



THOMSON-CSF

DIVISION TUBES ELECTRONIQUES

DATA TEV 3236

TH 9844

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TH 9844 1" VIDICON with integral focusing coil and deflecting yokes

Compact and lightweight :

Length : 100 mm
Diameter : 37 mm
Weight : 190 g

Rugged structure.

Focusing coil and deflecting yokes permanently assembled to the tube.

No need for beam alignment.

High resolution.

Low lag.



The TH 9844 is composed of a short (100 mm), sturdy 1" vidicon and an associated focusing-coil and deflecting-yokes assembly, matched to the camera tube.

The TH 9844, easy to install and to operate, is designed for compact, ruggedized TV cameras featuring high resolution and good uniformity of the video output signal.

Its performance is optimized by factory adjustment of the tube and the associated components, which are permanently attached to the tube.

The printed-circuit, low-impedance yokes also yield good deflection linearity and make the TH 9844 suitable for use in professional or military TV cameras requiring high image quality and good reliability.

The TH 9844 can be optionally provided with a soldered target lead, potted base and connection leads, depending on the specific application.

GENERAL CHARACTERISTICS

Electrical

— TUBE

Cathode.	Unipotential, indirectly heated, oxide coated
Heater :	
- voltage.	6.3 V
- current at 6.3 V	0.10 A $\pm$ 10 %
Minimum preheating time.	60 s
Output capacitance (target to all other electrodes).	6.5 pF
Focusing method.	Electromagnetic
Deflecting method.	Electromagnetic



– FOCUSING COIL - DEFLECTING YOKES

Focusing coil :		
- resistance	70 ± 7	Ω
Horizontal deflecting yoke :		
- resistance	12 ± 4	Ω
- self-inductance	360 ± 30	μH
Vertical deflecting yoke :		
- resistance	12 ± 4	Ω
- self-inductance	350 ± 30	μH

Optical

Target :		
- maximum useful diameter (format 4 x 3)	17	mm
- nominal image dimensions	12, 7 x 9, 5	mm
Spectral response.	See Figure 1	

Mechanical

Maximum overall length	101.6	mm
Maximum outer diameter	37.0	mm
Base (Ditetrar-8 pins) (see the Outline Drawing)	UTE 9 C 15 (JEDEC No. E8-11)	
Socket (Note 1)	THOMSON-CSF No. 8192138	
Operating position.	Any	
Weight, approx.	190 g	

OPERATING CONDITIONS

(All potentials are referred to grounded cathode)

Maximum Ratings (absolute values)

Operating and storage temperature	max.	+ 70	°C
	min.	–40	°C

– VIDICON

Target voltage.	125	V
Electrode g4 voltage (field)	750	V
Electrode g3 voltage (wall)	750	V
Electrode g2 voltage (acceleration)	350	V
Electrode g1 voltage (for picture cutoff) :		
- negative bias value	150	V
- positive bias value	0	V
Cathode k voltage	0	V
Heater voltage.	max.	6.6 V
	min.	6 V
Peak heater-to-cathode voltage :		
- heater negative with respect to cathode	125	V
- heater positive with respect to cathode	10	V
Dark current.	0.20	μA
Peak target current (Note 2)	0.60	μA
Faceplate illumination	10 000	lux

– COIL AND YOKES

Voltages between coils	250	V
Voltage between coils and ground.	250	V
Current in the focusing coil	300	mA
Direct current in each deflecting yoke	0.5	A
Peak current in each deflecting yoke	1	A

Operational Conditions

– VIDICON

Faceplate temperature (Note 3)	25	°C
Image dimensions on target	12.7 x 9.5	mm
Scanning standard	25 images/second, 625 interlaced lines	
Electrode g4 voltage.	420	V
Electrode g3 voltage.	290	V
Electrode g2 voltage.	300	V
Electrode g1 voltage (for picture cutoff) (Note 4)	max. - 45	V
	min. - 110	V
Minimum peak blanking voltage :		
- applied to g1.	-75	V
- applied to cathode.	+ 20	V
Average gamma for target illumination between 1 and 100 lux (Note 5).	0.65	
Limiting resolution at center of image (Note 6 - Figure 3)	1000 TV lines	
Limiting resolution at corners of image (without dynamic focus)	600 TV lines	
MTF for 400 TV lines at center of image (Note 7 - Figure 3)	60	%
Image distortion	1	%

– COIL AND YOKES

Current in the focusing coil	110 ± 10	mA
Peak-to-peak current in deflecting yokes :		
- horizontal deflection	290 ± 30	mA
- vertical deflection	220 ± 20	mA

Typical Performance

1 - HIGH LIGHT LEVEL OPERATION

(Faceplate illumination = 100 lux)

Dark current i_0	5	nA
Target voltage for $i_0 = 5$ nA (Note 8 - Figure 4)	10 to 25	V
Faceplate illumination (2854 °K) (Note 9).	100	lux
Signal current	300	nA
Lag : (Note 10 - Figure 5) :		
- maximum.	15	%
- average	10	%

2 - AVERAGE SENSITIVITY OPERATION

(Faceplate illumination = 10 lux)

Dark current i_0	20	nA
Target voltage for $i_0 = 20$ nA (Note 8 - Figure 4)	20 to 50	V
Faceplate illumination (2854 °K) (Note 9).	10	lux
Signal current	200	nA
Corresponding sensitivity	170	$\mu\text{A}/\text{lm}$
Target illumination for 100 nA signal current	3	lux
Lag : (Note 10 - Figure 5)		
- maximum.	20	%
- average	12	%

3 - HIGH SENSITIVITY OPERATION

(Faceplate illumination = 5 lux)

Dark current i_0	50	nA
Target voltage for $i_0 = 50$ nA (Note 8 - Figure 4)	25 to 60	V
Faceplate illumination (2854 °K) (Note 9).	5	lux
Signal current	200	nA
Corresponding sensitivity	300	$\mu\text{A}/\text{lm}$
Target illumination for 100 nA signal current	1.5	lux
Lag : (Note 10 - Figure 5)		
- maximum.	20	%
- average	15	%

4 - VERY HIGH SENSITIVITY OPERATION

(Faceplate illumination = 1 lux)

Dark current i_0	100	nA
Target voltage for $i_0 = 100$ nA (Note 8 - Figure 4).	30 to 70	V
Faceplate illumination (2854 °K) (Note 9).	1	lux
Signal current	100	nA
Corresponding sensitivity	800	$\mu\text{A}/\text{lm}$
Target illumination for 50 nA signal current	0.3	lux
Lag : (Note 10 - Figure 5)		
- maximum.	20	%
- average	17	%

SPURIOUS-SIGNAL TEST

Measurement Conditions

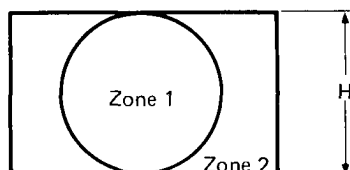
Dark current $i_0 = 20$ nA

Signal current $i_s = 200$ nA

The tube is adjusted to provide maximum image resolution.

The gain of the video amplifier and the monitor are adjusted to obtain the best image (Note 11).

The test is performed using a uniformly diffused white test pattern that shows two zones, as indicated in the following drawing.



Zone 1 : area inside the circle inscribed in the raster height, H.
Zone 2 : peripheral area.

Spots

Both black and white spots are counted, but actually considered as defects are only those spots having a contrast $C \geq 50$ %, in light or in darkness.

The contrast is defined as $C = 100 \times \frac{i_{sb}}{i_s}$ %,

where : i_{sb} = increment in video current due to the spot,
 i_s = normal signal current.

D/H* ratio (%) * D : average diameter spot H : raster height	Allowed spots			
	Zone 1	Zone 1 + Zone 2		
		a	a + b	a + b + c
a : $0.8 < D/H \leq 1$	0	1	3	6
b : $0.6 < D/H \leq 0.8$	1			
c : $0.2 < D/H \leq 0.6$	3			

Any numbers of spots having D/H up to and including 0.2 % are allowed unless concentration causes a smudged appearance.

Do not count spots of contrast $C < 50$ %.

Other Defects

Smudges, streaks, mottled or grainy background (black and white) are not considered as defects if their contrast is $C \leq 15$ %.

NOTES

- 1 - THOMSON-CSF - DTE, 38, rue Vauthier - 92100 BOULOGNE-BILLANCOURT - Tel. 604 81 75.
- 2 - The target current is the total current drawn in the load resistance connected to the target : signal current + dark current ; the dark current is the component existing when the illumination is removed.
The video amplifiers must be designed to handle a peak target current of $1\text{ }\mu\text{A}$ in order to avoid amplifier overload or image distortions.
- 3 - All characteristics are given for a faceplate temperature of $25\text{ }^{\circ}\text{C}$, the recommended temperature range being $20\text{ }^{\circ}\text{C}$ to $30\text{ }^{\circ}\text{C}$.
The rise of the faceplate temperature is determined by the ambient temperature and by the thermal dissipation of surrounding components and of the tube itself.
- 4 - Without blanking pulses applied to grid g1.
- 5 - Average gamma is defined as the slope of the rectilinear part of the light transfer characteristics in logarithmic coordinates.
- 6 - Practically, the limiting resolution corresponds to the resolution measured with a twin-bar test card at 5 % amplitude response.
- 7 - In 625-lines CCIR Standard, line duration being $52\text{ }\mu\text{s}$ (line suppression period not included), 400 TV lines correspond to 5 MHz.
- 8 - Indicated range of each type of service serves only to illustrate the operating target voltage range normally encountered. The target voltage for each vidicon must be adjusted to that value which gives the designed operating dark current.
- 9 - All the above-mentioned illuminations assume a $2854\text{ }^{\circ}\text{K}$ incandescent tungsten source.
- 10 - The lag is defined as the percentage of the residual signal (measured 60 milliseconds after light excitation removal) to the initial current.
This value assumes 50 frames/second scanning rate.
- 11 - The monitor is adjusted as follows :
 - for the pedestal level (black), the luminance of the screen is set at cutoff.
 - for the maximum level (white), the gain of the monitor is adjusted to obtain an optimum image depending on image content and ambient light.

Figure 1

TYPICAL SPECTRAL SENSITIVITY CHARACTERISTICS

For equal values of signal current at all wavelengths
($0.2\text{ }\mu\text{A}$ signal current and $0.02\text{ }\mu\text{A}$ dark current
for scanned area of $12.7\text{ mm} \times 9.5\text{ mm}$)

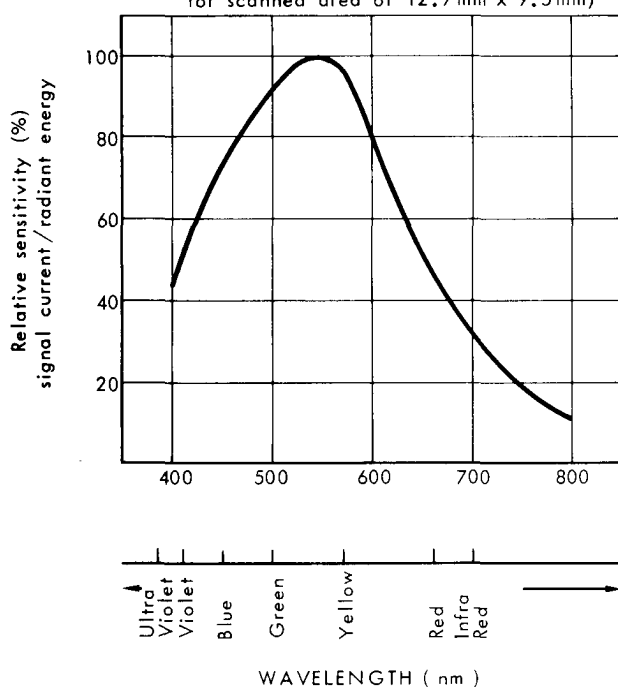
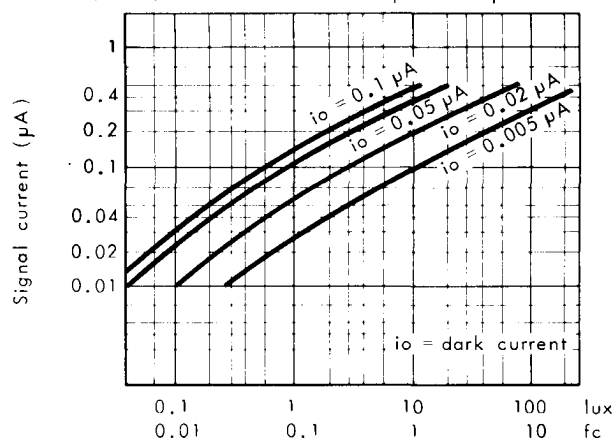


Figure 2

LIGHT TRANSFER CHARACTERISTICS

Illumination uniform over photoconductive layer-scanned
area $12.7\text{ mm} \times 9.5\text{ mm}$ - face plate temperature $25\text{ }^{\circ}\text{C}$



Illumination in lux and foot candles

Figure 3

MODULATION TRANSFER FUNCTION

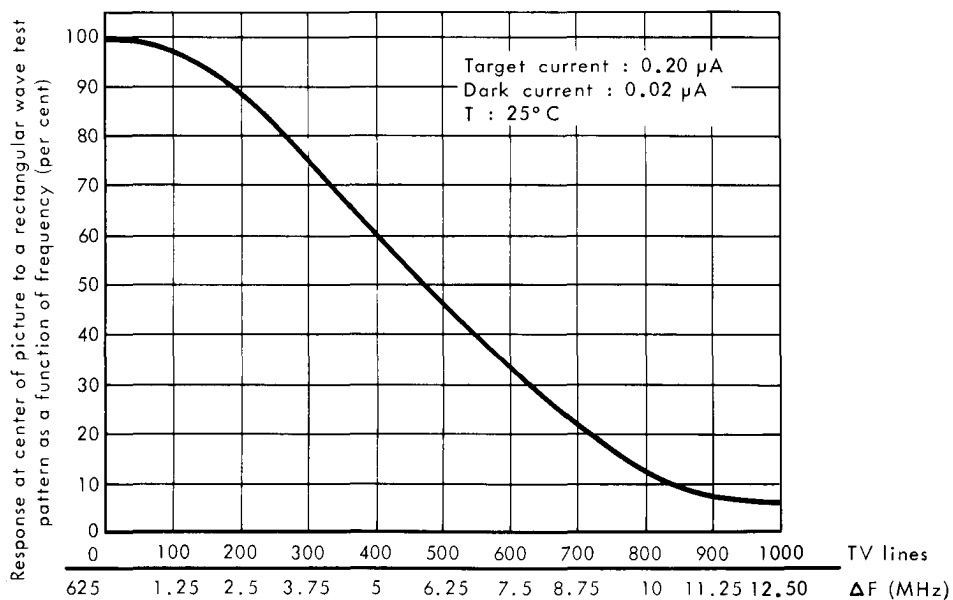


Figure 4

RANGE OF DARK CURRENT

Scanned area of photoconductive layer 12.7mm x 9.5mm

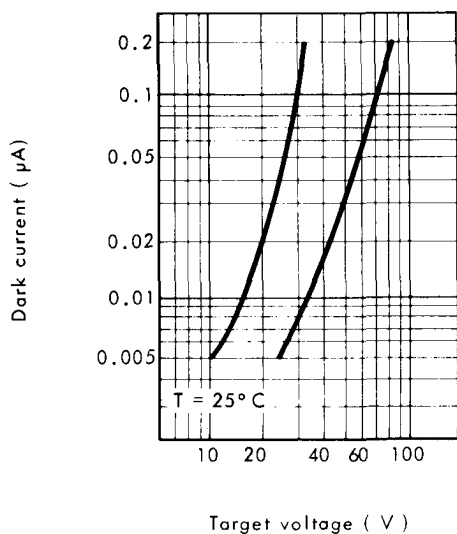
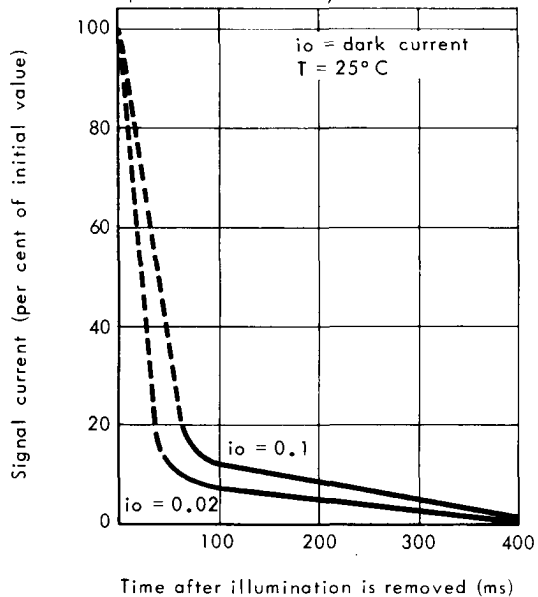


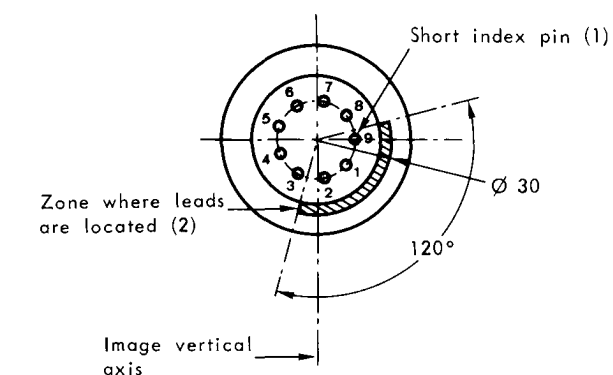
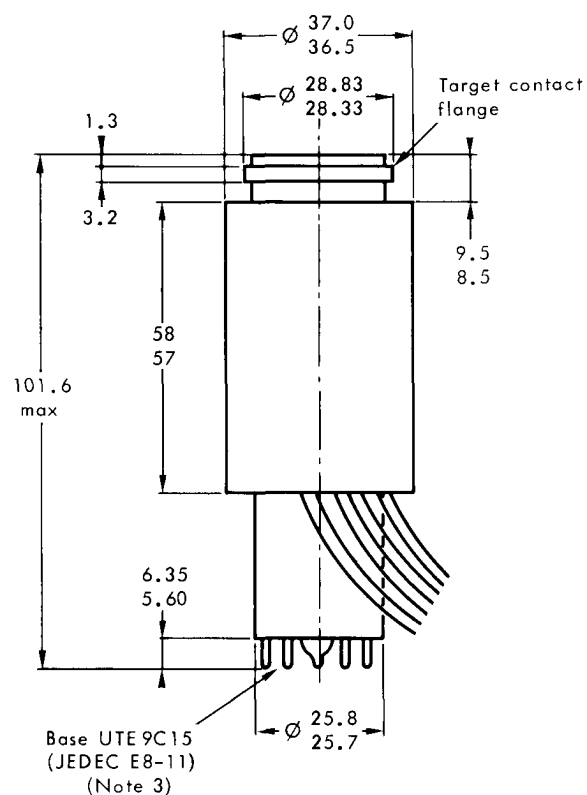
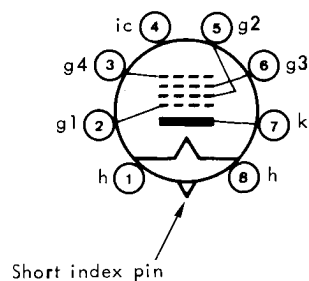
Figure 5

TYPICAL PERSISTENCE CHARACTERISTICS

Initial highlight signal current of 0.2 μ A, scanned area of photoconductive layer 12.7mm x 9.5mm



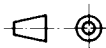
OUTLINE DRAWING

BASING DIAGRAM
(bottom view)

1 - Heater h	5 - Electrode g2
2 - Electrode g1	6 - Electrode g3
3 - Electrode g4	7 - Cathode k
4 - Internal connection	8 - Heater h

FLYING LEAD COLOR CODE	
Ground	: Gray
Focus coil	: Orange (+) Brown (-)
Horizontal deflection	: Red (+) Black (-)
Vertical deflection	: Green (+) White (-)

Length of leads : 250

Dimensions in mm, nominal
unless otherwise indicated

- (1) - The orientation of the index pin may be in any position with respect to the image axes.
- (2) - The location of this zone may be in any position with respect to the image axes.
- (3) - The base complies with JEDEC standard except for pin length.



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