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ROHM GROUP
LAPIS TECHNOLOGY

FEBL62Q2035RB-01

RB-D62Q2035TD20
User's Manual

Issue Date: March 9, 2023

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Preface

This manual describes about the ML62Q2035 Reference Board : RB-D62Q2035TD20.

Refer to following documents when necessary.

– ML62Q2000 Group User's Manual
Provides the detailed information about the microcontroller ML62Q2000 Group.

– EASE1000 V2 User's Manual
Provides the information on how to use the On-chip emulator EASE1000 V2.

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1. Overview

1.1. Features

The RB-D62Q2035TD20 can be used for learning 'how to use' the ML62Q2035, on which the user needs to provide additional external components if necessary. By using the RB-D62Q2035TD20 together with the LAPIS Technology's on-chip emulator EASE1000 V2 and the provided software development environment, the user can develop software, debug and program the Flash. Also, by connecting an external power supply to RB-D62Q2035TD20, it can be used independently without connecting a EASE1000 V2.
Before using RB-D62Q2035TD20 be sure to understand and keep in mind the following information.

1.1.1. Features

- The board is provided with ML62Q2035 20pin TSSOP.
- Mounted with the linked connector to EASE1000 V2.
- Through-holes for connecting the pins of LSI to external pheripheral boards.
- Power supply is selectable; supplied from the on-chip emulator EASE1000 V2 or CN1_6pin.
- Mounted with a charge pump for generating power.
- Mounted with LED (P05).
- Foot pattern with components for Successive Approximation Type A/D Converter is available (P14,P15,P16,P17).

1.1.2. Hardware specifications

Table 1 shows the hardware specifications of RB-D62Q2035TD20.

Table 1 Hardware specifications

Mounted LSI	U1 : ML62Q2035 20pin TSSOP
Other Mounted components	PWR: Jumper for selecting the power supply input (3pin pin-header and short pin)
	J1: Jumper for selecting RESET_N pin (3pin pin-header and short pin)
	J2: Jumper for selecting P00/TEST0 pin (3pin pin-header and short pin)
	P05: LEDs
	R1: Resistors for LED by P05
	J3: Jumper Chip for connecting LED
	CNE: Connector for EASE1000 V2(14pin connector)
	C1, C2: Capacitors for VDD and VDDL
	R2: Pull-up resistor for RESET_N
	U2: Charge-Pump
	C7, C8, C9: Capacitors for Charge-Pump
	R3: Resister for Charge-Pump
Pads (or/and) Through holes for mounting components	CN1-CN2: Connectors for user application system (12pin, 2.54mm pitch, φ0.9mm)
	C3-C6: Capacitors for Successive Approximation Type A/D Converter
Power check pin	VDD, VSS, UVDD: φ0.8mm
Supply voltage	3.3VOUT pin of EASE1000 V2: +3.1～+5.5V
	UVDD: +4.5 ～ +5.5V
Operating voltage	Supply from 3.3VOUT pin of EASE1000 V2: +4.8V - +5.2V
	Supply from UVDD: Input voltage of UVDD
Board size	55.88 mm x 93.98 mm

For more information about the connection of the mounted components, see the schematic.

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1.2. Outline Diagram

Fig. 1 shows the RB-D62Q2035TD20.

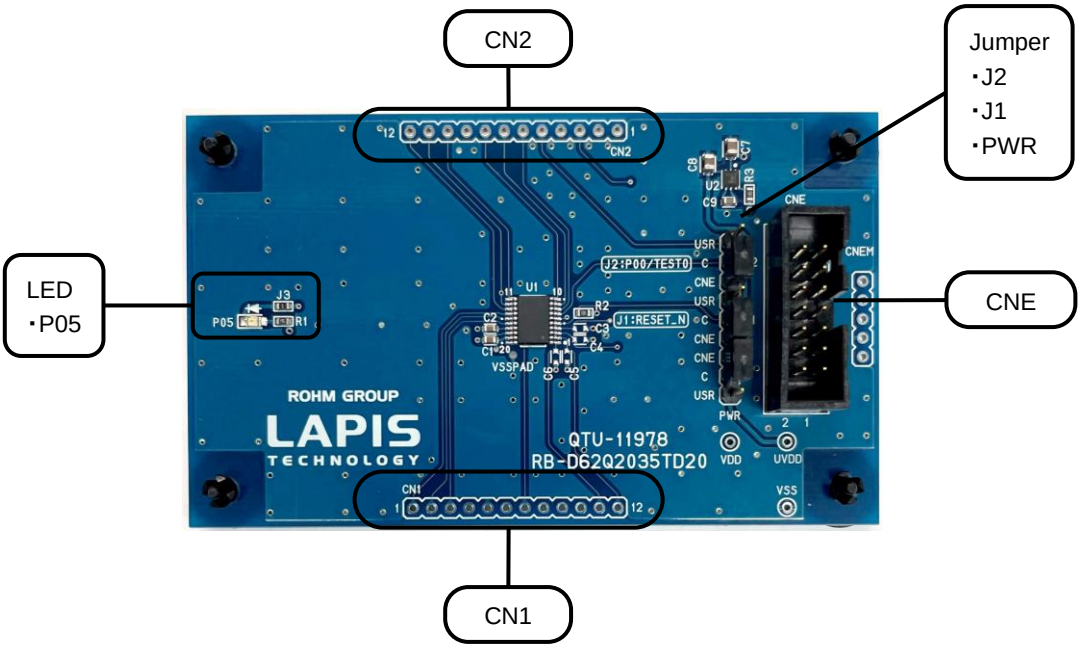


Fig. 1 Outline Diagram

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2. Function

2.1. Power Circuit

The input toV_{DD} can be selected from 3.3VOUT of EASE1000 V2 or CN1 6pin by PWR jumper.
When 3.3VOUT pin of EASE1000 V2 is selected, VDD is supplied through Charge-Pump. When CN1:6 pin is selected, VDD is supplied through Charge-Pump.

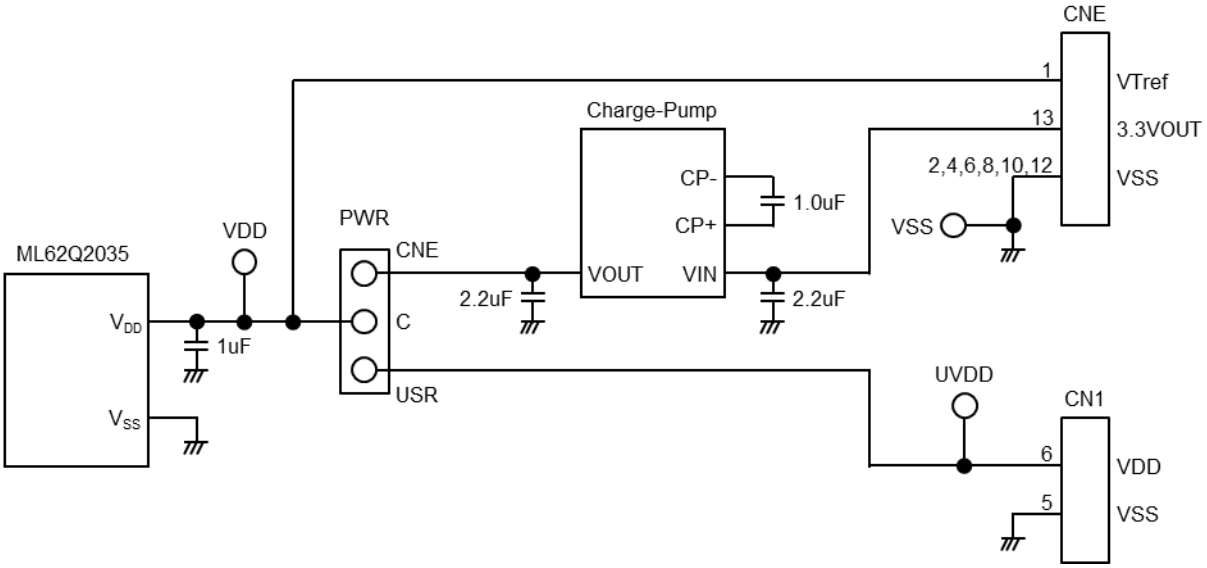


Fig. 2 Power Circuit

Table 2 Power supply specifications

Power supply	Direction	Voltage	Current
3.3VOUT pin off EASE1000 V2	Input	+3.1V - +5.5V	-
CN1:6pin	Input	+4.5V - +5.5V	-
VOUT of Charge-Pump	Output	+4.8V - +5.2V	120mA

[Note]
The power supply ON/OFF procedure in case of setting PWR jumper to the USR-side when using EASE1000 V2.

- The procedure of power supply ON
  1. The USB cable of EASE1000 V2 is connected.
  2. The power supply of user's target system is turned on.

- The procedure of power supply OFF
  1. The power supply of user's target system is turned off
  2. The USB cable of EASE1000 V2 is removed

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2.2. Connection for EASE1000 V2 (CNE)

EASE1000 V2 can be used if J1 and J2 jumper are set to "CNE".

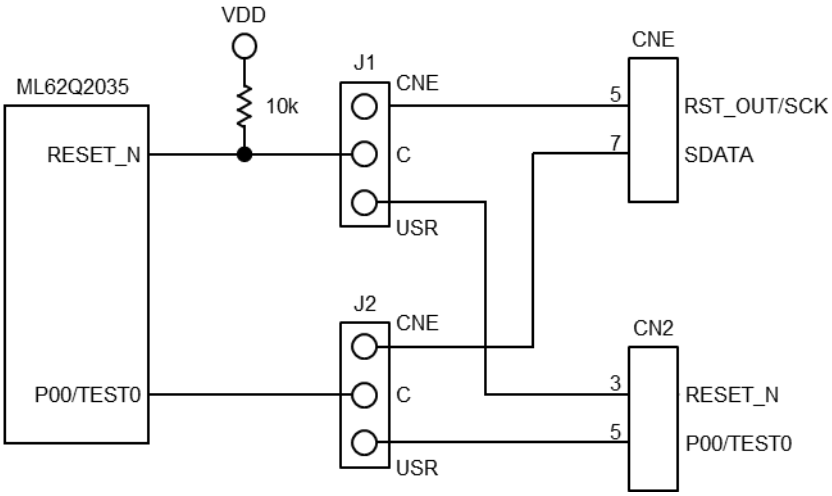


Fig. 3 EASE1000 V2 Interface

[Note]

P00/TEST0 pin:
P00/TEST0 pin of ML62Q2035 is initially set as a pull-up input mode
When using EASE1000 V2, do not set it as an output mode by using an application program, otherwise EASE1000 V2 cannot communicate with the ML62Q2035.

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2.3. LED (P05)

The P05 pin is port that can directly drive LED. The Port is connected to the LED through jumper-chip. Remove the jumper-chip when not using the LED.

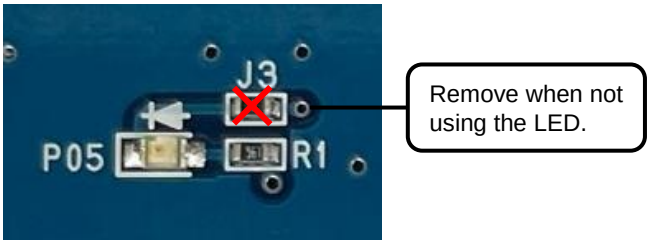


Fig. 4 Jumper-chip removal of LED

2.4. P14, P15, P16, P17

When P14, P15, P16, P17 pin is used as AIN0, AIN1, AIN2, AIN3 function of the successive approximation type A/D converter, the C3, C4, C5, C6 can implement a by-pass capacitor.
Fig. 5 shows the connection diagram.

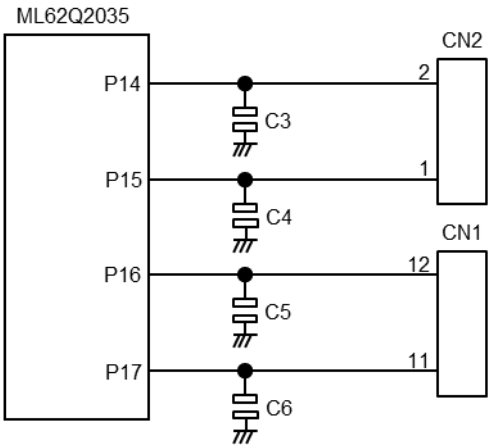


Fig. 5 P14, P15, P16, P17 Circuit

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3. User Interface

3.1. CN1, CN2

Table 3 shows the pin list of the RB-D62Q2035TD20 user interface connection CN1 and CN2.

Table 3 CN1, CN2

CN1 Pin No.	Connection destination			CN2 Pin No.	Connection destination		
	Device	Pin No.	Name		Device	Pin No.	Name
1	ML62Q2035	14	P03	1	ML62Q2035	3	P15
2	ML62Q2035	15	P02	2	ML62Q2035	4	P14
3	ML62Q2035	16	P01	3	J1	USR	RESET_N
4	-	-	N.C.	4	ML62Q2035	6	P13
5	-	-	VSS	5	J2	USR	P00/TEST0
6	PWR	USR	VDD	6	ML62Q2035	8	P12
7	ML62Q2035	20	P23	7	ML62Q2035	9	P11
8	-	-	N.C.	8	ML62Q2035	10	P10
9	-	-	N.C.	9	-	-	N.C.
10	-	-	N.C.	10	ML62Q2035	11	P06
11	ML62Q2035	1	P17	11	ML62Q2035	12	P05
12	ML62Q2035	2	P16	12	ML62Q2035	13	P04

N.C. : Not Connected

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3.2. CNE

Table 4 shows the pin list of the RB-D62Q2035TD20 user interface connection CNE.

Table 4 CNE

CNE		Connection		
Pin No.	Name	Parts	Pin No.	ML62Q2035 Pin Name
1	VTref	-	-	VDD
2	GND	-	-	VSS
3	VPP	-	-	N.C.
4	GND	-	-	VSS
5	RST_OUT/SCK	J1	CNE	RESET_N
6	GND	-	-	VSS
7	SDATA	J2	CNE-	P00/TEST0
8	GND	-	-	VSS
9	VDDL	-	-	N.C.
10	GND	-	-	VSS
11	N.C.	-	-	N.C.
12	GND	-	-	VSS
13	3.3VOUT	PWR	CNE	VDD
14	N.C.	-	-	N.C.

N.C. : Not Connected

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4. Precaution for usage

(1) The RB-D62Q2035TD20 is an unfinished product and intended for research and development and for expert use in the research and development facility only. The RB-D62Q2035TD20 is not intended to be used for volume production or parts thereof.
(2) Since the content specified herein is subject to change for improvement without notice, confirm the latest content when using the board.
(3) See the other documents, the ML62Q2000 group user's manual and EASE1000 V2 user's manual when using the RB-D62Q2035TD20.
(4) Confirm the final electrical characteristics by using the mass production parts on your mass production boards.
(5) LAPIS supports replacing the board for an initial failure soon after the shipment. However LAPIS doesn't support reparing the board.
(6) RB-D62Q2035TD20 have signal patterns on the underside, it might work abnormally if using on conductive materials. Use it on insulating materials or having any preventable parts.

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5. PCB specification, BOM list and Schematic

5.1. PCB specification

Fig. 6 shows the PCB dimensional outline diagram and layout of components.

PCB part number:
RB-D62Q2035TD20

Dimension:
55.88mm x 93.98mm

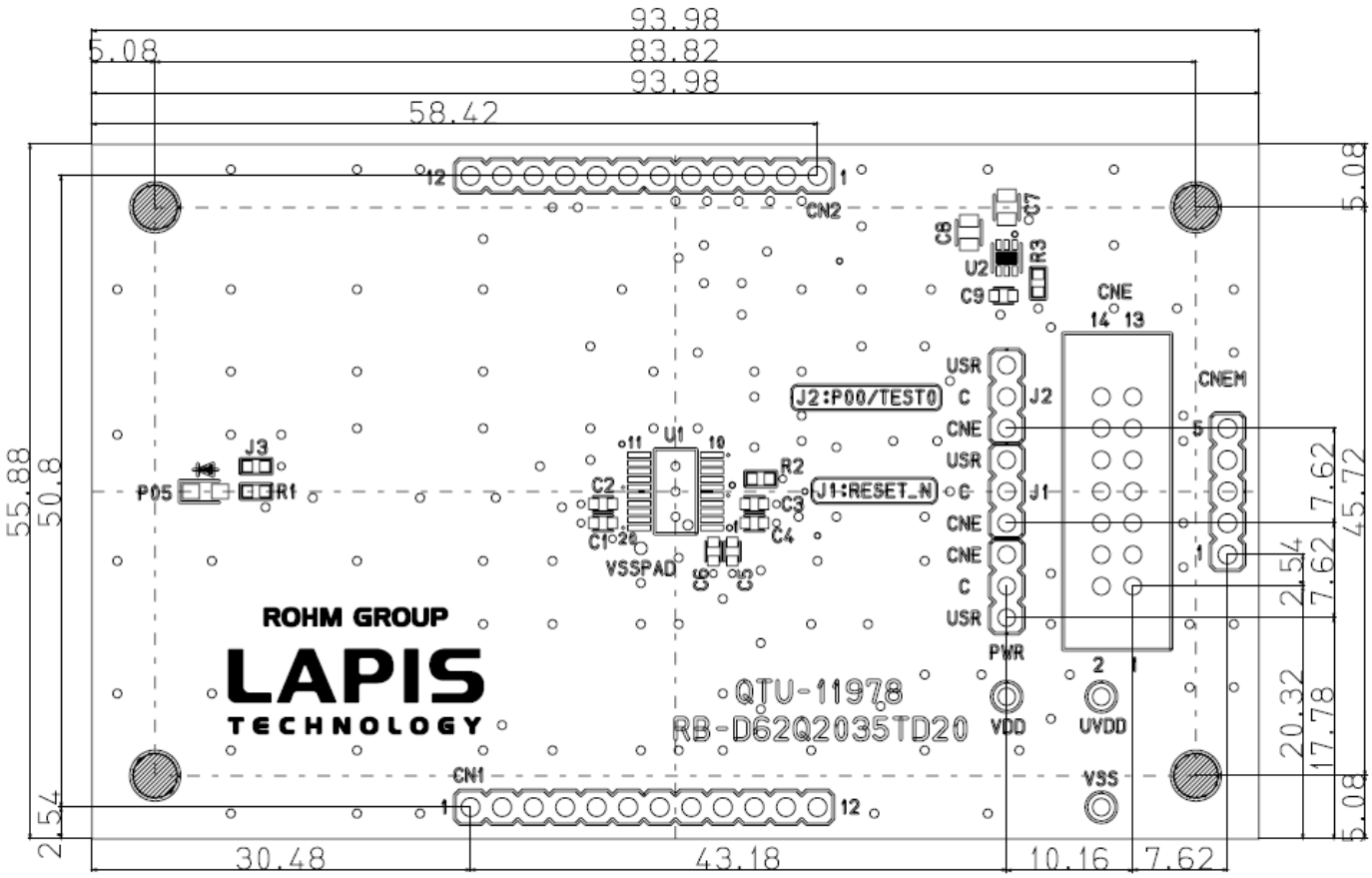


Fig. 6 PCB dimensional outline diagram and layout of components (Top view)

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5.2. BOM list

Table 5 BOM list

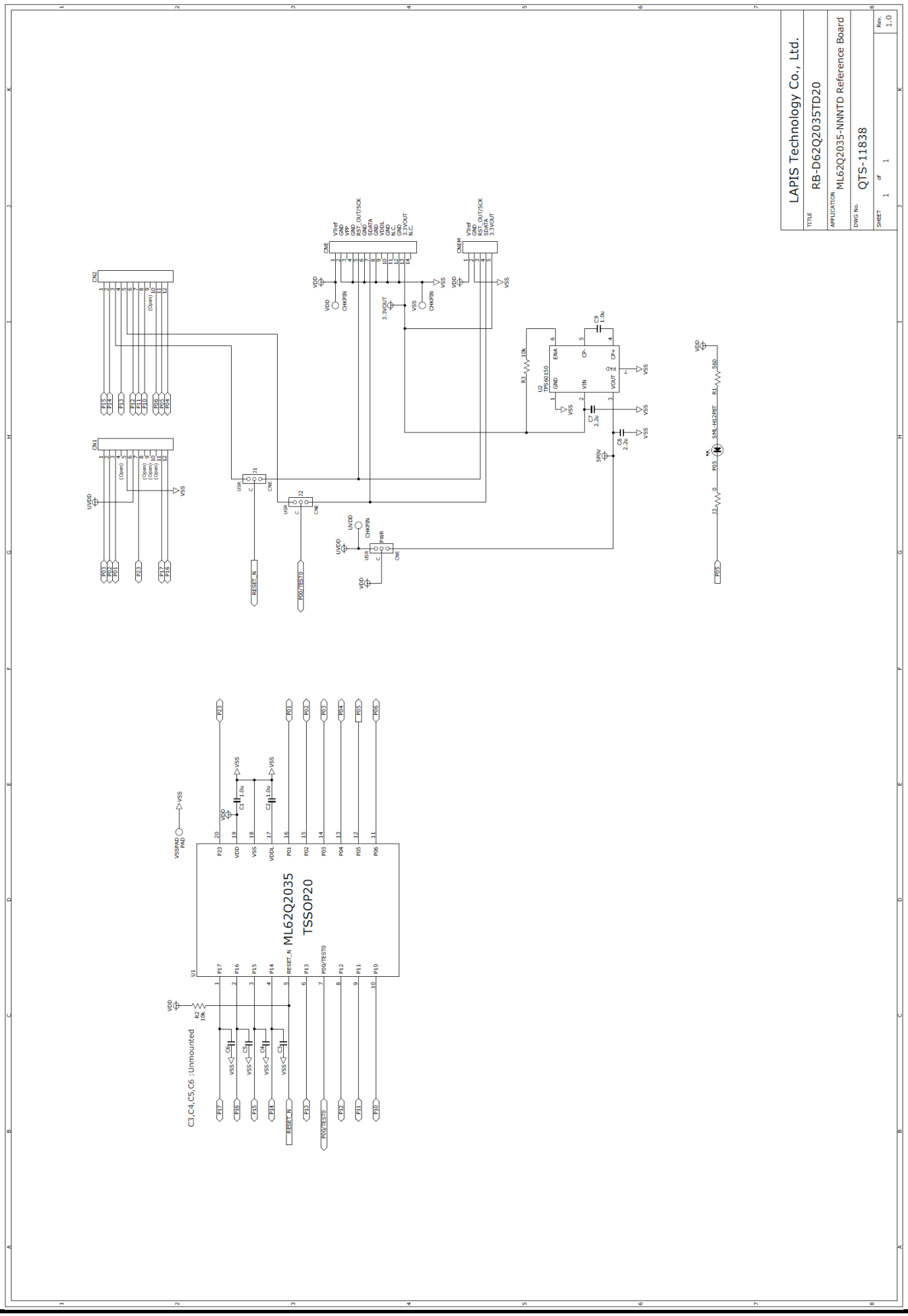
	Parts Number	Symbol	Contents	Qty.	Vendor
1	QTU-11978	RB-D62Q2035TD20	PCB	1	LAPIS Technology Co., Ltd.
2	C1608X7R1E105K080AB	C1, C2, C9	Ceramic Capacitor 1.0μF/25V X7R	3	TDK Corporation
3	-	C3, C4, C5, C6	Unmounted	4	-
4	C2012X7R1C225K125AB	C7, C8	Ceramic Capacitor 2.2μF/16V X7R	2	TDK Corporation
5	-	CN1, CN2	Unmounted	2	-
6	HIF3FC-14PA-2.54DSA (71)	CNE	14pin Header Connector	1	Hirose Electric Co., Ltd.
7	-	CNEM	Unmounted	1	-
8	A2-3PA-2.54DSA	J1, J2, PWR	3pin Header Connector	3	Hirose Electric Co., Ltd.
9	MCR03ERTJ000	J3	Resistor 0Ω	1	Rohm Co., Ltd.
10	SML-H12P8T	P05	LED Green	1	Rohm Co., Ltd.
11	MCR03EZPJ561	R1	Resistor 560Ω ±5%	1	Rohm Co., Ltd.
12	MCR03EZPJ103	R2, R3	Resistor 10kΩ ±5%	2	Rohm Co., Ltd.
13	ML62Q2035-xxxTD	U1	16-bit Microcontroller	1	LAPIS Technology Co., Ltd.
14	TPS60150DRVR	U2	5V/140mA Charge-Pump	1	Texas Instruments Incorporated
15	-	UVDD, VDD, VSS	Unmounted	3	-
16	-	VSSPAD	Unmounted	1	-
17	HIF3GA-2.54SP	-	Short pin	3	Hirose Electric Co., Ltd.

[Note]
- The diameter of through hole of CN1 and CN2 is 0.9 mm.
  Using CN1 and CN2, the diameter of connector pin should use the connector below 0.9mm, such as 0.5mm.
- The parts may be changed into another parts with equivalent part special quality.

5.3. Schematic

The next page shows the schematic of RB-D62Q2035TD20.

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6. Revision History

Document No.	Issue Date	Page		Description
		Previous Edition	New Edition	
FEBL62Q2035RB-01	March 9, 2023	–	–	First edition.

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