

STRUCTURE	Silicon Monolithic Integrated Circuit
PRODUCT SERIES	FM stereo transmitter IC for the car audio system.
TYPE	<b>BH1414K</b>
FEATURES	<ul style="list-style-type: none"> <li>• It is possible to set a level by the difference of the input source with the serial data because it has an EVR.</li> <li>• It is possible to attempt to improve a timbre because it has the limiter circuit and trap filter circuit of 19kHz and 38kHz.</li> <li>• Built-in the pilot-tone system FM stereo modulator circuit.</li> <li>• It becomes a monaural mode with the serial data.</li> <li>• Built-in the sound muting circuit.</li> <li>• The transmission frequency is stable because it has PLL system FM transmitter circuit.</li> <li>• PLL data input (CE, CK, DA) by serial input.</li> </ul>

○ Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit	Conditions
Supply voltage 1	Vcc1	+9.0	V	Pin 17
Supply voltage 2	Vcc2	+9.0	V	Pin 36
Supply voltage 3	Vcc3	+9.0	V	Pin 25
Port output terminal voltage	V <sub>P29</sub>	+10.0	V	Pin 29
Data input voltage	V <sub>IN-D</sub>	-0.3 ~ Vcc2+0.3	V	Pin 30, 31, 32, 33
Phase comparator output voltage	V <sub>OUT-P</sub>	-0.3 ~ Vcc2+0.3	V	Pin 20
Power dissipation	Pd	500	mW	(*1)
Storage temperature	Tstg	-55 ~ +125	°C	

(\*1) To use at a temperature higher than Ta=25°C, derate 5.0mW per 1°C.

Status of this document

The Japanese version of this document is the formal specification. A customer may use this translation version only for a reference to help reading the formal version. If there are any differences in translation version of this document, formal version takes priority.

Application example

The application circuit is recommended for use. Make sure to confirm the adequacy of the characteristics.

When using the circuit with changes to the external circuit constants, make sure to leave an adequate margin for external components including static and transitional characteristics as well as dispersion of the IC.

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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## ○ Operating Range

Parameter	Symbol	Limits	Unit	Conditions
Operating supply voltage	V <sub>CC</sub>	4.5 ~ 5.5	V	Pin17, 25, 36
Operating temperature	T <sub>opr</sub>	-40 ~ +85	°C	
Audio input level	V <sub>IN-A</sub>	~ 500	mVrms	Pin 5, 7
Audio input frequency band	f <sub>IN-A</sub>	20 ~ 15k	Hz	Pin 5, 7
Transmission frequency	f <sub>TX</sub>	75 ~ 110	MHz	Pin 23, 24, 28
Control terminal "H" level input voltage	V <sub>IH</sub>	0.8V <sub>CC2</sub> ~ V <sub>CC2</sub>	V	Pin 30, 31, 32, 33
Control terminal "L" level input voltage	V <sub>IL</sub>	GND ~ 0.2V <sub>CC2</sub>	V	Pin 30, 31, 32, 33

## ○ Electrical Characteristics

Unless otherwise specified Ta=25°C , V<sub>CC</sub>=5.0V

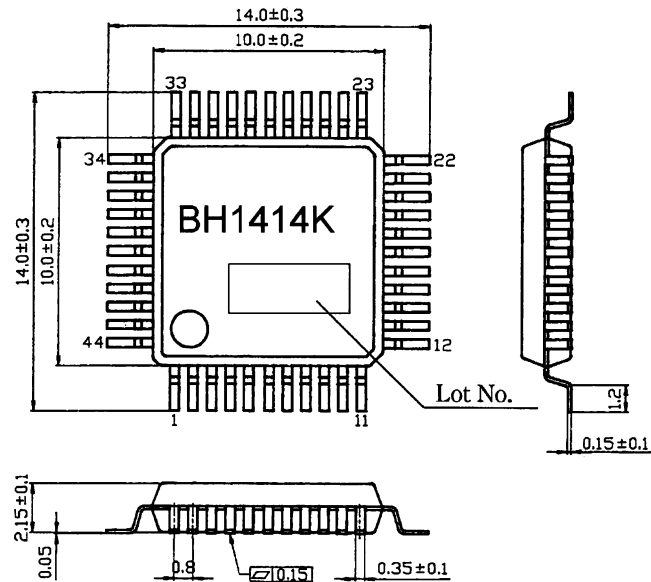
Signal source : f<sub>IN</sub>=400Hz

Parameter	Symbol	Limits			Unit	Conditions
		Min.	Typ.	Max.		
Quiescent current	I <sub>Q</sub>	15	21	29	mA	
Channel separation	Sep	30	45	—	dB	V <sub>IN</sub> =125mVrms L→R, R→L
Total harmonic distortion	THD	—	0.1	0.3	%	V <sub>IN</sub> =125mVrms L+R
Channel balance	C.B	-1.5	0	+1.5	dB	V <sub>IN</sub> =125mVrms L+R
Input output gain 1	G <sub>V1</sub>	-4	-2	0	dB	V <sub>IN</sub> =125mVrms, EVR=0dB L+R
Input output gain 2	G <sub>V2</sub>	+2	+4	+6	dB	V <sub>IN</sub> =125mVrms, EVR=+6dB L+R
Input output gain 3	G <sub>V3</sub>	-10	-8	-6	dB	V <sub>IN</sub> =125mVrms, EVR=-6dB L+R
Limiter input level	V <sub>IN(LIM)</sub>	205	260	325	mVrms	Output distortion at 3% for input level
LPF attenuation volume 1	V <sub>O(LPF)1</sub>	-2	0.5	+1.5	dB	V <sub>IN</sub> =125mVrms f=10kHz
LPF attenuation volume 2	V <sub>O(LPF)2</sub>	—	-37	-30	dB	V <sub>IN</sub> =125mVrms f=19kHz
LPF attenuation volume 3	V <sub>O(LPF)3</sub>	—	-49	-35	dB	V <sub>IN</sub> =125mVrms f=38kHz
Signal to noise ratio	S/N	55	68	—	dB	V <sub>IN</sub> =125mVrms L+R
Sub carrier rejection ratio	SCR	—	-30	-20	dB	V <sub>IN</sub> =125mVrms L+R
Pilot output level	V <sub>OP</sub>	180	200	220	mV <sub>P-P</sub>	Pin 19
Mute attenuation volume	V <sub>O(MUTE)</sub>	—	-68	-60	dB	V <sub>IN</sub> =125mVrms L+R
Transmission output level	V <sub>TX</sub>	84	87	90	dB μV	f <sub>TX</sub> =100MHz
Transmission frequency precision	Δf <sub>TX</sub>	-3	0	+3	kHz	f <sub>TX</sub> =100MHz
"H" level input current	I <sub>IH</sub>	—	—	1.0	μA	Pin 30, 31, 32, 33 V <sub>IN</sub> =5V
"L" level input current	I <sub>IL</sub>	-1.0	—	—	μA	Pin 30, 31, 32, 33 V <sub>IN</sub> =0V
"H" level output voltage	V <sub>OH</sub>	V <sub>CC</sub> -1.0	V <sub>CC</sub> -0.3	—	V	Pin 20 I <sub>OUT</sub> =-1.0mA
"L" level output voltage	V <sub>OL</sub>	—	0.3	1.0	V	Pin 20 I <sub>OUT</sub> =1.0mA
"off" level leak current 1	I <sub>OFF1</sub>	—	—	100	nA	Pin 20 V <sub>OUT</sub> =5V
"off" level leak current 2	I <sub>OFF2</sub>	-100	—	—	nA	Pin 20 V <sub>OUT</sub> =GND
"L" level output voltage	V <sub>OL</sub>	—	0.2	1.0	V	Pin 29 I <sub>OUT</sub> =3.0mA
"off" level leak current	I <sub>OFF</sub>	—	—	1.0	μA	Pin 29 V <sub>OUT</sub> =5V

© This product is not designed for protection against radioactive rays.

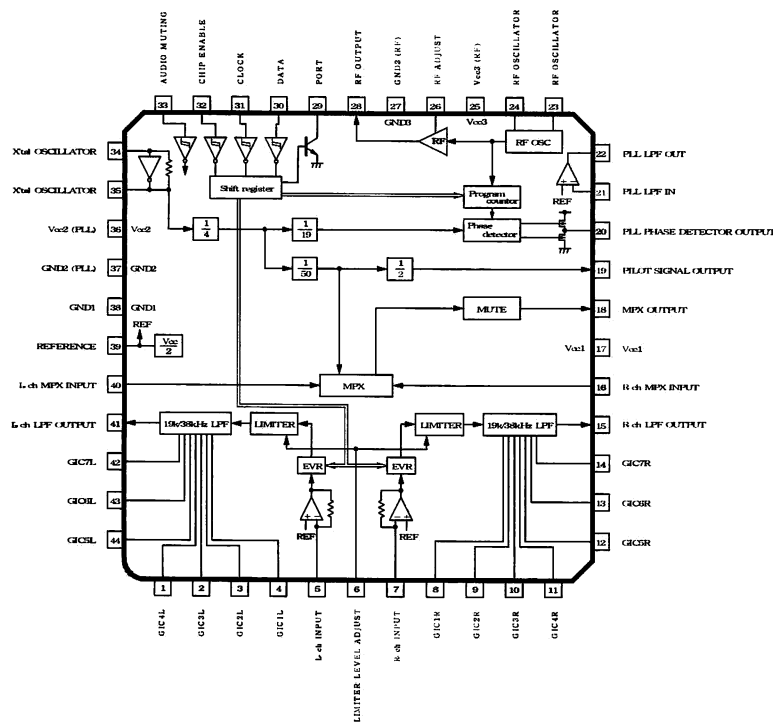
© The specification of transmission output level be based on the Radio Law in every country and the area.

○ External Dimension Diagram • Marking Diagram



QFP-44(Unit : mm)

○ Block Diagram



○ Pin No. • Pin Name

No.	Name	No.	Name
1	GIC4L	23	RF OSCILLATOR
2	GIC3L	24	RF OSCILLATOR
3	GIC2L	25	Vcc3 (RF)
4	GIC1L	26	RF ADJUST
5	L-ch INPUT	27	GND3 (RF)
6	LIMITER LEVEL ADJUST	28	RF OUTPUT
7	R-ch INPUT	29	POUT
8	GIC1R	30	DATA
9	GIC2R	31	CLOCK
10	GIC3R	32	CHIP ENABLE
11	GIC4R	33	AUDIO MUTING
12	GIC5R	34	X'tal OSCILLATOR
13	GIC6R	35	X'tal OSCILLATOR
14	GIC7R	36	Vcc2 (PLL)
15	R-ch LPF OUTPUT	37	GND2 (PLL)
16	R-ch MPX INPUT	38	GND1
17	Vcc1	39	REFERENCE
18	MPX OUTPUT	40	L-ch MPX INPUT
19	PILOT SIGNAL OUTPUT	41	L-ch MPX OUTPUT
20	PLL PHASE DETECTOR OUTPUT	42	GIC7L
21	PLL LPF IN	43	GIC6L
22	PLL LPF OUT	44	GIC5L

○ 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.

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