

Structure: Silicon Monolithic Integrated Circuit

Product: Audio Sound Processor for home audio

Type: BD3402KS2

Features: 1) Providing a specialized power supply terminal in a digital circuit to be able to set and maintain the state inside the IC by the minute stand-by current

- 2) Volume and Tone implemented with a resistance ladder circuit; achieving high performance with low noise and low distortion
- 3) Adopting the BiCMOS process achieves a low consumption current, which contributes to energy-saving design. It has the advantage in quality over scaling down and heat control of the internal regulators.

#### Absolute Maximum Ratings (Ta=25°C)

Items	Symbol	Value	Unit	
Power Supply Voltage	Vcc	10	V	
	Vdd	6	<b>v</b>	
Power Dissipation	Pd	1200*	mW	
Input Voltage Range	Vin	GND-0.3 to VCC+0.3	V	
Operating Temperature Range	Topr	−25 to +75	°C	
Storage Temperature Range	Tstg	-55 to +125	°	

<sup>\*</sup>Over Ta=25°C, derating at the rate of 12.0mW/°C. When installed on the standard board (size:  $70 \times 70 \times 1.6$ mm).

# Operating Voltage Range

Symbol	Range	Unit	
Vcc	8 to 9.5	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
Vdd	3 to 5.5	<b>v</b>	

Note that ROHM cannot provide adequate confirmation of patents.

The product described in this specification is designed to be used with ordinary electronic equipment or devices (such as audio-visual equipment, office-automation equipment, communications devices, electrical appliances, and electronic toys).

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#### Electrical characteristics

 $Ta=25^{\circ}C,\ VCC=9V,\ VDD=5V,\ f=1kHz,\ Vi=1Vrms,\ RL=10k\Omega,\ Rg=600\Omega,\ INPUT\ SELECTOR=Ach,\ INPUT\ GAIN=0dB,\ VOLUME=0dB,\ TREBLE=0dB,\ BASS=0dB,\ TONE\ ATT=0dB,\ MUX=STEREO,\ MIXING=OFF,\ MIXING\ GAIN=0dB,\ REC=OFF,\ LINE=OFF,\ ALC=OFF,\ INPUT=pin59,\ 60,\ OUTPUT=pin32,\ 33,\ unless\ otherwise\ noted.$ 

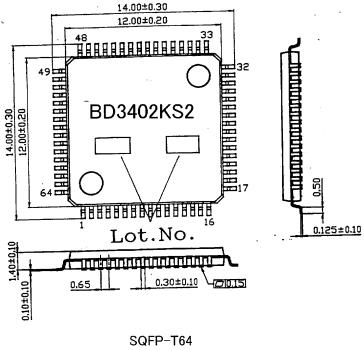
Item	Symbol	Standard Value		Unit	Condition		
rtem	Syllibol	Min.	Тур.	Max.	Offic	Condition	
Circuit Current	IQ	_	28	50	mA	(No signal)	
Output Voltage Gain	Gv	-2	0	2	dB	INPUT GAIN=0dB	
Total Harmonic Distortion ratio	THD t	1	0.005	0.05	%	Bw=400 to 30kHz, OUT=pin32,33,53,54	
Maximum Output Voltage	Vomaxt	2.0	2.5	-	Vrms	THD=1%, Bw=400 to 30kHz OUT=pin32,33,53,54	
Residual Noise Voltage*	Vr	-	1.5	5.0	μ Vrms	Rg=0Ω, Vol=-∞dB, Bw=IHF-A	
Output Noise Voltage*	Vno	1	2.5	8.0	μ Vrms	Rg=0Ω, Vol=0dB, Bw=IHF-A	
Cross-talk between Channels*	СТС	ı	-80	-70	dB	$Rg=0\Omega$ , Bw=IHF-A VOLOUT1=1Vrms	
Cross-talk between Selectors*	CTS	-	-80	-70	dB	Rg=0 $\Omega$ , Bw=IHF-A	
Output Voltage Gain(Play Back)	Gvp	23	25	27	dB	Vi=20mVrms, pin5-6, 7-8=short IN=pin9,10 OUT=pin6,7	
Total Harmonic Distortion ratio (Play Back)	THDp	-	0.01	0.1	%	Vi=20mVrms Bw=400 to 30kHz pin5-6, 7-8=short IN=pin9,10 OUT=pin6,7	
Maximum Output Voltage (Play Back)	Vomaxp	2.0	2.5	_	Vrms	THD=1%, Bw=400 to 30kHz pin5-6, 7-8=short IN=pin9,10 OUT=pin6,7	
Noise Voltage in input term* (Play Back)	Vnin	1	0.7	6.0	μ Vrms	Rg=0 $\Omega$ ,Bw=IHF-A, pin5-6, 7-8=short IN=pin9,10 OUT=pin6,7	
ALC Operation Level (REC)	ALC	0.5	0.7	0.9	Vrms	REC=ON ALC=ON	
Total Harmonic Distortion ratio (REC)	THDr	-	0.2	1	%	Bw=400 to 30kHz, OUT=pin14,15 REC=ON ALC=ON	
Output Noise Voltage (REC)*	Vnor	-	40	120	μ Vrms	Rg=0Ω, Bw=IHF-A, OUT=pin14,15 REC=ON ALC=ON	
Treble Boost Gain (Max)	Gtb	6	8	10	dB	f=50kHz, Vi=500mVrms	
Treble Cut Gain (Max)	Gtc	-10	-8	-6	dB	f=50kHz, Vi=500mVrms	
Bass Boost Gain (Max)	Gbb	6	8	10	dB	f=100Hz, Vi=500mVrms	
Bass Cut Gain (Max)	Gbc	-10	-8	-6	dB	f=100Hz, Vi=500mVrms	
Maximum Attenuation*	Vmin	1	-	-90	dB	Bw=IHF-A, VOLOUT=1Vrms	

<sup>\*</sup>For measurements marked with \*, VP-9690A (Average value wave detection, Effective value display) filter by Matsushita Communication Industrial is used.

<sup>\*</sup>Phase relation between Input/Output signal terminals is Equiphase. (Inputs: pin59-64, pin1-4, Outputs: pin32,33) \*Not designed for radiation resistance.

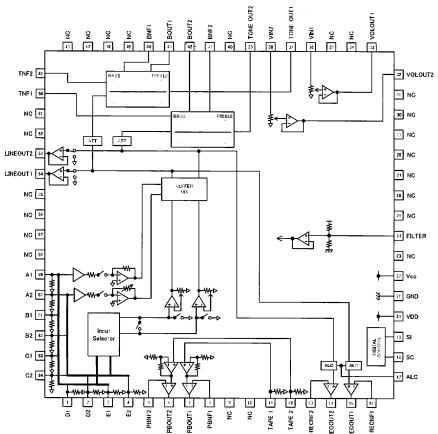


## Outline dimensions and Marking diagram



(Unit:mm)

# Block diagram





#### Terminal number • Terminal name

Terminal	Terminal						
number	name	number	name	number	name	number	name
1	D1	17	ALC	33	VOLOUT1	49	TNF2
2	D2	18	SC	34	_	50	TNF1
3	E1	19	SI	35	_	51	-
4	E2	20	VDD	36	VIN1	52	_
5	PBNF2	21	GND	37	TONEOUT1	53	LINEOUT2
6	PBOUT2	22	VCC	38	VIN2	5 <b>4</b>	LINEOUT1
7	PBOUT1	23	-	39	TONEOUT2	55	-
8	PBNF1	24	FILTER	40	_	56	_
9	-	25	-	41	BNF2	57	-
10	-	26	1	42	BOUT2	58	_
11	TAPE 1	27	1	43	BOUT1	59	A1
12	TAPE 2	28	_	44	BNF1	60	A2
13	RECNF2	29		45	_	61	B1
14	RECOUT2	30	_	46	_	62	B2
15	RECOUT1	31	_	47	_	63	C1
16	RECNF1	32	VOLOUT2	48		64	C2

#### Caution on use

- About operation voltage supply and operation temperature
   Within operation voltage supply and operation temperature, circuit function is guaranteed. The standard value in electric characteristic is guaranteed at its conditions. So it takes a change in a character of the IC into consideration. And design a set, please.
- 2) About serial control

  For the SC and SI terminals, the wiring and layout patterns should be routed not to cause interference with
  the analog-signal-related lines.
- 3) About power ON/OFF

At power ON/OFF, a shock sound will be generated and, therefore, MUTE shall be applied.

- About the start-up sequence of the power supplies
   VDD and VCC should be turned on simultaneously or VDD followed by VCC.
- 5) About function switching

For the functions except Master Volume, Treble, and Bass, MUTE shall be applied on the set.

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