

TLE9893_2QKW62S_PMU_SLEEP_EXTRG

About this document

Scope and purpose

The aim of this guide is to present the scope, the implementation, the algorithm and a demonstration of the **TLE9893_2QKW62S_PMU_SLEEP_EXTRG** example code for the TLE98xx Infineon Embedded Power ICs based on Arm® Cortex® M3. This example code can be found in the Keil µVision Pack Installer.

The full functionalities and characteristics of the embedded power devices are described in the datasheet and user's manual. Please refer to these documents for more detailed information. Furthermore, a low level (line-by-line) description of the code is not the aim of this document, although occasionally some code blocks might be reported if necessary to the comprehension.

Note: The following information is given as a hint for the implementation of the system only and shall not be regarded as a description or warranty of a certain functionality, condition or quality of the referred devices or presented software example.

Intended audience

Design engineers, system engineers, embedded power designers.

Table of contents

About this document.....	1
Table of contents.....	1
1 Introduction	2
2 Hardware	3
3 Implementation	4
3.1 Get the example via the Pack Installer for Keil.....	4
3.2 Configuration.....	4
3.3 Sample code	7
References.....	8
Revision history.....	9

1 Introduction

In this TLE9893_2QKW62S_PMU_SLEEP_EXTRG example the VDDP signal is captured (yellow signal). The blue signal captures the MON1 signal.

If the system enters the sleep mode the VDDP power supply is deactivated which can be seen by the falling edge to 0V.

Within the sleep mode the MON1 button is pressed and the system exits the sleep mode. The VDDP is supplied with 5V again.

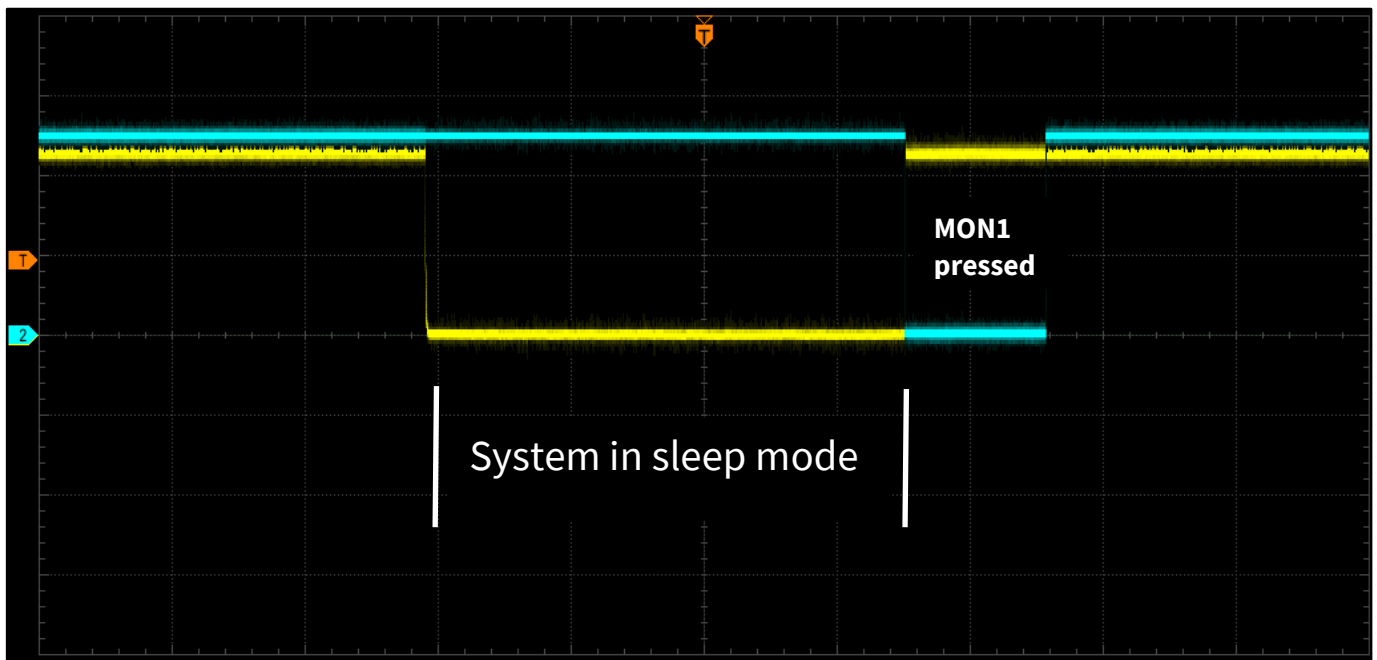


Figure 1 Capture of VDDP signal(yellow) and MON1 signal (blue)

2 Hardware

This chapter shows how to run the TLE9893_2QKW62S_PMU_SLEEP_EXTRG example with the TLE988X/TLE989X evaluation board. For this, the project must be opened and compiled.

Figure 2 shows the TLE988X/TLE989X evaluation board. The application code must be loaded via a debugger (e.g. ULINK or J-Link) to the board. The board must be powered with 12V (red and black connections).

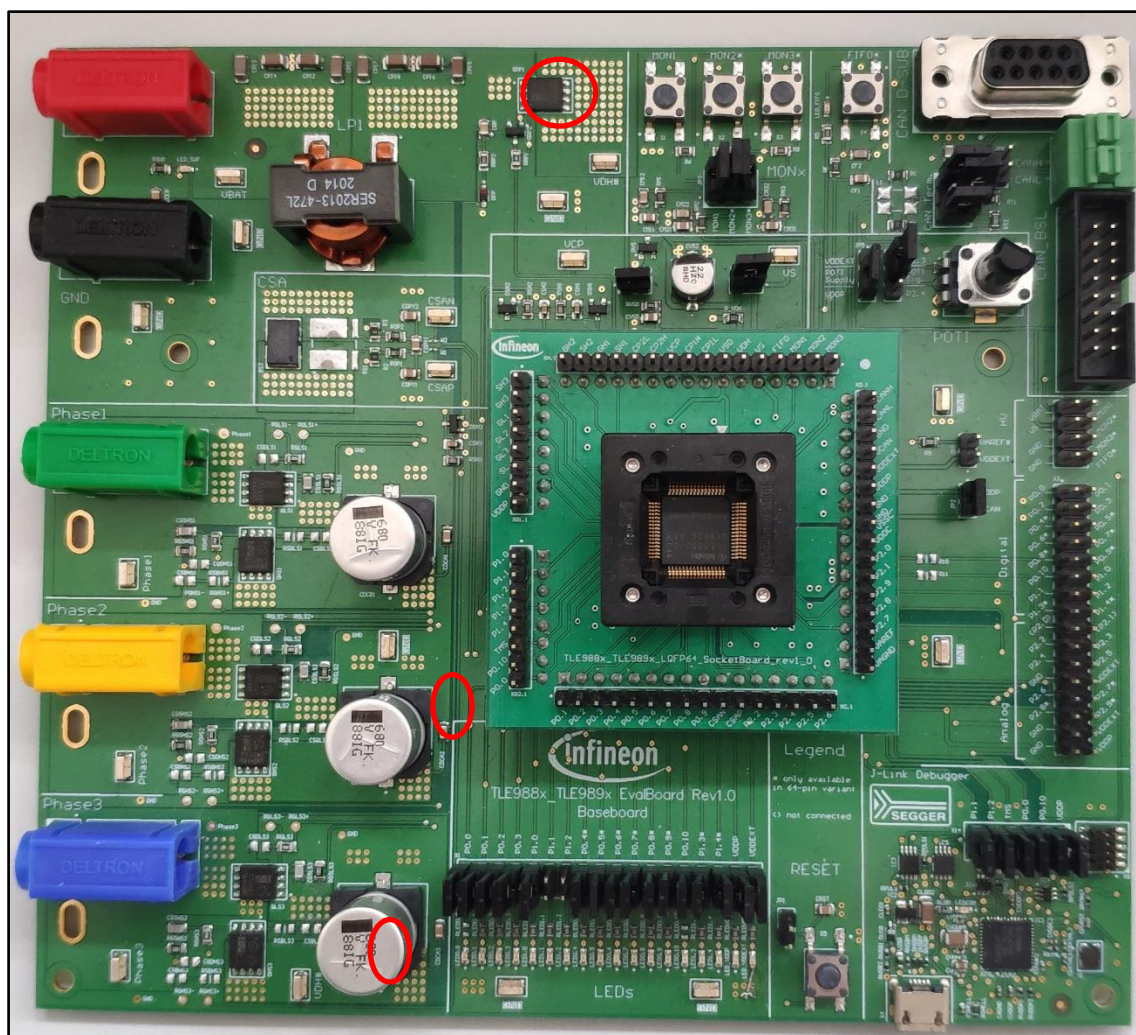


Figure 2 TLE988X/TLE989X evaluation board

If the system is in the normal operation mode, the LED 0.2 is on. If there is a high signal on GPIO P0.1 the system enters the sleep mode.

The system can be woken up from the sleep mode when the MON1 button is pressed.

3 Implementation

This chapter shows the process to follow to get a working TLE9893_2QKW62S_PMU_SLEEP_EXTRG example.

3.1 Get the example via the Pack Installer for Keil

Open the Pack Installer within the Keil IDE. See Figure 3 below.

Choose the appropriate device (here TLE9893_2QKW62S) on the left-hand side. On the right-hand side, select the tab Examples, where you can access the TLE9893_2QKW62S_PMU_SLEEP_EXTRG example.

Clicking on “Copy” will copy the example on your computer and open it.

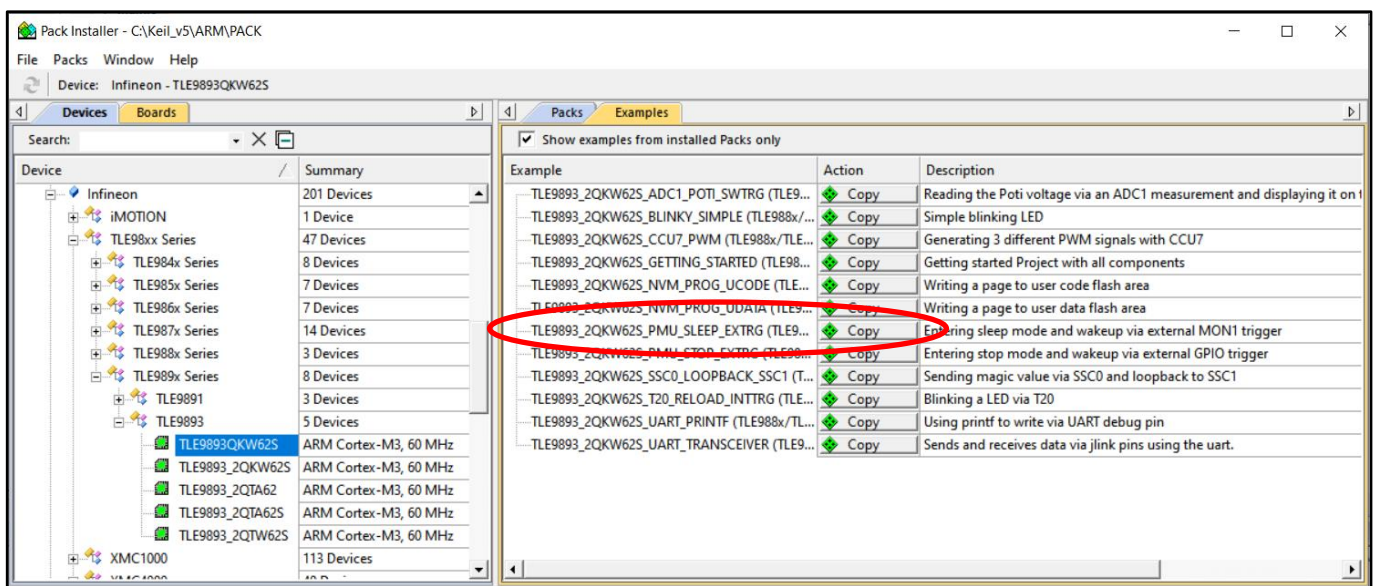


Figure 3 Keil Pack Installer

3.2 Configuration

In order to see the configured pins, start the tool Config Wizard. It is available within the Keil IDE through a shortcut in the Tools menu.

The Config Wizard opens and shows an overall status of the current pin configuration. The pin P0.1 is used as input signal. If this signal is high, the system enters the sleep mode. The pin P0.2 is configured as output signal and controls the LED0.2. If the system is in the normal operating mode, the LED is on. If the system is in the sleep mode, the LED is off.

The pin MON1 is the configured wakeup signal. If the signal on pin MON1 becomes low (e.g. by pressing the MON1 button), the system leaves the sleep mode.

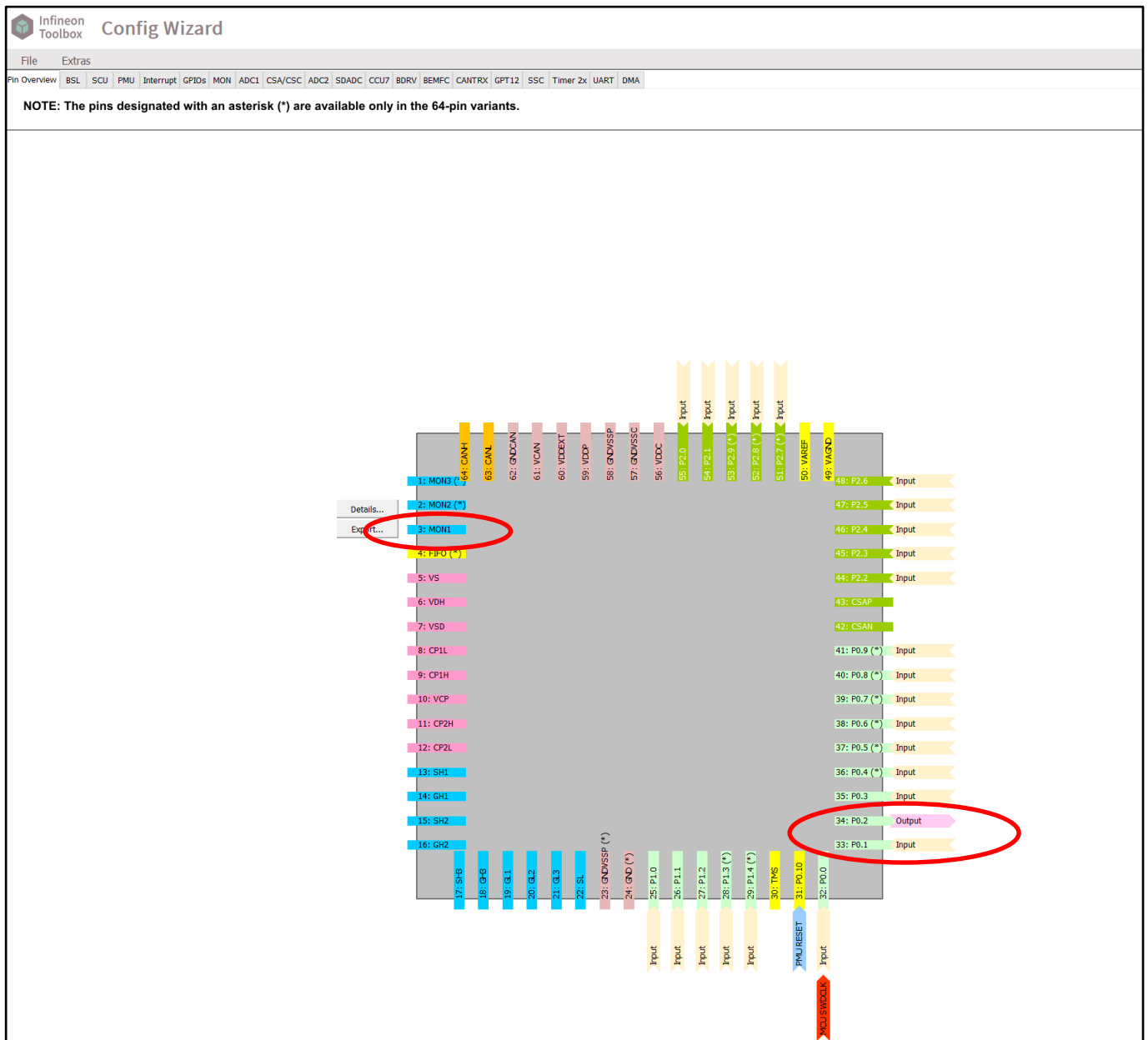


Figure 4 Config Wizard pin overview

In order to change the PMU configuration for the TLE9893_2QKW62S_PMU_SLEEP_EXTRG example, select the PMU tab.

Figure 5 shows the available components for the PMU module. In this example, all wakeup sources are disabled except the MON1 (see the orange box). All other configuration option can stay at their default settings.

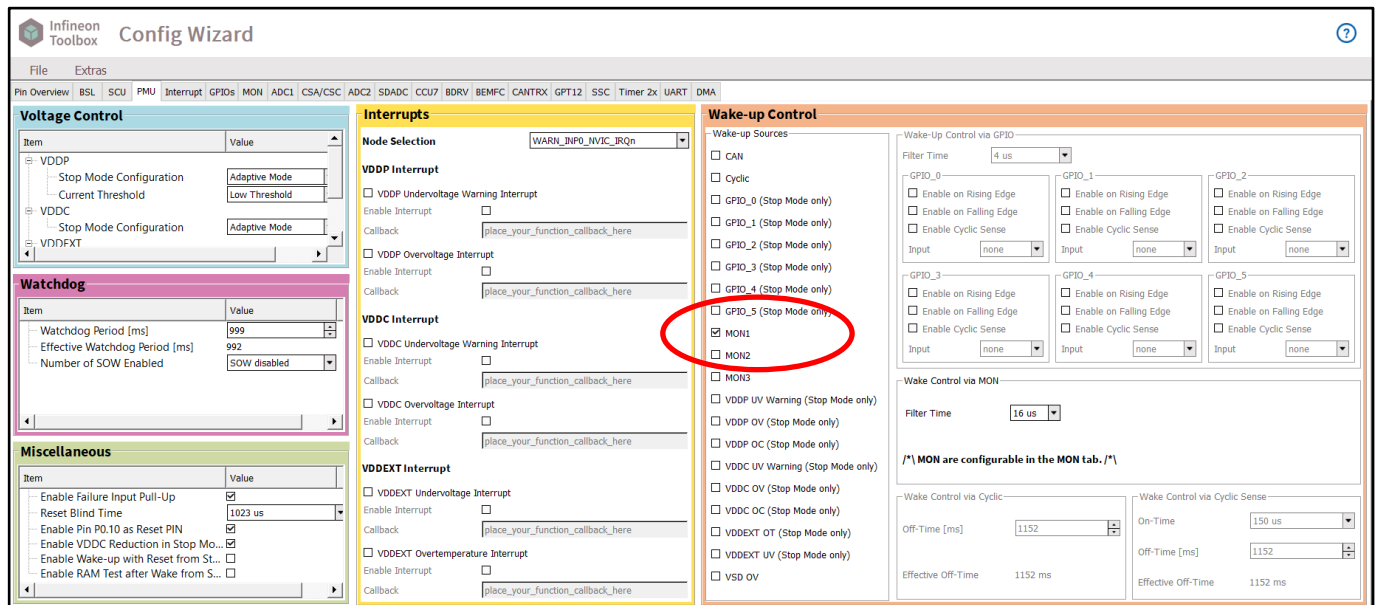


Figure 5 Config Wizard, module PMU

Figure 6 shows the configuration tab of the MON module. Each MON signal can be configured individually. In this example, the MON1 is enabled for wakeup (on rising and falling edges). The other MON2/3 signal are deactivated.

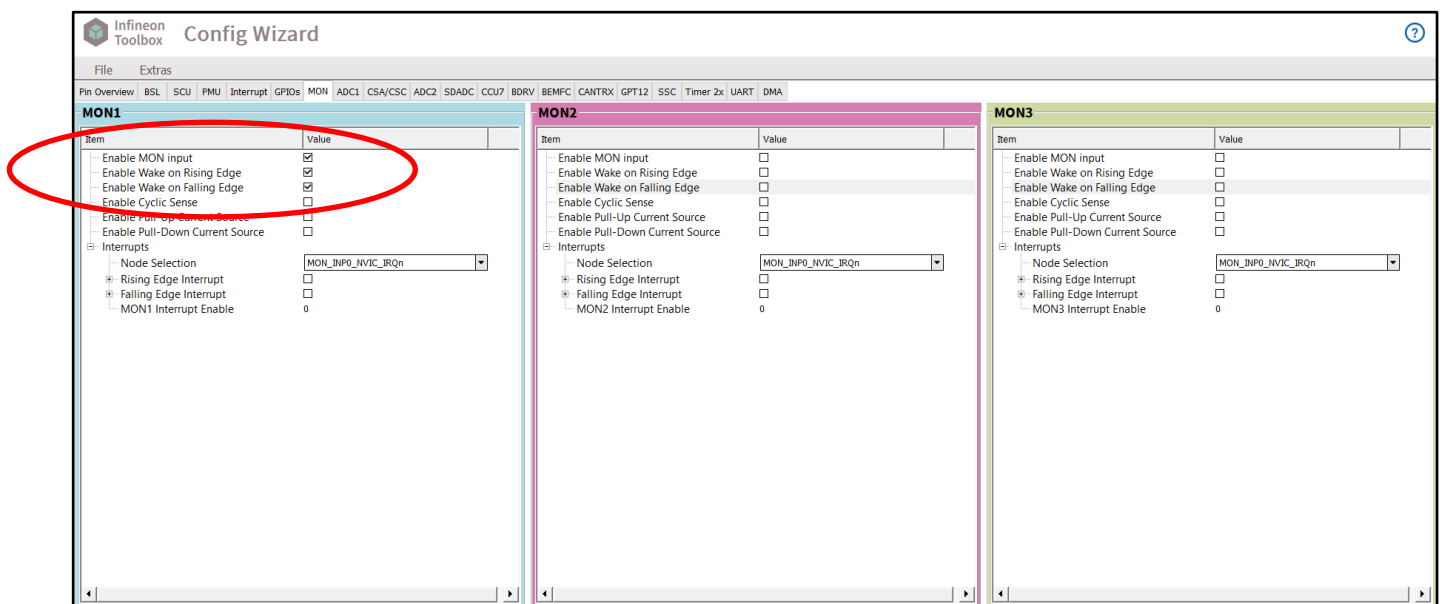


Figure 6 Config Wizard, module MON

Additionally, within the GPIO tab, the pin P0.2 is configured as output to show the normal operation mode with a lightning LED. When the system is in the sleep mode this LED is switched off.

Finally, save your configuration to take these changes into account (File -> Save).

3.3 Sample code

Figure 7 shows the application code of the TLE9893_2QKW62S_PMU_SLEEP_EXTRG application.

Within the main endless loop, the LED 0.2 is set to high as long as there is no high signal on GPIO P0.1 (line 99) detected.

If the GPIO P0.1 becomes high, the system enters the sleep mode (line 102). All power supplies (e.g. VDDP, VDDEXT, etc.) are deactivated. Therefore, the LED is also switched off. The system stays in the sleep mode even the high signal on GPIO P0.1 is removed.

If a wakeup signal by pressing the MON1 button is detected, the system exits the sleep mode and the LED is switched on again (high signal on GPIO P0.1 must be removed as well).

```
93   for (;;)
94   {
95       /* Main watchdog service */
96       (void) PMU_serviceFailSafeWatchdog();
97
98       /* Check if GPIO 0.1 is high. */
99       if (GPIO_P01_HIGH == GPIO_getP01State())
100      {
101          /* Enter sleep mode */
102          SCU_enterSleepMode(0);
103      }
104      else
105      {
106          /* If the CPU is not in sleep mode, set GPIO 0.2 to high. */
107          GPIO_setP02State(GPIO_STATE_HIGH);
108      }
109  }
```

Figure 7 TLE9893_2QKW62S_PMU_SLEEP_EXTRG application code

References

A Reference. See the code examples at www.infineon.com

Revision history

Document version	Date of release	Description of changes
1.0	2021-10-22	Initial version
1.1	2022-10-13	Editorial changes

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