**PRODUCTS**  
Semiconductor IC  
**TYPE**  
BH1427GUL  
**PAGE**  
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**STRUCTURE**  
Silicon Monolithic Integrated Circuit

**PRODUCT SERIES**  
Wireless Audio Link LSI for Mobile Phone (FM Stereo Transmitter)

**TYPE**  
**BH1427GUL**

**FEATURE**
- Low voltage Fast Mode P-C-BUS interface.
- Adjustment free wideband PLL frequency synthesizer (76MHz~108MHz).
- Possible to select reference clock frequency freely.
- Possible to select transmission power by serial control.
- Possible to select pre-emphasis time constant by serial control.
- Built-in high-performance Low-pass Filter.
- Built-in pilot-tone system FM stereo modulator circuit.
- The transmission frequency is stable because it has PLL system FM transmitter circuit.
- Possible to operate in monaural mode.
- Built-in the sound muting circuit.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Limits</th>
<th>Unit</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>VCC</td>
<td>-0.3 to +5.5 V</td>
<td>Pin 2, 7, 11, 13, 25</td>
<td></td>
</tr>
<tr>
<td>Data input voltage 1</td>
<td>VDA1</td>
<td>-0.3 to VDD+0.3</td>
<td>Pin 16, 19, 20</td>
<td></td>
</tr>
<tr>
<td>Data input voltage 2</td>
<td>VDA2</td>
<td>-0.3 to +5.5 V</td>
<td>Pin 17, 18</td>
<td></td>
</tr>
<tr>
<td>Power dissipation</td>
<td>Pd</td>
<td>950 mW</td>
<td>(NOTE 1)</td>
<td></td>
</tr>
<tr>
<td>Storage temperature</td>
<td>Tstg</td>
<td>-55 to +125 °C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*(NOTE 1) To use at a temperature higher than Ta=25°C, derate 9.6mW per 1°C.*

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**Application example**
- 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). Should you intend to use this product with equipment or devices which require an extremely high level of reliability and multifunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear reactor control devices, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.
- ROHM assumes no responsibility for use of any circuits described herein, conveys no license under any patent or other right, and makes no representations that the circuits are free from patent infringement.
### Operating Supply Voltage Range

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Limits</th>
<th>Unit</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating supply voltage 1</td>
<td>V_{DC}</td>
<td>2.7 to 3.6</td>
<td>V</td>
<td>Pin 2, 7, 11, 25</td>
</tr>
<tr>
<td>Operating supply voltage 2</td>
<td>V_{DD}</td>
<td>1.7 to 3.6</td>
<td>V</td>
<td>Pin 13</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>T_{op}</td>
<td>-20 to +85°C</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>Audio input level</td>
<td>V_{IN}</td>
<td>-10 dBV</td>
<td>V</td>
<td>Pin 26, 27</td>
</tr>
<tr>
<td>Audio input frequency</td>
<td>f_{IA}</td>
<td>20 to 15 kHz</td>
<td>Hz</td>
<td>Pin 26, 27</td>
</tr>
<tr>
<td>Transmission frequency</td>
<td>f_{TX}</td>
<td>76.0 to 108.0 MHz</td>
<td>100kHz step</td>
<td></td>
</tr>
<tr>
<td>Control terminal &quot;H&quot; level input voltage 1</td>
<td>V_{IN}</td>
<td>0.7V_{DD} to V_{DD}</td>
<td>V</td>
<td>Pin 16, 19, 20</td>
</tr>
<tr>
<td>Control terminal &quot;H&quot; level input voltage 2</td>
<td>V_{IN}</td>
<td>0.7V_{DD} to +5.5</td>
<td>V</td>
<td>Pin 17, 18</td>
</tr>
<tr>
<td>Control terminal &quot;L&quot; level input voltage 1</td>
<td>V_{OUT}</td>
<td>GND to 0.3V_{DD}</td>
<td>V</td>
<td>Pin 16, 17, 18, 19, 20</td>
</tr>
</tbody>
</table>

### Electrical Characteristics

Unless otherwise specified, 
- T_{A}=25°C, V_{CC}=3.0V, V_{DD}=1.8V
- Signal source: f_{S}=1kHz, V_{IN}=20dBV
- Common condition: f_{RX}=90MHz, A_{FX}=75kHz, r=50μs

#### Quiescent current
- I_{Q} 11 16 23 mA
- Tx power control is 0dB setting.

#### Power down current
- I_{PDP} 0 1 μA BUSEN="L"

#### Channel separation
- Sep 25 40 dB L=R, R→L

#### Signal to noise ratio
- SNR 60 69 dB L+R
- 61 70 dB MONO

#### Total harmonic distortion
- THD 0.1 0.3 % L+R
- 0.1 0.3 % MONO

#### Transmission power level
- P_{TX} -8 -5 -2 dBm Tx power control is 0dB setting.

#### Pilot modulation rate
- M_{S} 7 11 15 % L+R

#### "H" level input current
- I_{H} 1.0 μA Pin 16, 19, 20 V_{IN}=3V

#### "L" level input current
- I_{L} -1.0 μA Pin 16, 19, 20 V_{IN}=0V

#### "L" level output voltage
- V_{OL} - - 0.2V_{DD} V Pin 18 I_{OL}=3mA

© This product is not designed for protection against radiative rays.
© The specification of transmission output level be based on the Radio Law in every country and the area.
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.
Jissou Information

Package: VCSP50L3

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1. Structure and materials

Fig. 1 Structure

2. Tape and Reel information
2.1. Packing information

Tape: Embossed carrier tape
Quantity: 2,500pcs/Reel
Direction of feed: EZ (See Fig. 2)

2.2. Tape and Reel specification
2.2.1. Tape and reel dimensions (See the table on page 2/4)

Fig. 2 Typical Tape and Reel configuration

Fig. 3 Tape dimensions

Fig. 4 Reel dimensions

Design: CHECK: APPROVAL:
DATE: 2007.6.29 SPECIFICATION No.: TSZ222201-BH142702-1-2
REV. A ROHM CO.,LTD.

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No. Item | Materials
---|---
1 | Die | Silicon
2 | Cu Post | Cu
3 | Encapsulation | Epoxy Resin
4 | Ext. terminal | Sn-3Ag-0.5Cu Solder
5 | Encapsulation | Polyamide-imide Resin
6 | Marking | Laser Marking

Dehydrated weight: 0.009g
2. 3. Leader and Trailer
   No component pockets are 25 pockets or more.

2. 3. 2. Trailer
   No component pockets are 10 pockets or more.
   Tape is free from reel.

2. 4. Label for Reel and Box

Fig. 6 Label example

2. 5. Packing style

Fig. 6 Packing style

2. 6. Shipping style
   5 unit boxes or less per shipping box

Fig. 7 Shipping box dimensions and Shipping style

2. 7. Packing materials

<table>
<thead>
<tr>
<th>Item</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embossed carrier tape</td>
<td>PS</td>
</tr>
<tr>
<td>Cover tape</td>
<td>PET + PE</td>
</tr>
<tr>
<td>Reel</td>
<td>PS</td>
</tr>
<tr>
<td>Unit box</td>
<td>Cardboard</td>
</tr>
<tr>
<td>Shipping box</td>
<td>Cardboard</td>
</tr>
</tbody>
</table>
2. 8. Others
2. 8.1. Feedback strength
Cover tape feedback strength is 0.2~0.7N.

2. 8.2. Dropouts
(1) No consecutive dropouts.
(2) A maximum 0.1% of specified number of products in each packing may be missing.

3. Storage conditions
3. 1. Storage environment
Recommended storage conditions are as follows:
- Temperature: 5~30°C
- Humidity: 40~70% RH

3. 2. Storage period
- Specified storage period: 1 year

3. 3. Specified storage period until soldering
This package does not require additional drying treatment as long as the moisture condition at the mounting process is within our recommended mounting condition.

4. Marking lot number
- Production lot number
- Production week code
- The last figure of production year code

5. Soldering conditions
5. 1. Recommended temperature profile for reflow

Preheating temperature: 120°C~150°C
Preheating zone: 120°C MAX
Soldering temperature: 220°C~230°C
Soldering zone: 60°C MAX

(Notice) Maximum 2-times soldering

5. 2. About mounting with Sn-Pb solder paste.
Mounting with Sn-Pb solder paste is not recommended because it has a possibility of reducing reliability to connect with Sn-3.0Ag-0.5Cu solder balls.

5. 3. The wave soldering method is not supported.

5. 4. Partial heat supply method (by soldering iron) is not supported
6. Footprint dimensions (Optimize footprint dimensions to the board design and soldering condition)

7. Regarding the underfill material
There are some cases that the underfill material is applied as purpose to reinforce the soldered junctions of the package. Since the mount reliability depends on the resin material or coating condition, it may deteriorate on the contrary. Therefore, it is necessary to evaluate it sufficiently for its application.
In terms of the coating condition, it is preferable that there is enough material beyond the each four sides of a package.

8. External dimensions