IEEE802.11b/g/n（1x1) Wireless LAN Module BP3580

HARDWARE SPECIFICATION

Version 1.0.4

Revision History

VER.	Descriptive Revision	Date
1.0.4	First Edition	12/09/25

1 ABSTRACT

This guide is specification for the built-in wireless LAN LSI BU1805GU and based on IEEE802.11b/g/n (1×1) made by ROHM.

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3 ABSOLUTE MAXIMUM RATINGS

No.	PARAMETER	SYMBOL	LIMITS	UNIT	REMARKS
1	Power supply voltage	VCC	-0.3 ～ +3.6	V	DC
2	Operating temperature range	Topr	-40 ～ 85	℃	-
3	Storage temperature range	Tstg	-55 ～ 125	℃	-
4	ESD endurance(*)	Vsurge	±200	V	ESD-HBM MIL-STD-883/METHOD 3015

(*)RF-SW of the pin 35 (Ant terminal) inside is weak against static because of the specific.
Please do enough static provision for operating module.

Note) These are the values that must not be exceeded at any time under any application or any test conditions.

Please make design keeping enough margins accordingly.

4 OPERATION CONDITIONS

No.	PARAMETER	SYMBOL	SPEC			UNIT
			MIN.	TYP.	MAX.	
1	Power supply voltage	VCC	3.1	3.3	3.5	V
2	Operating temperature range	Ta	-40	25	85	℃

5 MAIN CHARACTERISTICS

No.	PARAMETER	CHARACTERISTICS
1	Frequency width	2,400MHz ～ 2,483.5MHz（ch1～ch13）
2	Frequency tolerance	Within ±25ppm
3	RF output power	IEEE802.11b : 15dBm±2dB IEEE802.11g : 13dBm±2dB IEEE802.11n : 12dBm±2dB
4	Supported data rates	IEEE802.11b : 1 ～ 11Mbps IEEE802.11g : 6 ～ 54Mbps IEEE802.11n : 6.5 ～ 72.2Mbps
5	Receiving sensitivity	IEEE802.11b : -94dBm @1Mbps, -89dBm @11Mbps IEEE802.11g : -92dBm @6Mbps, -73dBm @54Mbps IEEE802.11n : -90dBm @6.5Mbps, -68dBm @72.2Mbps
6	Diversity function	Software diversity *Control signal for the external RF-SW control
7	Security function	64bit/128bit WEP, TKIP, AES (*)
8	Host interface	USB2.0 (High-Speed mode) SDIO Ver.2.00 (High-Speed mode) UART (～921600bps)
9	Power supply voltage	Only 3.3V

(*) 64bit/128bit WEP, TKIP, and AES are everything processed with hardware.

6 BLOCK DIAGRAM

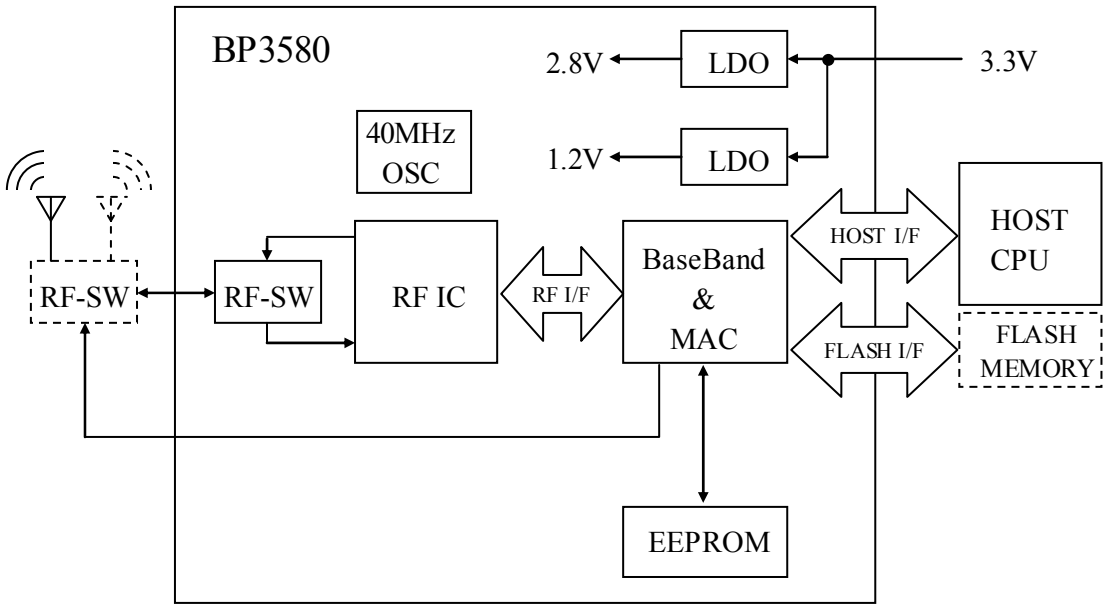


Fig1. Block diagram

- Optional Flash memory is necessary for using flash boot functions.
- External RF switch and antenna are needed for using Diversity functions.

7 ELECTRICAL CHARACTERISTICS

CONDITIONS: Ta=25℃, VCC=3.3V, GND=0.0V

No.	PARAMETER	CONDITION	SPEC			UNIT	REMARKS
			MIN.	TYP.	MAX.		
1	Consumption current	Sending	240	300	360	mA	Continuous
			280	340	400	mA	Continuous (With USB)
		Receiving	160	200	240	mA	-
			200	240	280	mA	With USB
		Sleep mode	-	500	-	uA	-
2	Center frequency	-	2412	-	2472	MHz	-
3	Frequency deviation	-	-25	-	25	ppm	-
4	RF output power	11b：11Mbps	13	15	17	dBm	-
		11g：54Mbps	11	13	15	dBm	-
		11n：MCS7	10	12	14	dBm	-
5	Unnecessary out-of-band radiation	-	-	-	2.5	uW/MHz	-
6	Transmit spectrum mask	DSSS 11Mbps	-	-	-30	dBr	1st Side-lobe
			-	-	-50	dBr	2nd Side-lobe
		OFDM 54Mbps	-	-	-20	dBr	±11MHz
			-	-	-28	dBr	±20MHz
			-	-	-40	dBr	±30MHz
7	Receiving sensitivity	11b：11Mbps	-	-89	-76	dBm	PER<8%
		11g：54Mbps		-73	-65	dBm	PER<10%
		11n：MCS7	-	-68	-64	dBm	PER<10%
8	Unnecessary radiation for receiving	Fr<1GHz	-	-	4	nW	-
		Fr≧1GHz	-	-	20	nW	-

8 TERMINAL FUNCTIONS

Please refer the product DIMENSIONS for the terminal number position.

Table 1. Terminal Functions（1/2）

No.	Terminal	I/O	Function	Remarks
1	GND	-	Ground	-
2	SDDATA3	I/O	SDIO data 3	-
3	SDCLK	I	SDIO clock	-
4	SDCMD	I/O	SDIO command	-
5	GND	-	Ground	-
6	USB_DP	AI/O	USB data plus	-
7	USB_DM	AI/O	USB data minus	-
8	GND	-	Ground	-
9	SDDATA2	I/O	SDIO data 2	-
10	SDDATA1	I/O	SDIO data 1	or UART_RTS
11	SDDATA0	I/O	SDIO data 0	or UART_CTS
12	GND	-	Ground	-
13	GND	-	Ground	-
14	VCC	I	Power supply 3.3V	Module power supply input
15	VCC	I	Power supply 3.3V	Module power supply input
16	V12	-	Bypass capacitor terminal (1.2V)	-
17	TRSTB	I	ARM JTAG TRSTB	For debug
18	TDO	O	ARM JTAG TDO	For debug
19	TDI	I	ARM JTAG TDI	For debug
20	TCK	I	ARM JTAG TCK	For debug
21	TMS	I	ARM JTAG TMS	For debug
22	PRST	I	Power on reset	0 : Reset, 1 : Normal
23	HRST	I	Host reset	0 : Reset, 1 : Normal
24	GND	-	Ground	-

Table 1. Terminal Functions（2/2）

No.	Terminal	I/O	Function	Remarks
25	GND	-	Ground	-
26	GPIO8/32k	I/O	General purpose Input/Output 8	GP108 or 32.768kHz clock input
27	GPIO6	I/O	General purpose Input/Output 6	
28	GPIO2	I/O	General purpose Input/Output 2	-
29	V28	-	Bypass capacitor terminal(2.8V)	-
30	M_ANA	AI/O	Analog monitor terminal	For Debug
31	GPIO1	I/O	General purpose Input/Output 1	-
32	GPIO0	I/O	General purpose Input/Output 0	-
33	GND	-	Ground	-
34	GND	-	Ground	-
35	ANT	AI/O	RF Input/Output	Antenna terminal（50Ω）
36	GND	-	Ground	-
37	GND	-	Ground	-
38	FLASH_SEL	I (*)	Flash memory area select	0: Region1, 1: Region2
39	FLASH_TXD	I/O	Flash memory sending data	Flash boot terminal
40	FLASH_CLK	O	Flash memory clock	Flash boot terminal
41	FLASH_CSB	O	Flash memory selection	Flash boot terminal
42	FLASH_RXD	I	Flash memory receiving data	Flash boot terminal
43	HOST_SEL	I (*)	Host I/F select	0:USB 1:SDIO
44	BOOT_SEL0	I (*)	Boot mode select	BOOT_SEL[1:0]
45	BOOT_SEL1	I (*)		00:USB, 01:SDIO, 10:FLASH, 11:UART
46	UART_TXD	O	UART transmit data	-
47	UART_RXD	I	UART receiving data	-
48	GND	-	Ground	-

Please refer to pin number in “DIMENSIONS.”

V12 terminal and V28 terminal are for the external bypass capacitor.

Be sure to connect the capacitor with large capacitance to VCC terminal and V28 terminal.

Please match (impedance matching) ANT terminal (pin 35) to 50Ω.

(*)FLASH_SEL/HOST_SEL/BOOT_SEL0/BOOT_SEL1/ terminal hold the value when releasing the POWER ON RESET.
After releasing the POWER ON RESET, these terminals are used for another purpose in the module.
They have pull down resistance inside. Therefore, please pull up the voltage OPEN in case of setting for “0” and 3.3V (power supply voltage) with 3-5kΩ (recommendation is 4.7kΩ) in case of setting for “1”.
When the host MCU controlling these terminal, please do not connect directly with output pin of host MCU and insert 3kΩ～5kΩresistor (recommendation is 4.7kΩ) between them.

When FLASH BOOT function is used, FLASH_TXD terminal (pin 39) should be connected pull down resistance of 47kΩ.
When FLASH BOOT function is not used, FLASH_TXD terminal (pin 39) and FLASH_RXD (pin 42) terminal would be connected pull down resistance, if you need.

PRST terminal is POWER ON RESET terminal. It is connected 4.7kΩ+2.2uF at 3.3V inside the module.
In case that need to watch the power supply voltage, please connect such as OPEN DRAIN RESET IC for this terminal.

Please open the other unused terminal.

9 DIMENSIONS

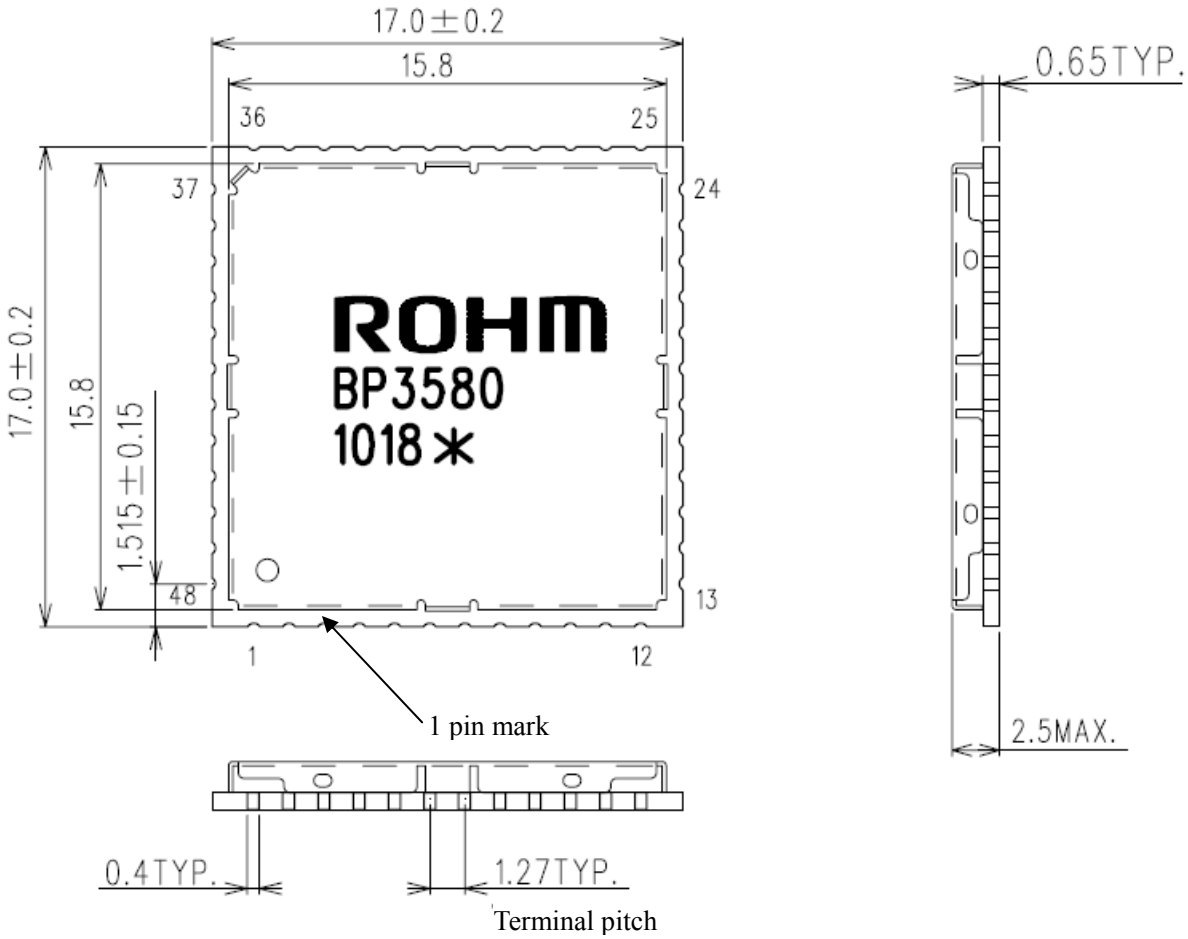


Fig.2　Dimensions（Unit: mm）

Marking

ROHM　：　ROHM Trade Mark

ＢＰ３５８０　：　Type Name

１０１８＊　：　Production lot number (4 digits)

（Example）１０１８＊→Year 2010　Week 18　＊Location

10 RECOMMENDED LAND PATTERN

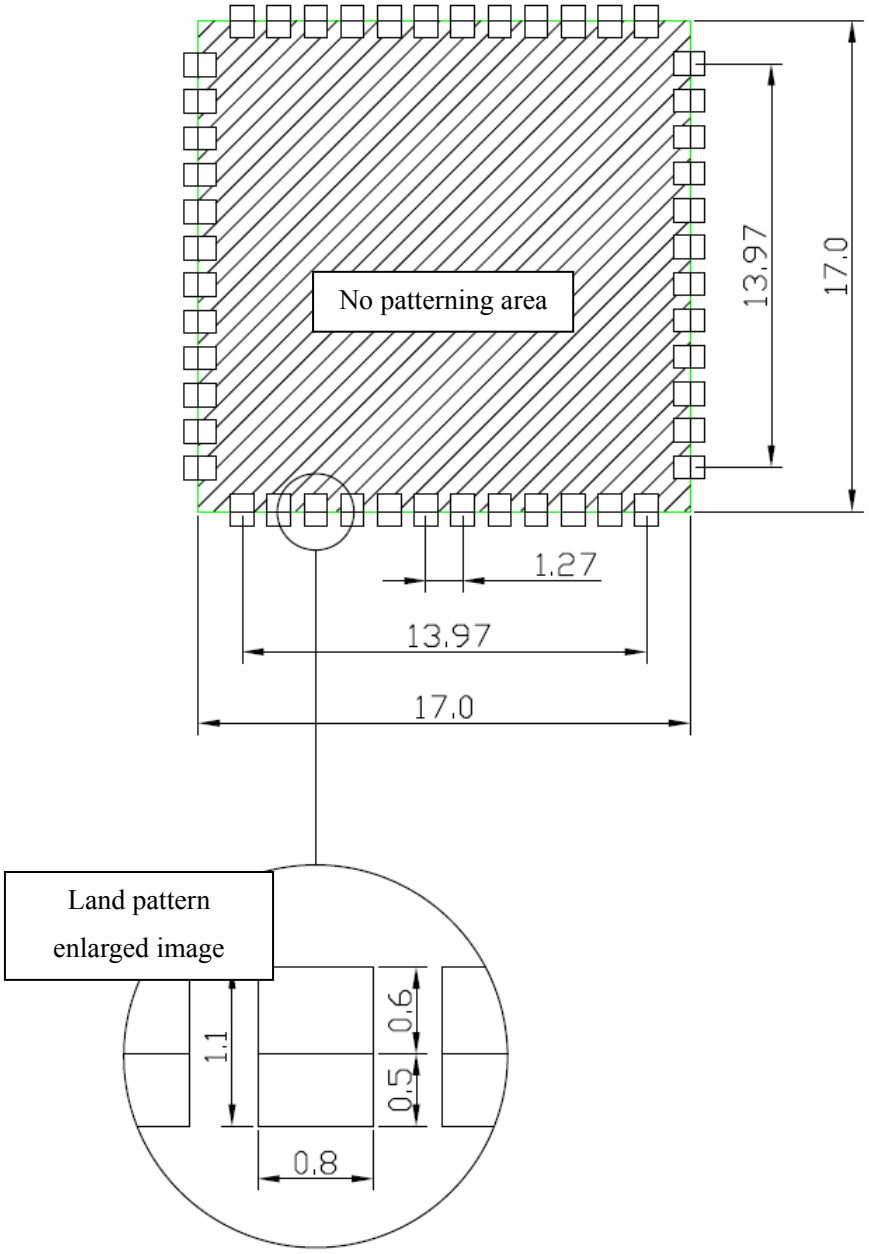


Fig.3 Recommended Land Pattern (Unit: mm)

Caution: There are patterning on the soldering surface (bottom side).
Please be sure not to wire (including GND) on the part of PCB under the module (Fig.3 Recommended land pattern) except land pattern for mounting the module.

11 REFERENCE CIRCUIT

11-1 SDIO Interface

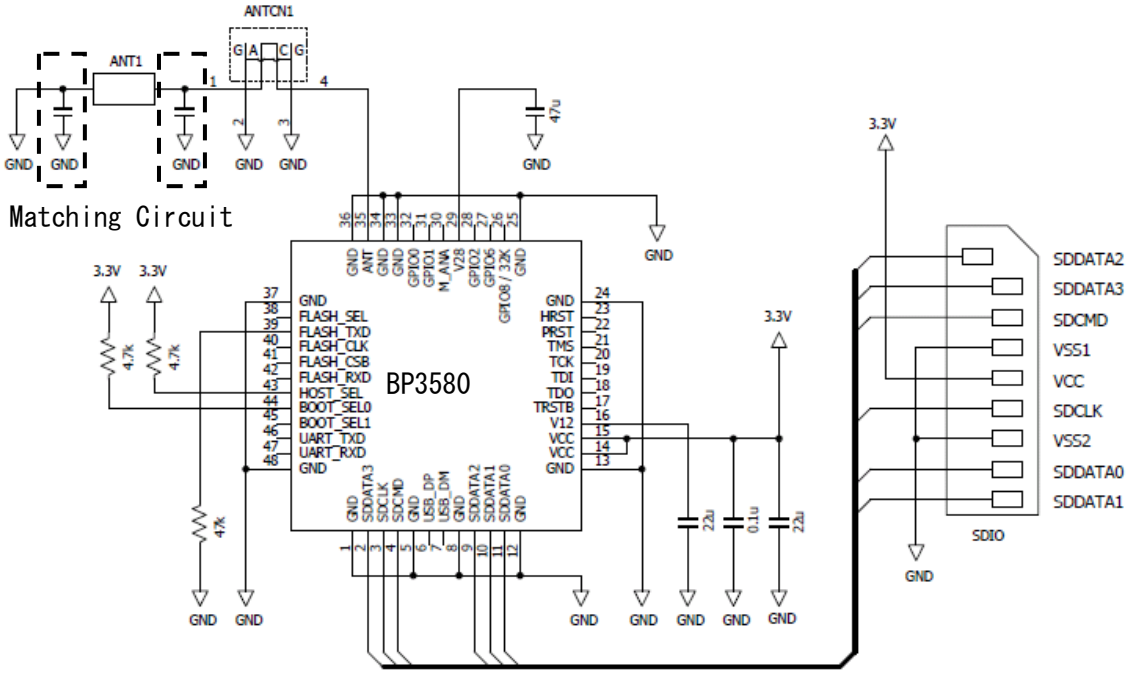


Fig.4 SDIO Interface Reference Circuit

※Matching Circuit is depending on the type of antenna, PCB and etc.
Please consult with antenna maker or PCB maker.

※ It is necessary impedance control (50Ω) that is the wireless from ANT terminal (pin 35) to ANT1.

※ Please reduce the ripple of power supply (VCC=3.3V) as much as possible (less than 10mVpp).

※ About the line of SDCLK/SDDATA/SDCMD
Over shoot and under shoot of signal line cause lot of damage to wireless performance. Please design so that its noise level becomes lower as possible within the SDIO standard timing.
It can be insert dumping resistor near the host signal source.

11-2 USB Host Interface

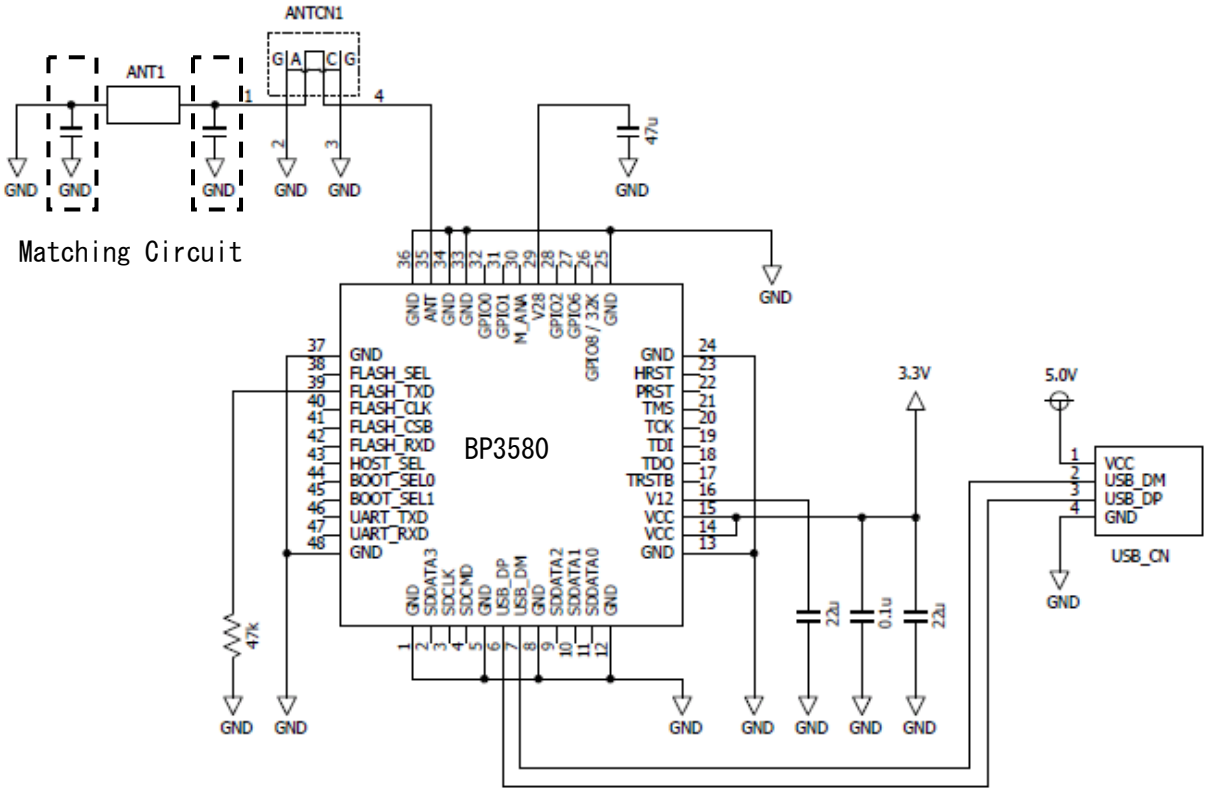


Fig.5 USB Interface Reference Circuit

※About USB_DP/USB_DM line

- Please shorten the wiring length as much as possible.
- Please take the differential impedance matching 90Ω±10%.
- Please set up the impedance matching of single end 45Ω±10%.
- Please wire so that USB_DP and USB_DM may become the same lengths as possible. (Difference of the length is less than 0.5mm.)
- Please do not bend many times and make the bend angle small.
- Please do not make the through hole on wiring if possible.
- Please do not cross the USB_DP/USB_DM line by other signal line, and USB_DP/USB_DM line do not cross also the sprit of power supply.

※Please reduce the ripple of power supply (VCC=3.3V) as much as possible (less than 10mVpp).

11-3 UART INTERFACE MODE

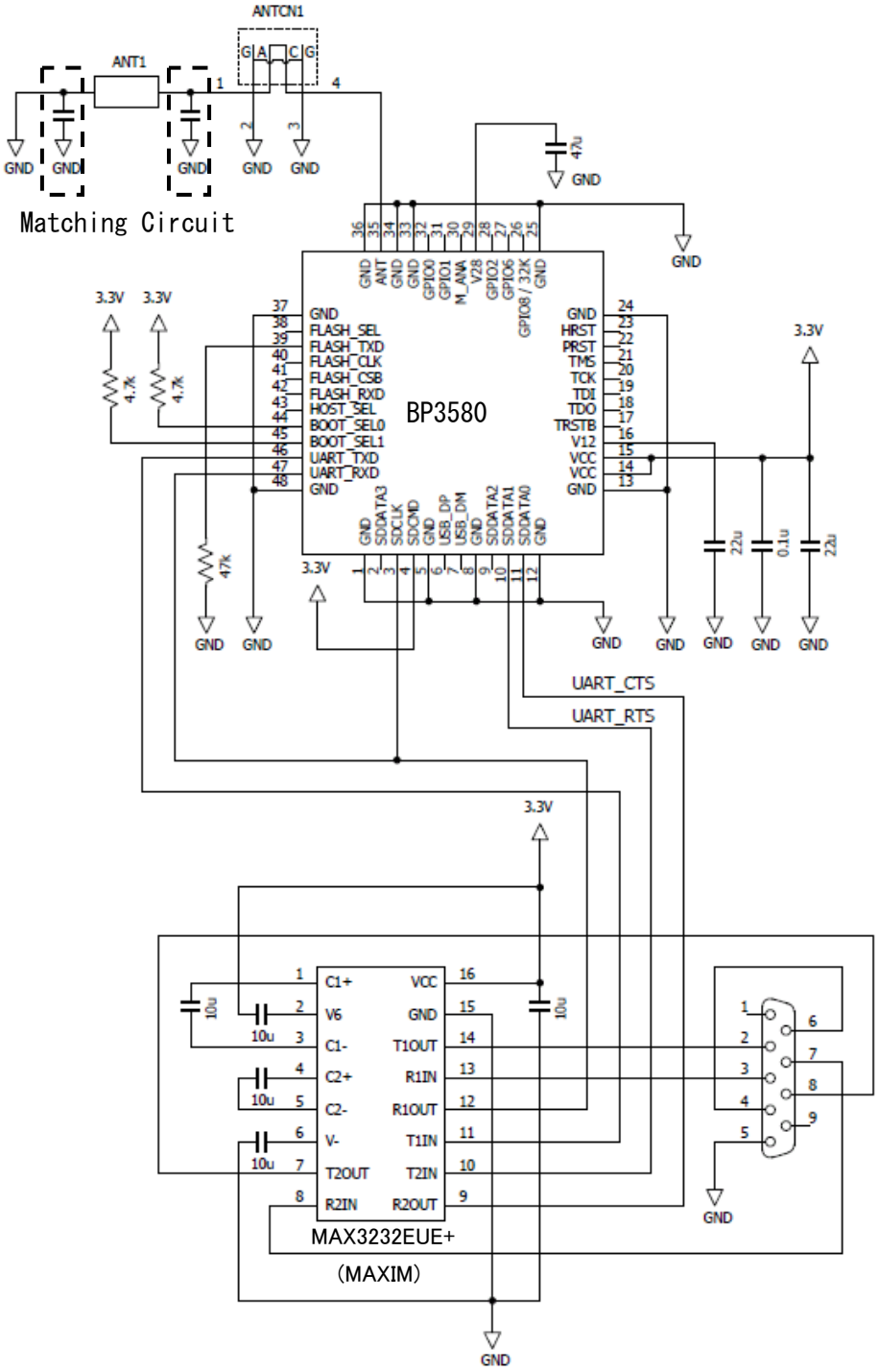
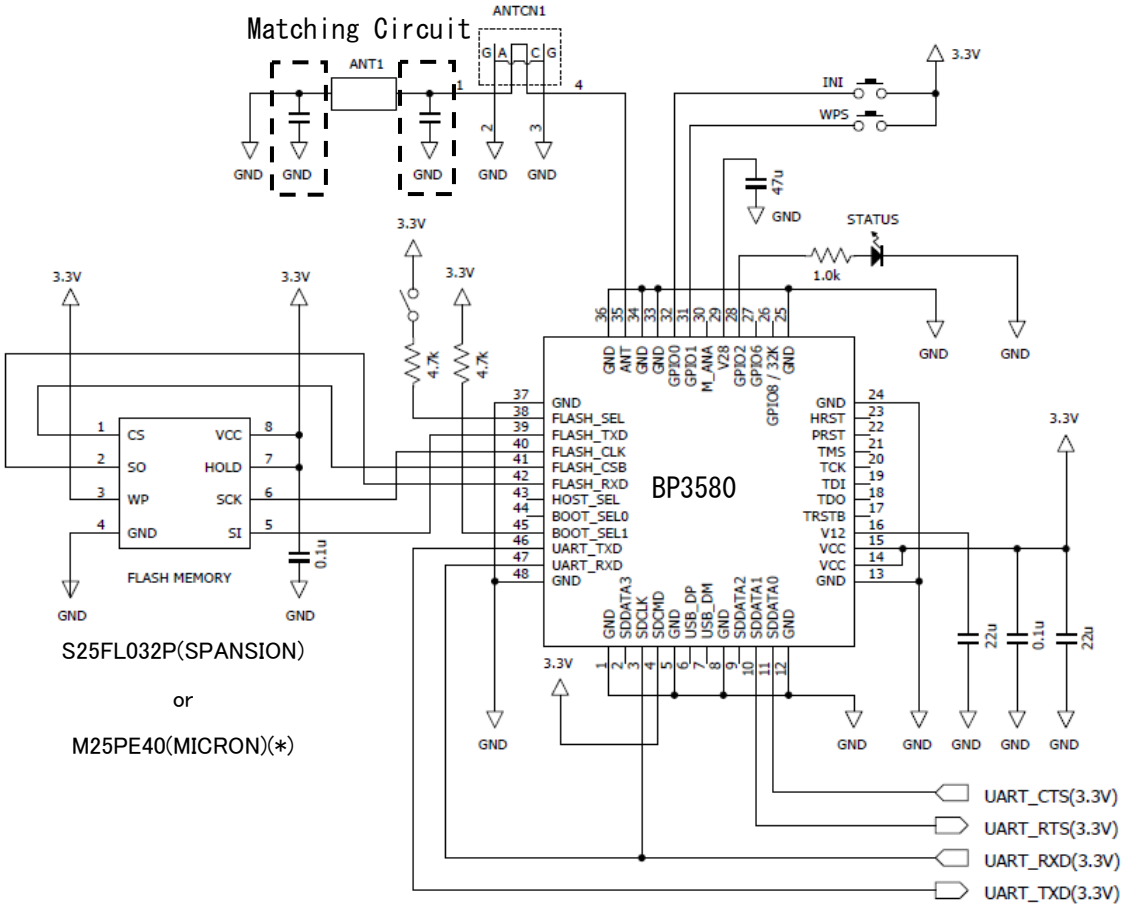


Fig.6 UART Interface Reference Circuit

※ About the set up of BOOT terminal, please refer to Table 1 (Terminal Functions).

※Please reduce the ripple of power supply (VCC=3.3V) as much as possible (less than 10mVpp).

11-4 FLASHBOOT (UART INTERFACE MODE)



(*)The flash memory of above figure is S25FL032P.

Fig.7 FLASH BOOT (UART Interface Mode) Reference Circuit

11-5 RESET IC

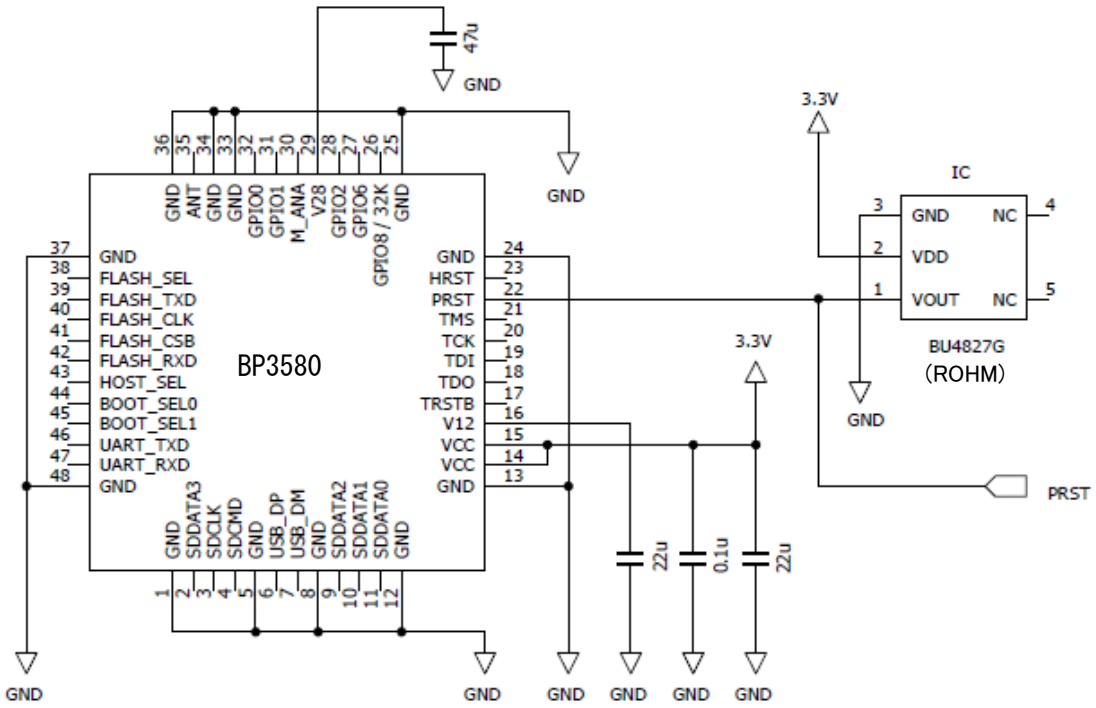


Fig.8 RESET IC Connection Reference Circuit

12 CAUTION FOR PCB LAYOUT

1) Wiring of ANT terminal (pin 35) to ANT1 needs impedance control (50Ω).

2) Soldering side of BP3580 (the bottom side of the module) has wiring patterns.
Please be sure not to wire (including GND) on the part of PCB under the module except land pattern for mounting the module.

3) When mounting to multilayer PCB, second layer of under side of the module should be the GND layer, and all under side of the module should be GND.

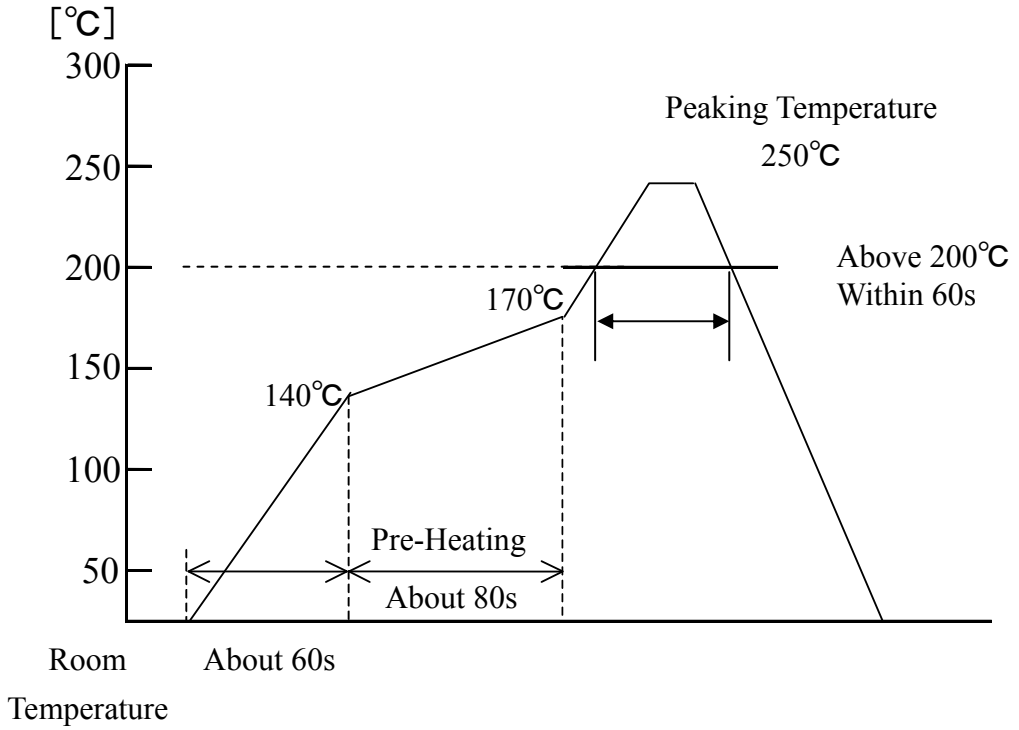
4) Be sure to set ANT line not to cross the signal line or power line in the other layer too.

5) Be sure to set I/F signal line not to cross the signal line or power line in the other layer too.

6) Please set the bypass capacitors for VCC, V28, and V12 near the module.

7) When you arrange the GND layer in multilayer, please open the through hole to a nearest part of the module and through it to the GND layer.

13 RECOMMENDED REFLOW CONDITION



※Reflow solder can be operated only once

Fig.9 Recommended Reflow Profile

14 PRECAUTIONS AS RESET OPERATION

・Please do not reset (PRST, HRST, COMMAND RESET) when BP3580 is accessing to its internal EEPROM.

・BP3580 under writing to the EEPROM is reset (*), which may cause unexpected failure such as incorrect checksum.

・BP3580 under reading from the EEPROM is reset (**), which may cause unstable condition, and you should supply VCC power again.

(*) About write operations of the EEPROM

BP3580 writes to the EEPROM in the following cases.

①Recording the MAC address

②Recording various settings used in TCP/IP firmware

③Recording credential data which is obtained when BP3591 with stand-alone mode acts WPS

(**) About read operations of the EEPPROM

BP3580 reads from the EEPROM in the following cases.

①After reset (≦100ms)

②After firmware starting (≦100ms)

③When WID_SERIAL_NUMBER command is issued.

15 PRECAUTIONS

1) This product allows the reflow process only once.
(With ROHM's recommended reflow conditions)
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: 5～40℃
Relative Humidity: 50±10%RH

3) If storage in the desiccators 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: Reel type: 60℃, 48 hours, up to twice
Single type: 125℃, 24 hours, up to twice

5) There will be a case of having different lot product within one or same reel.

6) 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.

7) About soldering parts of mounting on this product, presence of soldering fillet does not be asked.

8) 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.

9) RF-SW (pin 35, 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.

10) Please note that it is likely to come off when the stress joins the shield case.

11) BP3580 is written the same MAC Address in the EEPROM when shipped.
Please set any MAC Address when you use.

● Precaution for circuit design

1) The products are designed and produced for application in ordinary electronic equipment (AV equipment, OA equipment, telecommunication equipment, home appliances, amusement equipment, etc.).
If the products are to be used in devices requiring extremely high reliability (medical equipment, transport equipment, aircraft/spacecraft, nuclear power controllers, fuel controllers, car equipment including car accessories, safety devices, etc.) and whose malfunction or operational error may endanger human life and sufficient fail-safe measures, please consult with the ROHM sales staff in advance. If product malfunctions may result in serious damage, including that to human life, sufficient fail-safe measures must be taken, including the following:

[a] Installation of protection circuits or other protective devices to improve system safety
[b] Installation of redundant circuits in the case of single-circuit failure

2) The products are designed for use in a standard environment and not in any special environments.
Application of the products in a special environment can deteriorate product performance. Accordingly, verification and confirmation of product performance, prior to use, is recommended if used under the following conditions:
[a] Use in various types of liquid, including water, oils, chemicals, and organic solvents
[b] Use outdoors where the products are exposed to direct sunlight, or in dusty places
[c] Use in places where the products are exposed to sea winds or corrosive gases, including Cl_2, H_2S, NH_3, SO_2, and NO_2
[d] Use in places where the products are exposed to static electricity or electromagnetic waves
[e] Use in environment subject to strong vibration and impact.
[f] Use in proximity to heat-producing components, plastic cords, or other flammable items
[g] Use involving sealing or coating the products with resin or other coating materials
[h] In contact with unclean solder or exposed to water or water-soluble cleaning agents used after soldering.
[i] Use of the products in places subject to dew condensation

3) The products might receive the radio wave interference from electronic devices such as Wireless LAN devices, Bluetooth® devices, digital cordless telephone, microwave oven and so on that radiate electromagnetic wave.

4) The products are not radiation resistant.

5) Verification and confirmation of performance characteristics of products, after on-board mounting, is advised.

6) Confirm that operation temperature is within the specified range described in product specification.

7) Failure induced under deviant condition from what defined in the product specification can not be guaranteed.

8) When product safety related problems arises, please immediately inform to ROHM, and consider technical counter measure.

● Precaution for Mounting / Circuit board design

1) When a highly active halogenous (chlorine, bromine, etc.) flux is used, the remainder of flux may negatively affect product performance and reliability.

2) Soldering is reflow solder in principle.

●Precautions Regarding Reference Circuits

1) If change is made to the constant of an external circuit, allow a sufficient margin due to variations of the characteristics of the products and external components, including transient characteristics, as well as static characteristics.

2) The reference circuit examples, their constants, and other types of information contained herein are applicable only when the products are used in accordance with standard methods. Therefore, if mass production is intended, sufficient consideration to external conditions must be made.

● Precaution for Electrostatic

This product is Electrostatic sensitive product, which may be damaged due to Electrostatic discharge. Please take proper caution during manufacturing and storing so that voltage exceeding Product maximum rating won't be applied to products. Please take special care under dry condition (e.g. Grounding of human body / equipment / solder iron, isolation from charged objects, setting of Ionizer, friction prevention and temperature / humidity control).

● Precaution for Storage / Transportation

1) Product performance and connector mating may deteriorate if the products are stored in the following places:
   [a] Where the products are exposed to sea winds or corrosive gases, including Cl_2, H_2S, NH_3, SO_2, and NO_2
   [b] Where the temperature or humidity exceeds those recommended by the Company
   Temperature: 5℃～40℃, Humidity 40%～60%
   [c] Storage in direct sunshine or condensation.
   [d] Storage in high Electrostatic.

2) Even under ROHM recommended storage condition, connector mating of products over 1 year old may be degraded. The products which passed the recommended storage condition should be confirmed about soldering quality.
   ・Recommended storage condition: Temperature: 5℃～40℃,Humidity: 40%～60%

3) Store / transport cartons in the correct direction, which is indicated on a carton as a symbol. Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.

4) Please use in regulation time after opening the damp-proof packing. Please use after baking process with following conditions when the regulation time passes;
   ・Regulation time: Within 72 hours, Temperature: 5℃～40℃, Humidity: 40%～60%
   ・Baking condition: Reel type: 60℃, 48 hours, up to twice
   Single type: 125℃, 24 hours, up to twice

● Precaution for product label

QR code printed on ROHM product label is only for internal use, and please do not use at customer site.
It might contain an internal part number that is inconsistent with a product part number.

● Precaution for disposition

When disposing products please dispose them properly with an industry waste company.

● Prohibitions Regarding Industrial Property

1) These Specifications contain information related to the ROHM industrial property. Any use of them other than pertaining to the usage of appropriate products is not permitted. Duplication of these Specifications and its disclosure to a third party without the Company's permission is prohibited.

2) Information and data on products, including application examples, contained in these specifications are simply for reference; the Company does not guarantee any industrial property rights, intellectual property rights, or any other rights of a third party regarding this information or data. Accordingly, the Company does not bear any responsibility for:

[a] infringement of the intellectual property rights of a third party

[b] any problems incurred by the use of the products listed herein.

3) The Company prohibits the purchaser of its products to exercise or use the intellectual property rights, industrial property rights, or any other rights that either belong to or are controlled by the Company, other than the right to use, sell, or dispose of the products.