# 6CH VIDEO AMPLIFIER WITH SD/ HD LPF

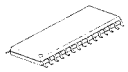
## ■ GENERAL DESCRIPTION

The NJM2583A is a single supply voltage 6ch Video amplifier.

It includes LPF, Y/C MIX circuit and SDC interface. LPF for the component signal can select SD/HD.

The NJM2583A is suitable for DVD recorder, set top box and the high quality AV systems with the SD/HD output.

## ■ PACKAGE OUTLINE

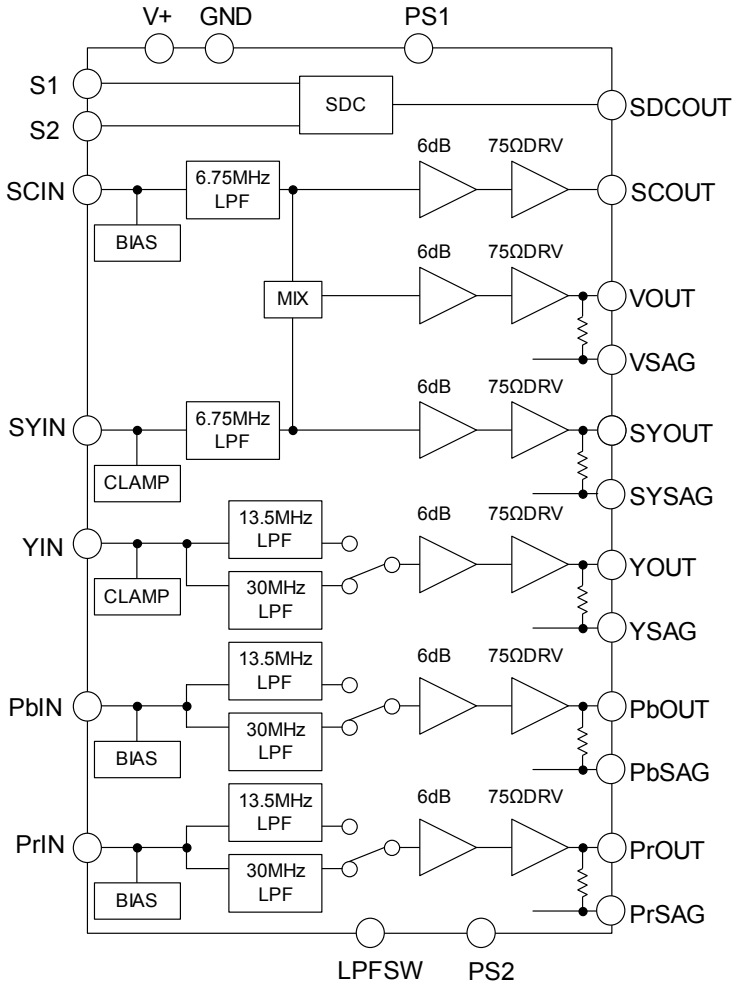


**NJM2583AV**

## ■ FEATURES

- Operating Voltage +4.5 to +5.5V
- SY,SC,Y,Pb,Pr Inputs
- 6dB Amplifier
- Internal 75Ω Driver Circuit
- 4th Order LPF V, SY, SC 6.75MHz
  Y, Pb, Pr 13.5MHz (Progressive), 30MHz (HD)
- Y/C MIX Circuit
- SDC Interface (S1/ S2)
- Power Save Circuit
- Bipolar Technology
- Package Outline SSOP32

## ■ BLOCK DIAGRAM



■ **ABSOLUTE MAXIMUM RATINGS** (Ta=25°C)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---|---|---|---|
| Supply Voltage | $V^+$ | 10.0 | V |
| Power Dissipation | $P_D$ | 1250 (Note 1) | mW |
| Operating Temperature Range | Topr | -40 to +85 | °C |
| Storage Temperature Range | Tstg | -40 to +150 | °C |

(Note 1) At on a board of EIA/JEDEC specification. (114.3 x 76.2 x 1.6mm 2 layers, FR-4)

■ **RECOMMENDED OPEARATING CONDITION** (Ta=25°C)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| Operating Voltage | Vopr | | +4.5 | +5.0 | +5.5 | V |

■ **ELECTRICAL CHARACTERISTICS** (Ta=25°C, $V^+$=5V, $R_L$=150Ω)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| Operating Current | $I_{CC}$ | No Signal | - | 65 | 90 | mA |
| Operating Current at Power Save | Isave | Power Save Mode | - | 2.0 | 4.0 | mA |
| Maximum Output Voltage Swing | Vom | (Note 2) Vin=100kHz, Sine Signal, THD=1% | 2.4 | - | - | Vp-p |
| Voltage Gain1 | Gv1 | (Note 2) Vin=1MHz, 1.0Vp-p, Sine Signal | 5.8 | 6.3 | 6.8 | dB |
| Voltage Gain2 | Gv2 | (Note 3) Vin=3.58MHz, 0.3Vp-p,Sine Signal | 5.8 | 6.3 | 6.8 | dB |
| Gain Difference Between channel | ΔGvI | (Note 2) Vin=1MHz, 1.0Vp-p,Sine Signal | -0.2 | 0 | +0.2 | dB |
| Low Pass Filter Characteristic 1 | Gfy6.75M | (Note 4) 6.75MHz/1MHz, 1.0Vp-p, Sine Signal | -1.0 | 0 | 1.0 | dB |
| | Gfy27M | (Note 4) 27MHz/1MHz, 1.0Vp-p, Sine Signal | - | -40 | -24 | dB |
| Low Pass Filter Characteristic 2 | Gfc6.75M | (Note 3) 6.75MHz/3.58MHz, 0.3Vp-p, Sine Signal | -1.0 | 0 | 1.0 | dB |
| | Gfc27M | (Note 3) 27MHz/3.58MHz, 0.3Vp-p, Sine Signal | - | -40 | -24 | dB |
| Low Pass Filter Characteristic 3 | $Gf_{SD}$13.5M | (Note 5) 13.5MHz/1MHz, 1.0Vp-p, Sine Signal | -1.0 | 0 | 1.0 | dB |
| | $Gf_{SD}$54M | (Note 5) 54MHz/1MHz, 1.0Vp-p, Sine Signal | - | -40 | -24 | dB |
| Low Pass Filter Characteristic 4 | $Gf_{HD}$30M | (Note 6) 30MHz/1MHz, 1.0Vp-p, Sine Signal | -1.0 | 0 | 1.0 | dB |
| | $Gf_{HD}$100M | (Note 6) 100MHz/1MHz, 1.0Vp-p, Sine Signal | - | -40 | -24 | dB |
| Differential Gain | DG | (Note 2) Vin=1.0Vp-p, 10step Video Signal | - | 0.5 | - | % |
| Differential Phase | DP | (Note 2) Vin=1.0Vp-p, 10step Video Signal | - | 0.5 | - | deg |
| S/N Ratio1 | SN1 | (Note 2) Vin=1.0Vp-p, 100% White video signal, $R_L$=75Ω, 100KHz to 6MHz | - | 80 | - | dB |
| S/N Ratio2 | SN2 | Vin=1.0Vp-p, 100% White video signal, $R_L$=75Ω, 100KHz to 6MHz, Y/C MIX OUT | - | 70 | - | dB |

(Note 2) (SYIN, YIN, PbIN, PrIN) Input
(Note 3) (SCIN) Input
(Note 4) (SYIN) Input
(Note 5) (YIN, PbIN, PrIN) Input, 13.5MHz LPF
(Note 6) (YIN, PbIN, PrIN) Input, 30MHz LPF

■ **ELECTRICAL CHARACTERISTICS** (Ta=25°C, $V^+$= 5V, $R_L$=150Ω)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| SDC Output Voltage Low Level | SDCL | RL=2kΩ+100kΩ | - | 0.1 | 0.5 | V |
| SDC Output Voltage Mid Level | SDCM | RL=2kΩ+100kΩ | 1.6 | 2.1 | 2.4 | V |
| SDC Output Voltage High Level | SDCH | RL=2kΩ+100kΩ | 4.3 | 4.6 | - | V |
| SW Voltage High Level | VthH | | 2.2 | - | $V^+$ | V |
| SW Voltage Low Level | VthL | | 0 | - | 1.0 | V |
| Switch inflow current High Level | $I_{SWH}$ | V=5V | - | - | 120 | μA |
| Switch inflow current Low Level | $I_{SWL}$ | V=0.3V | - | - | 8.0 | μA |

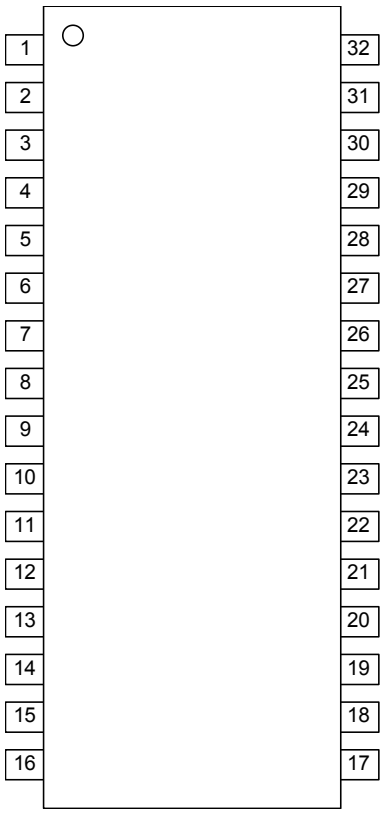
■ **CONTROL TERMINAL**

| PARAMETER | STATUS | NOTE |
|---|---|---|
| PS1 (Power Save1) | H | (SY, V, SC) Power Save: OFF (Active) |
| | L | (SY, V, SC) Power Save: ON (Mute) |
| | OPEN | (SY, V, SC) Power Save: ON (Mute) |
| PS2 (Power Save2) | H | (Y, Pb, Pr) Power Save: OFF (Active) |
| | L | (Y, Pb, Pr) Power Save: ON (Mute) |
| | OPEN | (Y, Pb, Pr) Power Save: ON (Mute) |
| LPF SW (LPF) | H | 30MHz LPF |
| | L | 13.5MHz LPF |
| | OPEN | 13.5MHz LPF |

■ **SDC OUT**

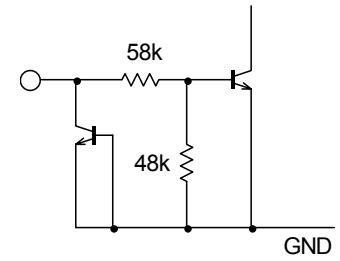
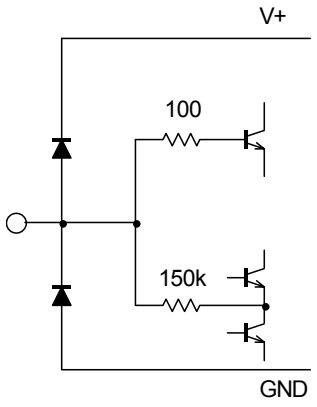
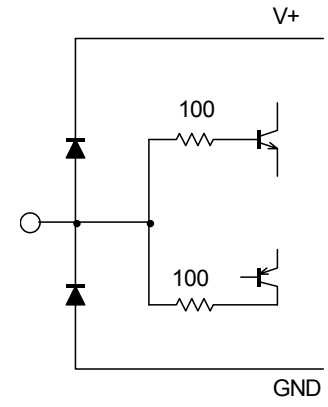
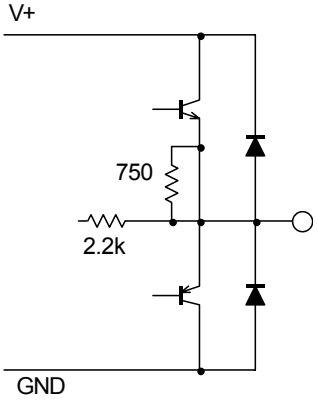
| S1 | S2 | SDC OUT | Aspect Ratio |
|---|---|---|---|
| L (OPEN) | L (OPEN) | 0V | 4:3 Normal |
| L (OPEN) | H | 2.1V | 4:3 Letter box |
| H | H | 2.1V | 4:3 Letter box |
| H | L (OPEN) | 4.6V | 16:9 Squeeze |

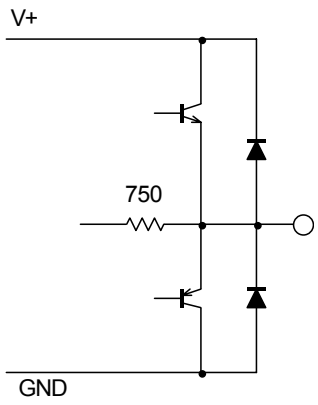
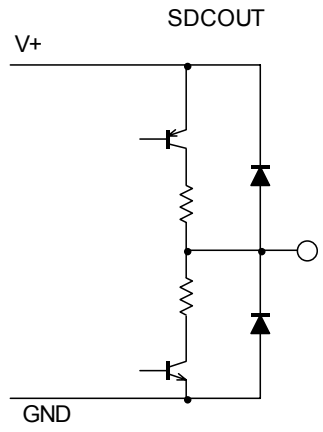
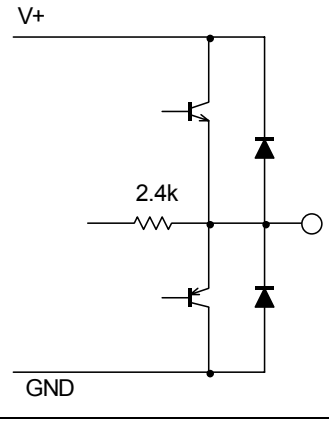
## ■ PIN CONFIGURATION



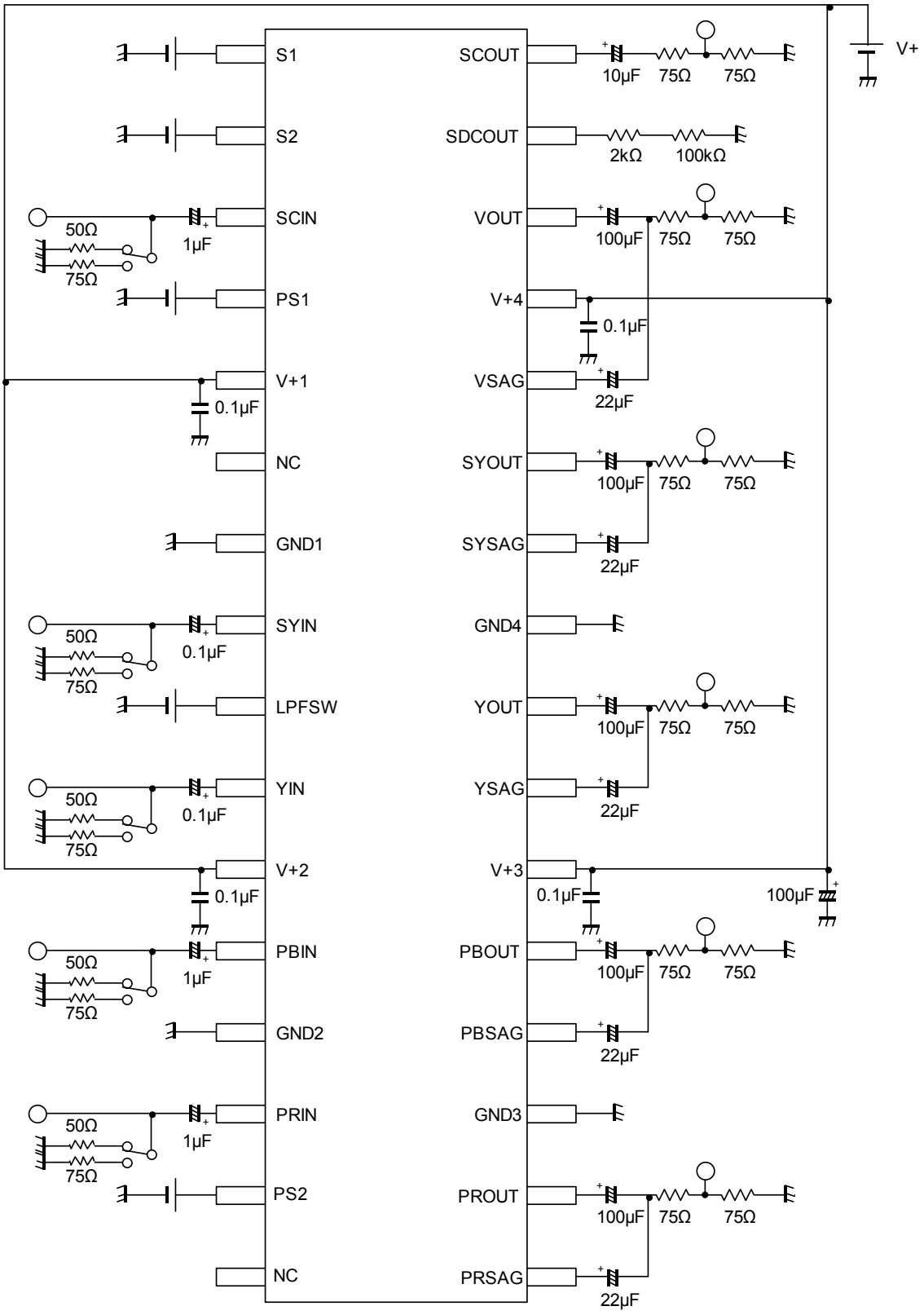

| | |
|---|---|
| 1. S1 | 17. PRSAG |
| 2. S2 | 18. PROUT |
| 3. SCIN | 19. GND3 |
| 4. PS1 | 20. PBSAG |
| 5. V+1 | 21. PBOUT |
| 6. NC | 22. V+3 |
| 7. GND | 23. YSAG |
| 8. SYIN | 24. YOUT |
| 9. LPFSW | 25. GND4 |
| 10. YIN | 26. SYSAG |
| 11. V+2 | 27. SYOUT |
| 12. PBIN | 28. VSAG |
| 13. GND2 | 29. V+4 |
| 14. PRIN | 30. VOUT |
| 15. PS2 | 31. SDCOUT |
| 16. NC | 32. SCOUT |

■ **TERMINAL FUNCTION**

| PIN No. | PIN NAME | FUNCTION | EQUIVALENT CIRCUIT | DC VOLTAGE |
|---|---|---|---|---|
| 1 | S2 | SDC control |  | - |
| 2 | S1 | SDC control | | |
| 4 | PS1 | (SY, V, SC, SDC) Power save | | |
| 9 | LPFSW | (Y, Pb, Pr) LPF control | | |
| 15 | PS2 | (Y, Pb, Pr) Power save | | |
| 3 | SCIN | Chroma signal input |  | 2.5V |
| 12 | PBIN | Component signal (Pb) input | | |
| 14 | PRIN | Component signal (Pr) input | | |
| 8 | SYIN | Y signal input |  | 1.7V |
| 10 | YIN | Component signal (Y), G input | | |
| 17 | PRSAG | Component signal (Pr) sag correction |  | 2.5V |
| 20 | PBSAG | Component signal (Pb) sag correction | | |
| 23 | YSAG | Component signal (Y) sag correction | | 1.3V |
| 26 | SYSAG | Y signal sag correction | | |
| 28 | VSAG | Composite video signal sag correction | | |

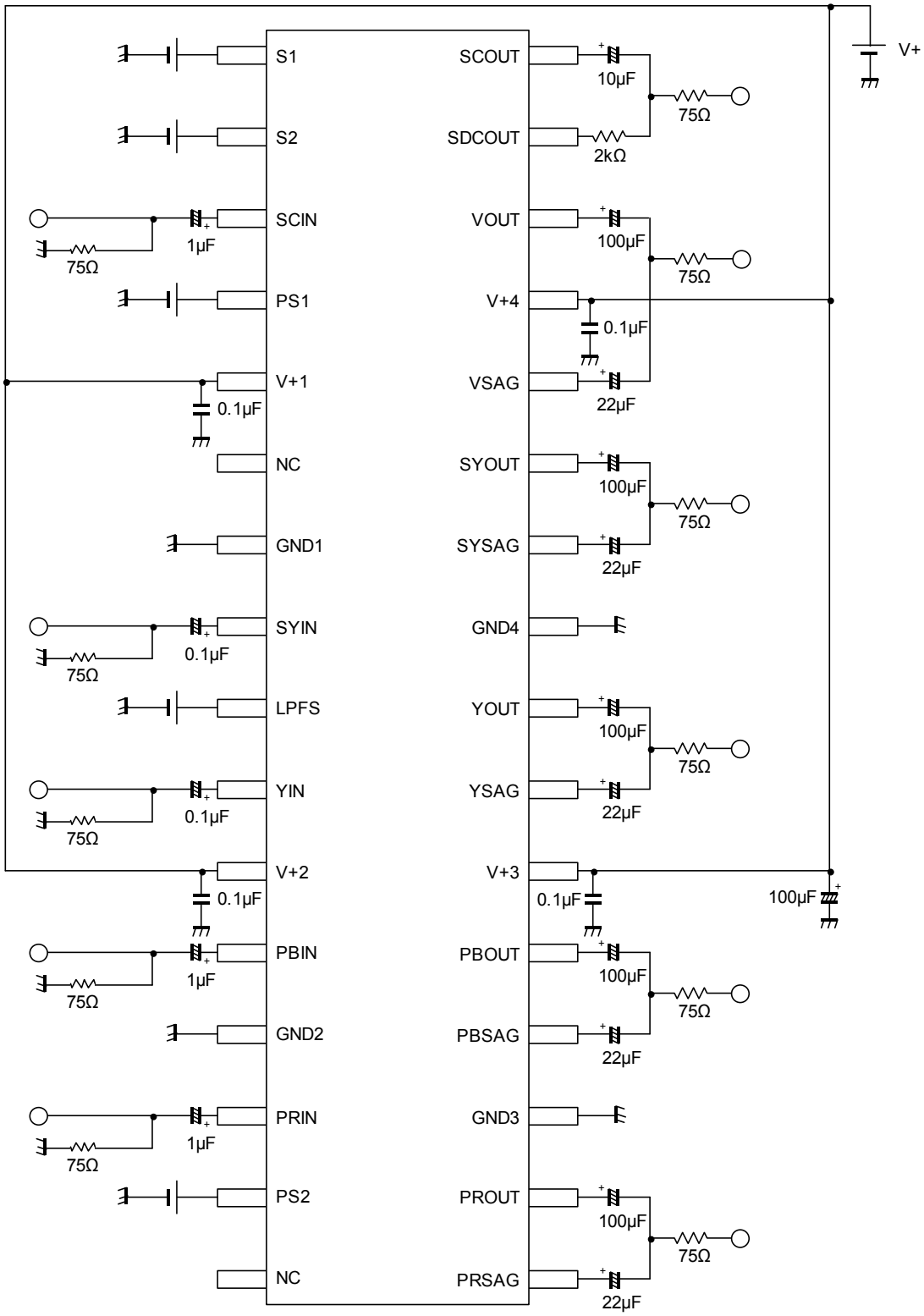
| PIN No. | PIN NAME | FUNCTION | EQUIVALENT CIRCUIT | DC VOLTAGE |
|---|---|---|---|---|
| 18<br>21 | PROUT<br>PBOUT | Component signal (Pr) output<br>Component signal (Pb) output |  | 2.5V |
| 24<br>27<br>30 | YOUT<br>SYOUT<br>VOUT | Component signal(Y) output<br>Y signal output<br>Composite video signal output | | 1.3V |
| 31 | SDCOUT | SDC output |  | - |
| 32 | SCOUT | Chroma signal output |  | 2.5V |

■ **TEST CIRCUIT**




(Note)
1. Put a bypass capacitor of 0.1µF near a V+ pin (V+1 to V+4).
2. Shorten the feedback loop of an output coupling capacitor and the SAG correction capacitor of the video signal output and put a 75Ω series resistance near IC pin.

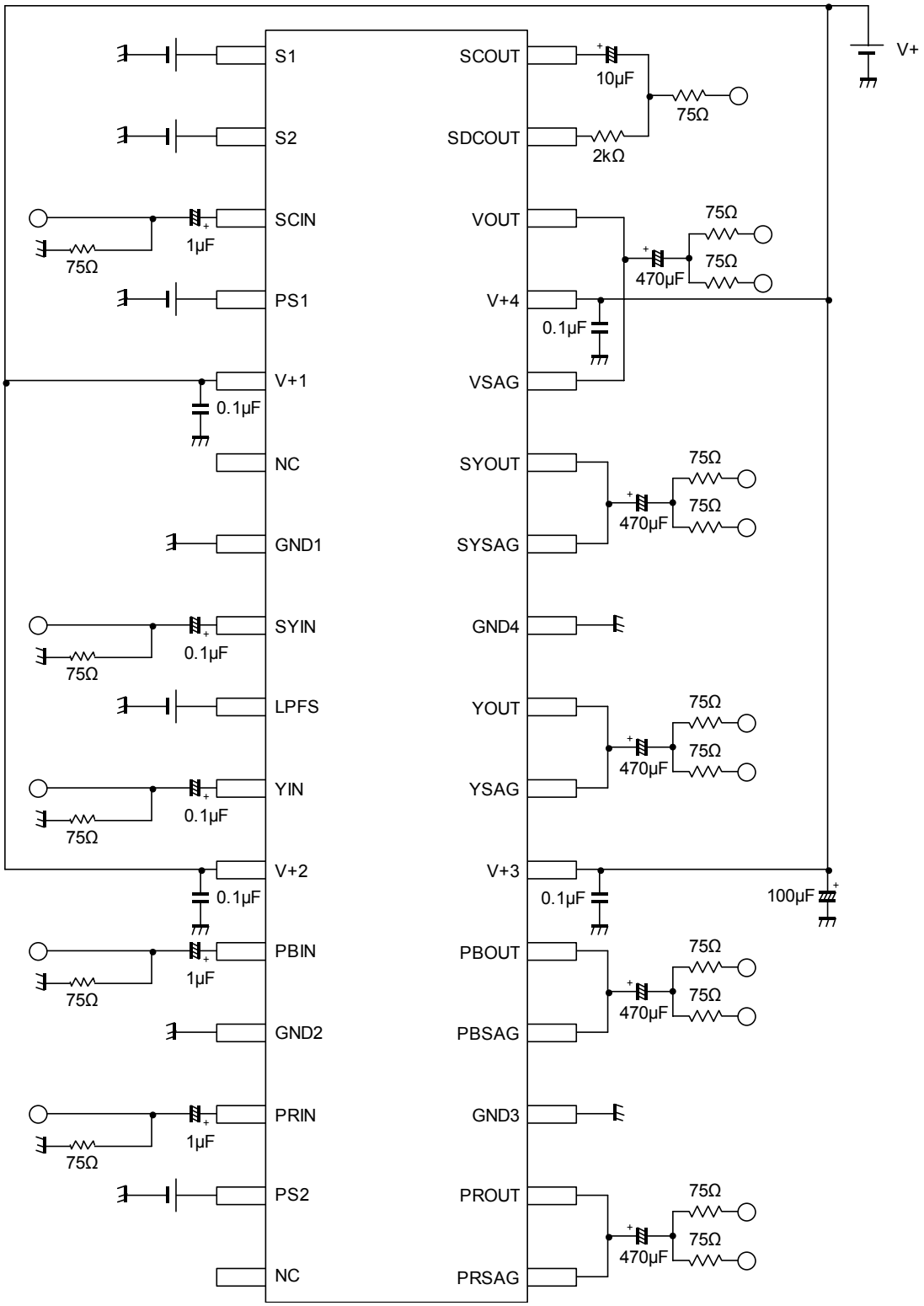
■ **APPLICATION CIRCUIT 1**




(Note)

1. Put a bypass capacitor of 0.1µF near a V+ pin (V+1 to V+4).
2. Shorten the feedback loop of an output coupling capacitor and the SAG correction capacitor of the video signal output and put a 75Ω series resistance near IC pin.

■ **APPLICATION CIRCUIT 2 (Two-line driving circuit)**

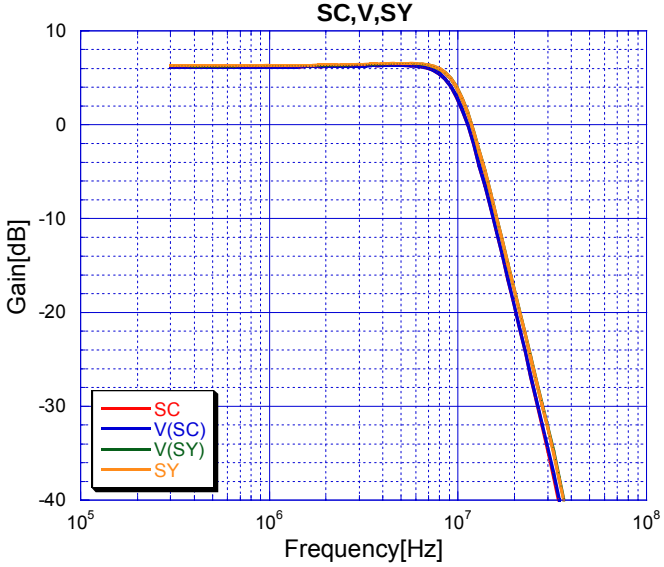



(Note)

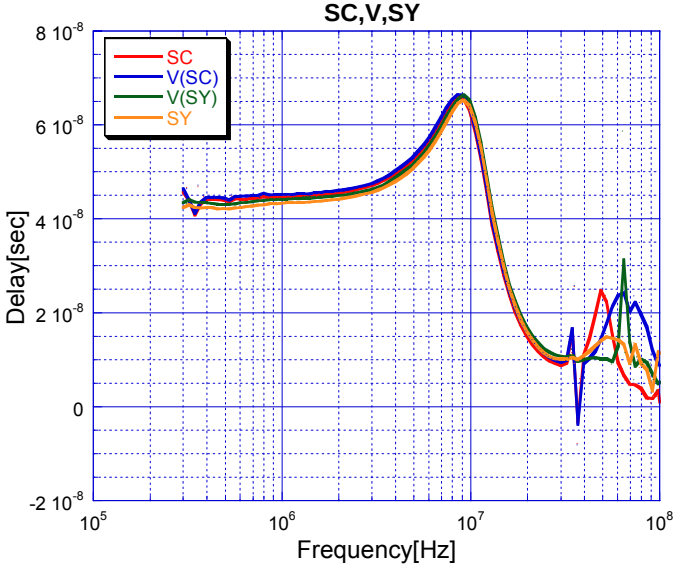
1. Put a bypass capacitor of 0.1µF near a V+ pin (V+1 to V+4).
2. Shorten the feedback loop of an output coupling capacitor and the SAG correction capacitor of the video signal output and put a 75Ω series resistance near IC pin.
3. Two-line driving circuit
   This circuit drives two-line of 150Ω. However, it may cause to lose synchronization by an input signal of large APL change (100% white signals more than 1Vp-p). Confirm the large APL change waveform (100% white signals more than 1Vp-p) and evaluate sufficiently.

## ■TYPICAL CHARACTERISTICS

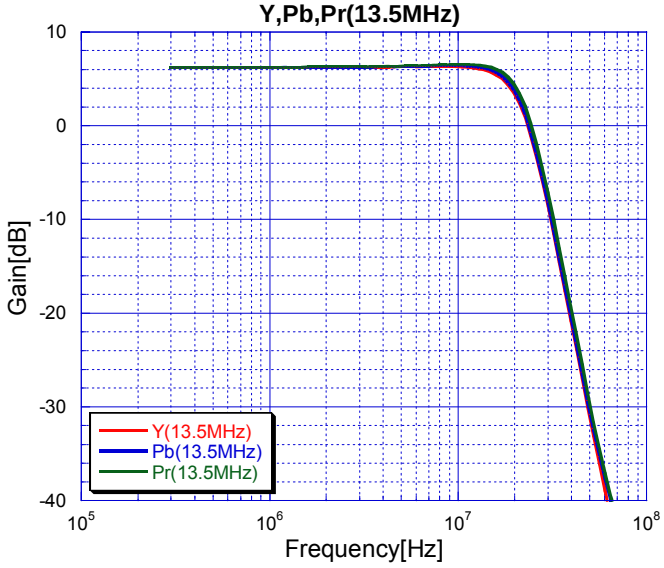
**Voltage Gain vs. Frequency**
**SC,V,SY**



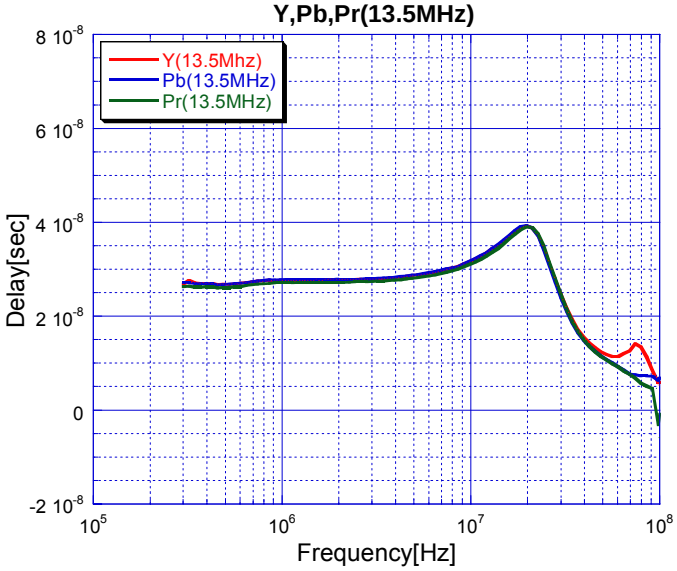

**Group Delay vs. Frequency**
**SC,V,SY**



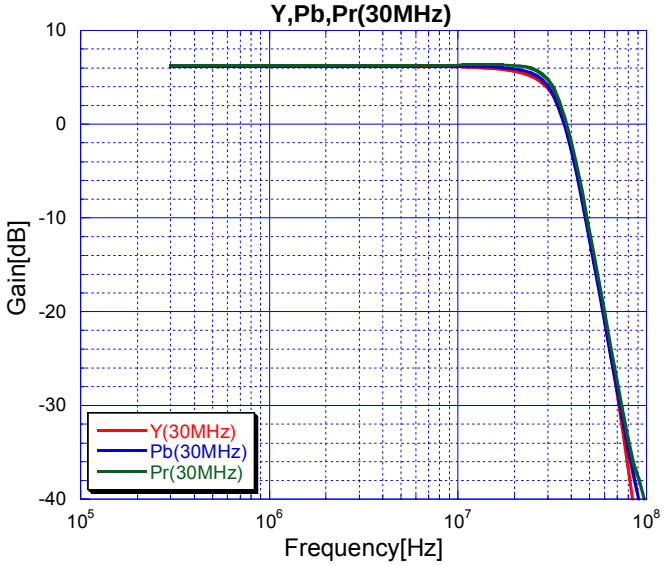

**Voltage Gain vs. Frequency**
**Y,Pb,Pr(13.5MHz)**



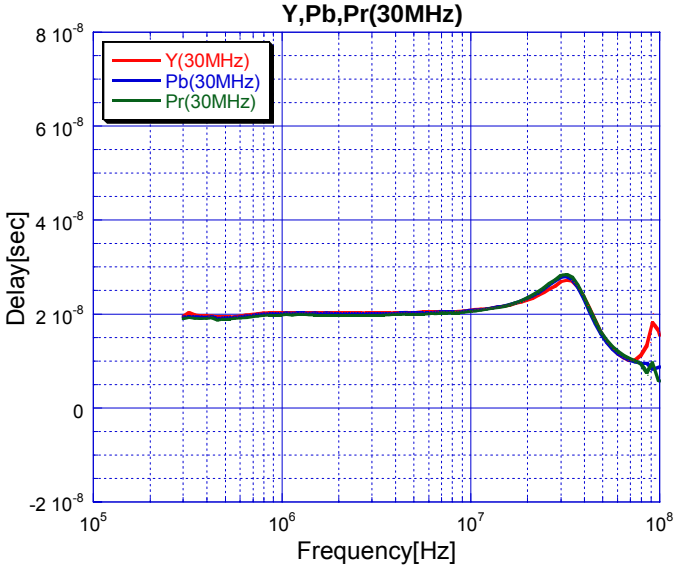

**Group Delay vs. Frequency**
**Y,Pb,Pr(13.5MHz)**




**Voltage Gain vs. Frequency**
**Y,Pb,Pr(30MHz)**




**Group Delay vs. Frequency**
**Y,Pb,Pr(30MHz)**



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