User Manual

Product Name: Core board module4G

Model Name: ABSL-G, XY6762CA-C

Brand Name: SHADOW

Manufacture: ABSOLUTE SOLUTION CO., LTD

1 product description

1.1Absl-g is a chip module with 166lcc pins. The size is only 40.5mm × 50.5mm × 85mm, which can be embedded in all kinds of M2M products through pad. It is very suitable for the development of mobile devices such as on-board computer, multimedia terminal, smart home, Internet of things terminal, etc.
1.2This document defines the hardware interface specification, electrical characteristics and mechanical specifications of absl-g module. With the help of this document, combined with our application manual and user guide, customers can quickly apply absl-g module to wireless applications.

By following the following safety principles, personal safety can be ensured and helps protect products and working environment from potential damage. The product manufacturer needs to communicate the following safety instructions to the end user. If these security rules are not observed, new technology will not be responsible for the wrong use of users.
1. Road safety first! When you are driving, do not use a handheld mobile terminal unless it has a hands-free function. Please stop and call again!

2. Please turn off the mobile terminal before boarding. The wireless function of mobile terminal is forbidden to be turned on on the aircraft to prevent interference to the aircraft communication system. Ignoring this prompt may lead to flight safety or even violation of the law.

3. When in the hospital or health care place, pay attention to whether there are restrictions on the use of mobile terminal equipment. RF interference can cause medical equipment to malfunction, so it may be necessary to turn off the mobile terminal equipment.

4. Your mobile terminal device will receive and transmit RF signals when it is turned on. When close to TV, radio, computer or other electronic equipment, radio frequency interference will be generated.

5. Please keep the mobile terminal away from flammable gas. When you are near a gas station, oil depot, chemical plant or explosive workplace, please turn off the mobile terminal equipment. Operating electronic equipment in any place with potential explosion hazard has potential safety hazard.

2 Product concept

2.1. overview

ABSL-G is a 4G intelligent module based on MTK's mt6762 (Lianfa technology Xili

P22) platform, industrial high performance, and can run Android 9.0 operating system. The hardware of the module is compatible with each other, supporting LTE / WCDMA / TD-SCDMA / EVDO / CDMA / GSM and other standards; It supports WiFi 802.11 a / B / g / N / AC, BT v2.1 + EDR, 3.0 + HS, v4.1 + HS, V5.0, Beidou, Galileo, GLONASS, GPS, QZSS satellite positioning; It has multiple audio and video input and output interfaces and rich GPIO interfaces.

The supported frequency bands are as follows:

LTE-FDD	B5
LTE-TDD	B41
GSM	B5
WCDMA	B5

2.2. main performance

The following table describes the detailed performance parameters of absl-g:

	ABSL-G MT6762
Process	12nm
Application processor	4xCortex-A53 2.0Ghz 4xCortex-A53 1.5Ghz
GPU	IMG GE8320 @ 650Mhz
Camera interface	2 MIPI CSI（4 Data lanes）21MP @ 30fps
video decode	1080p 30fps H.264/H.265
video encode	1080p 30fps H.264
LCM	MIPI DSI（4 Data lanes） HD+(1600x720)

Characteristics

Other performance parameters

performance	explain
Modem processor	Mips32 processor
power supply	The maximum frequency of arm is 864mhz
LTE features	256KB L2
WCDMA features	Vbat power supply voltage range: 3.5V ~ 4.35v

Characteristics of GSM / GPRS / edge	EDGE：
WLAN features	Support edge multi slot class 12
Bluetooth features	Support GMSK and 8PSK
satellite positioning	Coding format: cs1-4 and MCS 1-9
EMMC	2.4ghz/5ghz dual band, support 802.11a/b/g/n/ac, up to 150Mbps
DDR	Support AP mode
SDIO interface	Support SD / SDHC / MS / mspro / MMC / sdio2.0 or 3.0 4 bit SDIO
I2C interface	Support hot swap
ADC interface	Four groups of I2C, the maximum speed is 400k, when using I2C DMA, the maximum speed can reach 3.4mbps, used for TP, camera, sensor and other peripherals
temperature range	Normal operating temperature: - 20 ° C～ +70 ° C Limit working temperature: - 25 ° C and + 80 ° C 1) Storage temperature: - 40 ° C ～ +85 ° C
Software upgrade	Via USB

2.3. Function block diagram

The following figure is the functional block diagram of absl-g, which describes its main functions:

Power management

Radio frequency part

Baseband part

Lpddr3 + EMMC memory

Peripheral interface

--USB interface

--USIM card interface

--UART interface

--SDIO interface

--I2C interface

--ADC interface

--LCD (Mipi) interface

--TP interface

--Cam (Mipi) interface

--Audio interface

3. Power supply

3.1.Power interface

The input range of absl-g power supply is 3.45v-4.35v, and the recommended value is 4.0V. The performance of Vbat power supply, such as load capacity, ripple size, etc., will directly affect the performance and stability of the module. Under the limit condition, the module current consumption may reach the instantaneous peak value of about 3a, and if the power supply capacity is insufficient, there will be voltage drop. If the voltage drops below 3.1V, it will cause the module to shut down automatically and other abnormalities.

3.2 Module power on and Power off

3.2.1.Module power on

After Vbat is powered on, the module can be turned on by pulling down pwrkey time for more than 1.6s. Pwrkey has pull-up inside, the typical high voltage value is Vbat, please note that the external must not add pull resistance.

It is recommended to use the open set driver circuit to control the pwrkey pin. The reference circuit is as follows:

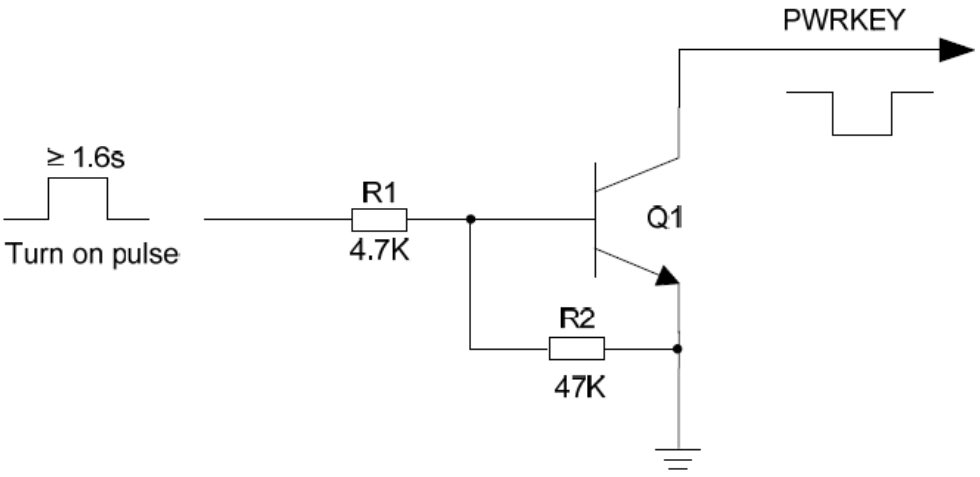

图 6：Open set drive reference power on circuit

Another way to control the pwrkey pin is directly through a button switch. A TVS should be placed near the button for ESD protection. The reference circuit is as follows:

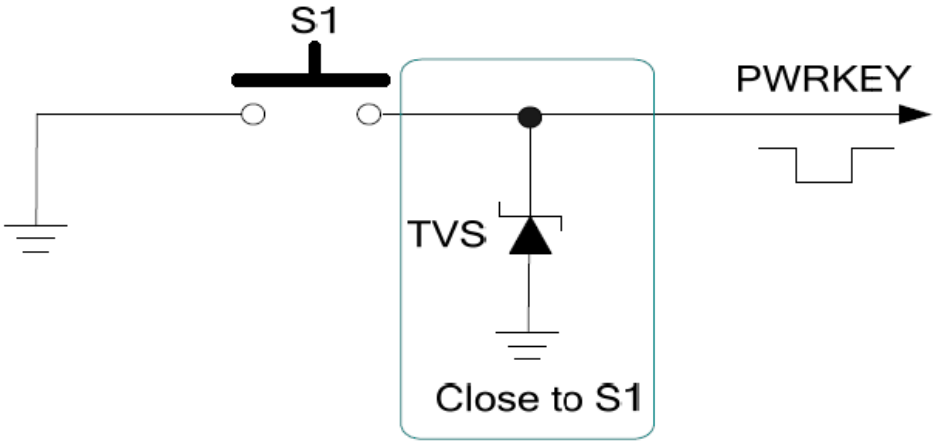

图 7：Key start reference circuit

3.2.2 Power off

Power off can be achieved by lowering the pwrkey signal for at least 2 seconds. After the module detects the shutdown action, a prompt window will pop up on the screen to confirm whether to execute the shutdown action.

Power off can also be achieved by pulling down pwrkey for more than 8s. The sequence diagram of forced shutdown is as follows:

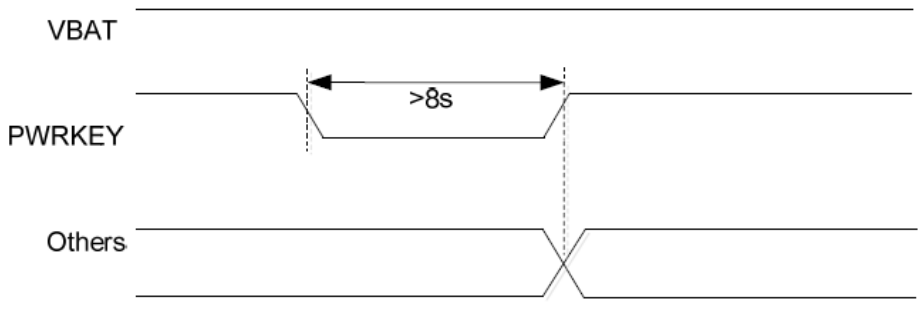

图 9：sequence diagram

4. Storage and production

Absl-g is packaged in the form of vacuum sealed bag, and the storage of the module should follow the following conditions:

1. When the ambient temperature is lower than 40 ℃ and the air humidity is less than 90%, the module can be stored in a vacuum sealed bag for 12 months.

When the vacuum sealing bag is opened, if the following conditions are met, the module can directly carry out reflow soldering or other high temperature processes:

Module storage air humidity is less than 10%.

The ambient temperature of the module is lower than 30 ℃, the air humidity is less than 60%, and the factory completes the placement within 72 hours.

2. If the module is in the following conditions, it needs to be baked before mounting

When the ambient temperature is 23 ℃, the humidity indicator card shows that the humidity is greater than 10%.

When the vacuum sealing bag is opened, the ambient temperature of the module is lower than 30 ℃ and the air humidity is less than 60%, but the factory fails to complete the placement within 72 hours.

When the vacuum sealing bag is opened, the humidity of the module storage air is greater than 10%

3. If the module needs to be baked, please bake at 125 ℃ for 48 hours.

FCC Statement

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.

(2) This device must accept any interference received, including interference that may cause undesired operation.

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

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

OEM INTEGRATION INSTRUCTIONS:

This device is intended only for OEM integrators under the following conditions:

The module must be installed in the host equipment such that 20 cm is maintained between the antenna and users, and the transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the internal on-board antenna that has been originally tested and certified with this module. External antennas are not supported. As long as these 3 conditions above are met, further transmitter test will not be required.

However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.). The end-product may need Verification testing, Declaration of Conformity testing, a Permissive Class II Change or new Certification. Please involve a FCC certification specialist in order to determine what will be exactly applicable for the end-product.

Validity of using the module certification:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module 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. In such cases, please involve a FCC certification specialist in order to determine if a Permissive Class II Change or new Certification is required.

Upgrade Firmware:

The software provided for firmware upgrade will not be capable to affect any RF parameters as certified for the FCC for this module, in order to prevent compliance issues.

End product labeling:

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: “Contains FCC ID: 2AZVC-ABSL-G”.

Information that must be placed in the end user manual:

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

FCC MODULAR APPROVAL INFORMATION EXAMPLES for Manual

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.

(2) This device must accept any interference received, including interference that may cause undesired operation.

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

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

WARNING

Changes or modifications not expressly approved by the manufacturer could void the user’s authority to operate the equipment.

“CAUTION : Exposure to Radio Frequency Radiation.
Antenna shall be mounted in such a manner to minimize the potential for human contact during normal operation. The antenna should not be contacted during operation to avoid the possibility of exceeding the FCC radio frequency exposure limit.

Requirement per KDB996369 D03

2.2 List of applicable FCC rules

List the FCC rules that are applicable to the modular transmitter. These are the rules that specifically establish the bands of operation, the power, spurious emissions, and operating fundamental frequencies. DO NOT list compliance to unintentional-radiator rules (Part 15 Subpart B) since that is not a condition of a module grant that is extended to a host manufacturer. See also Section 2.10 below concerning the need to notify host manufacturers that further testing is required.3

Explanation: This module meets the requirements of FCC part 15C(15.247). part 15E(15.407) ,part 22,part 27 ,part 15B

2.3 Summarize the specific operational use conditions

Describe use conditions that are applicable to the modular transmitter, including for example any limits on antennas, etc. For example, if point-to-point antennas are used that require reduction in power or compensation for cable loss, then this information must be in the instructions. If the use condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer’ s instruction manual. In addition, certain information may also be needed, such as peak gain per frequency band and minimum gain, specifically for master devices in
5 GHz DFS bands.

Explanation: This module has no antenna

2.4 Limited module procedures

If a modular transmitter is approved as a “limited module,” then the module manufacturer is responsible for approving the host environment that the limited module is used with. The manufacturer of a limited module must describe, both in the filing and in the installation instructions, the alternative means that the limited module manufacturer uses to verify that the host meets the necessary requirements to satisfy the module limiting conditions.

A limited module manufacturer has the flexibility to define its alternative method to address the conditions that limit the initial approval, such as: shielding, minimum signaling amplitude, buffered modulation/data inputs, or power supply regulation. The alternative method could include that the limited module manufacturer reviews detailed test data or host designs prior to giving the host manufacturer approval.

This limited module procedure is also applicable for RF exposure evaluation when it is necessary to demonstrate compliance in a specific host. The module manufacturer must state how control of the product into which the modular transmitter will be installed will be maintained such that full compliance of the product is always ensured. For additional hosts other than the specific host originally granted with a limited module, a Class II permissive change is required on the module grant to register the additional host as a specific host also approved with the module.

Explanation: The module is a limited module.

2.5 Trace antenna designs

For a modular transmitter with trace antenna designs, see the guidance in Question 11 of KDB Publication 996369 D02 FAQ – Modules for Micro-Strip Antennas and traces. The integration information shall include for the TCB review the integration instructions for the following aspects:
layout of trace design, parts list (BOM), antenna, connectors, and isolation requirements.
a) Information that includes permitted variances (e.g., trace boundary limits, thickness, length, width, shape(s), dielectric constant, and impedance as applicable for each type of antenna);
b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shape (traces in phase) can affect antenna gain and must be considered);
c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout;
d) Appropriate parts by manufacturer and specifications;
e) Test procedures for design verification; and
f) Production test procedures for ensuring compliance.
The module grantee shall provide a notice that any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.
Explanation: No, This module has no antenna

2.6 RF exposure considerations

It is essential for module grantees to clearly and explicitly state the RF exposure conditions that permit a host product manufacturer to use the module. Two types of instructions are required for RF exposure information: (1) to the host product manufacturer, to define the application conditions (mobile, portable – xx cm from a person's body); and (2) additional text needed for the host product manufacturer to provide to end users in their end-product manuals. If RF exposure statements and use conditions are not provided, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID (new application).
Explanation: This module complies with FCC RF radiation exposure limits set forth for an uncontrolled environment, This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body." This module is designed to comply with the FCC statement, FCC ID is: 2AZVC-ABSL-G

2.7 Antennas

A list of antennas included in the application for certification must be provided in the instructions. For modular transmitters approved as limited modules, all applicable professional installer instructions must be included as part of the information to the host product manufacturer. The antenna list shall also identify the antenna types (monopole, PIFA, dipole, etc. (note that for example an “omni-directional antenna” is not considered to be a specific “antenna type”)).

For situations where the host product manufacturer is responsible for an external connector, for example with an RF pin and antenna trace design, the integration instructions shall inform the installer that unique antenna connector must be used on the Part 15 authorized transmitters used in the host product. The module manufacturers shall provide a list of acceptable unique connectors.

Explanation: This module has no antenna.The antenna types allowed for GAM/WCDMA/LTE are PIFA and rod antenna, and the maximum antenna gain is 6dBi.The antenna types allowed for WIFI/BT are PIFA and ceramic antenna, and the maximum antenna gain is 6dBi

2.8 Label and compliance information

Grantees are responsible for the continued compliance of their modules to the FCC rules. This includes advising host product manufacturers that they need to provide a physical or e-label stating “Contains FCC ID” with their finished product. See Guidelines for Labeling and User Information for RF Devices – KDB Publication 784748.

Explanation: The host system using this module, should have label in a visible area indicated the following texts: “Contains FCC ID: 2AZVC-ABSL-G ”

2.9 Information on test modes and additional testing requirements5

Additional guidance for testing host products is given in KDB Publication 996369 D04 Module Integration Guide. Test modes should take into consideration different operational conditions for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product.

The grantee should provide information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host.

Grantees can increase the utility of their modular transmitters by providing special means, modes, or instructions that simulates or characterizes a connection by enabling a transmitter. This can greatly simplify a host manufacturer’s determination that a module as installed in a host complies with FCC requirements.

Explanation: Top band can increase the utility of our modular transmitters by providing instructions that simulates or characterizes a connection by enabling a transmitter.

2.10 Additional testing, Part 15 Subpart B disclaimer

The grantee should include a statement that the modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuity), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

Explanation: This module evaluates Part 15B, but when it is assembled into the whole machine, the holder also needs to evaluate Part 15B.