

Titler IC for Camera

Description

The CXA1393AN/AM is a title insertion IC for video cameras.

Features

- External parts are integrated in the IC to reduce peripherals.
- Hysteresis volume of the built-in comparator is variable.
- The gain of the Title signal is variable.

Applications

Titler IC for video cameras

Operating Conditions

- Supply voltage V_{CC} 4.75 to 5.25 V
- Ambient temperature T_{opr} -20 to +75 °C

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

- Supply voltage V_{CC} 7 V
- Ambient temperature T_{opr} -20 to +75 °C
- Storage temperature T_{stg} -65 to +150 °C
- Allowable power dissipation P_D

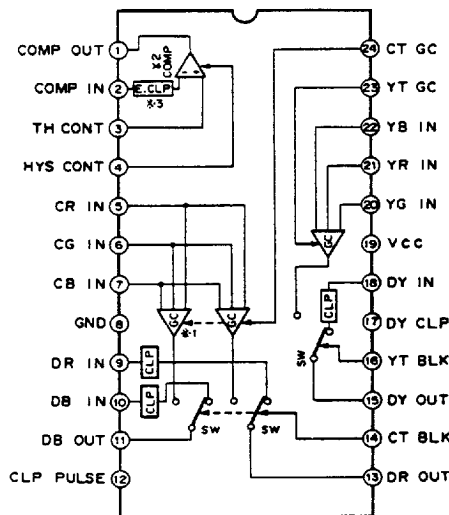
470	mW (CXA1393AN)
830	mW (CXA1393AM)

CXA1393AN 24 pin VSOP (Plastic) CXA1393AM 24 pin SOP (Plastic)



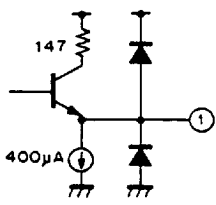
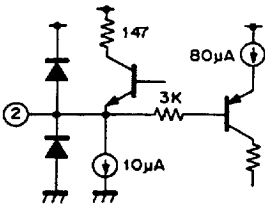
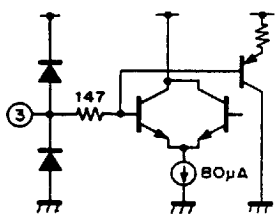
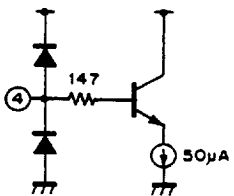
Block Diagram and Pin Configuration

(Top View)

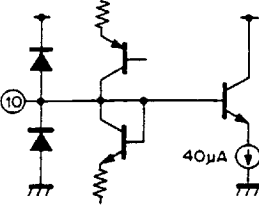
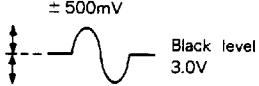
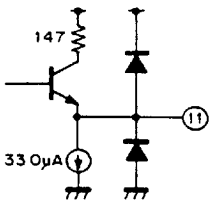
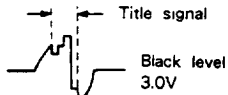
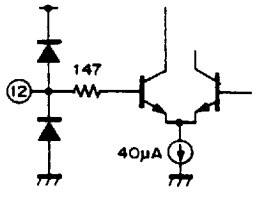
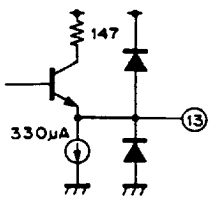
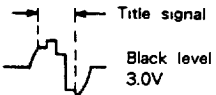


- * 1 GC GAIN CONTROL AMP
- * 2 COMP COMPARATOR
- * 3 E.CL P Emitter CLAMP

Pin Description

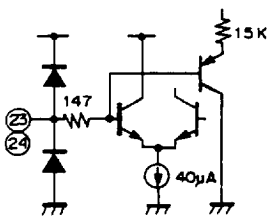
Pin No.	Symbol	Voltage	Equivalent circuit	Description
1	COMP OUT	L : below 0.2V _{CC} H : above 0.7V _{CC}		Comparator output pin.
2	COMP IN	approx. 2.1V		Comparator inverted input pin. Clamps Sync Tip inside C-Cut input. (Sync Tip approx. 2.1V) 160IRE (Max.)
3	TH CONT	TH OFF 0V Control 2 to 5V		Comparator threshold adjusting pin. (Non-inverted input pin) 2 to 5V 300 to 1000mV
4	HYS CONT	Control 2 to 5V		Comparator hysteresis adjusting pin. 2 to 5V 150 to 20mV

Pin No.	Symbol	Voltage	Equivalent circuit	Description
5	CR IN	—		Red signal input pin for chroma Title. TH = 2.5V (active H)
6	CG IN	—		Green signal input pin for chroma Title. TH = 2.5V (active H)
7	CB IN	—		Blue signal input pin for chroma Title. TH = 2.5V (active H)
8	GND	GND		
9	DR IN	Input clamp voltage Black level 3.0V		Input pin for main line R-Y signal. Clamps inside C-Cut input.

Pin No.	Symbol	Voltage	Equivalent circuit	Description
10	DB IN	Input clamp voltage Black level 3.0V		Input pin for main line B-Y signal. Clamps inside C-Cut input. 
11	DB OUT	Black level 3.0V		Output pin for main line B-Y signal + Title signal. 
12	CLP Pulse	—		CLP pulse input pin. TH = 2.5V (active H)
13	DR OUT	Black level 3.0V		Output pin for main line R-Y signal + Title signal. 

Pin No.	Symbol	Voltage	Equivalent circuit	Description
14	CT BLK	—		C blanking pulse input pin. TH = 2.5V (active L)
15	DY OUT	Black level 2.8V		Output pin for main line Y signal + Title signal.
16	YT BLK	—		Input pin for Y blanking pulse. TH = 2.5V (active H)
17	DY CLP			Capacitor connecting pin for Y clamp.

Pin No.	Symbol	Voltage	Equivalent circuit	Description
18	DY IN	Black level 2.8V $\pm 400\text{mV}$		Input Pin for main line Y signal.
19	Vcc	Vcc		
20	YG IN	—		Input pin of green signal for Y Title signal. TH = 2.5V (active H)
21	YR IN	—		Input pin of red signal for Y Title signal. TH = 2.5V (active H)
22	YB IN	—		Input pin of blue signal for Y Title signal. TH = 2.5V (active H)

Pin No.	Symbol	Voltage	Equivalent circuit	Description
23	YT GC	Preset = 0V 2 to 5V		Adjusting pin for Y Title signal gain. 0V : -0.5dB 2 to 5V -4 to +4dB
24	CT GC	Preset = 0V 2 to 5V		Adjusting pin for C Title signal gain. 0V : -0.5dB 2 to 5V -3.5 to +3.8dB

Electrical Characteristics

CXA1393AM specifications in brackets ().

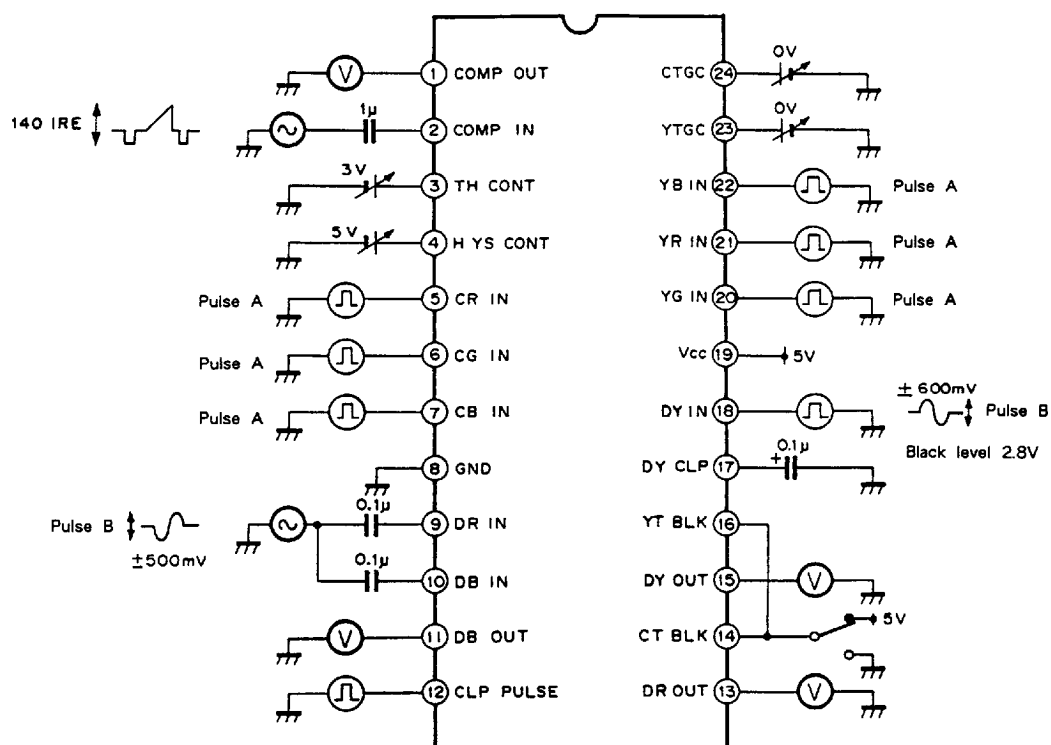
Item		Symbol	Conditions	Min.	Typ.	Max.	Unit
Current consumption		I _b	⑫ CLP PULSE = 5V	4.5	7.5	11	mA
Y Title signal gain Note 1	fix mode	Y _T FIX	⑮ DY OUT output * 0dB = 340mV	-2	-0.5	1	dB
	min mode	Y _T MIN	⑮ DY OUT output ⑳ YT GC = 1.8V	—	—	-4	dB
	max mode	Y _T MAX	⑮ DY OUT output ㉑ YT GC = 5V	4	—	—	dB
B - Y Title signal gain Note 2	fix mode	DBT FIX	⑪ DB OUT output ⑭ CT BLK = 0V * 0dB = 150mV	-2	-0.5	1	dB
	min mode	DBT MIN	⑪ DB OUT output ⑭ CT BLK = 0V ㉑ CT GC = 1.8V	—	—	-3.5	dB
	max mode	DBT MAX	⑪ DB OUT output ⑭ CT BLK = 0V ㉑ CT GC = 5V	3.8	—	—	dB
R - Y Title signal gain Note 3	fix mode	DRT FIX	⑮ DR OUT output ⑭ CT BLK = 0V * 0dB = 205mV	-2	-0.5	1	dB
	min mode	DRT MIN	⑮ DR OUT output ⑭ CT BLK = 0V ㉑ CT GC = 1.8V	—	—	-3.5	dB
	max mode	DRT MAX	⑮ DR OUT output ⑭ CT BLK = 0V ㉑ CT GC = 5V	3.8	—	—	dB
Y Title signal R, G, B, ratio	R/G	R/G Y	⑮ DY OUT output (Red) ㉑ YR IN ; Pulse A ⑮ DY OUT output (Green) ㉑ YB IN ; Pulse A R/G Y = $\frac{\text{⑮ DY OUT (Red)}}{\text{⑮ DY OUT (Green)}}$ The other input pin for Y Title signal is GND. Calculation for R, G and B ratio is executed similarly as mentioned above.	0.472	0.5	0.53	—

CXA1393AM specifications in brackets ().

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Y Title signal R, G, B ratio	B/G	B/G Y Blue/Green	0.154	0.164	0.177	dB
R - Y Title signal R, G, B ratio	R/G	R/G R R/G B = $\frac{\text{⑬ DR OUT (Red)}}{\text{⑬ DR OUT (Green)}}$ ⑭ CT BLK = 0V	1.102 (1.05)	1.16	1.236	dB
	B/G	B/G R Blue/Green ⑭ CT BLK = 0V	0.152 (0.15)	0.163	0.1766	dB
B - Y Title signal R, G, B ratio	R/G	R/G B R/G B = $\frac{\text{⑪ DR OUT (Red)}}{\text{⑪ DR OUT (Green)}}$ ⑭ CT BLK = 0V	0.472 (0.468)	0.5	0.53 (0.54)	dB
	B/G	B/G B Blue/Green ⑭ CT BLK = 0V	1.416	1.5	1.589	dB
HYSCOMP		Note 4)	Note 4) TH voltage - CLP voltage = TH volume			
Threshold volume (TH volume)	OFF	TH OFF	① COMP OUT output ③ TH CONT = 0V	—	—	0 IRE
	MID	TH MID	① COMP OUT output ③ TH CONT = 3V	40	50	60 IRE
	MAX	TH MAX	① COMP OUT output ③ TH CONT = 5V	75	85	95 IRE
HYSCOMP output voltage		L level	① COMP OUT output ③ TH CONT = 0V	—	—	0.2Vcc V
		H level	① COMP OUT output ③ TH CONT = 5V	0.7Vcc	—	— V

Electrical Characteristics Test Circuit

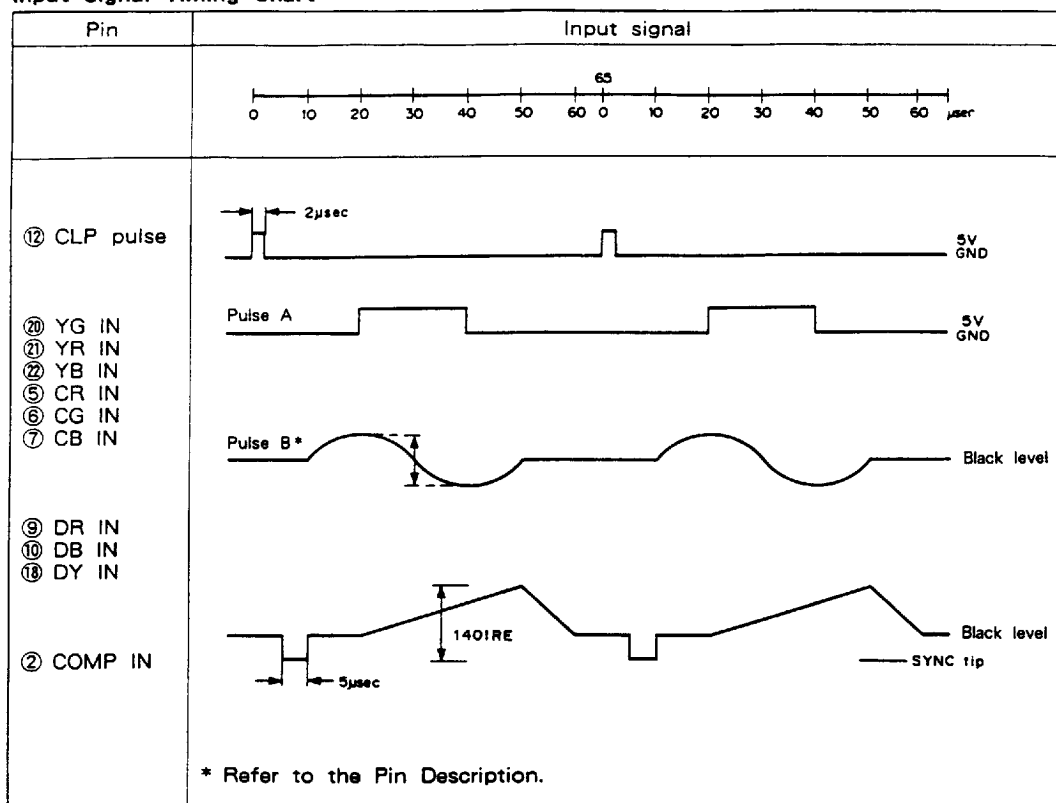
Standard setting conditions



*1 (V): Voltage waveform test (Both AC and DC)

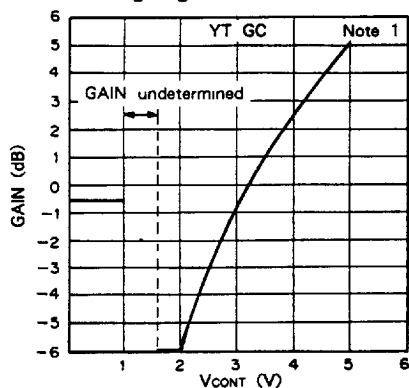
*2 Standard setting condition voltage for YT BLK and CT BLK pins is 5V.

Input Signal Timing Chart

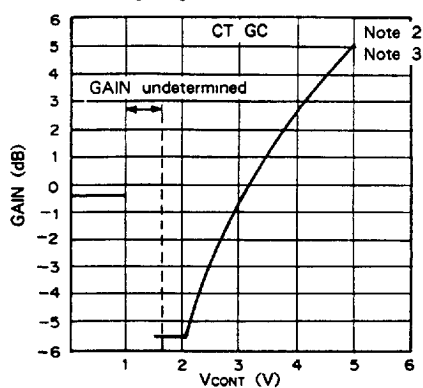


$V_{CC} = 5V$

Y Title signal gain control characteristics

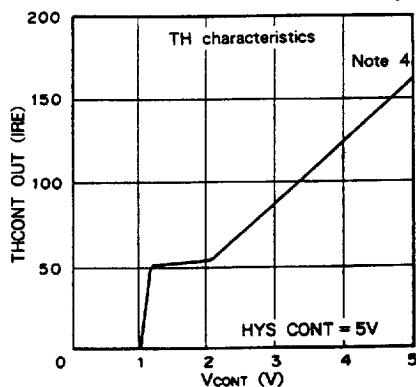


C Title signal gain control characteristics

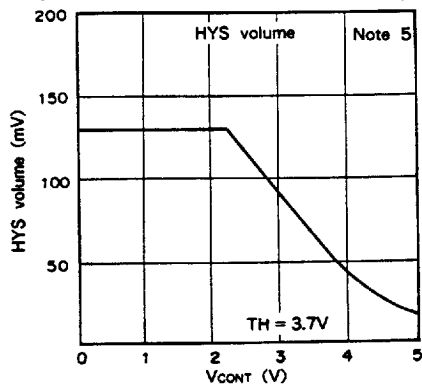


CXA1393A CONT curve data

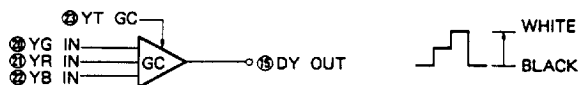
Threshold control characteristics for comparator



Hysteresis control characteristics for comparator



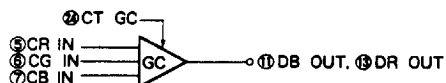
Note 1) | White - Black | = 340mV is taken as 0dB.



When YG IN (Pin 20) is at H, YR IN (Pin 21) is at H and YB IN (Pin 22) is at H, DY OUT (Pin 15) output voltage is White.

When YG IN (Pin 20) is at L, YR IN (Pin 21) is at L and YB IN (Pin 22) is at L, DY OUT (Pin 15) output voltage is Black.

Note 2) | Blue - Black | = 150mV is taken as 0dB.



When CR IN (Pin 5) is at L, CG IN (Pin 6) is at L and CB IN (Pin 7) is at H, DB OUT (Pin 11) output voltage is Blue.

When CR IN (Pin 5) is at L, CG IN (Pin 6) is at L and CB IN (Pin 7) is at L, DB OUT (Pin 11) output voltage is Black.

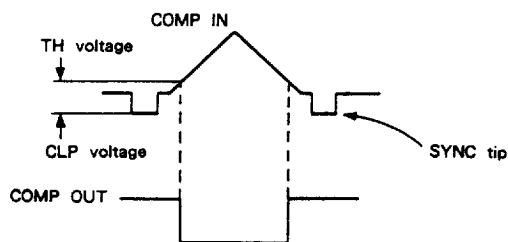
Note 3) | Red - Black | = 205mV is taken as 0dB.

When CR IN (Pin 5) is at H, CG IN (Pin 6) is at L and CB IN (Pin 7) is at L, DR OUT (Pin 13) output voltage is Red.

When CR IN (Pin 5) is at L, CG IN (Pin 6) is at L and CB IN (Pin 7) is at L, DR OUT (Pin 13) output voltage is Black.

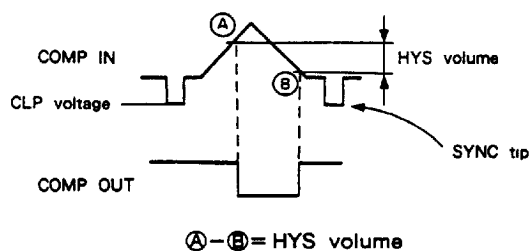
Moreover, when the pulse input voltage: L is set to less than 1V and H is set to over 4V.

Note 4)



$$\text{TH voltage} - \text{CLP voltage} = \text{TH volume}$$

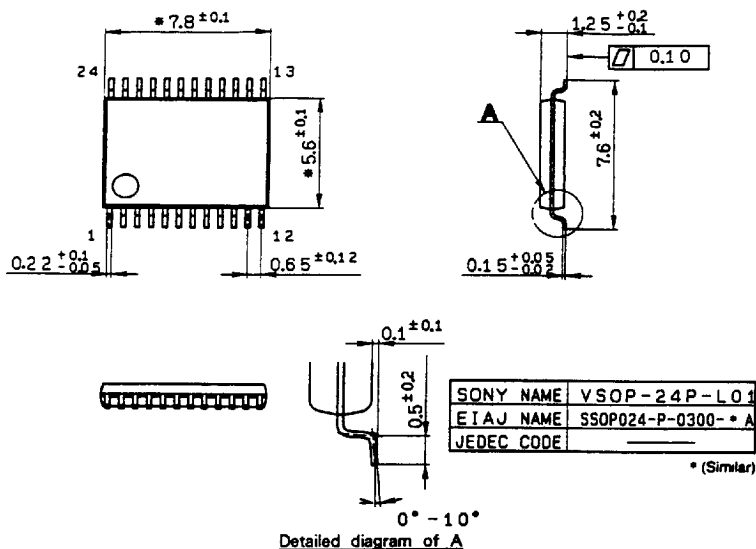
Note 5)



Package Outline Unit : mm

CXA1393AN

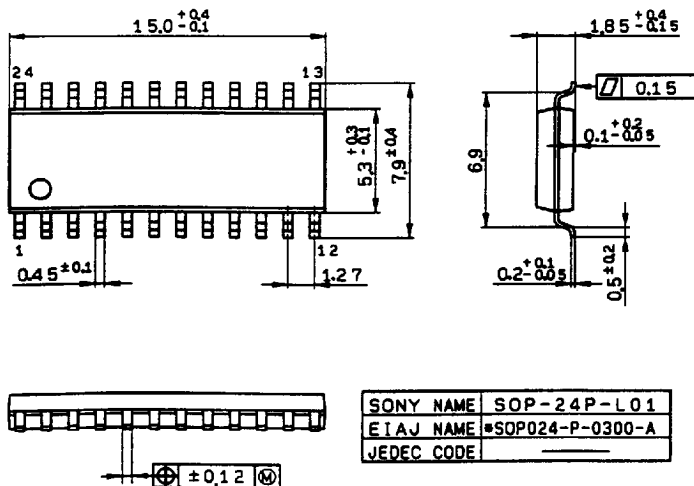
24 pin VSOP (Plastic) 300mil



Note) Dimensions marked with * do not include resin residue.

CXA1393AM

24 pin SOP (Plastic) 300mil 0.3g



CXA1390 Series System Diagram

