

*Bluetooth*TM Module

EYSF2SSXX (RF+Baseband (Class 2) USB Interface)

Specification report

In case you adopt this module and design some appliance,
Please ask for the latest specifications to the local sales
office.

EYSF2SSXX

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Document constituent list

| Control name | Control No. | Document Page |
|----------------------------|---------------|---------------|
| General Items | HD-AG-A991412 | 1/1 |
| Absolute maximum ratings | HD-AM-A991412 | 1/1 |
| Electrical characteristics | HD-AE-A991412 | 1/5 -5/5 |
| Circuit schematic | HD-MC-A991412 | 1/2 -2/2 |
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| Pin Layout | HD-BA-A991412 | 1/1 |
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Rev. record

7-MAR-2001> Newly issued

12-MAR-2001> Up-date

8-MAY-2001> Up-date

3-SEP-2001> Up-date

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|-------------------------------|-------|-------------------------------|
| Control No. HD-AG-A 991412 | (1/1) | Control name General Items |
|-------------------------------|-------|-------------------------------|

Scope

These specification apply to the hybrid IC “EYSF2SSXX” for use **Bluetooth**™ module by TAIYO YUDEN Co., Ltd.

1. Model Name:

EYSF2SSXX (USB I/F Support)

2. Function: Radio frequency transfer Module (power class 2). **Bluetooth**™ standard Ver 1.1 conformity

3. Use: Note PC, PDA and Cellular Phone

4. Structure: Hybrid IC loaded with silicon monolithic semiconductor

5. Outline: 18 pin leadless chip carrier

6. Marking: Model name, BD_ADDR, Lot No. and manufacturer on Shielding Case.

7. Features:

-**Bluetooth**™ 1.1 Qualified

-USB 1.1 Specification compatible

Full-Speed support

-USB Sideband signal

-Point-to-Multipoint (7 Slaves)

-Encryption

-Hold, Sniff Mode

-Supported Link Type : ACL

8. Packing:

Packaging method : Tray & aluminum moisture barrier bag

Packaging unit : 8*6=48 pieces/tray

Material of tray : PPE (Heat proof 135deg)

Tray Specification : JEDEC STD No. 95-1 Section 10 Revision C

9.Note:

a. Any queries arisen to the specifications shall be solved by arrangement.

b. Avoid use under the circumstance of radiation.

c. The operating conditions for the guarantee of this product are as shown in the drawing for specifications. Please note that TAIYO YUDEN Co., Ltd. Shall be irresponsible for a failure and/ or abnormality which are caused by use under the conditions other than the aforesaid operating conditions.

d. All electronic components listed in this catalog are developed, designed and intended for use in general electronics equipment (for AV, household, office supply, information service, telecommunications, etc.). Before using the components in any medical equipment, space equipment, disaster prevention equipment, etc. where higher safety and reliability are duly required the applicability and suitability of the electronics components must be fully evaluated to ensure correct operation in these type of specific conditions or installed in special equipment where a high concern for safety and reliability exist, evaluation of the safety function of the said components shall be thoroughly performed and when applicable a protective circuit shall be added in design stage.

This module is still under development, thus specifications do not guarantee both the quality and reliability at the time of shipment. Since the specifications and mass production of the module are not confirmed either, the contents of the technical notes are subject to change without any prior notice.

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| Control No. HD-AM-A 991412 | (1/1) | Control name Absolute maximum ratings |
|-------------------------------|-------|--|

Absolute maximum ratings

| Item | Symbol | Rating | | | Unit | Remark |
|----------------|--------|--------|------|------|------|--------|
| | | Min. | Typ. | Max. | | |
| Supply voltage | VDD | -0.3 | | 5.5 | V | |

Recommendation operating range

| Item | Symbol | Rating | | | Unit | Remark |
|---------------------------------------|--------|--------|------|------|-----------|--------------------------|
| | | Min. | Typ. | Max. | | |
| Supply voltage | VDD | 3.15 | 3.3 | 5.5 | V | |
| Supply voltage ripple and spike noise | VDD_rn | | | 20 | mVp-p | |
| Operation temperature range | Topr | 0 | 25 | 70 | degrees C | Humidity=40%RH Note 1 |

Note:

- 1.Operation temperature range is set to satisfy products electrical characteristics for a short period of time.
Refer reliability condition to check the product life cycle if you use this module for a long period of time in the condition other than the Typ. standard.

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| Control No. HD-AE-A 991412 | (1/5) | Control name Electrical characteristics |
|-------------------------------|-------|--|

Electrical characteristics

DC Specifications

The Specification applies for Ta=0 to +70 degrees C, VDD=3.15 to 5.5V

| No. | Parameter | Condition | Symbol | Min | Typ | Max | Unit | Remark |
|-----|-----------------------------|---------------------------|--------|------|------|------|------|------------|
| 1 | Normal supply voltage | | VDD | 3.15 | 3.3 | 5.5 | V | |
| 2 | Input low voltage | D+,D- | VIL1 | - | | 0.8 | V | |
| 3 | Input low voltage | DETACH | VIL2 | -0.3 | | 0.56 | V | |
| 4 | Input low voltage | BTM_ON | VIL3 | 0 | | 0.2 | V | |
| 5 | Input low voltage | /RESET | VIL4 | 0 | | 0.6 | V | Note 1 |
| 6 | Input High voltage (driven) | D+,D- | VIH1 | 2.0 | | 3.08 | V | |
| 7 | Input High voltage | DETACH | VIH2 | 2.47 | | 3.11 | V | |
| 8 | Input High voltage | BTM_ON | VIH3 | 2.0 | | VDD | V | |
| 9 | Input High voltage | /RESET | VIH4 | - | | - | V | Note 1 |
| 10 | Output low voltage | D+,D- | VOL1 | - | | 0.3 | V | |
| 11 | Output low voltage | WAKE_UP | VOL2 | - | | 0.4 | V | IOL=0.8mA |
| 12 | Output High voltage | D+,D- | VOH1 | 2.8 | | 3.08 | V | |
| 13 | Output High voltage | WAKE_UP | VOH2 | 2.31 | | 3.08 | V | IOH=-200uA |
| 14 | Peak current | Continuous Rx | Icp1 | | 80 | 120 | mA | |
| 15 | Average current1 | Hold mode (Slave only) | Icca1 | | (55) | | mA | |
| 16 | Average current2 | Standby mode | Icca2 | | (42) | | mA | |
| 17 | Average current3 | Send DM1packet | Icca3 | | 62 | | mA | |
| 18 | Average current4 | Receive DM1packet | Icca4 | | 60 | | mA | |

Note:

1. /RESET signal must be driven by open drain. Please input low voltage or open.

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| Control No. HD-AE-A 991412 | (2/5) | Control name Electrical characteristics |
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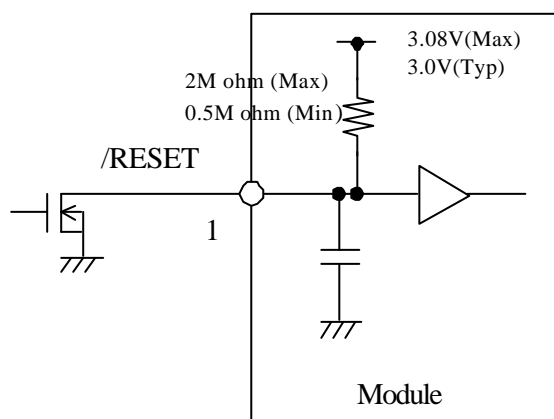
AC Specifications

The Specification applies for Ta=0 to +70 degrees C, VDD=3.15 to 5.5V

| No. | Parameter | Condition | Symbol | Min | Typ | Max | Unit | Remark |
|-----|---|-------------|--------|-----|-----|-----|------|---------|
| 1 | VDD Rise Time from 0V to 3.15V (see Notes 1) | | t1 | | | 2 | ms | |
| 2 | VDD 2.0V to BTM_ON 2.0V | VDD=>BTM_ON | t2 | 0 | | | ms | Notes 3 |
| 3 | /RESET High-Z to Module Ready | | t3 | | | 600 | ms | Notes 4 |
| 4 | /RESET Pulse Width (see Notes 2) | | t4 | 1 | | | ms | |
| 5 | DETACH Low to USB_I/F Active | | t5 | 0 | | 1 | ms | |
| 6 | DETACH High to USB_I/F High-Z | | t6 | | | 1 | ms | |
| 7 | DETACH High to WAKE_UP High | | t7 | 1 | | | s | |
| 8 | DETACH Low to WAKE_UP Low | | t8 | | | 1 | ms | |
| 9 | BTM_ON 0.2V to VDD 0.2V | VDD=>BTM_ON | t9 | 0 | | | ms | Notes 3 |
| 10 | BTM_ON High to /RESET High-Z | | t10 | 0 | | | ms | |
| 11 | /RESET Low to BTM_ON Low | | t11 | 0 | | | ms | |
| 12 | DETACH Low to BTM_ON Low | | t12 | 0 | | | ms | |

Notes:

1. If t1 is not satisfied the rise time, input /RESET signal of 1ms or more in condition of VDD at over 3.15V and BTM_ON in "High".
2. /RESET signal must be driven by open drain output. Pull-up resistor inside the Module is 1M ohm (Typ.). See the figure below.
3. Input voltage of BTM_ON pin should not exceed VDD voltage.
4. It may change due to the firmware version. See the figure below.

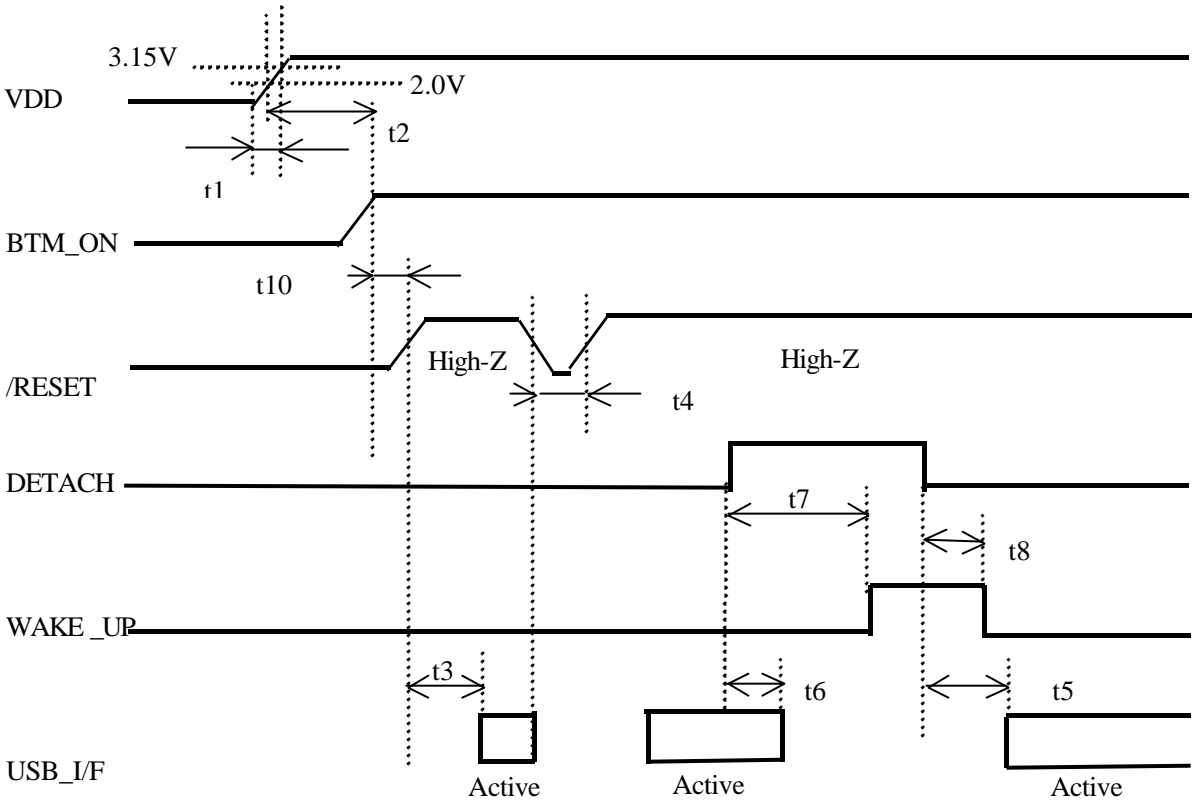


Equivalent Circuit of Internal Reset

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| Control No. HD-AE-A 991412 | (3/5) | Control name Electrical characteristics |
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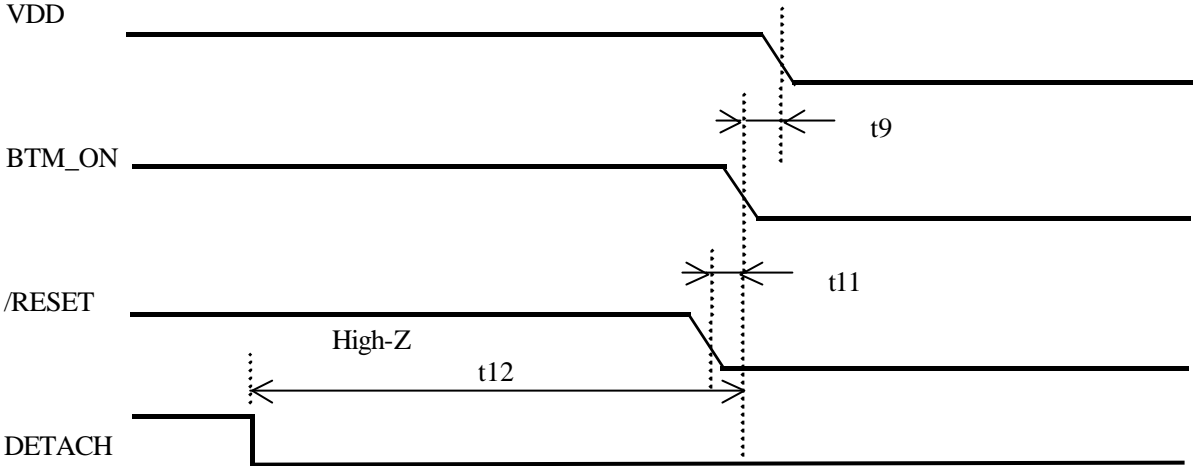


Timing Diagram for Power Up Sequence

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| Control No. HD-AE-A 991412 | (4/5) | Control name Electrical characteristics |
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Timing Diagram for Power Down Sequence

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| | | |
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| Control No. HD-AE-A 991412 | (5/5) | Control name Electrical characteristics |
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RF Specifications

The Specification applies for Ta=25 degrees C, VDD=3.3V

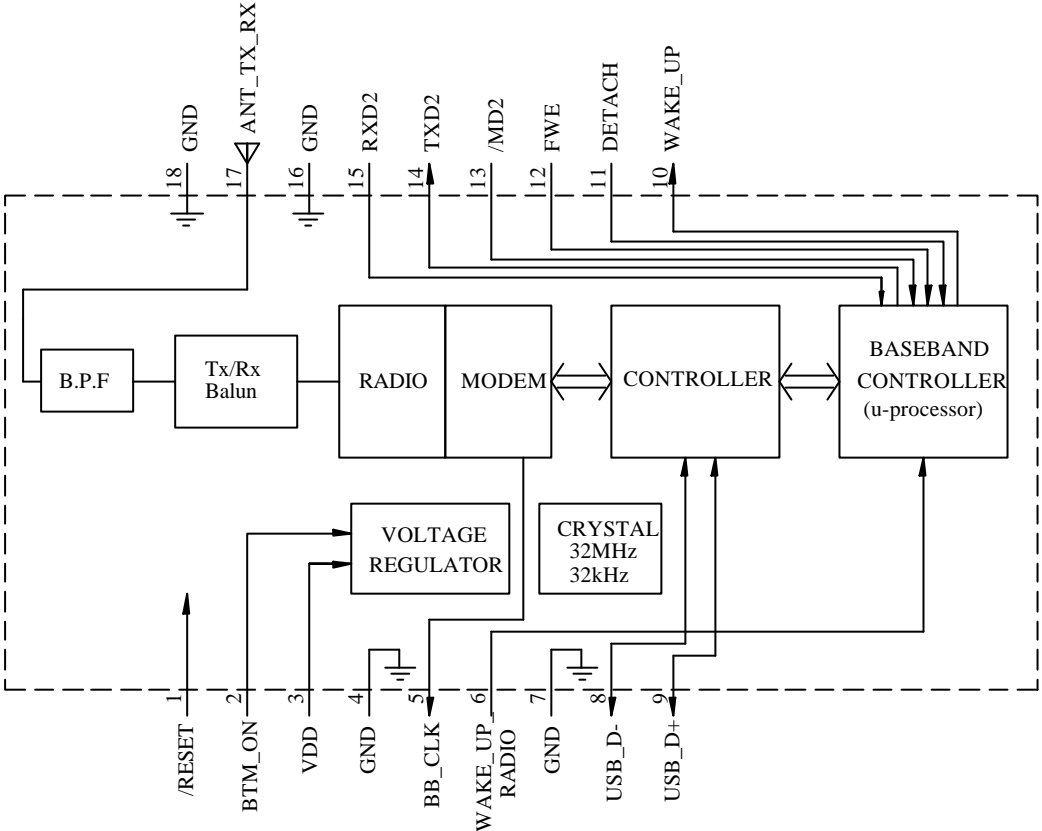
| No. | Parameter | Condition | Symbol | Min | Typ | Max | Unit | Remark |
|-----|-----------------------|------------------|----------------|------|-----|------|------|-----------|
| 1 | Frequency range | | Freq. | 2402 | | 2480 | MHz | |
| 2 | Tx power | | P ₀ | -6 | -2 | +4 | dBm | |
| 3 | Output Load VSWR | at 50 ohm System | VSWR | | | 5:1 | | No Damage |
| 4 | Rx sensitivity | | SEN | | -80 | -70 | dBm | |
| 5 | C/I co-channel | | CIC | | | 14 | dB | |
| 6 | C/I 1MHz | | CI1 | | | 0 | dB | |
| 7 | C/I 2MHz | | CI2 | | | -30 | dB | |
| 8 | C/I >3MHz | | CI3 | | | -40 | dB | |
| 9 | Out of band spurious1 | 30MHz to 1GHz | OSE1 | | | -36 | dBm | |
| 10 | Out of band spurious2 | 1 to 12.75GHz | OSE2 | | | -30 | dBm | |

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| Control No. HD-MC-A 991412 | (1/2) | Control name Circuit Schematic |
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Block Diagram

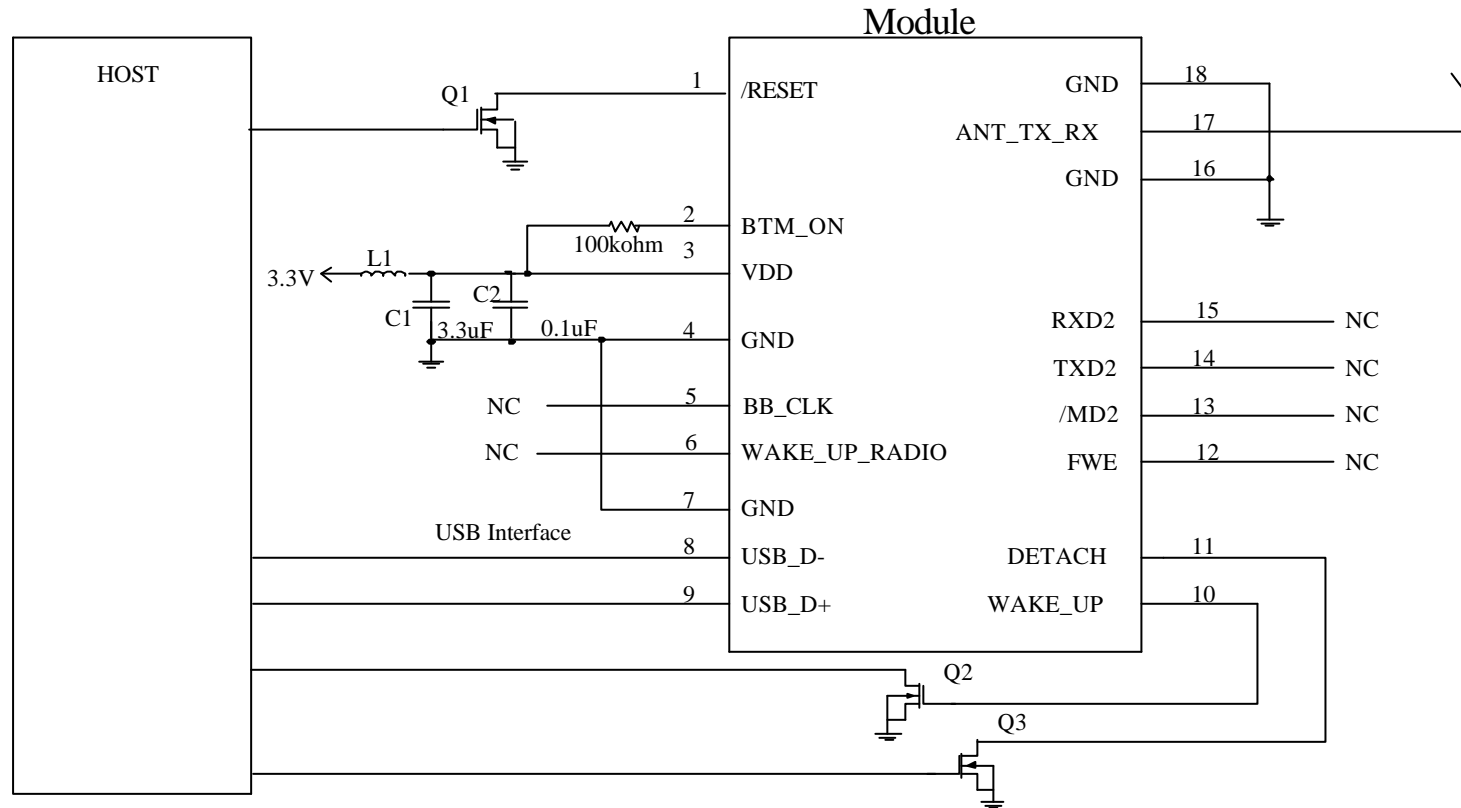


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| Control No. HD-MC-A 991412 | (2/2) | Control name Circuit schematic |
|-------------------------------|-------|-----------------------------------|

Example of operating circuit



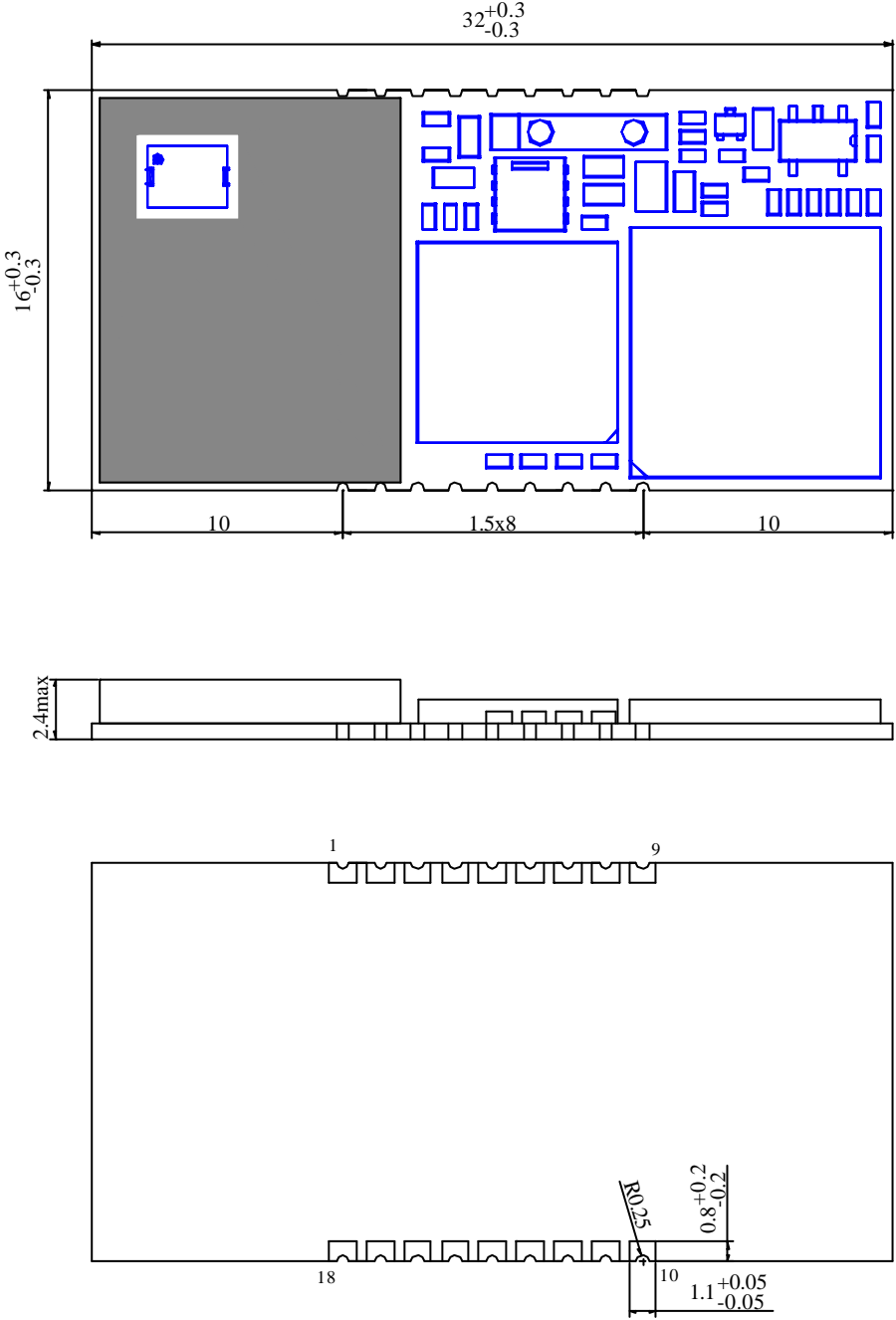
- L1: FBMH1608HM221(TAIYO YUDEN CO.,Ltd.)
- C1: LMK316BJ335K(TAIYO YUDEN CO.,Ltd.)
- C2: UMK212BJ104K(TAIYO YUDEN CO.,Ltd.)
- Q1,Q2,Q3: 2SK2158

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| Control No. HD-AD-A 991412 | (1/2) | Control name Outline/Appearance |
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Unit:mm



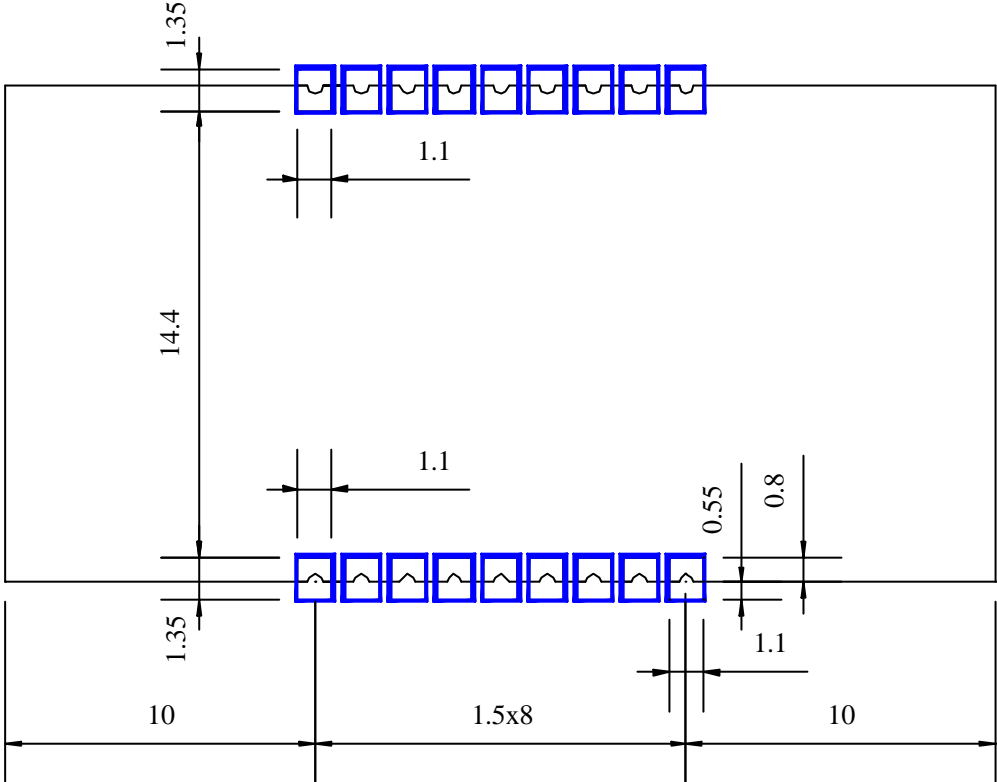
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| Control No. HD-AD-A 991412 | (2/2) | Control name Outline/Appearance |
|-------------------------------|-------|------------------------------------|

LAND PATTERN EXAMPLE

Unit: mm



Caution

Do not wire on mother board except ground pattern where reverse side of module to be placed.

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| | | |
|-------------------------------|-------|----------------------------|
| Control No. HD-BA-A 991412 | (1/1) | Control name Pin Layout |
|-------------------------------|-------|----------------------------|

Pin Descriptions

| No. | Pin Name | Type | Direction | Description | Block |
|-----|---------------|-------|-----------|--|-----------------|
| 1 | /RESET | CMOS | Input | Active low reset, see note 3 | |
| 2 | BTM_ON | CMOS | Input | When tied to VDD, the module is enabled. | |
| 3 | VDD | Power | Power | Power Supply Voltage | Power supply |
| 4 | GND | Power | Power | Signal ground | |
| 5 | BB_CLK | CMOS | Output | Do not connect -Baseband Clock Check port | |
| 6 | WAKE_UP_RADIO | CMOS | Input | Do not connect | |
| 7 | GND | Power | Power | Signal ground | |
| 8 | USB_D- | CMOS | In/Out | USB data pin, see note 1 | USB |
| 9 | USB_D+ | CMOS | In/Out | USB data pin, see note 1 | |
| 10 | WAKE_UP | CMOS | Output | Indicates that the module wants to be attached to the USB, active high, see note 2 | |
| 11 | DETACH | CMOS | Input | Indicates that the USB host wants to detach the module, active high, see note 2 | |
| 12 | FWE | CMOS | Input | Do not connect -Flash ROM write port | Flash ROM Write |
| 13 | /MD2 | CMOS | Input | Do not connect -Flash ROM write port | |
| 14 | TXD2 | CMOS | Output | Do not connect -Flash ROM write port | |
| 15 | RXD2 | CMOS | Input | Do not connect -Flash ROM write port | |
| 16 | GND | Power | Power | Radio Frequency Ground | RF |
| 17 | ANT_TX_RX | RF | In/Out | 50 ohm Antenna connection | |
| 18 | GND | Power | Power | Radio Frequency Ground | |

Note: The CMOS buffers are low voltage TTL compatible signals.

Notes

- 1: Full-speed of USB 1.1 specification is supported. (D + line is internally pulled up by 1.5k ohm resistor.)
- 2: The output high voltage and input high voltage of these pins listed Pin 10 and Pin 11 is usually 3.0V. In case there is a mismatch of interface voltage between Host and our module, please use the level shift buffer or other proper way for these signals. When you don't use DETACH and WAKE_UP function, please connect DETACH pin to GND and open WAKE_UP pin.
DETACH pin is internally pulled up toward 3.0V (Typ) or 3.08V (Max) by 100k ohm.
- 3: /RESET signal must be driven by open drain output. Pull-up resistor is not needed externally.

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|----------------------|--------------------------------|
| Control No. (1/1) | Control name Reflow profile |
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