

Electronic volume control

Description

The CXA1846AM/AN is an electrical volume control IC for use in car radios/stereos and radio-cassette recorders featuring serial data control. It has improved over the CXA1846M/N by reducing the 'pop' noise during volume level-switchings.

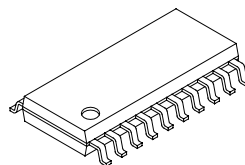
Features

- Volume adjustment (0dB to -87dB, -∞dB)
- Balance
- Serial data control (DATA, CLK, CE)
- Single 8V power supply
- Zero-cross detection circuit

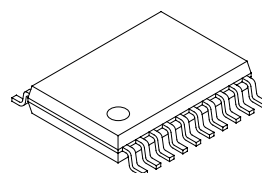
Structure

Bipolar silicon monolithic IC

CXA1846AM
20 pin SOP (Plastic)



CXA1846AN
20 pin SSOP (Plastic)



Absolute Maximum Ratings (Ta=25 °C)

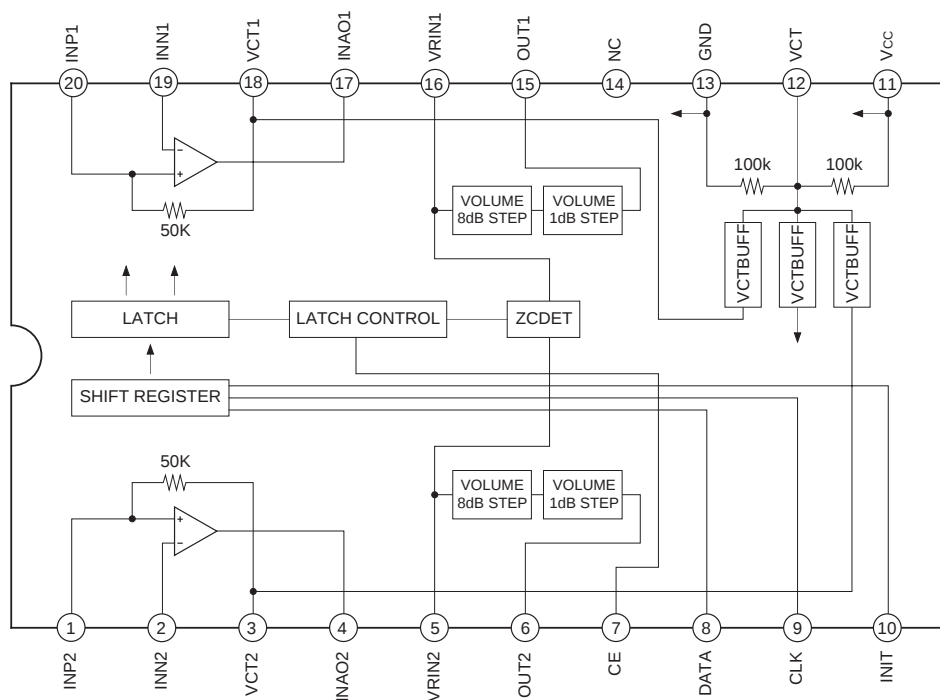
- Supply voltage V_{CC} 13 V
- Operating temperature T_{opr} -40 to +85 °C
- Storage temperature T_{stg} -65 to +150 °C
- Allowable power dissipation

P_D	SOP	350 (75°C)	mW
	SSOP	220 (75°C)	mW

Recommended Supply Voltage Range

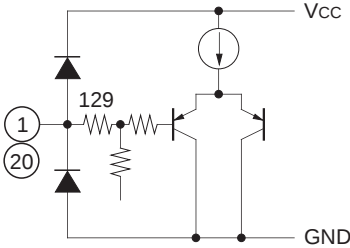
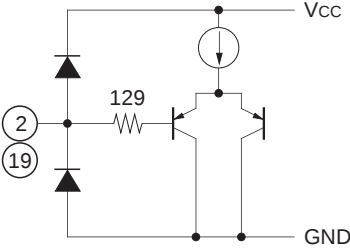
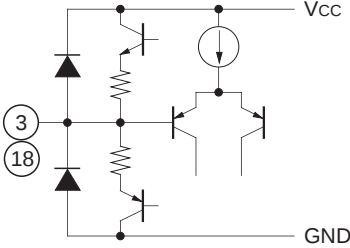
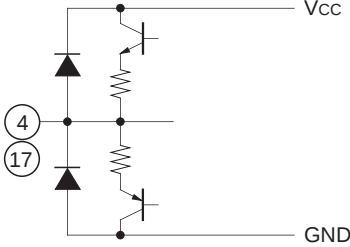
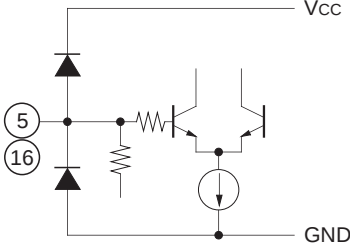
Supply voltage	V_{CC}	6 to 12	V
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Block Diagram and Pin Configuration



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Pin Description

Pin No.	Symbol	I/O resistance voltage	Equivalent circuit	Description
1 20	INP2 INP1	50k Ω VCT		Input operational amplifier positive phase input
2 19	INN2 INN1	— VCT		Input operational amplifier reversed phase input
3 18	VCT2 VCT1	— VCT		VCT buffer output
4 17	INAO2 INAO1	— VCT		Input operational amplifier
5 16	VRIN2 VRIN1	8.2k Ω VCT		Volume input

Pin No.	Symbol	I/O resistance voltage	Equivalent circuit	Description
6 15	OUT2 OUT1	— VCT		Volume output
7	CE	∞		Latch enable
8	DATA	∞		Serial data input
9	CLK	∞		Serial clock
10	INIT	—		System reset
11	Vcc	—		+ power supply
12	VCT	VCT		Mid-point potential
13	GND	—		GND

Electrical Characteristics(Unless otherwise specified $V_{CC} = 8V$, $T_a = 25^{\circ}C$)

Item		Symbol	Measurement Condition	Min.	Typ.	Max.	Unit
Circuit current		I _{cc}	No signal	5	8	12	mA
Total harmonic distortion		THD	1kHz, 5dBm	—	0.003	0.01	%
Output noise voltage		V _n	Input shorted	—	5	7	μV _{rms}
Maximum output voltage		V _{om}	1kHz	8	—	—	dBm
Separation		CS	1kHz	85	90	—	dB
Maximum attenuation		ATT _m		85	90	—	dB
Input voltage	High	V _{sh}	Data, INIT	3	—	6	V
	Low	V _{sl}	CLK, CE	0	—	1.5	V
Input voltage range		V _{in}		1	—	$V_{CC} - 1$	V
Maximum output current		I _{max}	Input buffer amplifier output current	—	—	1	mA

RESET

The IC is reset by reducing the voltage at the INIT pin to 1V or less when CLK is high. Reset can not be performed when CLK is low. The table below shows the status when the IC has been reset.

MODE	Setting
VRC1	— ∞
VRF1	−7dB
VRC2	— ∞
VRF2	−7dB

Data Allocation

Fast bit	D1	NOP	MSB
	D2 D3 D4 D5	VRC1	
	D6 D7 D8	VRF1	
	D9	NOP	
	D10 D11 D12 D13	VRC2	
	D14 D15 D16	VRF2	
			LSB

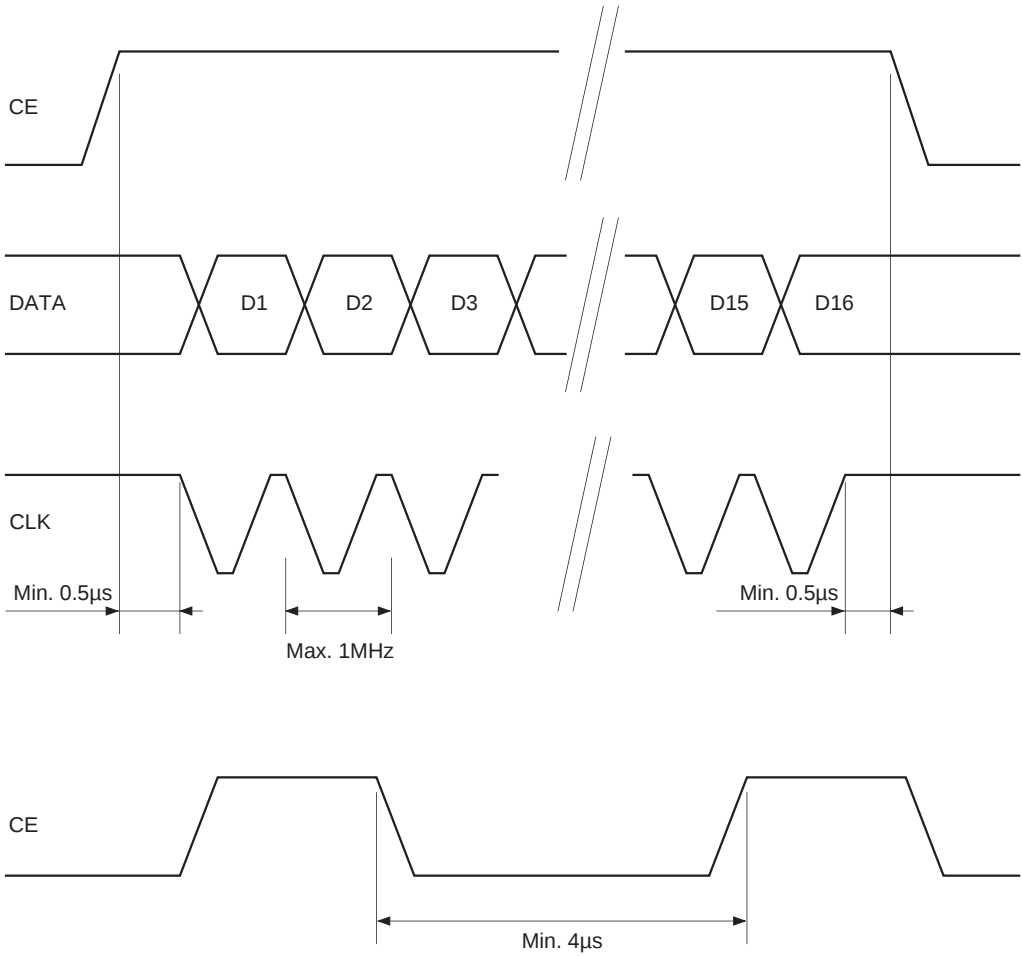
VRC1/VRC2

Setting	D2/D10	D3/D11	D4/D12	D5/D13
0	1	1	1	1
-8	1	1	1	0
-16	1	1	0	1
-24	1	1	0	0
-32	1	0	1	1
-40	1	0	1	0
-48	1	0	0	1
-56	1	0	0	0
-64	0	1	1	1
-72	0	1	1	0
-80	0	1	0	1
-∞	0	1	0	0
-∞	0	0	0	0

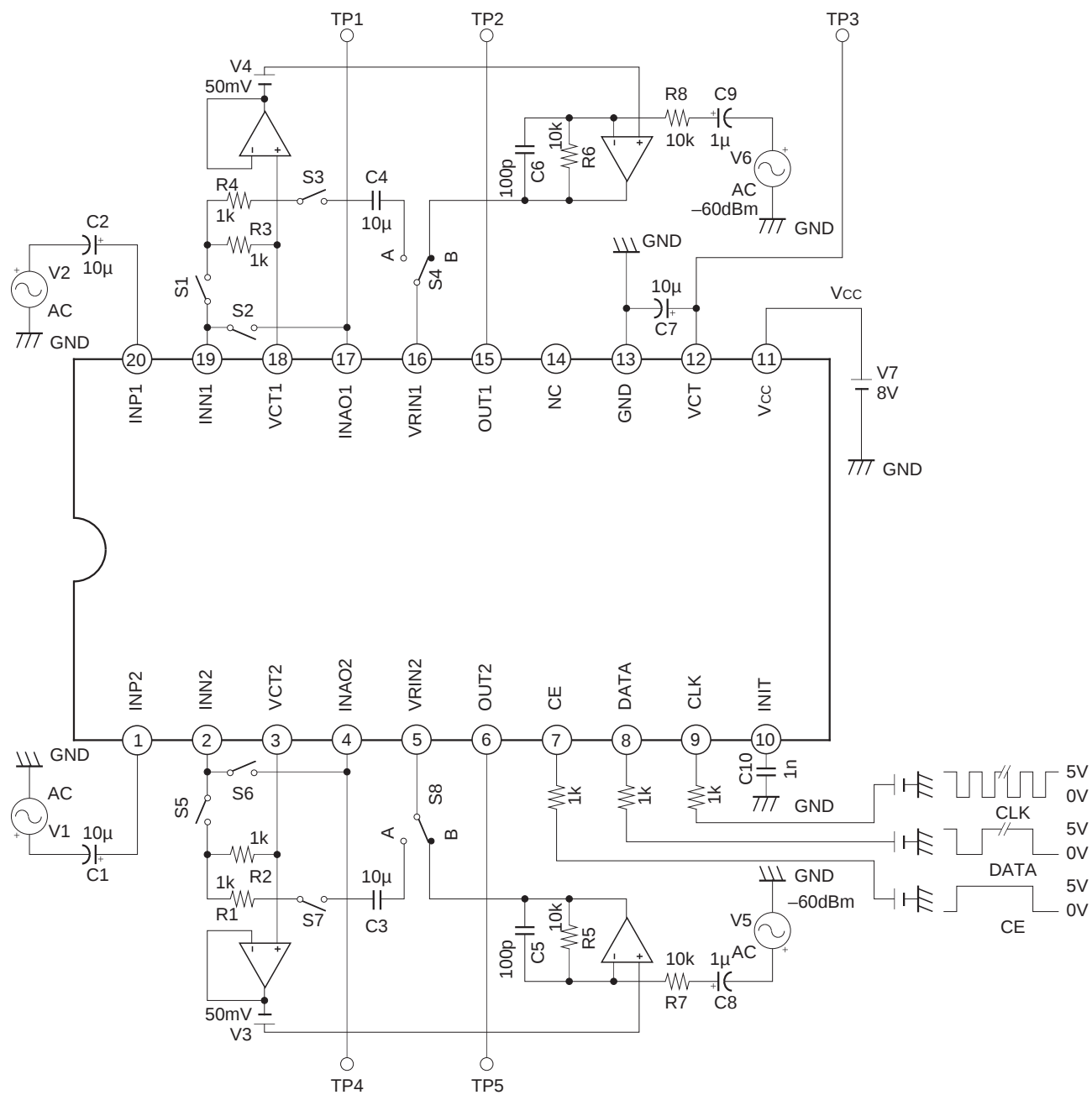
VRF1/VRF2

Setting	D6/D14	D7/D15	D8/D16
0	1	1	1
-1	1	1	0
-2	1	0	1
-3	1	0	0
-4	0	1	1
-5	0	1	0
-6	0	0	1
-7	0	0	0

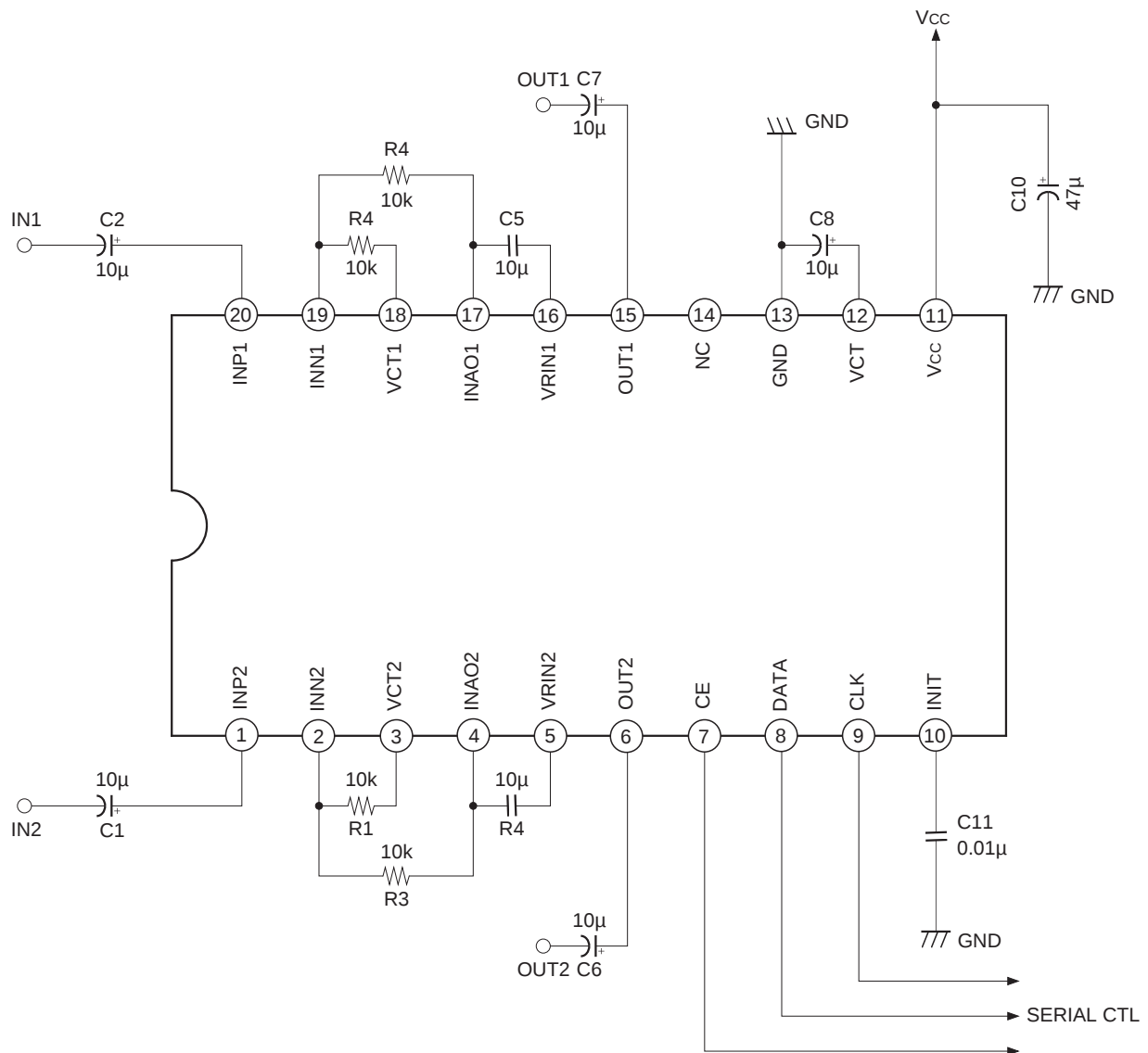
Data Timing



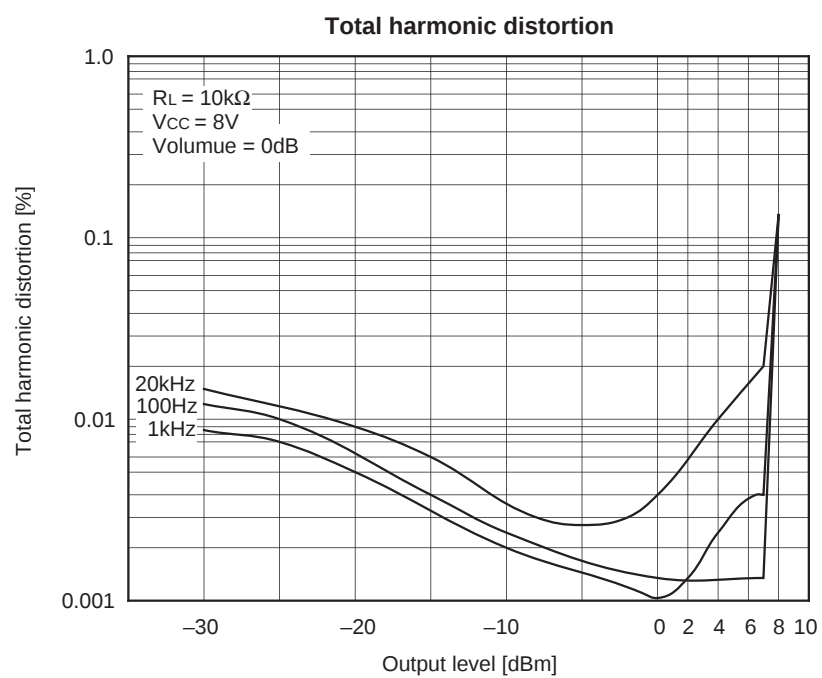
Test Circuit



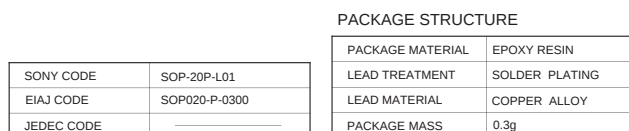
Application Circuit



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20PIN SOP (PLASTIC)



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