

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	
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	°C

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

Operating Voltage Range

Symbol	Range	Unit
Vcc	8 to 9.5	V
Vdd	3 to 5.5	

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

$T_a=25^{\circ}\text{C}$, $V_{CC}=9\text{V}$, $V_{DD}=5\text{V}$, $f=1\text{kHz}$, $V_i=1\text{V}_{\text{rms}}$, $R_L=10\text{k}\Omega$, $R_g=600\Omega$, 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.

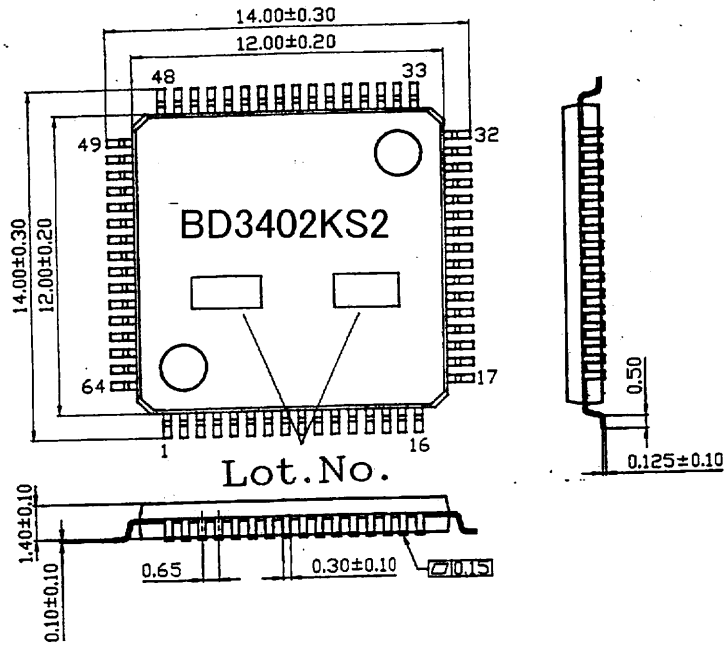
Item	Symbol	Standard Value			Unit	Condition
		Min.	Typ.	Max.		
Circuit Current	IQ	-	28	50	mA	(No signal)
Output Voltage Gain	Gv	-2	0	2	dB	INPUT GAIN=0dB
Total Harmonic Distortion ratio	THD t	-	0.005	0.05	%	Bw=400 to 30kHz, OUT=pin32,33,53,54
Maximum Output Voltage	Vomaxt	2.0	2.5	-	Vrms	THD=1%, Bw=400 to 30kHz OUT=pin32,33,53,54
Residual Noise Voltage*	Vr	-	1.5	5.0	μV_{rms}	$R_g=0\Omega$, $V_{ol}=-\infty\text{dB}$, Bw=IHF-A
Output Noise Voltage*	Vno	-	2.5	8.0	μV_{rms}	$R_g=0\Omega$, $V_{ol}=0\text{dB}$, Bw=IHF-A
Cross-talk between Channels*	CTC	-	-80	-70	dB	$R_g=0\Omega$, Bw=IHF-A VOLOUT1=1Vrms
Cross-talk between Selectors*	CTS	-	-80	-70	dB	$R_g=0\Omega$, Bw=IHF-A
Output Voltage Gain (Play Back)	Gvp	23	25	27	dB	$V_i=20\text{mV}_{\text{rms}}$, pin5-6, 7-8=short IN=pin9,10 OUT=pin6,7
Total Harmonic Distortion ratio (Play Back)	THDp	-	0.01	0.1	%	$V_i=20\text{mV}_{\text{rms}}$ 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	-	0.7	6.0	μV_{rms}	$R_g=0\Omega$, 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	μV_{rms}	$R_g=0\Omega$, Bw=IHF-A, OUT=pin14,15 REC=ON ALC=ON
Treble Boost Gain (Max)	Gtb	6	8	10	dB	$f=50\text{kHz}$, $V_i=500\text{mV}_{\text{rms}}$
Treble Cut Gain (Max)	Gtc	-10	-8	-6	dB	$f=50\text{kHz}$, $V_i=500\text{mV}_{\text{rms}}$
Bass Boost Gain (Max)	Gbb	6	8	10	dB	$f=100\text{Hz}$, $V_i=500\text{mV}_{\text{rms}}$
Bass Cut Gain (Max)	Gbc	-10	-8	-6	dB	$f=100\text{Hz}$, $V_i=500\text{mV}_{\text{rms}}$
Maximum Attenuation*	Vmin	-	-	-90	dB	Bw=IHF-A, VOLOUT=1Vrms

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

*Phase relation between Input/Output signal terminals is Equiphase. (Inputs: pin59-64, pin1-4, Outputs: pin32,33)

*Not designed for radiation resistance.

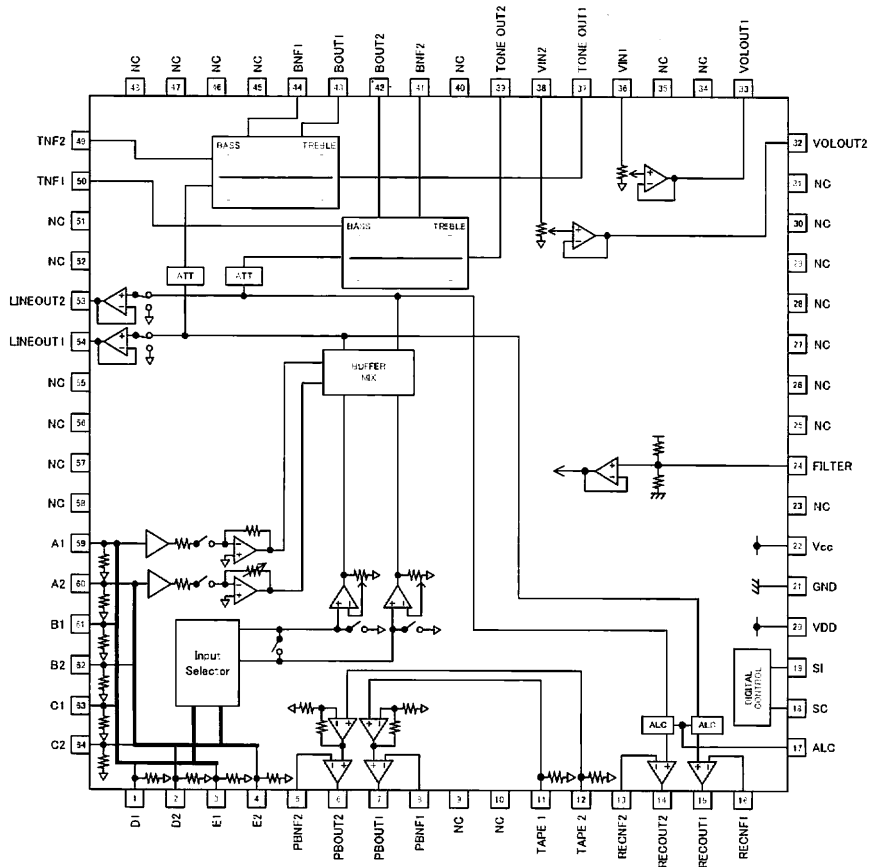
Outline dimensions and Marking diagram



SQFP-T64

(Unit: mm)

Block diagram



Terminal number • Terminal name

Terminal number	Terminal name	Terminal number	Terminal name	Terminal number	Terminal name	Terminal number	Terminal 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	54	LINEOUT1
7	PBOUT1	23	–	39	TONEOUT2	55	–
8	PBNF1	24	FILTER	40	–	56	–
9	–	25	–	41	BNF2	57	–
10	–	26	–	42	BOUT2	58	–
11	TAPE 1	27	–	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

1) 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.

4) 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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