

TA1249F

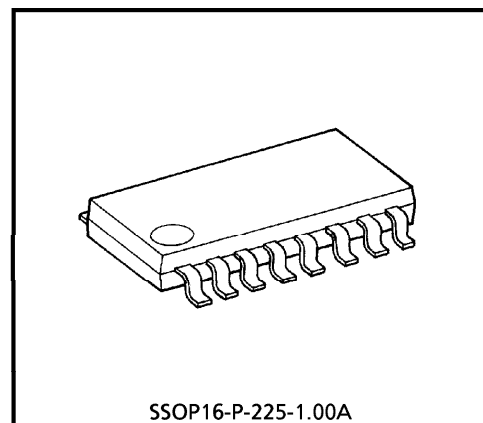
2-CHANNEL RECORDING AMPLIFIER & PRE-AMPLIFIER FOR VCR

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.

FEATURES

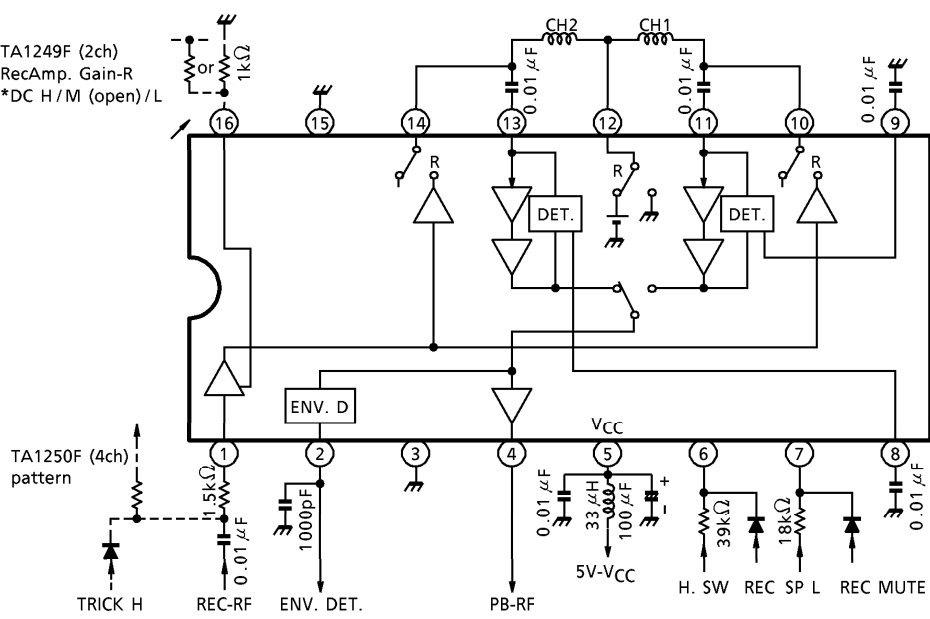
- Differential drive type recording amplifier
- Differential input type pre-amplifier
- Built-in envelope detector for auto-tracking
- Built-in recording mute circuit
- Board patterns can easily be shared, due to the high pin compatibility with the TA1250F 4-channel recording amplifier and pre-amplifier,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



SSOP16-P-225-1.00A

Weight : 0.14g (Typ.)

BLOCK DIAGRAM



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

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

During PB	V ₆ voltage	SP mode	EP mode	Hi-Fi mode
	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)
1k Ω	M	17.7mA
	L	8.89mA
1.5k Ω	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)
2k Ω	H	24.8mA
	M	16.6mA
	L	8.3mA
3k Ω	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 ($V_{CC} = 5V$, $T_a = 25^\circ C$)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) : $f = 1\text{MHz}$, 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	Vom1	—	Input (V11, V13) : $f = 1\text{MHz}$; level when thirdly harmonic distortion of output reaches – 30dB.	2.0	2.2	—	V_{p-p}
	Vom2						
Crosstalk	CR1	—	Input (V11, V13) : $f = 4\text{MHz}$, 0.3mV_{p-p} Level difference between channels	—	– 38	– 35	dB
	CR2						
Output DC Offset	ΔV_{ODC}	—	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) : $f = 4\text{MHz}$, $50\mu V_{p-p}$	0.4	0.7	1.0	V
	VENVS2	—	Input (V11, V13) : $f = 4\text{MHz}$, 1mV_{p-p}	2.95	3.35	3.75	
ENV-Det (EP Mode)	VENVE1	—	Input (V11, V13) : $f = 4\text{MHz}$, $50\mu V_{p-p}$	0.8	1.1	1.4	V
	VENVE2	—	Input (V11, V13) : $f = 4\text{MHz}$, 1mV_{p-p}	3.4	3.8	4.2	

Rec mode (Input resistance : $1.5\text{k}\Omega$)

CHARACTERISTIC	SYMBOL	TEST CIR- CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Power Supply Current	I _{CCR}	—	—	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						

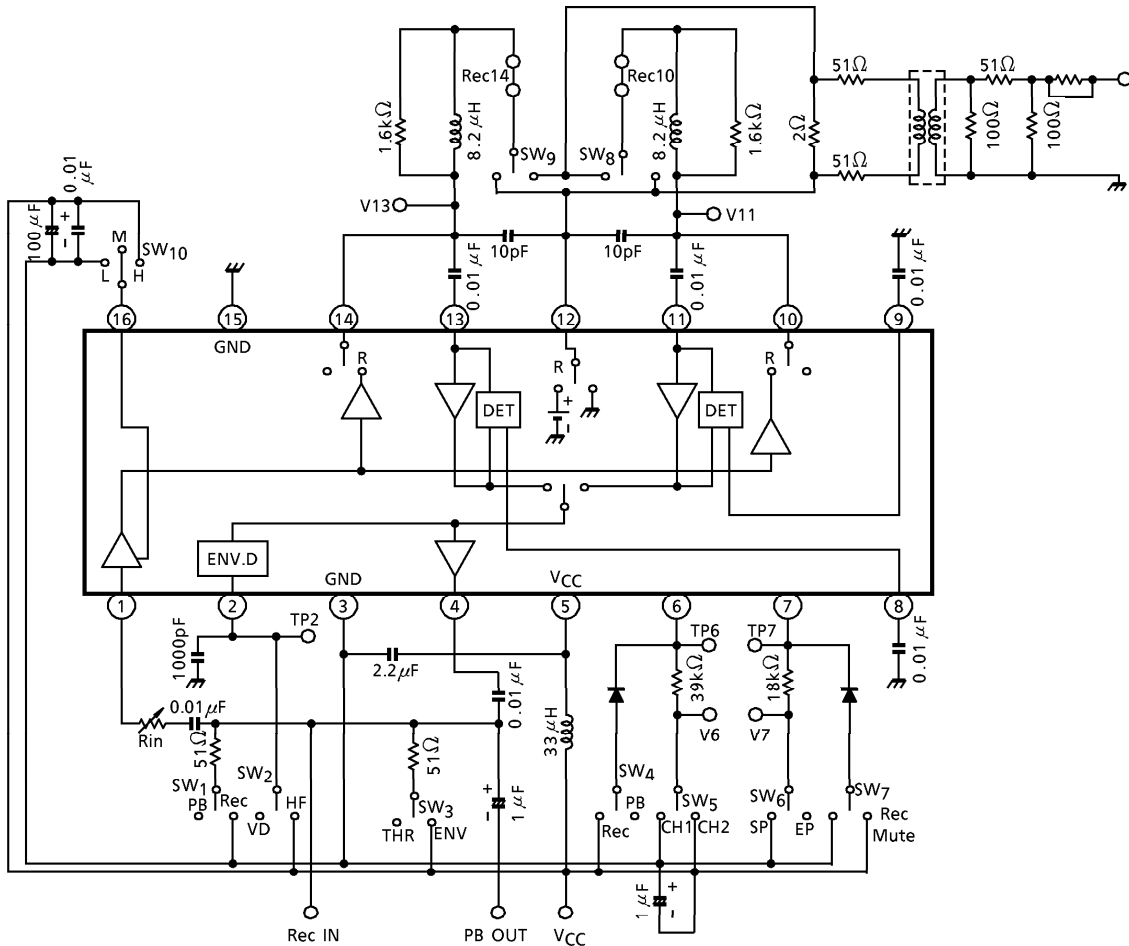
CONTROL SYSTEM

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	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 : 2K Ω)

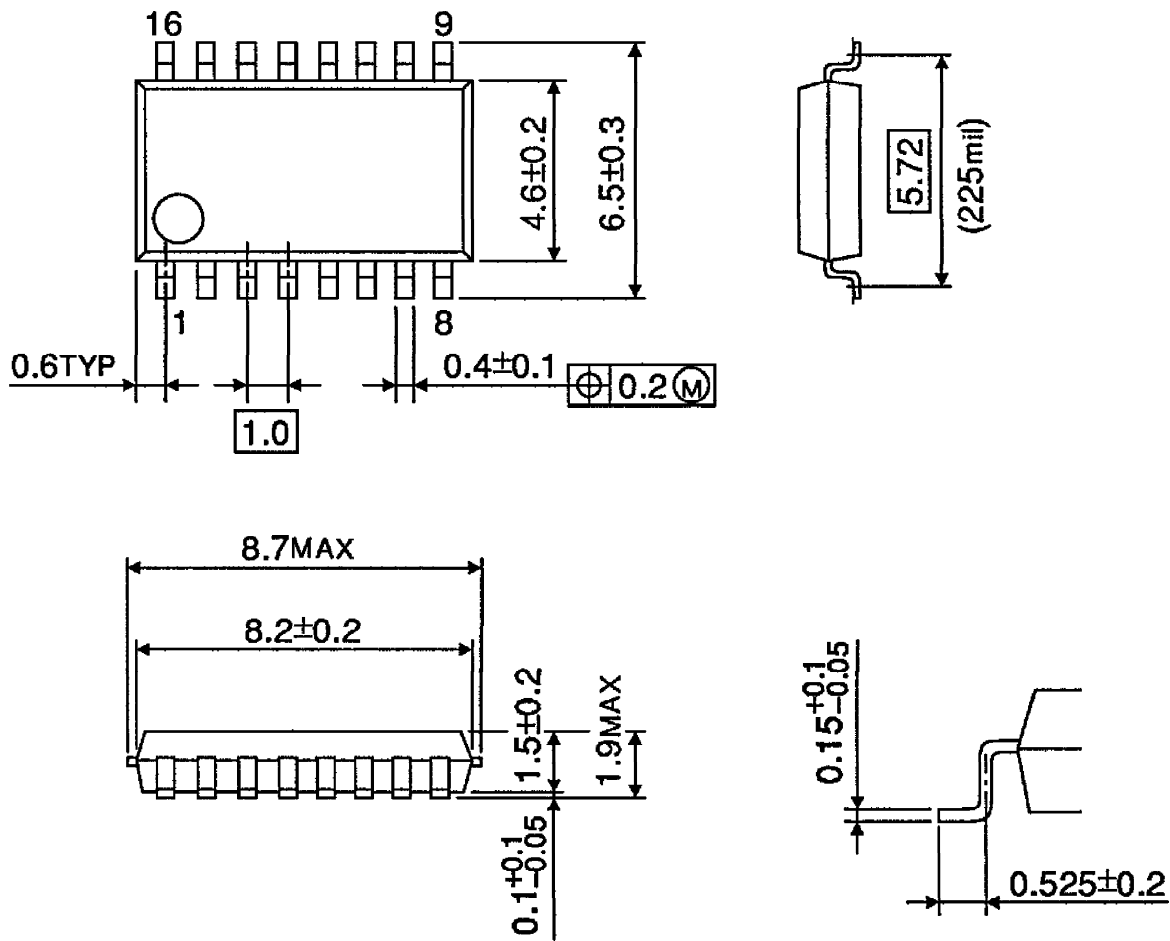
CHARACTERISTIC	SYMBOL	TEST CIR- CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Power Supply Current (PB)	Icchp	—	—	22	28	36	mA
Power Supply Current (Rec)	Icchr	—	—	63	77	96	mA
Voltage Gain (PB)	GHP1	—	Input (V11, V13) : 1MHz, 0.15mV _{p-p}	64	67	70	dB
	GHP2						
Current Gain (Rec)	GHRH1	—	Input : f = 1.5MHz, 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.)

RESTRICTIONS ON PRODUCT USE

000707EBA

- TOSHIBA is continually working to improve the quality and 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 comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products 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 TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- The products described in this document are subject to the 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.