

Summary

This application note describes the overview of RZ/V2M Evaluation Board Kit (made by Csm Solution Corporation).

Please refer to the hardware manual of RZ/V2M Evaluation Board Kit for details.

Target Device

RZ/V2M Evaluation Board Kit

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1. Overview

This evaluation board kit is for the Arm[®]-based vision-AI MPU RZ/V2M from Renesas Electronics (RZ/V2M Evaluation Board Kit, hereafter V2MEVK). This manual describes the overview of the V2MEVK.

The V2MEVK consists of the RZ/V2M Board (main), RZ/V2M Base Board (base), CIS IMX415 Board (CIS), and CIS GND Board (CIS_GND).

| Board Name | Overview |
|--------------------------|---|
| RZ/V2M Board (main) | <ul style="list-style-type: none"> The RZ/V2M is mounted. Board on which the main functional components for the RZ/V2M are mounted |
| RZ/V2M Base Board (base) | <ul style="list-style-type: none"> Connected to CN12 and CN13 on the RZ/V2M Board Board for the generation and supply of power |
| CIS IMX415 Board (CIS) | <ul style="list-style-type: none"> Connected to the CIS connector 1 on the RZ/V2M Board Image sensor board (on which IMX415 is mounted) |
| CIS GND Board (CIS_GND) | <ul style="list-style-type: none"> Connected to the CIS connector 2 on the RZ/V2M Board Board for handling unused pins of the CMOS image sensor I/F of the RZ/V2M |
| Audio Board | <ul style="list-style-type: none"> Board on which the audio codec IC is mounted*¹ |

Note 1. The audio board is an optional board provided by Renesas. Users can borrow it for free. For details, contact a Renesas Electronics sales representative.

The following documents have been prepared for V2MEVK. Make sure to refer to the latest versions of these documents.

| Document Type | Document Title | Document No. | Description |
|-----------------|---|--------------------------------------|---|
| Hardware manual | RZ/V2M Evaluation Board Kit Hardware Manual | Provided by Csm Solution Corporation | Hardware specifications of the V2MEVK |
| Start-up guide | RZ/V2M Evaluation Board Kit Start-Up Guide | R01UH1000EJ0100 | The startup procedure of the first boot loader, second boot loader, and U-Boot on the RZ/V2M Evaluation Board Kit |

1.1 Features

This V2MEVK includes the following features.

- LPDDR4: 32 Gbits
- eMMC™: 16 GB
- CMOS image sensor interface connector: 2 ch. (1ch is in preparation.)
- HDMI® Type-A connector: 1 ch.
- Gigabit Ethernet interface connector: 1 ch.
- USB3.1 Gen1 Type-C: 1 ch.
- Micro SD card connector: 1. ch.
- SDIO interface connector: 1 ch.
- Pmod™ interface connector: 1 ch.
- Debug serial interface micro USB Type-B: 1 ch.
- Lens motor interface connector: 1 ch.
- Audio interface connector: 1 ch.

1.2 Block Configuration

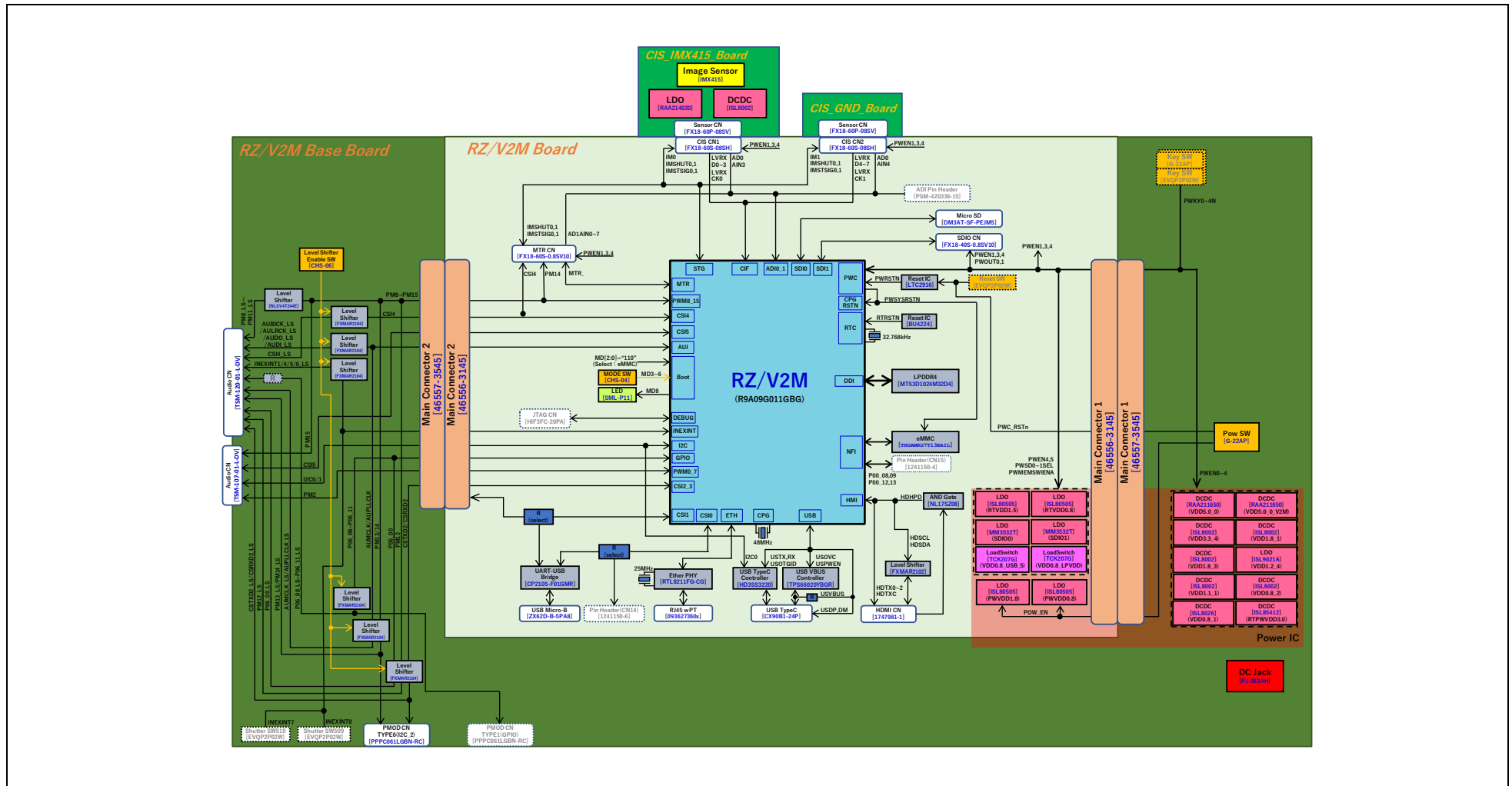


Figure 1.2-1 V2MEVK Block Diagram

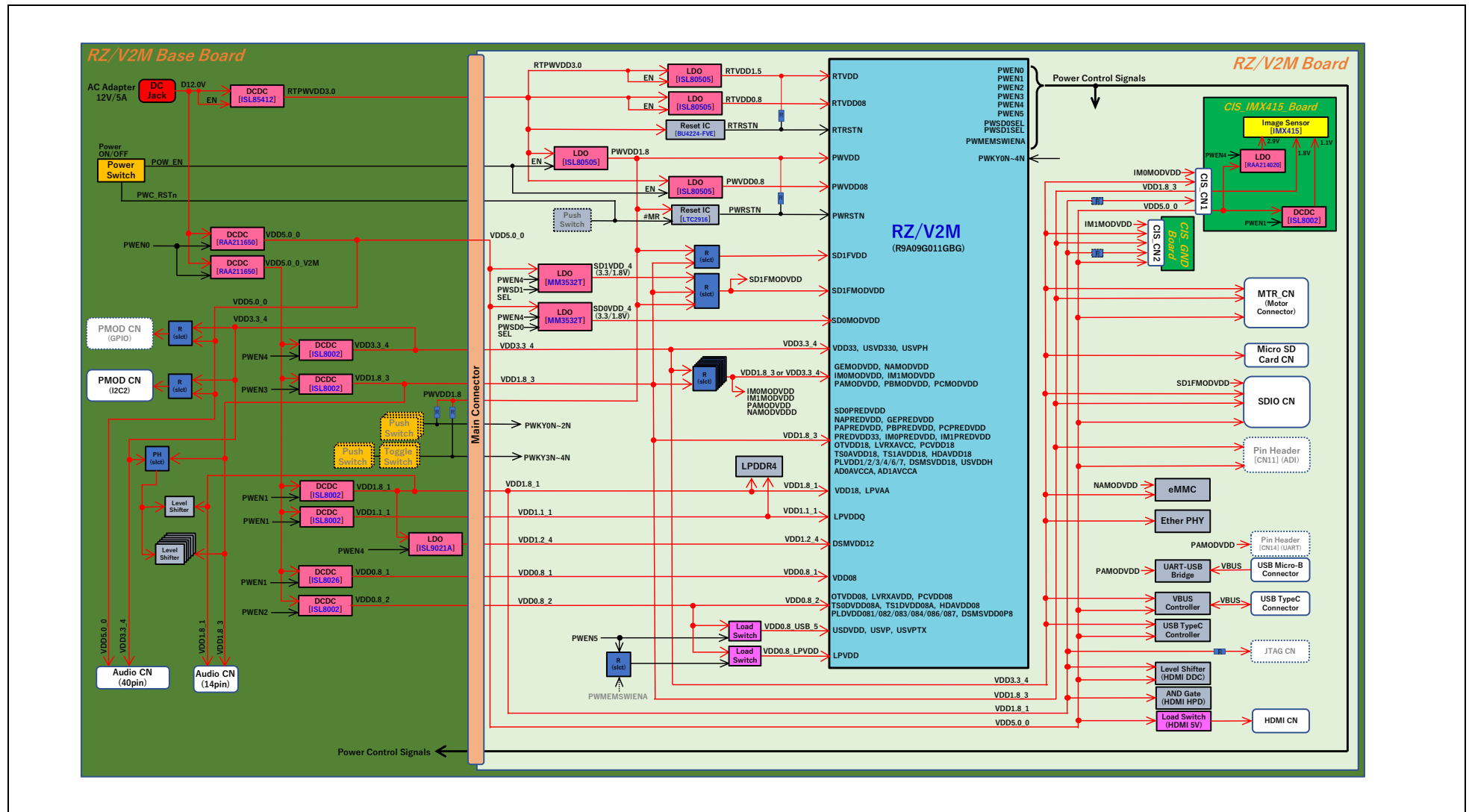


Figure 1.2-2 V2MEVK Power Supply Block Diagram

1.3 Specifications

1.3.1 V2MEVK Specifications

Table 1.3-1 V2MEVK Specifications

| Item | Specification |
|-------------------|--|
| MPU | R9A09G011GBG (RZ/V2M) |
| Board size | Main: 120 × 105 × 1.6 mm Base: 155 × 105 × 1.6 mm |
| LPDDR4 | Micron MT53D1024M32D4 32 Gb Dual-Rank |
| eMMC | Kioxia THGBMJG7C1LBAIL 16 GB (or same specification product) |
| HDMI | Connector: Type-A (standard) |
| USB | Connector: Type-C |
| Ethernet | Connector: RJ45 Ethernet PHY IC: RTL8211FG-CG |
| Audio I/F | Connector: 40 pins with 2.54-mm pitch Connector: 14 pins with 2.54-mm pitch For connecting to the TLV Audio Board* ¹ |
| SD Card I/F | Connector: Micro SD |
| SDIO | Connector: FX18-40S-0.8SV10 |
| Image sensor I/F | Connector: FX18-60S-0.8SH Connected to the CIS IMX415 Board and CIS GND Board connectors* ² |
| Motor control I/F | Connector: FX18-60S-0.8SV10 |
| Debug I/F | Connector: USB Micro-B UART-USB bridge: CP2105 |
| LED | For power supply (VDD5.0): Yellow green (main) For boot (MD8): Yellow green (main) For power supply (RTPWVDD3.0): Yellow green (base) |
| Switch | For mode setting: DIP × 1 (main) For level shifters setting: DIP × 1 (base) For power supply: Toggle × 1 (base) For audio interface IO power setting: Pin header × 1 (base) |
| Power supply | AC adapter: 12V/5A* ² |

Note 1. TLV Audio Board is an optional board provided by Renesas. Users can borrow it for free. For details, contact a Renesas Electronics sales representative.

Note 2. AC adapter and CS mount lens for camera are requested to prepare separately as needed.

Table 1.3-2 CIS IMX415 Board Specification

| Item | Specification |
|-------------------|-------------------------------------|
| CMOS image sensor | IMX415 (Made by SONY)* ¹ |

Note 1. IMX415 is used in sensor slave mode with the ISP support package.

1.3.2 V2MEVK Accessories

Table 1.3-3 V2MEVK Accessories

| Item | Specification |
|------------------|---|
| Upper plate | Material: Acrylic Size: 155 × 105 × 3 mm |
| Base plate | Material: Acrylic Size: 200 × 150 × 5 mm |
| Rubber feet | Size: 12.7 × 12.7 × 3 mm, Qty: 4 |
| Board spacers | M3 × 20 mm, Qty: 4 M3 × 8 mm, Qty: 4 M3 × 10 mm, Qty: 4 |
| M3 screws | M3 × 10, Qty:6 |
| Jumper connector | For CN508 |

1.3.3 Outer Appearance

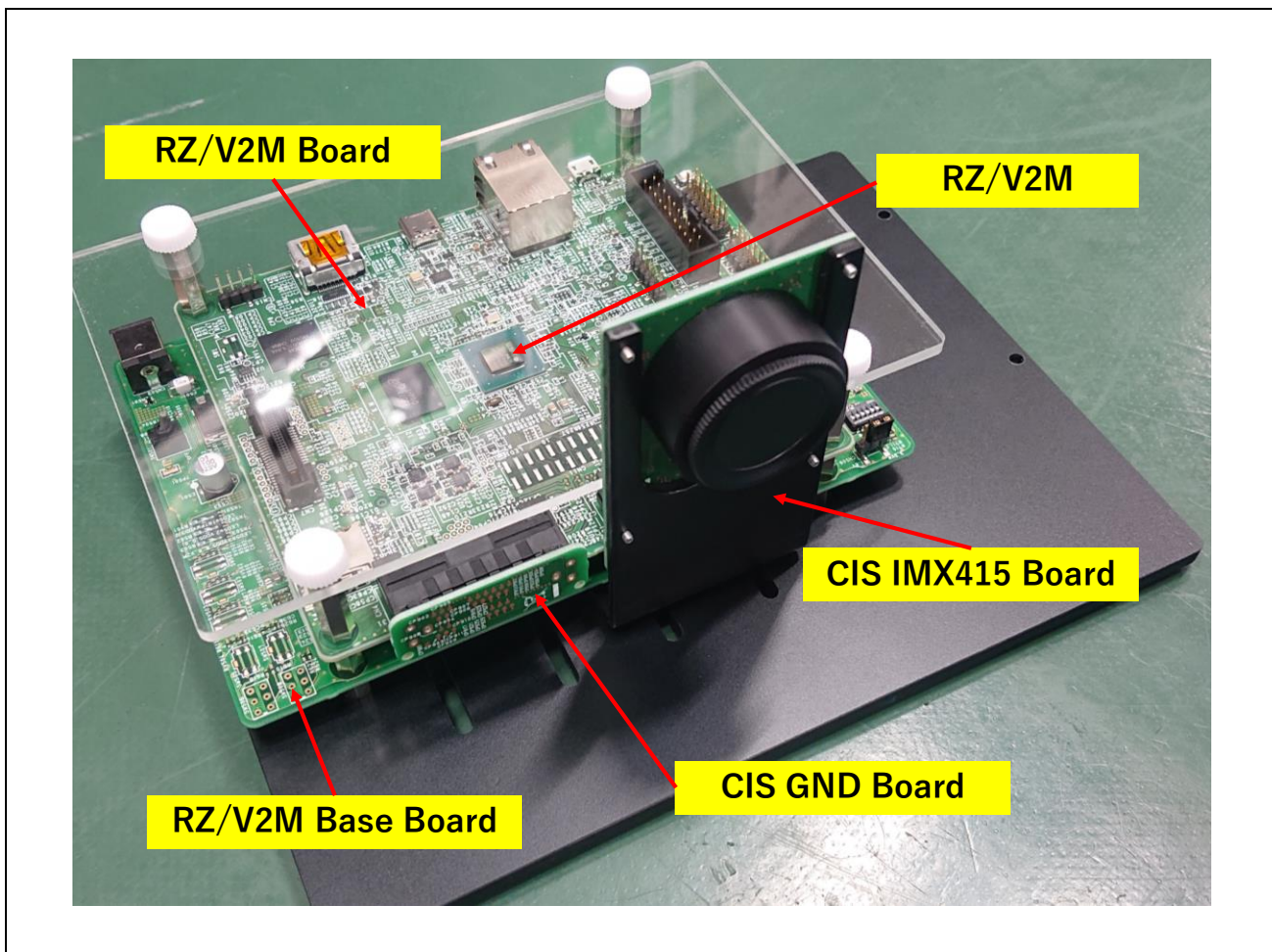


Figure 1.3-1 Outer Appearance of V2MEVK

| | |
|------------------|-------------------------------------|
| REVISION HISTORY | RZ/V2M Evaluation Board Kit Booklet |
|------------------|-------------------------------------|

| Rev. | Date | Description | |
|------|--------------|-------------|----------------------|
| | | Page | Summary |
| 1.00 | July 1, 2022 | — | First edition issued |
| | | | |

General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unit products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

1. Precaution against Electrostatic Discharge (ESD)

A strong electrical field, when exposed to a CMOS device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop the generation of static electricity as much as possible, and quickly dissipate it when it occurs. Environmental control must be adequate. When it is dry, a humidifier should be used. This is recommended to avoid using insulators that can easily build up static electricity. Semiconductor devices must be stored and transported in an anti-static container, static shielding bag or conductive material. All test and measurement tools including work benches and floors must be grounded. The operator must also be grounded using a wrist strap. Semiconductor devices must not be touched with bare hands. Similar precautions must be taken for printed circuit boards with mounted semiconductor devices.

2. Processing at power-on

The state of the product is undefined at the time when power is supplied. The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the time when power is supplied. In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the time when power is supplied until the reset process is completed. In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the time when power is supplied until the power reaches the level at which resetting is specified.

3. Input of signal during power-off state

Do not input signals or an I/O pull-up power supply while the device is powered off. The current injection that results from input of such a signal or I/O pull-up power supply may cause malfunction and the abnormal current that passes in the device at this time may cause degradation of internal elements. Follow the guideline for input signal during power-off state as described in your product documentation.

4. Handling of unused pins

Handle unused pins in accordance with the directions given under handling of unused pins in the manual. The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of the LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible.

5. Clock signals

After applying a reset, only release the reset line after the operating clock signal becomes stable. When switching the clock signal during program execution, wait until the target clock signal is stabilized. When the clock signal is generated with an external resonator or from an external oscillator during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Additionally, when switching to a clock signal produced with an external resonator or by an external oscillator while program execution is in progress, wait until the target clock signal is stable.

6. Voltage application waveform at input pin

Waveform distortion due to input noise or a reflected wave may cause malfunction. If the input of the CMOS device stays in the area between V_{IL} (Max.) and V_{IH} (Min.) due to noise, for example, the device may malfunction. Take care to prevent chattering noise from entering the device when the input level is fixed, and also in the transition period when the input level passes through the area between V_{IL} (Max.) and V_{IH} (Min.).

7. Prohibition of access to reserved addresses

Access to reserved addresses is prohibited. The reserved addresses are provided for possible future expansion of functions. Do not access these addresses as the correct operation of the LSI is not guaranteed.

8. Differences between products

Before changing from one product to another, for example to a product with a different part number, confirm that the change will not lead to problems. The characteristics of a microprocessing unit or microcontroller unit products in the same group but having a different part number might differ in terms of internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

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