LAPIS SEMICONDUCTOR

nanoEASE connection manual

ML610Qxxx

Revision 2.0

Issue Date: Jan. 17, 2012

NOTICE

No copying or reproduction of this document, in part or in whole, is permitted without the consent of LAPIS Semiconductor Co., Ltd.

The content specified herein is subject to change for improvement without notice.

The content specified herein is for the purpose of introducing LAPIS Semiconductor's products (hereinafter "Products"). If you wish to use any such Product, please be sure to refer to the specifications, which can be obtained from LAPIS Semiconductor upon request.

Examples of application circuits, circuit constants and any other information contained herein illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

Great care was taken in ensuring the accuracy of the information specified in this document. However, should you incur any damage arising from any inaccuracy or misprint of such information, LAPIS Semiconductor shall bear no responsibility for such damage.

The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. LAPIS Semiconductor does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by LAPIS Semiconductor and other parties. LAPIS Semiconductor shall bear no responsibility whatsoever for any dispute arising from the use of such technical information.

The Products specified in this document are intended to be used with general-use electronic equipment or devices (such as audio visual equipment, office-automation equipment, communication devices, electronic appliances and amusement devices).

The Products specified in this document are not designed to be radiation tolerant.

While LAPIS Semiconductor always makes efforts to enhance the quality and reliability of its Products, a Product may fail or malfunction for a variety of reasons.

Please be sure to implement in your equipment using the Products safety measures to guard against the possibility of physical injury, fire or any other damage caused in the event of the failure of any Product, such as derating, redundancy, fire control and fail-safe designs. LAPIS Semiconductor shall bear no responsibility whatsoever for your use of any Product outside of the prescribed scope or not in accordance with the instruction manual.

The Products are not designed or manufactured to be used with any equipment, device or system which requires an extremely high level of reliability the failure or malfunction of which may result in a direct threat to human life or create a risk of human injury (such as a medical instrument, transportation equipment, aerospace machinery, nuclear-reactor controller, fuel-controller or other safety device). LAPIS Semiconductor shall bear no responsibility in any way for use of any of the Products for the above special purposes. If a Product is intended to be used for any such special purpose, please contact a ROHM sales representative before purchasing.

If you intend to export or ship overseas any Product or technology specified herein that may be controlled under the Foreign Exchange and the Foreign Trade Law, you will be required to obtain a license or permit under the Law.

Copyright 2008 - 2012 LAPIS Semiconductor Co., Ltd.

Table of Contents

Introduction **1**

1.1 Recommended circuitry of user target board for nanoEASE connection **2**

1.1.1 Recommended circuitry using 3.3VOUT supplied from nanoEASE 3

1.1.2 Recommended circuitry using power supply on your target board 4

1.1.3 Recommended circuitry using RESET_N terminal and TEST terminal 5

1.1.4 Recommended circuitry using TEST1_N terminal and TEST0 terminal 6

1.1.5 Recommended circuitry using VDDL terminal 7

1.1.6 Recommended circuitry does not use VDDL terminal 8

1.1.7 Recommended socket and loacation on your PCB 9

1.1.8 Terminals of nanoEASE interface connector 10

1.2 Available function **11**

1.2.1 On-chip debug function 11

1.3 Notes **12**

1.3.1 Notes for on-chip debug emulator 12

Introduction

This material describes how nanoEASE has to be connected to ML610Qxxx on your target board, and the notations about using nanoEASE.

To understand well about the connection to each device, refer each devices' user's manual accordingly.

1.1 Recommended circuitry of user target board for nanoEASE connection

The examples of a circuit for connecting nanoEASE with a target microcomputer are shown below
The interface terminal of a target microcomputer changes with your target microcomputer.
When you connect with nanoEASE, please be sure to check by the target microcomputer's manual.

Connection of the power supply terminal of a target microcomputer

- Refer to chapter 1.1.1, when you supply the power supply of a targer microcomputer from nanoEASE
- Refer to chapter 1.1.2, when you supply the power supply of a taeget microcomputer from your target board.

Connection of a debugging terminal

- Refer to chapter 1.1.3 for a target microcomputer which use RESET_N terminal and TEST terminal as an interface of nanoEASE.
- Refer to chapter 1.1.4 for a target microcomputer which use TEST1_N terminal and TEST0 terminal as an interface of nanoEASE.

Connection of a VDDL terminal

- Refer to chapter 1.1.5 for a target microcomputer which use VDDL terminal as an interface of nanoEASE.
- Refer to chapter 1.1.6 for a target microcomputer which does not use VDDL terminal as an interface of nanoEASE.

1.1.1 Recommended circuitry using 3.3VOUT supplied from nanoEASE

nanoEASE is capable to supply +3.3V/100mA(max.) through 3.3VOUT terminal.

Below is a recommended circuitry using 3.3VOUT supplied from nanoEASE.

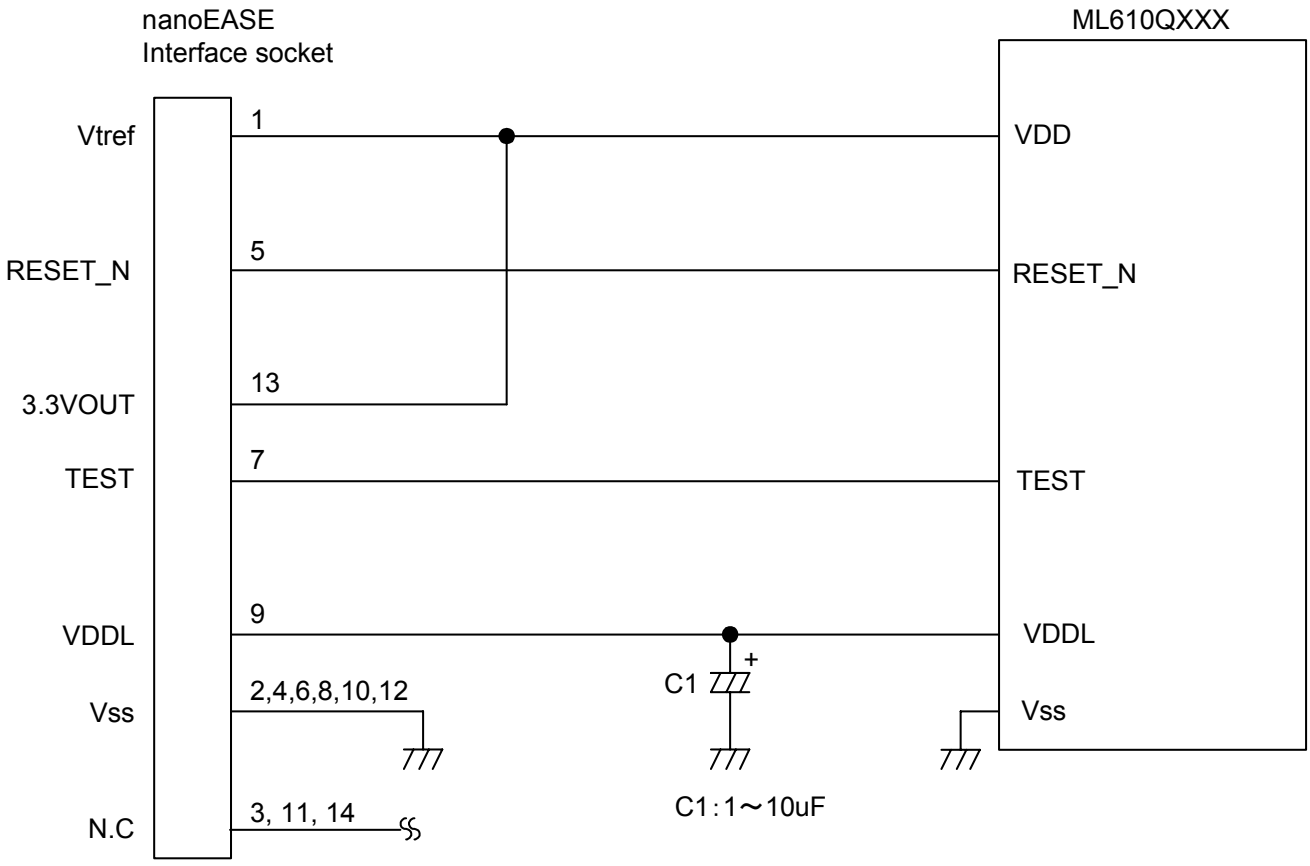

Fig 1 recommended circuitry using 3.3VOUT supplied from nanoEASE

Caution

nanoEASE controls reset of ML610QXXX.
When you connect nanoEASE, do not mount parts to RESET_N terminal of ML610QXXX

1.1.2 Recommended circuitry using power supply on your target board

The example of a circuit which uses power supply on your target board.

When you use the power supply of your target board, make 3.3VOUT terminal of nanoEASE open.

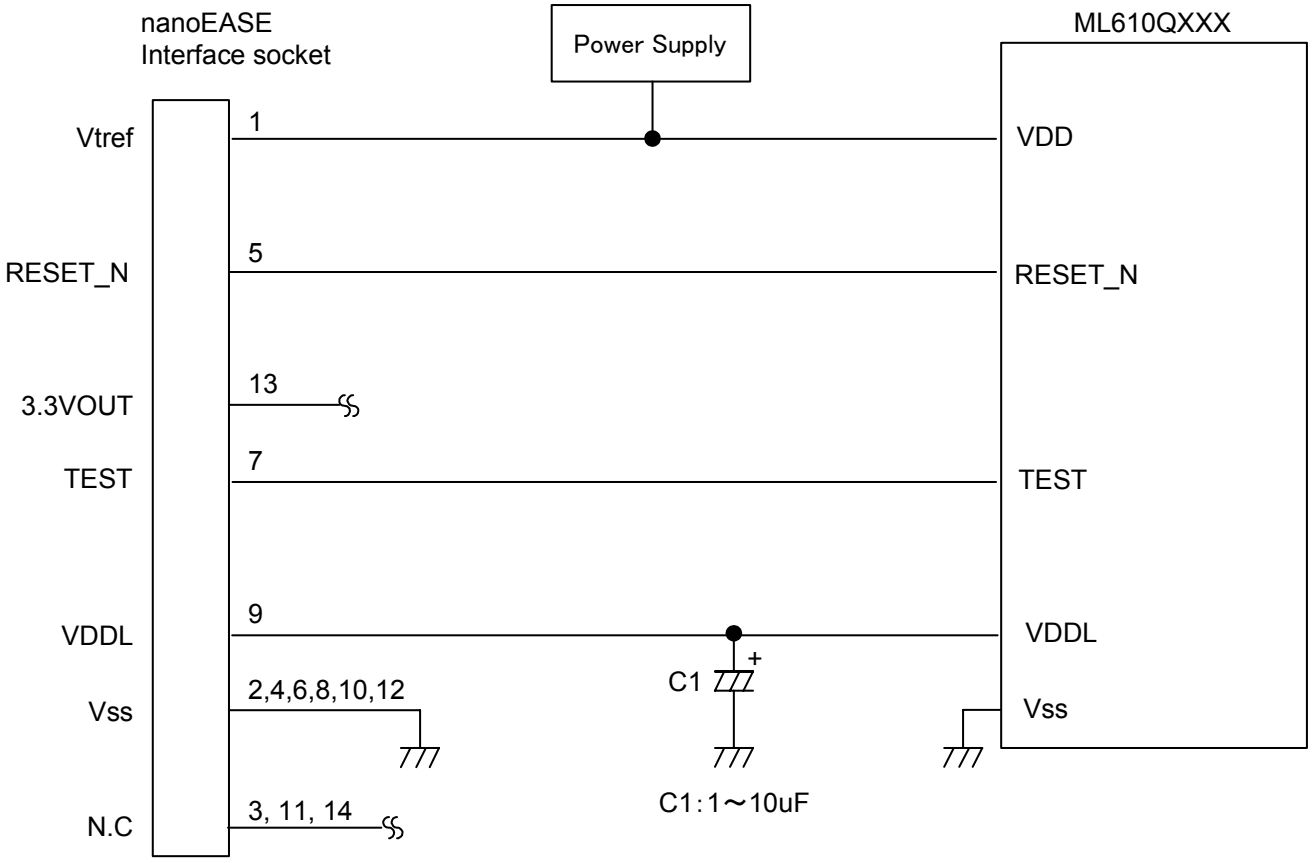

Fig 2 recommended circuitry using power supply on target board

1.1.3 Recommended circuitry using RESET_N terminal and TEST terminal

The example of a circuit iconnected with nanoEASE using RESET_N terminal and TEST terminal is shown below.

Since the RESET_N terminal and TEST terminal of target microcomputer are use as a debugging terminal of nanoEASE, do not connect any parts to these terminals.

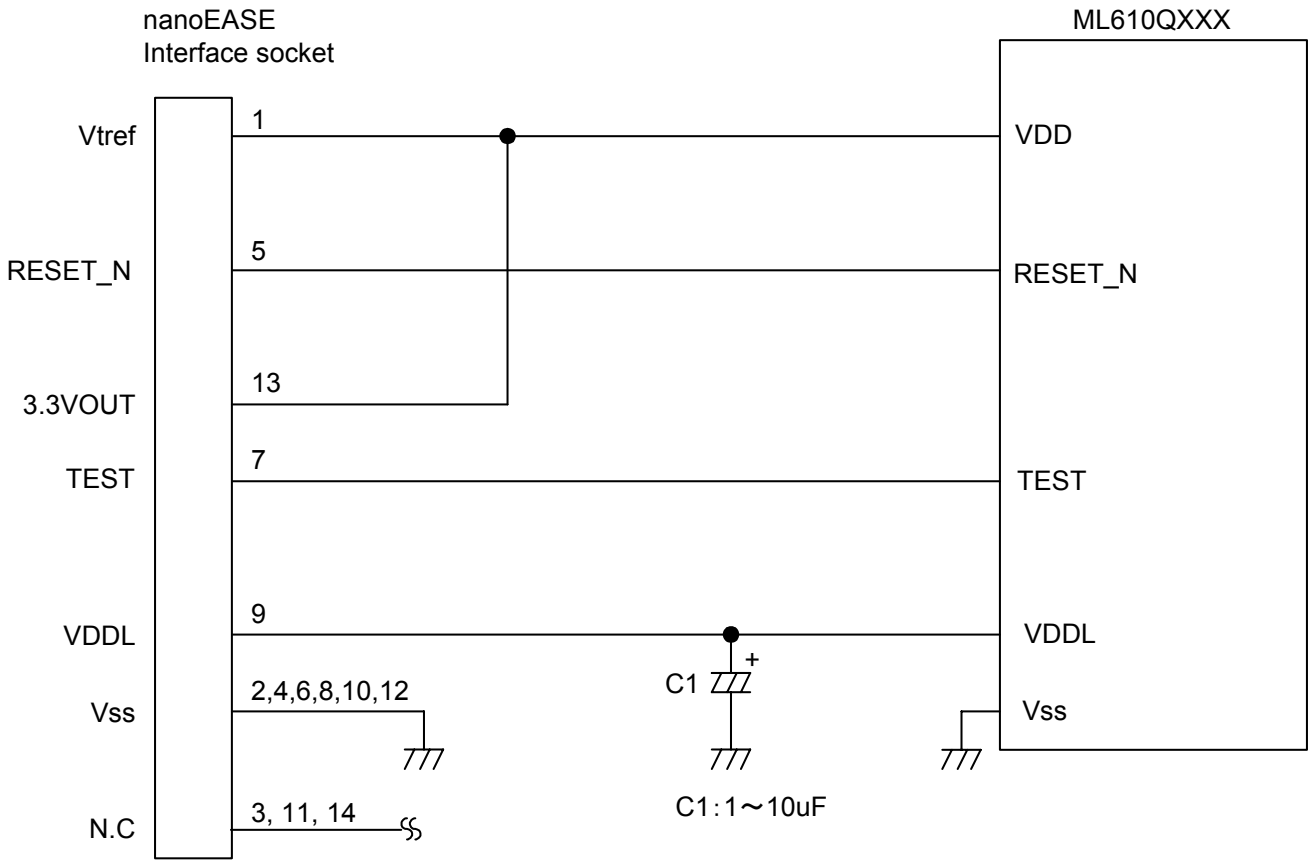

Fig 3 Recommended circuitry not using RESET_N terminal and TEST terminal

Caution

nanoEASE controls reset of ML610QXXX.
When you connect nanoEASE, do not mount parts to RESET_N terminal of ML610QXXX

1.1.4 Recommended circuitry using TEST1_N terminal and TEST0 terminal

The example of a circuit iconnected with nanoEASE using TEST1_N terminal and TEST0 terminal is shown below.

Since the TEST1_N terminal and TEST0 terminal of target microcomputer are use as a debugging terminal of nanoEASE, do not connect any parts to these terminals.

Since nanoEASE controls reset of a target microcomputer, do not reset from a RESET_N terminal during debugging.

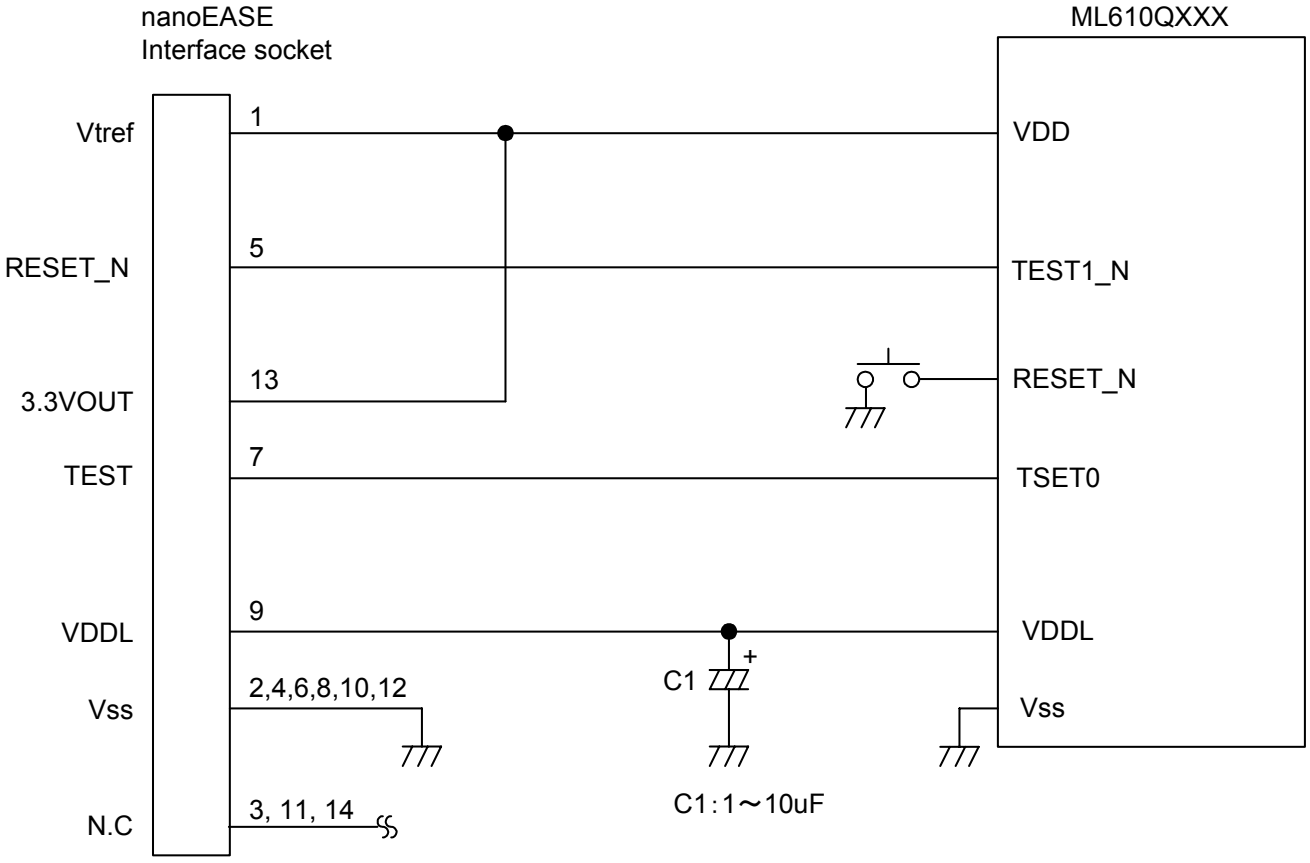

Fig 4 Recommended circuitry using TEST1_N terminal and TEST0 terminal

1.1.5 Recommended circuitry using VDDL terminal

The example of a circuit iconnected with nanoEASE using VDDL terminal is shown below.

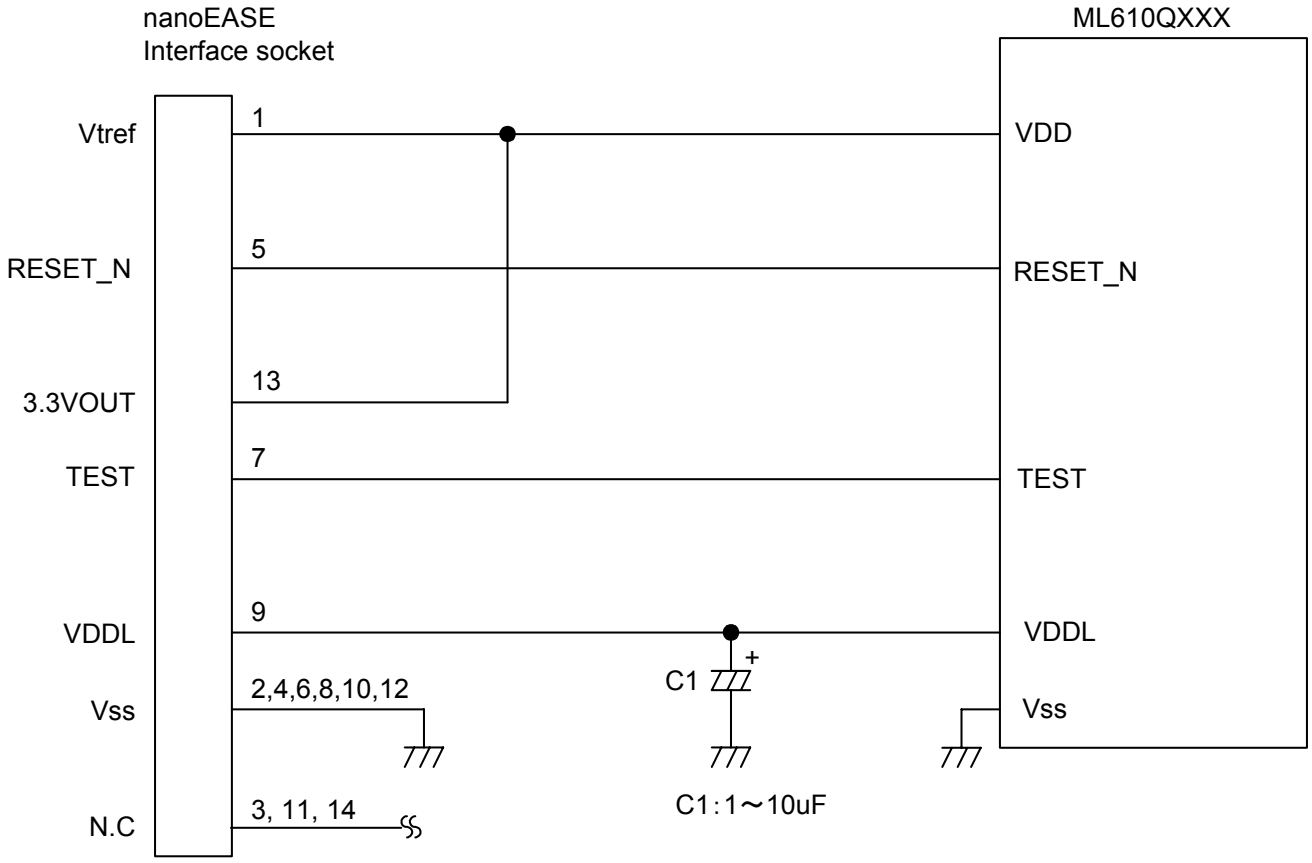

Fig 5 Recommended circuitry using VDDL terminal

Caution

When using nanoEASE connecting with ML610QXXX on your target Board, VDDL on ML610QXXX has to be connected to corresponding terminals of nanoEASE user cable only. Do not forget to isolate other VDDL supply from your target board. Otherwise, not only nanoEASE broken, but also burst and /or fire or electric component may be caused.

1.1.6 Recommended circuitry does not use VDDL terminal

The example of a circuit iconnected with nanoEASE does not usie VDDL terminal is shown below.

When you connect nanoEASE, do not connect any parts to VDDL terminal of nanoEASE interface socket.

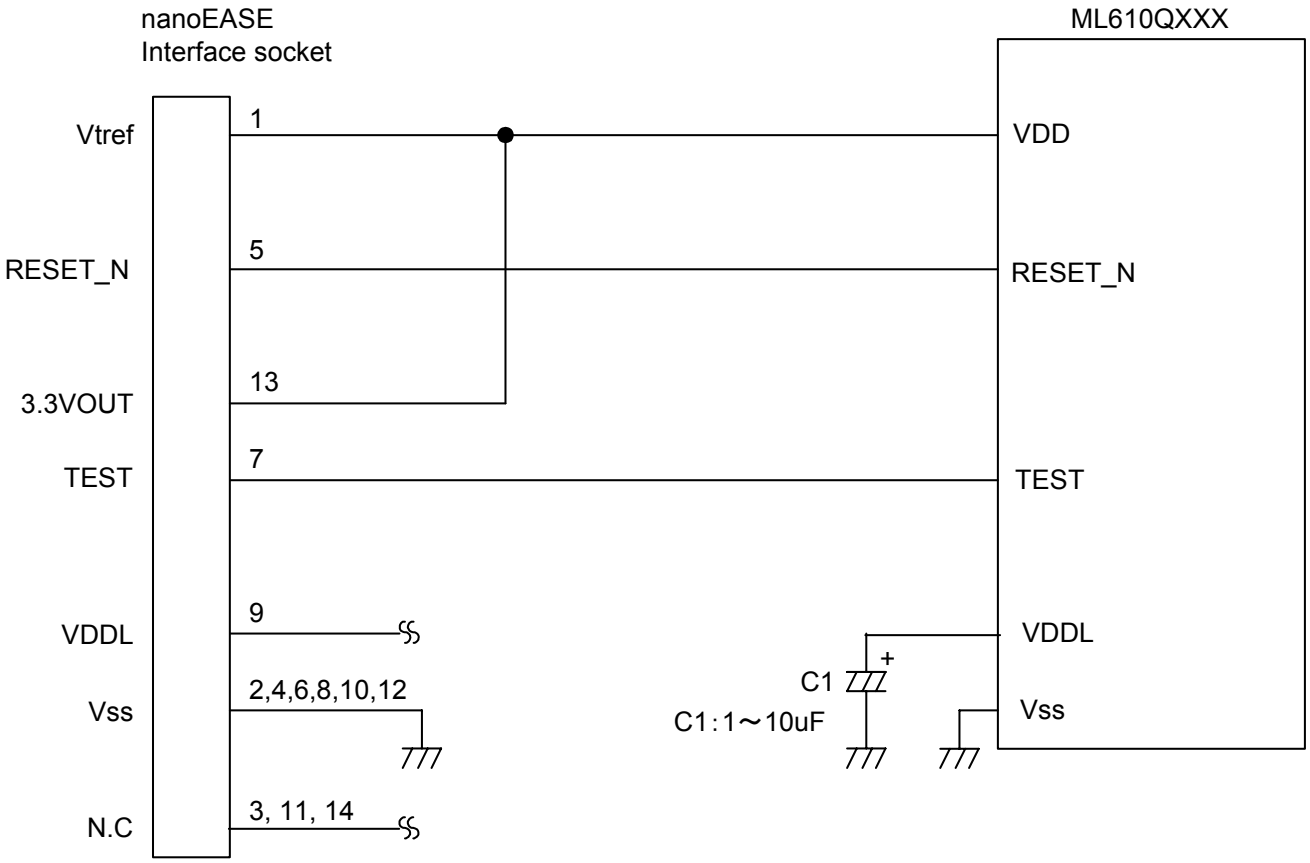

Fig 6 Recommended circuitry does not use VDDL terminal

1.1.7 Recommended socket and loacation on your PCB

- **Recommended socket on your PCB for nanoEASE I/F cable is**

  Part Number : 7614-6002

  Supplier : 3M

- **Socket location on your PCB for nanoEASE I/F cable**

Below is a recommended socket location on your PCB for nanoEASE interface socket.-

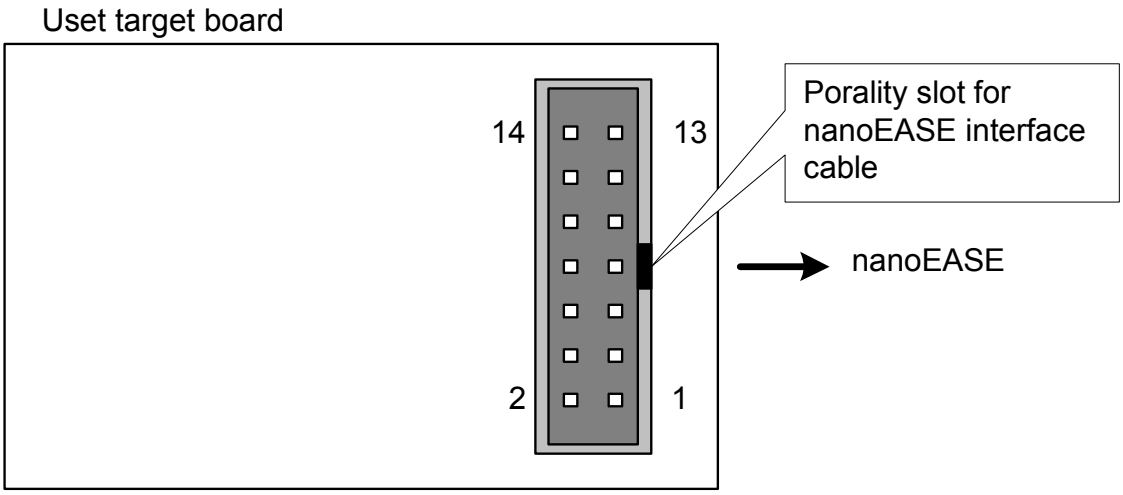

Fig 7 recommended board layout of nanoEASE interface socket

The length of the cable (nanoEASE interface cable) which connects a user target system with nanoEASE is about 15cm. A nanoEASE interface connector should be located as much as possible in the end of PCB, and please arrange it so that wiring with a nanoEASE interface connector and ML610Qxxx serves as the shortest.

(Conformity pin header: HIF3FC-14PA-2.54DSA)

1.1.8 Terminals of nanoEASE interface connector

Below is a table for terminals of nanoEASE interface connector.

Table1 nanoEASE interface connector terminals

Terminal No.	nanoEASE terminal	Corresponding terminals of ML610Qxxx
1	VTref	ML610Qxxx VDD, +Power supply
2	Vss	ML610Qxxx Vss, –Power supply (GND)
3	N.C	Do not connect. Keep it open.
4	Vss	ML610Qxxx Vss, –Power supply (GND)
5	RESET_N	ML610Qxxx RESET_N
6	Vss	ML610Qxxx Vss, –Power supply (GND)
7	TEST	ML610Qxxx TEST
8	Vss	ML610Qxxx Vss,–Power supply (GND)
9	VDDL	ML610Qxxx VDDL
10	Vss	ML610Qxxx Vss, –Power supply (GND)
11	N.C.	Do not connect. Keep it open.
12	Vss	ML610Qxxx Vss, –Power supply (GND)
13	3.3VOUT	3.3V output
14	N.C	Do not connect. Keep it open.

It recommends shielding wiring of a RESET_N terminal and a TEST terminal by VSS (GND).

1.2 Available function

The provided functions by using the nanoEASE are shown below.

1.2.1 On-chip debug function

The nanoEASE provides the on-chip debug function by linking to the DTU8 Debugger.

■ Application Program download function

A download and display the application program in the Flash ROM which is embedded in a target microcomputer.

■ A display and change the resources of a target microcomputer

- Processor's internal registers
- Program ROM
- Data RAM
- Special Function Register (SFR)

■ Emulation function

- Real-time emulation
- Single step emulation

■ Break function

- Hardware breakpoints (3 points)
- Software breakpoints
- Address pass count break (1 point)
- RAM data match break (1 point)
- Force break

1.3 Notes

The notations of debugging or programming by using the nanoEASE are shown below.

1.3.1 Notes for on-chip debug emulator

■ A RAM data match break

- When the RAM data match break occurs, the emulation is stopped after the CPU executes until 3 instructions from the satisfied of break condition.

■ Any break functions

As following, the behavior of the ML610Qxxx is influenced by break functions. Therefore, do not use the break function during the final check of application programs.

-When the break occurred, the following peripherals of ML610Qxxx are stopped.

- LTBC
- Real-time clock
- 1kHz timer
- Timer 0/1/2/3
- Watch dog timer
- Melody driver

If peripherals are enabled, the behavior will restart when the emulation is started.

- When the interruption occurs in the break, the CPU defers the execution of each interruption handler to the next emulation.

- If you use the force break function when CPU is STOP/HALT mode, the STOP/HALT mode is released by the break. And, if you set the breakpoints to next instruction of the instruction to change to the STOP/HALT mode, the STOP/HALT mode is released by the break.

■About the frequency control register (FCON0,1) in case of nanoEASE use

- Do not write the program made into the clock mode which is not mounted for the OSCM0/OSCM1 bit of FCON0 in the flash memory of target LSI. When this program is written in and the emulation is executed, the operation about execution becomes impossible, because the clock is not supplied to CPU. And DTU8+nanoEASE cannot be started by target LSI which wrote in this program. In these cases, Error number: 6300H is displayed.
- The OSCM0/OSCM1 bit of FCON0 cannot be changed in the SFR window on DTU8.
- When ENOSC and SYSCLK of FCON1 are set to 1, even if ENOSC is set to 0 in the SFR window on DTU8, the display of SYSCLK is still 1. However, SYSCLK inside target LSI is 0. Therefore, the emulation is executed in the state of SYSCLK=0 as it was operated in the SFR window.

Revision History

Revision No.	Date	Description
1.0	Dec. 21, 2011	First edition.
2.0	Jan. 17, 2012	Clerical error correction