

M52038ASP

PAL SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION

The M52038ASP is a single chip semiconductor integrated circuit that has color TV signal-processing functions. It processes signals of video intermediate frequency, audio intermediate frequency as well as video, color, and deflection signals. Combining it with a tuner and simple output drive circuits, based on discrete transistors, enables low-cost design of PAL color TV sets.

FEATURES

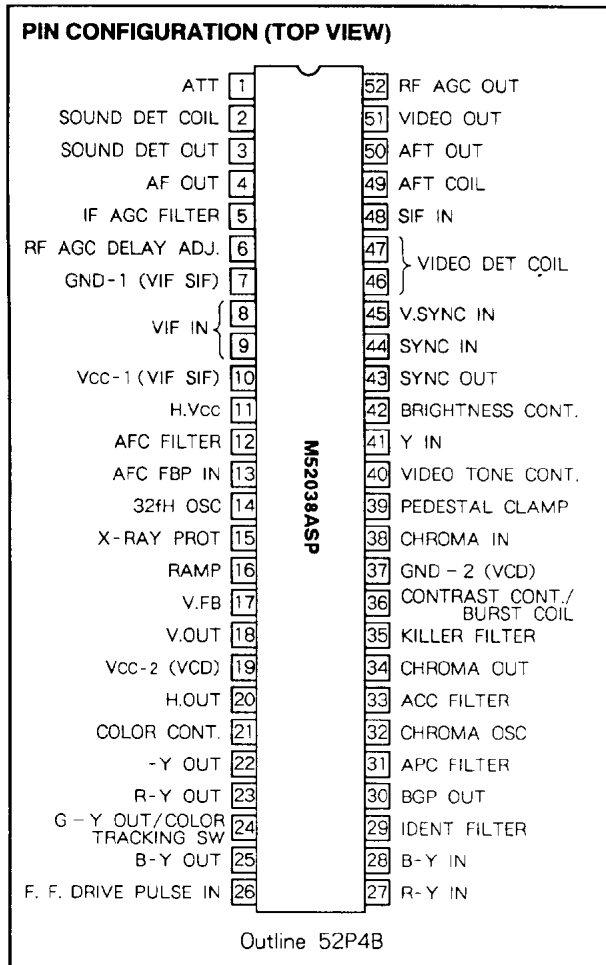
- Provided with all signal-processing functions except tuner and output drive functions. Useful in TV set cost-reduction.
- Input pins are used for differential inputs, using two input pins for each signal. They improve stability and prevent oscillations.
- For horizontal oscillation, the oscillator uses a ceramic resonator to produce reference signal of 32 times the horizontal deflection frequency. The count-down of the reference signal provides horizontal deflection signal. It is unnecessary, therefore, to adjust free-running frequency.
- For vertical oscillation, the count-down of twice the horizontal deflection signal, produced by the horizontal deflection count-down circuit, provides the vertical deflection signal. It eliminates the variable resistor for vertical synchronization. The count-down method has reduced the number of additional parts in the vertical deflection circuit.
- Capable of the AFT defeat, video muting, and audio muting functions.
- Picture quality, contrast, brightness, color saturation, and sound volume are each controlled by direct currents.
- Combining this IC with the SECAM chroma-IC enables a dual system composition.

APPLICATION

PAL color TV sets.

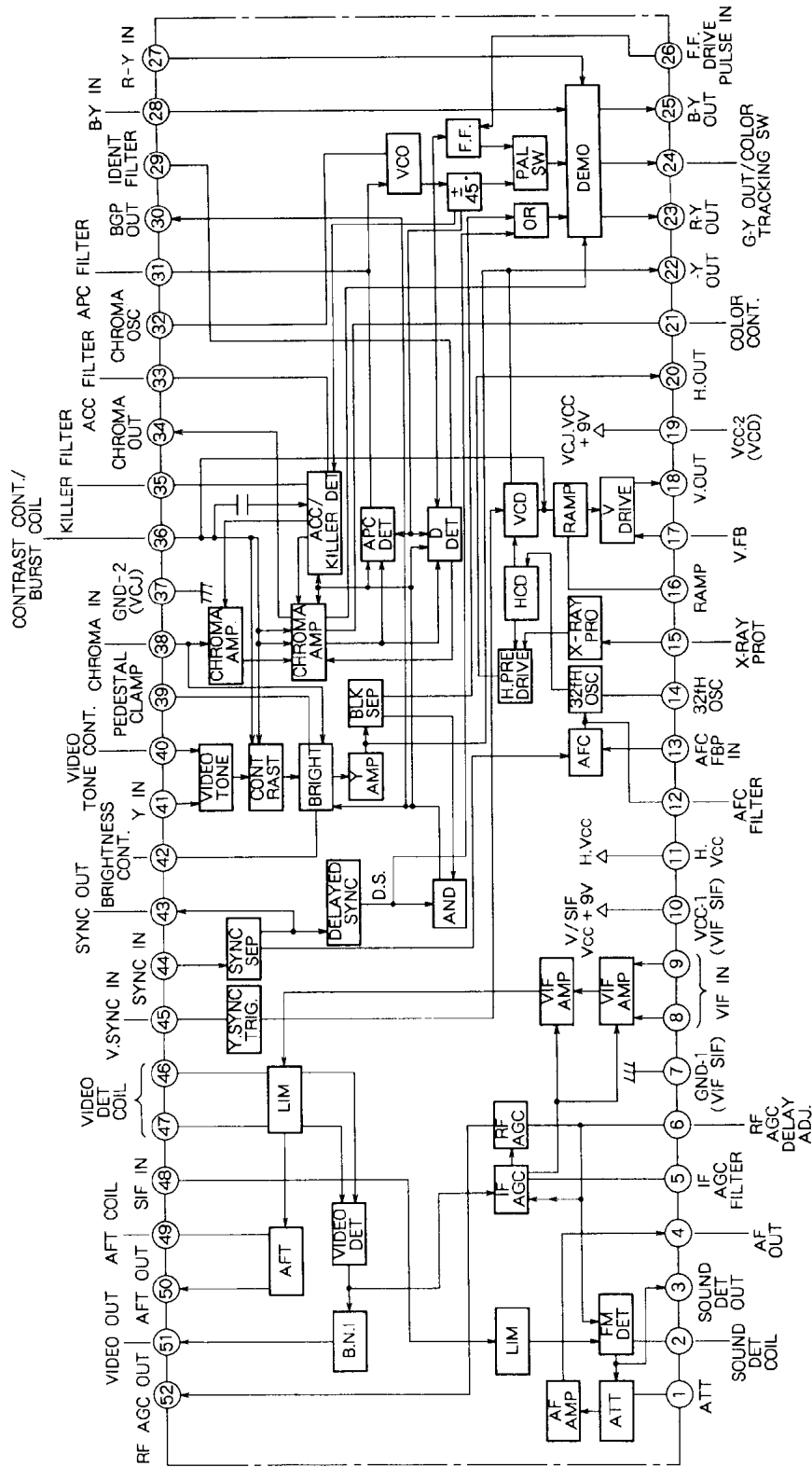
RECOMMENDED OPERATING CONDITION

| | |
|----------------------|--|
| Supply voltage range | 8.5~9.5V(V ₁₀ , V ₁₉) |
| Rated supply voltage | 9.0V(V ₁₀ , V ₁₉) |
| Supply current range | 15~22mA(I ₁₁) |
| Rated supply current | 18mA(I ₁₁) |



PAL SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

BLOCK DIAGRAM



M52038ASP

PAL SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Ratings | Unit |
|------------------|-----------------------|---------|------|
| V _{cc} | Supply voltage | 10.8 | V |
| P _d | Power dissipation | 1.4 | W |
| T _{opr} | Operating temperature | -20~65 | °C |
| T _{stg} | Storage temperature | -40~125 | °C |

ELECTRICAL CHARACTERISTICS (T_a = 25 °C, unless otherwise noted)

VIF-SIF SECTION

| Symbol | Parameter | Test Point | Input () | Test conditions* | | | | | | | | | | | | | | Limits | | | Unit | | | | | | |
|---------------------|---|------------|-----------|------------------|----------|------|--------------------|-----|-----|-----|------|------|-------|------|------|-------|------|--------|------|-------|------|------|------|------|------|------------------|---|
| | | | | 1 | 5 | 6 | V _{cc} 10 | S 2 | S 5 | S 6 | S 6A | S 10 | S 10A | S 47 | S 48 | S 48A | S 49 | S 51 | S 52 | S 52A | | Min. | Typ. | Max. | | | |
| I _{cc10} | Circuit current | A10 | - | - | - | 9.0V | - | - | ○ | - | ○ | - | - | - | - | - | - | - | - | ○ | - | 27 | 36 | 50 | mA | | |
| V ₅₁ | Video output DC voltage | 51 | - | - | - | 9.0V | ○ | ○ | ○ | - | ○ | - | - | - | - | - | - | - | - | ○ | ○ | - | 4.55 | 4.9 | 5.35 | V | |
| V _{O51} | Video output signal voltage | 51 | A SG1 | - | - | 9.0V | ○ | - | ○ | - | ○ | - | - | - | - | - | - | - | - | ○ | ○ | - | 1.7 | 2.0 | 2.3 | V _{P-P} | |
| V _{51L} | Sync. tip voltage | 51 | A SG2 | - | - | 9.0V | ○ | - | ○ | - | ○ | - | - | - | - | - | - | - | - | ○ | ○ | - | 2.3 | 2.6 | 2.9 | V | |
| V _{in min} | Input sensitivity | 51A | A SG3 | - | - | 9.0V | ○ | - | ○ | - | ○ | - | - | - | - | - | - | - | - | ○ | ○ | - | 37 | 45 | 51 | dBμ | |
| V _{in max} | Maximum allowable input | 51A | A SG4 | - | - | 9.0V | ○ | - | ○ | - | ○ | - | - | - | - | - | - | - | - | ○ | ○ | - | 103 | 110 | | dBμ | |
| V _{BTH} | Black spot noise inverter | 51 | A SG2 SG5 | Variable | Variable | 9.0V | ○ | ○ | ○ | - | - | - | - | - | - | - | - | - | - | ○ | ○ | - | 1.7 | 2.0 | 2.3 | V | |
| V _{BCL} | | | | | | | | | | | | | | | | | | | | | | | 3.3 | 3.8 | 4.3 | V | |
| BW | Video frequency characteristics | 51 | A SG8 | - | Variable | 9.0V | ○ | - | ○ | - | ○ | - | - | - | - | - | - | - | - | ○ | ○ | - | 5.6 | 8 | | MHz | |
| IM | Inter-modulation | 51 | A SG9 | - | - | 9.0V | ○ | - | ○ | - | ○ | - | - | - | - | - | - | - | - | ○ | ○ | - | 32 | 45 | | dB | |
| S/N | Video noise | 51A | A SG2 | - | - | 9.0V | ○ | - | ○ | - | ○ | - | - | - | - | - | - | - | - | ○ | ○ | - | 50 | 56 | | dB | |
| V ₅₀ | AFT output DC voltage | 50 | - | - | - | 9.0V | ○ | ○ | ○ | - | ○ | - | - | - | - | - | - | - | - | - | ○ | - | 3.0 | 4.0 | 5.0 | V | |
| V _{50H} | AFT output maximum voltage | 50 | A SG6 | - | - | 9.0V | ○ | - | ○ | - | ○ | - | - | - | - | - | - | - | - | - | ○ | - | 8.0 | 8.7 | | V | |
| V _{50L} | AFT output minimum voltage | 50 | A SG7 | - | - | 9.0V | ○ | - | ○ | - | ○ | - | - | - | - | - | - | - | - | - | ○ | - | | 0.3 | 1.0 | V | |
| μ AFT | AFT sensitivity | 50 | A SG5 | - | - | 9.0V | ○ | - | ○ | - | ○ | - | - | - | - | - | - | - | - | - | ○ | - | 40 | 60 | 120 | mV/kHz | |
| V _{50D} | AFT defeat voltage | 50 | A SG5 | - | - | 9.0V | ○ | - | ○ | - | ○ | - | - | - | - | - | - | - | - | - | ○ | - | 4.35 | 4.5 | 4.65 | V | |
| V _{52H} | RF AGC maximum voltage | 52 | A SG11 | - | - | 2.5V | 9.0V | ○ | ○ | - | ○ | - | - | - | - | - | - | - | - | - | ○ | ○ | - | 7.0 | 8.0 | | V |
| V _{52L} | RF AGC minimum voltage | 52 | A SG10 | - | - | 2.5V | 9.0V | ○ | ○ | - | ○ | - | - | - | - | - | - | - | - | - | - | ○ | ○ | | 0.01 | 0.3 | V |
| V. S. MUTE1 | Sync mute starting voltage | 5 6 | - | 9.0V | M | 9.0V | - | - | - | ○ | - | - | - | - | - | - | - | - | - | ○ | ○ | - | | 0.7 | 1.2 | V | |
| V ₃ | AF direct output direct current voltage | 3 | - | - | - | 9.0V | - | ○ | ○ | - | ○ | - | - | - | - | - | - | - | - | ○ | ○ | - | 3.4 | 3.9 | 4.5 | V | |
| V _{0AF} | AF direct output signal voltage | 3 | C SG12 | - | - | 9.0V | - | ○ | ○ | - | ○ | - | - | - | - | - | - | - | - | ○ | ○ | - | 540 | 630 | 720 | mVrms | |

* : "-" Indicates open.

PAL SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

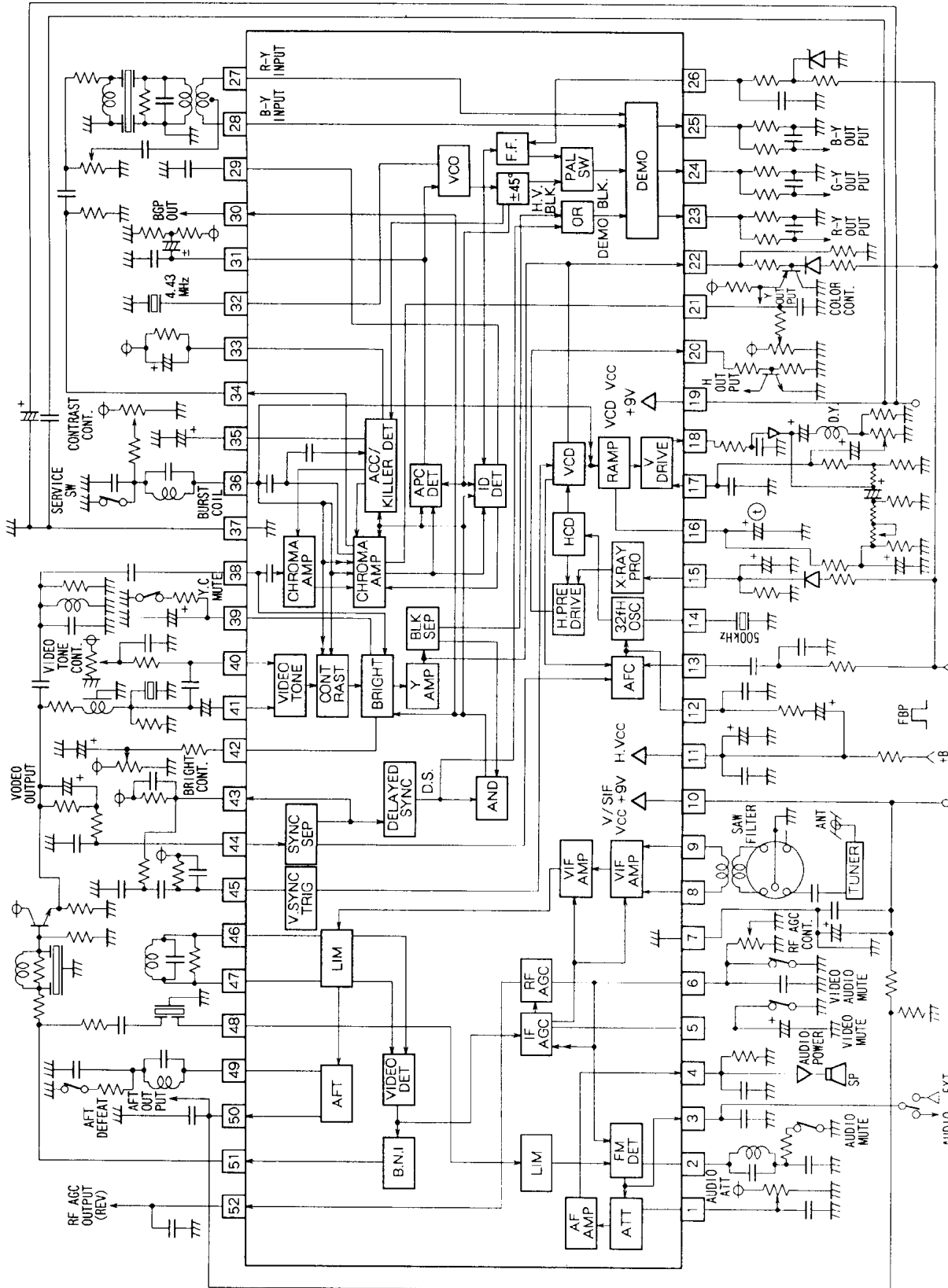
VIDEO SECTION

| Symbol | Parameter | Test Point | Input () | Test conditions* | | | | | | | | | | | | | | | | Limits | | | Unit | | | | | | | | |
|--------------------------|---|------------|--------------------------------|------------------|-------|-----|----------|-------|----------|----------|-----|-----|-----|-----|------|------|------|------|------|--------|------|------|------|------|------------------|------------------|----------|-------|-------|-------|-------|
| | | | | 11A | 16A | 19A | 21A | 22A | 29A | 36A | 38A | 39A | 40A | 42A | S19A | S22A | S24A | S27A | S28A | S28A | S35A | S36A | | S39A | S42A | S44A | Min. | Typ. | Max. | | |
| Icc19 | Circuit current | A19 | -- | -- | 9.0 V | -- | -- | 4.5 V | -- | 2.7 V | -- | -- | ○ | ○ | -- | -- | ○ | -- | -- | -- | -- | -- | 30 | 40 | 50 | mA | | | | | |
| Y _{max} | Maximum output | 22 | F SG21 | -- | 9.0 V | -- | -- | 9.0 V | -- | Variable | -- | -- | ○ | ○ | -- | -- | -- | -- | -- | -- | -- | 5.0 | 6.2 | | V _{P-P} | | | | | | |
| G _Y | Standard gain | 22 | F SG22 | -- | 9.0 V | -- | -- | 4.5 V | -- | Variable | -- | -- | ○ | ○ | -- | -- | -- | -- | -- | -- | -- | 11 | 15 | 19 | dB | | | | | | |
| G _{Y min} | Contrast control characteristics | 22 | F SG22 | -- | 9.0 V | -- | -- | 2.5 V | Variable | -- | -- | ○ | ○ | -- | -- | -- | -- | -- | -- | -- | -- | +2 | +6 | +8.5 | dB | | | | | | |
| G _{Y max} | | | | | | | | | | | | | | | | | | | | | | | | | | 6.5 V | Variable | 9.0 V | 4.9 V | 7.4 V | 2.4 V |
| V _{BRT-I-norm} | Brightness control characteristics-I | 22 | D SG18 | 12 V | 9.0 V | -- | -- | 4.5 V | -- | 9.0 V | -- | ○ | ○ | -- | -- | -- | -- | -- | -- | -- | -- | ○ | 2.25 | 2.6 | 2.95 | V _{O-P} | | | | | |
| V _{BRT-I-L} | | | | | | | | | | | | | | | | | | | | | | | | | | | 7.4 V | 4.5 V | 3.05 | 3.4 | 3.75 |
| V _{BRT-I-H} | | | | | | | | | | | | | | | | | | | | | | | | | | | 2.4 V | 4.5 V | 2.75 | 3.1 | 3.45 |
| V _{BRT-II-norm} | Brightness control characteristics-II | 22 | D SG18 | 12 V | 9.0 V | -- | -- | 4.5 V | 2.4 V | 9.0 V | -- | ○ | ○ | -- | -- | -- | -- | -- | -- | -- | -- | ○ | 1.65 | 2.0 | 2.35 | V _{O-P} | | | | | |
| V _{BRT-II-L} | | | | | | | | | | | | | | | | | | | | | | | | | | | 7.4 V | 4.5 V | 3.85 | 4.2 | 4.55 |
| V _{BRT-II-H} | | | | | | | | | | | | | | | | | | | | | | | | | | | 2.4 V | 4.5 V | 3.85 | 4.2 | 4.55 |
| G _P | Peaking value | 22 | F SG23 SG24 | -- | 9.0 V | -- | -- | 4.5 V | -- | Variable | -- | -- | ○ | ○ | -- | -- | -- | -- | -- | -- | -- | 7.5 | 11 | 14.5 | dB | | | | | | |
| G _{T norm} | Video tone control characteristics | 22 | F SG24 | -- | 9.0 V | -- | -- | 4.5 V | Variable | 4.5 V | -- | ○ | ○ | -- | -- | -- | -- | -- | -- | -- | -- | -- | -1.3 | -0.5 | 1.2 | dB | | | | | |
| G _{T min} | | | | | | | | | | | | | | | | | | | | | | | | | | | 6.5 V | 4.5 V | -21 | -15 | -11 |
| G _{T max} | | | | | | | | | | | | | | | | | | | | | | | | | | | 2.5 V | 4.5 V | 3.0 | 6.0 | 10.0 |
| f _{B (Y)} | Frequency characteristics | 22 | F SG25 | -- | 9.0 V | -- | -- | 4.5 V | -- | Variable | -- | -- | ○ | ○ | -- | -- | -- | -- | -- | -- | -- | 7 | 8 | | MHz | | | | | | |
| DG _Y | Differential gain | 22 | F SG22 | -- | 9.0 V | -- | -- | 4.5 V | -- | Variable | -- | -- | ○ | ○ | -- | -- | -- | -- | -- | -- | -- | | 1 | 6 | % | | | | | | |
| V ₄₀ | Pin 40 voltage | 40 | -- | -- | 9.0 V | -- | -- | 4.5 V | -- | M | -- | ○ | ○ | -- | -- | -- | -- | -- | -- | -- | -- | 4.15 | 4.45 | 4.75 | V | | | | | | |
| V _{BLK V} | Vertical blanking voltage | 22 | -- | 12 V | 9.0 V | -- | -- | 2.5 V | -- | Variable | -- | ○ | ○ | -- | -- | -- | -- | -- | -- | -- | -- | 7.3 | 7.7 | | V _{O-P} | | | | | | |
| V _{BLK TV50} | Vertical blanking pulse width | 22 | -- | 12 V | 9.0 V | -- | -- | 2.5 V | -- | Variable | -- | ○ | ○ | -- | -- | -- | -- | -- | -- | -- | -- | 1.31 | 1.38 | 1.44 | ms | | | | | | |
| V _{BLK H} | Horizontal blanking threshold voltage | 22 25A | H SG28 0.5 V _{P-P} | -- | 9.0 V | -- | Variable | 2.5 V | -- | Variable | -- | ○ | ○ | ○ | ○ | -- | -- | -- | -- | -- | -- | 6.35 | 6.8 | | V _{O-P} | | | | | | |
| V _{DC REG} | DC regeneration control characteristics | 22 | F SG17 | -- | 9.0 V | -- | -- | 4.5 V | -- | 9.0 V | -- | ○ | ○ | -- | -- | -- | -- | -- | -- | -- | -- | ○ | -1.2 | -0.2 | 1.0 | V | | | | | |

* : "--" Indicates open.

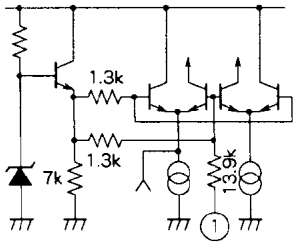
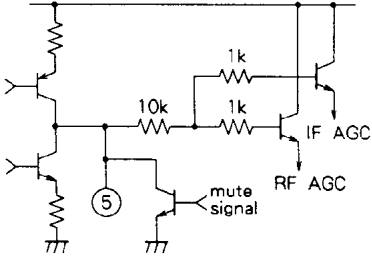
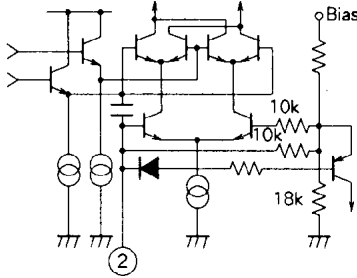
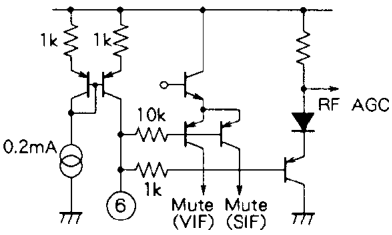
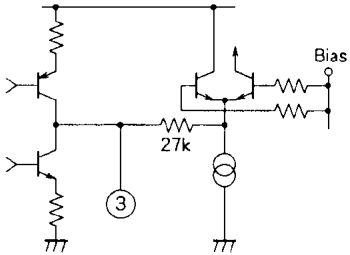
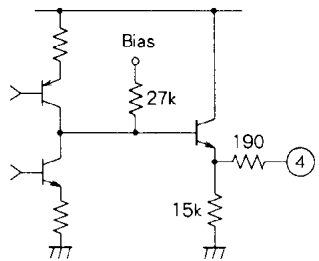
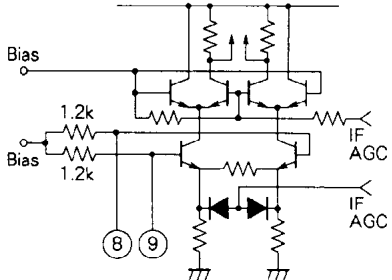
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TEST CIRCUIT



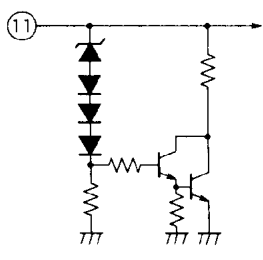
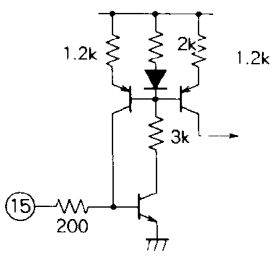
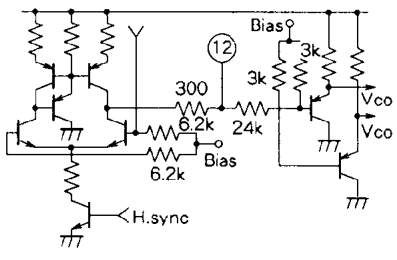
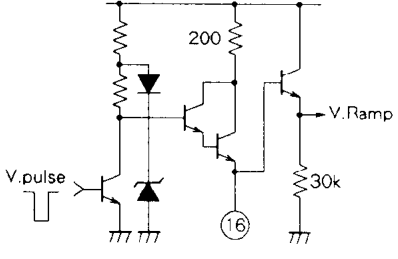
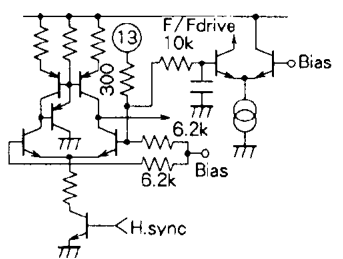
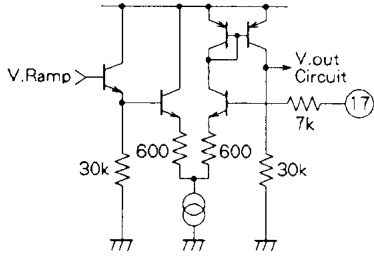
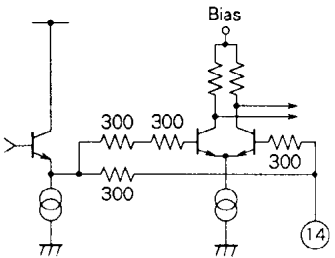
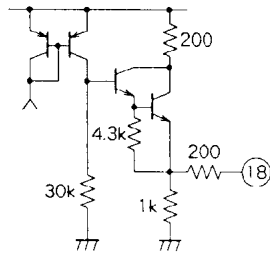
PAL SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN

| Pin No. | Name | Peripheral circuit of pins | Pin No. | Name | Peripheral circuit of pins |
|---------|----------------|---|---------|-------------------|---|
| ① | ATT |  | ⑤ | IF AGC FILTER |  |
| ② | SOUND DET COIL |  | ⑥ | RF AGC DELAY ADJ. |  |
| ③ | SOUND DET OUT |  | ⑦ | GND-1 (VIF SIF) | - |
| ④ | AF OUT |  | ⑧ | VIF IN |  |
| | | | ⑨ | VIF IN | |
| | | | ⑩ | Vcc-1 (VIF SIF) | - |

PAL SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN (cont.)

| Pin No. | Name | Peripheral circuit of pins | Pin No. | Name | Peripheral circuit of pins |
|---------|-------------|---|---------|------------|---|
| ⑪ | H.Vcc |  | ⑮ | X-RAY PROT |  |
| ⑫ | AFC FILTER |  | ⑯ | RAMP |  |
| ⑬ | AFC FBP IN |  | ⑰ | V.FB |  |
| ⑭ | 32fH OSC |  | ⑱ | V.OUT |  |
| ⑲ | Vcc-2 (VCD) | | | | |

PAL SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN (cont.)

| Pin No. | Name | Peripheral circuit of pins | Pin No. | Name | Peripheral circuit of pins |
|---------|-------------------------------|----------------------------|---------|----------------------|----------------------------|
| 20 | H.OUT | | 25 | B-Y OUT | |
| 21 | COLOR CONT. | | 26 | F. F. DRIVE PULSE IN | |
| 22 | -Y OUT | | 27 | R-Y IN | |
| 23 | R-Y OUT | | 28 | B-Y IN | |
| 24 | G-Y OUT/ COLOR TRACKING SW | | 29 | IDENT FILTER | |

PAL SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN (cont.)

| Pin No. | Name | Peripheral circuit of pins | Pin No. | Name | Peripheral circuit of pins |
|---------|------------|----------------------------|---------|-----------------------------|----------------------------|
| 30 | BGP OUT | | 34 | CHROMA OUT | |
| 31 | APC FILTER | | 35 | KILLER FILTER | |
| 32 | CHROMA OSC | | 36 | CONTRAST CONT. / BURST COIL | |
| 33 | ACC FILTER | | 37 | GND-2 (VCD) | - |
| | | | 38 | CHROMA IN | |
| | | | 39 | PEDESTAL CLAMP | |

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DESCRIPTION OF PIN (cont.)

| Pin No. | Name | Peripheral circuit of pins | Pin No. | Name | Peripheral circuit of pins |
|---------|------------------|----------------------------|---------|----------------|----------------------------|
| 40 | VIDEO TONE CONT. | | 44 | SYNC IN | |
| 41 | Y IN | | 45 | V.SYNC IN | |
| 42 | BRIGHTNESS CONT. | | 46 | VIDEO DET COIL | |
| 43 | SYNC OUT | | 47 | VIDEO DET COIL | |
| | | | 48 | SIF IN | |

PAL SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN (cont.)

| Pin No. | Name | Peripheral circuit of pins |
|---------|------------|----------------------------|
| ④⑨ | AFT COIL | |
| ⑤① | AFT OUT | |
| ⑤① | VIDEO OUT | |
| ⑤② | RF AGC OUT | |