ROHM

STRUCTURE	Silicon Monolithic Integrated Circuit
PRODUCT NAME	Monaural Audio Interface LSI for Digital still camera
MODEL NAME	**BH6412KN**
FEATURES	· Built-in circuit against line output noise
	· LPF with control variable cutoff and trap frequencies

○ Absolute Maximum Ratings (Ta=25℃)

Parameter	Symbol	Limits	Unit
Applied voltage	AVCC SPVCC	4.5	V
Power dissipation	Pd	580 *	mW
Operating Temperature Range	Topr	-20 to +70	℃
Storage Temperature Range	Tstg	-55 to +125	℃

* Glass epoxy board with a dimension of 70mm * 70mm * 0.8mm.

Over Ta=25°C, this value decreases at 5.8mW/°C.

○ Operating Range

| Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Operating supply voltage	AVCC SPVCC	2.7	3.0	3.6	V

* Not designed against radiation

○ Electrical Characteristics
(Ta=25°C, AVCC=3.0V, SPVCC=3.0V, unless otherwise noted.)

	Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
■ Circuit current							
<<AVCC circuit current>>	Power down mode	ICCA	-	30	100	µA	No load, MUTE Tr:off
	MIC mode	ICCA	-	5.0	10	mA	No load, MUTE Tr:off
	LINE+EVR+SP mode	ICCA	-	4.8	9.6	mA	No load, MUTE Tr:off
	BIAS mode	ICCA	-	1.0	2.0	mA	No load, MUTE Tr:off
<<SPVCC circuit current>>	Power down mode	ICCSP	-	0	100	µA	No load
	LINE+EVR+SP mode	ICCSP	-	3.0	10	mA	No load
	BIAS mode	ICCSP	-	200	400	µA	No load
■ REG	REG output voltage	VOREG	2.1	2.3	2.5	V	No load
Vout:REG							
■ MICAMP	Voltage gain	GV	53	56	59	dB	Vin=-60dBV, f=1KHz, MICAMP gain: 42.5dB
Vin:MICIN,Vout:MICOUT	ALC output level	VOALC	2.1	2.3	2.5	Vpp	Vin=-40dBV, f=1KHz, MICAMP gain: 42.5dB
	Input conversion noise	VON	-	-110	-90	dBV	DIN-AUDIO
■ LPF	Voltage gain	GV	5.5	7.0	8.5	dB	Vin=-20dBV, f=1KHz,LINEIN: 0dB setting
Vin:LINEIN,Vout:LINEOUT	Frequency characteristic 1	ΔGV1	-3.0	-0.5	-	dB	Vin=-20dBV, f=3KHz/1KHz, LINEIN: 0dB
	Frequency characteristic 2	ΔGV2	-	-10	-6.0	dB	Vin=-20dBV, f=4KHz/1KHz, LINEIN: 0dB
	Frequency characteristic 3	ΔGV3	-	-50	-30	dB	Vin=-20dBV, f=8KHz/1KHz, LINEIN: 0dB
■ LINEAMP	Voltage gain	GV	6.2	7.7	9.2	dB	Vin=-20dBV, f=1KHz
Vin:EVRIN,Vout:LINEOUT	Maximum output level	VOM	2.2	2.5	-	Vpp	f=1KHz,THD=1%
■ EVR	Voltage gain	GV	-1.5	0	+1.5	dB	Vin=-20dBV, f=1KHz, EVR: 0dB setting
Vin:EVRIN,Vout:EVROUT	Mute attenuation	MUTE	-	-70	-60	dB	Vin=-20dBV, f=1KHz, EVR: MUTE setting
■ SPAMP	Voltage gain	GV	11.5	13.5	15.5	dB	Vin=-14dBV,f=1KHz,BTL
Vin:SPIN,Vout:SPNEG,SPPOS	Maximum output power	VOM	200	250	-	mW	f=1KHz,BTL,THD=3%
■ LPF+EVR+SPAMP	Voltage gain	GV	10.3	12.8	15.3	dB	Vin=-20dBV,f=1KHz,BTL,
Vin:LINEIN,Vout:SPNEG,SPPOS							LINEIN: 0dB, EVR: 0dB setting

○ External Dimension Diagram ・ Marking Diagram

H6412

Lot.No.
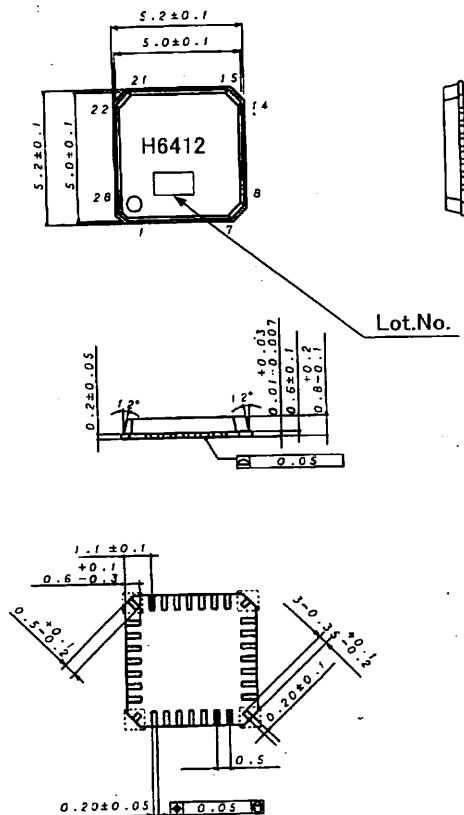
VQFN28 （Unit : mm）

○ Block Diagram
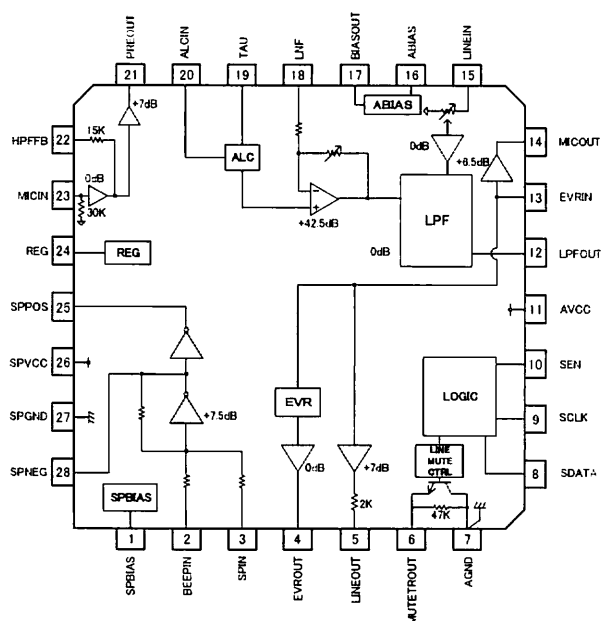
○ Pin No. ・ Pin Name

No.	Name	No.	Name
1	SPBIAS	15	LINEIN
2	BEEPIN	16	ABIAS
3	SPIN	17	BIASOUT
4	EVROUT	18	LNF
5	LINEOUT	19	TAU
6	MUTETROUT	20	ALCIN
7	AGND	21	PREOUT
8	SDATA	22	HPFFB
9	SCLK	23	MICIN
10	SEN	24	REG
11	AVCC	25	SPPOS
12	LPFOUT	26	SPVCC
13	EVRIN	27	SPGND
14	MICOUT	28	SPNEG

Rev.B

○ Cautions On Use

(1) Absolute maximum ratings
     If applied voltage, operating temperature range, or other absolute maximum ratings are exceeded, the LSI may be damaged.   Do not apply voltages or temperatures that exceed the absolute maximum ratings.   If you think of a case in which absolute maximum ratings are exceeded, enforce fuses or other physical safety measures and investigate how not to apply the conditions under which absolute maximum ratings are exceeded to the LSI.

(2) GND potential
     Make the GND pin voltage such that it is the lowest voltage even when operating below it.   Actually confirm that the voltage of each pin does not become a lower voltage than the GND pin, including transient phenomena.

(3) Thermal design
     Perform thermal design in which there are adequate margins by taking into account the allowable power dissipation in actual states of use.

(4) Shorts between pins and misinstallation
     When mounting the LSI on a board, pay adequate attention to orientation and placement discrepancies of the LSI.   If it is misinstalled and the power is turned on, the LSI may be damaged.   It also may be damaged if it is shorted by a foreign substance coming between pins of the LSI or between a pin and a power supply or a pin and a GND.

(5) Operation in strong magnetic fields
     Adequately evaluate use in a strong magnetic field, since there is a possibility of malfunction.

(6) Switching noise may occur in EVR gain setup.
     Measures for noise, like next block AMP mute, must be done in case it becomes a problem in application.

(7) Be careful pin no.12 (LPFOUT) doesn't have mute function.

(8) Each BIAS pin should connect capacity over $1.0\,\mu$ F.

(9) Connect the capacity of $4.7\,\mu$ F and below to the REG pin.

(10) CAPA between LNF pin and BIASOUT pin is should connect capacity over $2.2\,\mu$ F.

(11) Output pin should connect resister over 47 KΩ.

(12) The possibility of ALC incorrect action, set up PB mode before REC mode.

(13) When serial command for mute reset is sent LINEOUT and MUTETr, the LINEOUT pin will be set to mute reset.

The products listed in this document are 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).

Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of with would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.

About Export Control Order in Japan

Products described herein are the objects of controlled goods in Annex 1 (Item 16) of Export Trade Control Order in Japan.

In case of export from Japan, please confirm if it applies to "objective" criteria or an "informed" (by MITI clause) on the basis of "catch all controls for Non-Proliferation of Weapons of Mass Destruction.

Thank you for your accessing to ROHM product informations.

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