

EP06 Series

Reference Design

LTE-A Module Series

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About the Document

Revision History

Version	Date	Author	Description
1.0	2018-12-29	Ewent LU	Initial
1.1	2022-09-26	Frank GAO	Changed pins 1 and 42 to NC pins and deleted related information.

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1 Reference Design

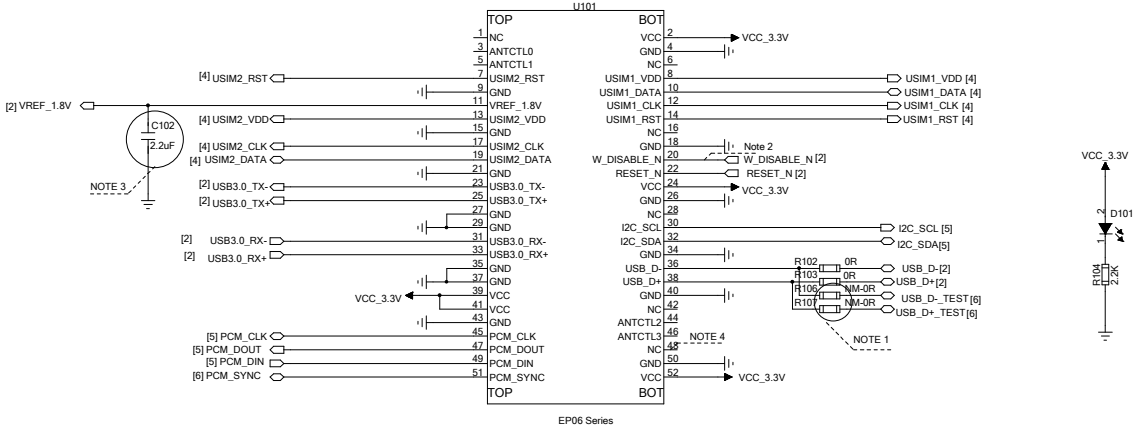
1.1. Introduction

This document provides the reference design for Quectel EP06 series module. The reference design includes module interfaces, MCU and other interfaces, power supply, (U)SIM interface, audio and test points designs.

1.2. Schematics

The schematics illustrated in the following pages are provided for your reference only.

Module Interfaces

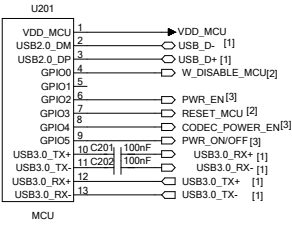


- NOTE:**
1. It is recommended to reserve the test points for upgrading the firmware over USB interface and minimize the stub length of USB test signals.
 2. The W_DISABLE_N signal is used to disable or enable RF function (not include GNSS).
 3. The VREF_1.8V can supply 1.8 V voltage for external circuit. If unused, keep this pin open and C102 unmounted.
 4. Keep all NC and unused pins unconnected.

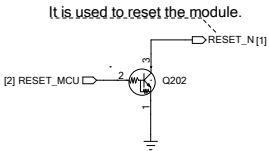
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MCU and Other Interfaces

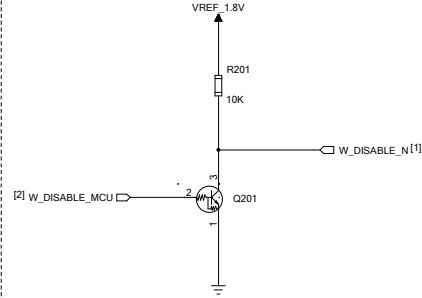
MCU Interface



RESET_N Interface



W_DISABLE_N Interface



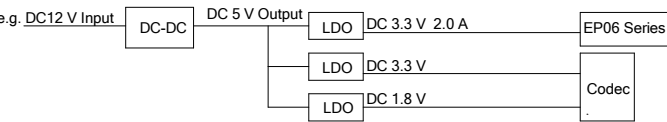
- NOTE:**
1. U201 represents your MCU.
 2. EP06 series provides one integrated USB interface which complies with the USB 3.0/2.0 specifications, and supports SuperSpeed on USB 3.0, high-speed and full-speed modes on USB 2.0.
 3. Place C201 and C202 to the MCU as close as possible.
 4. The differential impedance of USB 2.0 and USB 3.0 signal traces needs to be controlled as 90 Ω.
 5. If a USB connector is used, place the ESD protection components as close as possible to it.

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Power Supply Design

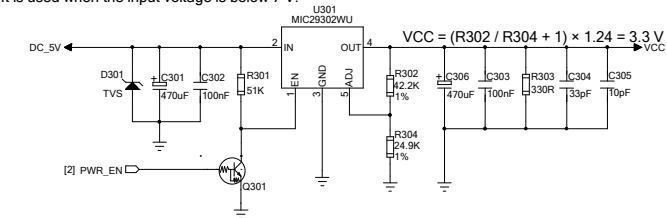
DC-DC Application

When the input voltage is above 7 V, a DC-DC converter should be used to convert the high input voltage to 5 V output, and then the LDOs will generate 3.3 V and 1.8 V typical voltages.



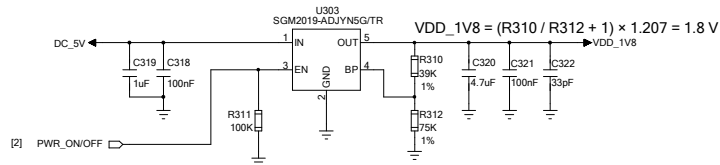
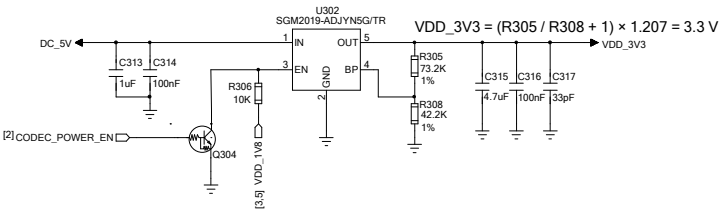
LDO Application

It is used when the input voltage is below 7 V.



- NOTE:**
- 1. The load current of MIC29302WU is recommended to be greater than 10 mA.
 - 2. The power supply must be able to provide sufficient current up to 2.0 A or more.
 - 3. The recommended operating voltage of VCC is 3.1-4.4 V.

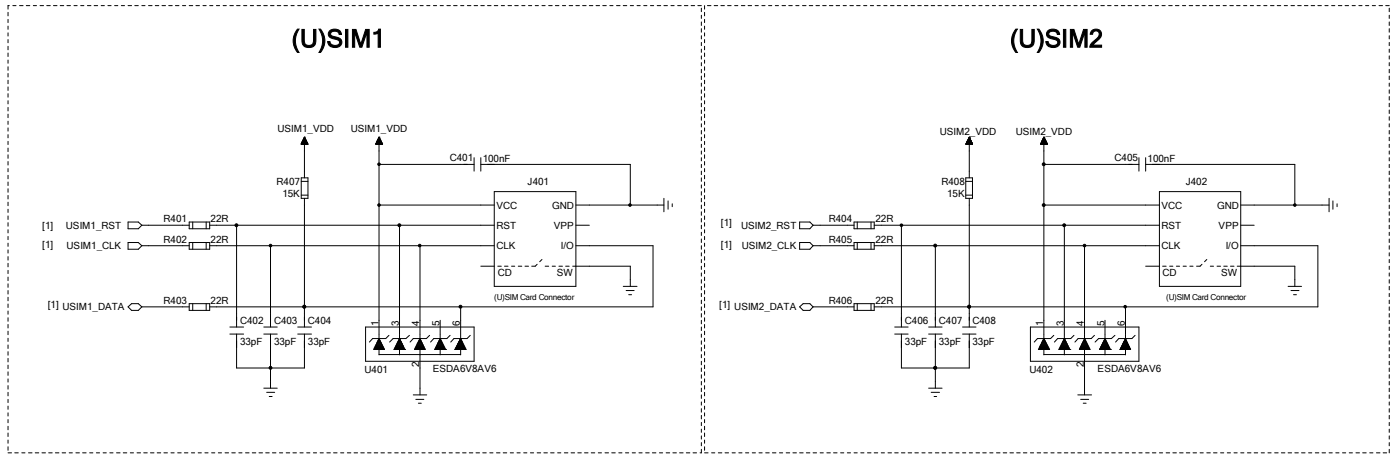
Power Supply for PCM Codec



- NOTE:**
- CODEC_POWER_EN must be at low level to ensure stable output voltage of VDD_3V3. When it is at high level, the power supply of VDD_3V3 will be cut off.

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(U)SIM Interfaces Design



NOTE:

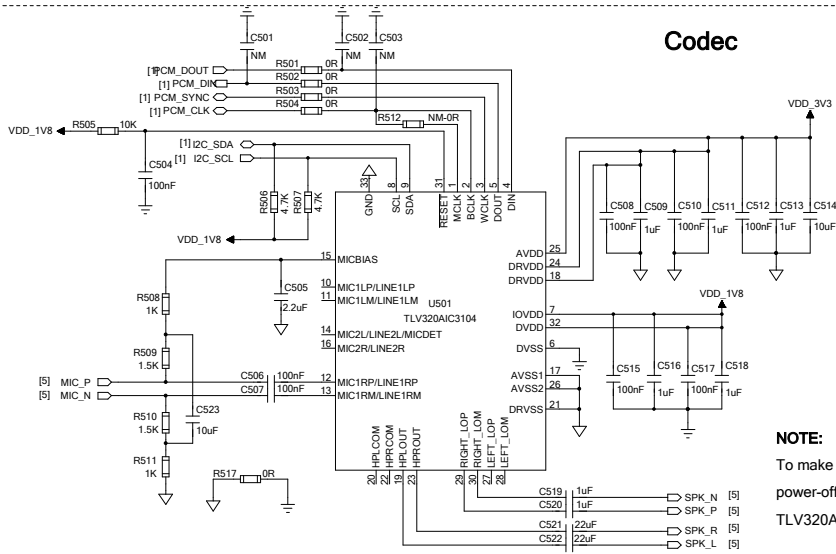
1. The decoupling capacitors of USIM1_VDD and USIM2_VDD must be near to (U)SIM card connectors.
2. R401-R406 are applied to suppress the EMI spurious transmission and enhance the ESD protection.
3. It is recommended to take electrostatic discharge (ESD) protection measures near the (U)SIM card connector,
A TVS array with junction capacitance less than 10 pF must be placed as close as possible to the (U)SIM card connector.
4. R407 and R408 can improve anti-jamming capability of the (U)SIM card circuit and should be placed close to the (U)SIM card connector.
5. The (U)SIM card connector should be placed near the Mini PCIe interface, as a long circuit may cause waveform distortion that affects signal quality.

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Audio Design

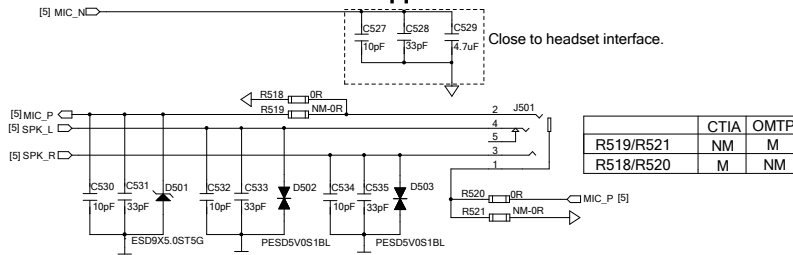
Codec



NOTE:

To make sure the audio function works normally, follow the power-on and power-off sequences of TLV320AIC3104. For more details, see TLV320AIC3104 datasheet.

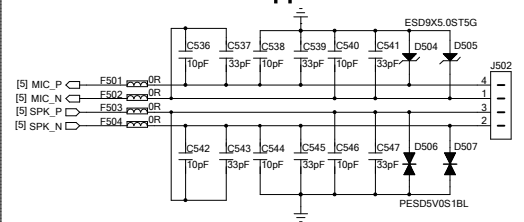
Headset Application



NOTE:

- The analog output only drives headset and handset. For devices that need larger power loads, such as speakers, the design for an audio power amplifier should be added.
- The maximum capacitive loading for speaker is 330 pF and the maximum capacitive loading for microphone is 250 pF.

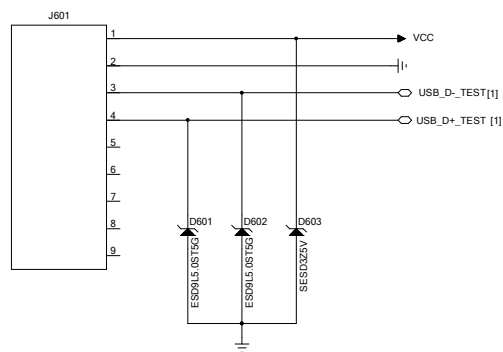
Handset Application



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Test Points Design



NOTE:

1. USB interface can also be used to upgrade firmware.
 2. Keep USB test points as close as possible to pins USB_D+ and USB_D-.
- Note that junction capacitance of the ESD protection components might cause influences on USB 2.0 and 3.0 data traces, so pay attention to the selection of the components.
- Typically, the capacitance should be less than 1 pF.

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