TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA1267AF

MULTISTANDARD PIF / SIF SYNCHRONOUS DEMODULATOR IC

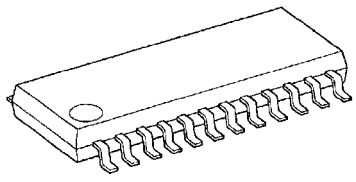
FEATURES

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

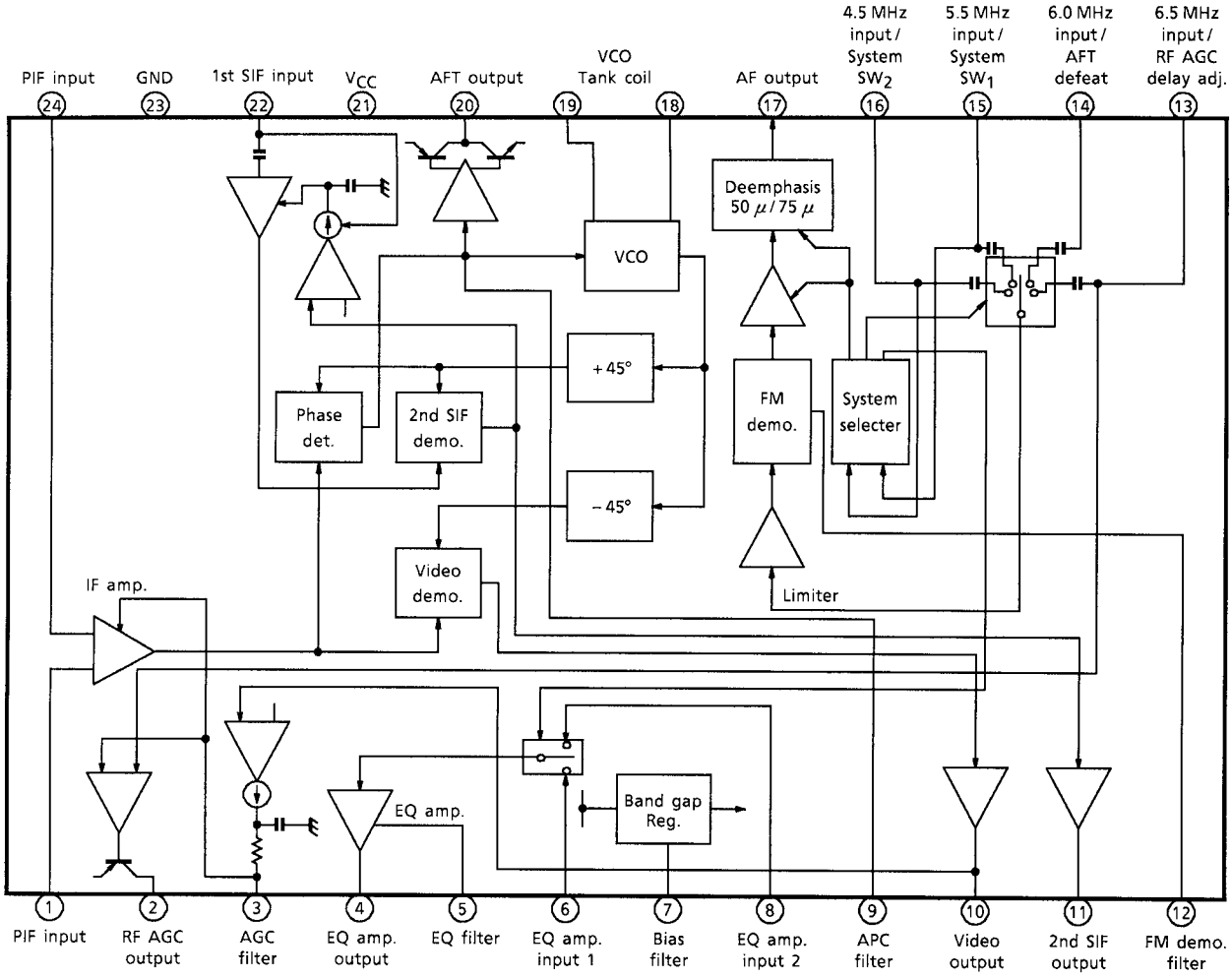
- Wide range gain controlled SIF amplifier (control range : 70 dB Typ.)
- Alignment-free PLL-FM demodulator
- Selectable 4 2nd-SIF inputs, 2 gain mode audio amplifier (0 dB / 6 dB), and 2 mode de-emphasis circuit (50 μs / 75 μs)



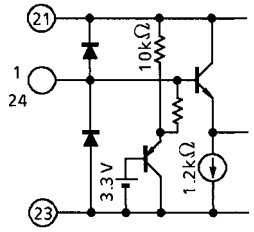
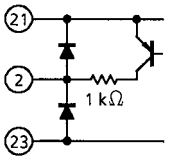
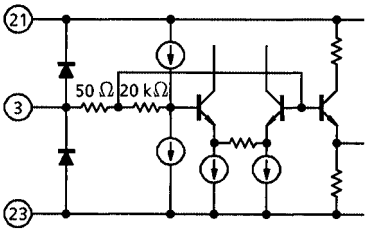
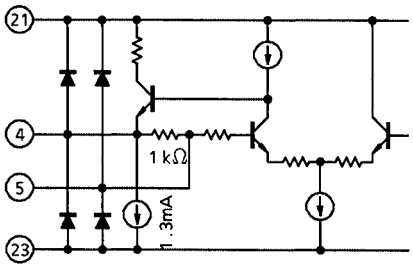
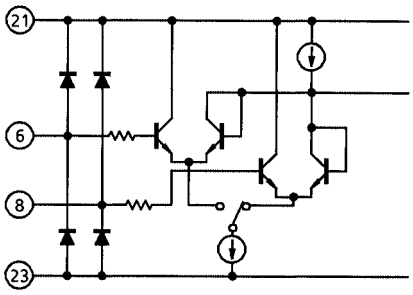
SSOP24-P-300-1.00B

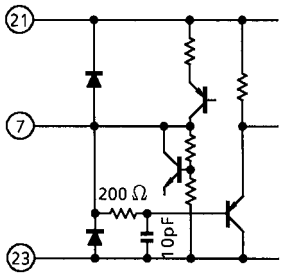
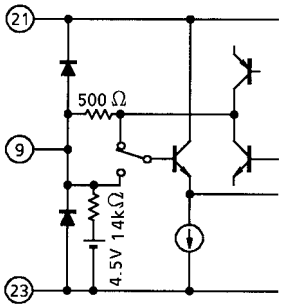
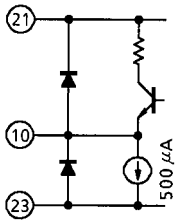
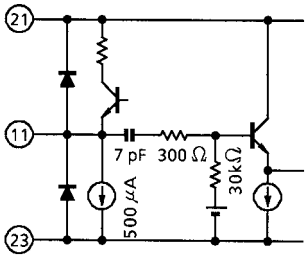
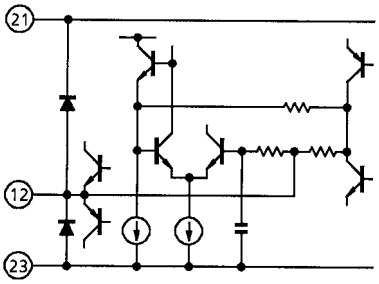
Weight: 0.27 g (Typ.)

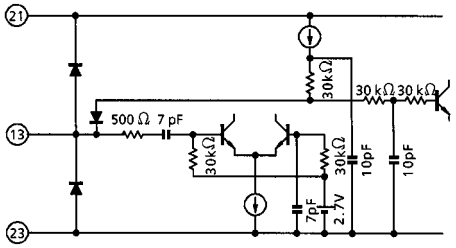
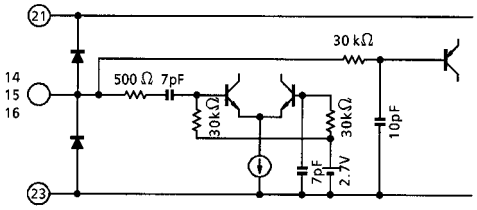
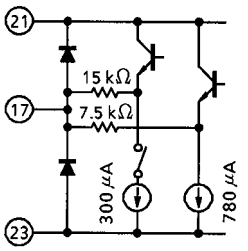
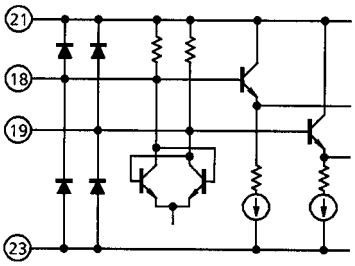
BLOCK DIAGRAM



TERMINAL FUNCTION

PIN No.	NAME	FUNCTION	INTERFACE CIRCUIT
1 24	PIF input	Differential type inputs Typical input level is 85 dBμV.	
2	RF AGC output	Open collector (PNP) type output. Maximum output current is 0.5 mA.	
3	AGC filter	Connect a capacitor (0.47 μF) 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 μF) between GND.	
9	APC filter	Connect a resister (330 Ω) and a capacitor (0.47 μF) between GND in series. And connect a capacitor (1000 pF) between this terminal and GND. Sensitivity of phase detector is 400 μA / rad (Typ.), and sensitivity of VCO is 1.8 MHz / V (Typ.) .	
10	Video output	Connect a resister (1 kΩ) 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 μF) between GND.	

PIN No.	NAME	FUNCTION	INTERFACE CIRCUIT
13	6.5 MHz input / RF AGC delay adj.	6.5 MHz 2nd SIF input. And this terminal has RF AGC delay point adjustment function. 100 μA current is outputted from this terminal. Connect a resister (5.6 kΩ) and a volume (10 kΩ) between GND in series.	
14 15 16	6.0 MHz input / AFT defeat 5.5 MHz input / system SW1 4.5 MHz input / system SW2	These terminals are input of 6.0 MHz 2nd SIF, 5.5 MHz 2nd SIF and 4.5 MHz 2nd SIF. No.14 terminal has AFT defeat function. If resister 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 0 dB or 6 dB by system switches. This system absorbs difference of the SIF's deviations (25 kHz or 50 kHz at 100% modulation). Output resistance of this terminal is selected 5 kΩ or 7.5 kΩ 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.	

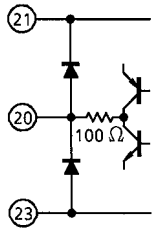
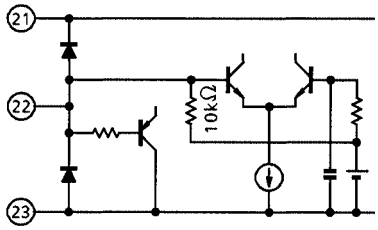
PIN No.	NAME	FUNCTION	INTERFACE CIRCUIT
20	AFT output	Push-pull type current output. Reverse type AFT.	
21	V_{CC}	Operating voltage range is 9.0 V ± 10%.	—
22	SIF input	In use inter-carrier application, connect this terminal to GND. In this condition, the SIF amplifier sets gain minimum.	
23	GND		—

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 (mVrms @DEVIATION)	DEEMPHASIS	
Low	Low	No.13	500@27 kHz	50 μs	No.6
Open	Low	No.14	↑	↑	↑
Low	Open	No.15	↑	↑	↑
Open	Open	No.16	500@13.5 kHz	75 μs	No.8
9 V	Open	↑	500@25 kHz	↑	↑

Specification of VCO Tank Coil (Reference value)

PIF FREQUENCY	TUNING CAPACITANCE
38.9MHz	27pF

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	V_{CC}	13	V
Power Dissipation	P_{Dmax}	1040 (Note 1)	mW
Operating Temperature	T_{opr}	−20~75	°C
Storage Temperature	T_{stg}	−55~150	°C

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

OPERATING SUPPLY VOLTAGE

PIN No.	PIN NAME	MIN	TYP.	MAX	UNIT
21	V_{CC}	8.1	9.0	9.9	V

ELECTRICAL CHARACTERISTICS

DC current characteristics (V_{CC} = 9.0 V, Ta = 25°C)

PIN No.	PIN NAME	SYMBOL	MIN	TYP.	MAX	UNIT
21	V_{CC}	I_{CC}	36	45	60	mA

DC voltage characteristics (V_{CC} = 9.0 V, Ta = 25°C)

PIN No.	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
1	V_1	—	—	3.5	4.0	4.5	V
4	V_4	—	No signal input, AGC gain min.	4.7	5.2	5.7	
5	V_5	—	No signal input, AGC gain min.	4.7	5.2	5.7	
7	V_7	—	—	6.3	7.0	7.7	
10	V_{10}	—	No signal input, AGC gain min.	4.7	5.2	5.7	
11	V_{11}	—	—	3.1	3.5	3.9	
14	V_{14}	—	—	2.5	3.1	3.7	
15	V_{15}	—	—	2.5	3.1	3.7	
16	V_{16}	—	—	2.5	3.1	3.7	
17	V_{17}	—	2nd SIF 5.5 MHz	3.2	3.7	4.2	
18	V_{18}	—	—	7.2	7.6	7.9	
19	V_{19}	—	—	7.2	7.6	7.9	
20	V_{20}	—	In AFT defeat	4.3	4.5	4.7	
22	V_{22}	—	—	4.9	5.3	5.7	
24	V_{24}	—	—	3.5	4.0	4.5	

AC CHARACTERISTICS (V_{CC} = 9.0 V, Ta = 25°C)

PIF section

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
PIF Input Sensitivity	v_{in} min (p)	—	(Note 1)	—	40	45	dBμV
PIF Maximum Input Signal	v_{in} max (p)	—		105	113	—	
PIF Gain Control Range	R_{AGC} (p)	—		68	73	—	dB
RF AGC Maximum Output Voltage	V_{AGC} max	—	(Note 2)	8.5	8.9	—	V
RF AGC Minimum Output Voltage	V_{AGC} min	—		—	0.0	0.1	V
PIF Input Resistance (*)	Z_{in} R (p)	—	(Note 3)	—	1.2	—	kΩ
PIF Input Capacitance (*)	Z_{in} 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	3.9	
Video Bandwidth (−3 dB)	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	β	—	(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} max	—		8.5	8.8	—	V
AFT Minimum Output Voltage	V_{AFT} min	—		—	0.4	0.6	
AFT Output Voltage on Defeating	V_{AFT} Def	—	(Note 14)	4.3	4.5	4.7	

*: Not tested

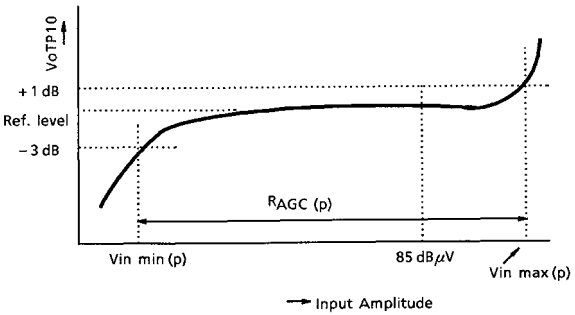
SIF section

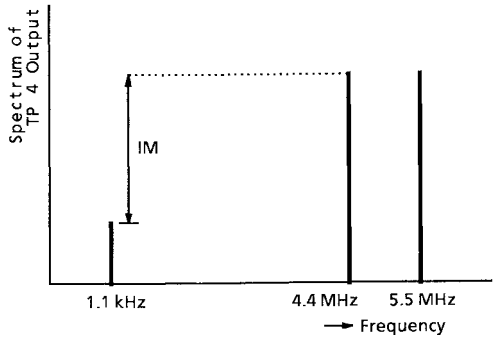
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
SIF Maximum Input Signal	v_{in} max (s)	—	(Note 15)	105	110	—	dBμV
SIF Gain Control Range	R_{AGC} (s)	—		55	70	—	dB
SIF Input Resistance (*)	Z_{in} R (s)	—	(Note 16)	—	10	—	kΩ
SIF Input Capacitance (*)	Z_{in} C (s)	—		—	2.8	—	pF
Limiting Sensitivity (4.5L)	v_{in} lim 4.5L	—	(Note 17)	—	32	45	dBμV
Limiting Sensitivity (4.5H)	v_{in} lim 4.5H	—	(Note 18)	—	35	45	dBμV
Limiting Sensitivity (5.5)	v_{in} lim 5.5	—	(Note 19)	—	32	45	dBμV
Limiting Sensitivity (6.0)	v_{in} lim 6.0	—	(Note 20)	—	32	45	dBμV
Limiting Sensitivity (6.5)	v_{in} lim 6.5	—	(Note 21)	—	32	45	dBμV
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	mV_{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	mV_{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	mV_{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	mV_{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	mV_{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)	—	—	3.9	MHz
FM Demodulatable Frequency Range (Upper 1)	f_{Det} (s) H1	—		5.3	—	—	
FM Demodulatable Frequency Range (Lower 2)	f_{Det} (s) L2	—	(Note 33)	—	—	4.9	
FM Demodulatable Frequency Range (Upper 2)	f_{Det} (s) H2	—		7.3	—	—	
Capture Range of the FM Demodulator (Lower 1)	f p (s) L1	—	(Note 34)	—	—	4.0	MHz
Capture Range of the FM Demodulator (Upper 1)	f p (s) H1	—		5.2	—	—	
Capture Range of the FM Demodulator (Lower 2)	f p (s) L2	—	(Note 35)	—	—	5.0	
Capture Range of the FM Demodulator (Upper 2)	f p (s) H2	—		7.2	—	—	

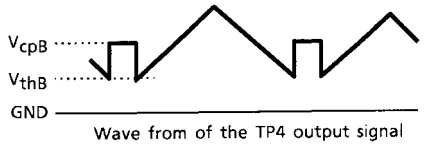
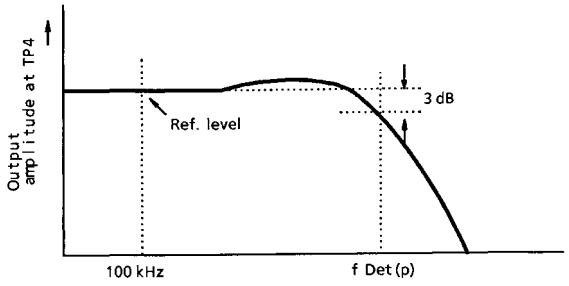
*: Not tested

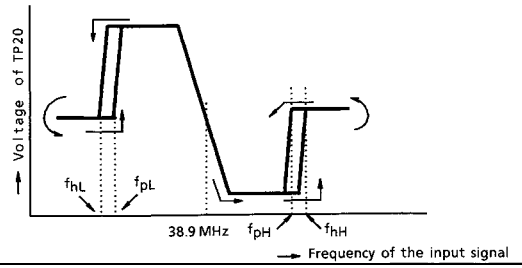
MEASUREMENTS

PIF Section

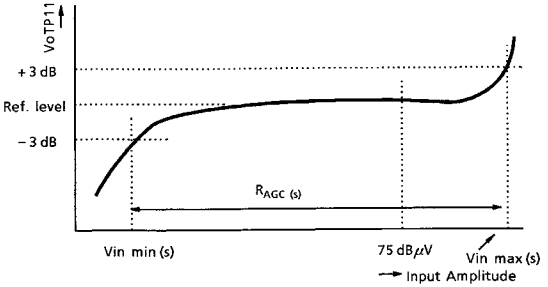
NOTE	TEST CONDITION															
	INPUT POINT	MEAS. POINT	SW_3	SW_6	SW_8	V_{R13}	SW_{13}	SW_{14} a	SW_{14} b	SW_{15} a	SW_{15} b	SW_{16} a	SW_{16} b	SW_{17}	SW_{22}	
Note 1	J1	TP10	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	• Input the signal (Frequency : 38.9 MHz, Amplitude : 85 dBμV, 15 kHz sine wave / 30% AM) to J1. • Change amplitude of the input signal, and measure amplitude of the output signal at TP10. • Calculate R_{AGC} (p) show as below. 
Note 2	J1	TP2	OFF	OFF	ON	Min. Max.	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	• Input the signal (Frequency : 38.9 MHz, Amplitude : 85 dBμV, 15 kHz sine wave / 30% AM) to J1. • Set V_{R13} to the minimum. • Measure voltage at TP2 (V_{AGC} max V.) • Set V_{R13} to the maximum. • Measure voltage at TP2 (V_{AGC} min V.)
Note 3	—	TP1 TP24	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	• 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.
Note 4	J1	TP4	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	• Input the signal (Frequency : 38.9 MHz, Amplitude : 85 dBμV, amplitude modulated by 10 step signal) to J1. • measure DG and DP at TP4.

NOTE	TEST CONDITION															
	INPUT POINT	MEAS. POINT	SW_3	SW_6	SW_8	V_{R13}	SW_{13}	SW_{14} a	SW_{14} b	SW_{15} a	SW_{15} b	SW_{16} a	SW_{16} b	SW_{17}	SW_{22}	
Note 5	J1	TP4	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	• Input the signal (Frequency : 38.9 MHz, Amplitude : 85 dBμV, 15 kHz sine wave / 30% AM) to J1. • Measure the minimum voltage of the output signal at TP4 (Vmin). • Input the mixture of 3 signals (signal 1 Frequency : 38.9 MHz, Amplitude : 85 dBμV, signal 2 Frequency : 34.5 MHz, Amplitude : 75 dBμV, and signal 3 Frequency : 33.4 MHz, Amplitude : 75 dBμV) to J1. • Apply DC voltage to TP3 and adjust it so that the bottom of the output signal at TP4 is equal to Vmin. • Measure frequency of the output signal at TP4. 
Note 6	J1	TP4	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	• Input the signal (Frequency : 38.9 MHz, Amplitude : 85 dBμV, amplitude modulated by 100 IRE whtie picture) to J1. • Measure amplitude of the output signal at TP4 (V_{Det} (p) V).
Note 7	J1	TP4	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	• Input the signal (Frequency : 38.9 MHz, Amplitude : 85 dBμV, amplitude modulated by black picture) to J1. • Measure video S / N at TP4 (HPF : 100 kHz, LPF : 5 MHz, CCIR Weighted) (S / N (p) dB).
Note 8	J1	TP4	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	• Input the signal (Frequency : 38.9 MHz, Amplitude : 85 dBμV, amplitude modulated by 100 IRE whtie picture) to J1. • Measure voltage of the sync. tip at TP4 (vsync V).

NOTE	TEST CONDITION															
	INPUT POINT	MEAS. POINT	SW_3	SW_6	SW_8	V_{R13}	SW_{13}	SW_{14} a	SW_{14} b	SW_{15} a	SW_{15} b	SW_{16} a	SW_{16} b	SW_{17}	SW_{22}	
Note 9	J1	TP4	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	• Input the signal (Frequency : 38.9 MHz, Amplitude : 85 dBμV, 15 kHz triangle wave / 50% AM) to J1. • Apply DC voltage to TP3 and adjust it to get the waveform shown as below at TP4. • Measure V_{thB} V and V_{cpB} V at TP4.  Wave from of the TP4 output signal
Note 10	J1	TP4	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	• Input the mixture of 2 signals (signal 1 Frequency : 38.9 MHz, Amplitude : 82 dBμV, signal 2 Frequency : 38.8 MHz, Amplitude : 69 dBμV) to J1. • Measure the minimum voltage of the output signal at TP4 (V_{oTP4}). • Apply DC voltage to TP3 and adjust it so that the minimum voltage of the output signal at TP4 is equal to V_{oTP4}. • Decrease frequency of the input signal at J1, and measure amplitude of the output signal at TP4.  Frequancy of the output signal at TP4

NOTE	TEST CONDITION															
	INPUT POINT	MEAS. POINT	SW_3	SW_6	SW_8	V_{R13}	SW_{13}	SW_{14} a	SW_{14} b	SW_{15} a	SW_{15} b	SW_{16} a	SW_{16} b	SW_{17}	SW_{22}	
Note 11	J1	TP20	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	• Input the signal (Frequency : 38.9 MHz, Amplitude : 85 dBμV) to J1. • 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. • Measure the voltage at TP20. 
Note 12	TP9	Pin18 Pin19	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	• 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). • Apply 4.3 V to TP9, and measure frequency of the VCO oscillation by the spectrum analyzer (f_{LVCO} MHz). • Apply 4.7 V to TP9, and measure frequency of the VCO oscillation by the spectrum analyzer (f_{HVCO} MHz). • β MHz / V = (f_{HVCO} − f_{LVCO}) / 0.4
Note 13	J1	TP20	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	• Input the signal (Frequency : 38.9 MHz − 20 kHz, Amplitude : 85 dBμV) to J1. • Measure voltage at TP20 (V_{HTP20} V). • Input the signal (Frequency : 38.9 MHz + 20 kHz, Amplitude : 85 dBμV) to J1. • Measure voltage at TP20 (V_{LTP20} V). • SAFT kHz / V = 40 / (V_{HTP20} − V_{LTP20}) • Input the signal (Frequency : 38.9 MHz − 500 kHz, Amplitude : 85 dBμV) to J1. • Measure voltage at TP20 (V_{AFT} max V). • Input the signal (Frequency : 38.9 MHz + 500 kHz, Amplitude : 85 dBμV) to J1. • Measure voltage at TP20 (V_{AFT} min V).

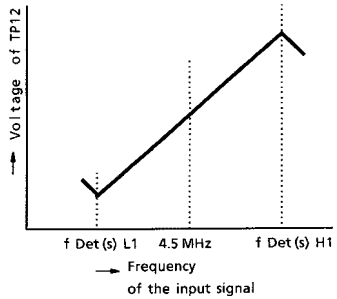
SIF Section

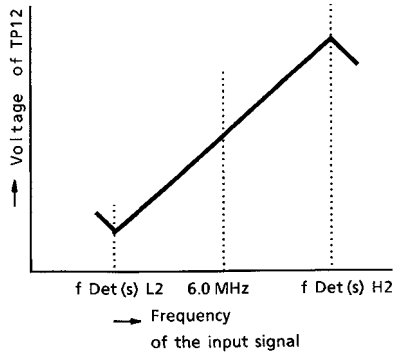
NOTE	TEST CONDITION															
	INPUT POINT	MEAS. POINT	SW_3	SW_6	SW_8	V_{R13}	SW_{13}	SW_{14} a	SW_{14} b	SW_{15} a	SW_{15} b	SW_{16} a	SW_{16} b	SW_{17}	SW_{22}	
Note 14	—	TP20	OFF	OFF	ON	—	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	ON	• Measure voltage at TP20 (V_{AFT} Def V).
Note 15	J1 J2	TP11	OFF	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	• Input the signal (Frequency : 38.9 MHz, Amplitude : 85 dBμV) to J1, and input the signal (Frequency : 33.4 MHz, Amplitude : 75 dBμV) to J2. • Change the amplitude of the signal at J2, and measure amplitude of the output signal at TP11. 
Note 16	—	TP22	ON	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	—	• Remove all connections from terminal 22. • Measure resistance (Z_{in} R (s) kΩ) and capacitance (Z_{in} C (s) pF) of TP1 and TP24 by the impedance meter.
Note 17	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	OFF	(a)	ON	OFF	ON	ON	• Input the signal (Frequency : 4.5 MHz, Amplitude : 100 dBμV, 400 Hz sine wave / 25 kHz Devi FM) to J3. • Measure amplitude of the output signal at TP17 (voTP17). • 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 dBμV).
Note 18	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	• Input the signal (Frequency : 4.5 MHz, Amplitude : 100 dBμV, 400 Hz sine wave / 13.5 kHz Devi FM) to J3. • Measure amplitude of the output signal at TP17 (voTP17). • Measure the input a signal amplitude when the output amplitude from TP17 becomes −3 dB of voTP17, by decreasing the input signal amplitude to J3 (vinlim4.5H dBμV).

NOTE	TEST CONDITION															
	INPUT POINT	MEAS. POINT	SW_3	SW_6	SW_8	V_{R13}	SW_{13}	SW_{14} a	SW_{14} b	SW_{15} a	SW_{15} b	SW_{16} a	SW_{16} b	SW_{17}	SW_{22}	
Note 19	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	ON	• Input the signal (Frequency : 5.5 MHz, Amplitude : 100 dBμV, 400 Hz sine wave / 27 kHz Devi FM) to J3. • Measure amplitude of the output signal at TP17 (voTP17). • Measure the input signal amplitude when the output amplitude from TP17 becomes −3 dB of voTP17, by decreasing the input signal amplitude to J3 (vinlim5.5 dBμV).
Note 20	J3	TP17	ON	OFF	ON	—	OFF	OFF	ON	OFF	(b)	OFF	OFF	ON	ON	• Input the signal (Frequency : 6.0 MHz, Amplitude : 100 dBμV, 400 Hz sine wave / 27 kHz Devi FM) to J3. • Measure amplitude of the output signal at TP17 (voTP17). • Measure the input signal amplitude when the output amplitude from TP17 becomes −3 dB of voTP17, by decreasing the input signal amplitude to J3 (vinlim6.0 dBμV).
Note 21	J3	TP17	ON	OFF	ON	—	ON	OFF	OFF	OFF	(b)	OFF	ON	ON	ON	• Input the signal (Frequency : 6.5 MHz, Amplitude : 100 dBμV, 400 Hz sine wave / 27 kHz Devi FM) to J3. • Measure amplitude of the output signal at TP17 (voTP17). • Measure the input signal amplitude when the output amplitude from TP17 becomes −3 dB of voTP17, by decreasing the input signal amplitude to J3 (vinlim6.5 dBμV).
Note 22	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	OFF	(a)	ON	OFF	ON	ON	• Input the signal (Frequency : 4.5 MHz, Amplitude : 100 dBμV, 400 Hz sine wave / 25 kHz Devi FM) to J3. • Measure amplitude of the output signal at TP17 (vFMTP17 mV_{rms}). • Input the signal (Frequency : 4.5 MHz, Amplitude : 100 dBμV, 400Hz sine wave / 30% AM) to J3. • Measure amplitude of the output signal at TP17 (vAMTP17 mV_{rms}). • AMR4.5L = 20łog (vFMTP17 / vAMTP17)

NOTE	TEST CONDITION															
	INPUT POINT	MEAS. POINT	SW_3	SW_6	SW_8	V_{R13}	SW_{13}	SW_{14} a	SW_{14} b	SW_{15} a	SW_{15} b	SW_{16} a	SW_{16} b	SW_{17}	SW_{22}	
Note 23	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	• Input the signal (Frequency : 4.5 MHz, Amplitude : 100 dBμV, 400 Hz sine wave / 13.5 kHz Devi FM) to J3. • Measure amplitude of the output signal at TP17 (vFMTP17 mV_{rms}). • Input the signal (Frequency : 4.5 MHz, Amplitude : 100 dBμV, 400 Hz sine wave / 30% AM) to J3. • Measure amplitude of the output signal at TP17 (vAMTP17 mV_{rms}). • AMR4.5H dB = 20 ℓog (vFMTP17 / vAMTP17)
Note 24	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	ON	• Input the signal (Frequency : 5.5 MHz, Amplitude : 100 dBμV, 400 Hz sine wave / 27 kHz Devi FM) to J3. • Measure amplitude of the output signal at TP17 (vFMTP17 mV_{rms}). • Input the signal (Frequency : 5.5 MHz, Amplitude : 100 dBμV, 400 Hz sine wave / 30% AM) to J3. • Measure amplitude of the output signal at TP17 (vAMTP17 mV_{rms}). • AMR5.5 dB = 20 ℓog (vFMTP17 / vAMTP17)
Note 25	J3	TP17	ON	OFF	ON	—	OFF	OFF	ON	OFF	(b)	OFF	OFF	ON	ON	• Input the signal (Frequency : 6.0 MHz, Amplitude : 100 dBμV, 400 Hz sine wave / 27 kHz Devi FM) to J3. • Measure amplitude of the output signal at TP17 (vFMTP17 mV_{rms}). • Input the signal (Frequency : 6.0 MHz, Amplitude : 100 dBμV, 400 Hz sine wave / 30% AM) to J3. • Measure amplitude of the output signal at TP17 (vAMTP17 mV_{rms}). • AMR6.0 dB = 20 ℓog (vFMTP17 / vAMTP17)
Note 26	J3	TP17	ON	OFF	ON	—	ON	OFF	OFF	OFF	(b)	OFF	ON	ON	ON	• Input the signal (Frequency : 6.5 MHz, Amplitude : 100 dBμV, 400 Hz sine wave / 27 kHz Devi FM) to J3. • Measure amplitude of the output signal at TP17 (vFMTP17 mV_{rms}). • Input the signal (Frequency : 6.5 MHz, Amplitude : 100 dBμV, 400 Hz sine wave / 30% AM) to J3. • Measure amplitude of the output signal at TP17 (vAMTP17 mV_{rms}). • AMR6.5 dB = 20 ℓog (vFMTP17 / vAMTP17)

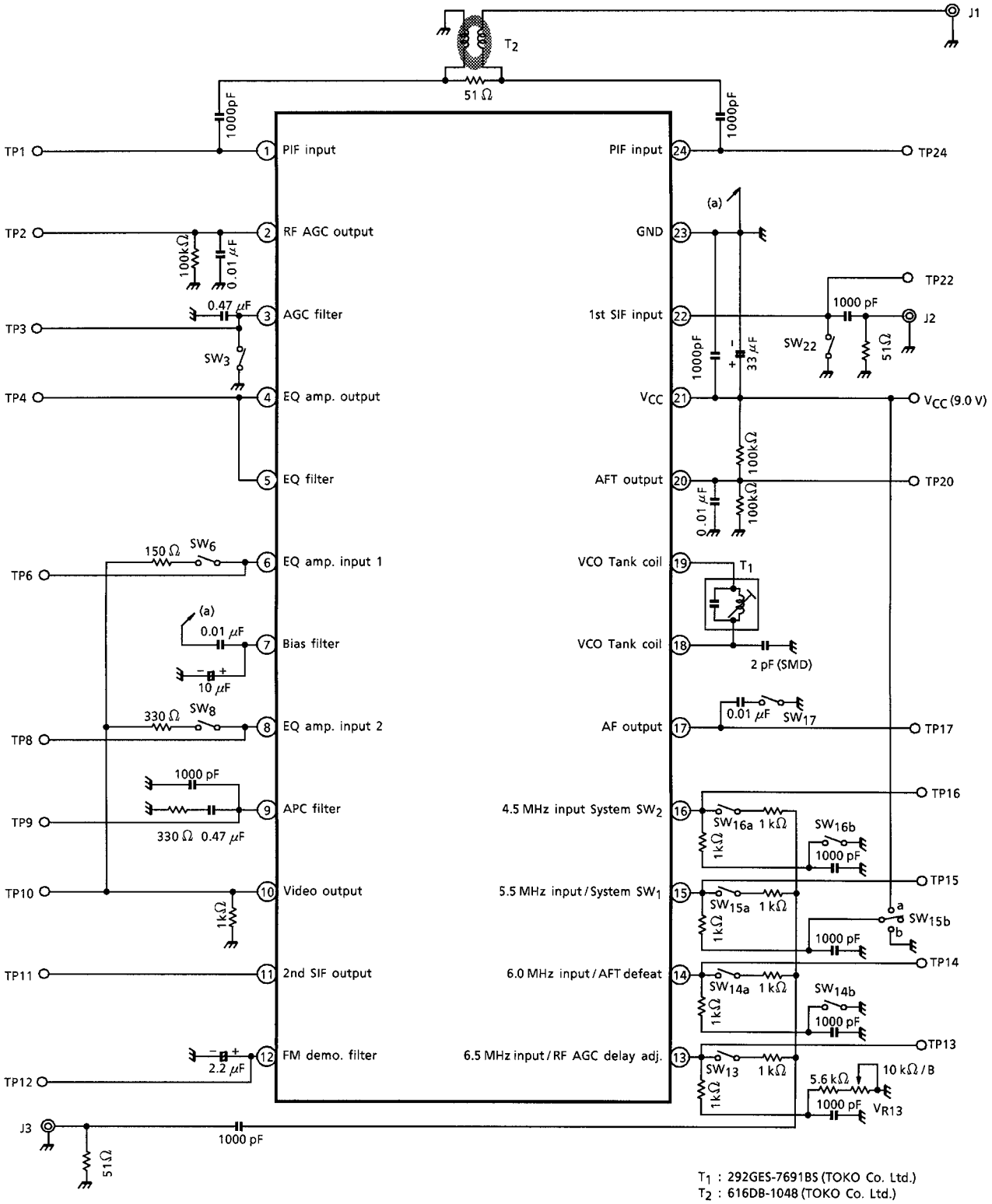
NOTE	TEST CONDITION															
	INPUT POINT	MEAS. POINT	SW_3	SW_6	SW_8	V_{R13}	SW_{13}	SW_{14} a	SW_{14} b	SW_{15} a	SW_{15} b	SW_{16} a	SW_{16} b	SW_{17}	SW_{22}	
Note 27	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	OFF	(a)	ON	OFF	ON	ON	• Input the signal (Frequency : 4.5 MHz, Amplitude : 100 dBμV, 400 Hz sine wave / 25 kHz Devi FM) to J3. • Measure amplitude of the output signal at TP17 (vDet (s) 4.5L mV_{rms}). • Measure distortion of TP17 output (THD4.5L %). • Input the signal (Frequency : 4.5 MHz, Amplitude : 100 dBμV) to J3. • Measure amplitude of the output signal at TP17 (vNTP17 mV_{rms}). • S / N4.5L = 20 ℓog (vDet (s) 4.5L / vNTP17)
Note 28	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	• Input the signal (Frequency : 4.5 MHz, Amplitude : 100 dBμV, 400 Hz sine wave / 13.5 kHz Devi FM) to J3. • Measure amplitude of the output signal at TP17 (vDet (s) 4.5H mV_{rms}). • Measure distortion of TP17 output (THD4.5H %). • Input the signal (Frequency : 4.5 MHz, Amplitude : 100 dBμV) to J3. • Measure amplitude of the output signal at TP17 (vNTP17 mV_{rms}). • S / N4.5L = 20 ℓog (vDet (s) 4.5H / vNTP17)
Note 29	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	ON	• Input the signal (Frequency : 5.5 MHz, Amplitude : 100 dBμV, 400 Hz sine wave / 27 kHz Devi FM) to J3. • Measure amplitude of the output signal at TP17 (vDet (s) 5.5 mV_{rms}). • Measure distortion of TP17 output (THD5.5 %). • Input the signal (Frequency : 5.5 MHz, Amplitude : (100 dBμV) to J3. • Measure amplitude of the output signal at TP17 (vNTP17 mV_{rms}). • S / N5.5 = 20 ℓog (vDet (s) 5.5 / vNTP17)

NOTE	TEST CONDITION															
	INPUT POINT	MEAS. POINT	SW_3	SW_6	SW_8	V_{R13}	SW_{13}	SW_{14} a	SW_{14} b	SW_{15} a	SW_{15} b	SW_{16} a	SW_{16} b	SW_{17}	SW_{22}	
Note 30	J3	TP17	ON	OFF	ON	—	OFF	OFF	ON	OFF	(b)	OFF	OFF	ON	ON	• Input the signal (Frequency : 6.0 MHz, Amplitude : 100 dBμV, 400 Hz sine wave / 27 kHz Devi FM) to J3. • Measure amplitude of the output signal at TP17 (vDet (s) 6.0 mV_{rms}). • Measure distortion of TP17 output (THD6.0 %). • Input the signal (Frequency : 6.0 MHz, Amplitude : 100 dBμV) to J3. • Measure amplitude of the output signal at TP17 (vNTP17 mV_{rms}). • S / N6.0 = 20 łog (vDet6.0 / vNTP17)
Note 31	J3	TP17	ON	OFF	ON	—	ON	OFF	OFF	OFF	(b)	OFF	ON	ON	ON	• Input the signal (Frequency : 6.5 MHz, Amplitude : 100 dBμV, 400 Hz sine wave / 27 kHz Devi FM) to J3. • Measure amplitude of the output signal at TP17 (vDet (s) 6.5 mV_{rms}). • Measure distortion of TP17 output (THD6.5 %). • Input the signal (Frequency : 6.5 MHz, Amplitude : 100 dBμV) to J3. • Measure amplitude of the output signal at TP17 (vNTP17 mV_{rms}). • S / N6.5 = 20 łog (vDet (s) 6.5 / vNTP17)
Note 32	J3	TP17	ON	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	• Input the signal (Frequency : 4.5 MHz, Amplitude : 100 dBμV) to J3. • Change the frequency of the input signal, and measure voltage at TP12. 

NOTE	TEST CONDITION															
	INPUT POINT	MEAS. POINT	SW_3	SW_6	SW_8	V_{R13}	SW_{13}	SW_{14} a	SW_{14} b	SW_{15} a	SW_{15} b	SW_{16} a	SW_{16} b	SW_{17}	SW_{22}	
Note 33	J3	TP17	ON	OFF	ON	—	ON	OFF	OFF	OFF	(b)	OFF	ON	ON	ON	• Input the signal (Frequency : 6.0 MHz, Amplitude : 100 dBμV) to J3. • Change the frequency of the input signal, and measure voltage at TP12. 
Note 34	J3	TP12	ON	OFF	ON	—	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	• Input the signal (Frequency : 1 MHz, Amplitude : 100 dBμV) to J3. • Increase frequency of the input signal. • Measure voltage of TP12 (VTP120 V). • Apply 5 V to TP12. • Stop applying 5 V to TP12. • Measure voltage of TP12 (VTP121 V). • Measure frequency of the input signal when VTP120 = VTP121 (f p (s) L1 MHz). • Input the signal (Frequency : 10 MHz, Amplitude : 100 dBμV) to J3. • Decrease frequency of the input signal. • Measure voltage of TP12 (VTP122 V). • Connect TP12 to GND. • Open TP12. • Measure voltage of TP12 (VTP123 V). • Measure frequency of the input signal when VTP122 = VTP123 (f p (s) H1 MHz).

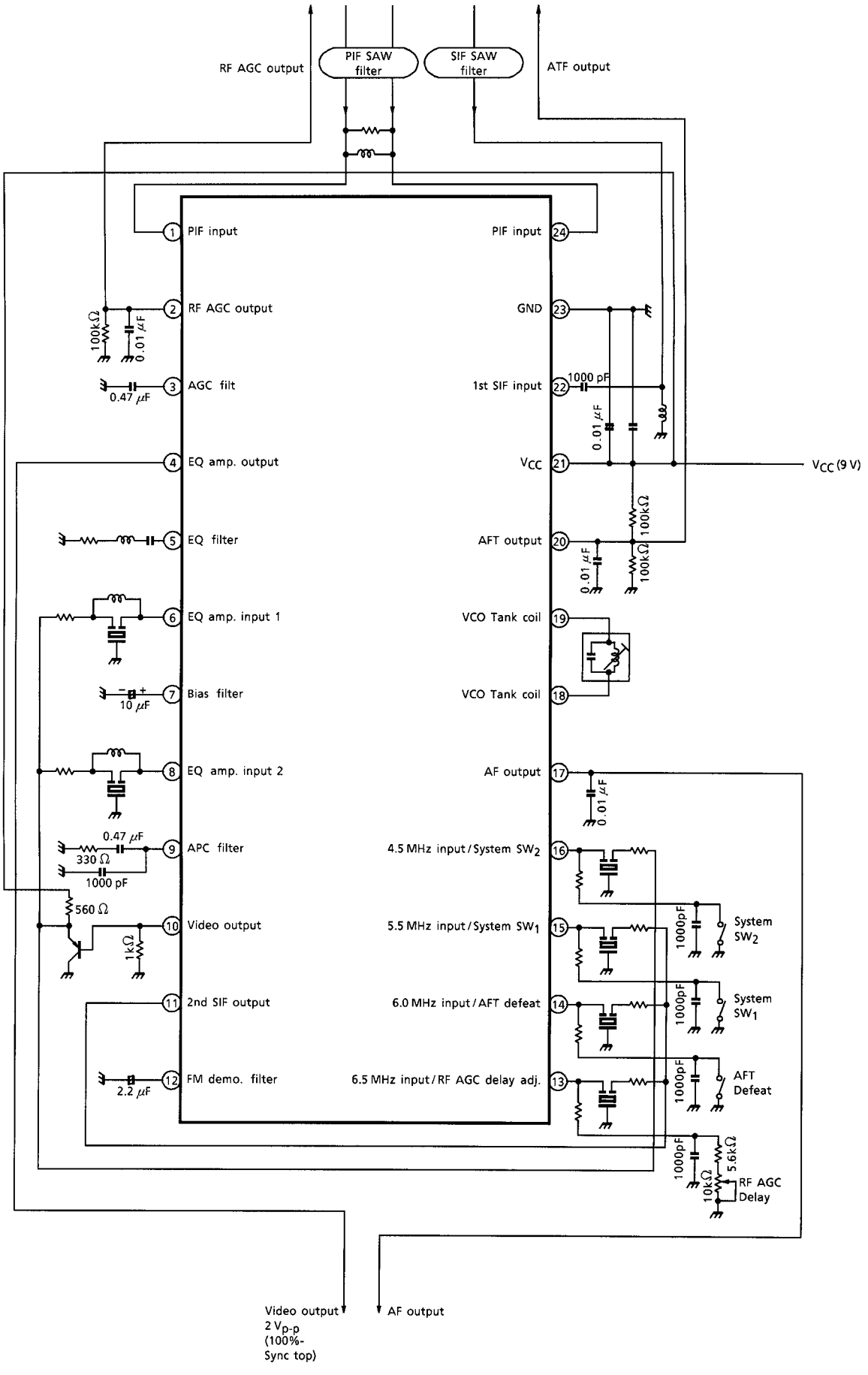
NOTE	TEST CONDITION															
	INPUT POINT	MEAS. POINT	SW_3	SW_6	SW_8	V_{R13}	SW_{13}	SW_{14} a	SW_{14} b	SW_{15} a	SW_{15} b	SW_{16} a	SW_{16} b	SW_{17}	SW_{22}	
Note 35	J3	TP12	ON	OFF	ON	—	ON	OFF	OFF	OFF	(b)	OFF	ON	ON	ON	• Input the signal (Frequency : 3 MHz, Amplitude : 100 dBμV) to J3. • Increase frequency of the input signal. • Measure voltage of TP12 (VTP120 V). • Apply 5 V to TP12. • Stop applying 5 V to TP12. • Measure voltage of TP12 (VTP121 V). • Measure frequency of the input signal when VTP120 = VTP121 (f p (s) L2 MHz). • Input the signal (Frequency : 13 MHz, Amplitude : 100 dBμV) to J3. • Decrease frequency of the input signal. • Measure voltage of TP12 (VTP122 V). • Connect TP12 to GND. • Open TP12. • Measure voltage of TP12 (VTP123 V). • Measure frequency of the input signal when VTP122 = VTP123 (f p (s) H2 MHz).

TEST CIRCUIT



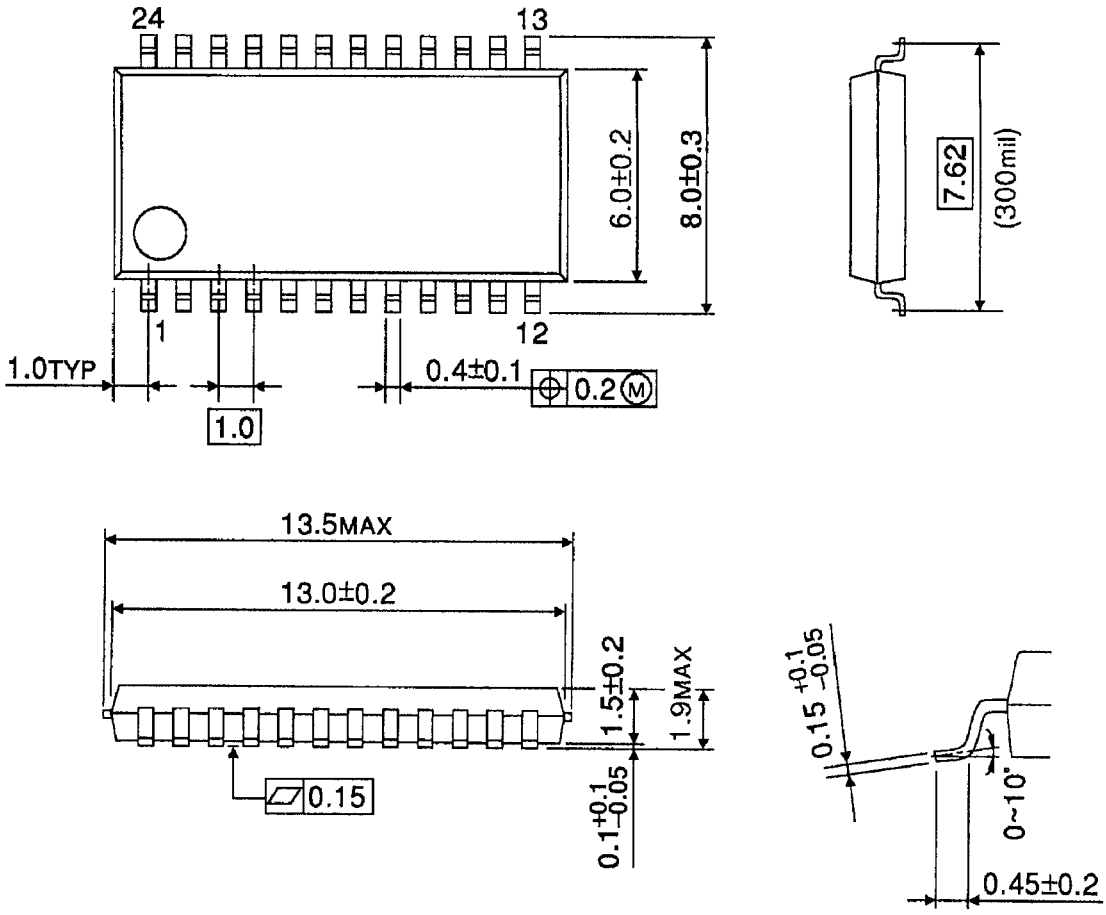
T1 : 292GES-7691BS (TOKO Co. Ltd.)
T2 : 616DB-1048 (TOKO Co. Ltd.)

APPLICATION CIRCUIT



PACKAGE DIMENSIONS

SSOP24-P-300-1.00B Unit : mm



Weight: 0.27g (Typ.)