



Dear customer

ROHM Co., Ltd. ("ROHM"), on the 1st day of April, 2024,
has absorbed into merger with 100%-owned subsidiary of LAPIS Technology Co., Ltd.

Therefore, all references to "LAPIS Technology Co., Ltd.", "LAPIS Technology"
and/or "LAPIS" in this document shall be replaced with "ROHM Co., Ltd."

Furthermore, there are no changes to the documents relating to our products other than
the company name, the company trademark, logo, etc.

Thank you for your understanding.

ROHM Co., Ltd.
April 1, 2024

Dear customer

LAPIS Semiconductor Co., Ltd. ("LAPIS Semiconductor"), on the 1st day of October, 2020, implemented the incorporation-type company split (shinsetsu-bunkatsu) in which LAPIS established a new company, LAPIS Technology Co., Ltd. ("LAPIS Technology") and LAPIS Technology succeeded LAPIS Semiconductor's LSI business.

Therefore, all references to "LAPIS Semiconductor Co., Ltd.", "LAPIS Semiconductor" and/or "LAPIS" in this document shall be replaced with "LAPIS Technology Co., Ltd."

Furthermore, there are no changes to the documents relating to our products other than the company name, the company trademark, logo, etc.

Thank you for your understanding.

LAPIS Technology Co., Ltd.
October 1, 2020

ML62Q1235 Reference Board User's Manual

Issue Date: October 10, 2017



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Preface

This manual describes about the ML62Q1235 Reference Board : RB-D62Q1235TD20.

Refer to following documents when necessary.

- ML62Q1000 User's Manual
Describes about the microcontroller ML62Q1000 series.
- EASE1000 User's Manual
Describes about the On-chip emulator EASE1000.

1. Overview

1.1 Features

ML62Q1235 Reference Board is for learning how to use the ML62Q1235, on which adding external user components if necessary. Using ML62Q1235 Reference Board with LAPIS Semiconductor's on-chip emulator EASE1000 delivered with the software development environments, help user's software development and debugging and programming the Flash.

1.1.1 ML62Q1235 Reference Board features

- The board delivered with ML62Q1235 20pin TSSOP .
- The connector linked to ESE1000 is mounted.
- Through-holes for connecting the pins of LSI to external peripheral boards.
- The power supply is selectable, supplied from the on-chip emulator EASE1000 or CN1_3pin / CN2_2pin.
- LED is mounted (P20, P21, P22)

1.1.2 ML62Q1235 Reference Board Hardware specifications

The hardware specification of ML62Q1235 Reference Board is indicated to Table 1.

Table.1 ML62Q1235 Reference Board Hardware specifications

| | |
|---|--|
| Mounted LSI | U1 : ML62Q1235 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) |
| | P20-P22: LEDs |
| | R1-R3: Resistors for LEDs by P20 to P22 |
| | J3-J5: Jumper Chip for connecting LEDs |
| | CNE: Connector for EASE1000 (14pin connector) |
| | C1-C2: Capacitors for V _{DD} and V _{DDL} |
| | R4: Pull-up resistor for RESET_N |
| Pads (or/and) Through holes for mounting components | CN1-CN2: Connectors for user application system (25pin, 2.54mm pitch, φ 0.8mm) |
| Power check pin | VDD, VSS, UVDD: φ 0.8mm |
| Operating voltage | +1.6V to +5.5V |
| Board size | 55.88 mm x 93.98 mm |

See the schematic for more detail about connection of the mounted components.

1.2 ML62Q1235 Reference Board Outline Drawing

The Figure.1 show the ML62Q1235 Reference Board.

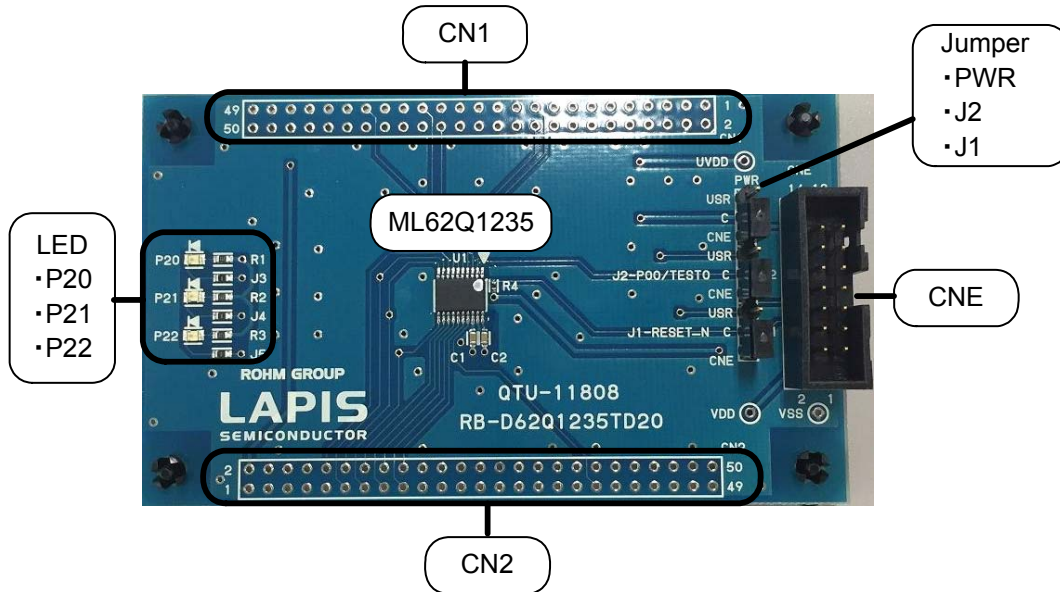


Fig.1 ML62Q1235 Reference Board Outline Drawing

2. Function of ML62Q1235 Reference Board

2.1 Power Circuit

V_{DD} can select the input from 3.3VOUT of EASE1000 or CN1_3pin / CN2_2pin by PWR jumper.

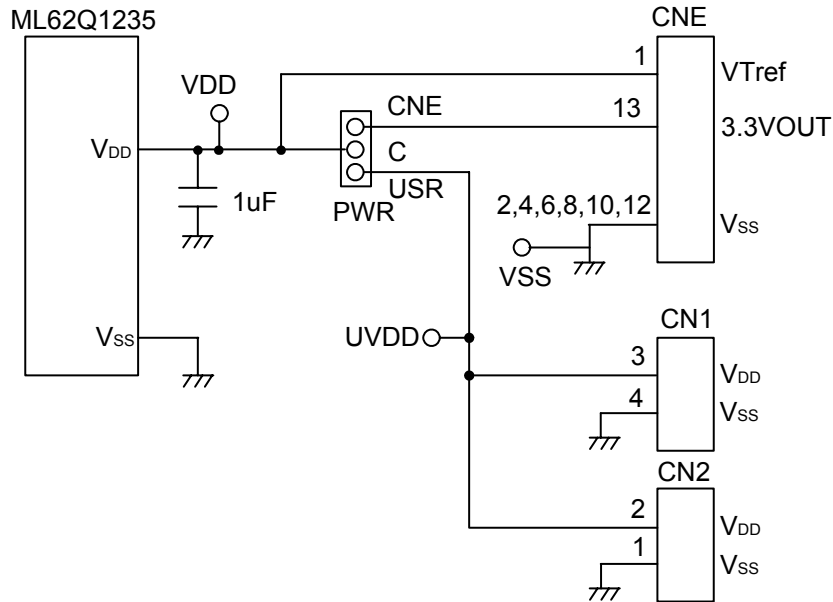


Fig.2 Power Circuit

[Note]

The power supply ON/OFF procedure in case of setting PWR jumper to the USB-side, and using EASE1000

- The procedure of power supply ON
 1. The USB cable of EASE1000 is connected.
 2. The power supply of user target system is turned on..
- The procedure of power supply OFF
 1. The power supply of user target system is turned off
 2. The .USB cable of EASE1000 is removed

2.2 Connector for EASE1000 (CNE)

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

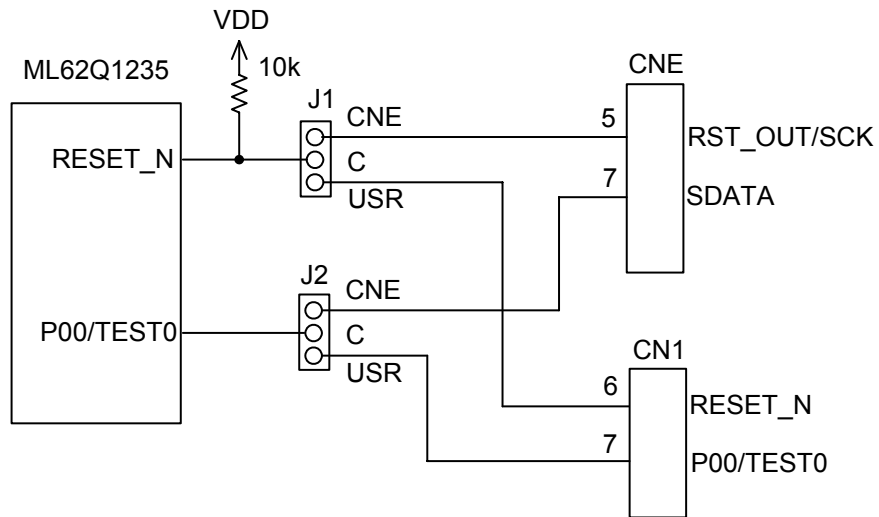


Fig.3 EASE1000 Interface

[Note]

P00/TEST0 pin:

P00/TEST0 pin of ML62Q1235 is initially set as the pulled-up input mode.

When using EASE1000 do not set it as an output mode by the application program, otherwise EASE1000 cannot communicate with the ML62Q1235.

2.3 LED (P20, P21, P22)

P20-P22 of the ML62q1235 are ports that can directly drive a LED. The Ports are connected to the LEDs through jumper-chip. Remove the jumper-chip when not using the LEDs.

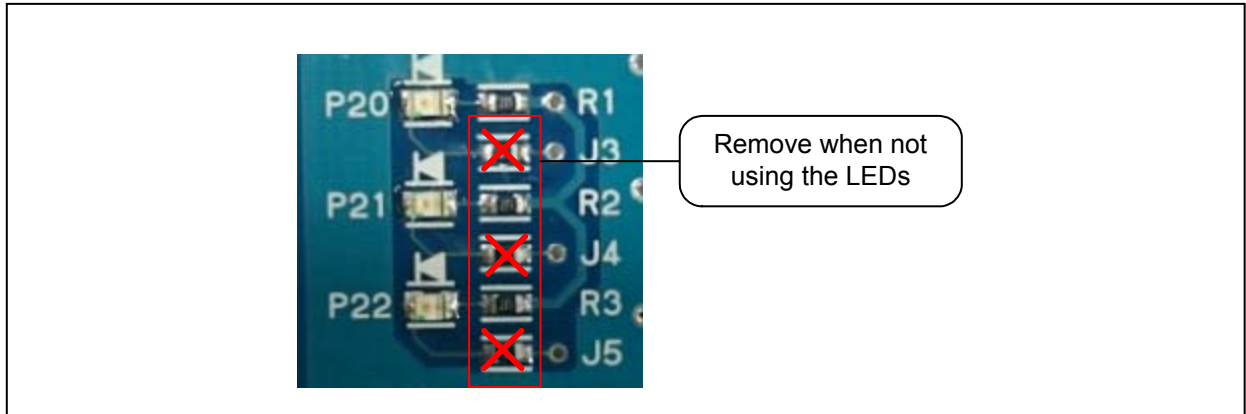


Fig.4 Jumper-chip removal of LEDs

3. User Interface

Table 2. show the pin list of the ML62Q1235 Reference Board user interface connector CN1 and CN2.

Table 2. ML62Q1235 Reference Board CN1/CN2

| CN1 | NAME | CN1 | NAME | CN2 | NAME | CN2 | NAME |
|-----|-----------------|-----|------|-----|-----------------|-----|------|
| 1 | N.C. | 26 | N.C. | 1 | V _{SS} | 26 | N.C. |
| 2 | N.C. | 27 | N.C. | 2 | V _{DD} | 27 | N.C. |
| 3 | V _{DD} | 28 | N.C. | 3 | N.C. | 28 | N.C. |
| 4 | V _{SS} | 29 | N.C. | 4 | N.C. | 29 | N.C. |
| 5 | N.C. | 30 | P04 | 5 | N.C. | 30 | N.C. |
| 6 | RESET_N | 31 | P05 | 6 | N.C. | 31 | N.C. |
| 7 | P00/TEST0 | 32 | N.C. | 7 | N.C. | 32 | N.C. |
| 8 | N.C. | 33 | N.C. | 8 | N.C. | 33 | N.C. |
| 9 | N.C. | 34 | N.C. | 9 | N.C. | 34 | N.C. |
| 10 | N.C. | 35 | N.C. | 10 | P17 | 35 | N.C. |
| 11 | N.C. | 36 | N.C. | 11 | P20 | 36 | N.C. |
| 12 | N.C. | 37 | P13 | 12 | P21 | 37 | P33 |
| 13 | N.C. | 38 | N.C. | 13 | P22 | 38 | N.C. |
| 14 | N.C. | 39 | N.C. | 14 | P23 | 39 | N.C. |
| 15 | N.C. | 40 | N.C. | 15 | P24 | 40 | N.C. |
| 16 | N.C. | 41 | N.C. | 16 | P25 | 41 | N.C. |
| 17 | N.C. | 42 | N.C. | 17 | P26 | 42 | N.C. |
| 18 | N.C. | 43 | N.C. | 18 | P27 | 43 | N.C. |
| 19 | P02 | 44 | N.C. | 19 | N.C. | 44 | N.C. |
| 20 | P03 | 45 | N.C. | 20 | N.C. | 45 | N.C. |
| 21 | N.C. | 46 | N.C. | 21 | N.C. | 46 | N.C. |
| 22 | N.C. | 47 | N.C. | 22 | N.C. | 47 | N.C. |
| 23 | N.C. | 48 | N.C. | 23 | N.C. | 48 | N.C. |
| 24 | N.C. | 49 | N.C. | 24 | N.C. | 49 | N.C. |
| 25 | N.C. | 50 | N.C. | 25 | N.C. | 50 | N.C. |

N.C. : Non-Connection

4. Precaution for use

- (1) The ML62Q1235 Reference Board is an unfinished product and intended for research and development and for expert use in the research and development facility only. The ML62Q1235 Reference Board is not intended for use for volume production or parts thereof.
- (2) Since the content specified herein is subject to change for improvement without notice, confirm the content is the latest when using the board.
- (3) See another documents ML62Q1000 series user's manual and EASE1000 user's manual when using the ML62Q1235 Reference Board.
- (4) Confirm the final electrical characteristics by using the mass production parts on your mass production boards.
- (5) LAPIS support replacing the board for an initial failure soon after the shipment, can not support repairing the board.
- (6) ML62Q1235 Reference Board have signal patterns on the underside, it might work in abnormal if using on conductive materials. Use it on insulating materials or having any preventable parts.

5. PCB specification, BOM and Schematic

5.1 ML62Q1235 Reference Board PCB specification

Figure 5. shows the Reference Board PCB dimensional outline drawing and layout of components.

PCB part number:
RB-D62Q1235TD20

Dimension:
55.88 mm x 93.98 mm

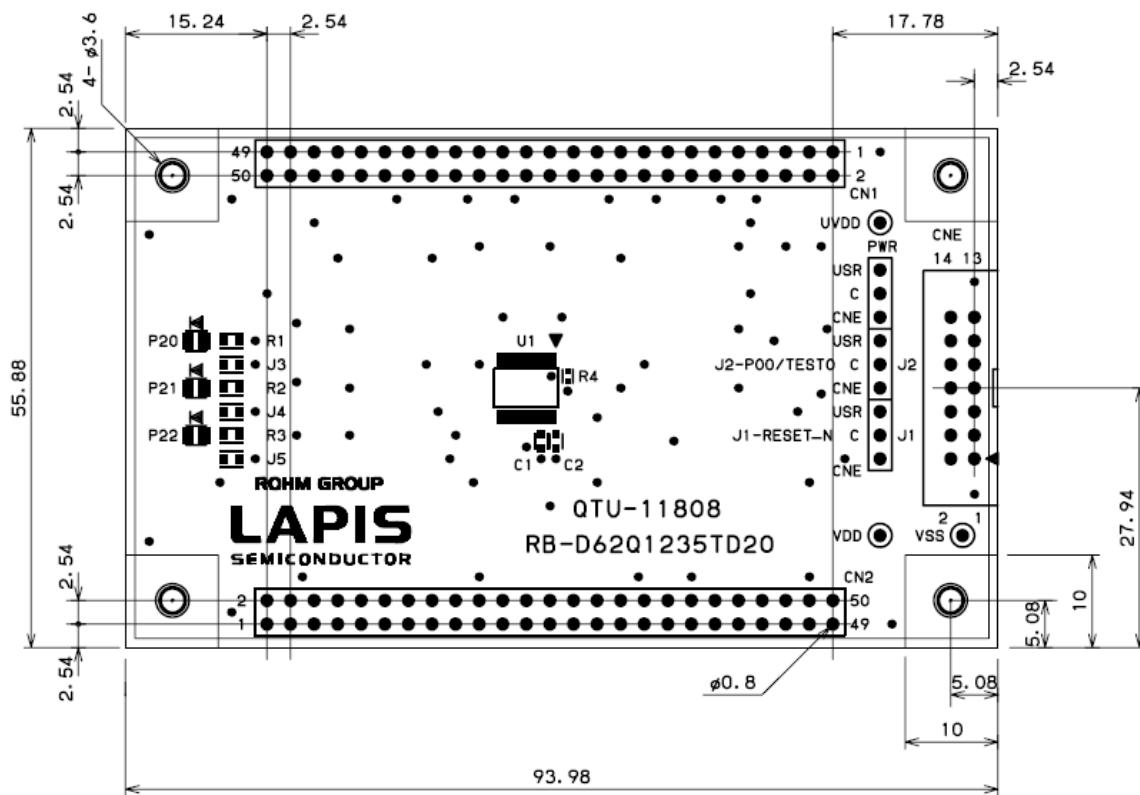


Fig.5 Reference Board PCB dimensional outline drawing and layout of components (Top view)

5.2 ML62Q1235 Reference Board BOM

Table 3. Reference Board BOM

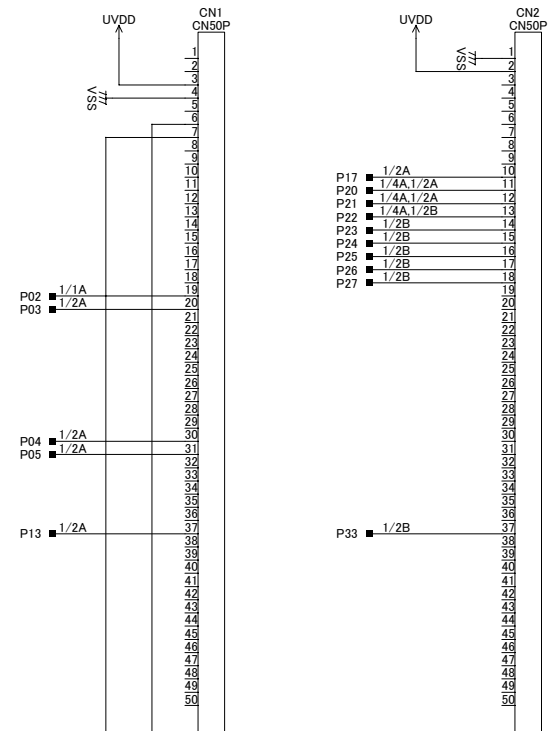
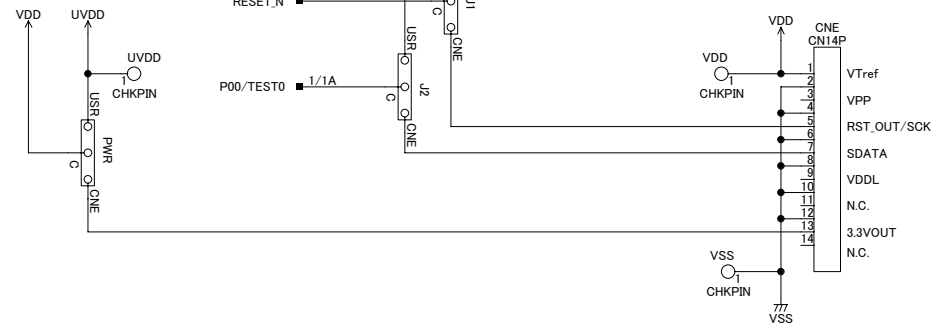
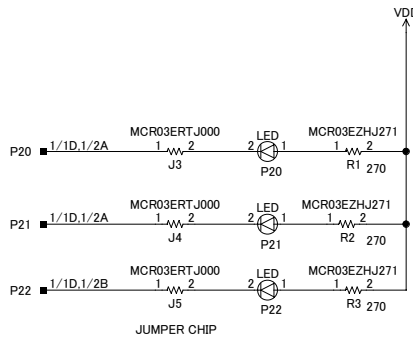
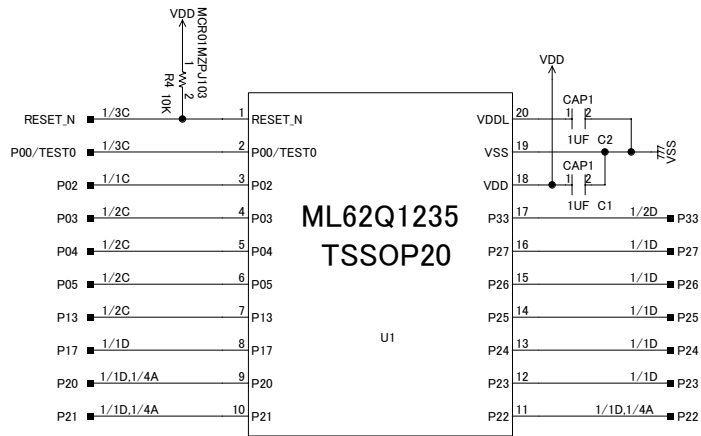
| | Parts Number | Silk | Contents | Package Type | Qty. | Maker |
|----|----------------------------------|-----------------|------------------------------|-------------------|------|------------------|
| 1 | QTU-11808 | RB-D62Q1235TD20 | PCB | - | 1 | LAPIS |
| 2 | ML62Q1235TSSOP20 | U1 | ML62Q1235TSSOP20 | TSSOP20 | 1 | LAPIS |
| 3 | MCR03ERTJ000 | J3, J4, J5 | Jumper Chip | 1608(1.6x0.8mm) | 3 | ROHM |
| 4 | SML-210PT | P20, P21, P22 | ChipLED (Green) | 2012(2.0x1.2mm) | 3 | ROHM |
| 5 | MCR03EZHZ271 | R1, R2, R3 | Chip Resistor 270Ω | 1608(1.6x0.8mm) | 3 | ROHM |
| 6 | MCR01MZPJ103 | R4 | Chip Resistor 10kΩ | 1005(1.0x0.5mm) | 1 | ROHM |
| 7 | GRM188R7YA105KA12D | C1, C2 | Ceramic Capacitor 1uF/35V | 1608(1.6x0.8mm) | 2 | MURATA |
| 8 | HIF3FC-14PA-2.54DSA | CNE | 14pin Connector | 14pin DIP | 1 | HIROSE |
| 9 | A2-3PA-2.54DSA | J1, J2, PWR | 3pin Pin_Header | 3pin DIP Straight | 3 | HIROSE |
| 10 | HIF3GA-2.54SP | - | Short pin | - | 3 | HIROSE |
| 11 | FF013-AR79 | - | Rubber leg | - | 4 | KOYO FASTENER |
| 12 | P3555 | - | Push rivet | - | 4 | KOYO FASTENER |
| 13 | A1-50PA-2.54DSA (Un-mounting) | CN1, CN2 | 50pin 2.54pitch φ0.8 mm | 50pin Straight | 2 | HIROSE |
| 14 | Check Pin (Un-mounting) | VDD, VSS | φ0.8 mm | - | 2 | - |

[Note]

- The diameter of through hole of CN1 and CN2 is 0.8 mm.
Using CN1 and CN2, the diameter of connector pin should use the connector below 0.8mm, such as 0.5mm.
- The parts may be changed into another parts with equivalent part special quality.

5.3 ML62Q1235 Reference Board Schematic

The next page shows the schematic of ML62Q1235 Reference Board



| | | |
|-------------------------------------|--------------------|-----------------------------|
| LAPIS SEMICONDUCTOR CO.,LTD. | | |
| TITLE | RB-D62Q1235TD20 | |
| APPLICATION | ML62Q1235TSSOP20RB | |
| DWG NO | QTS-11668 | |
| DRAWN By | SHEET | 9-7-2016_16:40 1/1 REV 1.00 |

REVISION HISTORY

| Document No. | Date | Page | | Description |
|------------------|-------------------|------------------|-----------------|--------------------------|
| | | Previous Edition | Current Edition | |
| FEBL62Q1235RB-01 | November 8, 2016 | - | - | First Edition |
| FEBL62Q1235RB-02 | September 1, 2017 | 4 | 4 | Fig1: Changed |
| | | 11 | 11 | Table3: Corrected C1, C2 |
| FEBL62Q1235RB-03 | October 10,2017 | 11 | 11 | Table3: Corrected C1, C2 |