

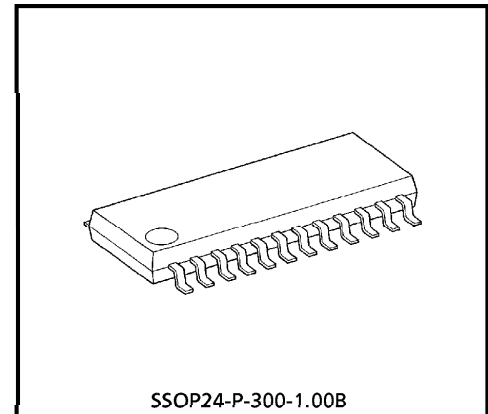
TENTATIVE TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

**TA1267AF****MULTISTANDARD PIF / SIF SYNCHRONOUS DEMODULATOR IC****FEATURES****PIF CIRCUIT**

- True synchronous PIF demodulator
- 3-stages gain controlled PIF amplifier
- High speed response PIF AGC detector
- Buzz reducer
- 2 video inputs for selecting sound-carrier traps
- Equalizer for video output
- AFT detector without extra reference circuit

**SIF CIRCUIT**

- Wide range gain controlled SIF amplifier (control range : 70 [dB] Typ.)
- Alignment-free PLL-FM demodulator
- Selectable 4 2nd-SIF inputs, 2 gain mode audio amplifier (0dB / 6dB), and 2 mode de-emphasis circuit (50 $\mu$ s / 75 $\mu$ s)

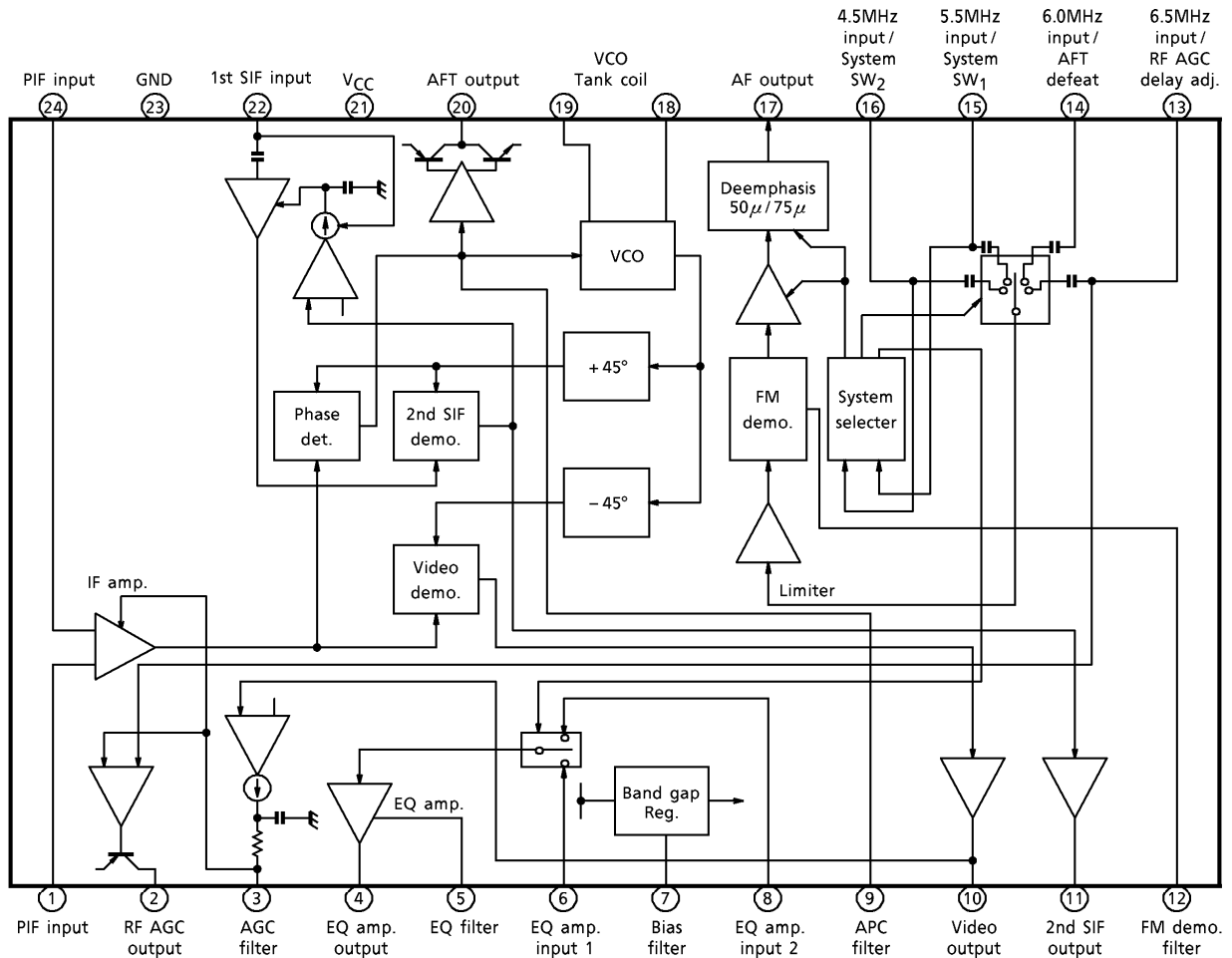


Weight : 0.27g (Typ.)

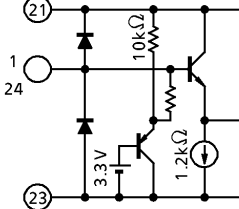
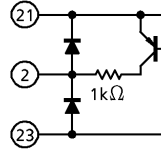
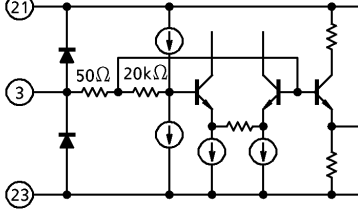
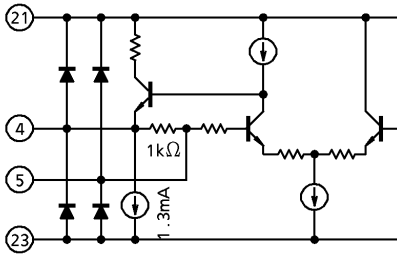
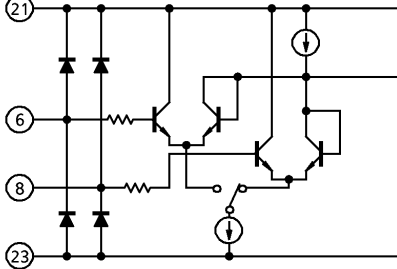
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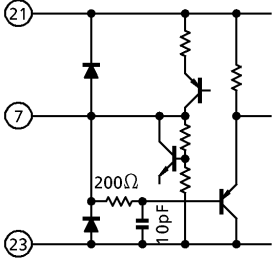
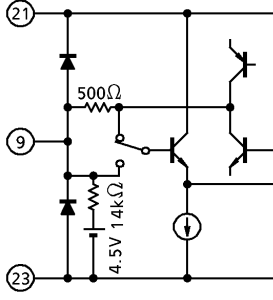
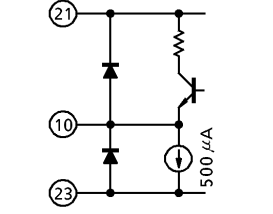
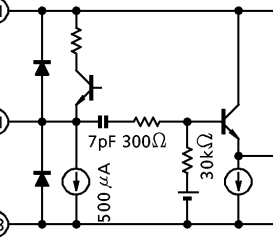
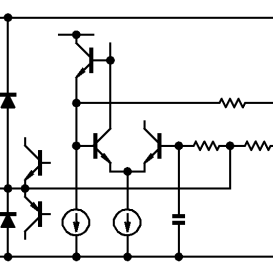
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**BLOCK DIAGRAM**

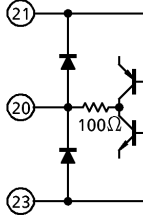
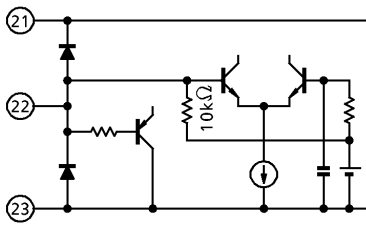


**TERMINAL FUNCTION**

PIN No.	NAME	FUNCTION	INTERFACE CIRCUIT
1 24	PIF input	Differential type inputs Typical input level is 85 [dB $\mu$ V].	
2	RF AGC output	Open collector (PNP) type output. Maximum output current is 0.5 [mA].	
3	AGC filter	Connect a capacitor (0.47 $\mu$ F) between GND.	
4 5	EQ amplifier output EQ filter	No.4 terminal is EQ amplifier output. Maximum output current of this terminal is 5 [mA]. No.5 terminal is for EQ filter.	
6 8	EQ amplifier input 1 EQ amplifier input 2	Selectable EQ amplifier inputs. On M-standard mode (selected No.16 terminal for 2nd-SIF input), No.8 terminal is selected. On other mode, No.6 terminal is selected.	

PIN No.	NAME	FUNCTION	INTERFACE CIRCUIT
7	Bias filter	Connect a capacitor (10 [ $\mu$ F]) between GND.	
9	APC filter	Connect a resistor (330 [ $\Omega$ ]) and a capacitor (0.47 [ $\mu$ F]) between GND in series. And connect a capacitor (1000 [pF]) between this terminal and GND. Sensitivity of phase detector is 400 [ $\mu$ A / rad] (Typ.), and sensitivity of VCO is 1.8 [MHz / V] (Typ.).	
10	Video output	Connect a resistor (1 [k $\Omega$ ]) between GND. Maximum output current is 10 [mA].	
11	2nd SIF output	2nd SIF signal is outputted from this terminal.	
12	FM demodulating filter	Connect a capacitor (2.2 [ $\mu$ F]) between GND.	

PIN No.	NAME	FUNCTION	INTERFACE CIRCUIT
13	6.5MHz input / RF AGC delay adj.	6.5 [MHz] 2nd SIF input. And this terminal has RF AGC delay point adjustment function. 100 [ $\mu$ A] current is outputted from this terminal. Connect a resistor (5.6 [k $\Omega$ ]) and a volume (10 [k $\Omega$ ]) between GND in series.	
14 15 16	6.0MHz input / AFT defeat 5.5MHz input / system SW1 4.5MHz input / system SW2	These terminals are input of 6.0MHz 2nd SIF, 5.5MHz 2nd SIF and 4.5MHz 2nd SIF. No.14 terminal has AFT defeat function. If resistor is connected between this terminal and GND, AFT defeat is active. No.15 and No.16 terminals have system switch function. The table of 'Condition of No.15 terminal and No.16 terminal' vs 'System' is on next page	
17	AF output	Gain of the audio amplifier is selected 0dB or 6dB by system switches. This system absorbs difference of the SIF's deviations (25kHz or 50kHz at 100% modulation). Output resistance of this terminal is selected 5 [k $\Omega$ ] or 7.5 [k $\Omega$ ] by system switches. So connect a capacitor between GND, the time-constant of the deemphasis is changed by system switches.	
18 19	VCO tank	Connect tank for VCO between these terminals.	

PIN No.	NAME	FUNCTION	INTERFACE CIRCUIT
20	AFT output	Push-pull type current output. Reverse type AFT.	
21	VCC	Recommended voltage range is 9.0 [V] ± 10 [%].	—
22	SIF input	In use inter-carrier application, connect this terminal to GND. In this condition, the SIF amplifier sets gain minimum.	
23	GND		—

**Table of System switches condition vs Operations**

CONDITION		2nd SIF INPUT TERMINAL	AF OUTPUT		EQ AMPLIFIER INPUT TERMINAL
TERMINAL No.15	TERMINAL No.16		OUTPUT LEVEL (mV <sub>rms</sub> @DEVIATION)	DEEMPHASIS	
Low	Low	No.13	500@27kHz	50 μs	No.6
Open	Low	No.14	↑	↑	↑
Low	Open	No.15	↑	↑	↑
Open	Open	No.16	500@13.5kHz	75 μs	No.8
9V	Open	↑	500@25kHz	↑	↑

**MAXIMUM RATINGS (Ta = 25°C)**

CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	V <sub>CC</sub>	13	V
Power Dissipation	P <sub>D max</sub>	1040 (Note 1)	mW
Operating Temperature	T <sub>opr</sub>	- 20~75	°C
Storage Temperature	T <sub>stg</sub>	- 55~150	°C

(Note 1) This value is on condition that the IC is mounted on PCB (50mm×50mm). When using the device at Ta=25°C, decrease the power dissipation by 8.3mW for each increase of 1°C.

## RECOMMENDED SUPPLY VOLTAGE

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

## ELECTRICAL CHARACTERISTICS

DC current characteristics (V<sub>CC</sub> = 9.0V, Ta = 25°C)

PIN No.	PIN NAME	SYMBOL	MIN.	TYP.	MAX.	UNIT
21	V <sub>CC</sub>	I <sub>CC</sub>	36	45	60	mA

DC voltage characteristics (V<sub>CC</sub> = 9.0V, Ta = 25°C)

PIN No.	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
1	V <sub>1</sub>	—	—	3.5	4.0	4.5	V
4	V <sub>4</sub>	—	No signal input, AGC gain min.	4.7	5.2	5.7	
5	V <sub>5</sub>	—	No signal input, AGC gain min.	4.7	5.2	5.7	
7	V <sub>7</sub>	—	—	6.3	7.0	7.7	
10	V <sub>10</sub>	—	No signal input, AGC gain min.	4.7	5.2	5.7	
11	V <sub>11</sub>	—	—	3.1	3.5	3.9	
14	V <sub>14</sub>	—	—	2.5	3.1	3.7	
15	V <sub>15</sub>	—	—	2.5	3.1	3.7	
16	V <sub>16</sub>	—	—	2.5	3.1	3.7	
17	V <sub>17</sub>	—	2nd SIF 5.5MHz	3.2	3.7	4.2	
18	V <sub>18</sub>	—	—	7.2	7.6	7.9	
19	V <sub>19</sub>	—	—	7.2	7.6	7.9	
20	V <sub>20</sub>	—	In AFT defeat	4.3	4.5	4.7	
22	V <sub>22</sub>	—	—	4.9	5.3	5.7	
24	V <sub>24</sub>	—	—	3.5	4.0	4.5	

**AC CHARACTERISTICS** ( $V_{CC} = 9.0V$ ,  $T_a = 25^\circ C$ )

PIF section

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
PIF Input Sensitivity	$v_{in \text{ min}}$ (p)	—	(Note 1)	—	40	45	$dB_{\mu V}$
PIF Maximum Input Signal	$v_{in \text{ max}}$ (p)	—		105	113	—	
PIF Gain Control Range	$R_{AGC}$ (p)	—		68	73	—	dB
RF AGC Maximum Output Voltage	$V_{AGC \text{ max}}$	—	(Note 2)	8.5	8.9	—	V
RF AGC Minimum Output Voltage	$V_{AGC \text{ min}}$	—		—	0.0	0.1	V
PIF Input Resistance (*)	$Z_{in \text{ R}}$ (p)	—	(Note 3)	—	1.2	—	$k\Omega$
PIF Input Capacitance (*)	$Z_{in \text{ C}}$ (p)	—		—	3.6	—	pF
Differential Gain	DG	—	(Note 4)	—	1.0	3.0	%
Differential Phase	DP	—		—	3.0	5.0	deg
Intermodulation	$I_M$	—	(Note 5)	50	55	—	dB
Video Output Signal Amplitude	$v_{Det}$ (p)	—	(Note 6)	2.0	2.2	2.4	V
Video Output S/N	S/N (p)	—	(Note 7)	55	60	—	dB
Synchronous Signal Level	$V_{sync}$	—	(Note 8)	2.4	2.7	3.0	V
Threshold Level of the Black Noise Inverter	$V_{thB}$	—		1.7	2.0	2.3	
Clamp Level of the Black Noise Inverter	$V_{cpB}$	—		(Note 9)	3.3	3.6	
Video Bandwidth (–3dB)	$f_{Det}$ (p)	—	(Note 10)	6	8	10	MHz
Capture Range of the PLL (Upper)	$f_{pH}$	—	(Note 11)	1.8	2.3	—	MHz
Capture Range of the PLL (Lower)	$f_{pL}$	—		—	–2.0	–1.5	
Lock Range of the PLL (Upper)	$f_{hH}$	—		1.8	2.3	—	
Lock Range of the PLL (Lower)	$f_{hL}$	—		—	–2.0	–1.5	
Control Steepness of the VCO	$\beta$	—	(Note 12)	—	1.8	—	MHz/V
Steepness of the AFT Detection	$S_{AFT}$	—	(Note 13)	20	25	30	kHz/V
AFT Maximum Output Voltage	$V_{AFT \text{ max}}$	—		8.5	8.8	—	V
AFT Minimum Output Voltage	$V_{AFT \text{ min}}$	—		—	0.4	0.6	
AFT Output Voltage on Defeating	$V_{AFT \text{ Def}}$	—	(Note 14)	4.3	4.5	4.7	

(\*) Not tasted



SIF section

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
SIF Maximum Input Signal	$v_{in}$ max (s)	—	(Note 15)	105	110	—	$\text{dB}\mu\text{V}$
SIF Gain Control Range	$R_{AGC}$ (s)	—		55	70	—	dB
SIF Input Resistance (*)	$Z_{in}$ R (s)	—	(Note 16)	—	10	—	$\text{k}\Omega$
SIF Input Capacitance (*)	$Z_{in}$ C (s)	—		—	2.8	—	pF
Limiting Sensitivity (4.5L)	$v_{in}$ lim 4.5L	—	(Note 17)	—	32	45	$\text{dB}\mu\text{V}$
Limiting Sensitivity (4.5H)	$v_{in}$ lim 4.5H	—	(Note 18)	—	35	45	$\text{dB}\mu\text{V}$
Limiting Sensitivity (5.5)	$v_{in}$ lim 5.5	—	(Note 19)	—	32	45	$\text{dB}\mu\text{V}$
Limiting Sensitivity (6.0)	$v_{in}$ lim 6.0	—	(Note 20)	—	32	45	$\text{dB}\mu\text{V}$
Limiting Sensitivity (6.5)	$v_{in}$ lim 6.5	—	(Note 21)	—	32	45	$\text{dB}\mu\text{V}$
AM Reduction Ratio (4.5L)	AMR 4.5L	—	(Note 22)	55	60	—	dB
AM Reduction Ratio (4.5H)	AMR 4.5H	—	(Note 23)	50	55	—	dB
AM Reduction Ratio (5.5)	AMR 5.5	—	(Note 24)	55	60	—	dB
AM Reduction Ratio (6.0)	AMR 6.0	—	(Note 25)	55	60	—	dB
AM Reduction Ratio (6.5)	AMR 6.5	—	(Note 26)	55	60	—	dB
AF Output Signal Amplitude (4.5L)	$v_{Det}$ (s) 4.5L	—	(Note 27)	350	500	710	$\text{mV}_{\text{rms}}$
AF Output S/N (4.5L)	S/N (s) 4.5L	—		55	63	—	dB
Total Harmonics Distortion (4.5L)	THD 4.5L	—		—	0.2	1.0	%
AF Output Signal Amplitude (4.5H)	$v_{Det}$ (s) 4.5H	—	(Note 28)	350	500	710	$\text{mV}_{\text{rms}}$
AF Output S/N (4.5H)	S/N (s) 4.5H	—		50	58	—	dB
Total Harmonics Distortion (4.5H)	THD 4.5H	—		—	0.2	1.0	%
AF Output Signal Amplitude (5.5)	$v_{Det}$ (s) 5.5	—	(Note 29)	350	500	710	$\text{mV}_{\text{rms}}$
AF Output S/N (5.5)	S/N (s) 5.5	—		55	63	—	dB
Total Harmonics Distortion (5.5)	THD 5.5	—		—	0.2	1.0	%
AF Output Signal Amplitude (6.0)	$v_{Det}$ (s) 6.0	—	(Note 30)	350	500	710	$\text{mV}_{\text{rms}}$
AF Output S/N (6.0)	S/N (s) 6.0	—		55	63	—	dB
Total Harmonics Distortion (6.0)	THD 6.0	—		—	0.2	1.0	%
AF Output Signal Amplitude (6.5)	$v_{Det}$ (s) 6.5	—	(Note 31)	350	500	710	$\text{mV}_{\text{rms}}$
AF Output S/N (6.5)	S/N (s) 6.5	—		55	63	—	dB
Total Harmonics Distortion (6.5)	THD 6.5	—		—	0.2	1.0	%
FM Demodulatable Frequency Range (Lower 1)	$f_{Det}$ (s) L1	—	(Note 32)	—	2.6	3.0	MHz
FM Demodulatable Frequency Range (Upper 1)	$f_{Det}$ (s) H1	—		6.4	7.8	—	
FM Demodulatable Frequency Range (Lower 2)	$f_{Det}$ (s) L2	—	(Note 33)	—	4.7	5.1	
FM Demodulatable Frequency Range (Upper 2)	$f_{Det}$ (s) H2	—		7.0	9.1	—	

(\*) Not tasted

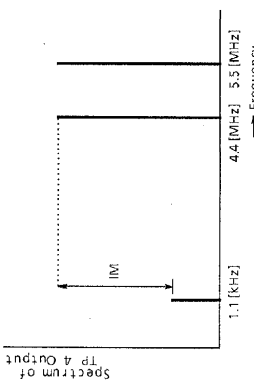
MEASUREMENTS  
PIF Section

		TEST CONDITION													
NOTE	INPUT POINT	MEAS. POINT	SW3	SW6	SW8	VR13	SW13	SW14 a	SW14 b	SW15 a	SW15 b	SW16 a	SW16 b	SW17	SW22
Note 1	J1	TP10	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON
Note 2	J1	TP2	OFF	OFF	ON	Min. Max.	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON
Note 3	—	TP1 TP24	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON
Note 4	J1	TP4	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON

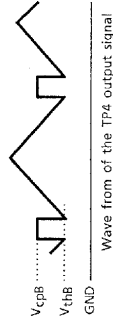
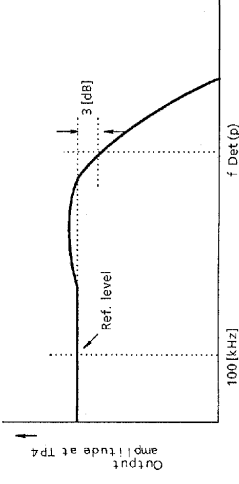
The graph plots RAGC (p) on the y-axis against Input Amplitude (V) on the x-axis. The curve shows a peak at 85 [dBμV] and a dip at Vin min (p). The y-axis is labeled Vp10 (dB) with markers at +1 (dB), Ref. level, and -3 (dB).

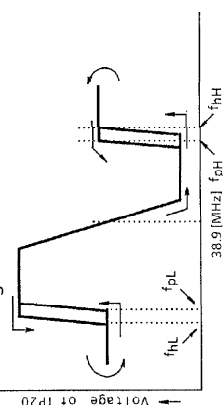
- Input the signal (Frequency : 38.9 [MHz], Amplitude : 85 [dBμV], 15 [kHz] sine wave / 30 [%] AM) to J1.
- Change amplitude of the input signal, and measure amplitude of the output signal at TP10.
- Calculate RAGC (p) show as below.

- Input the signal (Frequency : 38.9 [MHz], Amplitude : 85 [dBμV], 15 [kHz] sine wave / 30 [%] AM) to J1.
- Set VR13 to the minimum.
- Measure voltage at TP2 (VAGC max [V].)
- Set VR13 to the maximum.
- Measure voltage at TP2 (VAGC\_min [V].)
- Remove all connections from terminal 1 and terminal 24.
- Measure resistance (Zin R (p) [kΩ]) and capacitance (Zin C (p) [pF]) of TP1 and TP24 by the impedance meter.
- Input the signal (Frequency : 38.9 [MHz], Amplitude : 85 [dBμV], amplitude modulated by 10 step signal) to J1.
- measure DG and DP at TP4.

TEST CONDITION																	
NOTE	INPUT POINT	MEAS. POINT	SW3	SW6	SW8	V <sub>R13</sub>	SW13	SW13	SW14 a	SW14 b	SW15 a	SW15 b	SW16 a	SW16 b	SW17	SW22	
																	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 38.9 [MHz], Amplitude : 85 [dB<sub>μ</sub>V], 15 [kHz] sine wave /30 [%] AM) to J1.</li> <li>Measure the minimum voltage of the output signal at TP4 (V<sub>min</sub>).</li> <li>Input the mixture of 3 signals (signal 1 Frequency : 38.9 [MHz], Amplitude : 85 [dB<sub>μ</sub>V], signal 2 Frequency : 34.5 [MHz], Amplitude : 75 [dB<sub>μ</sub>V], and signal 3 Frequency : 33.4 [MHz], Amplitude : 75 [dB<sub>μ</sub>V]) to J1.</li> <li>Apply DC voltage to TP3 and adjust it so that the bottom of the output signal at TP4 is equal to V<sub>min</sub>.</li> <li>Measure frequency of the output signal at TP4.</li> </ul>
Note 5	J1	TP4	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	
Note 6	J1	TP4	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 38.9 [MHz], Amplitude : 85 [dB<sub>μ</sub>V], amplitude modulated by 100 IRE white picture) to J1.</li> <li>Measure amplitude of the output signal at TP4 (V<sub>Det</sub>(p) [V]).</li> </ul>
Note 7	J1	TP4	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 38.9 [MHz], Amplitude : 85 [dB<sub>μ</sub>V], amplitude modulated by black picture) to J1.</li> <li>Measure video S/N at TP4 (HPF : 100 [kHz], LPF : 5 [MHz], CCIR Weighted) (S/N(p) [dB]).</li> </ul>
Note 8	J1	TP4	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 38.9 [MHz], Amplitude : 85 [dB<sub>μ</sub>V], amplitude modulated by 100 IRE white picture) to J1.</li> <li>Measure voltage of the sync. tip at TP4 (v<sub>sync</sub> [V]).</li> </ul>

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TEST CONDITION																
NOTE	INPUT POINT	MEAS. POINT	SW3	SW6	SW8	VR13	SW13	SW14 a	SW14 b	SW15 a	SW15 b	SW16 a	SW16 b	SW17	SW22	
Note 9	J1	TP4	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	<p>Input the signal (Frequency : 38.9 [MHz], Amplitude : 85 [dB<math>\mu</math>V], 15 [kHz] triangle wave /50 [%] AM) to J1.</p> <ul style="list-style-type: none"> <li>Apply DC voltage to TP3 and adjust it to get the waveform shown as below at TP4.</li> <li>Measure <math>V_{thB}</math> [V] and <math>V_{cpB}</math> [V] at TP4.</li> </ul> 
Note 10	J1	TP4	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	<ul style="list-style-type: none"> <li>Input the mixture of 2 signals (signal 1 Frequency : 38.9 [MHz], Amplitude : 82 [dB<math>\mu</math>V], signal 2 Frequency : 38.8 [MHz], Amplitude : 69 [dB<math>\mu</math>V]) to J1.</li> <li>Measure the minimum voltage of the output signal at TP4 (<math>V_{oTP4}</math>).</li> <li>Apply DC voltage to TP3 and adjust it so that the minimum voltage of the output signal at TP4 is equal to <math>V_{oTP4}</math>.</li> <li>Decrease frequency of the input signal at J1, and measure amplitude of the output signal at TP4.</li> </ul> 

		TEST CONDITION														
NOTE	INPUT POINT	MEAS. POINT	SW3	SW6	SW8	VR13	SW13	SW14 a	SW14 b	SW15 a	SW15 b	SW16 a	SW16 b	SW17	SW22	
Note 11	J1	TP20	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 38.9 [MHz], Amplitude : 85 [dB<math>\mu</math>V]) to J1.</li> <li>Sweep down the input signal frequency to 34.9 [MHz], and sweep up to 42.9 [MHz]. Sweep down the input signal frequency to 38.9 [MHz].</li> <li>Measure the voltage at TP20.</li> </ul> 
Note 12	TP9	Pin 18 Pin 19	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	<ul style="list-style-type: none"> <li>Set the FET probe which connected to the spectrum analyzer near by TP18 or TP19 (Don't touch the probe directly to TP18 or to TP19).</li> <li>Apply 4.3 [V] to TP9, and measure frequency of the VCO oscillation by the spectrum analyzer (f<sub>L</sub>VCO [MHz]).</li> <li>Apply 4.7 [V] to TP9, and measure frequency of the VCO oscillation by the spectrum analyzer (f<sub>H</sub>VCO [MHz]).</li> <li><math>\beta</math> [MHz/V] = (f<sub>H</sub>VCO - f<sub>L</sub>VCO) / 0.4</li> <li>Input the signal (Frequency : 38.9 [MHz] - 20 [kHz], Amplitude : 85 [dB<math>\mu</math>V]) to J1.</li> <li>Measure voltage at TP20 (V<sub>H</sub>TP20 [V]).</li> <li>Input the signal (Frequency : 38.9 [MHz] + 20 [kHz], Amplitude : 85 [dB<math>\mu</math>V]) to J1.</li> <li>Measure voltage at TP20 (V<sub>L</sub>TP20 [V]).</li> <li>SAFT [kHz/V] = 40 / (V<sub>H</sub>TP20 - V<sub>L</sub>TP20)</li> <li>Input the signal (Frequency : 38.9 [MHz] - 500 [kHz], Amplitude : 85 [dB<math>\mu</math>V]) to J1.</li> <li>Measure voltage at TP20 (VAFT max [V]).</li> <li>Input the signal (Frequency : 38.9 [MHz] + 500 [kHz], Amplitude : 85 [dB<math>\mu</math>V]) to J1.</li> <li>Measure voltage at TP20 (VAFT min [V]).</li> </ul>
Note 13	J1	TP20	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	

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SIF Section

NOTE	INPUT POINT	MEAS. POINT	TEST CONDITION														
			SW3	SW6	SW8	VR13	SW13	SW14 a	SW14 b	SW15 a	SW15 b	SW16 a		SW16 b	SW17	SW22	
Note 14	—	TP20	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	<ul style="list-style-type: none"> <li>Measure voltage at TP20 (VAFT Def[V]).</li> </ul>
Note 15	J1 J2	TP11	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 38.9 [MHz], Amplitude : 85 [dB<math>\mu</math>V]) to J1, and input the signal (Frequency : 33.4 [MHz], Amplitude : 75 [dB<math>\mu</math>V]) to J2.</li> <li>Change the amplitude of the signal at J2, and measure amplitude of the output signal at TP11.</li> </ul>
Note 16	—	TP22	ON	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	—	—	<ul style="list-style-type: none"> <li>Remove all connections from terminal 22.</li> <li>Measure resistance (<math>Z_{in}</math>, <math>R</math> (s) [k<math>\Omega</math>]) and capacitance (<math>Z_{in}</math> C (s) [pF]) of TP1 and TP24 by the impedance meter.</li> </ul>
Note 17	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 4.5 [MHz], Amplitude : 100 [dB<math>\mu</math>V], 400 [Hz] sine wave / 25 [kHz Dev] FM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (voTP17).</li> <li>Measure the input signal amplitude when the output amplitude from TP17 becomes -3 [dB] of voTP17, by decreasing the input signal amplitude to J3 (vinlim4.5L [dB<math>\mu</math>V]).</li> </ul>
Note 18	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 4.5 [MHz], Amplitude : 100 [dB<math>\mu</math>V], 400 [Hz] sine wave / 13.5 [kHz Dev] FM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (voTP17).</li> <li>Measure the input signal amplitude when the output amplitude from TP17 becomes -3 [dB] of voTP17, by decreasing the input signal amplitude to J3 (vinlim4.5H [dB<math>\mu</math>V]).</li> </ul>

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NOTE	TEST CONDITION																
	INPUT POINT	MEAS. POINT	SW3	SW6	SW8	V <sub>R13</sub>	SW13	SW13 a	SW14 a	SW14 b	SW15 a	SW15 b	SW16 a	SW16 b	SW17	SW22	
Note 19	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 5.5 [MHz], Amplitude : 100 [dB<sub>μ</sub>V], 400 [Hz] sine wave / 27 [kHz Devi] FM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (v<sub>o</sub>TP17).</li> <li>Measure the input signal amplitude when the output amplitude from TP17 becomes -3 [dB] of v<sub>o</sub>TP17, by decreasing the input signal amplitude to J3 (vinlim5.5 [dB<sub>μ</sub>V]).</li> </ul>
Note 20	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	(b)	OFF	OFF	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 6.0 [MHz], Amplitude : 100 [dB<sub>μ</sub>V], 400 [Hz] sine wave / 27 [kHz Devi] FM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (v<sub>o</sub>TP17).</li> <li>Measure the input signal amplitude when the output amplitude from TP17 becomes -3 [dB] of v<sub>o</sub>TP17, by decreasing the input signal amplitude to J3 (vinlim6.0 [dB<sub>μ</sub>V]).</li> </ul>
Note 21	J3	TP17	ON	OFF	ON	—	ON	OFF	OFF	OFF	OFF	(b)	OFF	ON	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 6.5 [MHz], Amplitude : 100 [dB<sub>μ</sub>V], 400 [Hz] sine wave / 27 [kHz Devi] FM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (v<sub>o</sub>TP17).</li> <li>Measure the input signal amplitude when the output amplitude from TP17 becomes -3 [dB] of v<sub>o</sub>TP17, by decreasing the input signal amplitude to J3 (vinlim6.5 [dB<sub>μ</sub>V]).</li> </ul>
Note 22	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	(a)	ON	OFF	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 4.5 [MHz], Amplitude : 100 [dB<sub>μ</sub>V], 400 [Hz] sine wave / 25 [kHz Devi] FM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (v<sub>FM</sub>TP17 [mVrms]).</li> <li>Input the signal (Frequency : 4.5 [MHz], Amplitude : 100 [dB<sub>μ</sub>V], 400 [Hz] sine wave / 30 [%] AM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (v<sub>AM</sub>TP17 [mVrms]).</li> <li>AMR4.5L = 20%og (v<sub>FM</sub>TP17 / v<sub>AM</sub>TP17)</li> </ul>

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NOTE	TEST CONDITION															
	INPUT POINT	MEAS. POINT	SW3	SW6	SW8	V <sub>R13</sub>	SW13	SW14 a	SW14 b	SW15 a	SW15 b	SW16 a	SW16 b	SW17	SW22	
Note 23	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 4.5 [MHz], Amplitude : 100 [dB<sub>z</sub>V], 400 [Hz] sine wave / 13.5 [kHz Devi] FM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (vFMTP17 [mV<sub>rms</sub>]).</li> <li>Input the signal (Frequency : 4.5 [MHz], Amplitude : 100 [dB<sub>z</sub>V], 400 [Hz] sine wave / 30 [%] AM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (vAMTP17 [mV<sub>rms</sub>]).</li> <li>AMR4.5H [dB] = 20log (vFMTP17 / vAMTP17)</li> </ul>
Note 24	J3	TP17	ON	OFF	ON	—	OFF	OFF	ON	OFF	OFF	OFF	ON	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 5.5 [MHz], Amplitude : 100 [dB<sub>z</sub>V], 400 [Hz] sine wave / 27 [kHz Devi] FM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (vFMTP17 [mV<sub>rms</sub>]).</li> <li>Input the signal (Frequency : 5.5 [MHz], Amplitude : 100 [dB<sub>z</sub>V], 400 [Hz] sine wave / 30 [%] AM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (vAMTP17 [mV<sub>rms</sub>]).</li> <li>AMR5.5 [dB] = 20log (vFMTP17 / vAMTP17)</li> </ul>
Note 25	J3	TP17	ON	OFF	ON	—	OFF	ON	OFF	OFF	(b)	OFF	OFF	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 6.0 [MHz], Amplitude : 100 [dB<sub>z</sub>V], 400 [Hz] sine wave / 27 [kHz Devi] FM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (vFMTP17 [mV<sub>rms</sub>]).</li> <li>Input the signal (Frequency : 6.0 [MHz], Amplitude : 100 [dB<sub>z</sub>V], 400 [Hz] sine wave / 30 [%] AM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (vAMTP17 [mV<sub>rms</sub>]).</li> <li>AMR6.0 [dB] = 20log (vFMTP17 / vAMTP17)</li> </ul>
Note 26	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	OFF	(b)	OFF	ON	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 6.5 [MHz], Amplitude : 100 [dB<sub>z</sub>V], 400 [Hz] sine wave / 27 [kHz Devi] FM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (vFMTP17 [mV<sub>rms</sub>]).</li> <li>Input the signal (Frequency : 6.5 [MHz], Amplitude : 100 [dB<sub>z</sub>V], 400 [Hz] sine wave / 30 [%] AM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (vAMTP17 [mV<sub>rms</sub>]).</li> <li>AMR6.5 [dB] = 20log (vFMTP17 / vAMTP17)</li> </ul>

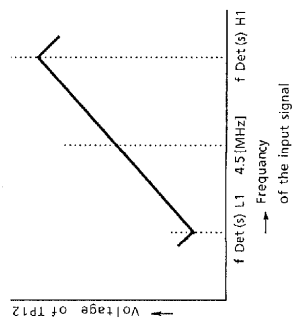
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NOTE	TEST CONDITION															
	INPUT POINT	MEAS. POINT	SW3	SW6	SW8	VR13	SW13	SW14 a	SW14 b	SW15 a	SW15 b	SW16 a	SW16 b	SW17	SW22	
Note 27	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	OFF	(a)	ON	OFF	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 4.5 [MHz], Amplitude : 100 [dB<sub>μ</sub>V], 400 [Hz] sine wave / 25 [kHz Devi] FM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (vDet (s) 4.5L [mV<sub>rms</sub>]).</li> <li>Measure distortion of TP17 output (THD4.5L [%]).</li> <li>Input the signal (Frequency : 4.5 [MHz], Amplitude : 100 [dB<sub>μ</sub>V]) to J3.</li> <li>Measure amplitude of the output signal at TP17 (vNTP17 [mV<sub>rms</sub>]).</li> <li>S / N4.5L = 20log (vDet (s) 4.5L / vNTP17)</li> </ul>
Note 28	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 4.5 [MHz], Amplitude : 100 [dB<sub>μ</sub>V], 400 [Hz] sine wave / 13.5 [kHz Devi] FM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (vDet (s) 4.5H [mV<sub>rms</sub>]).</li> <li>Measure distortion of TP17 output (THD4.5H [%]).</li> <li>Input the signal (Frequency : 4.5 [MHz], Amplitude : 100 [dB<sub>μ</sub>V]) to J3.</li> <li>Measure amplitude of the output signal at TP17 (vNTP17 [mV<sub>rms</sub>]).</li> <li>S / N4.5L = 20log (vDet (s) 4.5H / vNTP17)</li> </ul>
Note 29	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 5.5 [MHz], Amplitude : 100 [dB<sub>μ</sub>V], 400 [Hz] sine wave / 27 [kHz Devi] FM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (vDet (s) 5.5 [mV<sub>rms</sub>]).</li> <li>Measure distortion of TP17 output (THD5.5 [%]).</li> <li>Input the signal (Frequency : 5.5 [MHz], Amplitude : 100 [dB<sub>μ</sub>V]) to J3.</li> <li>Measure amplitude of the output signal at TP17 (vNTP17 [mV<sub>rms</sub>]).</li> <li>S / N5.5 = 20log (vDet (s) 5.5 / vNTP17)</li> </ul>

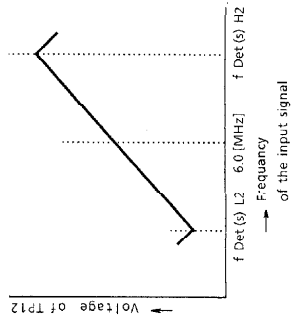
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NOTE	TEST CONDITION												MEAS. POINT	INPUT POINT	Description
	SW3	SW6	SW8	VR13	SW13	SW14 a	SW14 b	SW15 a	SW15 b	SW16 a	SW16 b	SW17			
Note 30		OFF	ON	—	OFF	OFF	ON	OFF	(b)	OFF	OFF	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 6.0 [MHz], Amplitude : 100 [dB<sub>z</sub>V], 400 [Hz] sine wave / 27 [kHz Devi] FM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (vDet (s) 6.0 [mV<sub>rms</sub>]).</li> <li>Measure distortion of TP17 output (THD6.0 [%]).</li> <li>Input the signal (Frequency : 6.0 [MHz], Amplitude : 100 [dB<sub>z</sub>V]) to J3.</li> <li>Measure amplitude of the output signal at TP17 (vNTP17 [mV<sub>rms</sub>]).</li> <li>S / N6.0 = 20log (vDet6.0 / vNTP17)</li> </ul>	
Note 31		OFF	ON	—	OFF	OFF	ON	OFF	(b)	OFF	OFF	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 6.5 [MHz], Amplitude : 100 [dB<sub>z</sub>V], 400 [Hz] sine wave / 27 [kHz Devi] FM) to J3.</li> <li>Measure amplitude of the output signal at TP17 (vDet (s) 6.5 [mV<sub>rms</sub>]).</li> <li>Measure distortion of TP17 output (THD6.5 [%]).</li> <li>Input the signal (Frequency : 6.5 [MHz], Amplitude : 100 [dB<sub>z</sub>V]) to J3.</li> <li>Measure amplitude of the output signal at TP17 (vNTP17 [mV<sub>rms</sub>]).</li> <li>S / N6.5 = 20log (vDet (s) 6.5 / vNTP17)</li> </ul>	
Note 32		OFF	ON	—	OFF	OFF	ON	OFF	OFF	ON	OFF	ON	ON	<ul style="list-style-type: none"> <li>Input the signal (Frequency : 4.5 [MHz], Amplitude : 100 [dB<sub>z</sub>V]) to J3.</li> <li>Change the frequency of the input signal, and measure voltage at TP12.</li> </ul>	

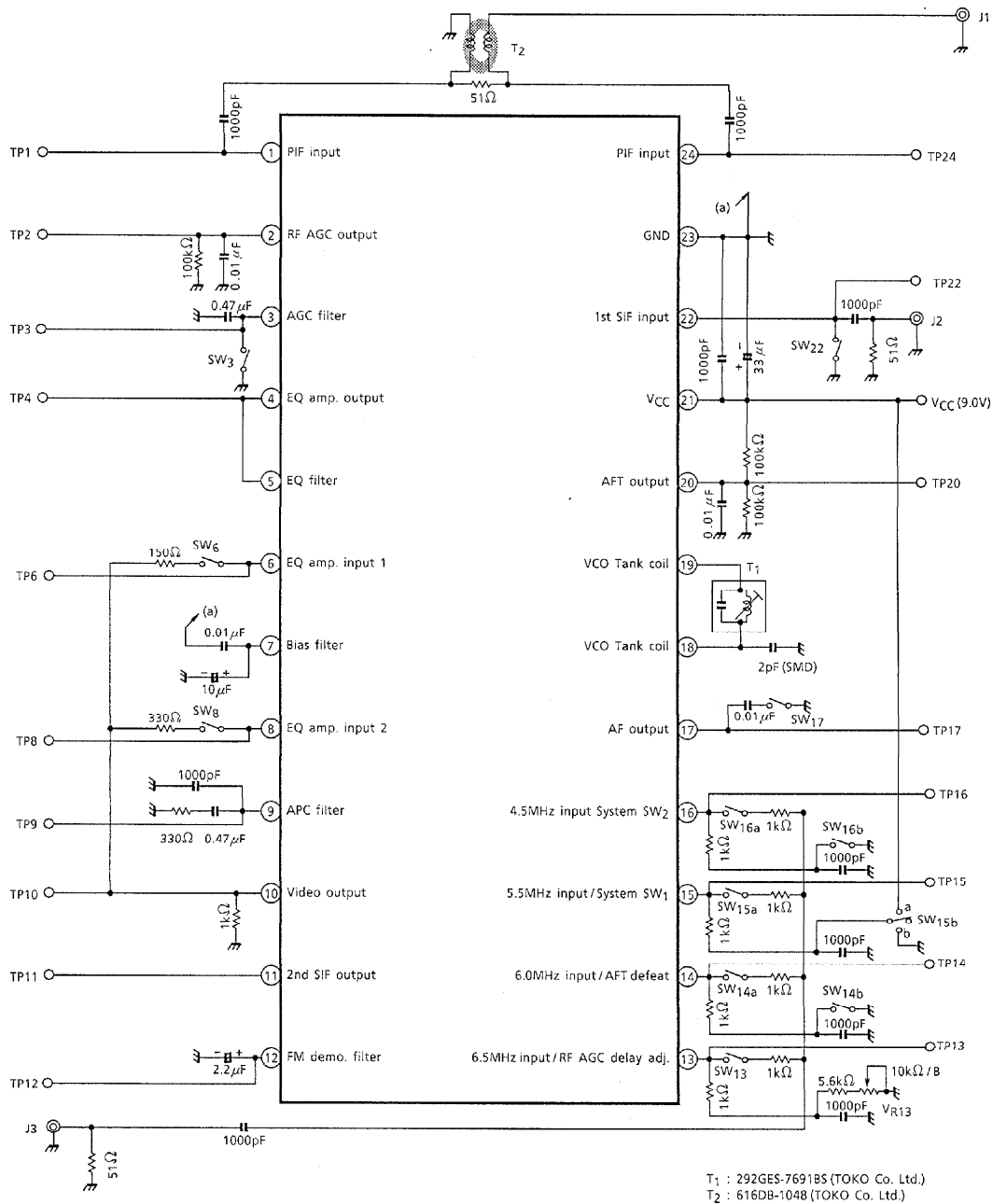


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TEST CONDITION															
NOTE	INPUT POINT	MEAS. POINT	SW3	SW6	SW8	VR13	SW13	SW14 a	SW14 b	SW15 a	SW15 b	SW16 a	SW16 b	SW17	SW22
Note 33	J3	TP17	ON	OFF	ON	—	ON	OFF	OFF	OFF	(b)	OFF	ON	ON	ON
<ul style="list-style-type: none"> <li>• Input the signal (Frequency : 6.0 [MHz], Amplitude : 100 [dB<sub>μ</sub>V]) to J3.</li> <li>• Change the frequency of the input signal, and measure voltage at TP12.</li> </ul>															

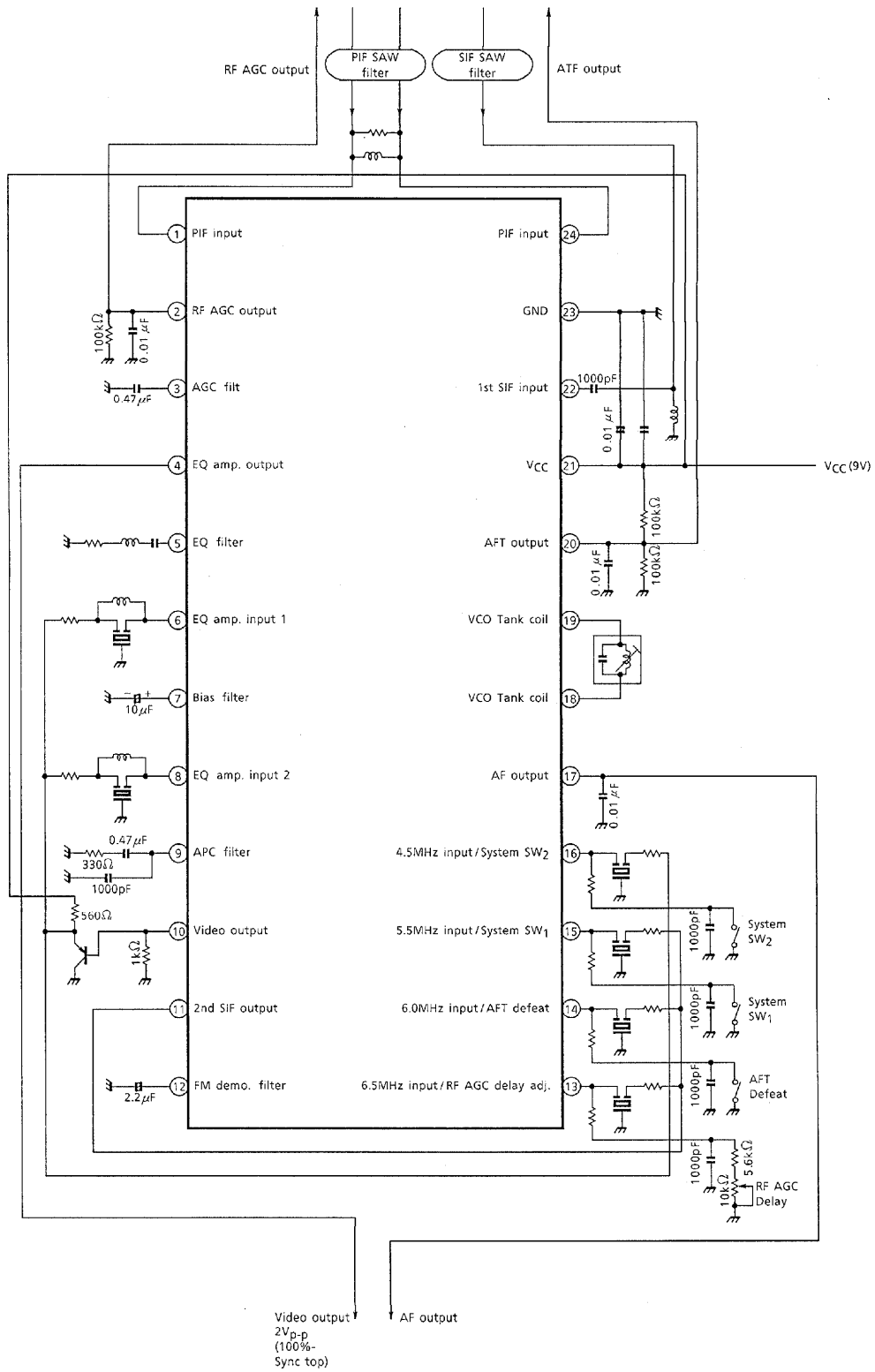


TEST CIRCUIT



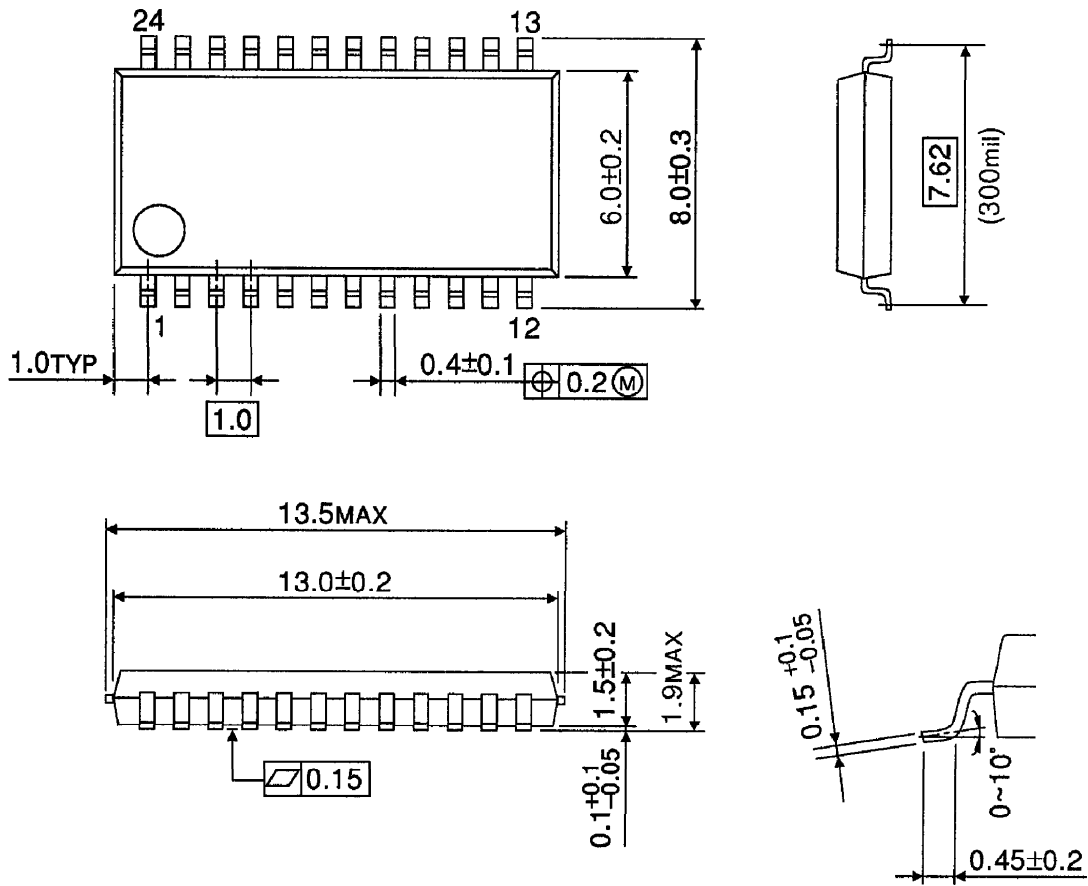
T<sub>1</sub> : 292GES-7691BS (TOKO Co. Ltd.)  
 T<sub>2</sub> : 616DB-1048 (TOKO Co. Ltd.)

APPLICATION CIRCUIT



**OUTLINE DRAWING**  
SSOP24-P-300-1.00B

Unit : mm



Weight : 0.27g (Typ.)