

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

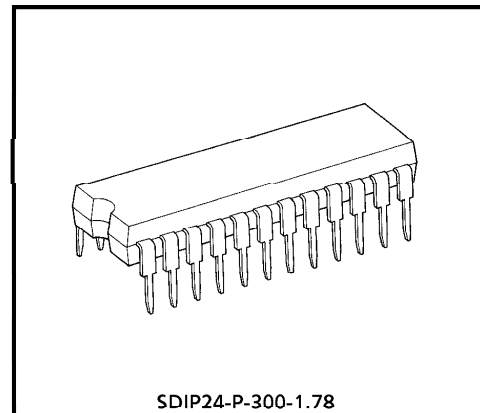
TA2008AN

5V AM / FM 1 CHIP TUNER IC (for Digital Tuning System)

The TA2008AN is the AM / FM 1 Chip Tuner IC, which is designed for radio cassette players and music centers. This is suitable for Digital Tuning System Applications.

FEATURES

- Suitable for combination with Digital Tuning System which is included IF Counter.
- One terminal type AM / FM IF Count Output (Auto Stop Signal) for IF Counter of Digital Tuning System.
 - FM : 1.3375MHz (1/8 dividing)
 - AM : 450kHz
- Built-in Mute Circuit for IF Count Output.
- For adopting Ceramic Discriminator and Ceramic Resonator, it is not necessary to adjust the FM Quad Detector Circuit and FM Stereo Detector VCO Circuit.
- Built-in one terminal type AM / FM Local Oscillator Buffer Output for Digital Tuning System Applications.
- Operating Supply Voltage Range : $V_{CC} = 3.5 \sim 14V$ ($T_a = 25^\circ C$)

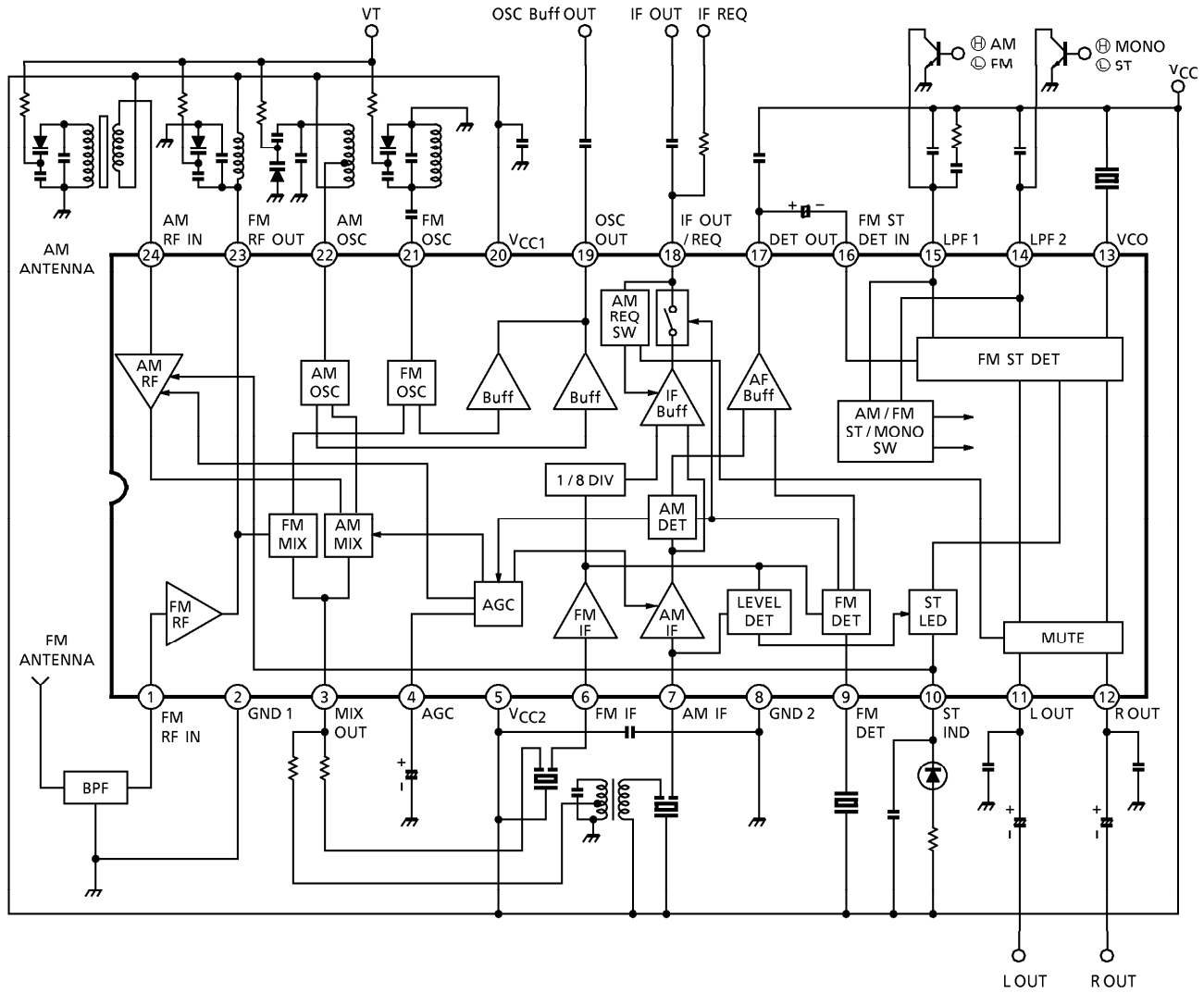


Weight : 1.2g (Typ.)

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BLOCK DIAGRAM



EXPLANATION OF TERMINALS

PIN No.	CHARACTERISTIC	INTERNAL CIRCUIT	DC VOLTAGE (V) (at no signal)	
			AM	FM
1	FM-RF IN		0	0.8
2	GND1 (GND for RF Stage)	—	0	0
3	MIX OUT		0.3	0.8
4	AGC		1.2	0.9
5	VCC2 (VCC for IF/FM ST DET Stage)	—	5.0	5.0
6	FM IF IN		5.0	5.0

PIN No.	CHARACTERISTIC	INTERNAL CIRCUIT	DC VOLTAGE (V) (at no signal)	
			AM	FM
7	AM IF IN		5.0	5.0
8	GND2 (GND for IF/FM ST DET Stage)	—	0	0
9	QUAD (FM QUAD. Detector)		4.1	3.6
10	ST IND <ul style="list-style-type: none"> • Stereo LED Terminal • Offset Voltage Cancel for AM RF Amp. 		4.2	—
11 12	L-OUT (L-ch Output) R-OUT (R-ch Output)		1.35	1.35

PIN No.	CHARACTERISTIC	INTERNAL CIRCUIT	DC VOLTAGE (V) (at no signal)	
			AM	FM
13	VCO		5.0	4.1
14	LPF2 ● LPF Terminal for Synchronous Detector. ● VCO Stop Terminal $V_{14} = \text{GND} \rightarrow \text{VCO Stop}$		5.0	3.4
15	LPF1 ● LPF Terminal for Phase Detector ● Bias Terminal for AM/FM SW Circuit $V_{15} = \text{GND} \rightarrow \text{AM}$ $V_{15} = \text{OPEN} \rightarrow \text{FM}$		0	2.8
16	FM ST DET IN		1.4	1.4

PIN No.	CHARACTERISTIC	INTERNAL CIRCUIT	DC VOLTAGE (V) (at no signal)	
			AM	FM
17	DET OUT	<p> VCC2 (5) AM FM (a) (b) GND2 (8) </p> <p> (a) LOW→FM, HIGH→AM (b) LOW→AM, HIGH→FM </p>	1.4	1.4
18	IF OUT / REQ V ₁₈ = GND → IF OUT	<p> VCC2 (5) 100Ω (18) </p>	4.0	4.0
19	OSC OUT	<p> VCC1 (20) AM OSC FM OSC (19) GND1 (2) </p>	4.0	4.0
20	VCC1 (VCC for RF Stage)	—	5.0	5.0
21	FM OSC	<p> VCC1 (20) (21) MIX GND1 (2) </p>	5.0	5.0

PIN No.	CHARACTERISTIC	INTERNAL CIRCUIT	DC VOLTAGE (V) (at no signal)	
			AM	FM
22	AM OSC		5.0	5.0
23	FM RF OUT	cf. pin①	5.0	5.0
24	AM RF IN		5.0	5.0

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V _{CC}	15	V
LED Current	I _{LED}	10	mA
LED Voltage	V _{LED}	15	V
Power Dissipation	P _D *	1200	mW
Operating Temperature	T _{opr}	- 25~75	°C
Storage Temperature	T _{stg}	- 55~150	°C

* : Derated above Ta = 25°C in the proportion of 9.6mW/°C

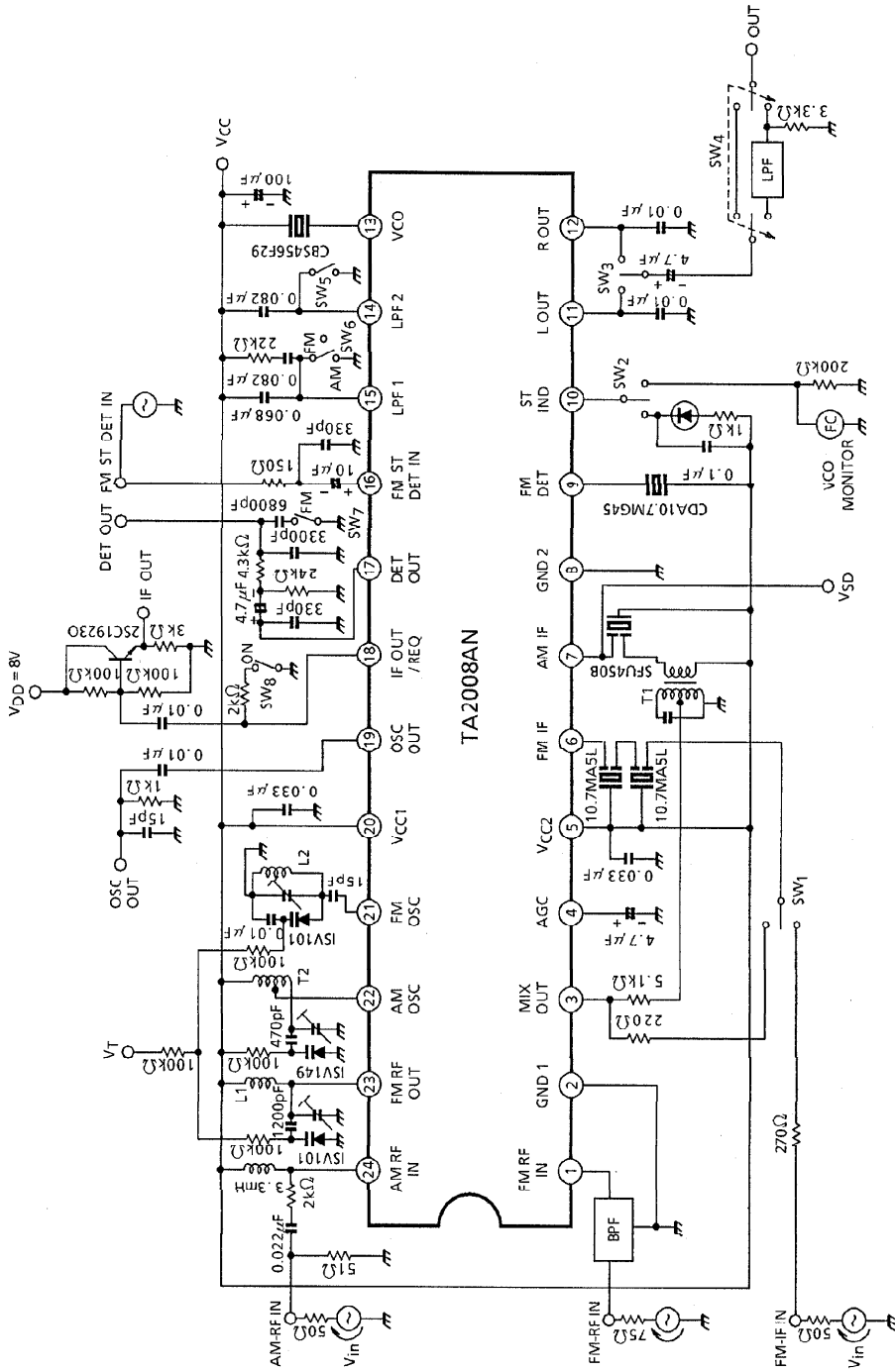
ELECTRICAL CHARACTERISTICS

Unless otherwise specified, Ta = 25°C, V_{CC} = 5V, SW8 : OFF, F/E : f = 98MHz, f_m = 1kHz
 FM IF : f = 10.7MHz, Δf = ± 22.5kHz, f_m = 1kHz
 AM : f = 1MHz, MOD = 30%, f_m = 1kHz
 FM ST DET : f_m = 1kHz

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current	I _{CC} (FM)	—	—	V _{in} = 0, FM Mode	—	27	36	mA
	I _{CC} (AM)	—	—	V _{in} = 0, AM Mode	—	18	25	
F/E	Input Limiting Voltage	V _{in} (lim.)	—	- 3dB Limiting with respect to V _{OD} Level at V _{in} = 60dB _μ V EMF	—	11	—	dB _μ V EMF
	Local OSC Buffer Output Voltage	V _{OSC} (buff) FM	—	f _{OSC} = 108.7MHz	90	180	—	mV _{rms}
FM IF	Input Limiting Voltage	V _{in} (lim.) IF	—	- 3dB Limiting with respect to V _{OD} Level at V _{in} = 80dB _μ V EMF	40	45	50	dB _μ V EMF
	Recovered Output Voltage	V _{OD}	—	V _{in} = 80dB _μ V EMF	50	75	100	mV _{rms}
	Signal To Noise Ratio	S / N	—	V _{in} = 80dB _μ V EMF	—	70	—	dB
	Total Harmonic Distortion	THD	—	V _{in} = 80dB _μ V EMF	—	0.3	—	%
	AM Rejection Ratio	AMR	—	V _{in} = 80dB _μ V EMF	—	50	—	dB
	SD Output Sensitivity	V _{SD}	—	V _{SD} = V _{CC} - 0.1V	53	58	63	dB _μ V EMF
	IF Count Output Frequency	f _{1/8} IF (FM)	—	V _{in} = 80dB _μ V EMF, SW8 : ON	1.3373	1.3375	1.3377	MHz
	IF Count Output Voltage	V _{1/8} IF (FM)	—	V _{in} = 80dB _μ V EMF, SW8 : ON	350	500	—	mV _{p-p}
IF Count Output Sensitivity	IF sens (FM)	—	SW8 : ON	49	54	59	dB _μ V EMF	

CHARACTERISTIC		SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT		
AM	Gain	G _V	—	V _{in} = 26dB _μ V EMF	20	45	80	mV _{rms}		
	Recovered Output Voltage	V _{OD}	—	V _{in} = 60dB _μ V EMF	45	65	90	mV _{rms}		
	Signal To Noise Ratio	S / N	—	V _{in} = 60dB _μ V EMF	—	42	—	dB		
	Total Harmonic Distortion	THD	—	V _{in} = 60dB _μ V EMF	—	1.0	—	%		
	Local OSC Buffer Output Voltage	V _{OSC} (buff) AM	—	f _{OSC} = 1.45MHz	90	150	—	mV _{rms}		
	IF Count Output Voltage	V _{IF} (AM)	—	V _{in} = 60dB _μ V EMF, SW8 : ON	350	500	—	mV _{p-p}		
	IF Count Output Sensitivity	IF sens (AM)	—	SW8 : ON	35	40	45	dB _μ V EMF		
Pin⑰ Output Resistance		R17	—	FM Mode	—	0.75	—	kΩ		
				AM Mode	—	15.5	—			
FM ST DET	Input Resistance		R _{IN}	—	—	24	—	kΩ		
	Output Resistance		R _{OUT}	—	—	5	—	kΩ		
	Max. Composite Signal Input Voltage		V _{in} MAX (Stereo)	—	L + R = 90%, P = 10%, SW4 : LPF ON f _m = 1kHz, THD = 3%	—	800	—	mV _{rms}	
	Separation		Sep.	—	L + R = 180mV _{rms}	f _m = 100Hz	—	42	—	dB
					P = 20mV _{rms}	f _m = 1kHz	35	42	—	
					SW4 : LPF ON	f _m = 10kHz	—	42	—	
	Total Harmonic Distortion	Monaural	THD (Monaural)	—	V _{in} = 200mV _{rms}	—	0.1	—	%	
		Stereo	THD (Stereo)	—	L + R = 180mV _{rms} , P = 20mV _{rms} , SW4 : LPF ON	—	0.1	—		
	Voltage Gain		G _V	—	V _{in} = 200mV _{rms}	-2	0	2	dB	
	Channel Balance		C.B.	—	V _{in} = 200mV _{rms}	-2	0	2	dB	
	Stereo LED Sensitivity	ON	V _L (ON)	—	Pilot Input	—	8	15	mV _{rms}	
OFF		V _L (OFF)	—	2		6	—			
Stereo LED Hysteresis		V _H	—	To LED turn off from LED Turn on	—	2	—	mV _{rms}		
Capture Range		C.R.	—	P = 15mV _{rms}	—	± 1.3	—	%		
Signal To Noise Ratio		S / N	—	V _{in} = 200mV _{rms}	—	80	—	dB		
Muting Attenuation		MUTE	—	V _{in} = 200mV _{rms}	—	80	—	dB		

TEST CIRCUIT



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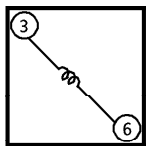
COIL DATA

COIL No.	TEST FREQ.	L (μ H)	C _o (pF)	Q _o	TURNS				WIRE (mm ϕ)	REFERENCE
					1-2	2-3	1-3	3-6		
L1 FM RF	100MHz			100				2 $\frac{1}{2}$	0.5UEW	Within Core
L2 FM OSC	100MHz			100				2 $\frac{1}{2}$	0.5UEW	Within Core
T1 AM MIX	455kHz		180	48 \uparrow	47	111	158	4-6 20	0.06UEW	Ⓓ : A7LCS-12064N
T2 AM OSC	796kHz	268		125	15	89			0.06UEW	Ⓔ : 2157-2239-213A Ⓓ : A7BRS-11998Y

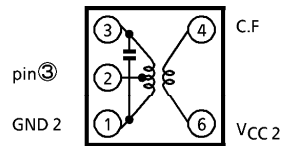
Ⓔ : SUMIDA ELECTRIC Co., Ltd.

Ⓓ : TOKO Co., Ltd.

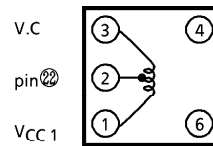
L₁ : FM RF
L₂ : FM OSC



T1 : AM MIX

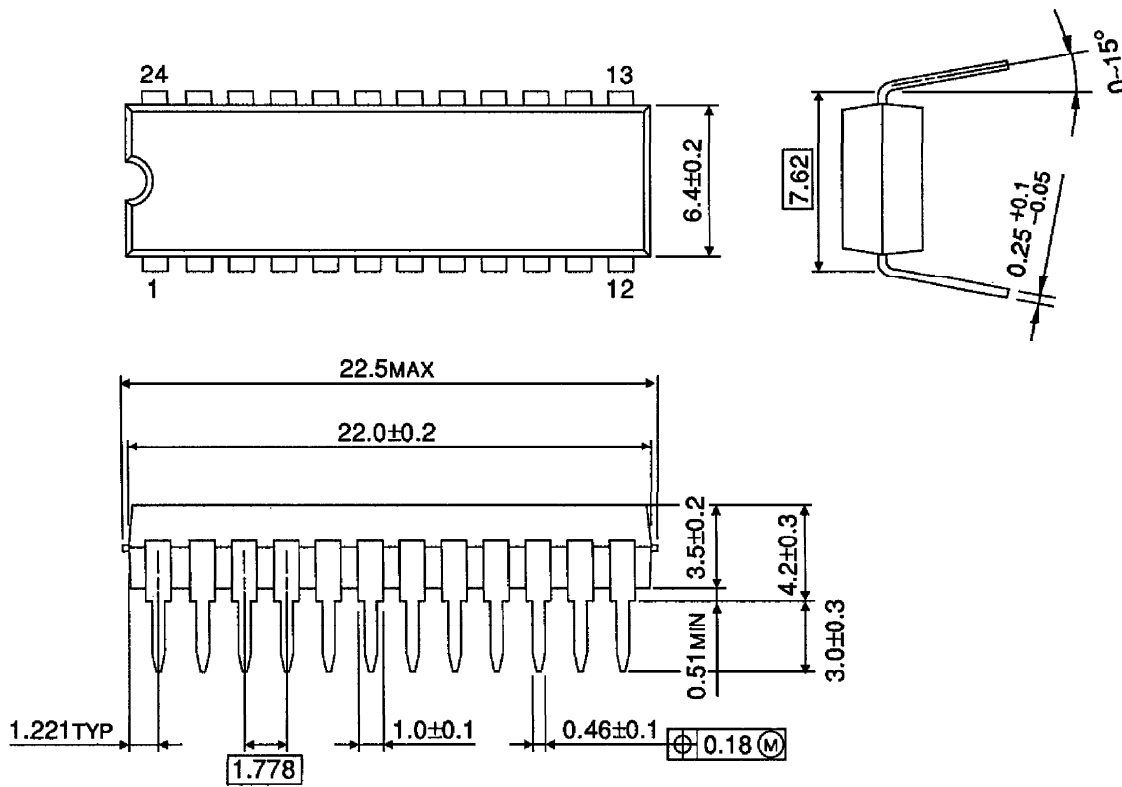


T2 : AM OSC



OUTLINE DRAWING
SDIP24-P-300-1.78

Unit : mm



Weight : 1.2g (Typ.)