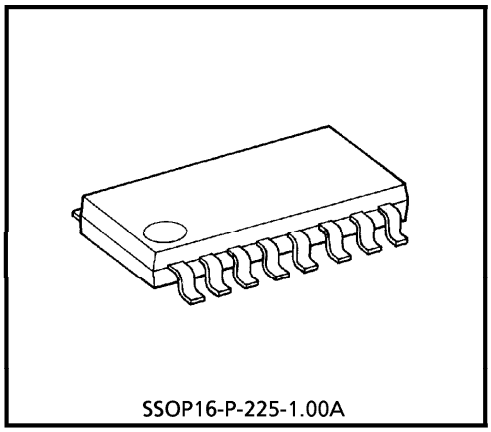
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUITS SILICON MONOLITHIC

TA1249F

2-CHANNEL RECORDING AMPLIFIER & PRE-AMPLIFIER FOR VCR

The TA1249F is a 2-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.



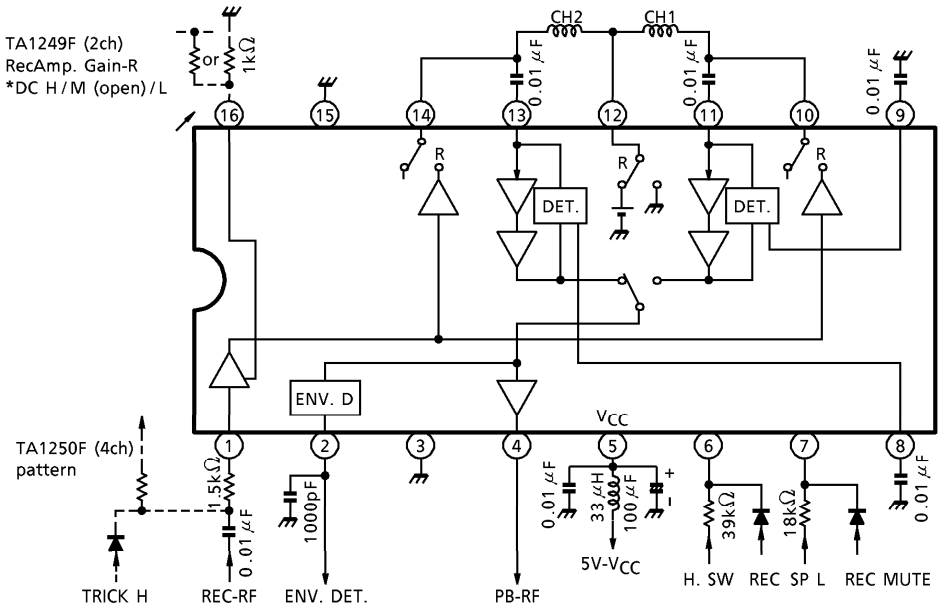
SSOP16-P-225-1.00A

Weight : 0.14g (Typ.)

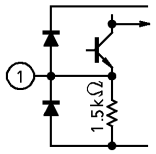
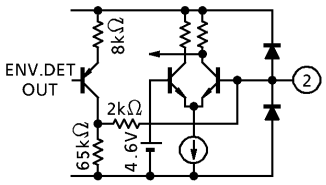
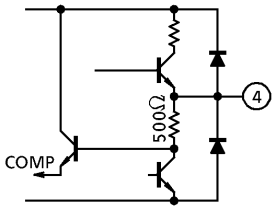
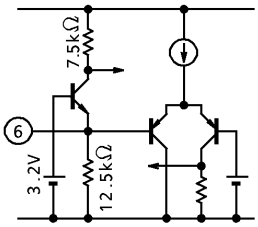
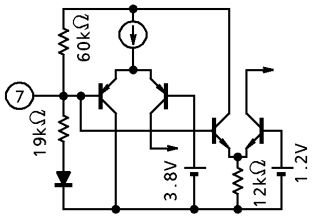
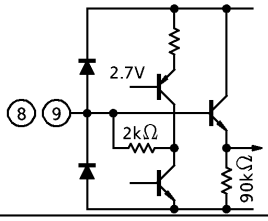
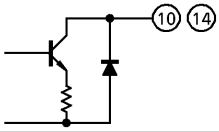
FEATURES

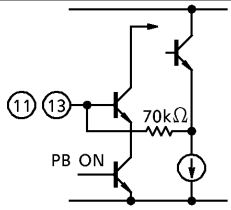
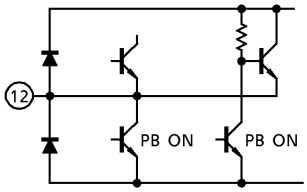
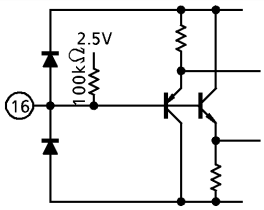
- Differential drive type recording amplifier
- Differential input type pre-amplifier
- Built-in envelope detector for auto-tracking
- Built-in recording mute circuit
- Board patterns can easily be shared, due to the high pin compatibility with the TA1250F 4-channel recording amplifier and pre-amplifier, and the TA1273F 6-channel recording amplifier and pre-amplifier.

BLOCK DIAGRAM



PIN DESCRIPTIONS (V_{CC} = 5.0V, Ta = 25°C)

PIN No.	FUNCTION	TYPICAL DC VOLTAGE	INTERFACE CIRCUIT	NOTES
1	Rec RF IN	0.9V		Current input type
2	ENV DET OUT	—		Pull-up used in Hi-Fi mode (Over 4.9V : Hi-Fi mode)
3	GND	(0V)	—	—
4	PB RF OUT	2V		Video : 0.3mV_{p-p} input ↓ 60dB 300mV_{p-p} output Hi-Fi : 0.15mV_{p-p} input ↓ 67dB 336mV_{p-p}
5	V_{CC}	(5V)	—	—
6	H.SW / Rec H switching	2.5V		REC mode when TP6 is greater than 4.1V H.SW is current input type
7	SP / EP / Rec Mute switching	1.7V		V_7 voltage L : SP H : EP TP7 voltage H : Red Mute
8	Filter 2	1.8V		DC return filter
9	Filter 1			
10	Rec OUT1	Open collector		—
14	Rec OUT2			

PIN No.	FUNCTION	TYPICAL DC VOLTAGE	INTERFACE CIRCUIT	NOTES
11	PB IN1	PB : 0.9V		—
13	PB IN2			
12	Head COMMON	Rec : 4.3V PB : 0.1V		—
15	Head GND	(0V)	—	—
16	Rec current gain switching	2.5V		Open : 2.5V Gain switching : H / M / V→ 5V / 2.5V (OPEN) / 0V

CONTROL TABLES

HEAD switching

	V_6 voltage	SP mode	EP mode	Hi-Fi mode
During PB	H	2ch	2ch	2ch
	L	1ch	1ch	1ch

(Note) The above settings are controlled by the input and output currents.
Pin 6 (TP6) has function of Rec H too.

MODE switching

V_7 voltage	Mode
L	SP
H (OPEN)	EP

(Note) Pin 7 has function of Rec Mute too. When pin 7 (TP7) is raised to H (V_{CC}), then Rec Mute mode is set.

Switching of Rec current gain is performed at pin 16.

Pin 16 voltage	Gain
H	3.5dB
M (OPEN)	0dB
L	– 6dB

(Note) Uses M-level voltage at pin 16 as reference.

EXAMPLES OF REC CURRENT SETTING

- When used in video mode
  Input : 500mV$_{p-p}$, 4MHz

PIN 1 INPUT RESISTANCE	REC CURRENT GAIN	REC CURRENT (SINGLE-CHANNEL OUTPUT)
1kΩ	M	17.7mA
	L	8.89mA
1.5kΩ	H	17.8mA
	M	11.8mA
	L	5.93mA

- When used in Hi-Fi mode
  Input : 700mV$_{p-p}$, 2MHz

PIN 1 INPUT RESISTANCE	REC CURRENT GAIN	REC CURRENT (SINGLE-CHANNEL OUTPUT)
2kΩ	H	24.8mA
	M	16.6mA
	L	8.3mA
3kΩ	H	16.5mA
	M	11.0mA

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	V_{CC}	7	V
Power Dissipation 1	P_{D1} (Note 1)	378	mW
Power Dissipation 2	P_{D2} (Note 2)	780	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 3mW / °C.
(Note 2) On the board mounting (Glass epoxy 50 × 50 × 1.6mm, Area of copper : 40%)
Derated linearly above Ta = 25°C in the proportion of 6.3mW / °C.

RECOMMENDED POWER SUPPLY VOLTAGE RANGE

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

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

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Power Supply Current	Iccp	—	—	21	27	33	mA
Voltage Gain	G1	—	Input (V11, V13) : f = 1MHz, 0.3mV$_{p-p}$	57	60	63	dB
	G2						
Voltage Gain Difference	ΔG	—	G1 – G2	– 0.5	0	0.5	dB
frequency Characteristic	GF1	—	Input (V11, V13) : 0.3mV$_{p-p}$ Output ratio 8M / 1M	– 1.5	0.5	2.5	dB
	GF2						
secondary Harmonic Distortion	HD1	—	Input (V11, V13) : 0.3mV$_{p-p}$ Power ratio 8M / 4M	—	– 50	– 45	dB
	HD2						
Maximum Output Voltage	V_{om1}	—	Input (V11, V13) : f = 1MHz ; level when thirdly harmonic distortion of output reaches – 30dB.	2.0	2.2	—	V_{p-p}
	V_{om2}						
Crosstalk	CR1	—	Input (V11, V13) : f = 4MHz, 0.3mV$_{p-p}$ Level difference between channels	—	– 38	– 35	dB
	CR2						
Output DC Offset	ΔVODC	—	CH1 – CH2	– 15	0	15	mV
Eguated Input Noise	N1	—	Measurement point 4MHz RBW : 10kHz	—	0.1	—	μV_{rms}
	N2						
ENV-Det (SP Mode)	VENVS1	—	Input (V11, V13) : f = 4MHz, 50μV_{p-p}	0.4	0.7	1.0	V
	VENVS2	—	Input (V11, V13) : f = 4MHz, 1mV$_{p-p}$	2.95	3.35	3.75	
ENV-Det (EP Mode)	VENVE1	—	Input (V11, V13) : f = 4MHz, 50μV_{p-p}	0.8	1.1	1.4	V
	VENVE2	—	Input (V11, V13) : f = 4MHz, 1mV$_{p-p}$	3.4	3.8	4.2	

Rec mode (Input resistance : 1.5kΩ)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Power Supply Current	Iccr	—	—	52	63	79	mA
Current Gain	GrH1	—	Input : f = 1MHz, 500mV$_{p-p}$ Pin 16 pull-up (Rec Gain : High)	33.8	34.3	34.8	dB
	GrH2						
	GrM1	—	Input : f = 1MHz, 500mV$_{p-p}$ Pin 16 open (Rec Gain : Middle)	30.3	30.8	31.3	
	GrM2						
	GrL1	—	Input : f = 1MHz, 500mV$_{p-p}$ Pin 16 pull-down (Rec Gain : Low)	24.4	24.9	25.4	
	GrL2						
Frequency Characteristic	Grf1	—	Input : 500mV$_{p-p}$, pin 16 open Output ratio 8M / 1M	– 1.5	0	1.5	dB
	Grf2						
Secondary Harmonic Distortion	HDR1	—	f = 4MHz, 500mV$_{p-p}$, Output ratio 8M / 4M	—	– 50	– 45	dB
	HDR2						

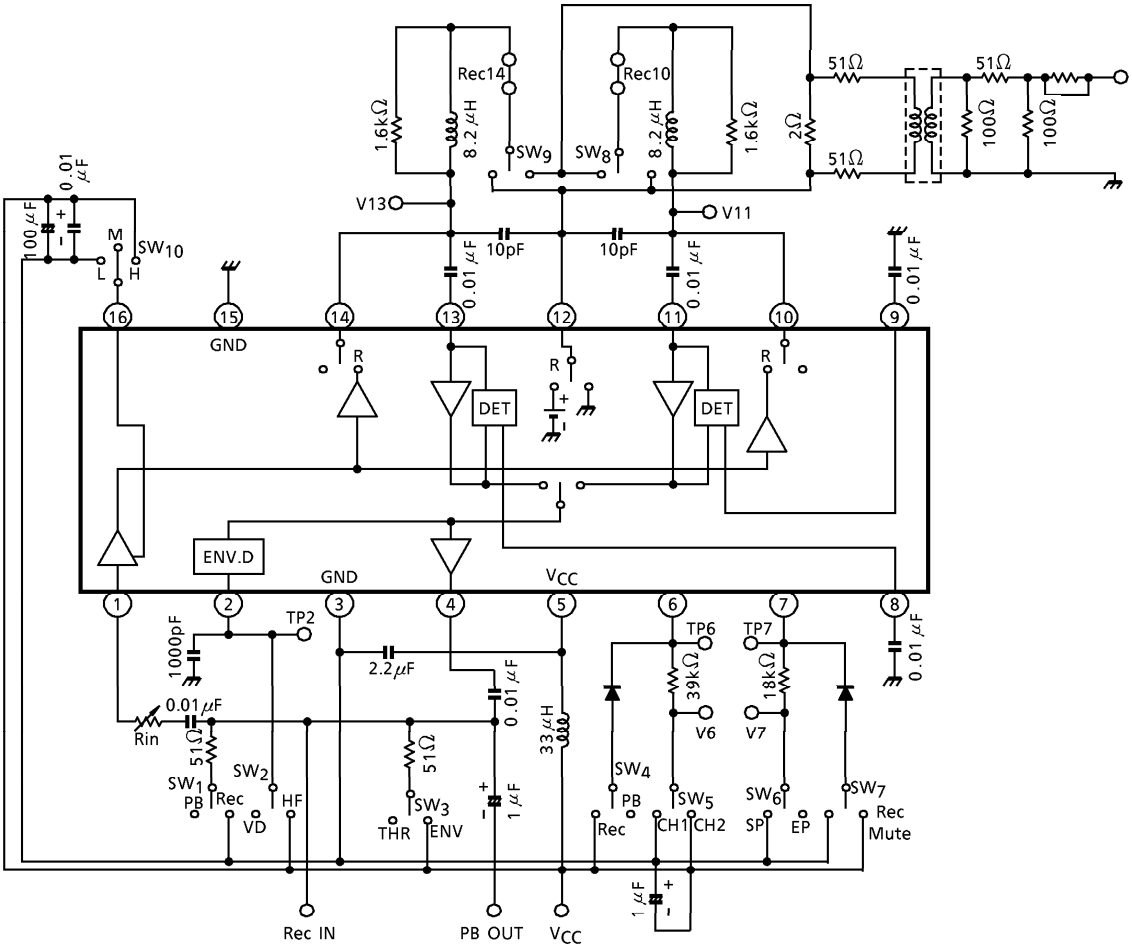
CONTROL SYSTEM

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rec Mute	Mute1	—	Mute ON (TP7)	4.2		5.0	V
	Mute2	—	Mute OFF (TP7)	0.0		3.4	
Rec / PB	R / P1	—	Rec mode (TP6)	4.0		5.0	V
	R / P2	—	PB mode (TP6)	0.0		2.8	
SP / EP	EPS1	—	SP mode (V7)	0.0		0.6	V
	EPS2	—	EP mode (V7)	1.5		5.0	
1CH / 2CH	SWP1	—	1CH (V6)	0.0		1.5	V
	SWP2	—	2CH (V6)	3.5		5.0	
Pin 16 Gain Change	GH	—	High	4.0		5.0	V
	GL	—	Low	0.0		1.0	
Video / Hi-Fi	VH1	—	Video mode (TP2)	0.0		4.3	V
	VH2	—	Hi-Fi mode (TP2)	4.9		5.0	

Hi-Fi SYSTEM (Input resistance : 2KΩ)

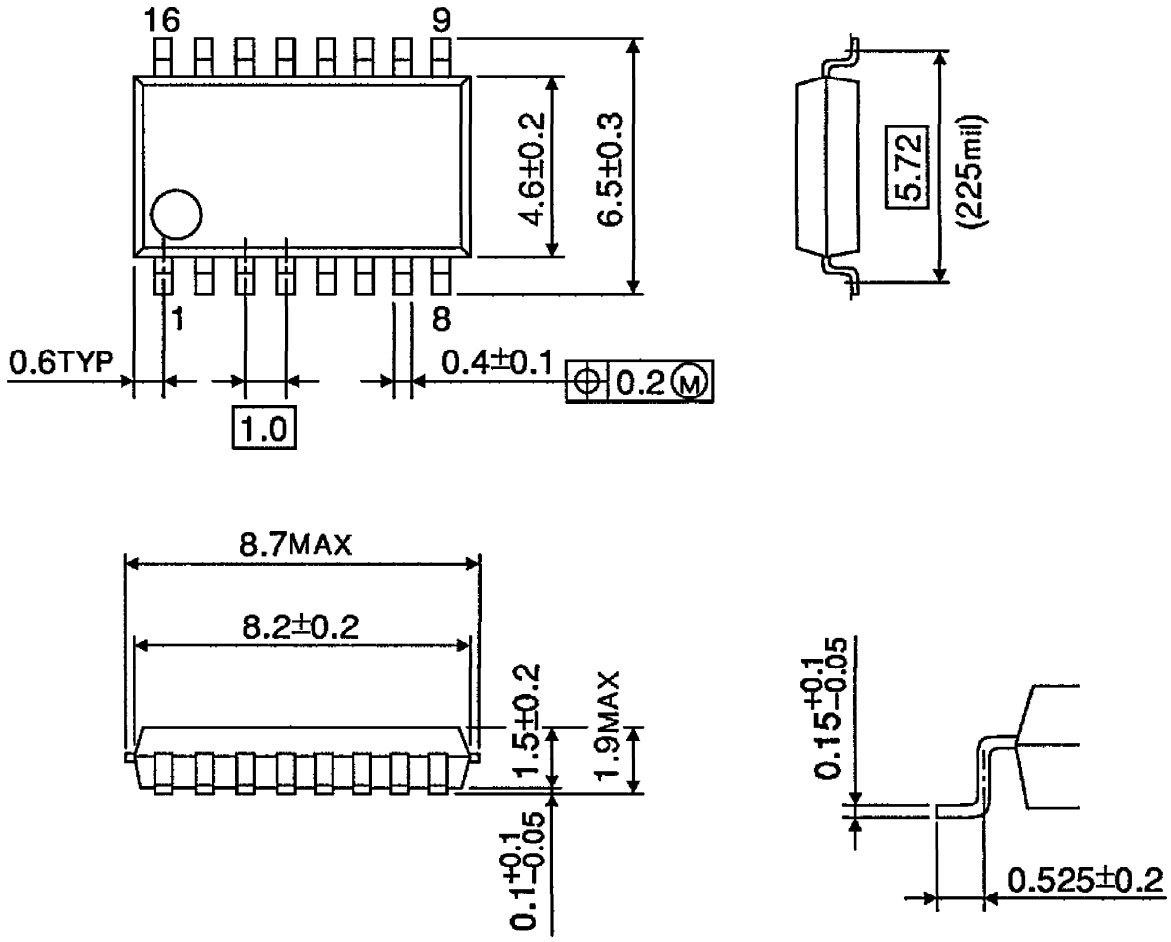
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Power Supply Current (PB)	Icchp	—	—	22	28	36	mA
Power Supply Current (Rec)	Icchr	—	—	63	77	96	mA
Voltage Gain (PB)	GHP1	—	Input (V11, V13) : 1MHz, 0.15mV$_{p-p}$	64	67	70	dB
	GHP2						
Current Gain (Rec)	GHRH1	—	Input : f = 1.5MHz, 700mV$_{p-p}$ Rec Gain : High	36.8	37.3	37.8	dB
	GHRH2						
	GHRM1	—	Input : f = 1.5MHz, 700mV$_{p-p}$ Rec Gain : Middle	33.3	33.8	34.3	
	GHRM2						
	GHRL1	—	Input : f = 1.5MHz, 700mV$_{p-p}$ Rec Gain : Low	27.4	27.9	28.4	
	GHRL2						
Frequency Characteristic (PB)	GHf1	—	Input (V11, V13) : 0.15mV$_{p-p}$ Output ratio 3M / 1M	− 0.3	0.2	0.7	dB
	GHf2						
Frequency Characteristic (Rec)	GHrf1	—	Input : 700mV$_{p-p}$ Output ratio 3M / 1M	− 0.6	0	0.4	dB
	GHrf2						
Secondary Harmonic Distortion (PB)	HDrf1	—	Input (V11, V13) : 2MHz, 0.15mV$_{p-p}$ Ratio 4M / 2M	—	− 60	− 45	dB
	HDrf2						
Secondary Harmonic Distortion (Rec)	HDRf1	—	Input : 2MHz, 700mV$_{p-p}$ Ratio 4M / 2M	—	− 50	− 45	dB
	HDRf2						
Intermodulation Distortion	CMD1	—	Input : 700mV$_{p-p}$ (R) + 221 mV$_{p-p}$ (L) L : f = 1.3MHz, R : f = 1.7MHz, L / R ratio : − 10dB	—	− 45	− 40	dB
	CMD2						
Crosstalk	CRH1	—	Input (V11, V13) : f = 2MHz, 0.15mV$_{p-p}$ Level difference between channels	—	− 38	− 36	dB
	CRH2						

TEST CIRCUIT



PACKAGE DIMENSIONS

SSOP16-P-225-1.00A Unit : mm



Weight : 0.14g (Typ.)

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000707EBA

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