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the company name, the company trademark, logo, etc.

Thank you for your understanding.

ROHM Co., Ltd.
April 1, 2024

ROHM GROUP
LAPIS TECHNOLOGY

FEBL22Q284RB-01

RB-S22Q284TD20
User's Manual

Issue Date: January 29, 2021

ROHM SEMICONDUCTOR

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LAPIS Technology Co.,Ltd.

2-4-8 Shinyokohama, Kouhoku-ku, Yokohama 222-8575, Japan
https://www.lapis-tech.com/en/

Table of Contents

1. Overview

This instruction manual is for the RB-S22Q284TD20 which is the reference board for ML22Q284 (hereinafter referred to as "Speech Synthesis LSIs").

This board can be combined with Sound Device Control Board 3 (hereinafter referred to as "SDCB3") to do the following:

- Voice playback by ML22Q284.
- Writing sound code data into ML22Q284.

2. Operational notes

The following describes the precautions to follow when handling the RB-S22Q284TD20.

- Turn off the power when attaching the RB-S22Q284TD20 to the SDCB3.
- Turn off the power when loading Speech Synthesis LSIs into the RB-S22Q284TD20. Pin 1 is the position of the board silk ▲ at the bottom left with respect to the socket opening. The Figure 1 shows the setting directions of Speech Synthesis LSIs.
- The ML22Q284 supply voltages 2.0 to 5.5V. Use the RB-S22Q284TD20 with a power supply voltage of 3.0 to 5.5V. When connecting to SDCB3, the power supply voltage of RB-S22Q284TD20 is 3.0V.
- Connect jack to the mono speaker.

- RB-S22Q284TD20 is a device used only by experts in R&D facilities for research and development purposes. RB-S22Q284TD20 is not intended to be used in mass-produced products or parts thereof.
- The information in this document is subject to change without notice due to product improvement and technological improvement. Prior to use, please ensure that the information is up to date.
- LAPIS Technology does not provide any RB-S22Q284TD20 support. Replace only in case of initial failure.

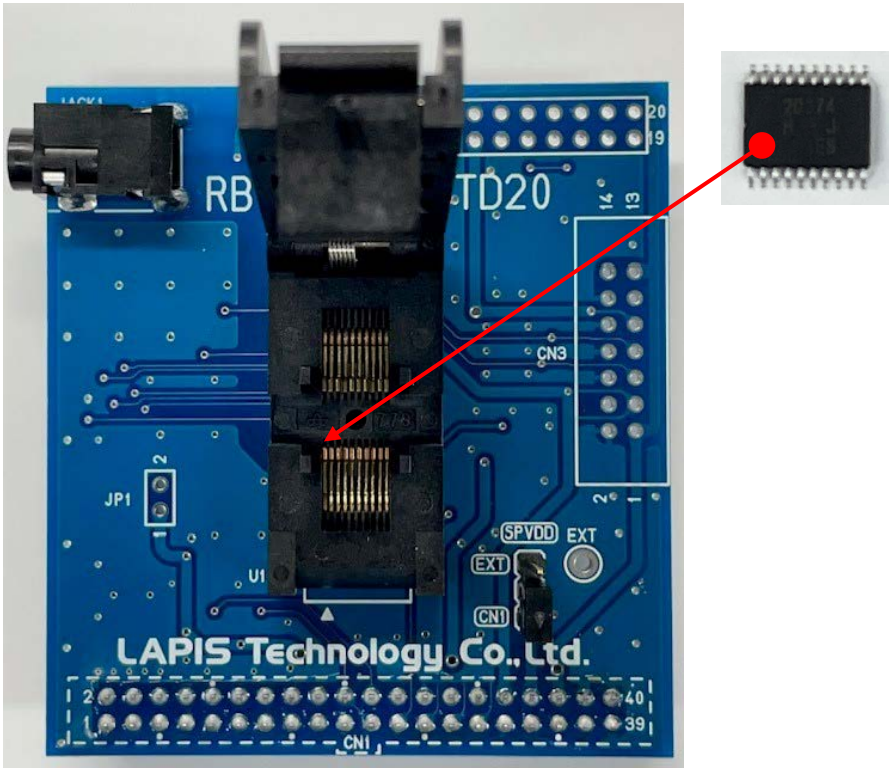


Figure 1 Outline Diagram

3. Specification

3.1. SPVDD jumper pin, EXT through hall

SPVDD jumper pin is jumper pin that switch the connection of SPVDD pin of Speech Synthesis LSIs.

SPVDD	Contents
CN1	SPVDD pin is connected to 34pin of CN1.
EXT	SPVDD pin is connected to the EXT through hall.

When supplying from SDCB3, set SPVDD jumper pin to CN1.
To supply from an external source, set SPVDD jumper pin to EXT and input SPVDD from the EXT through hole.

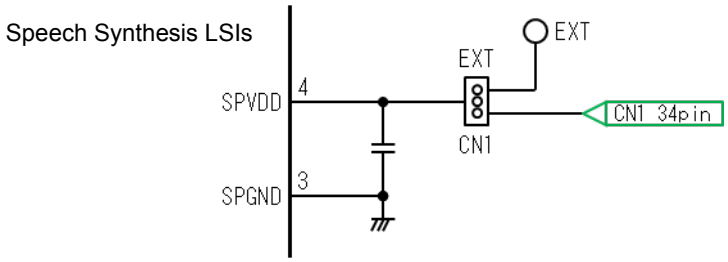


Figure 2 SPVDD jumper pin, EXT through hall

3.2. Jack

Jack is a jack where the signal from SPP,SPM pins of Speech Synthesis LSIs is output.
Connect a monaural speaker.

3.3. JP1 jumper terminal

JP1 jumper terminal is a jumper terminal that enables or disables the signal input from CN1 (SDCB3) to the input pin (RESET_N, TEST, WVIN4-0) of Speech Synthesis LSIs.

JP1 terminal Through hall	Contents
Not connect	Enables: Signals are input from CN1 to the input pins of Speech Synthesis LSIs.
Connect	Disables: No signals are input from CN1 to the input pins of Speech Synthesis LSIs.

When connecting to a SDCB3 for use, not connect the through holes of the JP1 jumper terminal.
When using this board alone, connect the through holes of the JP1 jumper terminal.
When this board is shipped, there is no connection between the through holes of the JP1 jumper terminal.

3.4. R12,R13 land

R12 is a pull up resistor mounting land for BUSYB pin of Speech synthesizer LSIs.
R13 is a pull down resistor mounting land for BUSYB pin of Speech synthesizer LSIs.
R12,R13 are not mounted at the time of shipment from this board.

BUSYB pin of Speech Synthesis LSIs select the pin status from COMS output, Nch open drain output, Pch open drain output, and Hi-Z output according to Code Option setting. (Refer to Speech LSI Utility User's Manual.)
When using BUSYB pin with Nch open drain output, mount resistor (10kΩ or less, size:1608) to R12 on the back of the board.
When using BUSYB pin with Pch open drain output, mount resistor (1kΩ or less, size:1608) to R13 on the back of the board.

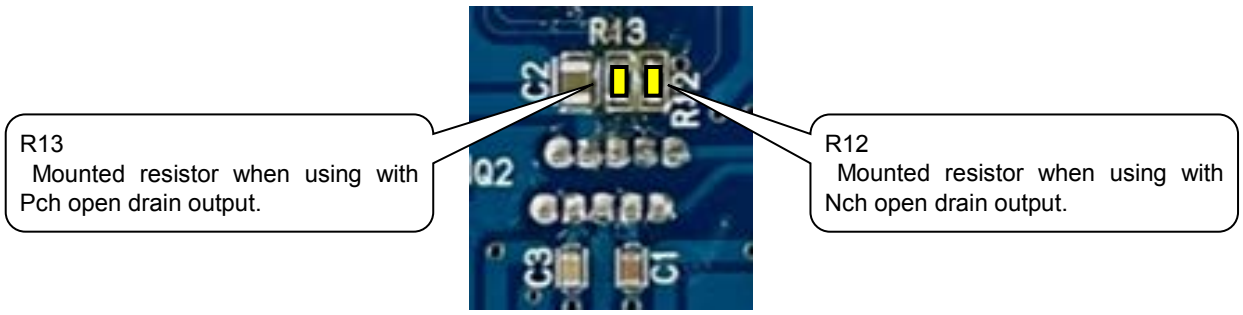


Figure 3 R12,R13 land

3.5. CN1 connector

CN1 connector is used to connect to SDCB3.

3.6. CN2 connector

CN2 connector is used to connect to the pins of Speech Synthesis LSIs.

CN2 Pin No	LSI		I/O	
	Pin No	Pin Name	SDCB3 connection	Single unit *2
1	1	SPP	O	O
2	2	SPM	O	O
3	3	SPGND	O	I
4	4	SPVDD *1	O	I
5	5	BUSYB	O	O
6	6	DGND	O	I
7	7	VDDL	O	O
8	8	DVDD *1	O	I
9	9	-	-	-
10	10	-	-	-
11	11	-	-	-
12	12	-	-	-
13	13	EVIN0	O	I
14	14	EVIN1	O	I
15	15	EVIN2	O	I
16	16	EVIN3	O	I
17	17	EVIN4	O	I
18	18	VPP	O	I
19	19	TEST	O	I
20	20	RESET_N	O	I

*1 Do not supply DVDD,SPVDD from CN2 when connecting SDCB3.
*2 When using a single unit, connect the terminals of JP1 jumper terminal. (Refer to 3.3 JP1 jumper terminal.)

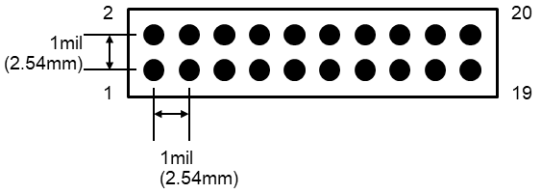


Figure 4 CN2 connectors hole pattern

4. Appendix

4.1. PCB layout

Figure 5 shows the RB-S22Q284TD20 PCB layout.

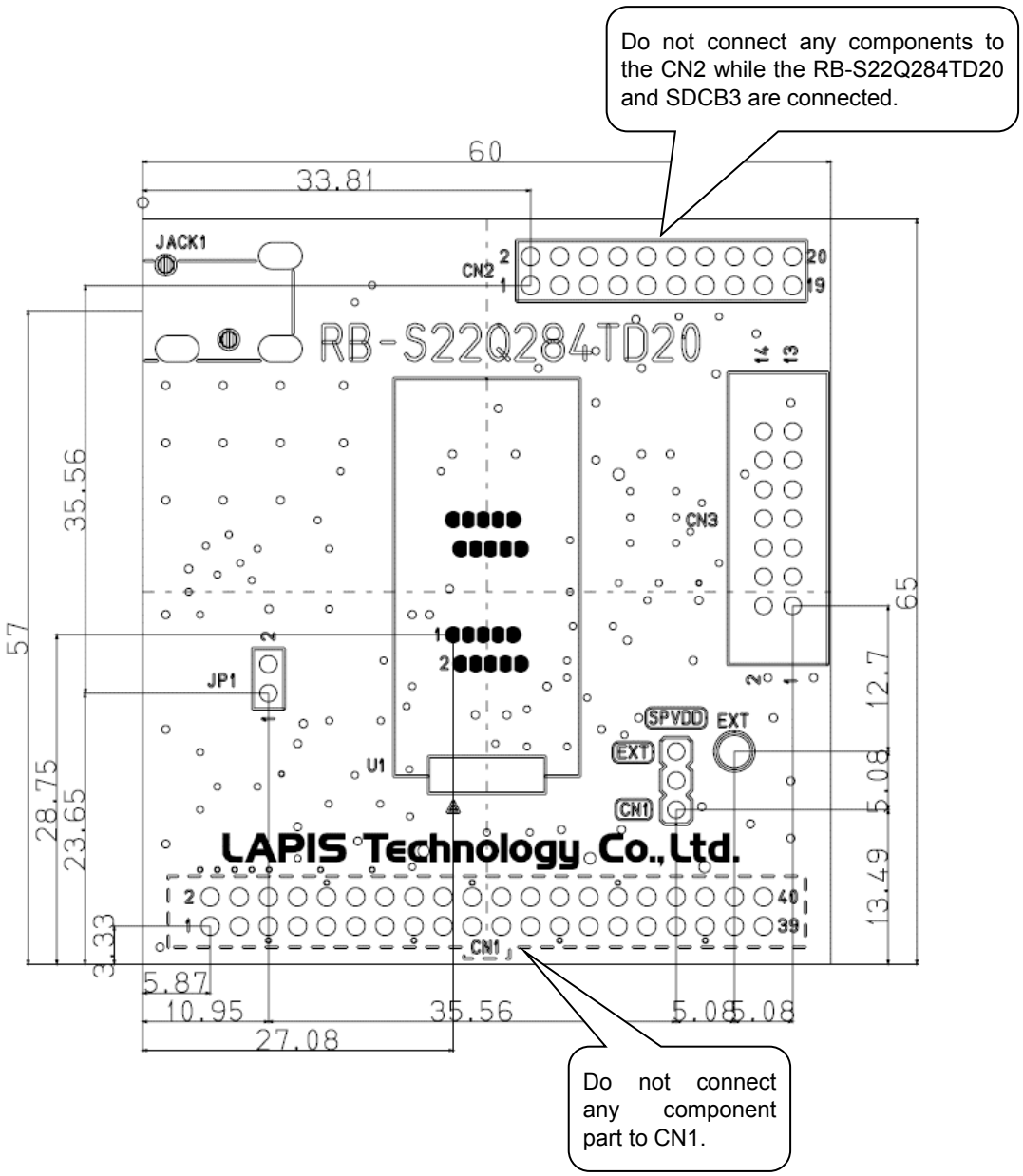
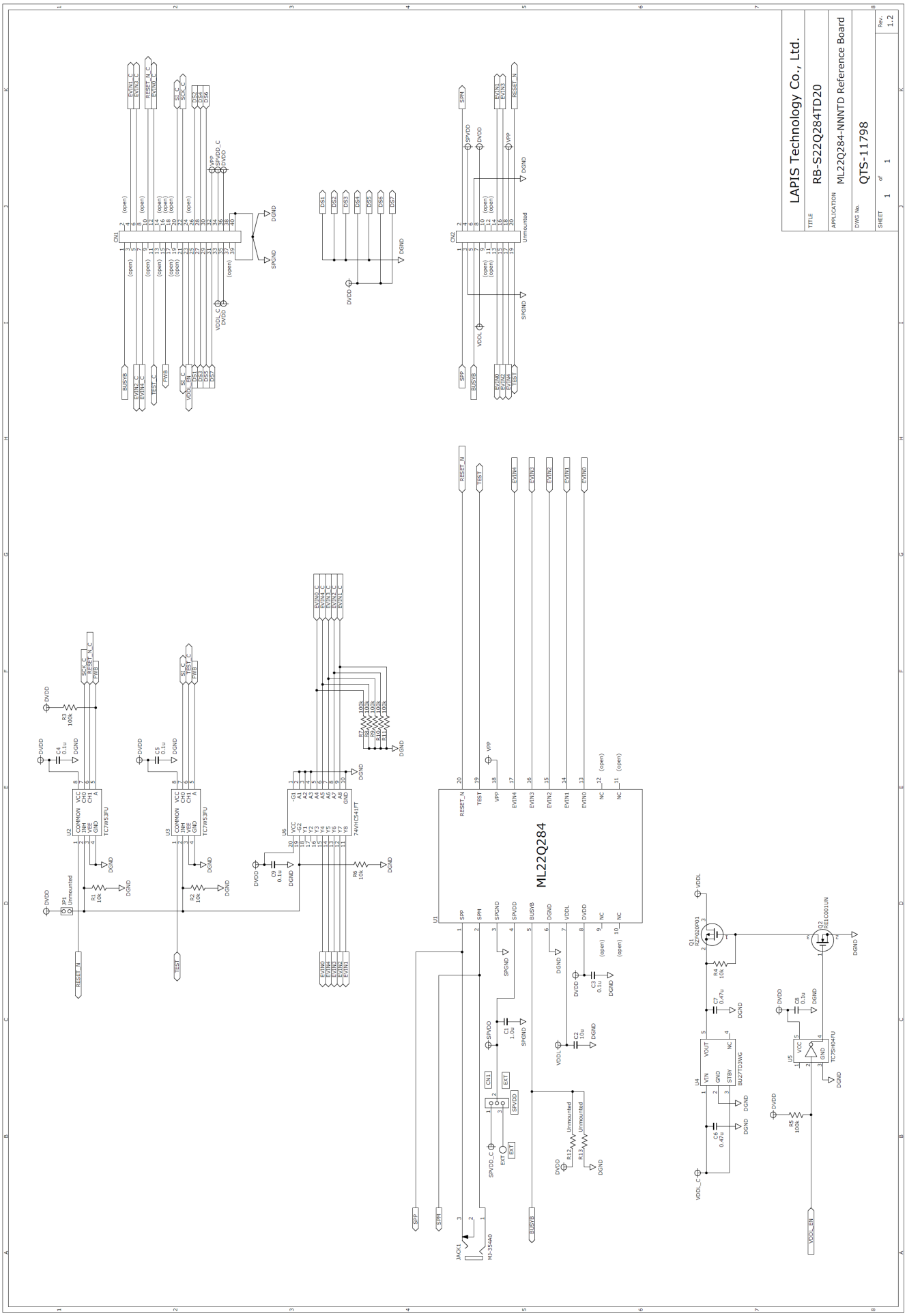


Figure 5 PCB layout

4.2. BOM list, Schematic

	Parts Number	Symbol	Contents	Qty.	Vendor
1	QTU-11924	RB-S22Q284TD20	PCB	1	LAPIS Technology Co., Ltd.
2	CGA3E1X7R1C105K080AC	C1	Ceramic Capacitor 1.0μF/16V X7R	1	TDK Corporation
3	EMK212ABJ106KD-T	C2	Ceramic Capacitor 10uF/16V X5R	1	TAIYO YUDEN Co., Ltd.
4	CGA3E2X7R1E104K080AA	C3,C4,C5,C8	Ceramic Capacitor 0.1μF/25V X7R	4	TDK Corporation
5	CGA3E1X7R1C474K080AC	C6,C7,C9	Ceramic Capacitor 0.47μF/16V X7R	3	TDK Corporation
6	HIF3FB-40DA-2.54DSA(71)	CN1	40pin Receptacle	1	Hirose Electric Co., Ltd.
7	-	CN2	Unmounted	1	-
8	-	CN3	Unmounted	1	-
9	-	EXT	Unmounted	1	-
10	MJ-354A0	JACK1	2-Conductor Miniature Jack	1	MARUSHIN ELECTRIC MFG. Co., Ltd.
11	-	JP1	Unmounted	1	-
12	RZF020P01TL	Q1	Pch MOSFET	1	ROHM Co., Ltd.
13	RE1C001UNTCL	Q2	Nch MOSFET	1	ROHM Co., Ltd.
14	MCR03EZPJ103	R1,R2,R4,R6	Resistor 10kΩ ±5%	4	ROHM Co., Ltd.
15	MCR03EZPJ104	R3,R5	Resistor 100kΩ ±5%	2	ROHM Co., Ltd.
16	MCR01EZPJ104	R7,R8,R9,R10, R11	Resistor 100kΩ ±5%	5	ROHM Co., Ltd.
17	-	R12,R13	Unmounted	2	-
18	A2-3PA-2.54DSA(71)	SPVDD	3pin Pin Header	1	Hirose Electric Co., Ltd.
19	IC51-0202-779	U1	TSSOP20 Socket	1	YAMAICHI ELECTRONICS Co., Ltd.
20	TC7W53FU	U2,U3	2-Channel Multiplexer/Demultiplexer	2	Toshiba Corporation
21	BU27TD3WG-TR	U4	LDO Regulators	1	ROHM Co., Ltd.
22	TC7SH04FU	U5	Inverter	1	Toshiba Corporation
23	74VHC541FT	U6	Octal Bus Buffer	1	Toshiba Corporation
24	HIF3GA-2.54SP	-	Short Pin	1	Hirose Electric Co., Ltd.


LAPIS Technology Co., Ltd.
TITLE RB-S22Q284TD20
APPLICATION ML22Q284-NNNTD Reference Board
DWG No. QTS-11798
SHEET 1 of 1
Rev. 1.2
ML22Q284
U1
U2 TC7W53FU
U3 TC7W53FU
U4 BU27TD3WG
U5 TC7SH04FU
U6 74VHC541FT
Q1 2SD2109P01
Q2 RE1C001UN
CN1
CN2
JACK1 MJ-354A0
JP1 Unmounted
SPVDD_C
VDDL_C
VDDL_EN

5. Revision History

Document No.	Issue Date	Page		Description
		Previous Edition	New Edition	
FEBL22Q284RB-01	January 29, 2021	–	–	First edition.