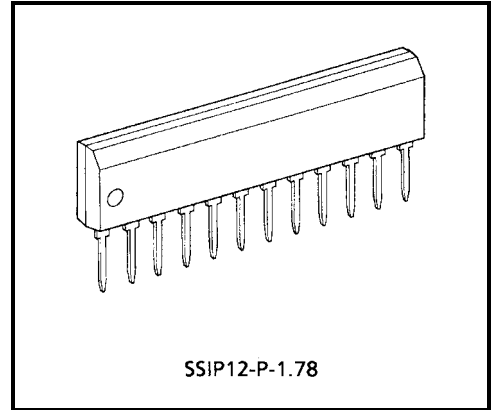


TA8703S

QUASI-SIF SYSTEM FOR TV

FEATURES

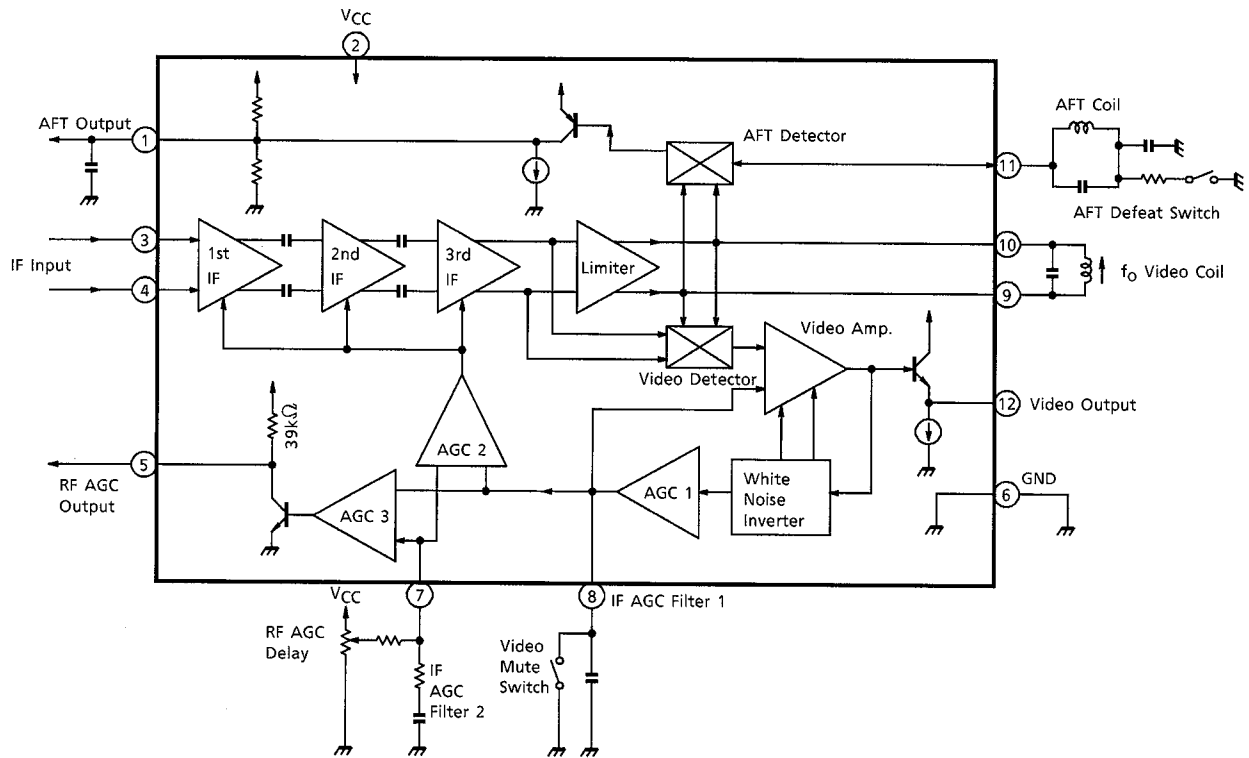
- QUASI-SIF IC for TV
- 3-stage, gain-controlled intermediate frequency (IF) amplifier
The IF amplifier has three stages. Automatic gain control (AGC) is used to control this 3-stage amplifier circuit.
- Doubled time constant for accelerated AGC response
- AGC is peak value type.
- AFT voltage is output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



SSIP12-P-1.78

BLOCK DIAGRAM

Weight: 0.71 g (Typ.)



000707EBA2

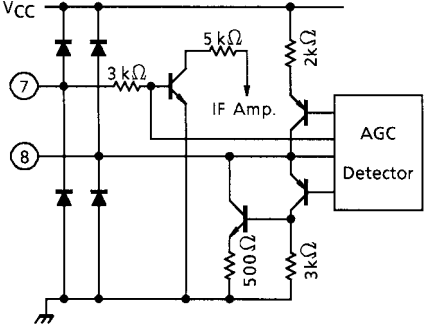
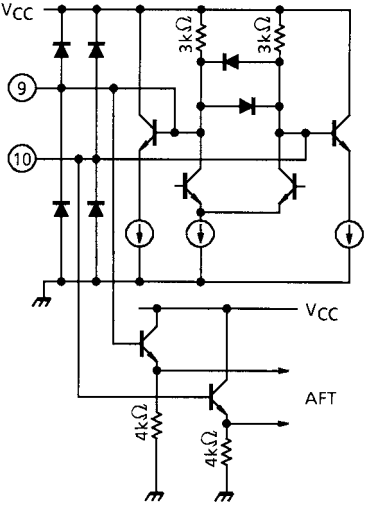
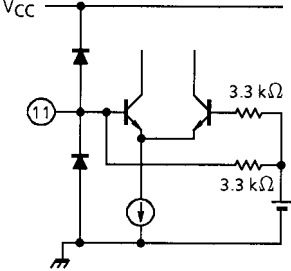
• TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..

TERMINAL FUNCTION

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
1	AFT Output	AFT signal output.	
2	IF V _{CC}	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 = 2.5 kΩ (typ.) and C = 4 pF (typ.).	
5	RF AGC Output	Output pin for AGC (RF-AGC) supplied to the tuner. A 39 kΩ 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.	—

000707EBA2

- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- The products described in this document are subject to the foreign exchange and foreign trade laws.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

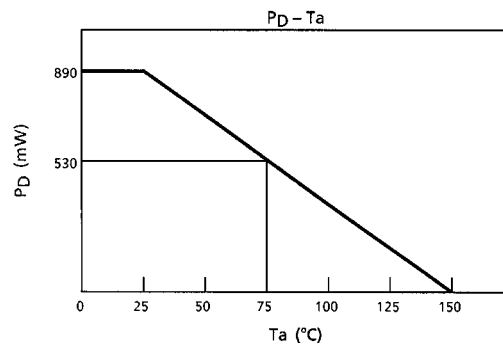
PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
7 8	AGC Filter	<p>Terminal used to connect a CR filter for AGC.</p> <p>To accelerate AGC response, the CR filter time constant is doubled. Connecting these terminals to GND considerably reduces the amplitude of the video output signal (pin 12 output signal). (Video mute is applied.)</p>	
9 10	Video Coil	Connects video signal detector coil.	
11	AFT Coil	<p>Connects the AFT coil.</p> <p>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.</p> <p>The external circuit configuration is simple. Just connect the AFT coil to the terminal.</p> <p>Connecting a resistor of 5.1 kΩ between pin 11 and the GND terminal switches to AFT defeat mode (defeats the AFT function).</p>	

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 7.12 mW 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, $V_{CC} = 9\text{ V}$, $T_a = 25^\circ\text{C}$)

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	—	—	
				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, $V_{CC} = 9\text{ V}$, $T_a = 25^\circ\text{C}$, 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 μ V
Maximum Input Voltage		V_{INMAX}	2	—	90	95	—	dB μ 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 $f_0 = 58.75$ MHz

Frequency of modulation signal $f_m = 15.7$ kHz

Percentage modulation (AM modulation) = 30%

Signal amplitude (signal level) = 84 dB μ V

Measure the amplitude (level) of the input signal when the amplitude of output level of the IC (pin 12 output signal) = 0.6 V_{p-p}.

Note 2: IF AGC range

When pin 7 voltage = 9 V, 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 V_{p-p}.

Next, when the pin 7 voltage = 3 V, measure the amplitude (level) of the input signal as V_2 with this IC output signal (pin 12 output signal) = 0.6 V_{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 $f_0 = 58.75$ MHz

Modulation signal is the ramp waveform signal.

Percentage modulation (AM modulation) = 87.5%

Signal amplitude (signal level) = 84 dB μ 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 2.0 V.

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 10 pF ($C_{in} = 10$ pF).

Note 5: Sync. tip level

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

Center (carrier wave) frequency $f_0 = 58.75$ MHz

Modulation signal : 100% white video signal

Percentage modulation (AM modulation) = 87.5%

Signal amplitude (signal level) = 84 dB μ 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).

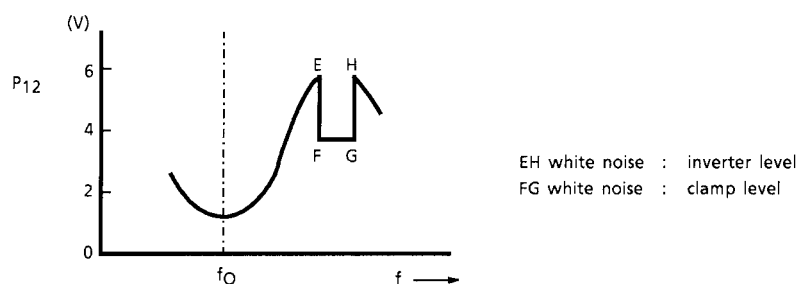
Note 7: White noise inverter level, white noise clamp level

Input the following signals to pins 3 and 4.

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

Signal amplitude (signal level) = 84 dB 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 $f_0 = 58.75$ MHz

Modulation signal is 100% white video signal.

Percentage modulation (AM modulation) = 87.5%

Signal amplitude (signal level) = 84 dB μ V

Adjust the pin 7 voltage so that the amplitude of the IC output signal (pin 12 output signal) = 2.0 V_{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 2 V_{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 2 V_{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 $f_0 = 58.75$ MHz.

signal amplitude (signal level) = 84 dB μ V

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

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

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

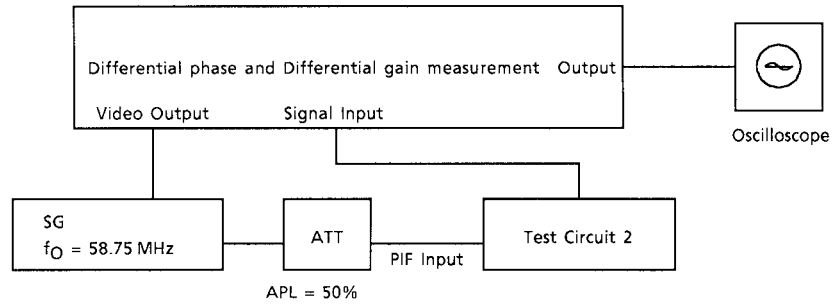
Signal with frequency of 55.17 MHz and signal amplitude (chroma signal) of 78 dB μ V

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) = 2.0 V.

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 920 kHz signal, then determine the difference between the measured amplitude values.

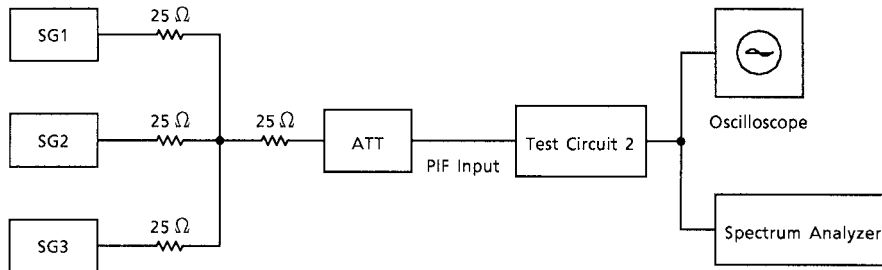
TEST CIRCUIT 3.

Differential phase, Differential gain
Measuring instrument for Differential phase and gain



TEST CIRCUIT 4.

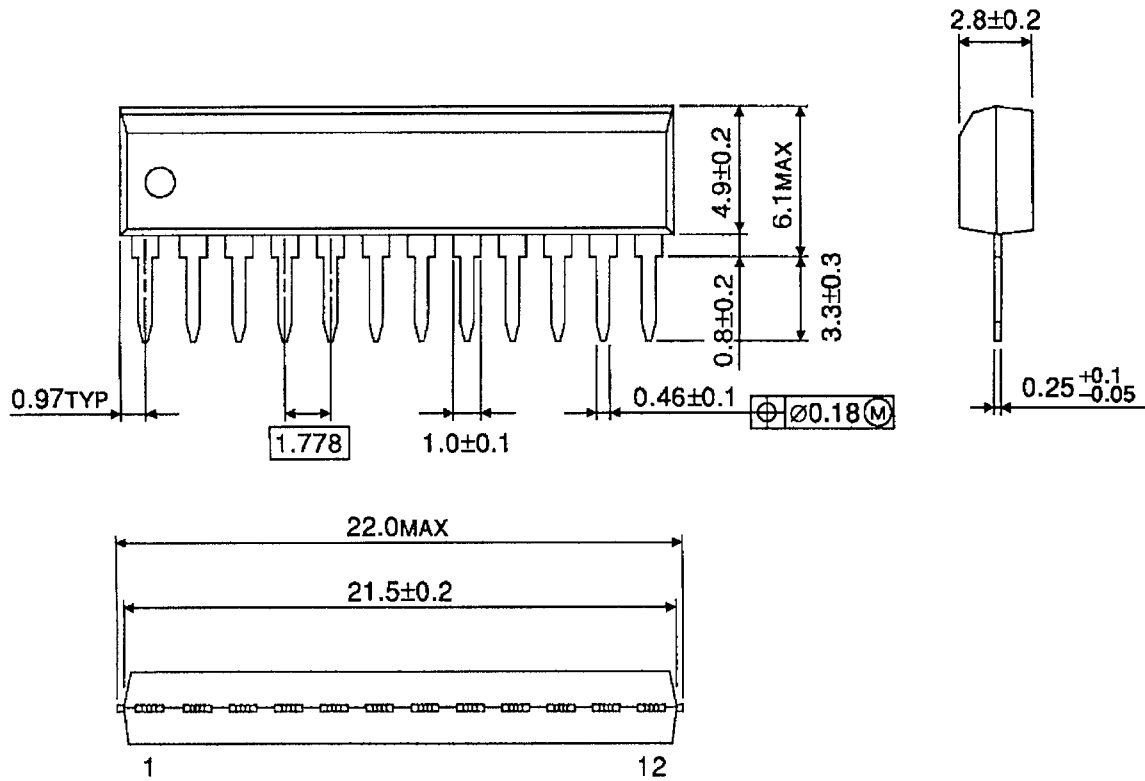
Carrier wave, Second harmonic rejection ratio, Intermodulation



PACKAGE DIMENSIONS

SSIP12-P-1.78

Unit: mm



Weight: 0.71 g (Typ.)