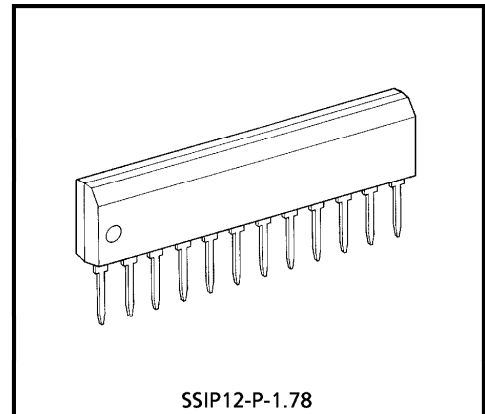


TA8703S

QUASI-SIF SYSTEM FOR TV

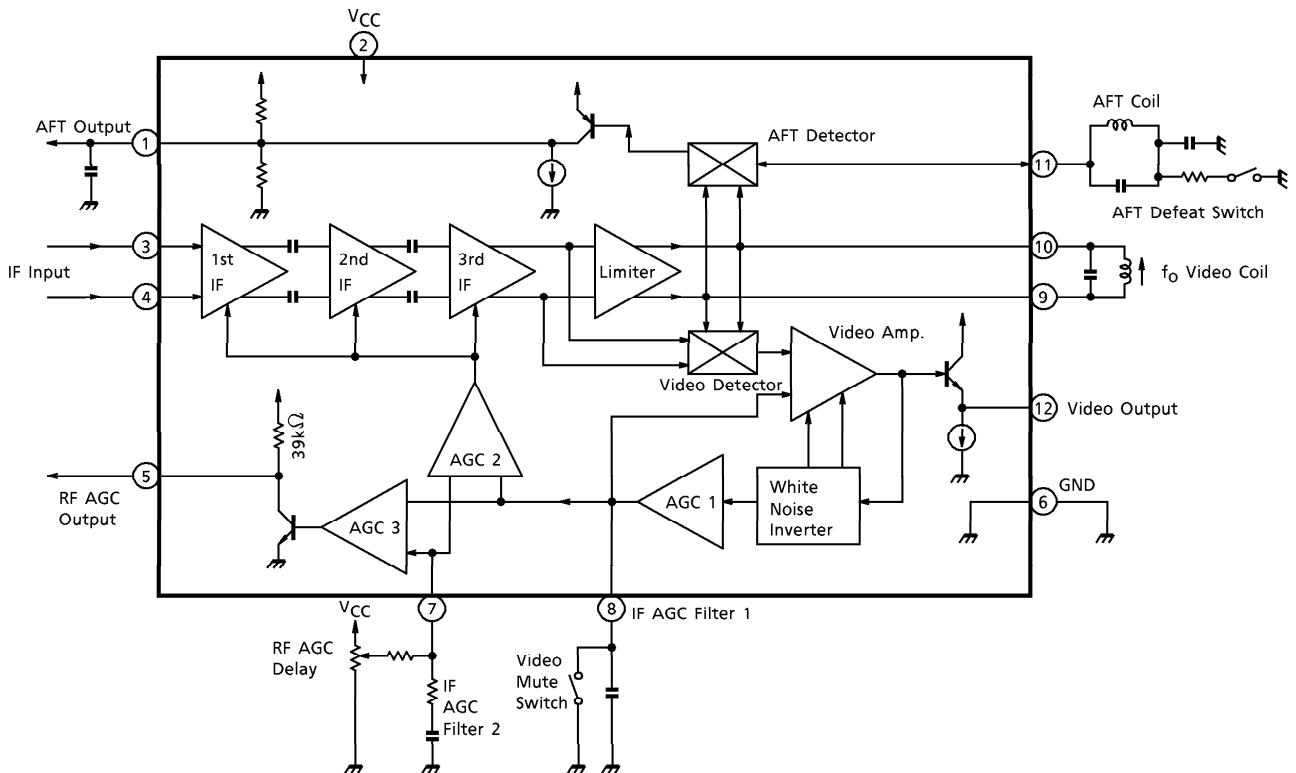
FEATURES

- QUASI-SIF IC for TV
- 3-stage, gain-controlled intermediate frequency (IF) amplifier
The IF amplifier has three stages. Automatic gain control (AGC) is used to control this 3-stage amplifier circuit.
- Doubled time constant for accelerated AGC response
AGC is peak value type.
- AFT voltage is output single-polarity with a defeat function.
- RF-AGC supplied to the tuner is reverse type.
- White noise inverter circuit.



Weight : 0.71g (Typ.)

BLOCK DIAGRAM



961001EBA2

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TERMINAL FUNCTION

| PIN No. | PIN NAME | FUNCTION | INTERFACE CIRCUIT |
|---------|---------------|--|-------------------|
| 1 | AFT Output | AFT signal output. | |
| 2 | IF VCC | IF circuit power supply. Connect a capacitor between pins 2 and 6. | — |
| 3 4 | IF Input | IF amplifier input. The first stage of the IF amplifier is an emitter follower circuit, so input impedance is high. The input impedance value is $R = 2.5k\Omega$ (typ.) and $C = 4pF$ (typ.). | |
| 5 | RF AGC Output | Output pin for AGC (RF-AGC) supplied to the tuner. A $39k\Omega$ resistor is connected internally between pin 5 and the internal power supply terminal. | |
| 6 | PIF GND | GND terminal for the IF amplifier. Connect a capacitor between pins 2 and 6. | — |

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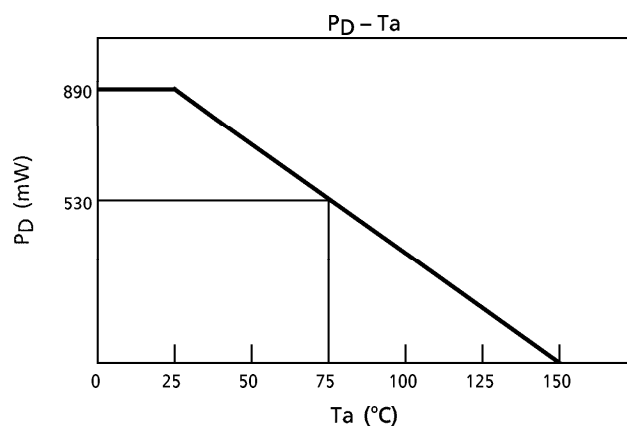
| PIN No. | PIN NAME | FUNCTION | INTERFACE CIRCUIT |
|---------|------------|---|-------------------|
| 7 8 | AGC Filter | Terminal used to connect a CR filter for AGC. To accelerate AGC response, the CR filter time constant is doubled. Connecting these terminals to GND considerably reduces the amplitude of the video output signal (pin 12 output signal). (Video mute is applied.) | |
| 9 10 | Video Coil | Connects video signal detector coil. | |
| 11 | AFT Coil | Connects the AFT coil. When control current is supplied to pin 11 for the AFT coil, the amount of current varies in response to small differences between the frequency of the control signal and that of the coil resonant. The current is supplied to the resistor and the amount of current is converted to the amount of voltage. The external circuit configuration is simple. Just connect the AFT coil to the terminal. Connecting a resistor of 5.1kΩ between pin 11 and the GND terminal switches to AFT defeat mode (defeats the AFT function). | |

| PIN No. | PIN NAME | FUNCTION | INTERFACE CIRCUIT |
|---------|-------------------------|---|-------------------|
| 12 | Video Signal Output Pin | Output signal supplied to the sound IF (SIF) circuit. | |

MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|-----------------------|-----------------------|----------|------|
| Supply Voltage | V _{CC} | 15 | V |
| Power Dissipation | P _D (Note) | 890 | mW |
| Operating Temperature | T _{opr} | - 25~75 | °C |
| Storage Temperature | T _{stg} | - 55~150 | °C |

(Note) When using the device at above Ta = 25°C, decrease the power dissipation by 7.12mW for each increase of 1°C.



RECOMMENDED SUPPLY VOLTAGE

| PIN No. | PIN NAME | MIN. | TYP. | MAX. | UNIT |
|---------|-----------------|------|------|------|------|
| 2 | V _{CC} | 8.1 | 9.0 | 9.9 | V |

ELECTRICAL CHARACTERISTICS

DC CHARACTERISTICS (unless otherwise specified, $V_{CC} = 9V$, $T_a = 25^\circ C$)

| CHARACTERISTIC | SYMBOL | TEST CIR-CUIT | TEST CONDITION | MIN. | TYP. | MAX. | UNIT | |
|------------------|----------|---------------|----------------|--------|------|------|------|---|
| Supply Current | I_{CC} | 1 | — | 18 | 28 | 38 | mA | |
| Terminal Voltage | Pin 1 | V_1 | 1 | — | 3.3 | 4.4 | 5.5 | V |
| | Pin 3 | V_3 | | — | 3.6 | 4.0 | 4.4 | |
| | Pin 4 | V_4 | | — | 3.6 | 4.0 | 4.4 | |
| | Pin 5 | $V_5(1)$ | | SW : A | 8.8 | — | — | |
| | | $V_5(2)$ | | SW : B | — | — | 0.1 | |
| | Pin 9 | V_9 | | — | 5.6 | 6.2 | 6.8 | |
| | Pin 10 | V_{10} | | — | 5.6 | 6.2 | 6.8 | |
| | Pin 11 | V_{11} | | — | 2.5 | 3.0 | 3.5 | |
| Pin 12 | V_{12} | — | 4.0 | 4.5 | 5.0 | | | |

AC CHARACTERISTICS (unless otherwise specified, $V_{CC} = 9V$, $T_a = 25^\circ C$, with specified coil)

| CHARACTERISTIC | SYMBOL | TEST CIR-CUIT | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|------------------------------|-----------------------|---------------|----------------|------|------|------|--------------|
| Input Sensitivity | V_{INMIN} | 2 | (Note 1) | 30 | 35 | 40 | $dB_{\mu V}$ |
| Maximum Input Voltage | V_{INMAX} | 2 | — | 90 | 95 | — | $dB_{\mu V}$ |
| IF AGC Range | ΔA | 2 | (Note 2) | 50 | 60 | — | dB |
| Differential Gain | DG | 3 | (Note 3) | — | — | 20 | % |
| Differential Phase | DP | | | — | — | 5 | ° |
| No-signal Output Level | V_{12} | 2 | (Note 4) | 4.0 | 4.5 | 5.5 | V |
| Sync Tip Level | V_{SYNC} | 2 | (Note 5) | 2.15 | 2.35 | 2.55 | V |
| Video Output Amplitude | V_{OUT} | 2 | (Note 6) | 1.35 | 1.65 | 1.95 | V_{p-p} |
| White Noise Inverter Level | V_{WTH} | 2 | (Note 7) | — | 5.2 | — | V |
| White Noise Clamp Level | V_{WCL} | | | — | 3.5 | — | |
| Carrier Wave Rejection Ratio | C_L | 4 | (Note 8) | 40 | — | — | dB |
| Harmonic Rejection Ratio | I_{2nd} | 4 | (Note 9) | 40 | — | — | dB |
| AFT Sensitivity | $\Delta F / \Delta V$ | 2 | (Note 10) | 20 | 25 | 35 | kHz/V |
| AFT Output Voltage | Min. V_L | 2 | — | — | 0.1 | 0.5 | V |
| | Max. V_U | | | 8.0 | 8.8 | — | |
| Inter Modulation | I_{920} | 4 | (Note 11) | 30 | 38 | — | dB |

TEST CONDITIONS

(Note 1) Input sensitivity

Input the following signal (PIF signal) to pins 3 and 4.

Center (carrier wave) frequency $f_O = 58.75\text{MHz}$

Frequency of modulation signal $f_m = 15.7\text{kHz}$

Percentage modulation (AM modulation) = 30%

Signal amplitude (signal level) = $84\text{dB}\mu\text{V}$

Measure the amplitude (level) of the input signal when the amplitude of output level of the IC (pin 12 output signal) = $0.6\text{V}_{\text{p-p}}$.

(Note 2) IF AGC range

When pin 7 voltage = 9V , measure, as V_1 , the amplitude (level) of the input signal when the amplitude of the output signal of the IC (pin 12 output signal) = $0.6\text{V}_{\text{p-p}}$.

Next, when the pin 7 voltage = 3V , measure the amplitude (level) of the input signal as V_2 with this IC output signal (pin 12 output signal) = $0.6\text{V}_{\text{p-p}}$.

Substitute those values, V_1 and V_2 , in the following expression and determine ΔA .

$$\Delta A = 20 \log (V_1 / V_2)$$

(Note 3) Differential gain, differential phase

Input the following (PIF) signal to pins 3 and 4.

Center (carrier wave) frequency $f_O = 58.75\text{MHz}$

Modulation signal is the ramp waveform signal.

Percentage modulation (AM modulation) = 87.5%

Signal amplitude (signal level) = $84\text{dB}\mu\text{V}$

Adjust the AGC voltage (pin 7 voltage) externally supplied to this IC so that the amplitude of the sync signal part of the output signal (pin 12 output signal) of the IC is 2.0V .

In the above state, measure the differential gain (DG) and differential phase (DP).

(Note 4) No-signal output level

When no signals are input to pins 3 and 4 (PIF signal), measure the DC voltage of the output signal of the IC (pin 12 output signal).

Use a probe with input capacitance of 10pF ($C_{in} = 10\text{pF}$).

(Note 5) Sync. tip level

Input the following signal (PIF signal) to pins 3 and 4.

Center (carrier wave) frequency $f_O = 58.75\text{MHz}$

Modulation signal : 100% white video signal

Percentage modulation (AM modulation) = 87.5%

Signal amplitude (signal level) = $84\text{dB}\mu\text{V}$

In the above state, measure the DC voltage of the sync tip level part of the output signal of the IC (pin 12 output signal).

(Note 6) Video output amplitude

Measure the amplitude of the video signal part of the output signal of the IC (pin 12 output signal).

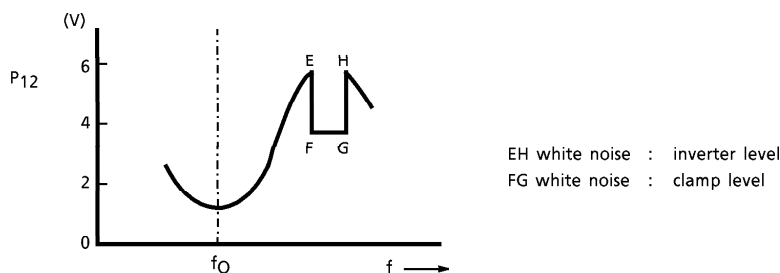
(Note 7) White noise inverter level, white noise clamp level

Input the following signals to pins 3 and 4.

Signal obtained by sweeping the frequency between 57 to 65MHz.

Signal amplitude (signal level) = 84dB μ V

In this state, when the voltage on pin 7 is changed, measure the amplitude change of the output signal of the IC (pin 12 output signal), graph the result as shown below.



(Note 8) Carrier wave rejection ratio

Input the following (PIF signal) to pins 3 and 4.

Center (carrier wave) frequency $f_0 = 58.75\text{MHz}$

Modulation signal is 100% white video signal.

Percentage modulation (AM modulation) = 87.5%

Signal amplitude (signal level) = 84dB μ V

Adjust the pin 7 voltage so that the amplitude of the IC output signal (pin 12 output signal) = 2.0V_{p-p}.

In this state, change the input signal (PIF signal) to an unmodulated signal (percentage modulation = 0%), then measure the amplitude of the carrier wave signal (leakage amount of carrier wave signal) included in the pin 12 output signal.

Determine the relative value (dB value) of the measured leakage amount using 2V_{p-p} as a reference value.

(Note 9) Harmonic rejection ratio

Under the same conditions as (Note 8), measure the leakage amount of the second harmonic signal, then determine the relative value (dB value) of the measured leakage amount using 2V_{p-p} as a reference value.

(Note 10) AFT sensitivity

Input the following signal (PIF signal) to pins 3 and 4.

Unmodulated signal (carrier wave) of frequency $f_0 = 58.75\text{MHz}$.

signal amplitude (signal level) = 84dB μ V

After adjusting the video detector coil, adjust the AFT coil so that the AFT output voltage (pin 1 output voltage) = 4.5V.

In this state, alter the frequency of the input signal and measure the change in the AFT output voltage (pin 1 output voltage) versus the change in frequency.

(Note 11) Inter modulation

Composite the following three signals, then input the result as the PIF signal to pins 3 and 4.

Signal with frequency of 58.75MHz and signal amplitude (picture signal) of 84dB μ V

Signal with frequency of 54.25MHz and signal amplitude (sound signal) of 78dB μ V

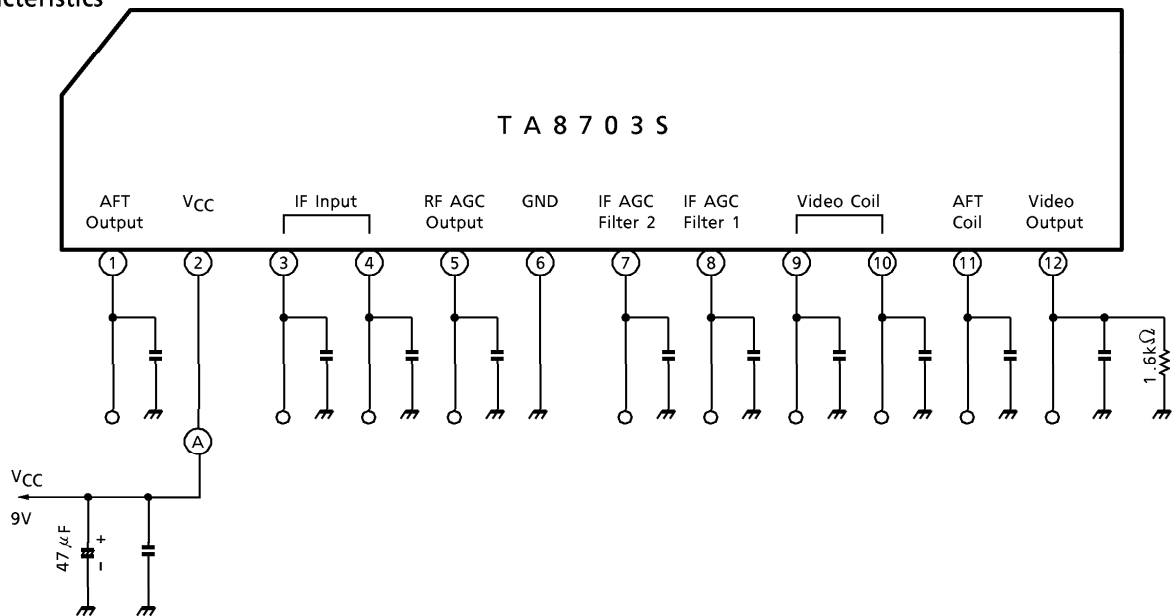
Signal with frequency of 55.17MHz and signal amplitude (chroma signal) of 78dB μ V

Next, adjust the AGC voltage (pin 7 externally supplied voltage) supplied externally to the IC so that the amplitude of the sync tip level part of the output signal of the IC (pin 12 output signal) = 2.0V.

In this state, measure the amplitude of the chroma signal included in the output signal of the IC (pin 12 output signal) and the amplitude of the 920kHz signal, then determine the difference between the measured amplitude values.

TEST CIRCUIT 1.

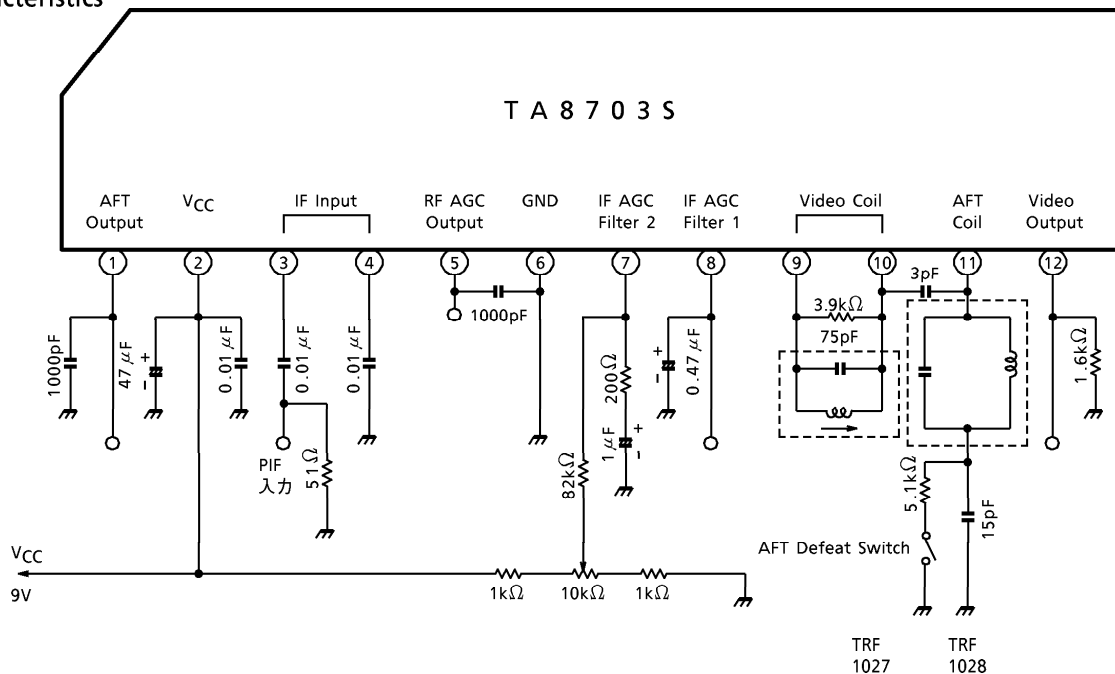
DC characteristics



In test circuit 1, capacitors without specified values are 0.01µF.

TEST CIRCUIT 2.

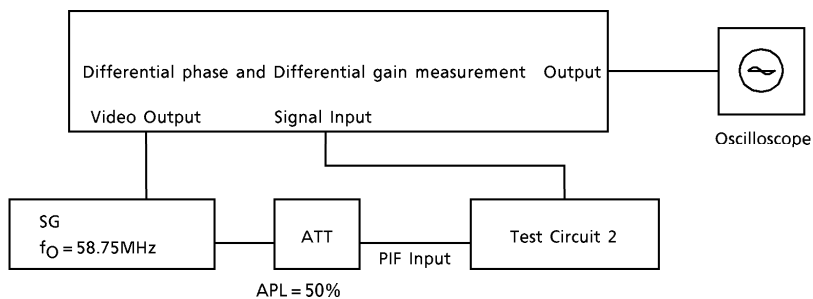
AC characteristics



TEST CIRCUIT 3.

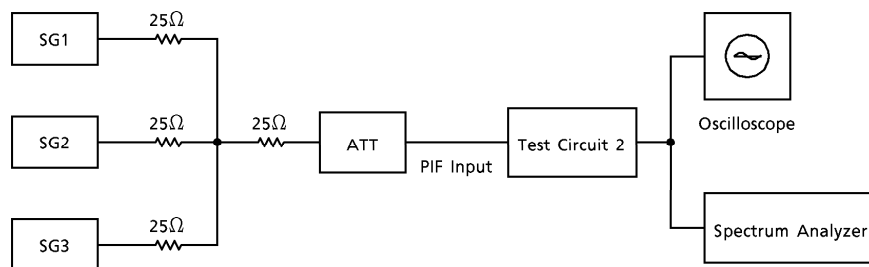
Differential phase, Differential gain

Measuring instrument for Differential phase and gain

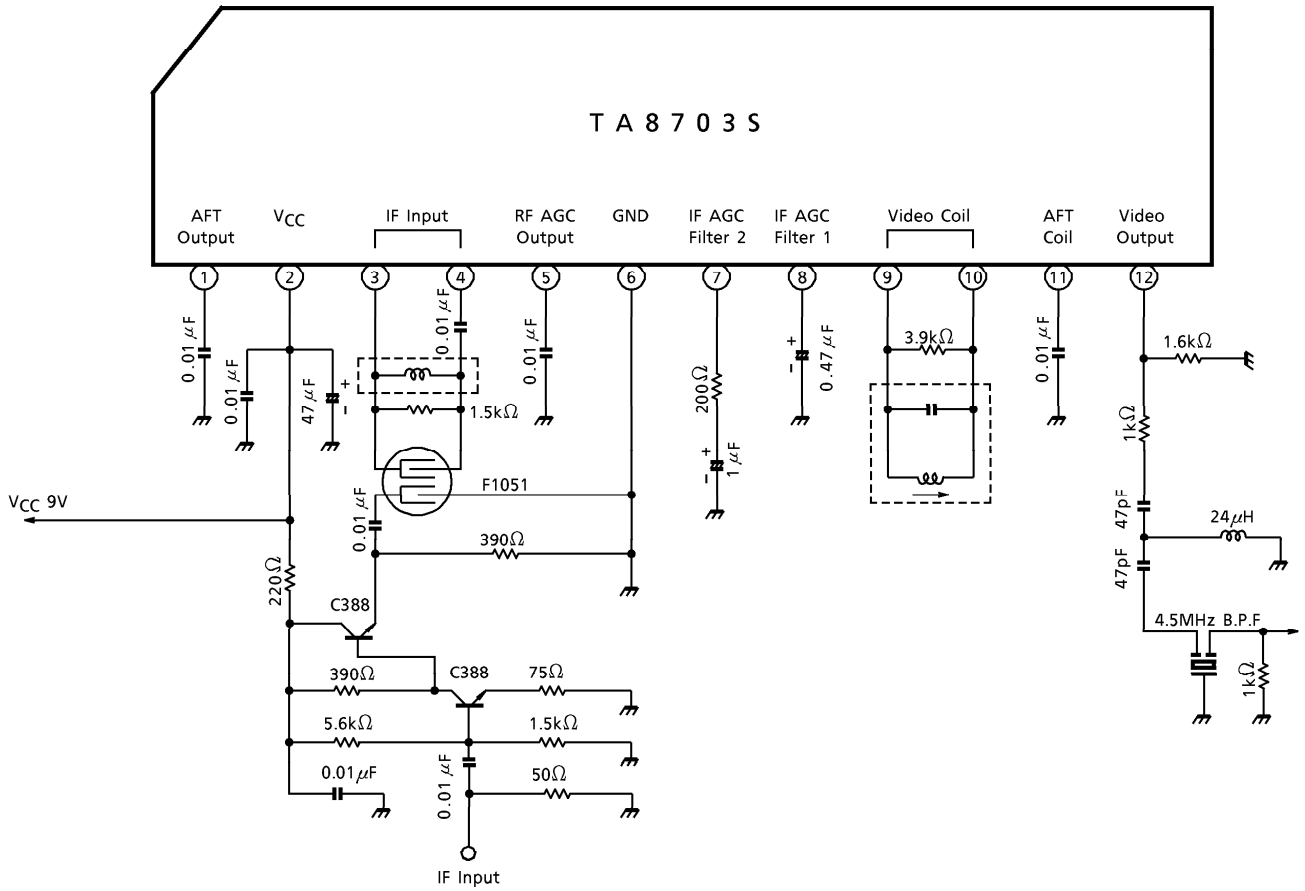


TEST CIRCUIT 4.

Carrier wave, Second harmonic rejection ratio, Intermodulation

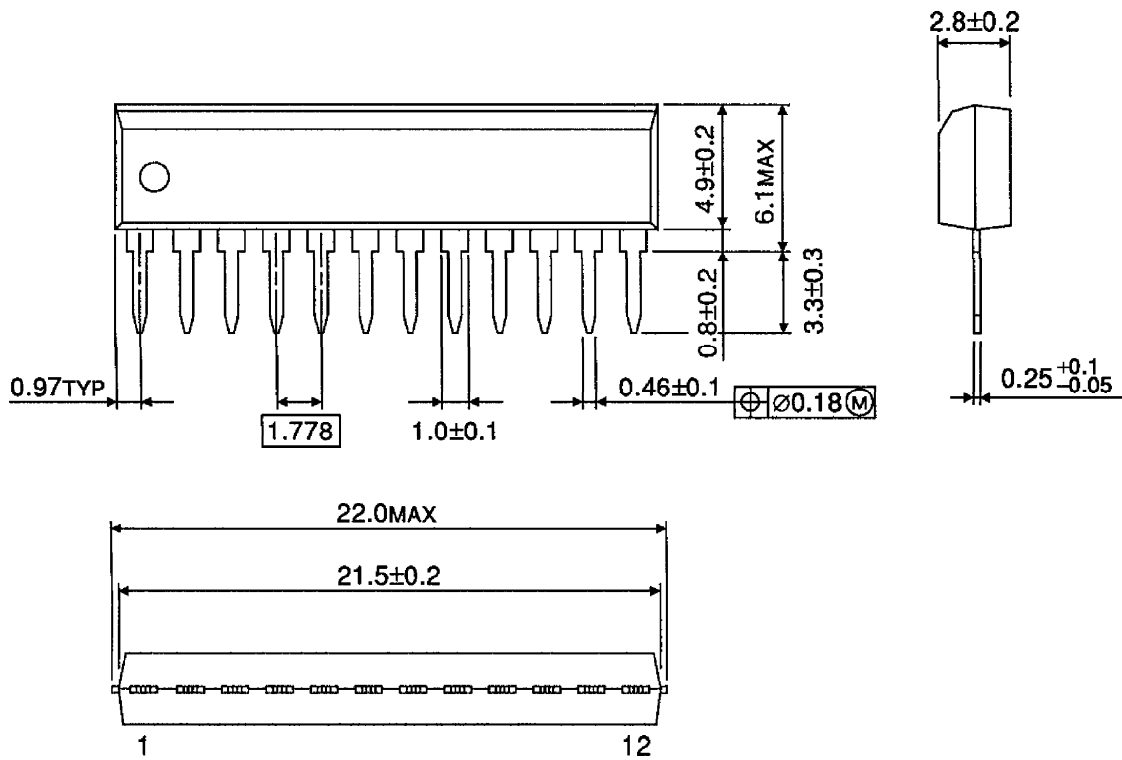


APPLICATION CIRCUIT



OUTLINE DRAWING
SSIP12-P-1.78

Unit : mm



Weight : 0.71g (Typ.)