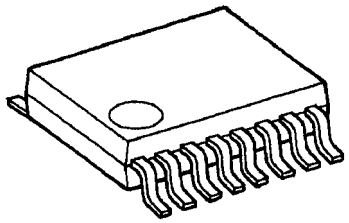
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA1290FN

PIF IC FOR TV

FEATURES

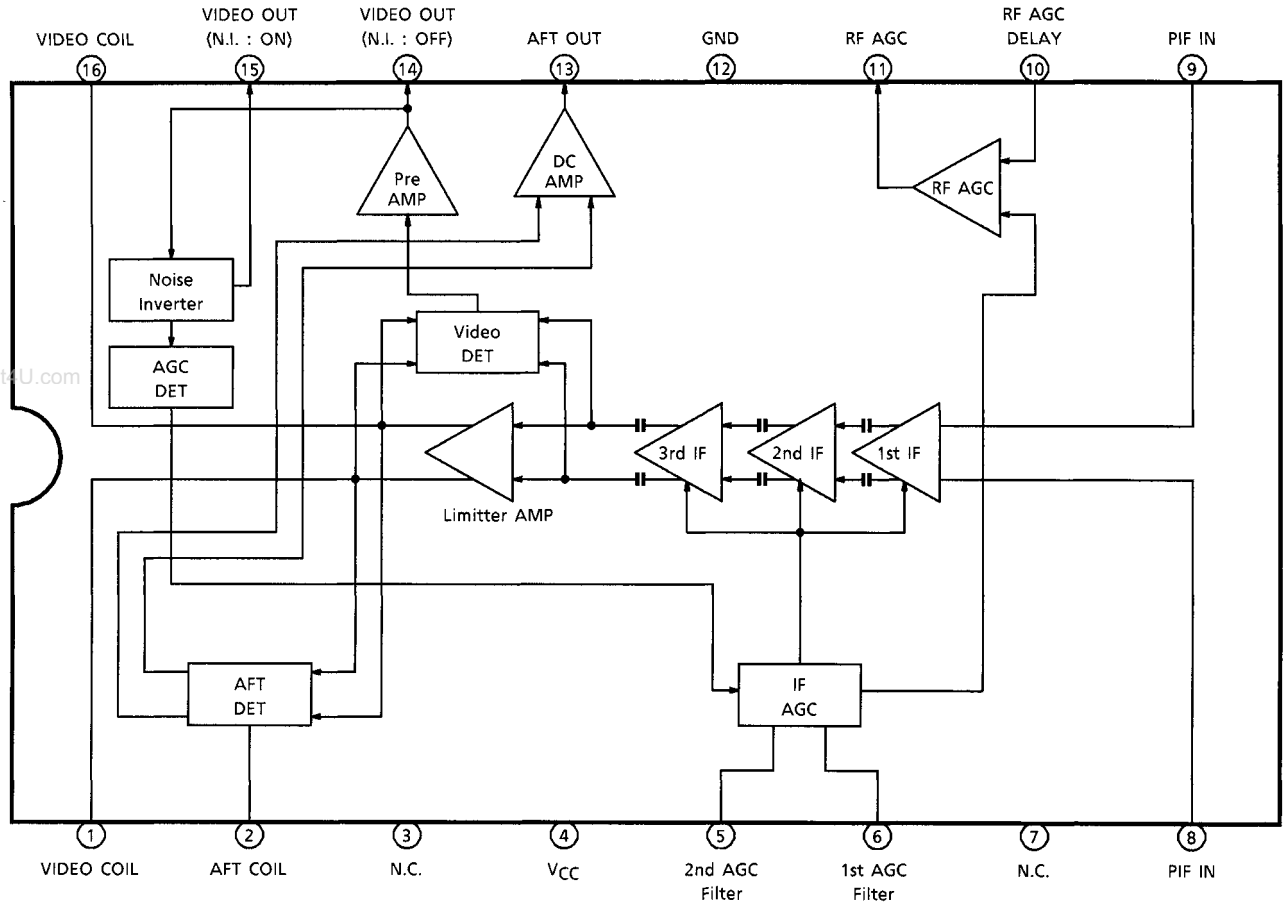
- RF Pre Amp. less by high input sensitivity
- 3-stage IF amplifier with variable gain
- High-speed response AGC with dual time constants
- Single AFT output with defeat function
- Delayed RF AGC output (reverse AGC)
- Output with white / black noise inverter
- Output without white / black noise inverter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



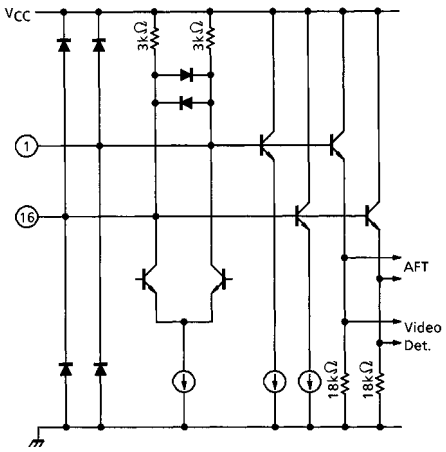
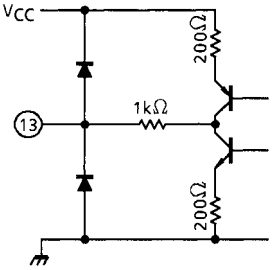
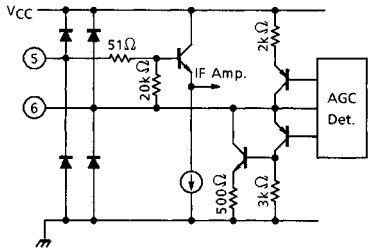
SSOP16-P-225-0.65B

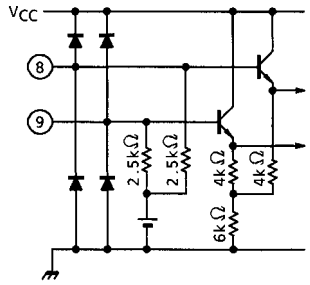
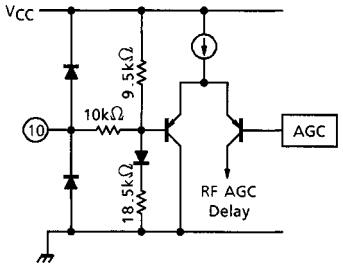
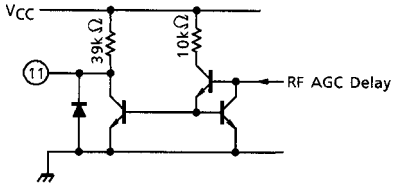
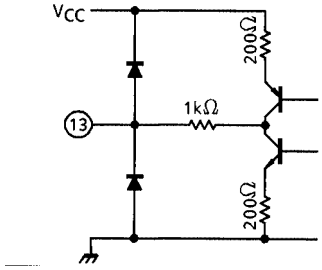
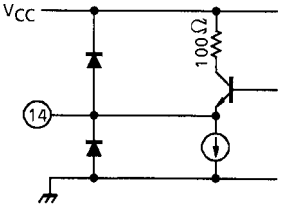
Weight: 0.07g (Typ.)

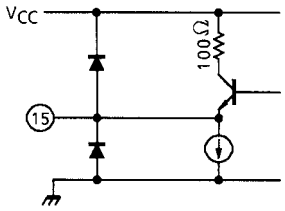
BLOCK DIAGRAM



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_{CC}	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) Resister (39kΩ) is connected internally between this terminal and V_{CC}.	
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.	

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_{CC}	15	V
Power Dissipation	P_D (Note)	781	mW
Operating Temperature	T_{opr}	−20~65	°C
Storage Temperature	T_{stg}	−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_{CC}	8.1	9.0	9.9	V

ELECTRIC CHARACTERISTICS
DC CHARACTERISTICS
(Unless otherwise specified, V_{CC} = 9V, Ta = 25°C, SW_1 : ON, SW_2 : ON)

CHARACTERISTICS		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Supply Current		I_{CC}	1	—	20	29	38	mA
Terminal Voltage	Pin 1	V_1		—	5.8	6.3	6.8	V
	Pin 2	V_2		—	2.3	2.8	3.3	
	Pin 8	V_8		SW_1 : OFF	3.5	4.0	4.5	
	Pin 9	V_9		—	3.5	4.0	4.5	
	Pin 10	V_{10}		SW_2 : OFF	5.7	6.2	6.7	
	Pin 13	V_{13}		—	2.5	4.0	5.5	
	Pin 14	V_{14}		—	4.2	4.7	5.2	
	Pin 15	V_{15}		—	4.2	4.7	5.2	
	Pin 16	V_{16}		—	5.8	6.3	6.8	

AC CHARACTERISTICS (Unless otherwise specified, V_{CC} = 9V, Ta = 25°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	dBμV
Maximum Input Signal Voltage		V_{in} Max		(Note 2)	100	110	—	dBμV
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		Δf / ΔV		(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 = 58.75MHz, f_m = 15.75kHz, 30%AM, 84dBμV
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 = 58.75MHz, f_m = 15.75kHz, 30%AM, 84dBμV
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 = 58.75MHz, Standard television signal (V / S = 10 : 4 ramp waveform), 87.5%AM, 84dBμV
IF AGC : free

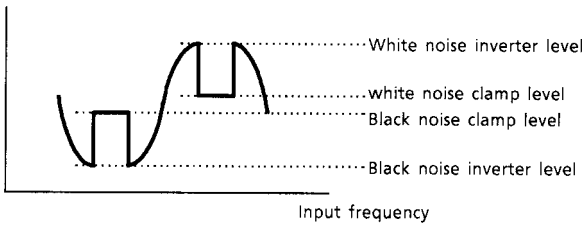
Measure deferential gain and deferential phase (15-b).

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 = 58.75MHz, Standard television signal (V / S = 10 : 4 ramp waveform), 87.5%AM, 84dBμV
Measure sync. voltage level (15-b).

Note 6: Output signal voltage
PIF input : f_p = 58.75MHz, Standard television signal (V / S = 10 : 4 ramp waveform), 87.5%AM, 84dBμV
Measure output video signal voltage (15-b).

Note 7: Noise inverter
PIF input : f_p = 57~65MHz (sweep signal), 84dBμV.
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 = 58.75MHz, f_m = 15.75kHz, 30%AM, 84dBμV

Add the 2nd AGC terminal from external power supply, so that the output video signal voltage (15-b) can be $2V_{p\text{-}p}$.

Turning modulation off, measure output career (V_{career} [$V_{p\text{-}p}$]) at pin 15. Calculate the following equation.

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

Note 9: Suppression of career harmonics

PIF input : f_p = 58.75MHz, f_m = 15.75kHz, 30%AM, 84dBμV

Add the 2nd AGC terminal from external power supply, so that the output video signal voltage (15-b) can be $2V_{p\text{-}p}$.

Turning modulation off, measure output career (117.5MHz) level (Vcareer [Vp-p]) at pin 15. Calculate the following equation.

(Suppression of career harmonics) = 20 λog (2 / V_{career}) [dB]

Note 10: AFT control steepness

PIF input : f_p = 58.75MHz, 84dBμV, CW

Input the above signal and adjust the AFT coil so that the AFT output voltage is 4.5V.

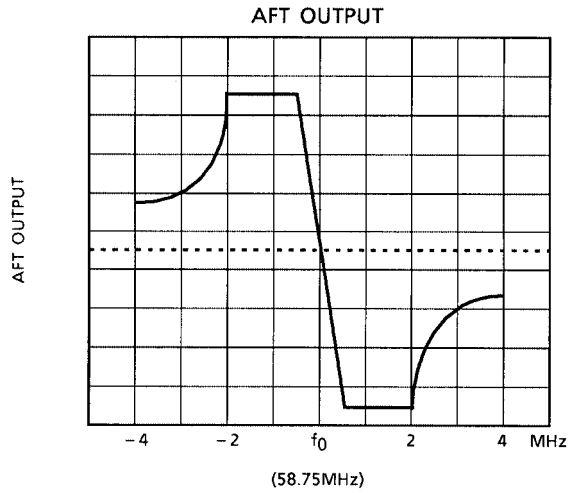
Measure AFT output voltage of following conditions.

(input frequency = 58.74MHz) : V_{AFT1}

(input frequency = 58.76MHz) : V_{AFT2}

AFT control steepness is calculated by following equality.

(AFT control steepness) = Δf / ΔV = 20 / (V_{AFT1}−V_{AFT2})



Note 11: Intermodulation

Input following composite signals to the PIF input.

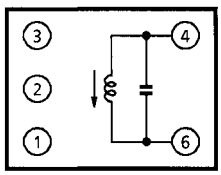
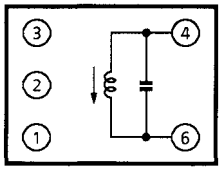
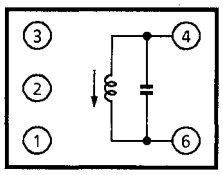
SG : 1 58.75MHz, 84dBμV (picture career)

SG : 2 54.25MHz, 74dBμV (sound career)

SG : 3 55.17MHz, 74dBμV (chroma)

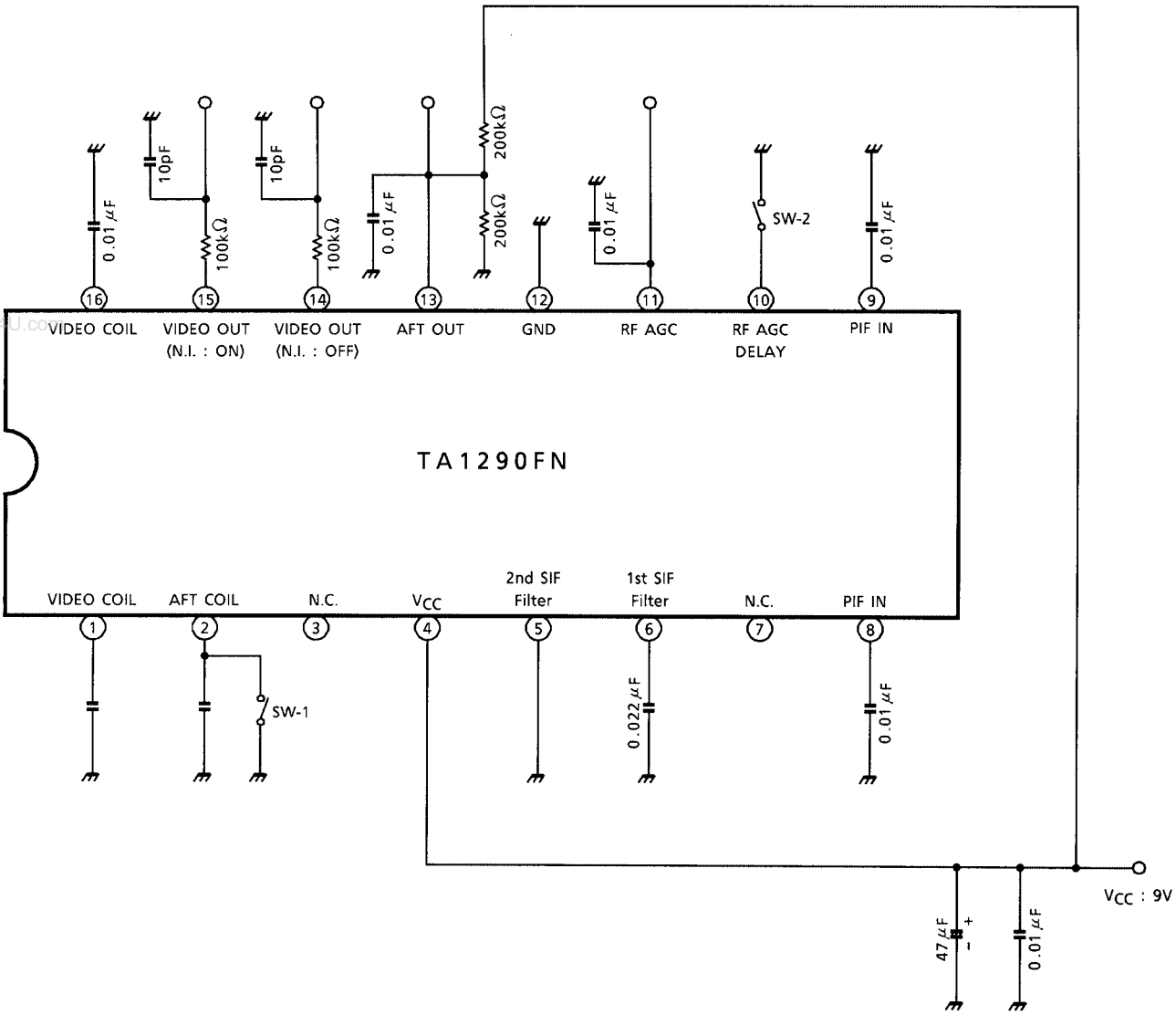
Supply DC voltage to 2nd AGC terminal from external source, so that bottom of output signal voltage (15-b) matches sync. tip level. Measure the difference of output signal voltage at pin 15 between 3.58MHz component (chroma) and 920kHz component.

COIL SPECIFICATION

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

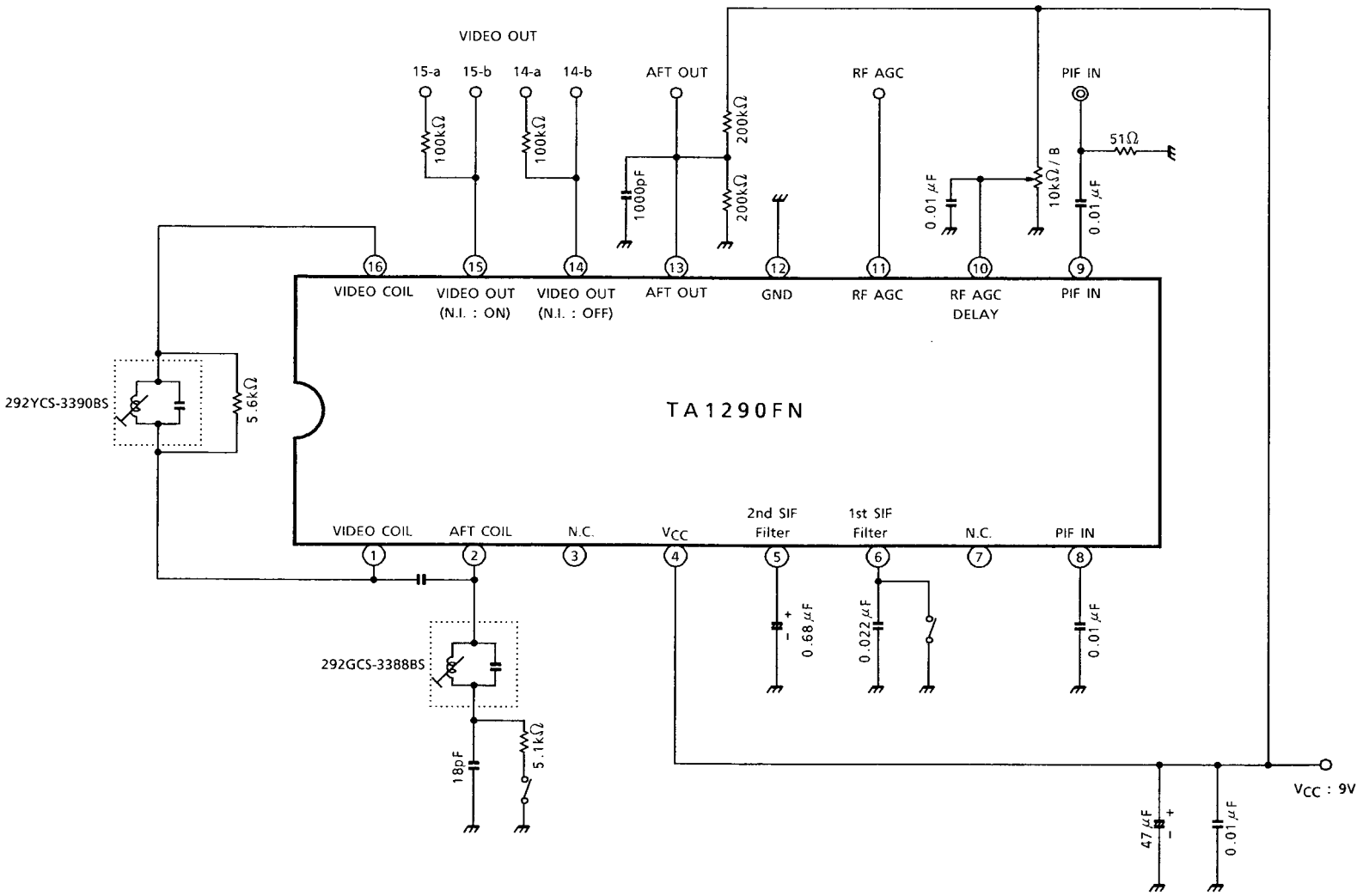
TEST CIRCUIT 1

DC characteristic

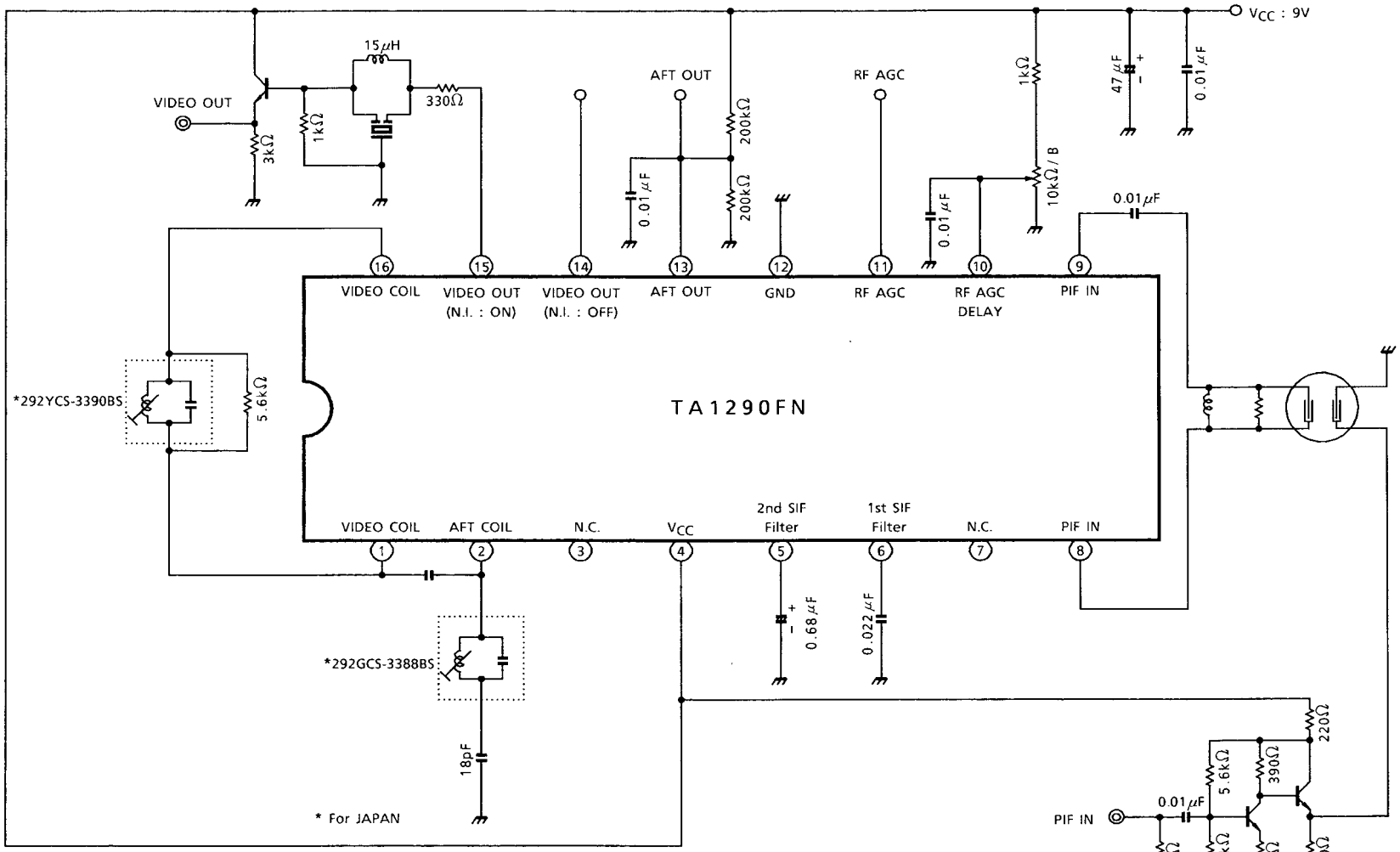


TEST CIRCUIT 2

AC characteristic



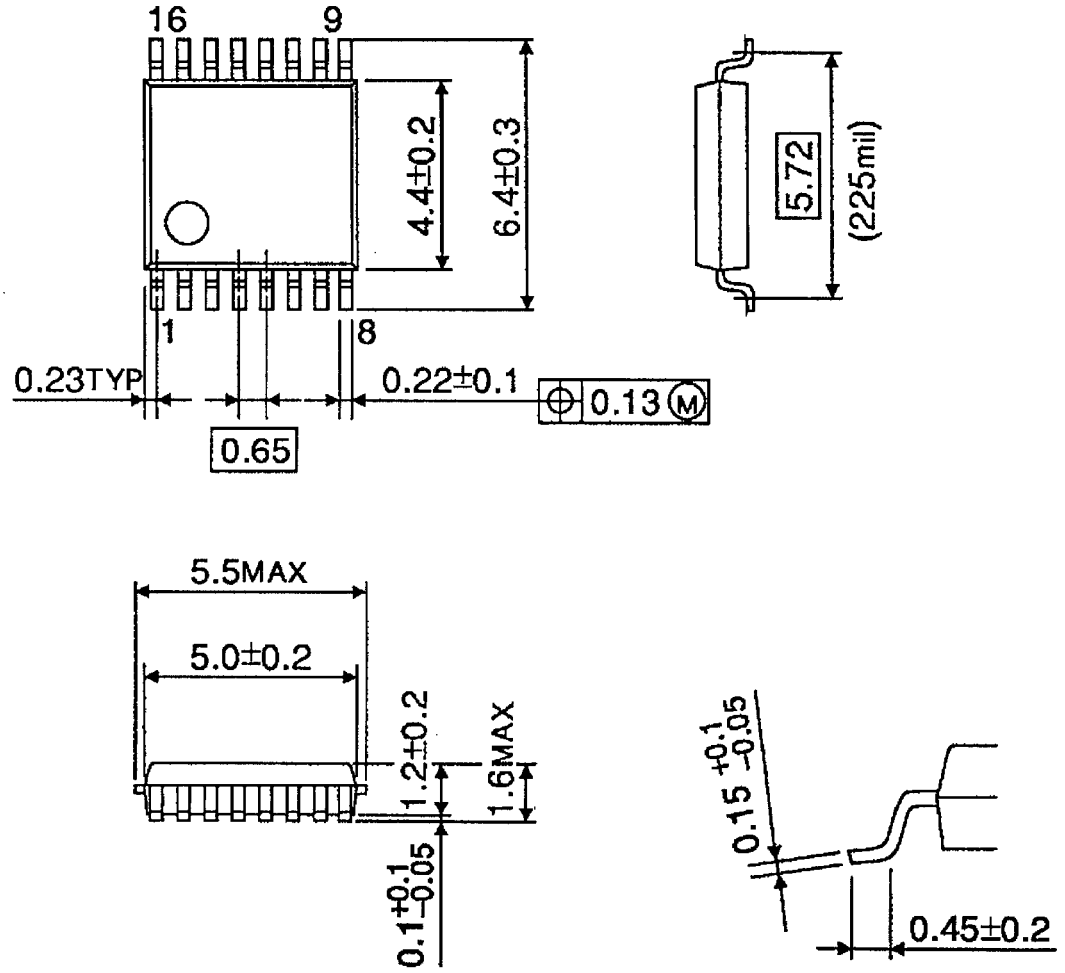
APPLICATION CIRCUIT



COIL	JAPAN	USA
VIDEO	292YCS-3390BS	T119KC-14969NK
AFT	292GCS-3388BS	T119KC-14969NK

PACKAGE DIEMENSIONS

SSOP16-P-225-0.65B Unit : mm



Weight: 0.07g (Typ.)