STRUCTURE Silicon Monolithic Integrated Circuit

PRODUCT SERIES FM stereo transmitter IC for audio systems.

TYPE **BH1418KN**

FEATURES
- It is possible to attempt to improve a timbre because it has the pre-emphasis circuit, limiter circuit and low-pass filter circuit.
- Built-in the pilot-tone system FM stereo modulator circuit.
- The transmission frequency is stable because it has PLL system FM transmitter circuit.
- PLL data input (CE, CK, DA) by serial input.
- It is possible for the monaural mode.
- Built-in the sound muting circuit.

○ Absolute Maximum Ratings (Ta=25℃)

Parameter	Symbol	Limits	Unit	Conditions
Supply voltage	Vcc	+7.0	V	Pin 6, 12
Data input voltage	V_{IN-D}	-0.3 ～ Vcc+0.3	V	Pin 16, 17, 18, 19
Phase comparator output voltage	V_{OUT-P}	-0.3 ～ Vcc+0.3	V	Pin 5
Power dissipation	Pd	370	mW	(*1)
Storage temperature	Tstg	-55 ～ +125	℃	

(*1) To use at a temperature higher than Ta=25℃, derate 3.7mW per 1℃.

○ Operating Range

Parameter	Symbol	Limits	Unit	Conditions
Operating supply voltage	Vcc	2.7 ～ 4.0	V	Pin 6, 12
Operating temperature	Topr	-40 ～ +85	℃	
Audio input level	V_{IN-A}	～ -10	dBV	Pin 24, 26
Audio input frequency band	f_{IN-A}	20 ～ 15k	Hz	Pin 24, 26
Pre-emphasis time constant set up range	τ_{PRE}	～ 155	μsec	Pin 23, 27
Transmission frequency	f_{TX}	70 ～ 120	MHz	Pin 8, 11
Control terminal "H" level input voltage	V_{IH}	0.8Vcc ～ Vcc	V	Pin 16, 17, 18, 19
Control terminal "L" level input voltage	V_{IL}	GND ～ 0.2Vcc	V	Pin 16, 17, 18, 19

○ Electrical Characteristics

Unless otherwise specified Ta=25℃ , V_{CC}=3.3V

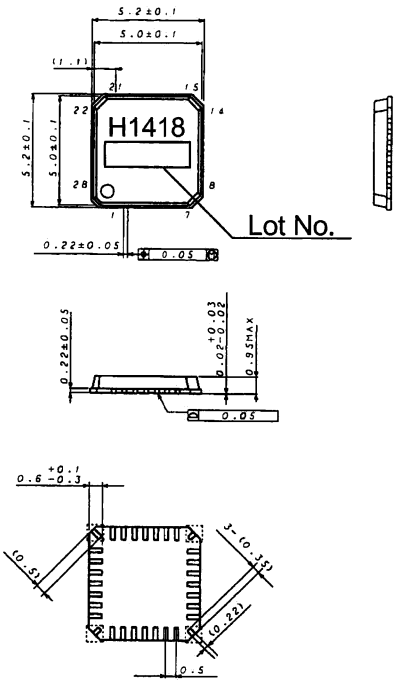
Signal source : f_{IN}=400Hz

Parameter	Symbol	Limits			Unit	Conditions
		Min.	Typ.	Max.		
Quiescent current	I_Q	13	18.5	28	mA	
Channel separation	Sep	25	40	—	dB	V_{IN}=-20dBV, L→R, R→L
Total harmonic distortion	THD	—	0.1	0.3	%	V_{IN} =-20dBV, L+R
Channel balance	C.B	-2	0	+2	dB	V_{IN} =-20dBV, L+R
Input output gain	G_V	-2	0	+2	dB	V_{IN} =-20dBV, L+R
Pilot modulation rate	M_P	12	15	18	%	V_{IN} =-20dBV, L+R, Pin2
Sub carrier rejection ratio	SCR	—	-30	-20	dB	V_{IN} =-20dBV, L+R
Pre-emphasis time constant	τ_{PRE}	40	50	60	μsec	V_{IN} =-20dBV, L+R
Limiter input level	$V_{IN(LIM)}$	-16	-13	-10	dBV	Output level at 1dB gain compression
LPF cut off frequency	$f_{C(LPF)}$	12	15	18	kHz	V_O=-3dB, Pin23, 27 Open
Mute attenuation volume	$V_{O(MUTE)}$	—	-48	-42	dB	V_{IN}=-20dBV, L+R
Transmission output level	V_{TX}	96	99	102	dBμV	f_{TX}=100MHz
"H" level input current	I_{IH}	—	—	1.0	μA	Pin 16, 17, 18, 19 V_{IN}=3.3V
"L" level input current	I_{IL}	-1.0	—	—	μA	Pin 16, 17, 18, 19 V_{IN}=0V
"H" level output voltage	V_{OH}	Vcc-1.0	Vcc-0.15	—	V	Pin 5 I_{OUT}=-1.0mA
"L" level output voltage	V_{OL}	—	0.15	1.0	V	Pin 5 I_{OUT}=1.0mA
"off" level leak current 1	I_{OFF1}	—	—	100	nA	Pin 5 V_{OUT}=3.3V
"off" level leak current 2	I_{OFF2}	-100	—	—	nA	Pin 5 V_{OUT}=GND

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

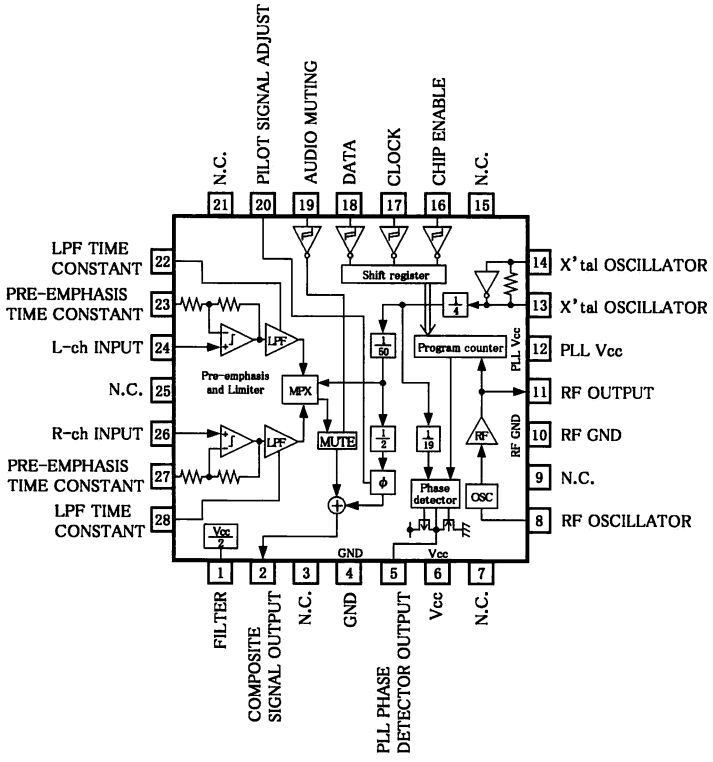
◎ The specification of transmission output level be based on the Radio Law in every country and the area.

○ External Dimension Diagram • Marking Diagram



VQFN28 (Unit : mm)

○ Block Diagram



○ Pin No. • Pin Name

No.	Name	No.	Name
1	FILTER	15	N.C.
2	COMPOSITE SIGNAL OUTPUT	16	CHIP ENABLE
3	N.C.	17	CLOCK
4	GND	18	DATA
5	PLL PHASE DETECTOR OUTPUT	19	AUDIO MUTING
6	Vcc	20	PILOT SIGNAL ADJUST
7	N.C.	21	N.C.
8	RF OSCILLATOR	22	LPF TIME CONSTANT
9	N.C.	23	PRE-EMPHASIS TIME CONSTANT
10	RF GND	24	L-ch INPUT
11	RF OUTPUT	25	N.C.
12	PLL Vcc	26	R-ch INPUT
13	X'tal OSCILLATOR	27	PRE-EMPHASIS TIME CONSTANT
14	X'tal OSCILLATOR	28	LPF TIME CONSTANT

○ 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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