

EC2X-QuecOpen

Power On/Down User

Guide

LTE Module Series

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About the Document

History

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1 Introduction

This document mainly introduces the power management, battery power reading, on/down design of EC2X module, to help users develop power on/down feature.

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2 Power Design

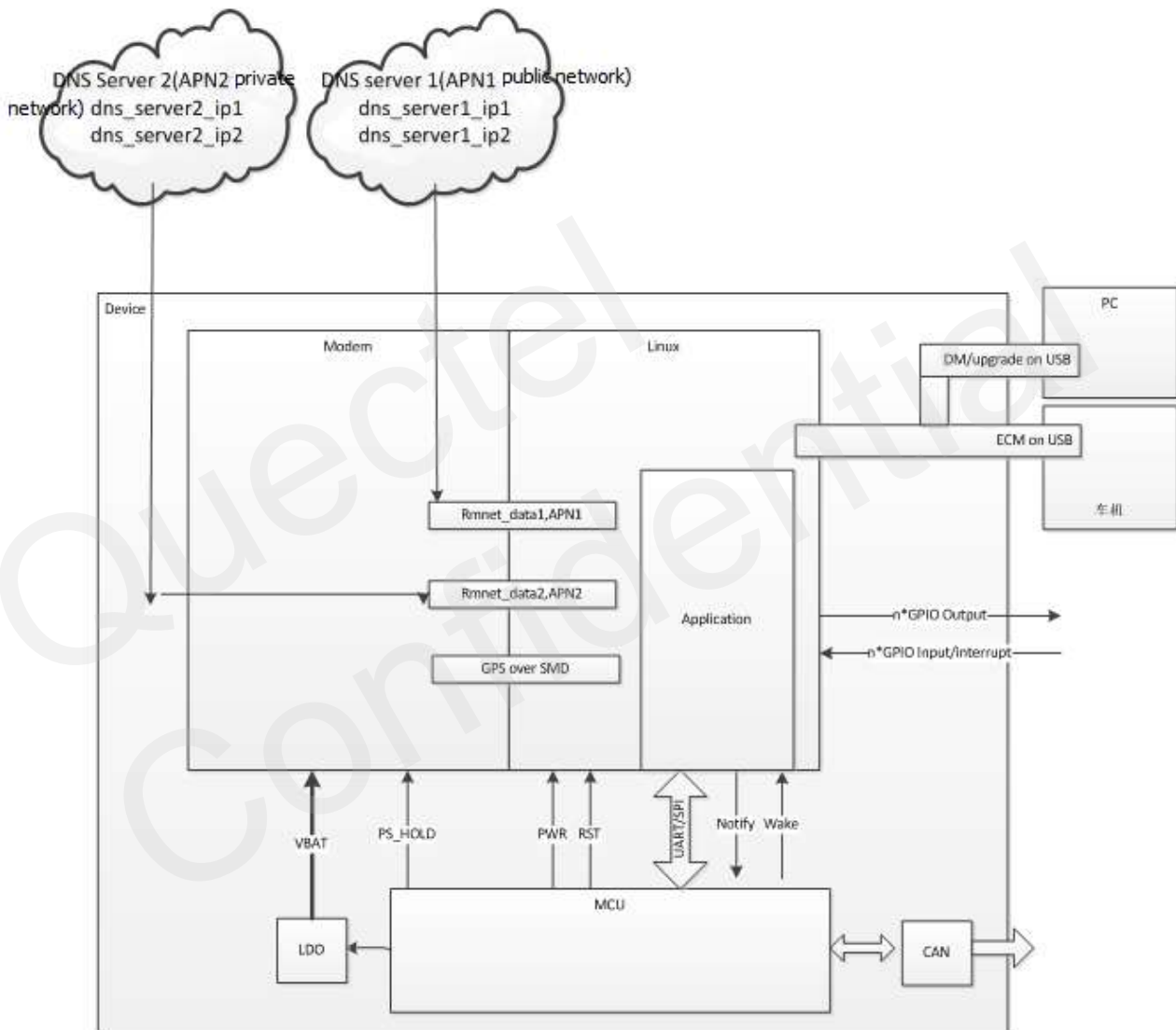


Figure 1: Recommended Power Design

As shown above, power the module VBAT through LDO, then pull low PWRKEY to power on, and power down software via function `QI_Powerdown()`. If there is abnormal phenomenon and module cannot power on/down normally, please directly cut off the power of the VBAT and restart it.

NOTE

Cutting off the power of VBAT directly will cause the RTC time in the module to be reset. Only for AG35 series, under abnormal phenomenon, recommend to restart module via PS_HOLD pin.

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3 Pin Control Instructions

3.1. Control PWRKEY Pin to Power On

Table 1: PWRKEY Pin Definition

Pin Name	Pin Number	I/O	Description	Remark
PWRKEY	21	DI	Module power on/down	Due to the diode voltage drop in the chip set, the output voltage after the pin power on is 0.8v.

When EC20 R2.1-QuecOpen module is under off mode, module can be powered on through pulling low PWRKEY pin at least 500ms. It is recommended to use open collector driver circuit to control PWRKEY pin. After STATUS pin output low-level, PWRKEY can be released.

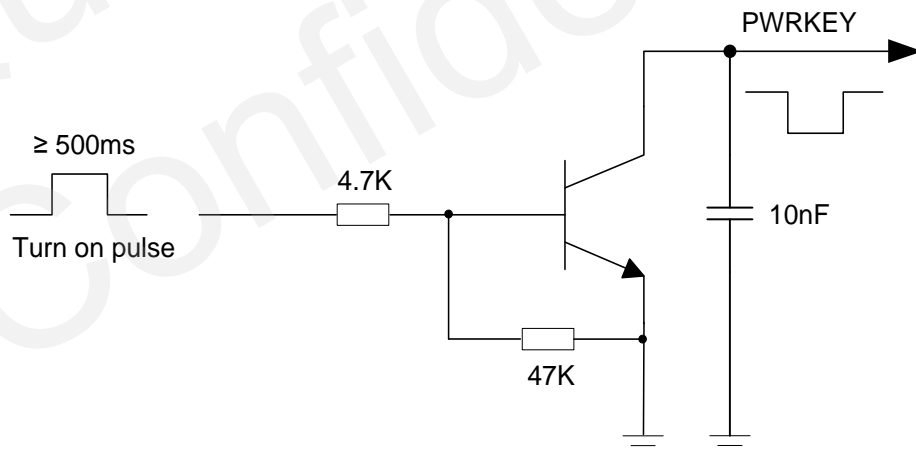


Figure 2: Referenced Circuit of Open Collector Driver

Another way to control PWRKEY pin is by a button, and a TVS need placed near this button for ESD protection.

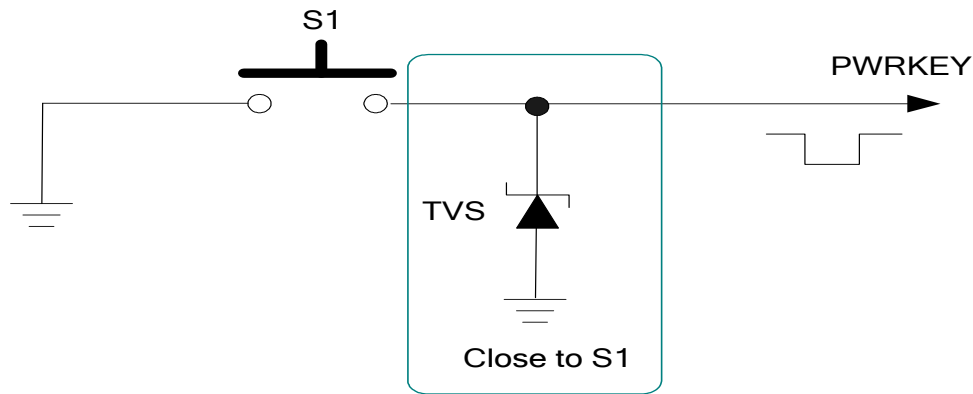


Figure 3: Referenced Circuit of Using Button to Power On

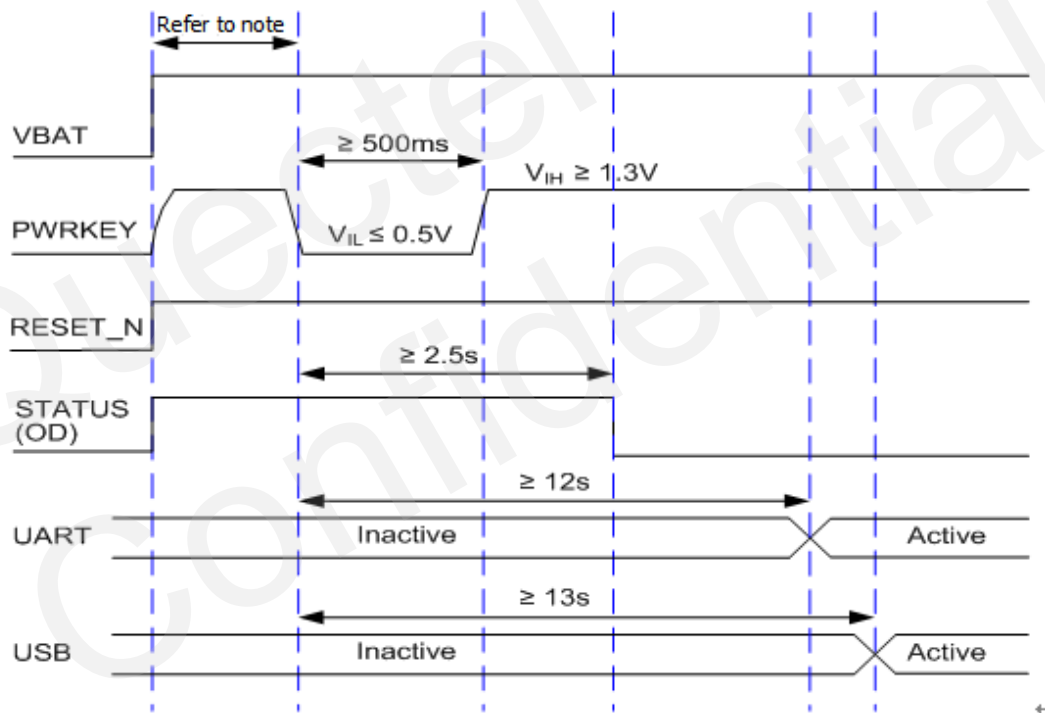


Figure 4: Timing Sequence Diagram of Power On

NOTE

Before pulling low PWRKEY, please ensure VBAT voltage stability. It is recommend that the time interval from VBAT powering on to pulling low PWRKEY PIN at least 30ms.

3.2. Control PWRKEY Pin to Power Off

When the module under on mode, pull low PWRKEY pin at least 650ms, module will power down.

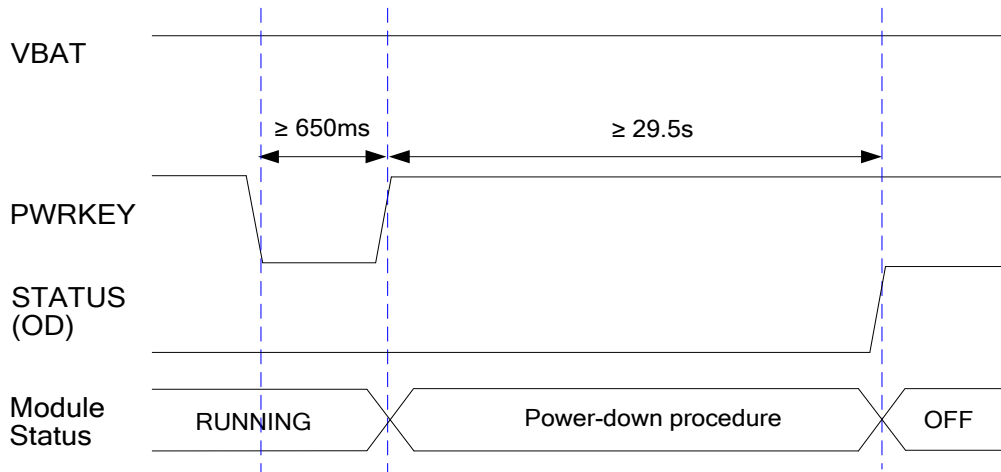


Figure 5: Timing Sequence Diagram of Power Off

NOTES

1. When module works normally, please don't cut off module power directly to avoid damaging the Flash in module. It is recommend that power down module via PWRKEY or API first, then cut off the power.
2. When power off module via API, please make sure that PWRKEY is always high-level after the shutdown command is executed, otherwise the module will automatically power on.

3.3. RESET_N Reset Pin

Pull low RESET_N pin, module will reset after 150ms~460ms. RESET_N is sensitive to signal interference. Therefore, it is recommended that the trace on the module interface board should be as short as possible, and need ground dealing.

Table 2: RESET_N Pin Definition

Pin Name	Pin Number	I/O	Description	Remark
RESET_N	20	DI	Module Reset	Voltage domain is 1.8V. Default voltage is 1.8V.

User also can use open-collector driver circuit and button to control RESET_N pin.

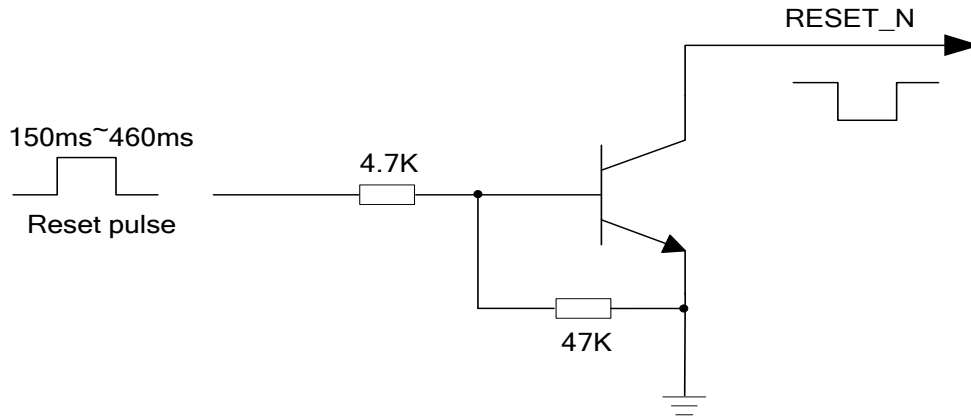


Figure 6: RESET_N Open Collector Driver Reference Circuit

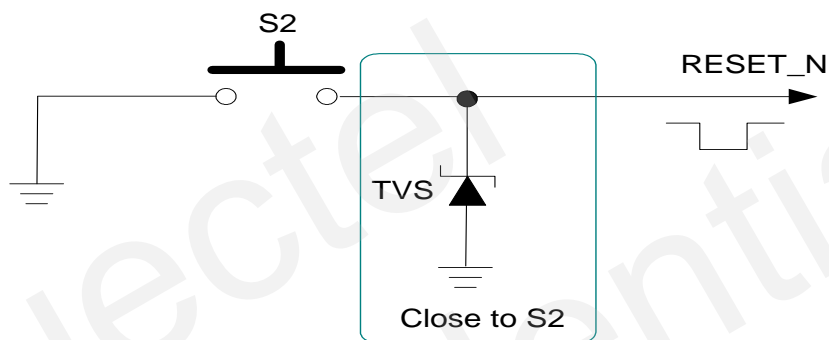


Figure 7: RESET_N Button Controlled Reference Circuit

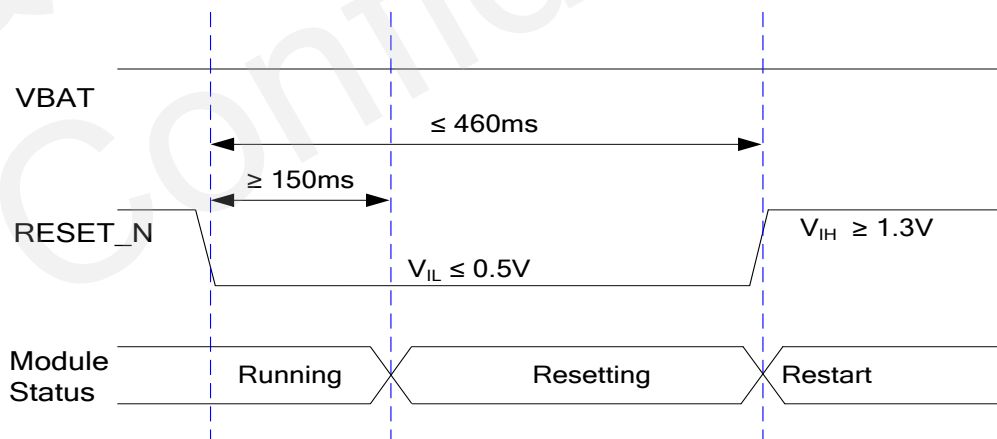


Figure 8: Timing Sequence Diagram of Reset

NOTES

1. It is recommended that take reset feature only after powering off failed via API and PWRKEY.
2. Please make sure that the PWRKEY and RESET_N pins have no large load capacitance.

4 API Function Introduction

4.1. QI_Powerdown()

Calling halt or reboot directly may cause the shutdown failure, caused by the system going to sleep during shutdown or reboot. It is recommended that call function QI_Powerdown() to control software power down, and this function depends on library libqi_common_api.a.

Interface Introduction:

```
void QI_Powerdown(int mode);
```

Power down and reboot.

Parameter: Mode

- 0 Send the TERM signal to all user processes, then uninstall the file system and power down.
- 1 Send the TERM signal to all user processes, then uninstall the file system and reboot.
- 2 Does not synchronize and uninstall the file system, without flash protection, directly power down.
- 3 Does not synchronize and uninstall the file system, without flash protection, directly reboot.

Example: ql-ol-extsdk/example/powerdown

4.2. Power Voltage Detection

Below API can be used to detect and query current VBAT_BB voltage.

```
int qi_adc_show(char *adc);
```

Get ADC value, voltage value (mv)

Parameter: CBC

Return: battery value, else return -1.

Example: ql-ol-extsdk/example/adc