

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

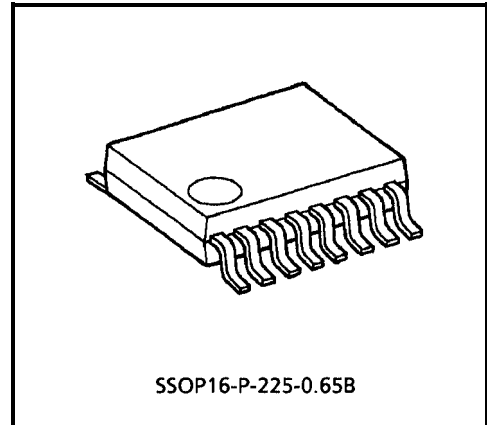
# TA1290FN

PIF IC FOR TV

## FEATURES

- RF Pre Amp. less by high input sensitivity
- 3-stage IF amplifier with variable gain
- High-speed response AGC with dual time constants
- Single AFT output with defeat function
- Delayed RF AGC output (reverse AGC)
- Output with white / black noise inverter
- Output without white / black noise inverter
- Video mute switch

www.DataSheet4U.com



Weight: 0.07g (Typ.)

000707EBA1

• 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..

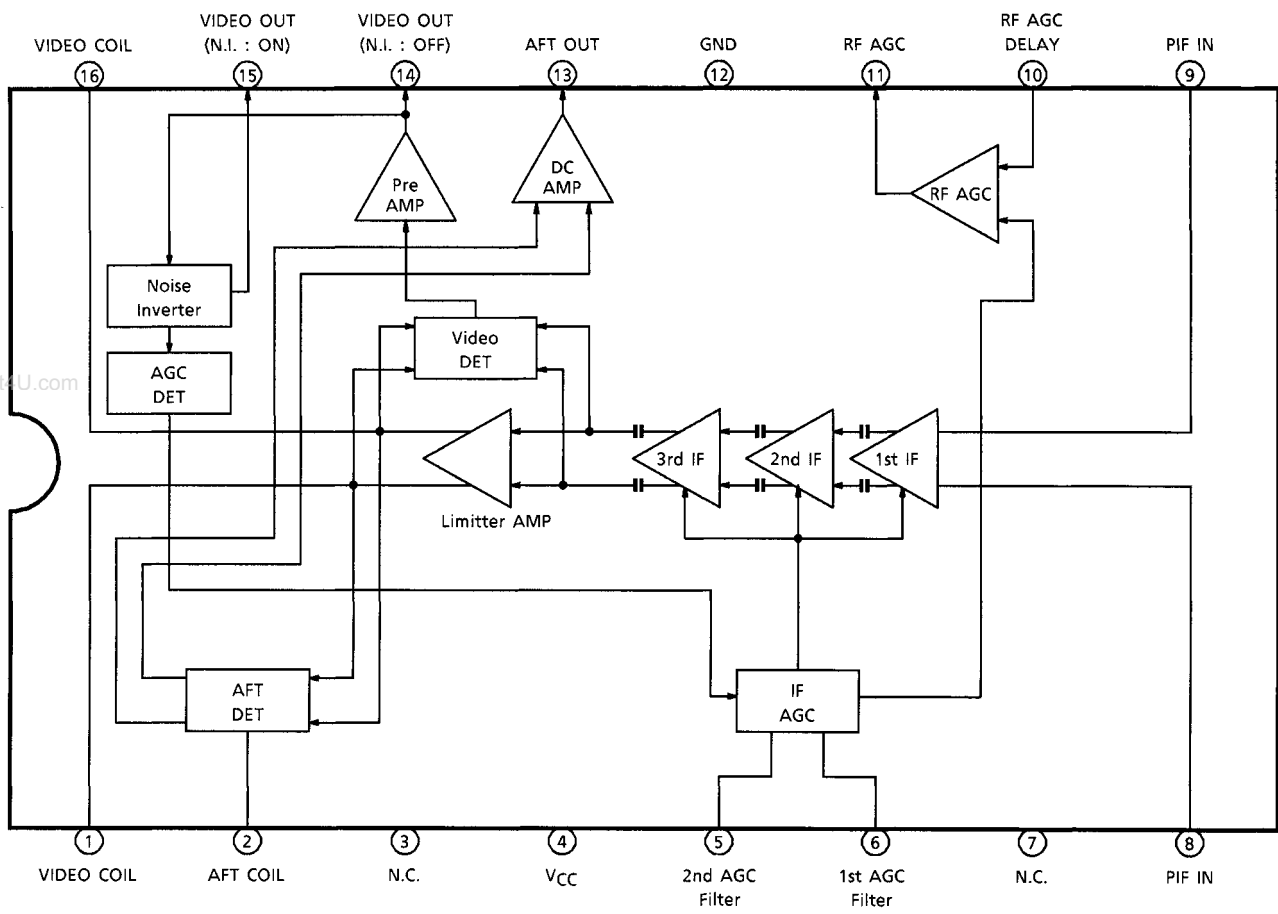
• The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment 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.

## BLOCK DIAGRAM



TERMINAL FUNCTION

PIN No	PIN NAME	FUNCTION	INTERFACE
1 16	Video Coil	Connect video detection coil.	
2	AFT Coil	Connect AFT detection coil. AFT output is defeated when this terminal is connected to GND.	
3	N.C.	—	—
4	V <sub>CC</sub>	Connect bypass capacitor between this terminal and PIF GND with shortest wiring. (Typ. : 9V)	—
5 6	2nd AGC Filter 1st AGC Filter	This IC is adopted dual time constant AGC circuit to improve AGC responsibility. To mute picture, connect pin 6 with GND.	

PIN No	PIN NAME	FUNCTION	INTERFACE
7	N.C.	—	—
8 9	PIF Input	PIF input terminal. Input impedance is 2.5kΩ, 4pF.	
10	RF AGC Delay	Changing comparator reference voltage adjusts RF AGC delay point.	
11	RF AGC Out	RF AGC output terminal. (open collector output) Resistor (39kΩ) is connected internally between this terminal and V <sub>CC</sub> .	
12	PIF GND	Connect bypass capacitor between this terminal and PIF GND with shortest wiring.	—
13	AFT Out	AFT detector output terminal.	
14	Video Out (With Noise Inverter)	Video signal output terminal. (with noise inverter) To mute picture, connect pin 6 with GND.	

www.DataSheet4U.com

PIN No.	PIN NAME	FUNCTION	INTERFACE
15	Video Out (Without Noise Inverter)	Video signal output terminal. (without noise inverter) To mute picture, connect pin 6 with GND.	

## MAXIMUM RATINGS (Ta = 25°C)

PIN No.	SYMBOL	RATING	UNIT
Power Supply Voltage	V <sub>CC</sub>	15	V
Power Dissipation	P <sub>D</sub> (Note)	781	mW
Operating Temperature	T <sub>opr</sub>	-20~65	°C
Storage Temperature	T <sub>stg</sub>	-55~150	°C

Note: Mounted on the circuit board.

When using the device at above Ta = 25°C, decrease the power dissipation by 6.25mW for each increase of 1°C.

## RECOMMENDED POWER SUPPLY

PIN No.	SYMBOL	MIN	TYP.	MAX	UNIT
4	V <sub>CC</sub>	8.1	9.0	9.9	V

## ELECTRIC CHARACTERISTICS

### DC CHARACTERISTICS

(Unless otherwise specified, V<sub>CC</sub> = 9V, Ta = 25°C, SW<sub>1</sub> : ON, SW<sub>2</sub> : ON)

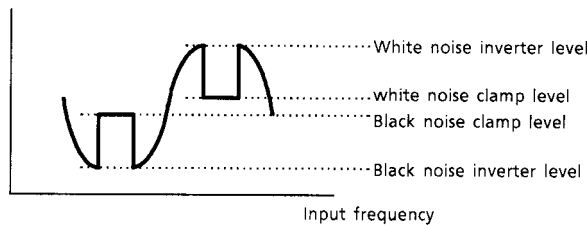
CHARACTERISTICS	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT	
Supply Current	I <sub>CC</sub>	1	—	20	29	38	mA	
Terminal Voltage	Pin 1		V <sub>1</sub>	—	5.8	6.3	6.8	V
	Pin 2		V <sub>2</sub>	—	2.3	2.8	3.3	
	Pin 8		V <sub>8</sub>	SW <sub>1</sub> : OFF	3.5	4.0	4.5	
	Pin 9		V <sub>9</sub>	—	3.5	4.0	4.5	
	Pin 10		V <sub>10</sub>	SW <sub>2</sub> : OFF	5.7	6.2	6.7	
	Pin 13		V <sub>13</sub>	—	2.5	4.0	5.5	
	Pin 14		V <sub>14</sub>	—	4.2	4.7	5.2	
	Pin 15		V <sub>15</sub>	—	4.2	4.7	5.2	
Pin 16	V <sub>16</sub>		—	5.8	6.3	6.8		

**AC CHARACTERISTICS (Unless otherwise specified,  $V_{CC} = 9V$ ,  $T_a = 25^\circ C$ )**  
**PIF CHARACTERISTICS (Using recommended coil)**

CHARACTERISTICS		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TY.P	MAX	UNIT
Input Signal Voltage sensitivity		$V_{in}$ Min	2	(Note 1)	36	41	46	dB $\mu$ V
Maximum Input Signal Voltage		$V_{in}$ Max		(Note 2)	100	110	—	dB $\mu$ V
Differential Gain		DG		(Note 3)	—	—	8	%
Differential phase		DP			—	—	6	°
Output Voltage at No Signal		$V_{14}$ , $V_{15}$		(Note 4)	4.0	4.6	5.2	V
Sync. Voltage Level		$V_{sync}$		(Note 5)	2.0	2.3	2.6	V
Output Signal Voltage		$V_{out}$		(Note 6)	1.7	2.0	2.3	$V_{p-p}$
White Noise Inverter Level		$V_{wth}$		(Note 7)	—	5.0	—	V
White Noise Clamp Level		$V_{wcl}$			—	3.8	—	
Black Noise Inverter Level		$V_{bth}$			0.9	1.2	1.5	
Black Noise Clamp Level		$V_{bcl}$			3.2	3.5	3.8	
Suppression of Career		CR		(Note 8)	40	—	—	dB
Suppression of Career Harmonics		HR		(Note 9)	40	—	—	dB
AFT Control Steepness		$\Delta f / \Delta V$		(Note 10)	—	20	30	kHz / V
AFT Output	Min.	$V_l$		—	—	0.1	0.5	V
	Max.	$V_h$			8.4	8.7	—	
Intermodulation		IM		(Note 11)	30	38	—	dB

## TEST CONDITION

- Note 1: Input signal voltage sensitivity  
 PIF input :  $f_p = 58.75\text{MHz}$ ,  $f_m = 15.75\text{kHz}$ , 30%AM, 84dB $\mu$ V  
 Measure output video signal voltage (15-a, that voltage is 0dB). Lower input signal voltage gradually, measure input PIF signal voltage when output video signal voltage is -3dB.
- Note 2: Maximum input signal voltage  
 PIF input :  $f_p = 58.75\text{MHz}$ ,  $f_m = 15.75\text{kHz}$ , 30%AM, 84dB $\mu$ V  
 Raise input signal voltage gradually, measure input PIF signal voltage (15-a) when output video signal voltage is at the noise inverter threshold.
- Note 3: Differential gain / Differential phase  
 PIF input :  $f_p = 58.75\text{MHz}$ , Standard television signal (V / S = 10 : 4 ramp waveform), 87.5%AM, 84dB $\mu$ V  
 IF AGC : free  
 Measure deferential gain and deferential phase (15-b).
- Note 4: Output voltage at no signal  
 PIF input : no input  
 IF AGC : GND  
 Measure output video signal DC voltage (15-b).
- Note 5: Sync. voltage level  
 PIF input :  $f_p = 58.75\text{MHz}$ , Standard television signal (V / S = 10 : 4 ramp waveform), 87.5%AM, 84dB $\mu$ V  
 Measure sync. voltage level (15-b).
- Note 6: Output signal voltage  
 PIF input :  $f_p = 58.75\text{MHz}$ , Standard television signal (V / S = 10 : 4 ramp waveform), 87.5%AM, 84dB $\mu$ V  
 Measure output video signal voltage (15-b).
- Note 7: Noise inverter  
 PIF input :  $f_p = 57\sim 65\text{MHz}$  (sweep signal), 84dB $\mu$ V.  
 Connect monitor scope to video output (15-b). Supply DC voltage to 2nd AGC from external source. Controlling that voltage, measure noise inverter and clamp level when a waveform like that in the following figure is output.



Note 8: Suppression of career  
 PIF input :  $f_p = 58.75\text{MHz}$ ,  $f_m = 15.75\text{kHz}$ , 30%AM, 84dB $\mu\text{V}$   
 Add the 2nd AGC terminal from external power supply, so that the output video signal voltage (15-b) can be 2V $_{p-p}$ .  
 Turning modulation off, measure output career ( $V_{\text{career}}$  [V $_{p-p}$ ]) at pin 15. Calculate the following equation.

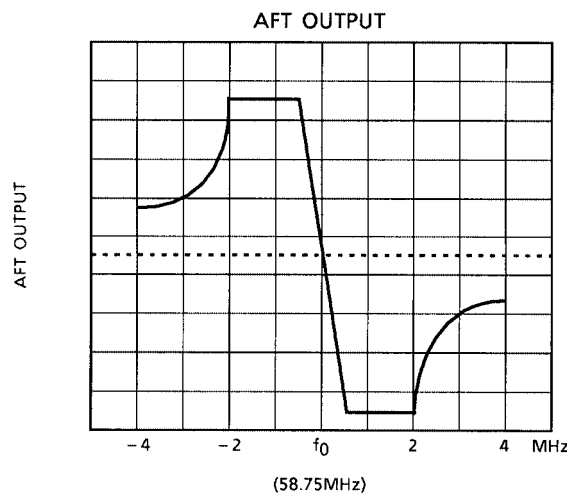
$$(\text{Suppression of career}) = 20 \log (2 / V_{\text{career}}) \text{ [dB]}$$

Note 9: Suppression of career harmonics  
 PIF input :  $f_p = 58.75\text{MHz}$ ,  $f_m = 15.75\text{kHz}$ , 30%AM, 84dB $\mu\text{V}$   
 Add the 2nd AGC terminal from external power supply, so that the output video signal voltage (15-b) can be 2V $_{p-p}$ .  
 Turning modulation off, measure output career (117.5MHz) level ( $V_{\text{career}}$  [V $_{p-p}$ ]) at pin 15. Calculate the following equation.

$$(\text{Suppression of career harmonics}) = 20 \log (2 / V_{\text{career}}) \text{ [dB]}$$

www.DataSheet4U.com

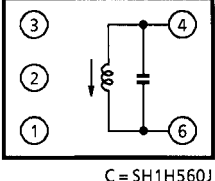
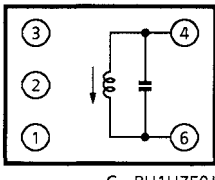
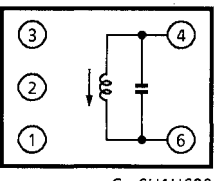
Note 10: AFT control steepness  
 PIF input :  $f_p = 58.75\text{MHz}$ , 84dB $\mu\text{V}$ , CW  
 Input the above signal and adjust the AFT coil so that the AFT output voltage is 4.5V.  
 Measure AFT output voltage of following conditions.  
 (input frequency = 58.74MHz) :  $V_{\text{AFT1}}$   
 (input frequency = 58.76MHz) :  $V_{\text{AFT2}}$   
 AFT control steepness is calculated by following equality.  
 (AFT control steepness) =  $\Delta f / \Delta V = 20 / (V_{\text{AFT1}} - V_{\text{AFT2}})$



Note 11: Intermodulation  
 Input following composite signals to the PIF input.  
 SG : 1      58.75MHz, 84dB $\mu\text{V}$  (picture career)  
 SG : 2      54.25MHz, 74dB $\mu\text{V}$  (sound career)  
 SG : 3      55.17MHz, 74dB $\mu\text{V}$  (chroma)  
 Supply DC voltage to 2nd AGC terminal from external source, so that bottom of output signal voltage (15-b) matches sync. tip level. Measure the difference of output signal voltage at pin 15 between 3.58MHz component (chroma) and 920kHz component.



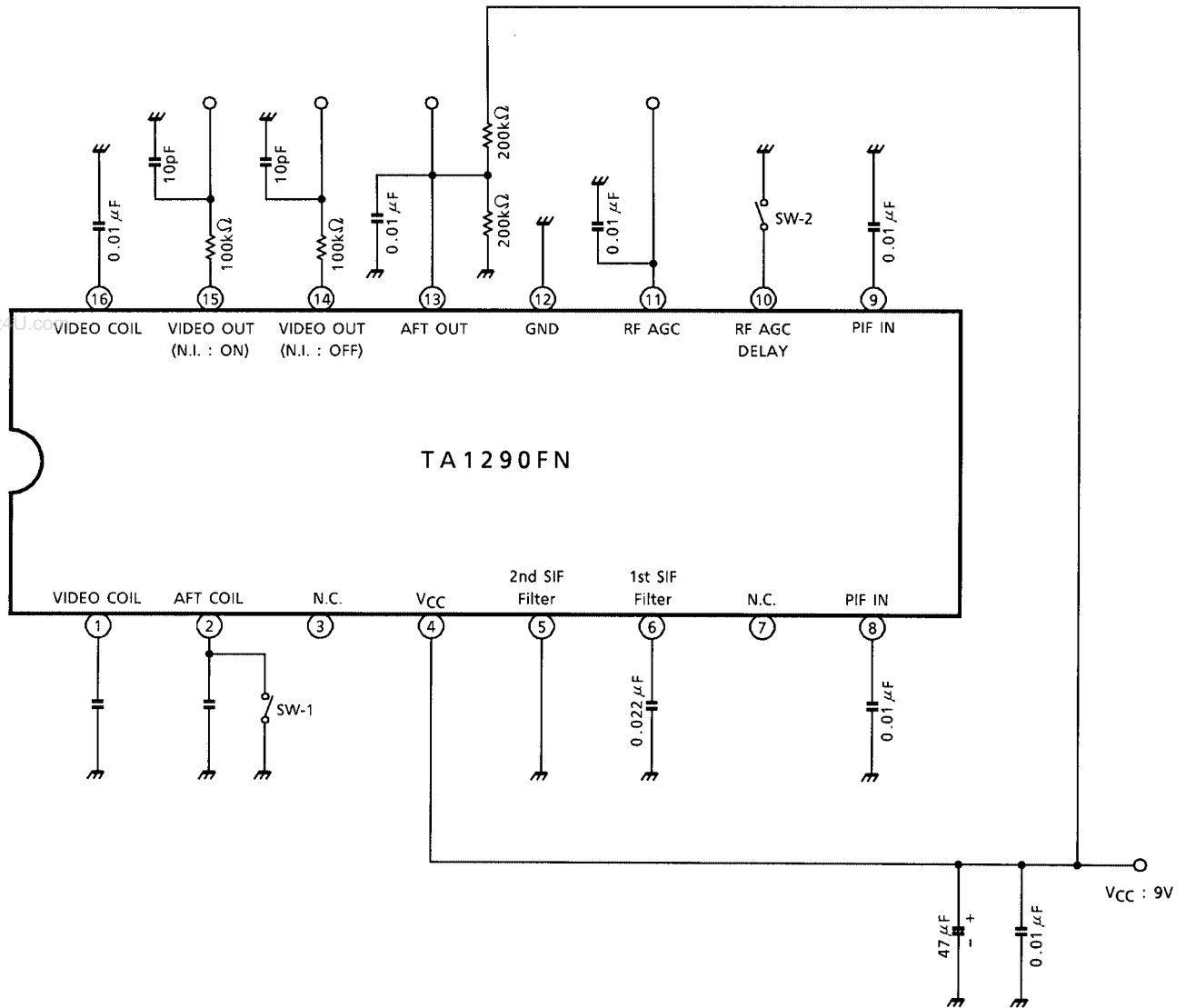
## COIL SPECIFICATION

COIL NAME	PART NUMBER	CONNECTION	SPECIFICATION	
AFT IF = 58.75MHz	292GCS-3388BS (TOKO)	 <p>C = SH1H560J</p>	f <sub>O</sub> MAX	Above 70MHz
			f <sub>O</sub> MIN	Below 61MHz
			Q (non-load)	46±20% (f <sub>O</sub> MIN)
PIF IF = 58.75MHz	292YCS-3390BS (TOKO)	 <p>C = RH1H750J</p>	f <sub>O</sub> MAX	Above 66.5MHz
			f <sub>O</sub> MIN	Below 61.8MHz
			Q (non-load)	17±20% (f <sub>O</sub> MIN)
PIF,AFT IF = 45.75MHz	T119KC-14969NK (TOKO)	 <p>C = SH1H680J</p>	f <sub>O</sub> MAX	57.2MHz-8% or above
			f <sub>O</sub> MIN	42.6MHz+8% or below
			Q (non-load)	69±25% (f <sub>O</sub> MIN)

www.DataSheet4U.com

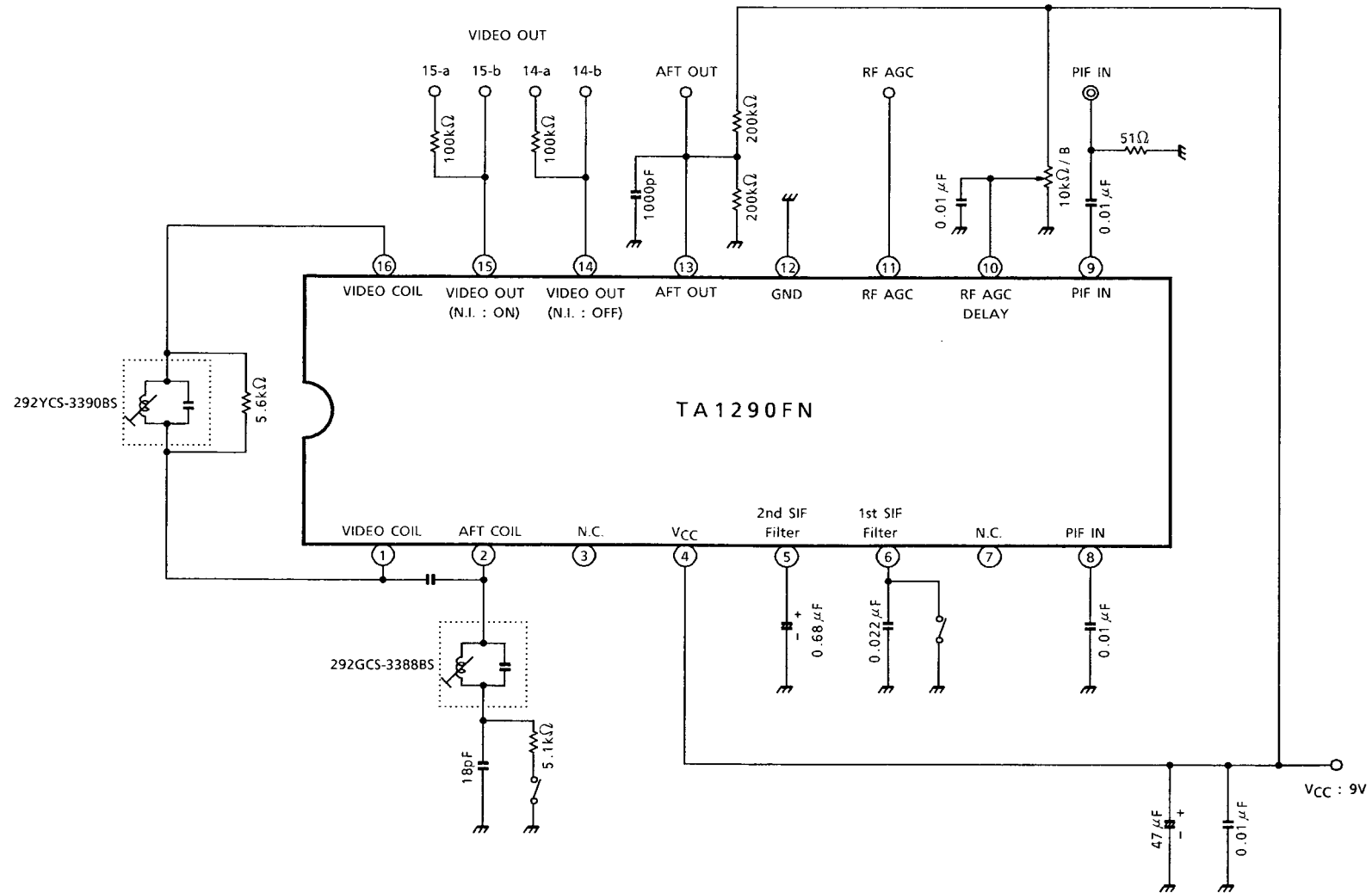
## TEST CIRCUIT 1

DC characteristic

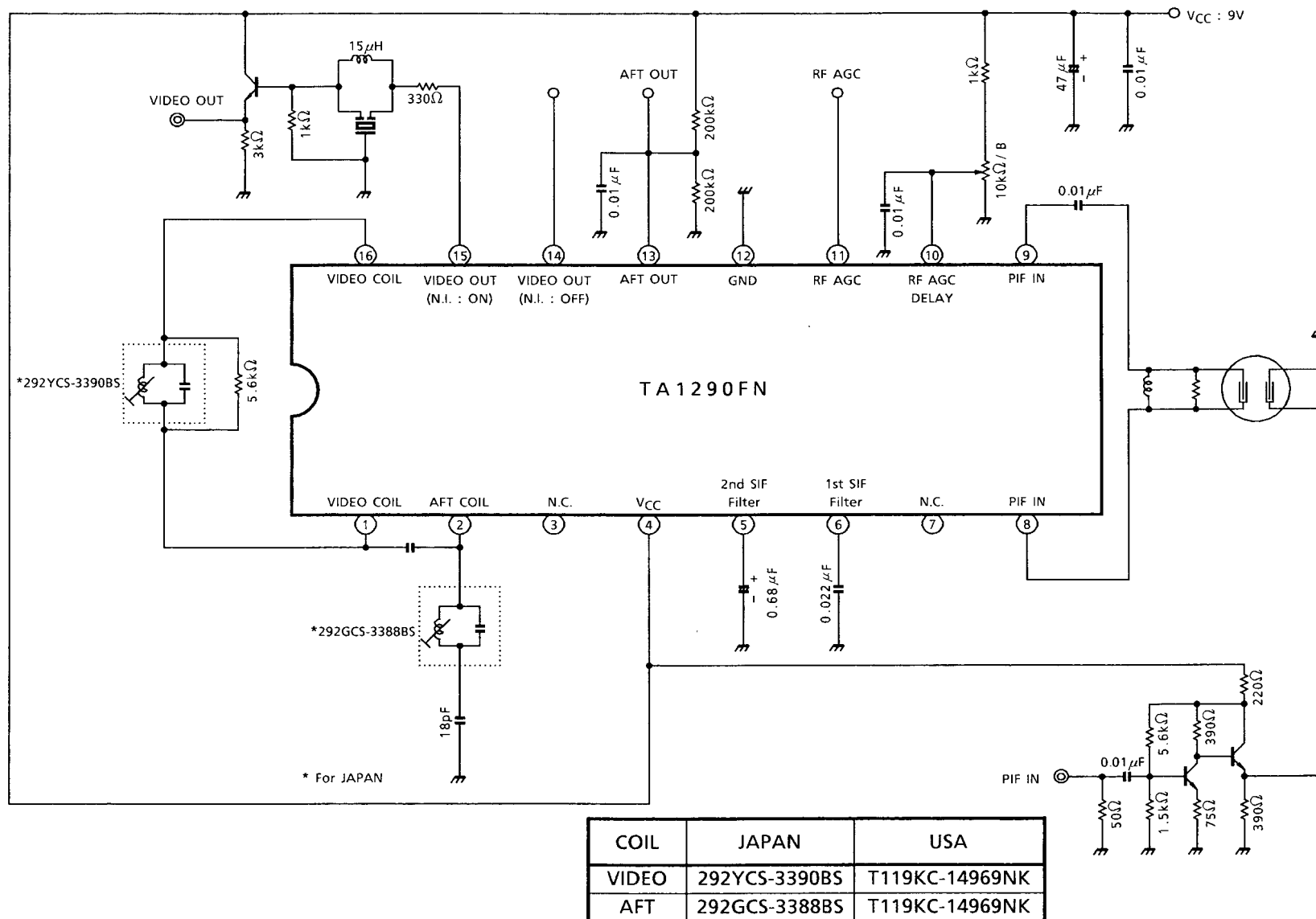


## TEST CIRCUIT 2

AC characteristic



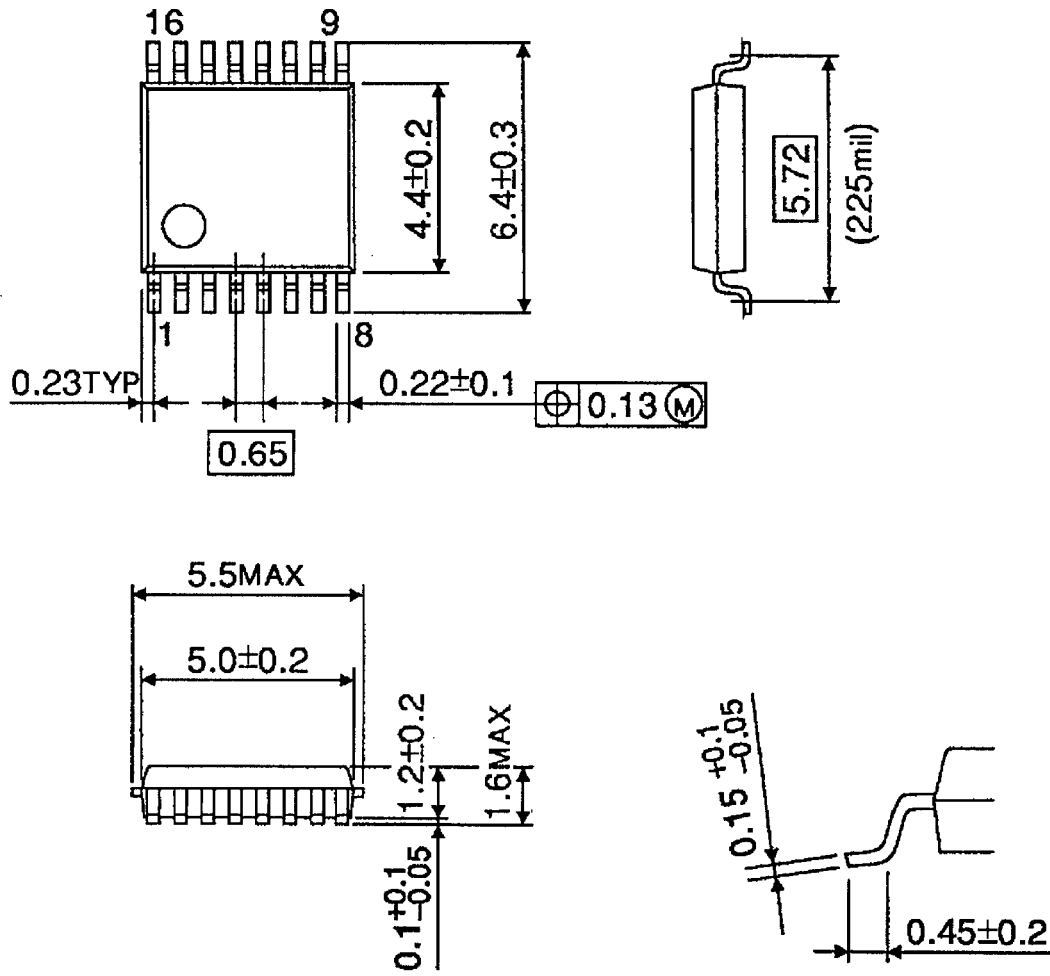
## APPLICATION CIRCUIT



## PACKAGE DIMENSIONS

SSOP16-P-225-0.65B

Unit : mm



Weight: 0.07g (Typ.)