AN3581S

Video output IC with character insertion interface

■ Overview

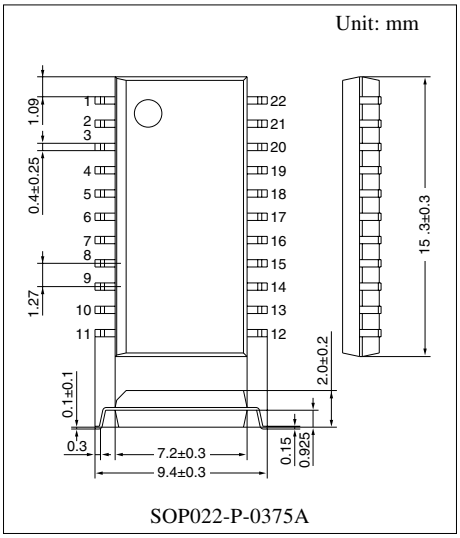
The AN3581S is a video output interface driver IC.

■ Features

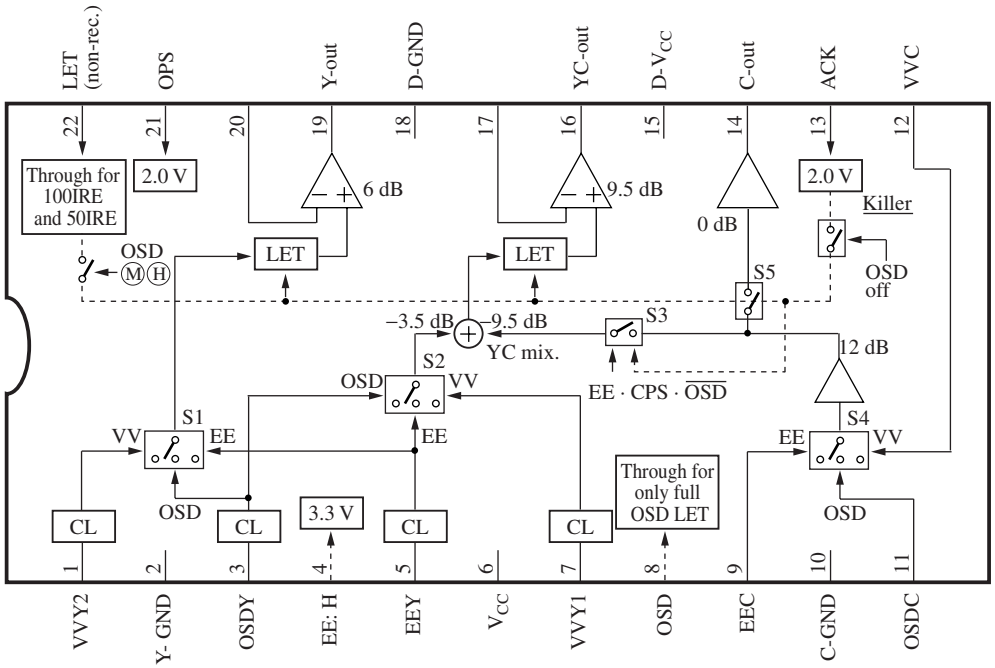
- 75 Ω driver capable of 2-channel output (through a 75 Ω resistor each)
- Seperated input for component and composite signals (for luminance system)
- Built-in character insertion circuit

■ Applications

- VCRs



■ Block Diagram



■ Pin Descriptions

Pin No.	Description	Pin No.	Description
1	VVY2 input	12	VVC input
2	GND1 (Y system)	13	ACK mode changeover
3	OSDY input	14	C-amp. output
4	Changeover EE-VV mode	15	V_{CC2} (driver system)
5	EEY input	16	Y+C amp. ouput
6	V_{CC1} (except driver)	17	Y+C feedback input
7	VVY1 input	18	GND3 (driver system)
8	Changeover OSD mode	19	Y-amp. output
9	EEC input	20	Y feedback input
10	GND2 (C system)	21	CPS mode changeover
11	OSDC input	22	LET mode changeover

■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	6.0	V
Supply current	I_{CC}		mA
Power dissipation *2	P_D	275	mW
Operating ambient temperature *1	T_{opr}	−20 to +70	°C
Storage temperature *1	T_{stg}	−55 to +125	°C

Note) ∗1: Except for the operating ambient temperature and storage temperature, all ratings are for T_a = 25°C.
∗2: T_a = 70°C.

■ Recommended Operating Range

Parameter	Symbol	Range	Unit
Supply voltage	V_{CC}	4.5 to 5.5	V

■ Electrical Characteristics at T_a = 25°C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Circuit current	I_5	V_{CC} = 5.0 V	26	(38)	50	mA
VVY2 Y signal gain	$G_{19\text{-}1}$	Input 1 V[p-p], f = 1 MHz	5.4	(5.9)	6.4	dB
OSDY Y signal gain	$G_{19\text{-}3}$	Input 1 V[p-p], f = 1 MHz	5.4	(5.9)	6.4	dB
EEY Y signal gain	$G_{19\text{-}5}$	Input 1 V[p-p], f = 1 MHz	5.4	(5.9)	6.4	dB
OSDY YC signal gain	$G_{16\text{-}3}$	Input 1 V[p-p], f = 1 MHz	5.5	(6.0)	6.5	dB
EEY YC signal gain difference	$\Delta G_{16\text{-}5}$	Input 1 V[p-p], f = 1 MHz	– 0.6	(– 0.2)	0.2	dB
VVY1 YC signal gain	$G_{16\text{-}7}$	Input 1 V[p-p], f = 1 MHz	5.5	(6.0)	6.5	dB
EEC YC signal gain difference	$\Delta G_{16\text{-}9}$	Input 300 mV[p-p], f = 3.58 MHz	–1.6	(– 0.8)	0.0	dB
EEC C signal gain	$G_{14\text{-}9}$	Input 300 mV[p-p], f = 3.58 MHz	10.6	(11.5)	12.4	dB
OSDC C signal gain	$G_{14\text{-}11}$	Input 300 mV[p-p], f = 3.58 MHz	10.6	(11.5)	12.4	dB
VVC C signal gain	$G_{14\text{-}12}$	Input 300 mV[p-p], f = 3.58 MHz	10.6	(11.5)	12.4	dB
VVY2 Y signal frequency characteristics	$F_{19\text{-}1}$	Input 1 V[p-p], f = 6 MHz/1 MHz	– 0.9	(0.1)	1.1	dB
VVY1 YC signal frequency characteristics	$F_{16\text{-}7}$	Input 1 V[p-p], f = 6 MHz/1 MHz	–1.2	(– 0.2)	0.8	dB
VVC YC signal frequency characteristics	$F_{16\text{-}12}$	Input 300 mV[p-p], f = 6 MHz/3.58 MHz	– 0.9	(0.1)	1.1	dB
VVC C signal frequency characteristics	$F_{14\text{-}12}$	Input 300 mV[p-p], f = 6 MHz/3.58 MHz	– 0.9	(0.1)	1.1	dB
EEY Y signal frequency characteristics difference	$R_{F19\text{-}5}$	Input 1 V[p-p], f = 6 MHz, R = 75/2	– 0.3	(0.2)	0.7	dB
EEY YC signal frequency characteristics difference	$R_{F16\text{-}5}$	Input 1 V[p-p], f = 6 MHz, R = 75/2	– 0.7	(– 0.2)	0.3	dB
EEC C signal frequency characteristics difference	$R_{F14\text{-}9}$	Input 300 mV[p-p], f = 6 MHz, R = 75/2	– 0.6	(– 0.1)	0.4	dB
VVY2 → Y_{OUT} cross talk	$CT_{19\text{-}1}$	EE mode, input 1 V[p-p], f = 5 MHz	—	(–60)	–45	dB
OSDY → Y_{OUT} cross talk	$CT_{19\text{-}3}$	OSD LO, input 1 V[p-p], f = 5 MHz	—	(–60)	–45	dB
EEY → YC_{OUT} cross talk	$CT_{16\text{-}5}$	VV mode, input 1 V[p-p], f = 5 MHz	—	(–45)	–35	dB
EEC → YC_{OUT} cross talk	$CT_{16\text{-}9}$	CPS Hi, input 300 mV[p-p], f = 3.58 MHz	—	(–60)	–45	dB
VVC → C_{OUT} cross talk	$CT_{14\text{-}12}$	EE mode, input 300 mV[p-p], f = 3.58 MHz	—	(–60)	–45	dB
EEC → C_{OUT} cross talk	$CT_{14\text{-}9}$	ACK Hi, input 300 mV[p-p], f = 3.58 MHz	—	(–55)	–45	dB
EEC → Y_{OUT} cross talk	$CT_{19\text{-}9}$	EE mode, input 300 mV[p-p], f = 3.58 MHz	—	(–55)	–45	dB
EEY → C_{OUT} cross talk	$CT_{14\text{-}5}$	EE mode, input 1 V[p-p], f = 5 MHz	—	(–50)	–45	dB

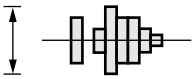
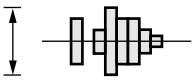
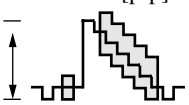
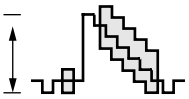
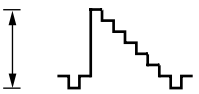
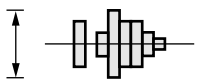
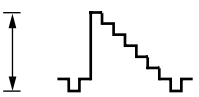
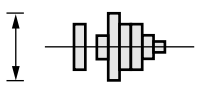
Note) The typical value in the parenthesis is the typical values and not the guaranteed one.

■ Electrical Characteristics at T_a = 25°C (continued)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Character level (1) (100IRE)	$DL_{19\text{-}3(H)}$	OSDH, input 1 V[p-p], pin 22 character input (high)	94	(103)	112	IRE
Character level (2) (100IRE)	$\Delta DL_{16\text{-}3(H)}$	OSDH, input 1 V[p-p], pin 22 character input (high)	−5	(7)	19	IRE
Character level (3) (50IRE)	$DL_{19\text{-}3(M)}$	OSDH, input 1 V[p-p], pin 22 character input (middle)	46	(55)	64	IRE
Character level (4) (50IRE)	$\Delta DL_{16\text{-}3(M)}$	OSDH, input 1 V[p-p], pin 22 character input (middle)	−6	(6)	18	IRE
EE/VV mode changeover threshold	V_{4TH}	V_{CC} = 5.0 V	3.0	(3.3)	3.6	V
ACK changeover threshold	V_{13TH}	V_{CC} = 5.0 V	1.65	(1.95)	2.25	V
CPS changeover threshold	V_{21TH}	V_{CC} = 5.0 V	1.65	(1.95)	2.25	V
OSD (L) changeover threshold	$V_{8TH(L)}$	V_{CC} = 5.0 V	1.2	(1.5)	1.8	V
OSD (H) changeover threshold	$V_{8TH(H)}$	V_{CC} = 5.0 V	3.2	(3.5)	3.8	V
LET (L) changeover threshold	$V_{22TH(L)}$	V_{CC} = 5.0 V	1.2	(1.5)	1.8	V
LET (H) changeover threshold	$V_{22TH(H)}$	V_{CC} = 5.0 V	3.1	(3.4)	3.7	V
EEY second harmonic wave	$2Y_{19\text{-}5}$	f = 1 MHz	—	(−60)	−40	dB
EEYC second harmonic wave	$2YC_{16\text{-}5}$	f = 1 MHz	—	(−55)	−40	dB
EEC second harmonic wave	$2C_{14\text{-}9}$	f = 1 MHz	—	(−48)	−40	dB

Note) The typical value in the parenthesis is the typical values and not the guaranteed one.

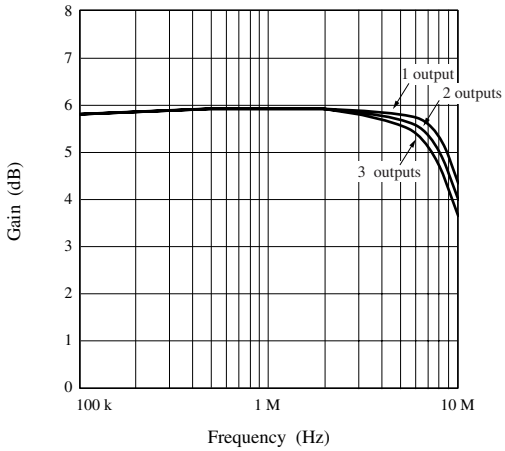
■ Terminal Waveform

Pin No.	Normal waveform	DC voltage (V)	Z_{IN} Z_{OUT}	Pin No.	Normal waveform	DC voltage (V)	Z_{IN} Z_{OUT}
1	≈ 1 000 mV[p-p] 	2.0	Diode clamp	12	 ≈ 300 mV[p-p]	2.0	Z_{IN} 20 kΩ
2	—	0.0	—	13	Two-values L/H	—	Base
3	≈ 1 000 mV[p-p] 	2.0	Diode clamp	14	 ≈ 1 250 mV[p-p]	2.4	Z_{OUT} ≈ 0 kΩ
4	Two-values L/H	—	Base	15	—	5.0	—
5	≈ 1 000 mV[p-p] 	2.0	Diode clamp	16	≈ 2 000 mV[p-p] 	1.3	Z_{OUT} ≈ 0 kΩ
6	—	5.0	—	17	≈ 2 000 mV[p-p] 	1.3	—
7	≈ 1 000 mV[p-p] 	2.0	Diode clamp	18	—	0.0	—
8	Three-values L/M/H	—	Base	19	≈ 2 000 mV[p-p] 	1.4	Z_{OUT} ≈ 0 kΩ
9	 ≈ 300 mV[p-p]	2.0	Z_{IN} 20 kΩ	20	≈ 2 000 mV[p-p] 	1.3	—
10	—	0.0	—				
11	 ≈ 300 mV[p-p]	2.0	Z_{IN} 20 kΩ	21	Two-values L/H	—	Base
				22	Three-values L/M/H	—	Base

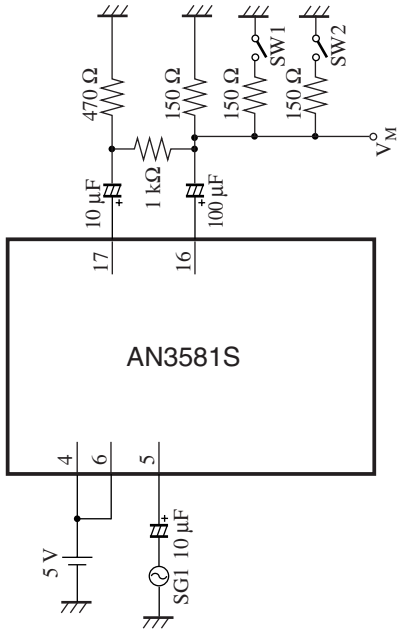
■ Technical Data

1. YC output drive characteristics

1) Gain-Frequency characteristics

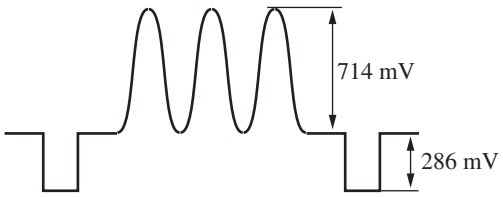


2) Measurement circuit



	SW1	SW2
1 output	off	off
2 outputs	on	off
3 outputs	on	on

$$\text{Gain} = 20 \log \frac{V_M \text{ (mV[p-p])}}{714 \text{ (mV)}} \text{ [dB]}$$



Note) The above-mentioned characteristics is an example of real measurement value and not guaranteed value.

■ Technical Data (continued)

2. Functional comparison on AN3580, AN3581, AN3582, and AN3584

Signal output / Parts No.	Component Y output	Component C output	Composite (Y+C) output	EVF output
AN3580SB SSOP016-P-0225A	Y: 1 output With 75 Ω driver	C: 2 inputs With 75 Ω driver	Y: 1 input, C: 2 inputs With 75 Ω driver	Y: 1 input, character: 1 input Zone: 1 input (Black and white)
AN3581S SOP022-P-0375A	Y: 2 inputs, character Y: 1 input With 75 Ω driver	C: 2 inputs, character C: 1 input With 75 Ω driver	Y: 2 inputs, C: 2 inputs Character Y: 1 input, character C: 1 input With 75 Ω driver	Nil
AN3582S/SH SOP024-P-0375A/ SSOP024-P-0300A	Y: 2 inputs, character Y: 1 input	C: 2 inputs	Y: 1 input, C: 2 inputs Character Y: 1 input With 75 Ω driver	Y: 1 input, C: 2 inputs Character Y: 1 input (Black and white/ color changeover)
AN3584SH SSOP024-P-0300A	Y: 2 inputs, character Y: 1 input	C: 2 inputs	Y: 1 input, C: 2 inputs Character Y: 1 input Character black frame Y: 1 input With 75 Ω driver	Y: 1 input, C: 2 inputs Character Y: 1 input Character black frame Y: 1 input (Black and white/ color changeover)

■ Usage Notes

- If LET is unnecessary, don't input control signal to pin 22.
- Be cautious in use of this IC because pin 8 is easy to latch up compared with other pins.

Latch up level at C = 200 pF

Pin 8 + side 210 V

− side 140 V

Latch up of another pins are 250 V or more both + and − sides.

■ Application Circuit Example