



Features:

Bluetooth 3.0+EDR Wireless Speaker module



Version: 0.3

Jan 2013

- Bluetooth 3.0+EDR compliant
- Typical +2dBm Class 2 output power
- Receiver Sensitivity: GFSK typical -91dBm, $\pi/4$ PSK typical -92dBm, 8DPSK typical -84dBm
- Piconet and Scatter net support
- HCI UART interface
- CVSD, A-law, μ -law CODEC algorithms for voice applications
- SBC decode for Bluetooth audio streaming
- Build-in High performance stereo audio codec
- Cap-less/single end headphone driver
- Audio DAC: 94dB SNR
- Build in Max. 350mAH Li-ion battery charger
- HSP, HFP, A2DP, AVRCP profile support
- 3V operating voltage
- ROM version: 32Kb EEPROM
- Size: 23mm x 14mm
- Build-in PCB Antenna
- RoHS compliant

Product Description:

The WLIS01-SM is a highly integrated Bluetooth 3.0+EDR stereo module, designed for high data rate, short-range wireless communication in the 2.4 GHz ISM band. With ISSC Bluetooth stack and profile, the WLIS01-SM provides a low power and ultra-low cost Bluetooth 3.0+EDR solution for wireless voice/audio applications.

Applications:

- High quality stereo speaker and HiFi
- High quality wireless stereo audio receiver
- Hands HiFi-Free Car Kits
- High-END stereo wireless headsets

**Outline Dimension & Pin Definition:**

| Pin No. | I/O | Name | Description |
|---------|-----|----------|---|
| 1 | P | P30 | GPIO, default pull-high input Line-in detection, 1: no line-in detected; 0: line-in detected |
| 2 | I/O | P20 | GPIO, default pull-high input System Configuration, H: Application; L: Baseband(IBDK Mode) |
| 3 | I/O | P00 | GPIO, default , pull-low input. Slide Switch Detector |
| 4 | I/O | P04 | GPIO, default pull-high input Audio AMP Enable/NFC detect |
| 5 | AO | SPKR | R-channel analog headphone output, single-ended application only |
| 6 | AO | AOHPM | Headphone common mode output/sense input |
| 7 | AO | SPKL | L-channel analog headphone output, single-ended application only |
| 8 | P | VDDAO | Positive power supply dedicated to CODEC output amplifiers |
| 9 | P | GND | Ground |
| 10 | AI | MIC1_P | Mic 1 mono differential analog positive input |
| 11 | AI | MIC1_N | Mic 1 mono differential analog negative input |
| 12 | AP | MIC_BIAS | Microphone biasing voltage |
| 13 | AI | AIR | Stereo analog line in, R-channel |
| 14 | AI | AIL | Stereo analog line in, L-channel |
| 15 | I/O | RST_N | System Reset Pin |
| 16 | P | GND | Ground |
| 17 | P | ADAP_IN | Power adaptor input |
| 18 | P | BAT_IN | Battery input |
| 19 | P | SYS_PW | System Power Output |
| 20 | I/O | SK1/P35 | Default SAR input for battery detection This pin can be re-defined as GPIO3_5 |
| 21 | P | BK_OUT | Buck feedback sense pin |
| 22 | P | GND | Ground |
| 23 | P | MFB | Multi-Function Push Button key Combined Play/Panse key when A2DP enabled. |
| 24 | P | LED1 | LED Driver 1 |
| 25 | P | LED2 | LED Driver 2 |
| 26 | I/O | P02 | GPIO, default pull-high input PLAY/PAUSE button |



| | | | |
|----|-----|---------|---|
| 27 | I/O | P27 | GPIO, default pull-high input Foward button |
| 28 | I/O | P05 | GPIO, default pull-high input REW button |
| 29 | O | HCI_TXD | HCI TX data |
| 30 | I | HCI_RXD | HCI RX data |
| 31 | I/O | P16 | GPIO, default pull-high input Volume down button |
| 32 | I/O | P01 | GPIO, default pull-high input Volume up button |
| 33 | I/O | P03 | GPIO, default pull-high input, RX_IND |
| 34 | P | GND | Ground |

Electrical Characteristics:

Absolute Maximum Ratings

| Rating | | Min | Max | Max |
|-----------------------|--|-------|-------|-----|
| Operation Temperature | | -20°C | +70°C | °C |
| Core supply voltage | VDD_CORE, VCC_RF, AVDD_SAR, AVDD_PLL | 1.7V | 1.98V | V |
| Codec supply voltage | VDD_AUDIO | | 3.3 | V |
| I/O voltage | VDD_IO | | 3.3 | V |
| Supply voltage | BK_VDD | | 4.7 | V |
| | 3V1_VIN | | 5 | V |
| | BAT_IN | | 4.3 | V |
| | ADAP_IN | | 6 | V |
| | LED[1:0] | | 5 | V |
| | Power switch | | 6 | V |



Recommended Operate Condition:

| Symbol | Parameter | Min | Typical | Max | Unit |
|------------------------|-----------------------------|------|---------|------|------|
| V _{DD18} | Digital core supply voltage | | | | |
| | SAR ADC supply voltage | 1.62 | 1.8 | 1.92 | V |
| | CODEC supply voltage | | | | |
| V _{DDIO} | I/O supply voltage | 2.5 | 2.7 | 3.3 | V |
| | RF supply voltage | | | | |
| T _{OPERATION} | Operating temperature range | -20 | +25 | +70 | °C |
| T _{stg} | Storage temperature | -40 | | +125 | °C |
| V _{LDO} | LDO supply voltage | 1.8 | | 3.3 | V |
| V _{BAT_IN} | Input voltage for SAR ADC | 0.9 | | 3.3 | V |

Audio Codec: ADC

| Test Condition: | | | | | |
|---|--|---------|------|------|------|
| T= 25°C, Vdd=2.8V, 1KHz sine wave input, Bandwidth = 20~20KHz | | | | | |
| Parameter | Condition | Min. | Typ. | Max. | Unit |
| Input full-scale | Full scale (line-in) | | | 2.2 | Vpp |
| Resolution | | | 16 | | bits |
| Input Sampling Rate | | 8 | | 48 | KHz |
| SNR | f _{in} =1KHz B/W=20~20KHz A-weighted THD+N < 1% 150mVpp input | 8KHz | | 83 | dB |
| | | 16KHz | | 83 | |
| | | 32KHz | | 83 | |
| | | 44.1KHz | | 83 | |
| | | 48KHz | | 83 | |



| | | | | | |
|---|--|-----|------|------|------------|
| SNR | A-weighted 1KHz@full scale, Microphone boost enable | | 75 | | dB |
| THD+N (Mic input) @30mVrms input | | | 0.04 | | % |
| THD+N (line input) | | | 0.01 | | % |
| Mic Boost Gain | | | 20 | | dB |
| Digital Gain | | -54 | | 4.85 | dB |
| Analog Gain | | | | 26 | dB |
| Digital Gain Step | | | 6 | | dB |
| Analog Gain Step | | | 1.7 | | dB |
| Input impedance (microphone mode) | Input impedance | | 6 | 10 | K Ω |
| | Input capacitance | | | 20 | pF |
| Analog supply voltage (AVDD) | | 1.8 | 2.8 | 3.0 | V |

Audio Codec: DAC

| Test Condition: T= 25°C, Vdd=2.8V, 1KHz sine wave input, Bandwidth= 20~20KHz | | | | | | |
|--|--|---------|------|------|------|------|
| Parameter | Condition | | Min. | Typ. | Max. | Unit |
| Output Level | Full scale | | | 2.1 | | Vpp |
| Resolution | | | 16 | | | bits |
| Output Sampling Rate | | | 8 | | 48 | KHz |
| SNR | f _{in} =1KHz B/W=20~20KHz A-weighted THD+N < 0.01% 0dBFS signal Load=100K Ω | 8KHz | | 94 | | dB |
| | | 16KHz | | 94 | | dB |
| | | 32KHz | | 94 | | dB |
| | | 44.1KHz | | 94 | | dB |
| | | 48KHz | | 94 | | dB |
| Max Output Power | R _L =16Ohm | | | 35 | | mW |
| | R _L =32Ohm | | | 17 | | mW |



| | | | | | |
|------------------------------|---|-----|-----|------|-----|
| THD+N | 16Ohm load | | | 0.05 | % |
| | 100K Ω load | | | 0.01 | % |
| Digital Gain | | -54 | | 4.85 | dB |
| Digital Gain Resolution | | | 6 | | dB |
| Analog Gain | | -28 | | 3 | dB |
| Analog Gain step | | | 1 | | dB |
| Output resistance | R _L | 8 | 16 | | Ohm |
| Output capacitance | C _p | | | 500 | pF |
| Crosstalk between channels | L vs. R, measured at -10dBFS@1KHz input | | -90 | -80 | dB |
| Analog supply voltage (AVDD) | | 1.8 | 2.8 | 3.0 | V |

Battery Charger:

| Charging Mode (BAT_IN rising to 4.2V) | Min | Typ | Max | Unit |
|--|-----------------|------|-----|------|
| Operation Temperature | -20 | | 70 | °C |
| Input Voltage (V _{in}) Note: It needs more time to get battery fully charged when V _{in} =4.5V | 4.5 | | 6 | V |
| Battery trickle charge current (BAT_IN < trickle charge voltage threshold) | | 0.1C | | mA |
| Trickle charge voltage threshold | | 3 | | V |
| Maximum battery charge current | Headroom > 0.7V | | 350 | mA |
| | Headroom = 0.3V | | 150 | mA |
| Minimum battery charge current | Headroom > 0.7V | | 1 | mA |
| | Headroom = 0.3V | | 1 | mA |



| | | | | |
|--|--|-------|--|----|
| Battery charge termination current, % of fast charge current | | 10 | | % |
| Battery recharge hysteresis (Note1) | | 100 | | mV |
| Battery recharge current (Note2) Note: C → Battery capacity | | 0.25C | | mA |

Note1: When charging complete and the adapter is still in, the battery voltage will slowly drop down.

when the voltage drop is larger than 100mV from the full voltage, the re-charging cycle will start.

Note2: If the battery voltage during plug in is larger than 4V, the charging current will be limited to 0.25C to avoid the battery voltage overshoot.

FCC ID: OZJWLIS-01SM

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The OEM integrator is still responsible for the FCC compliance requirement of the end product, which integrates this module. Appropriate measurements (e.g. 15 B compliance) and if applicable additional equipment authorizations (e.g. Verification , Doc) of the host device to be addressed by the integrator/manufacturer.

Attention:

This RF Module does not have an own shielding, so that a Limited Modular Approval (LMA) was granted: This RF module is strictly limited to the integration by the Grantee himself or the dedicated OEM integrators under the control of the Grantee. Proper measurements of the host device including this RF module (radiated spurious emissions and bandegde) are required to assure compliance with the FCC regulations.



Any other integrator must contact the Grantee to determine necessary compliance measurements and/or additional equipment authorizations (e.g. Class II Permissive Change or New Equipment Authorization) for his configuration.

This RF Module must not be sold to the general public.

IMPORTANT NOTE: In the event that these conditions cannot be met (for example: certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains FCC ID: OZJWLIS-01SM " any similar wording that expresses the same meaning may be used.

IC: 10725A-01SM

BQB:



QDL Bluetooth® Qualified Design Listing

The Bluetooth SIG Hereby Recognizes

WLINK TECHNOLOGY (HK) CO., LIMITED

Member Company

Audio BT module

Qualified Design Name

Qualified Design ID(s): **B021126**

Specification Name: **3.0**

Product Type: **End Product**

Model Number: **WLIS01-SM**

BQE Name: **Totti Huang**

Listing Date: **13 June 2013**

Assessment Date: **13 June 2013**

Hardware Version Number: **V1.1**

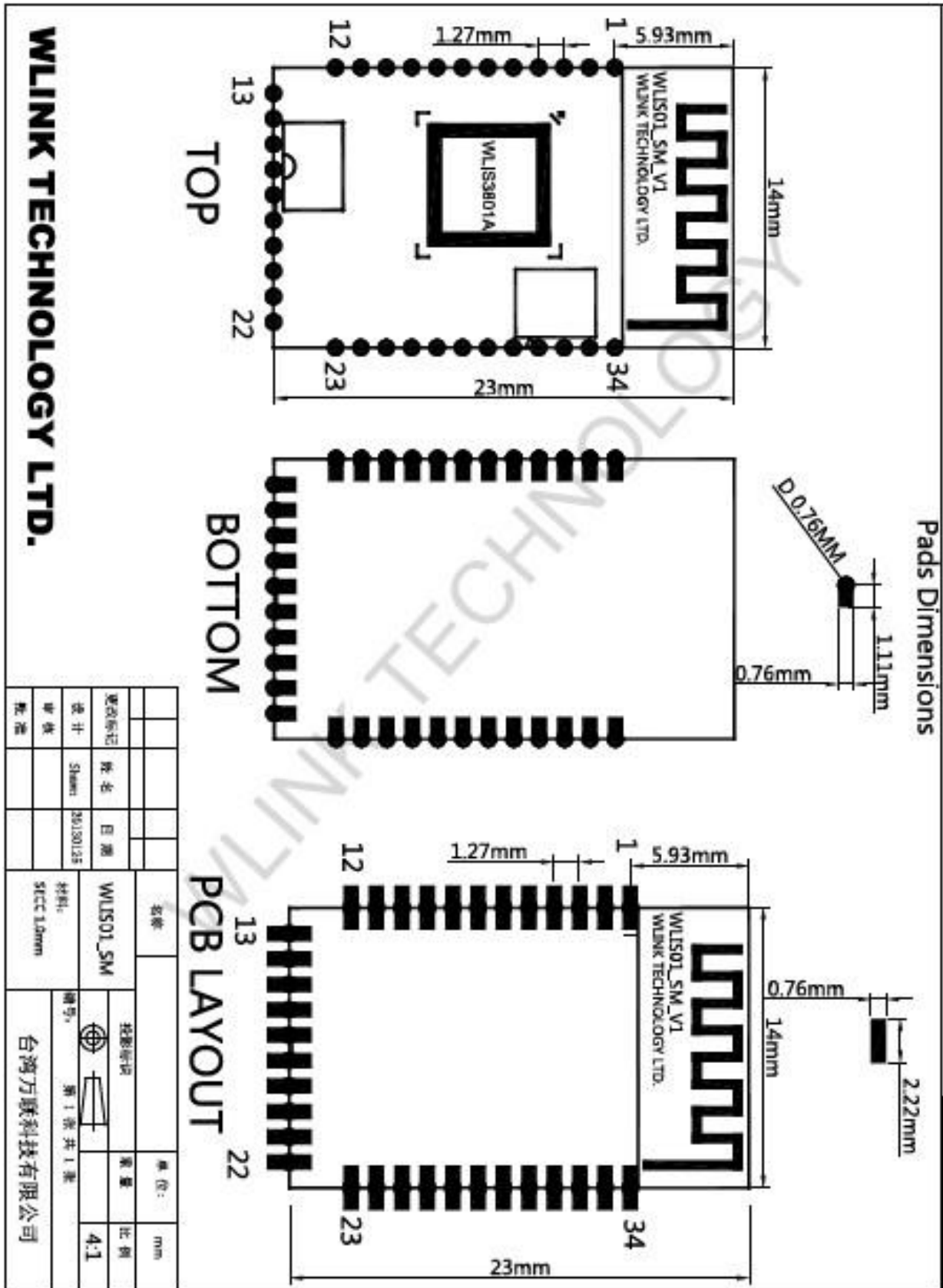
Software Version Number: **V1**

This certificate acknowledges the *Bluetooth*® Specifications declared by the member were achieved in accordance with the *Bluetooth* Qualification Process as specified within the *Bluetooth* Specifications and as required within the current PRD





Mechanical specification:



| | | | | | |
|------------|-------|----------|-----------------|------|----|
| 更改标记 | 姓名 | 日期 | 名称 | 投影标记 | 单位 |
| 设计 | Shawn | 26/12/15 | WLS01_SM | | mm |
| 审核 | | | 材料: SICC 1.0mm | 数量 | 比例 |
| 批准 | | | 编号: 第 1 张 共 1 张 | 4:1 | |
| 台湾万联科技有限公司 | | | | | |