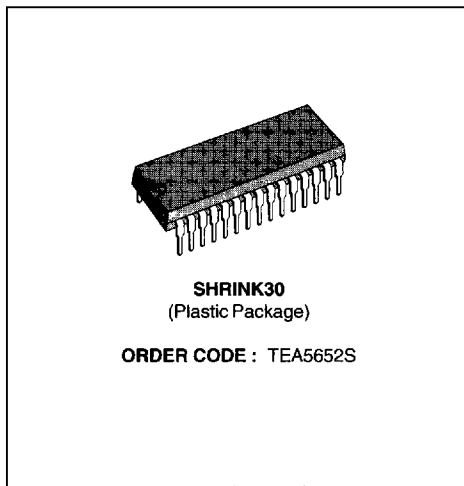


WIDE BAND VIDEO PROCESSOR

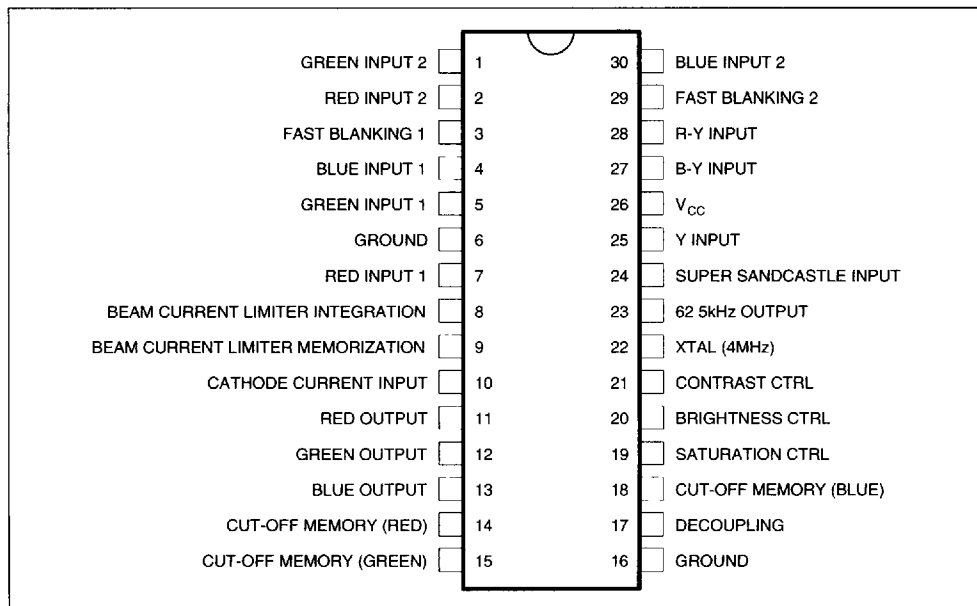
- Y, R-Y, B-Y INPUTS
- 2 RGB AND FAST BLANKING SOURCES
- RGB SOURCES MATRIXING INTO Y, R-Y, B-Y
- ANALOG CUT-OFF CONTROLS
- ANALOG CONTROLS FOR : BRIGHTNESS, CONTRAST, SATURATION ON ALL INPUT SIGNALS
- BEAM CURRENT LIMITER
- 62.5kHz GENERATOR (FOR TEA5640)
- INTERNAL INDEXATION BETWEEN SATURATION AND CONTRAST

DESCRIPTION

The TEA5652 is a wide band flexible video processor intended for low-cost CTV. It integrates two RGB and fast blanking inputs, a beam current limiter and a 62.5kHz generator (for TEA5640).

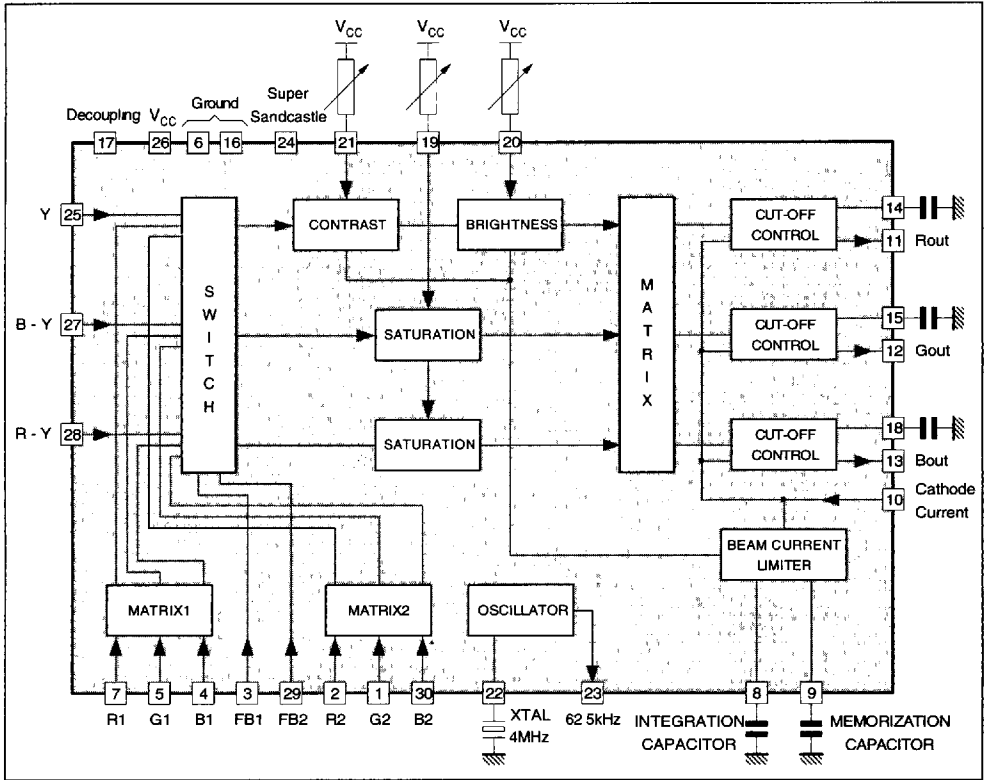


PIN CONNECTIONS



5652-01 EPS

BLOCK DIAGRAM



GENERAL DESCRIPTION

- This circuit includes the following features.
- One Y, R-Y, B-Y input
 - Two R, G, B sources with their associated fast blankings
 - Analog inputs for contrast brightness and saturation controls both on TV and RGB pictures.
 - Saturation contrast indexation internally made.
 - Analog cut-off controls.
 - Start beam current limiter.
 - Average beam current limiter.
 - 62.5kHz generator to drive TEA5640 multistandard chroma decoder.

CLAMPING SYSTEM

Because the clamp information are selected after fast blanking switch it is necessary to clamp source by source line after line. So during frame retrace the Y, R-Y, B-Y source is sampled during the burst gate of every line. During the frame one source is selected by line : one line Y, R-Y, B-Y, one line RGB1, one line RGB2.

Analog Controls

Brightness, contrast and saturation are controlled by analog inputs.

The indexation between saturation and contrast is achieved internally.

Analog Cut-off Controls

The IC incorporates a standard sequential analog cut-off controls.

The controls are achieved sequentially during the four lines following the end of the frame retrace.

Beam Current Limiter (see Figures 1 and 2)

A new beam current limiter is used in this circuit. It provides the following features.

- a short time constant (one frame)
- no brightness and contrast variation during the frame
- a limitation of peak magnitudes

62.5kHz Generator

This function is devoted to deliver the 62.5kHz frequency reference to the chroma decoder TEA5640 from a 4MHz crystal. By this way the

TEA5652 and TEA5640 can achieve a complete multistandard luma-chroma application.

Beam Current Limiter Capacitors Setting

C1 CALCULATION

C1 is the capacitor which integrates the cathode current during the frame :

$$C1 = \frac{1.15 \times I_{CATH} \times T_{AV}}{100 \times V_{TH}}$$

I_{CATH} : Average current per cathode

T_{AV} : Averaging duration =

Frame period - Frame retrace duration

~ 18.5ms for 50Hz operation

V_{TH} : Beam current limiter threshold voltage

~ 2.5V for $V_{CC} = 8V$

example : for $I_{cathode} = 800\mu A$ **C1 = 68nF**

C2 SETTING

The value of the memorization capacitor is determined to obtain good picture stability from one frame to following one.

We advice a value of 680nF for standard operation.

Figure 1 : Beam Current Limiter Block Diagram

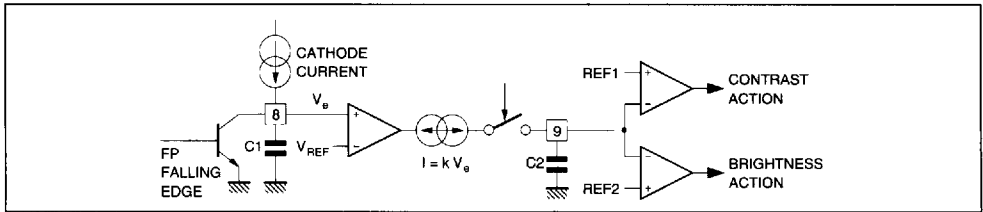
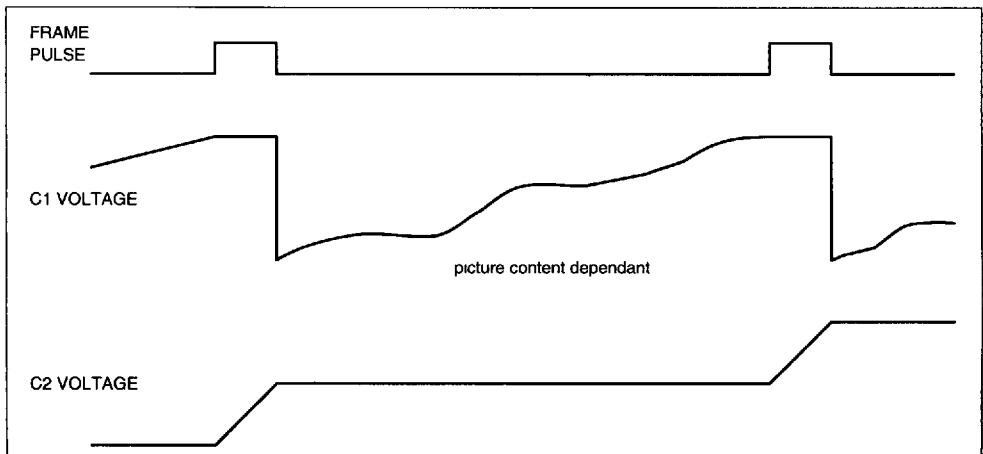


Figure 2 : Beam Current Limiter Waveforms



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{CC}	Supply Voltage	12.6	V
T _{amb}	Operating Ambient Temperature	0, +70	°C

THERMAL DATA

Symbol	Parameter	Value	Unit
R _{th(j-a)}	Junction-ambient Thermal Resistance	70	°C/W

ELECTRICAL CHARACTERISTICS (V_{CC} = 8V, T_{amb} = 25°C, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
--------	-----------	-----------------	------	------	------	------

SUPPLY SECTION (Pin 26)

V _{CC}	Supply Voltage		7.5	8	8.5	V
I _{CC}	Supply Current	no loads on outputs		55	80	mA

Y-CVBS INPUT (Pin 25)

CVBS	Signal Amplitude	100% white CVBS signal		0.5	0.75	V _{pp}
DC Y A	DC Level			1.7		V
I _{CLPY}	Positive Clamp Current			180		μA
I _{CLNY}	Negative Clamp Current			180		μA
I _{LEAK Y}	Leakage Current				1	μA

R-Y INPUT (Pin 28)

R-Y A	Signal Amplitude	75% color bar pattern		1.05	1.47	V _{pp}
DC R-Y	DC Level			2.7		V
I _{CLPR}	Positive Clamp Current			180		μA
I _{CLNR}	Negative Clamp Current			180		μA
I _{LEAK A}	Leakage Current				1	μA

B-Y INPUT (Pin 27)

B-Y A	Signal Amplitude	75% color bar pattern		1.3	1.86	V _{pp}
DC B-Y	DC Level			2.7		V
I _{CLPB}	Positive Clamp Current			180		μA
I _{CLNB}	Negative Clamp Current			180		μA
I _{LEAK B}	Leakage Current				1	μA

R-G-B INPUTS (Pins 1-2-4-5-7-30)

RGB A	Signal Amplitude	100% amplitude		0.7	1	V _{pp}
DC RGB	DC Level			2.6		V
I _{CLP}	Positive Clamp Current			180		μA
I _{CLN}	Negative Clamp Current			180		μA
I _{LEAK}	Leakage Current				1	μA

FAST BLANKING INPUTS (Pins 3-29)

FBLL	TV/RGB Low Level				0.5	V
FBHL	TV/RGB High Level		0.95		3	V
Z _{IN FB}	Input Impedance			1		kΩ
T _{ON FB}	Switching Delay Time On			40		nsec
T _{OFF FB}	Switching Delay Time Off			40		nsec

ELECTRICAL CHARACTERISTICS ($V_{CC} = 8V$, $T_{amb} = 25^{\circ}C$, unless otherwise specified) (continued)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
CONTRAST CONTROL (Pin 21)						
Typ. CONT	Nominal Value	Maximum contrast		0		dB
Min. CONT	Minimum Value			-16		dB
DC Max. C	DC Level for Contrast Max.			4.2		V
DC Min. C	DC Level for Contrast Min.			1.2		V
I _{CONT C}	Input Current				2	μA

SATURATION CONTROL (Pin 19)

Max. SAT	Over Saturation Value			6		dB
Off SAT	Color Off Value	Referred to over saturation value		-45		dB
DC Nom. S	DC Level for Nominal Saturation			2.75		V
DC Max. S	DC Level for Over Saturation			4.25		V
DC Min. S	DC Level for Minimum Saturation			1.5		V
I _{CONT S}	Input Current				2	μA

BRIGHTNESS CONTROL (Pin 20)

I _{CONT B}	Input Current				2	μA
BRIG	Brightness Range	Referred to nominal input levels (350mV B/W)		± 40		%
DC Max. B	DC Level for Maximum Brightness			4		V
DC Min. B	DC Level for Minimum Brightness			2		V

RGB OUTPUTS (Pins 11-12-13)

High CLIP	High Clipping Level	Referred to minimal black level		185		%
	Blanking Voltage			0.5		V
	Typical Output B/W	Contrast max. - B/W input 350mV		1.6		V
	Minimum DC Level Cut-off Inserted	Cut-off caps DC voltage = 2.5V		1.7		V
	Maximum DC Level Cut-off Inserted	Cut-off caps DC voltage = V_{CC}		4.8		V
Y BAND	Y Bandwidth	-3dB attenuation	8	15		MHz
B-Y BAND	B-Y Bandwidth	-3dB attenuation	8	10		MHz
R-Y BAND	R-Y Bandwidth	-3dB attenuation	8	10		MHz
RGB BAND	RGB Bandwidth	-3dB attenuation	8	15		MHz

CROSSTALK

CRRY	RGB/YUV Crosstalk	0 - 5MHz		45		dB
CRYR	RGB1/RGB2 Crosstalk	0 - 5MHz		45		dB

AUTOMATIC CUT-OFF (Pins 10-14-15-18)

LEA REF	Leakage Current Reference Voltage			2		V
COF REF	Cut-off Reference	Referred to leakage current reference measured on Pin 10		+350		mV
I _{COP}	Capacitor Cut-off Positive Clamping Current			100		μA
I _{CON}	Capacitor Cut-off Negative Clamping Current			100		μA
BS REF	Start Beam Current Detection Reference Voltage	Pin 10		2.5		V
I _{LEAK}	Low Voltage Output Current	$V_{10} = 0V$		200		μA

ELECTRICAL CHARACTERISTICS ($V_{CC} = 8V$, $T_{amb} = 25^{\circ}C$, unless otherwise specified) (continued)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
AVERAGE BEAM CURRENT LIMITER (Pin 8)						
	Max. Contrast Action	First action (decreasing)		-5		dB
	Max. Brightness Action	After contrast decreasing		80		%
V_{C1TH}	C1 Threshold Voltage			2.5		V
	C1 Discharging Current			10		mA
	Current Ratio between Pin 10 and 8			100		
C2 Y	C2 Min. Voltage	$V_{C1} < V_{C1TH}$		2.2		V
C2 I _C	Max. C2 Charging Current	$V_{C1} = 6V$		50		μA
C2 T _C	C2 Threshold Voltage for Contrast Action			2.6		V
C2 T _B	C2 Threshold Voltage for Brightness Action			3.2		V

SUPERSANDCASTLE INPUT (Pin 24)

FT	Frame Threshold			0.7		V
LT	Line Threshold			1.9		V
BGT	Burst Gate Threshold			4		V
I _{OUT SSC}	Output Current	$V_{24} = 0V$		30		μA

XTAL (Pin 22)

DC XTAL	DC Level			2.4		V
Z _S XTAL	Output Impedance			400		Ω

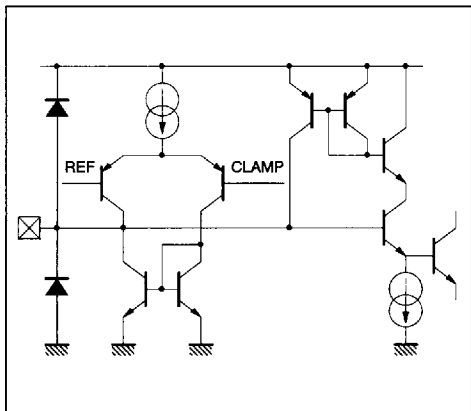
62.5kHz OUTPUT (Pin 23)

Z _S	Output Impedance			250		Ω
DC H	DC Level High			6		V
DC L	DC Level Low			1.3		V
DC	Duty Cycle			100		%

5652-05 TEL

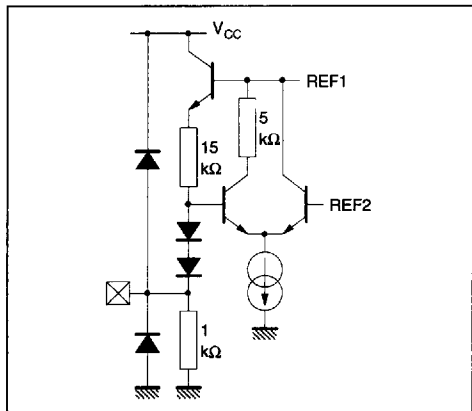
INPUTS/OUTPUTS EQUIVALENT INTERNAL DIAGRAMS

Figure 3 : Pins 1-2-4-5-7-30



5652-06 EPS

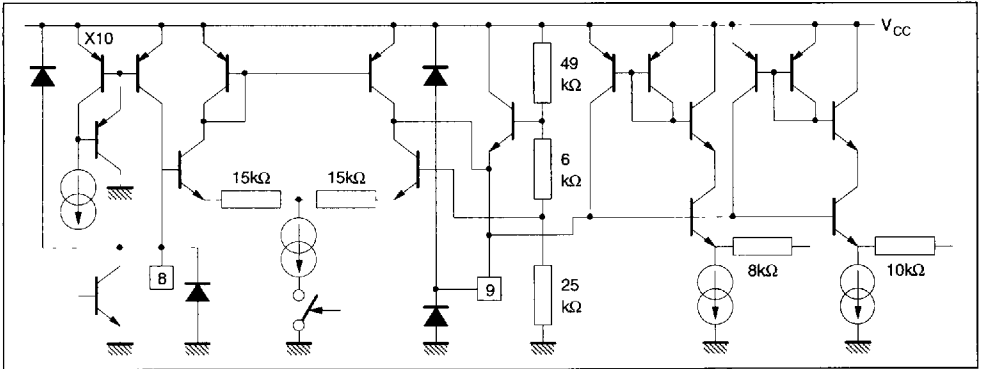
Figure 4 : Pins 3-29



5652-06 EPS

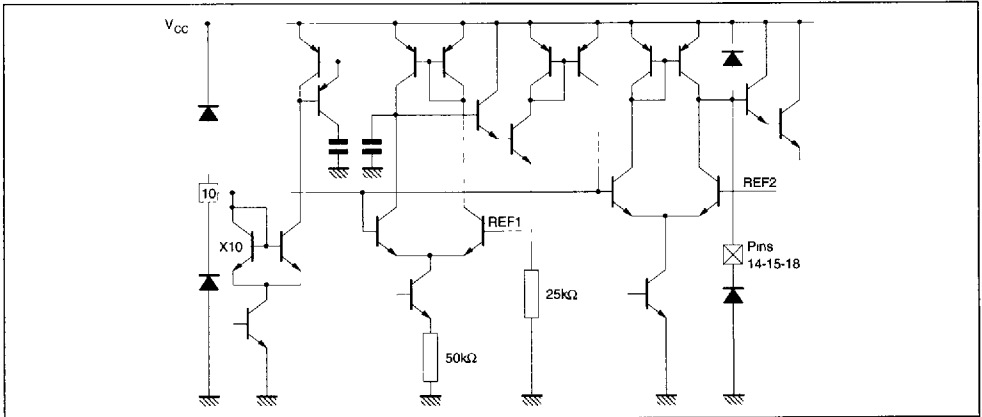
INPUTS/OUTPUTS EQUIVALENT INTERNAL DIAGRAMS (continued)

Figure 5 : Pins 8-9



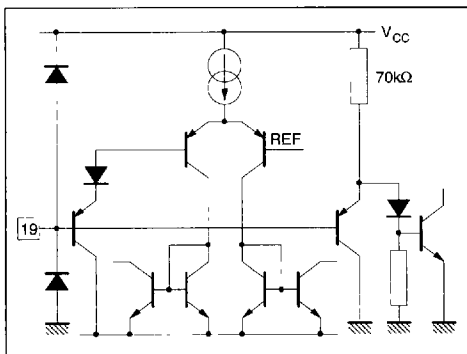
5652-07 EPS

Figure 6 : Pins 10-14-15-18



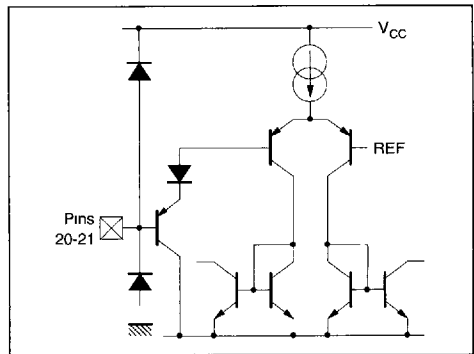
5652-08 EPS

Figure 7 : Pin 19



5652-09 EPS

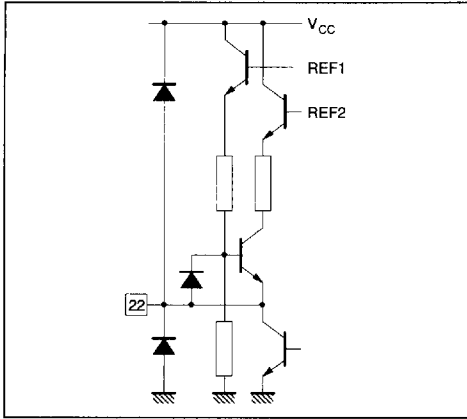
Figure 8 : Pins 20-21



5652-10 EPS

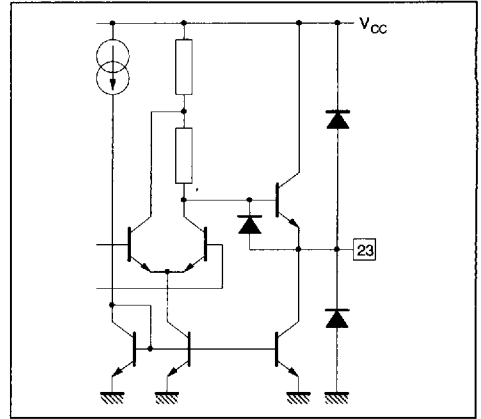
INPUTS/OUTPUTS EQUIVALENT INTERNAL DIAGRAMS (continued)

Figure 9 : Pin 22



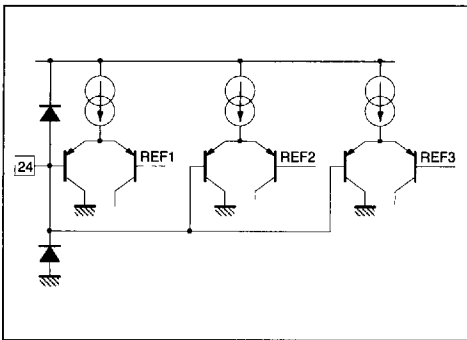
5652-11 EPS

Figure 10 : Pin 23



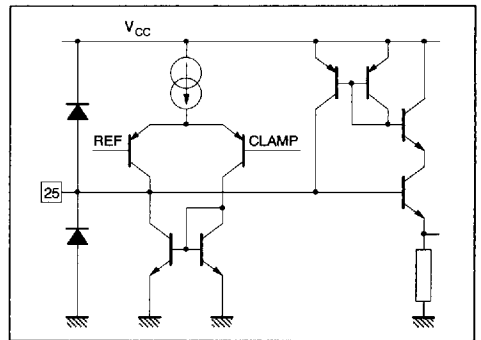
5652-12 EPS

Figure 11 : Pin 24



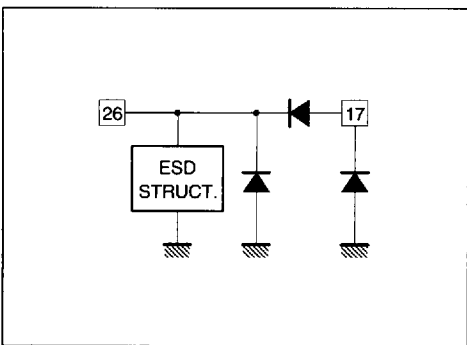
5652-13 EPS

Figure 12 : Pin 25



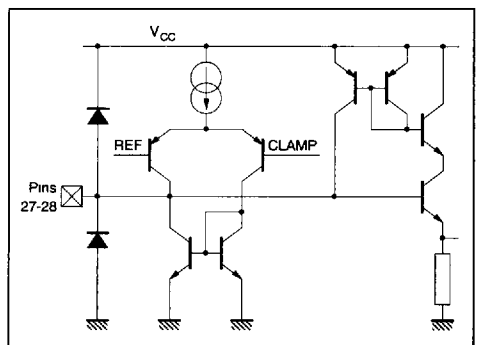
5652-14 EPS

Figure 13 : Pins 26-17



5652-15 EPS

Figure 14 : Pins 27-28



5652-16 EPS

Figure 19 : Beam Current Limiter Action
 Contrast Variation = $f(V_{BCL2})$

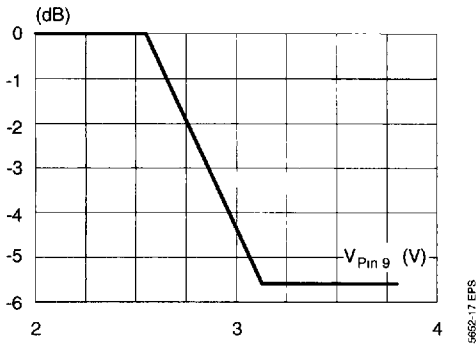


Figure 21 : Contrast Variation

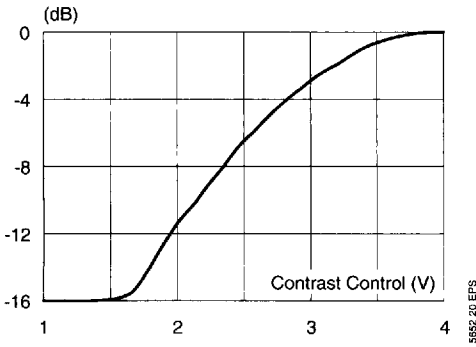


Figure 23 : Brightness Variation

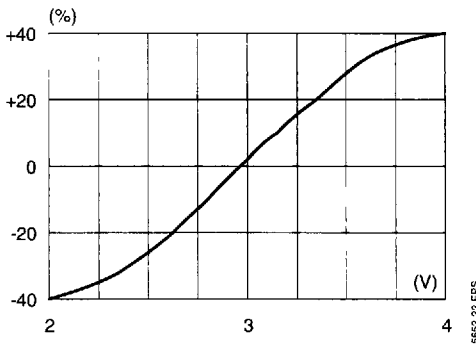


Figure 20 : Beam Current Limiter Action
 Brightness Variation = $f(V_{BCL2})$

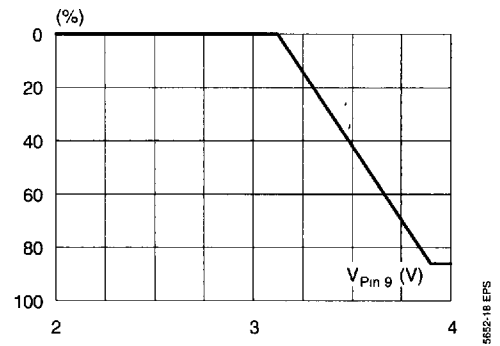
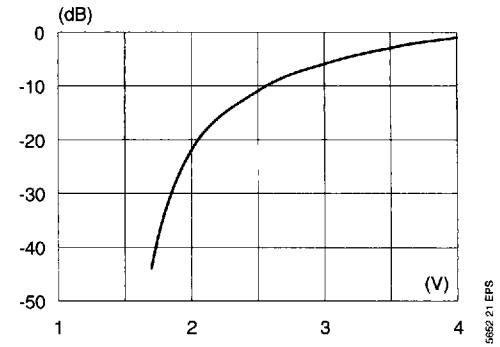
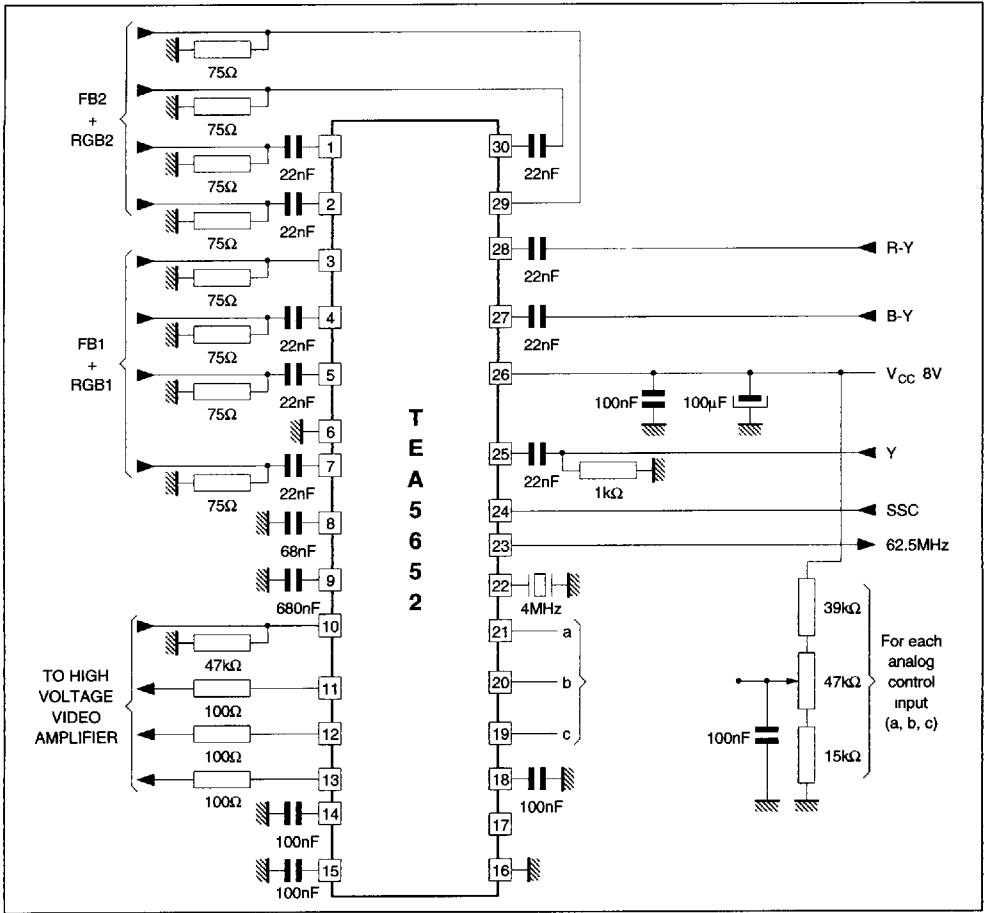


Figure 22 : Saturation Variation



TYPICAL APPLICATION



5652-33 EPS