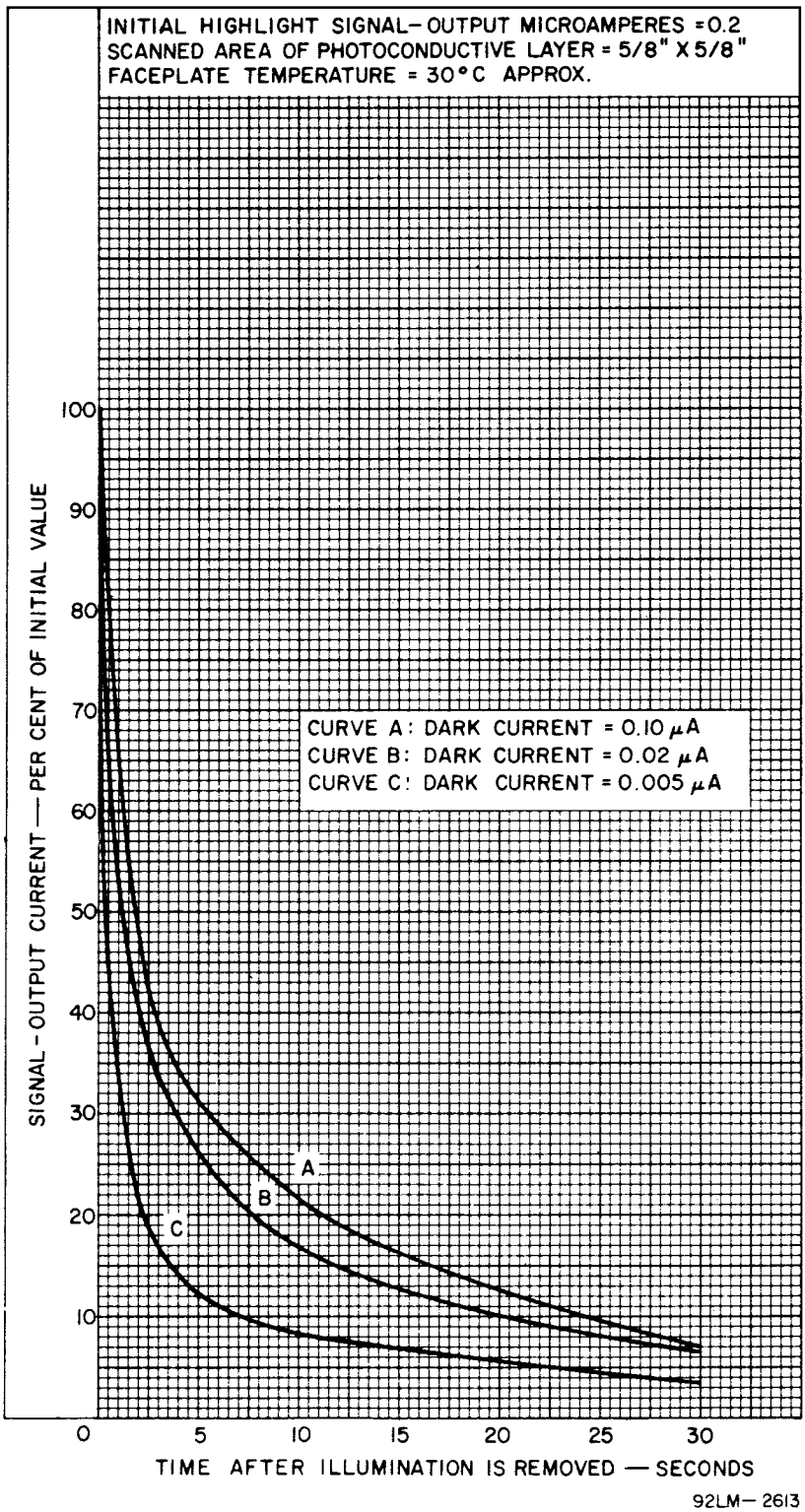
RANGE OF DARK CURRENT



LIGHT TRANSFER CHARACTERISTICS



VARIATION OF TYPICAL PERSISTENCE CHARACTERISTICS WITH CHANGES IN DARK CURRENT



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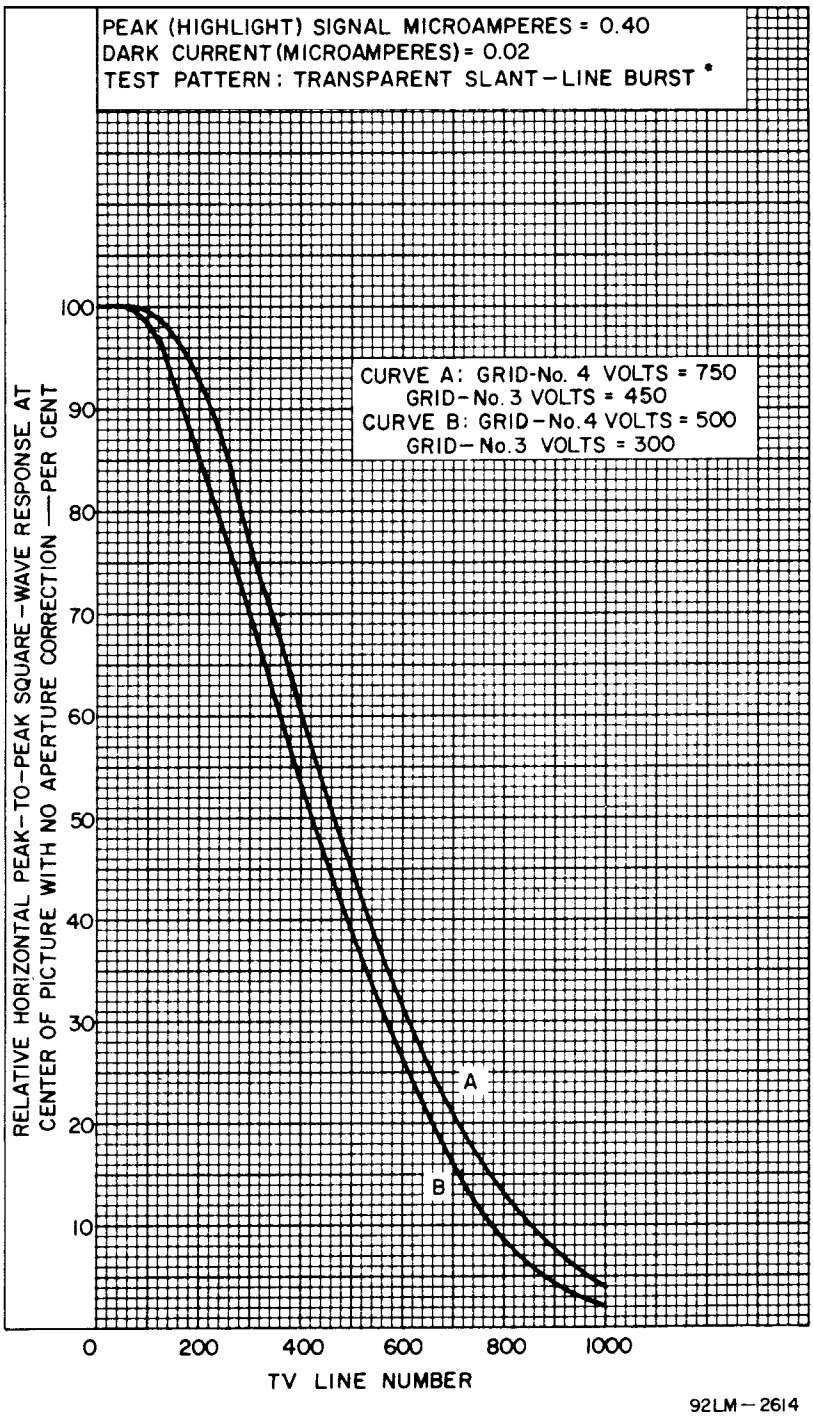
HORIZONTAL SQUARE-WAVE RESPONSE



*Amplitude response measured using the RCA P200 slant-line burst pattern with horizontal center response balanced on the 400 line chevrons.