General Description

BP35C0-J11 is a Wi-SUN Route-B, Enhanced HAN compatible wireless communication module.

Features

- RF designed
- Antenna terminal 50Ω impedance adjusted
- Transmission output power adjusted
- Built-in certified Wi-SUN software stack

Package

W (Typ.) x D (Typ.) x H (Typ.)
19.0 mm x 15.0 mm x 2.6 mm

Major Performance

Parameter	Description
Radio standards	Compliant with ARIB STD-T108
Radio frequency	920 MHz band
Modulation method	Binary GFSK
Data rate	100 kbps
Transmission power	20 mW
Receiving sensitivity	-103 dBm (TYP.) (100 kbps、BER<0.1 %)
Frequency tolerance	±20 ppm or less
Current consumption (VDD=3.3 V, Data rate=100 kbps)	51 mA (TYP.) [Transmission: 20 mW output] 29 mA (TYP.) [Reception] 4 μA (TYP.) [Sleep state]
Host interface	UART (115,200 bps), GPIO

Block Diagram

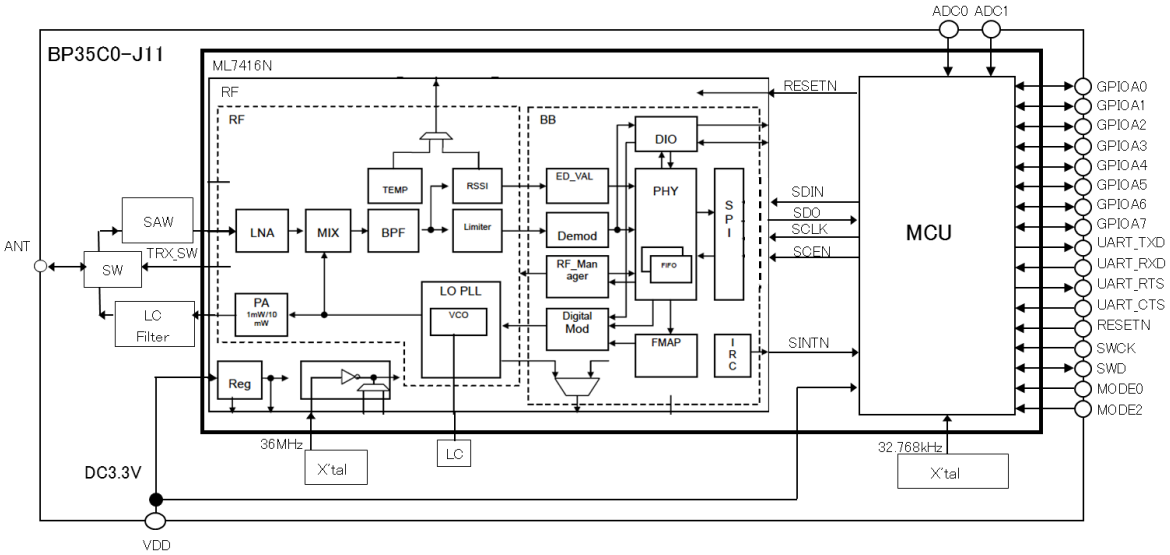


Fig. 1. Block Diagram

1. Absolute Maximum Ratings

No.	Parameter	Symbol	Rating	Unit	Condition
1	Supply voltage	VDD	-0.3 to +3.9	V	DC
2	Digital input voltage	V_{DIN}	-0.3 to VDD+0.3	V	
3	Digital output voltage	V_{DO}	-0.3 to VDD+0.3	V	
4	Digital output current	I_{DO}	-8 to +8	mA	
5	RF Input power	PIN	0	dBm	
6	Operating temperature range	Topr	-30 to +85	°C	
7	Storage temperature range	Tstg	-40 to +85	°C	

(Note) The absolute maximum ratings represent values that shall not be exceeded for even an instant on all operating or testing conditions.
Design systems with a margin for the ratings listed above.

2. Recommended Operating Conditions

No.	Parameter	Symbol	Specification			Unit	Condition
			MIN.	TYP.	MAX.		
1	Supply voltage	VDD	2.6	3.3	3.6	V	
2	Operating temperature range	Ta	-30	+25	+85	°C	

3. Electrical Characteristics

Input current characteristics

(Ta=25 °C, VDD=3.6 V)

No.	Parameter	Condition	Specification			Unit
			MIN.	TYP.	MAX.	
1	Current consumption (Data rate: 100 kbps)	Transmission state (set to 20 mW)	–	51	62	mA
2		Transmission state (set to 10mW)	–	44	55	mA
3		Transmission state (set to 1mW)	–	25	34	mA
4		Reception state	–	29	35	mA
5		Sleep state*	–	4	–	μA

Measurement was made with the terminal of 50-ohm measuring instrument connected with the antenna connector terminal of the module using RF cable.
Be noted that the parameter marked with "*" represents a design guaranteed value.

RF characteristics

Measurement conditions: Ta=25 °C and VDD=3.3 V
Data rate: 100 kbps
Modulation method: Binary GFSK
Channel spacing: 400 kHz
Measurement made at the antenna connector terminal of the module

Transmission characteristics

(Ta=25 °C, VDD=3.3 V)

No.	Parameter	Condition	Specification			Unit
			MIN.	TYP.	MAX.	
1	Transmission output power	20 mW mode	11.8	12.8	13.6	dBm
		10 mW mode	9.1	10.0	10.9	dBm
		1 mW mode	-2.5	-1.0	+0.5	dBm
2	Occupied bandwidth	n=2	–	175	400	kHz
3	Adjacent channel leakage power [ACPR]	20 mW mode ± 1 channel Bandwidth: 200 kHz	–	-36	-15	dBm
4	Frequency shift [Fdev] *	–	35	50	65	kHz

Be noted that the parameter marked with "*" represents a design guaranteed value.

Transmission characteristics (continued)

(Ta=25 °C, VDD=3.3 V)

No.	Parameter	Condition	Specification			Unit
			MIN.	TYP.	MAX.	
5	Spurious emission levels for transmission (in 20 mW mode)	100 kHz bandwidth below 710 MHz	–	-74	-36	dBm
6		1 MHz bandwidth between 710 MHz and 900 MHz	–	-68	-55	dBm
7		100 kHz bandwidth between 900 MHz and 915 MHz	–	-76	-55	dBm
8		100 kHz bandwidth between 915 MHz and 930 MHz (except levels detuned by 400 kHz or less from the center of radio channels (n=2); provided that levels ranging from 920.5 MHz to 922.3 MHz and detuned by 300 kHz or less shall be excluded)	–	-42	-36	dBm
9		100 kHz bandwidth between 930 MHz and 1 GHz	–	-69	-55	dBm
10		1 MHz bandwidth between 1 GHz and 1.215 GHz	–	-70	-45	dBm
11		1 MHz bandwidth between 1.215 GHz and 2.5 GHz (over second harmonic)	–	-48	-30	dBm

Reception characteristics

(Ta=25 °C, VDD=3.3 V)

No.	Parameter	Condition	Specification			Unit
			MIN.	TYP.	MAX.	
12	Minimum receiving sensitivity *	BER<0.1 %、100 kbps mode	–	-103	-95	dBm
		PER<1.0 %、100 kbps mode, 100 byte data	–	-99	-91	
13	Maximum receiving input level *	100 kbps mode	0	–	–	dBm
14	Adjacent interference of C/I performance in a reception circuit *	100 kbps mode	20	41	–	dB
15	Next-adjacent interference of C/I performance in a reception circuit *	100 kbps mode	30	48	–	dB
16	Minimum power detection (ED value) level *	–	–	–	-95	dBm
17	Power detection range *	Dynamic range	60	70	–	dB
18	Power detection accuracy *	–	-6	–	+6	dB

Be noted that the parameter marked with "*" represents a design guaranteed value.

Reception characteristics (continued)

(Ta=25 °C, VDD=3.3 V)

No.	Parameter	Condition	Specification			Unit
			MIN.	TYP.	MAX.	
19	Subsidiary emission levels	100 kHz bandwidth below 710 MHz *	–	-76	-54	dBm
20		1 MHz bandwidth between 710 MHz and 900 MHz *	–	-71	-55	dBm
21		100 kHz bandwidth between 900 MHz and 915 MHz *	–	-83	-55	dBm
22		100 kHz bandwidth between 915 MHz and 930 MHz *	–	-83	-54	dBm
23		100 kHz bandwidth between 930 MHz and 1 GHz *	–	-81	-55	dBm
24		1 MHz bandwidth over 1 GHz *	–	-60	-47	dBm

Be noted that the parameter marked with "*" represents a design guaranteed value.

4. Interface Characteristics

Terminal characteristics (design guarantee values)

(Ta=-30 °C to +85 °C, VDD=2.6 V to 3.6 V)

No.	Parameter	Symbol	Condition	Specification			Unit
				MIN.	TYP.	MAX.	
1	High-level input voltage	VIH1	(*1)	VDDx0.75	–	VDD	V
2	Low-level input voltage	VIL1	(*1)	0	–	VDDx0.18	V
3	Input leak current	IIH	High level voltage	-1	–	+3.6	μA
		IIL	Low level voltage	-1	–	+1	μA
4	High-level output voltage	VOH	IOH=-4 mA (*2)	VDDx0.8	–	VDD	V
5	Low-level output voltage	VOL	IOL=4 mA (*2)	0	–	0.3	V
6	Input capacitance	CIN	(*1)	–	6	–	pF

(*1) Pin shown as “I” in the “I/O” column in “Pin Description” table.
(*2) Pin shown as “O” in the “I/O” column in “Pin Description” table.
* Hereinafter, for digital input / output voltage, high level is referred to “High”, and low level is referred to “Low”.

UART specification

Parameter	Specification
Baud rate	115,200 bps
Data width	8 bits
Parity	Not provided
Stop bit	1 bit
HW flow control (*1)	Disabled (Default) / Enable

It is able to check and change the setting via commands. For details, refer to the software specification.
(*1) You should verify and determine whether to disable or enable the HW flow control.

Host interface (UART Notice Control)

Item	I / O	Specification
UART Notice1 (GPIOA1)	I	This pin is used to input the UART reception state of a host MCU. UART connection is available: High UART connection is not available: Low
UART Notice2 (GPIOA3)	O	This pin indicates whether UART data is to be sent from this Product or not. There is data to send: High There is no data to send: Low

*I/O definition - I: Digital input pin, O: Digital output pin

UART Notice Control On / Off

This Product checks the state of GPIOA1 (pin 21) at start-up and judges whether or not to perform UART Notice control.

Checking at 10 ms period and when it is Low for 3 consecutive times, UART Notice control is ON.

Checking at 10 ms period and when it is High for 3 consecutive times or Hi-Z level, UART Notice control is OFF.

Make a host MCU output Low to UART Notice1 at start-up when this Product is used as end device to enable UART Notice control.

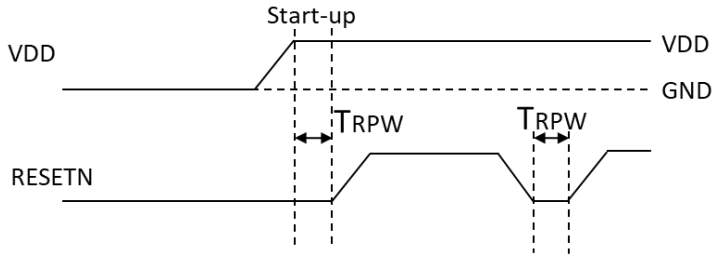
* When UART Notice1 is not connected (is open), UART Notice control is OFF.

Reset characteristics (design guarantee value)

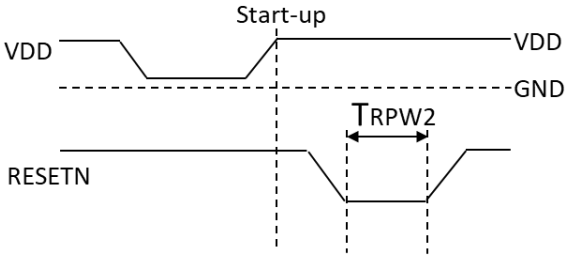
Make sure that this Product can be reset by controlling Pin No.4 (RESETN) from a host MCU and so on.

(Ta=-30 °C to +85 °C, VDD=2.6 V to 3.6 V)

Parameter	Symbol	Condition	Specification			Unit
			MIN.	TYP.	MAX.	
RESETN pulse period (When starting from VDD=0 V) (*1)	TRPW	VDD completely rising	200	–	–	ns
RESETN pulse period 2 (When starting from VDD≠0 V) (*2)	TRPW2	VDD completely rising	500	–	–	µs



When starting from VDD=0 V



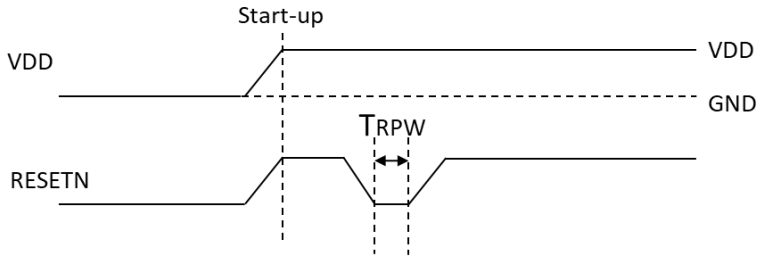
When starting from VDD≠0 V

(*1) Input High level signal, following an assert duration (longer than TRPW) ,to RESETN after VDD completely rising for start-up.

Input a pulse to RESETN after VDD completely rising and in stable state, for reset after start-up.

(*2) Input a pulse to RESETN after VDD completely rising for start-up from VDD≠0.

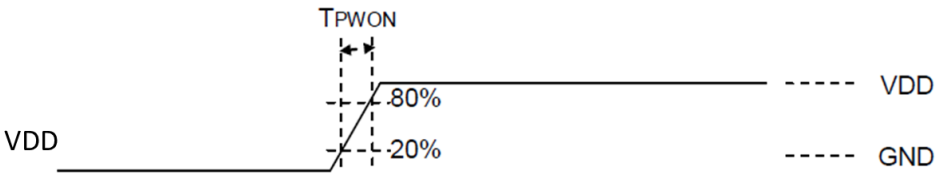
In case of the voltage applied to RESETN and VDD simultaneously rising, input a pulse (longer than TRPW) to RESETN after VDD completely rising for start-up.



Power ON characteristics (design guarantee value)

(Ta=-30 °C to +85 °C, VDD=2.6 V to 3.6 V)

Parameter	Symbol	Condition	Specification			Unit
			MIN.	TYP.	MAX.	
Power ON time	TPWON	Power ON	–	–	5	ms



Startup time

Check the status after start-up or resetting (Using command code: 0x6019) before executing first command.

5. Channel Setting

(Bandwidth: 400 kHz, Data rate: 100 kbps)

Channel Setting Number	Unit Channel Number	Center Frequency (MHz)
4	33,34	922.5
5	35,36	922.9
6	37,38	923.3
7	39,40	923.7
8	41,42	924.1
9	43,44	924.5
10	45,46	924.9
11	47,48	925.3
12	49,50	925.7
13	51,52	926.1
14	53,54	926.5
15	55,56	926.9
16	57,58	927.3
17	59,60	927.7

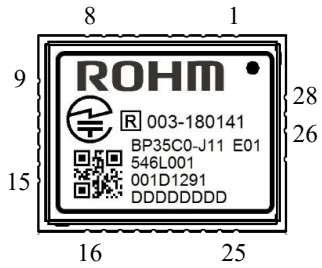
This Product is available for use in the range of 922.5 MHz to 927.7 MHz.

6. Setting of Communication Time Limit and Carrier Sensing Time

This Product has acquired the Technical Regulations Conformity Certification with the settings listed in the table below. The Products is not allowed to be used with any setting outside the setting range listed below.

Unit Channel Number	Data rate setting (Number of channels to use at a time)	Carrier sensing time	Transmission time limit	Pause time	Total of transmission time per hour
33-61	100 kbps (n=2)	148 μs or more (Sensing at all times)	200 ms or less per transmission	2 ms or more	360 s or less

7. List of Pins



Pin No.	Pin Name	I/O	Function
1	TP1	O	Reserve (Open)
2	MODE0	I	Mode pin (GND at default)
3	MODE2	I	Mode pin (GND at default)
4	RESETN	I	Reset pin
5	SWCK	I	Debug clock input (pull-up resistor)
6	SWD	I/O	Debug clock input/output (pull-up resistor)
7	GND	-	Ground pin
8	VDD	-	Power supply pin
9	ADC1	I_A	Reserve (Open)
10	ADC0	I_A	Reserve (Open)
11	GND	-	Ground pin
12	GPIOA11	I/O	Reserve (Open)*1
	UART_RTS	O	UART notification output*2
13	GPIOA10	I/O	Reserve (Open)*1
	UART_CTS	I	UART notification input*2
14	UART_TXD	O	UART data output
15	UART_RXD	I	UART data input
16	GPIOA7	I/O	Reserve (Open)
17	GPIOA6/FTM	I/O	Reserve (Open)
18	GPIOA5/I2C_SDA	I/O	Reserve (Open)
19	GPIOA4/I2C_SCL	I/O	Reserve (Open)
20	GPIOA2/DIO/SPI_MISO	I/O	Reserve (Open)
21	GPIOA1/DCLK/SPI_SSN	I	UART Notice1
22	GPIOA3/DMON/SPI_MOSI	O	UART Notice2
23	GPIOA0/SPI_SCK	I/O	Reserve (Open)
24	GND	-	Ground pin
25	N.C	-	Non connect
26	GND	-	Ground pin
27	ANT	RF IN/OUT	RF input output pin
28	GND	-	Ground pin

*I/O definition - I: Digital input pin, O: Digital output pin, I_A: Analog input pin

*1: When UART flow control is disabled (Default)

*2: When UART flow control is enabled

8. Reference Peripheral Circuit Diagrams

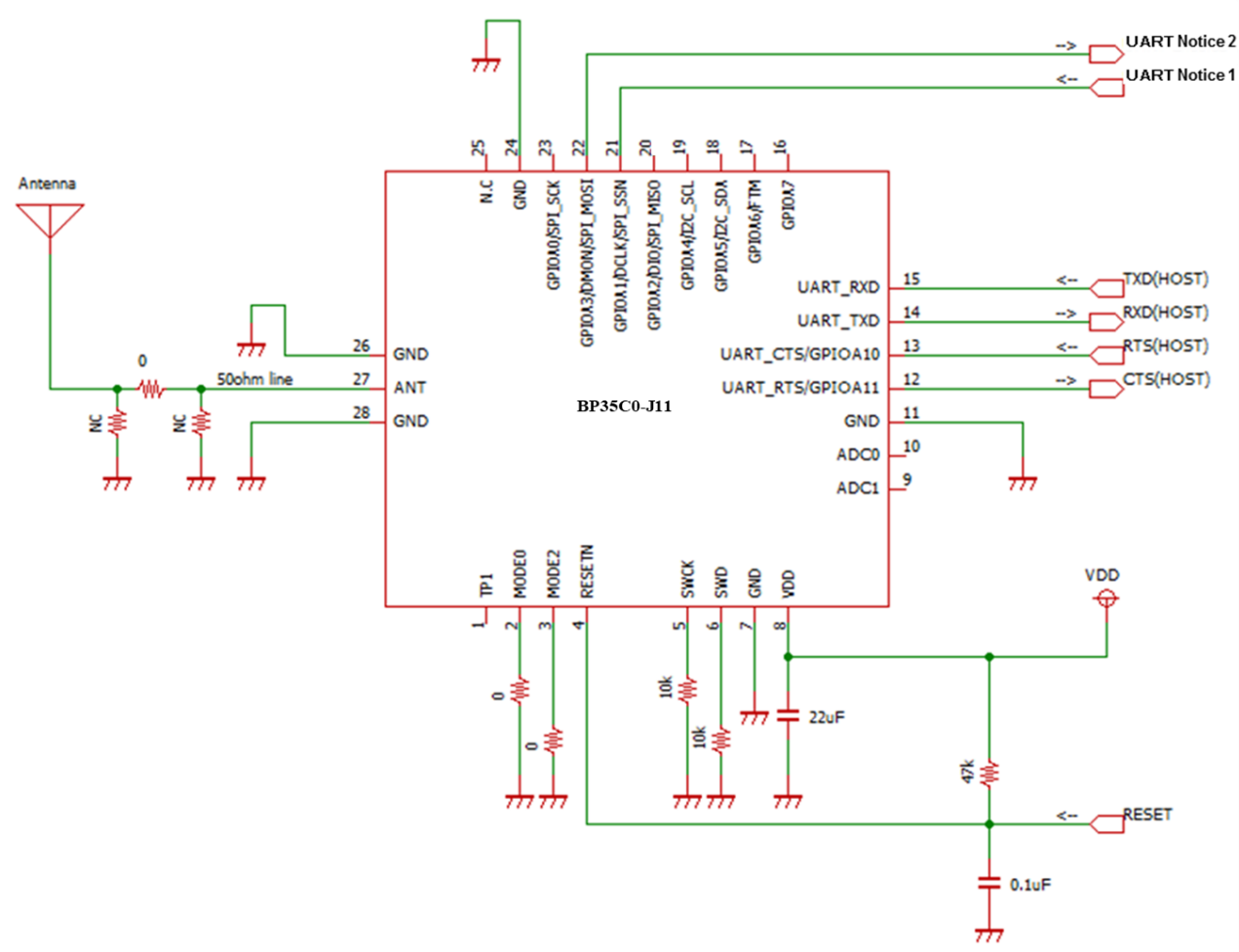


Fig. 2. Reference Peripheral Circuit Diagrams

* When UART flow control is disabled, Pin No.12 (GPIOA11) and No.13 (GPIOA10) will be open.

* Make sure that this Product can be reset by controlling Pin No.4 (RESETN) from a host MCU and so on.

9. Outline Dimensions

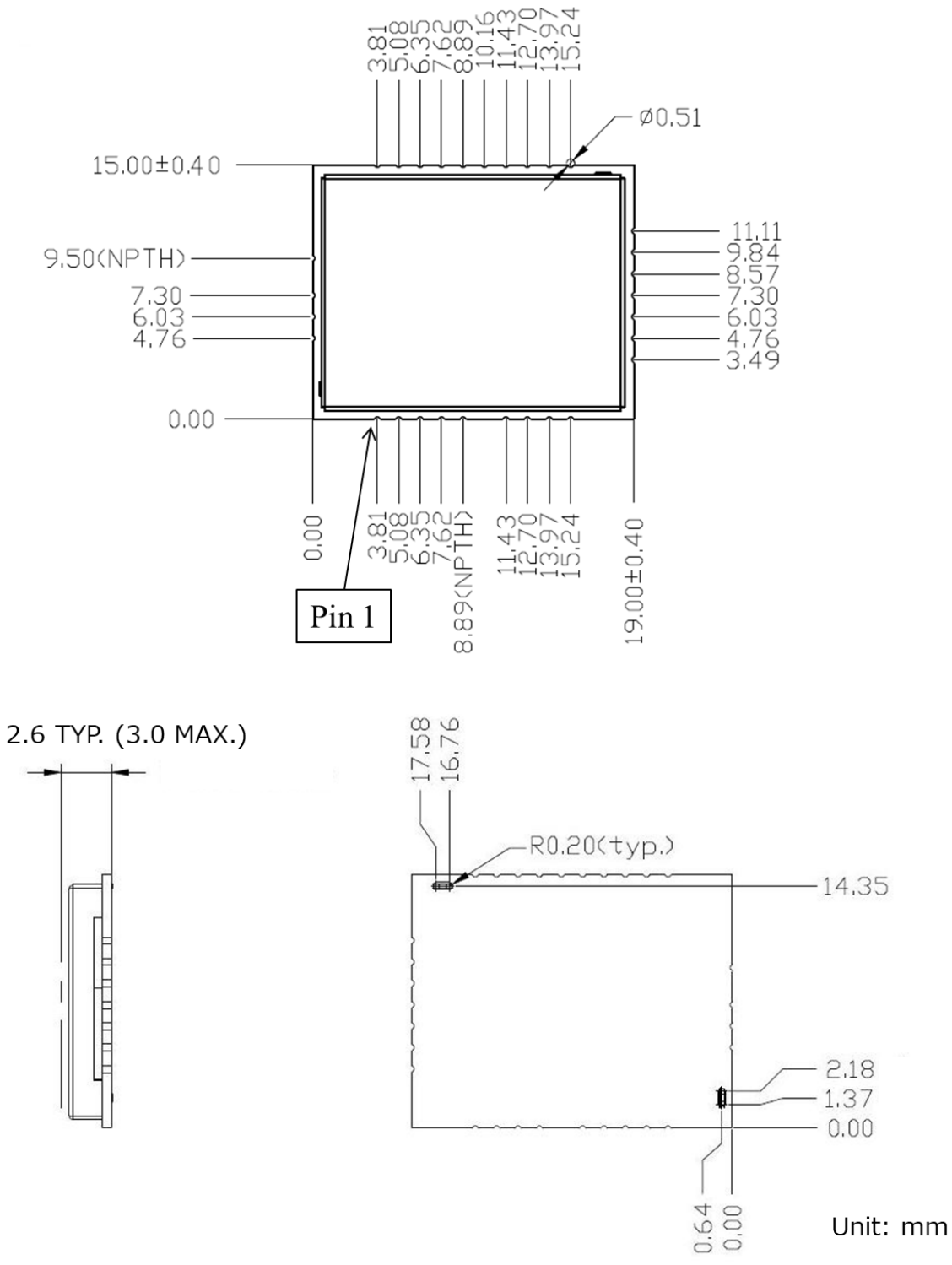


Fig. 3. Outline Dimensions Diagram

* Any defects in the appearance other than scratches and dents harmful to the practical use of this Product are overlooked.

10. Product Marking and Labeling Specification

The following items are indicated on the product.

Label appearance

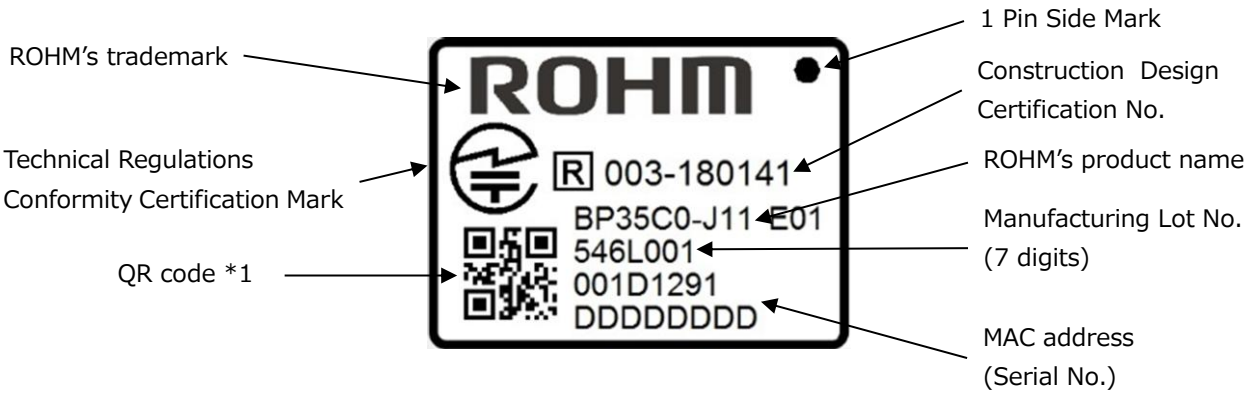


Fig. 4. Marking Specification

*1: QR code has a product serial number as information.
The design of marking is subject to change without prior notice.

Marking items

ROHM	: ROHM's trademark
B P 3 5 C 0 – J 1 1	: ROHM's product name
5 4 6 ∗ ▲ ▲ ▲	: Manufacturing Lot No. (3digits) (Example) 5 4 6 ∗ ▲ ▲ ▲ → 2 0 1 5 _46th week_ ∗ ▲ ▲ ▲ (∗: Secret serial number) (▲ ▲ ▲: Secret serial number)
R 0 0 3 – 1 8 0 1 4 1	: Construction Design Certification No.
	: Technical Regulations Conformity Certification Mark
0 0 1 D 1 2 ∗ ∗ ∗ ∗ ∗ ∗ ∗ ∗ ∗ ∗	: Individual address 0 0 1 D 1 2 (OUI (Vendor ID): ROHM)

11. Recommended Land Pattern

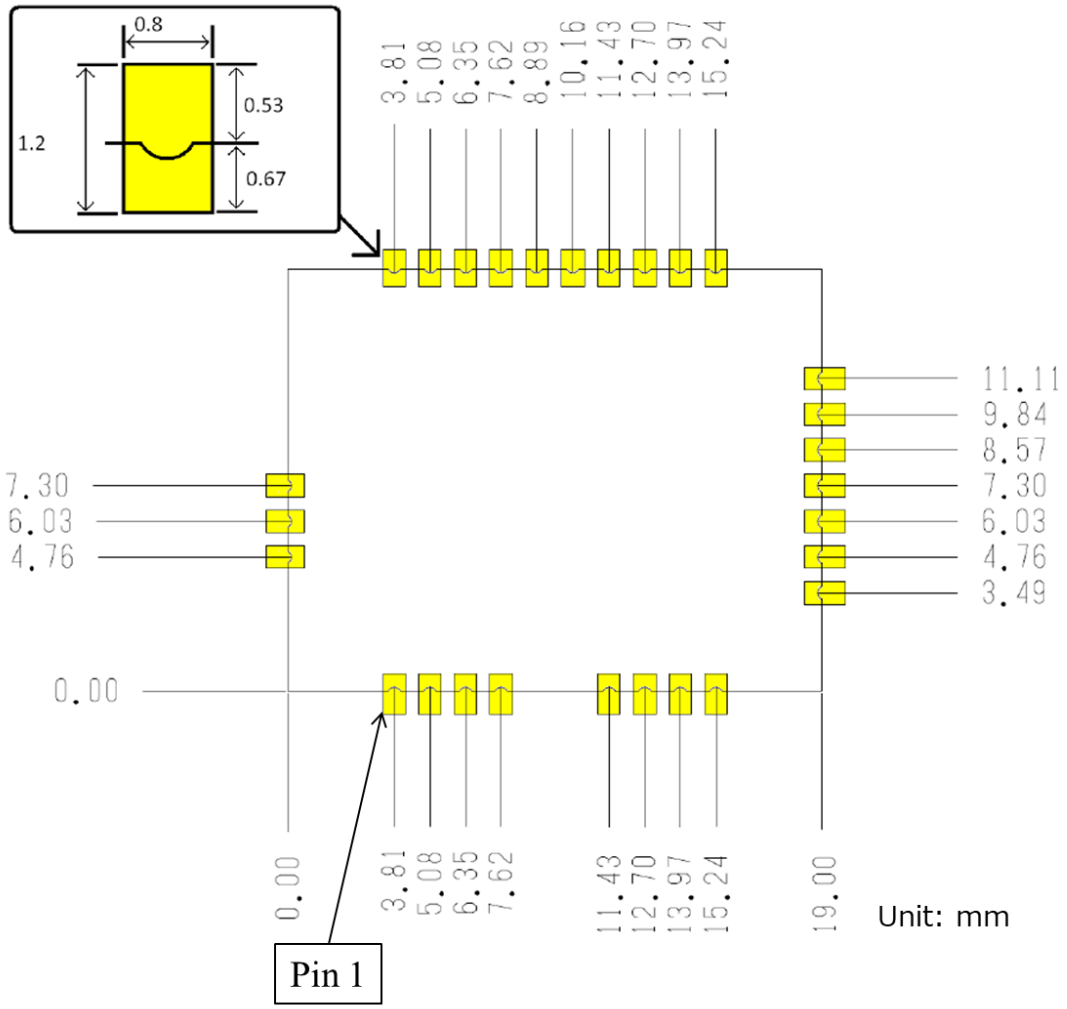
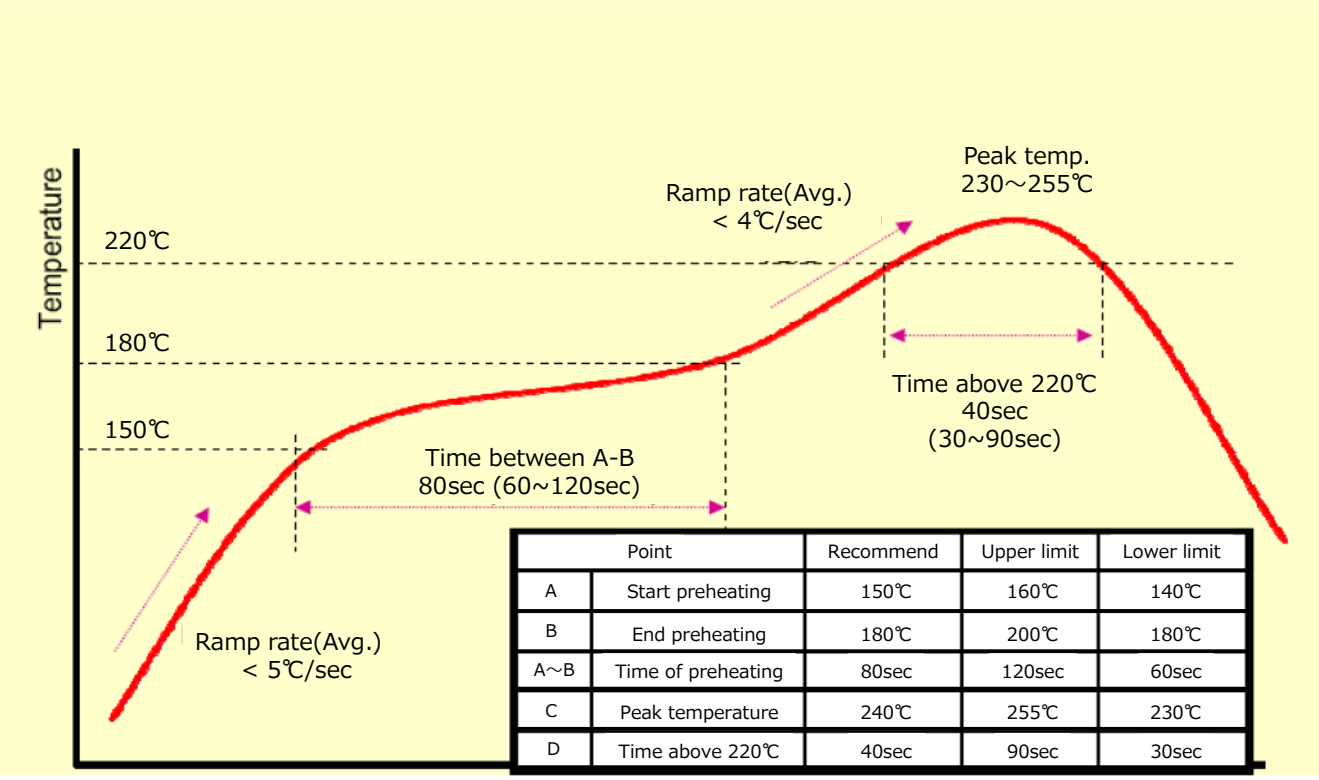


Fig. 5. Recommended Land Pattern

Caution: There are patterns on the soldering surface (bottom side).
Be sure not to wire (including GND) on the part of PCB under the module except land pattern for mounting the module.

12. Recommended Reflow Condition



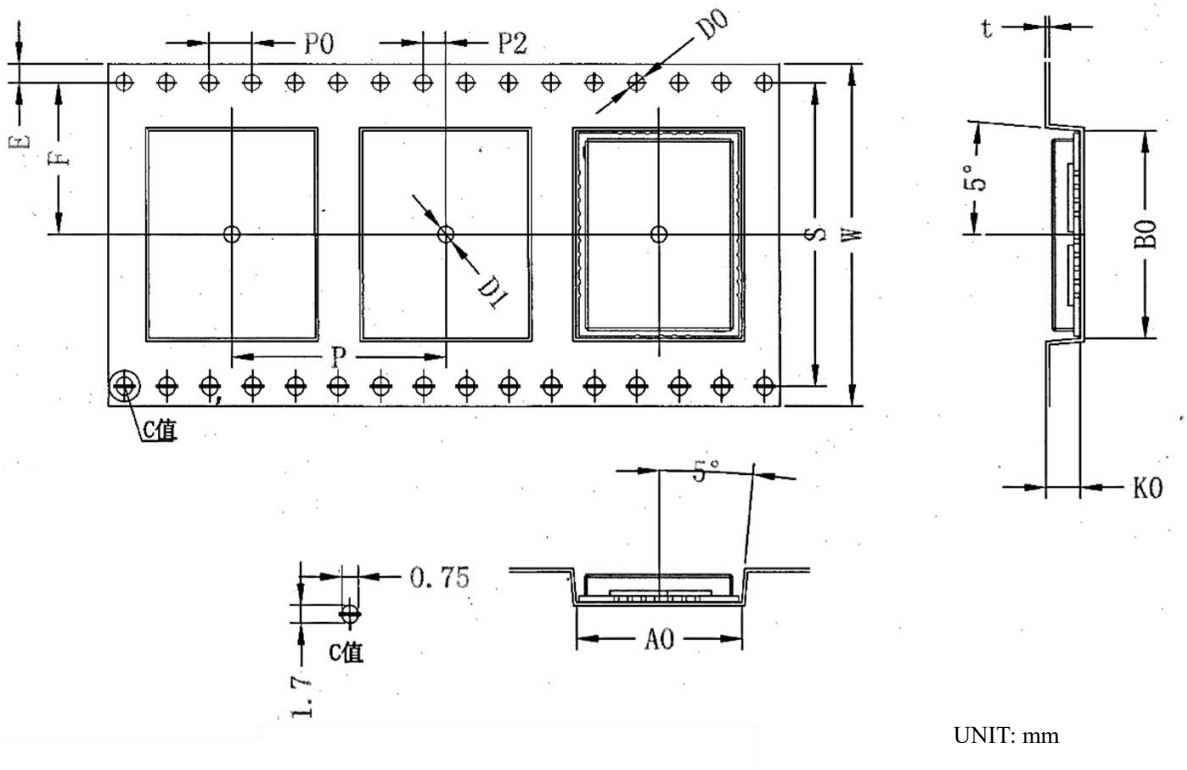
Point		Recommend	Upper limit	Lower limit
A	Start preheating	150℃	160℃	140℃
B	End preheating	180℃	200℃	180℃
A～B	Time of preheating	80sec	120sec	60sec
C	Peak temperature	240℃	255℃	230℃
D	Time above 220℃	40sec	90sec	30sec

*Reflow solder can be operated only once

Fig. 6. Recommended Reflow Profile

13. Packing

13.1. Taping dimensions



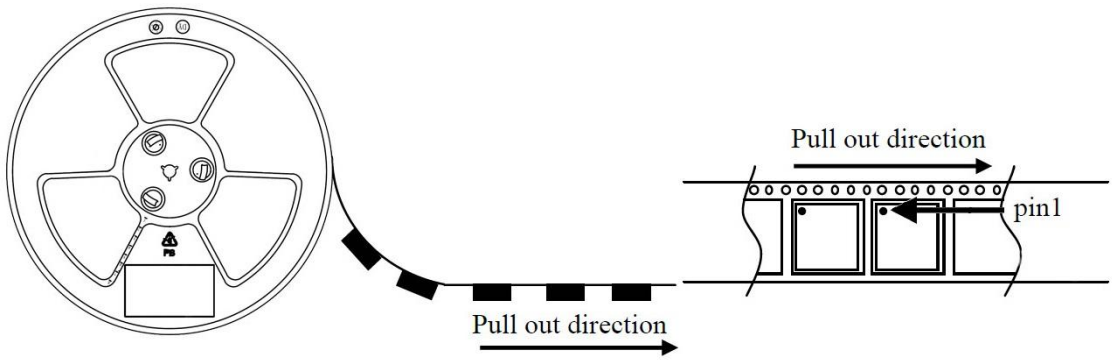
UNIT: mm

Symbol	A0	B0	D0	D1	E	F	P0	P	P2	K0	S	t	W
Dimensions (mm)	15.55	19.4	1.5	2.0	1.75	14.2	4.0	20.0	2.0	3.2	28.4	0.35	32.0
Tolerance (mm)	±0.1	±0.1	+0.1 /0.0	MIN.	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.05	±0.3

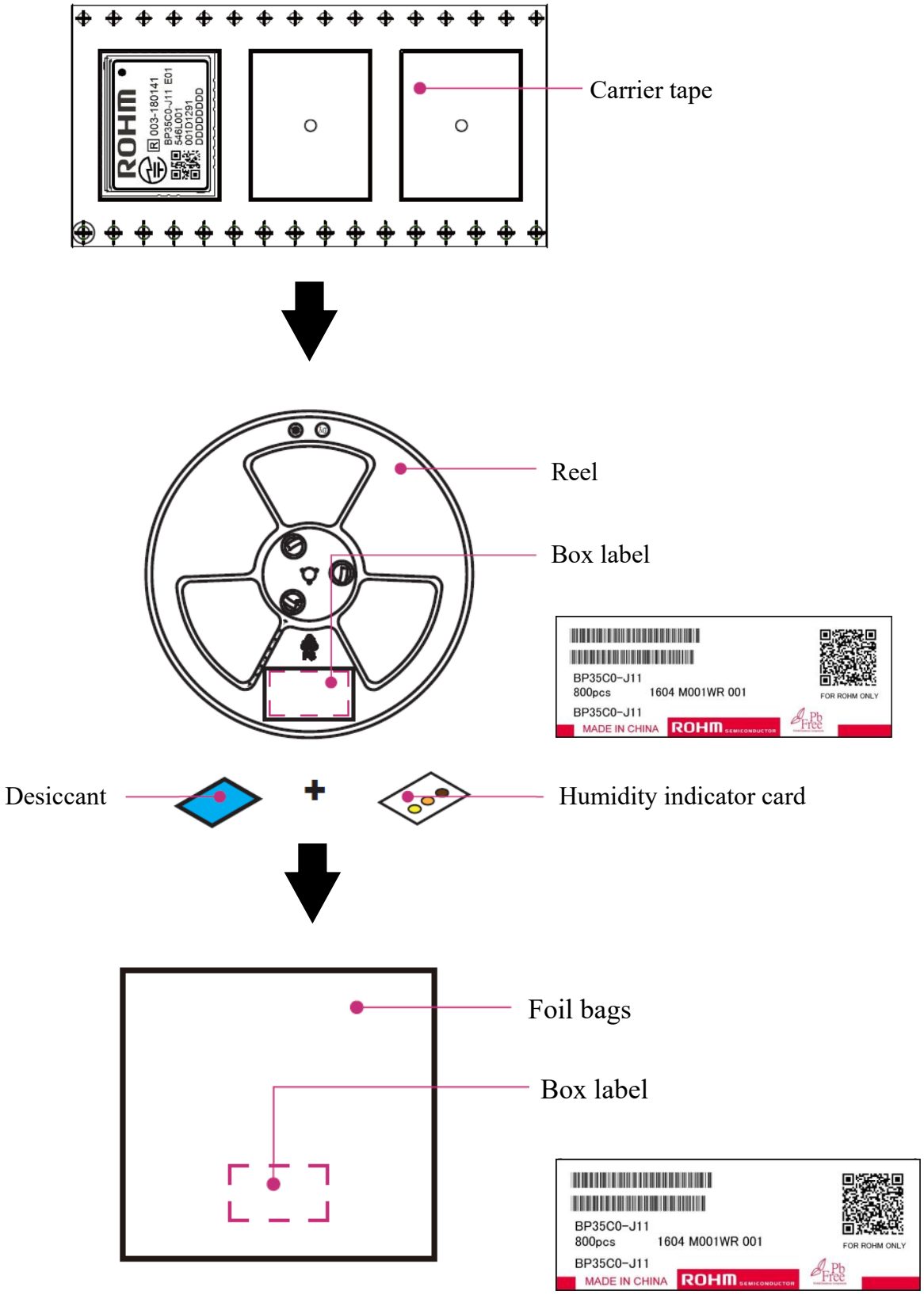
<Material of tape> Pocket: PS, Cover tape: PE

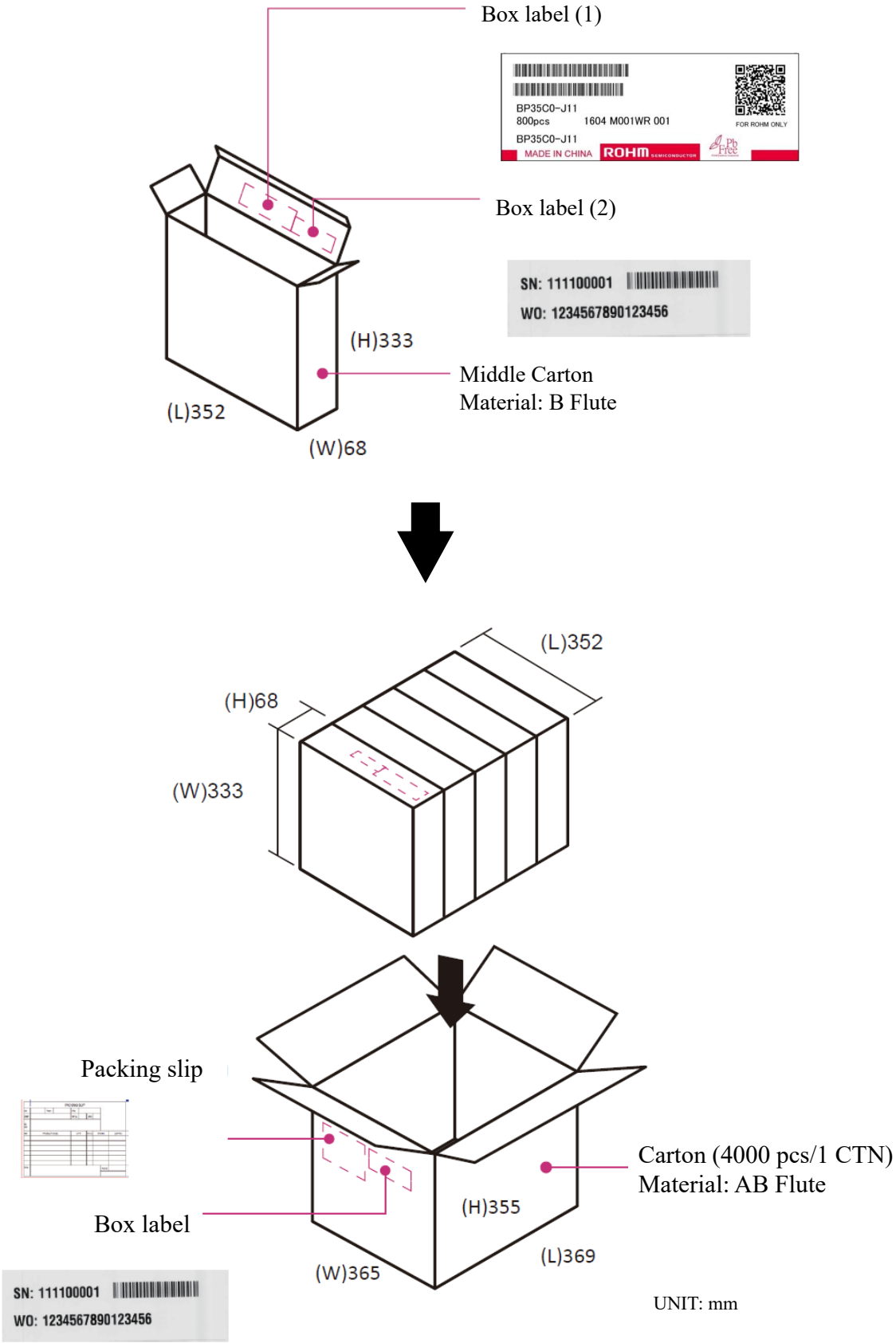
13.2. Taping packaging specification

Pull-Out direction of taping and direction of pin 1 are shown below.
The taping of the products is done so that the adsorption side of the mounter may become a shield case side.

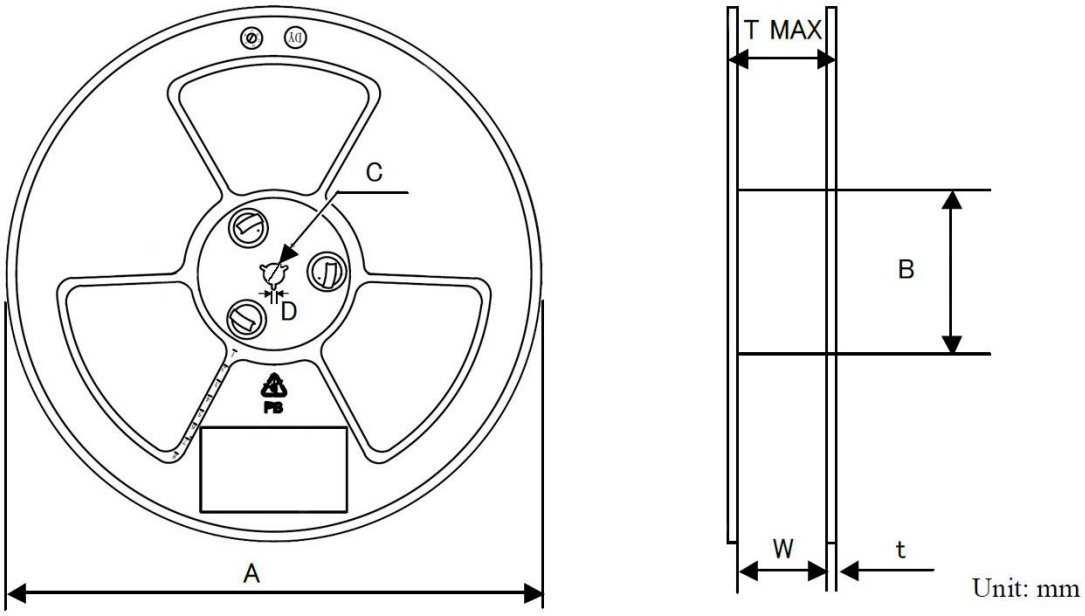


13.3. Packaging method





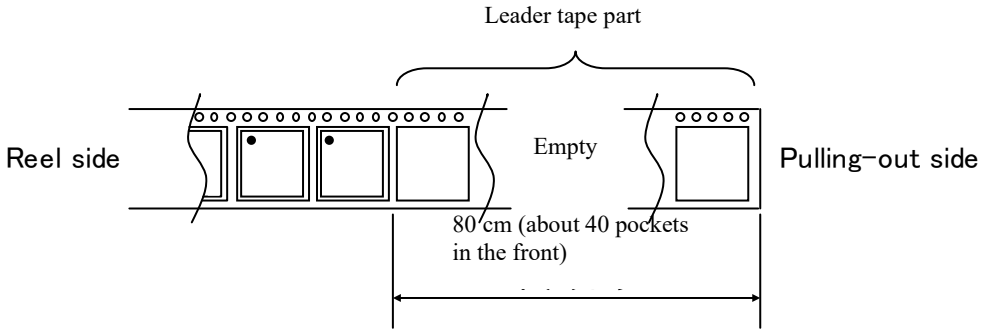
13.4. Reel Dimensions



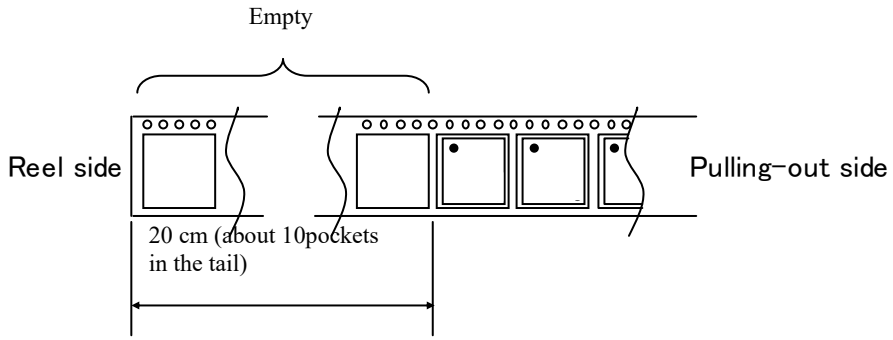
Reel size/ Tape size	A	B	C	D	W	t	T MAX
Dimensions (mm)	330	100	13.3	2.5	32.5	2.0	36
Tolerance (mm)	±2.0	±2.0	±1.0	±0.5	+2.0/ -0.0	±0.5	+2.0/ -1.0

13.5. Leader and Trail Tape

There will be 40 pockets at Leader tape.



There will be 10 pockets at Trail tape.
The end of Trail tape is not fixed to Reel.



13.6. Missing Product Quantity

	Rate of incident	Remark
Consecutive missing products	None	Except Leader and Trail tapes
Non-Consecutive missing products	MAX 1 pc / reel	

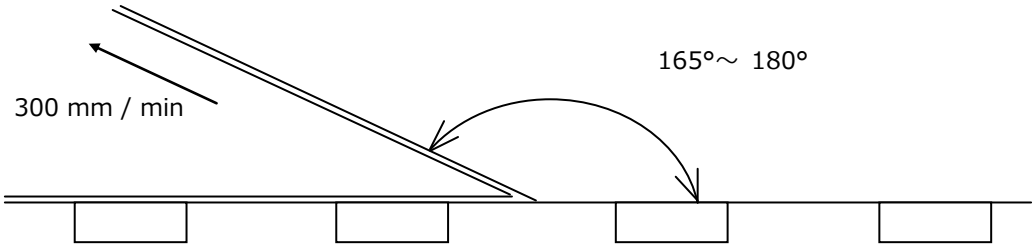
13.7. Standard Packaging Quantity

Type	Package Quantity
BP35C0-J11	800 pcs / reel

- Please be sure to order product with multiple number of the Standard Packaging Quantity.
- The quantity of “Standard Package Quantity” may change in future.

13.8. Peel-off strength of Cover Tape

Peel-off strength of Cover tape is: 0.1～0.7 N (10 gf～70 gf) with peeling speed of 300 mm/min.



13.9. Packing Label

The label with following information is stuck at the packing case.

① Type name (BP35C0-J11)
② Quantity
③ Lot No.
④ Shipment inspection stamp
⑤ Country of origin
⑥ Manufacturing company name (Trade mark)
⑦ Logotype of lead free

Please refer to the following example of the label indication.

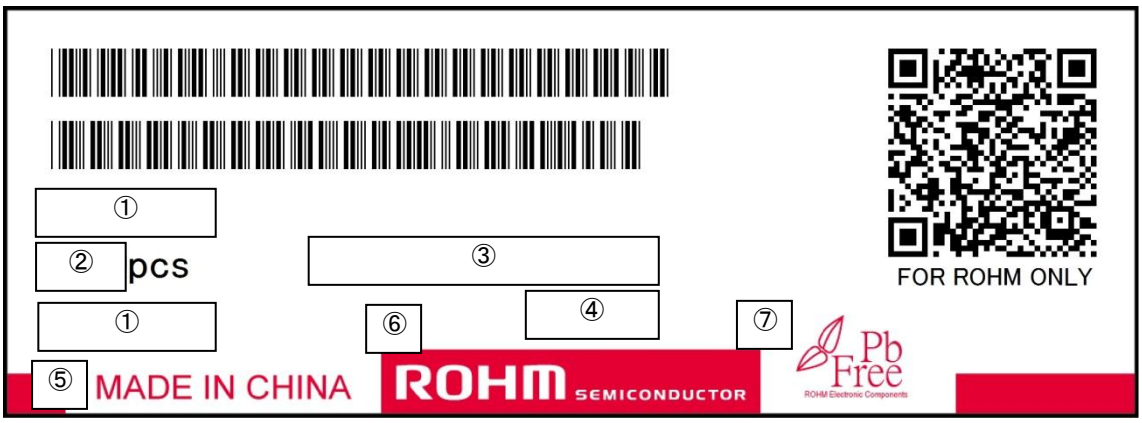


Fig. 7. Packing Labeling

14. Product Mass

1.5 g

15. Country of Manufacture

China

16. Precautions for Use

1) This product allows the reflow process only once. (with ROHM's recommended reflow condition)
   During the reflow process, the solder inside the product may be re-fused or re-melt.
   Please note this and pay special attention.
2) If this product is laid neglected, it will absorb moisture from the surrounding environment.
   Please keep this product with below mentioned condition, and reflow mount it within 72 hours of opening the laminated bag.
   <Store condition> Temperature: 5 °C to 40 °C, Relative Humidity: 50±10 %RH
3) If storage in the desiccator where is humidity under the recommended values, please do enough static provision.
4) Please use after baking process with following conditions when it passed 72 hours after opening;
   * Baking condition: Tape & Reel type: 60 °C, over 12 hours and within 24 hours
5) When a mounter is used to place this product, its recognition should be taken with the reverse side (pad) of product. It is not recommended to use the dimensions of product for recognition as its tolerance is big.
6) There are cases where lot numbers are different in the same reel.
7) There are cases where serial numbers are not in sequence in the same reel.
8) About soldering parts of mounting on this product, presence of soldering fillet does not be asked.
9) With respect to a label affixed to this Product, defects other than "peeling", "sticking-out", and "extreme defect in character recognition" are overlooked.
10) This module is assumed to be mounted on glass epoxy PCB.
    If the module is mounted on other materials such as ceramic, be sure to evaluate it sufficiently.
11) RF-SW (pin 27, ANT terminal) which is mounted inside the module is a product very weak to static electricity on the specification. Please use it after doing the countermeasure against static electricity enough.
12) Please note that it is likely to come off when the stress joins the shield case.
13) Use this product without cleaning residue of flux.
14) About wireless communication
    1. Wireless communication may be unstable due to radio wave environment and communication environment, does not guarantee 100 % data transfer, ROHM assumes absolutely no responsibility even if data is missing.
    2. UDP does not provide for the arrival of consecutive packets and data arrival is not guaranteed.
    3. Please fully verify with customers before installing this product in customer's set and doing full-scale operation.
    4. ROHM assumes no responsibility for any damage or malfunction caused by data interception, loss, theft, leakage to a third party.
    5. For customers who are verifying points relating to specific communication, please introduce SK Catcher, a product of Skyley Networks Inc. As a rule, support of the contents related to communication is prerequisite to notify about SK Catcher log and SK Catcher product ID number.

17. Precautions as Radio Equipment

This Product has acquired the “Construction design certification” (Article 38-24 (1) of the Radio Act) for “Radio Equipment: Specified low power equipment of less than 13 GHz prescribed in Article 2-1 (8) Type of Specified Radio Equipment.”
Consequently, this Product is available for use as radio equipment only in Japan without making an application for radio station license.

- Construction Design Certification Number: 003-180141

To safely use this Product as radio equipment, be sure to observe the following.

1) The marking of this Product [Ⓡ003-180141] indicates that it has acquired the “Technical Regulations Conformity Certification”. Do not erase the marking or affix any label on the marking.
   It is also recommended to display the above mark on the part where your product containing this Product is easy to see.
2) Never disassembly or modify this Product. Doing so may be subject to punishment under the Radio Act.
3) To use the dedicated external antenna, contact your ROHM representative in advance.

18. Firmware

18.1. Firmware licensing

With respect to the built-in firmware of this Product, agree to the following licensing prior to use.

1) This Software is firmware dedicated to BP35C0-J11. Do not use the firmware for any product other than BP35C0-J11.
2) Do not assign, transfer, sub-license, or lend this Software to any third parties.
3) Reverse engineering, decompilation, disassembly, reproduction, and change of this Software are prohibited.
4) ROHM shall not guarantee any and all operations performed by using this Software.
5) Since this Software will be updated, be sure to implement the update function of this Software on the customer's set main unit. Please inquire about the update method separately.
6) In the event of a defect or the like to be attributed to ROHM under normal use for the Software during the first six (6) months from (1) Initial delivery date of BP35C0-J11 or (2) Date of this specification change, customer must notify ROHM immediately.
7) Please note that ROHM does not pay any costs (including but not limited to outsourcing expenses, repair expenses, product collection expenses, alternative procurement costs, etc.) paid by customers from third parties due to defects etc. without prior consent of ROHM.
8) In any case, the amount borne by ROHM due to defects etc. of this Software shall be no more than the last six (6) months of the total sales value of BP35C0-J11 from ROHM to the customer.
9) If the provisions of Article 18.1 of this specification, the provisions of the basic contract to be concluded, any contracts and memoranda, incidental thereto, and other specifications of this specification between customer and ROHM contradict or conflict, the provisions of this section shall prevail.

18.2. Firmware version

1) The version of firmware written to this Product is the latest version at the time when it is manufactured.
2) Firmware may not be the latest version depending on the shipment timing.
3) The version of firmware is subject to change without prior notice. ROHM shall not be in any way responsible or liable for damages of customers caused by such changes.
4) The version of firmware written to this Product cannot be distinguished by the appearance of the Product.
5) The same firmware is written to products contained in the same package.

18.3. Method for checking firmware version

Firmware version can be checked by using the following commands.

- Use “Get Version Information (command code: 0x006B)” command to check major version, minor version and revision of the firmware.

For details, refer to information in software specification.

18.4. Number of rewritable firmware

The maximum number of times that the firmware of this Product can be rewritten is 100 times. If you rewrite the firmware beyond this number, ROHM will not guarantee the operation of this Product.

19. Notice

Precaution on using this product

1) This Product may be subjected to radio wave interference from other equipment emitting radio waves.
2) This Product emits radio waves due to the specification. To use equipment emitting radio waves, certification under the Radio Act should be obtained by region in which the Product is used. For the standards for certification under the Radio Act to be obtained for the use of this Product, separately contact your ROHM representative.

Notes

1) The information contained herein is subject to change without notice.

2) Before you use our Products, please contact our sales representative and verify the latest specifications.

3) Although ROHM is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors.
Therefore, in order to prevent personal injury or fire arising from failure, please take safety measures such as complying with the derating characteristics, implementing redundant and fire prevention designs, and utilizing backups and fail-safe procedures. ROHM shall have no responsibility for any damages arising out of the use of our Poducts beyond the rating specified by ROHM.

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

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

6) The Products are intended for use in general electronic equipment (i.e. AV/OA devices, communication, consumer systems, gaming/entertainment sets) as well as the applications indicated in this document.

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

8) For use of our Products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a ROHM representative : transportation equipment (i.e. cars, ships, trains), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, servers, solar cells, and power transmission systems.

9) Do not use our Products in applications requiring extremely high reliability, such as aerospace equipment, nuclear power control systems, and submarine repeaters.

10) ROHM shall have no responsibility for any damages or injury arising from non-compliance with the recommended usage conditions and specifications contained herein.

11) ROHM has used reasonable care to ensure the accuracy of the information contained in this document. However, ROHM does not warrants that such information is error-free, and ROHM shall have no responsibility for any damages arising from any inaccuracy or misprint of such information.

12) Please use the Products in accordance with any applicable environmental laws and regulations, such as the RoHS Directive. For more details, including RoHS compatibility, please contact a ROHM sales office. ROHM shall have no responsibility for any damages or losses resulting non-compliance with any applicable laws or regulations.

13) When providing our Products and technologies contained in this document to other countries, you must abide by the procedures and provisions stipulated in all applicable export laws and regulations, including without limitation the US Export Administration Regulations and the Foreign Exchange and Foreign Trade Act.

14) This document, in part or in whole, may not be reprinted or reproduced without prior consent of ROHM.

ROHM SEMICONDUCTOR

Thank you for your accessing to ROHM product informations.
More detail product informations and catalogs are available, please contact us.

ROHM Customer Support System

http://www.rohm.com/contact/

General Precaution

1. Before you use our Products, you are requested to carefully read this document and fully understand its contents. ROHM shall not be in any way responsible or liable for failure, malfunction or accident arising from the use of any ROHM's Products against warning, caution or note contained in this document.

2. All information contained in this document is current as of the issuing date and subject to change without any prior notice. Before purchasing or using ROHM's Products, please confirm the latest information with a ROHM sales representative.

3. The information contained in this document is provided on an "as is" basis and ROHM does not warrant that all information contained in this document is accurate and/or error-free. ROHM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties resulting from inaccuracy or errors of or concerning such information.