

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

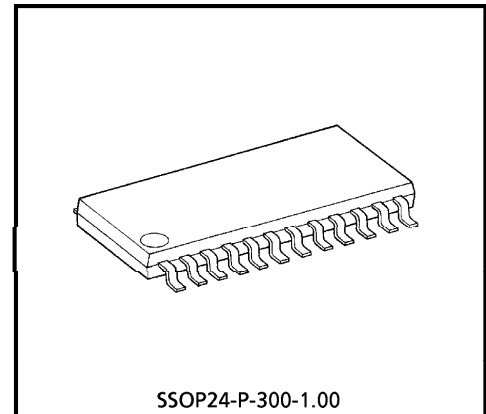
TA1250F

4-CHANNEL RECORDING AMPLIFIER & PRE-AMPLIFIER FOR VCR

The TA1250F is a 4-channel recording amplifier and pre-amplifier for use in VCR. Since the recording amplifier uses a differential mechanism, it is particularly effective in reducing high-frequency even-ordered distortion. The pre-amplifier also has a differential mechanism and thus also reduces noise.

FEATURES

- Differential drive type recording amplifier
- Differential input type pre-amplifier
- Built-in envelope detector for auto-tracking
- Built-in envelope comparator for special playback
- Built-in recording mute circuit
- Board patterns can easily be shared, due to the high pin compatibility with the TA1249F 2-channel recording amplifier and pre-amplifier, and the TA1273F 6-channel recording amplifier and pre-amplifier.

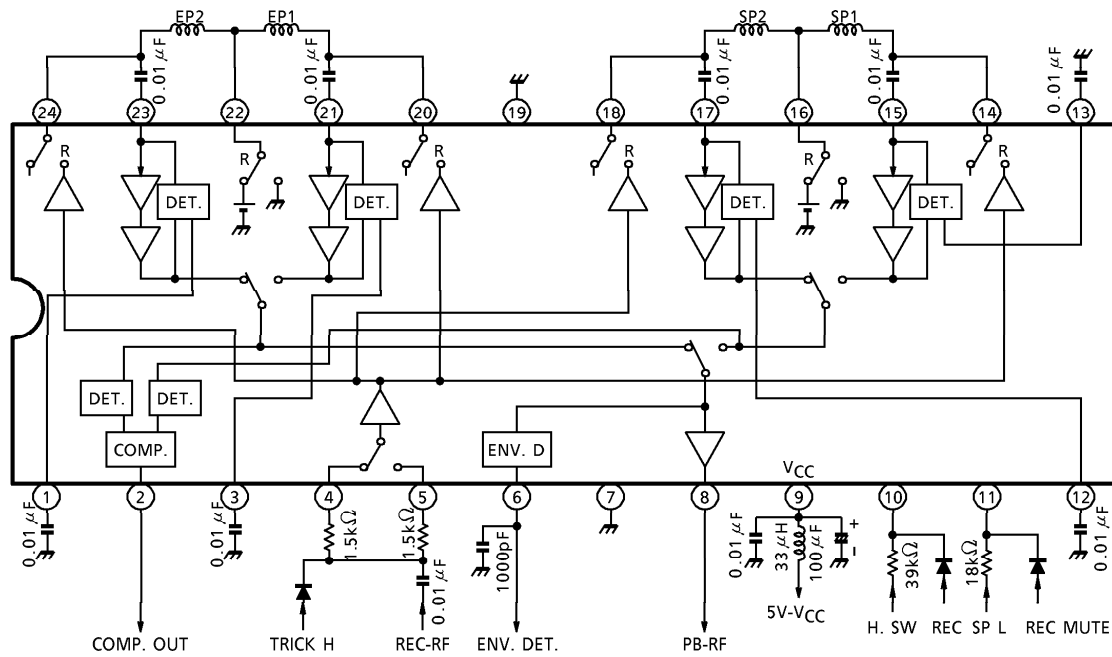


Weight : 0.32g (Typ.)

980508EBA1

- TOSHIBA is continually working to improve the quality and the 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 observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product 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 products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.
- The products described in this document are subject to 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



PIN FUNCTION ($V_{CC} = 5.0V$, $T_a = 25^\circ C$)

PIN No.	FUNCTION	TYPICAL DC VOLTAGE	INTERFACE CIRCUIT	NOTES
1	Filter 4	1.8V		DC return filter
3	Filter 3			
12	Filter 2			
13	Filter 1			
2	ENV.COMP.OUT	—		SP : 0V EP : 5V
4	SP Rec input and trick mode switching	Rec : 0.9V		Current input type Trick mode set when pin 4 (TP4) raised to H.
5	EP Rec input	Rec : 0.9V		Current input type
6	ENV.DET.OUT	—		—
7	GND	(0V)	—	—
8	PB RF OUT	2V		SP : 0.3mV _{p-p} input ↓ 57dB 212mV _{p-p} output EP : 0.3mV _{p-p} input ↓ 60dB 300mV _{p-p} output
9	V _{CC}	(5V)	—	—
10	Head SW & Rec H	2.5V		Refer to the head switching table in the Control Tables. TP10→H : Rec Mode

PIN No.	FUNCTION	TYPICAL DC VOLTAGE	INTERFACE CIRCUIT	NOTES
11	Mode switching & Rec Mute	—		V ₁₁ voltage L : SP H : EP TP11 voltage H : Rec Mute
14	Rec OUT1 (SP1)	Open collector		—
18	Rec OUT2 (SP2)			
20	Rec OUT3 (EP1)			
24	Rec OUT4 (EP2)			
15	PB IN1 (SP1)	PB : 0.9V		—
17	PB IN2 (SP2)			
21	PB IN3 (EP1)			
23	PB IN4 (EP2)			
16	Head COMMON 1	Rec : 4.3V PB : 0.1V		—
22	Head COMMON 2			
19	Head GND	(0V)	—	—

CONTROL TABLES

HEAD switching

During PB	V ₁₀ voltage	SP mode	EP mode
	H	2ch	1ch
	L	1ch	2ch

(Note) The above settings are controlled by the input and output currents.
Pin10 (TP10) has function of Rec H too.

MODE switching

V ₁₁ voltage	Mode
L	SP
H	EP

(Note) Pin 11 has function of Rec Mute too.
When pin 11 (TP11) is raised to H (V_{CC}), then Rec Mute mode is set.

- Trick mode is set by raising pin 4 (TP4) to H.

EXAMPLES OF REC CURRENT SETTING

Input : 500mV_{p-p}, 4MHz

MODE	INPUT RESISTANCE	REC CURRENT (SINGLE-CHANNEL OUTPUT)
SP	1.5kΩ	14.9mA
	2.0kΩ	11.2mA
EP	1.5kΩ	10.5mA
	2.0kΩ	7.9mA

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	V _{CC}	7	V
Power Dissipation 1	P _{D1} (Note 1)	595	mW
Power Dissipation 2	P _{D2} (Note 2)	830	mW
Input Voltage	V _{IN}	GND - 0.3~V _{CC} + 0.3	V
Operating Temperature	T _{opr}	- 20~75	°C
Storage Temperature	T _{stg}	- 55~150	°C

(Note 1) Derated linearly above Ta = 25°C in the proportion of 4.8mW/°C.

(Note 2) On the board mounting (Glass epoxy 50×50×1.6mm, Area of copper : 30%)
Derated linearly above Ta = 25°C in the proportion of 6.7mW/°C.

RECOMMENDED POWER SUPPLY VOLTAGE RANGE

Power supply voltage : 4.5~5.5V, 5V (typical)

ELECTRICAL CHARACTERISTICS (V_{CC} = 5V, Ta = 25°C)

PB mode

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Power Supply Current	I _{ccp}	—	—	26	32	40	mA
Voltage Gain (SP Mode)	G _{s1}	—	Input (V15, V17, V21, V23) : f = 1MHz, 0.3mV _{p-p}	54	57	60	dB
	G _{s2}						
Voltage Gain (EP Mode)	G _{e1}			57	60	63	
	G _{e2}						
Voltage Gain Difference	ΔG _S	—	G _{s1} - G _{s2}	-0.5	0	0.5	dB
	ΔG _E	—	G _{e1} - G _{e2}				
Frequency Characteristic	G _{Fs1}	—	Input (V15, V17, V21, V23) : 0.3mV _{p-p} Output ratio 8M / 1M	-1.5	0.5	2.5	dB
	G _{Fs2}						
	G _{Fe1}						
	G _{Fe2}						
Secondary Harmonic Distortion	H _{Ds1}	—	Input (V15, V17, V21, V23) : 0.3mV _{p-p} Power ratio 8M / 4M	—	-45	-40	dB
	H _{Ds2}						
	H _{De1}						
	H _{De2}						
Maximum Output Voltage	V _{oms1}	—	Input (V15, V17, V21, V23) : f = 1MHz Level when thirdly harmonic distortion of output reaches - 30dB.	2.0	2.2	—	V _{p-p}
	V _{oms2}						
	V _{ome1}						
	V _{ome2}						

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Crosstalk Between Channels (SP Mode)	CRS12	—	Input (V15, V17, V21, V23) : f = 4MHz, 0.3mV _{p-p} Level difference between channels.	—	- 40	- 38	dB
	CRS21						
Crosstalk Between Channels (EP Mode)	CRE12	—	Input (V15, V17, V21, V23) : f = 4MHz, 0.3mV _{p-p} Level difference between channels.	—	- 34	- 32	dB
	CRE21						
Crosstalk Between Modes	CRS1E1	—	Input (V15, V17, V21, V23) : f = 4MHz, 0.3mV _{p-p} Level difference between modes.	—	- 60	- 40	dB
	CRS1E2						
	CRS2E1						
	CRS2E2						
	CRE1S1						
	CRE1S2						
	CRE2S1						
Output DC Offset	ΔVs1s2	—	DC difference between outputs	- 15	0	15	mV
	ΔVs1e1						
	ΔVs1e2						
	ΔVs2e1						
	ΔVs2e2						
	ΔVe1e2						
Equated Input Noise	NS1	—	Measurement point 4MHz RBW : 10kHz	—	0.1	—	μV _{rms}
	NS2						
	NE1						
	NE2						
ENV Det (SP Mode)	VENVS1	—	Input : f = 4MHz, 50μV _{p-p}	0.4	0.7	1.0	V
	VENVS2	—	Input : f = 4MHz, 1mV _{p-p}	2.95	3.35	3.75	
ENV Det (EP Mode)	VENVE1	—	Input : f = 4MHz, 50μV _{p-p}	0.8	1.1	1.4	V
	VENVE2	—	Input : f = 4MHz, 1mV _{p-p}	3.3	3.7	4.1	
ENV Comp	VCOM1	—	Selects SP head; pin 11 low	0	0.1	0.3	V
	VCOM2	—	Selects EP head; pin 11 high	4.7	4.9	5.0	

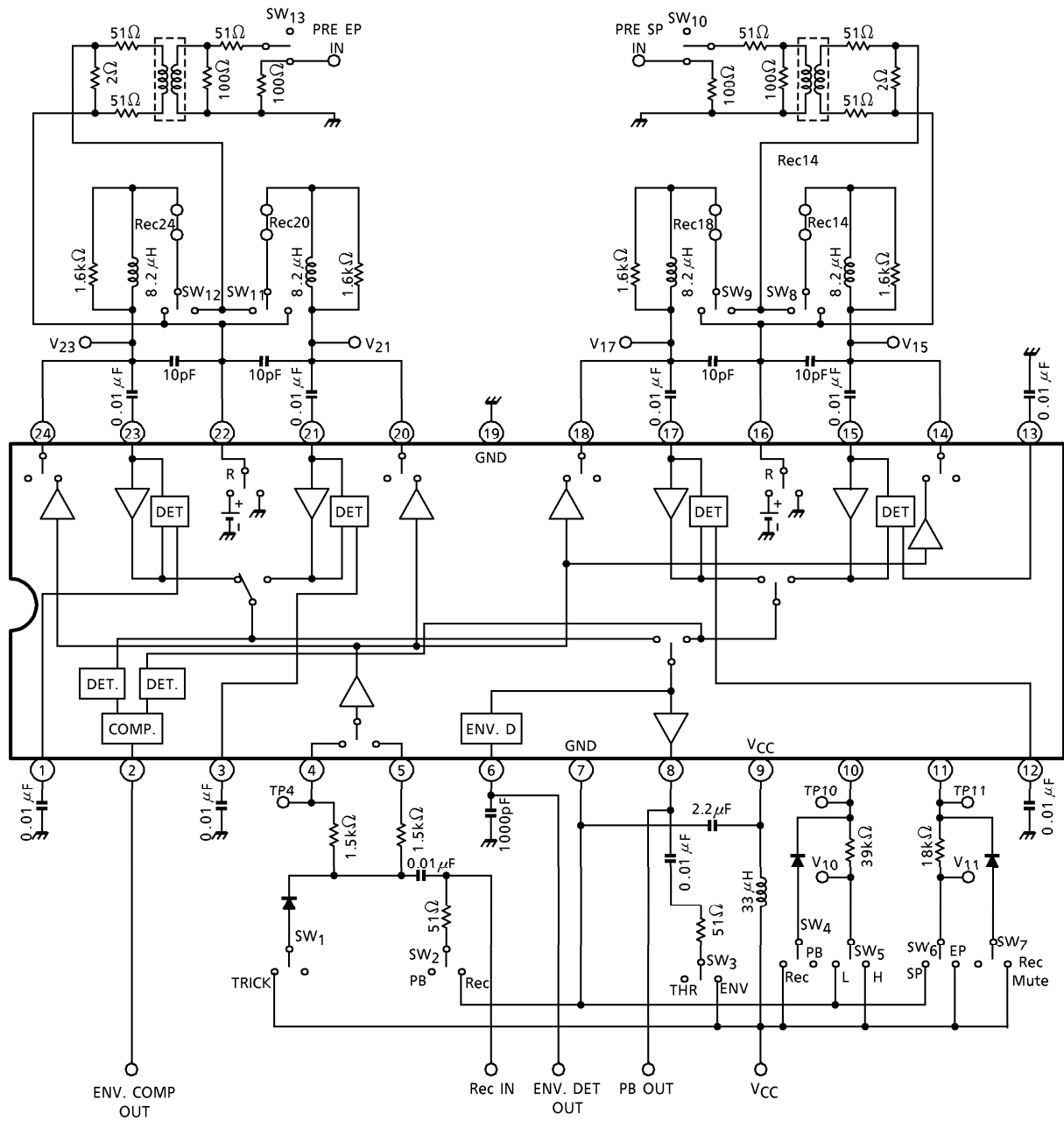
REC mode (Input resistance : 1.5kΩ)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Power Supply Current	I _{ccr}	—	—	32	52	65	mA
Current Gain (SP Mode)	G _{rs1}	—	Input : f = 1MHz, 500mV _{p-p}	32.5	33	33.5	dB
	G _{rs2}						
Current Gain (EP Mode)	G _{re1}	—	Input : f = 1MHz, 500mV _{p-p}	29.1	29.6	30.1	dB
	G _{re2}						
Frequency Characteristic	G _{rf1}	—	Input : 500mV _{p-p} Output ratio 1M / 8M	- 1.5	0	1.5	dB
	G _{rf2}						
	G _{rfe1}						
	G _{rfe2}						
Secondary Harmonic Distortion	HDRs1	—	Input : f = 4MHz, 500mV _{p-p} Output ratio 8M / 4M	—	- 45	- 40	dB
	HDRs2						
	HDR _{e1}						
	HDR _{e2}						

CONTROL SYSTEM

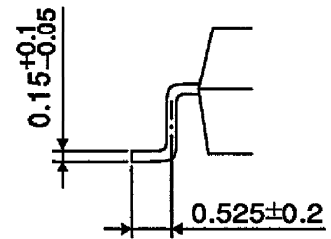
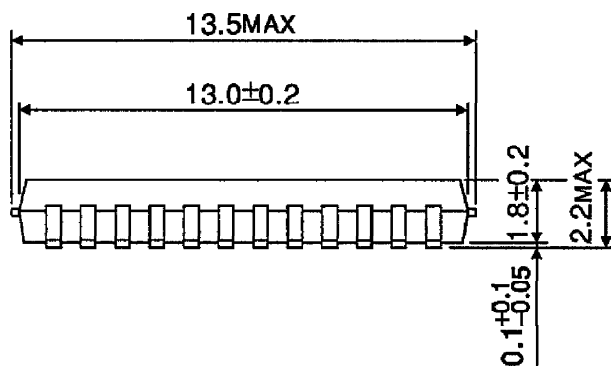
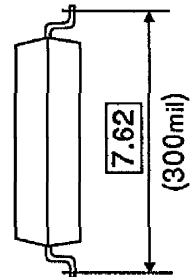
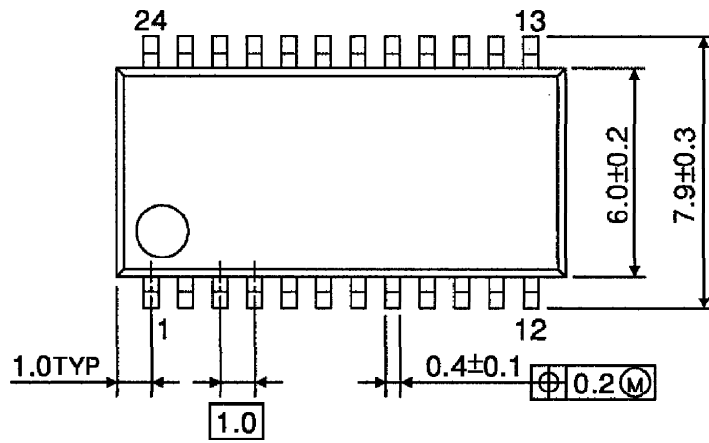
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Short SW ON Resistance	R_{in}	—	—	—	6	—	Ω
Input Resistance	r_{in}	—	—	—	600	—	Ω
Rec Mute	Mute1	—	Mute ON (TP11)	4.2		5.0	V
	Mute2	—	Mute OFF (TP11)	0.0		3.4	
Rec/PB	R/P1	—	Rec mode (TP10)	3.8		5.0	V
	R/P2	—	PB mode (TP10)	0.0		2.8	
SP/EP	EPS1	—	SP mode (V_{11})	0.0		0.9	V
	EPS2	—	EP mode (V_{11})	1.7		5.0	
LCH/HCH	SWP1	—	LCH (V_{10})	0.0		1.5	V
	SWP2	—	HCH (V_{10})	3.5		5.0	
Normal/Trick	NT1	—	Normal mode (TP4)	0.0		0.4	V
	NT2	—	Trick mode (TP4)	1.0			

TEST CIRCUIT



OUTLINE DRAWING
SSOP24-P-300-1.00

Unit : mm



Weight : 0.32g (Typ.)