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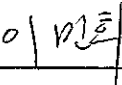
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# SPECIFICATIONS

ALPS Model : UGZZC-505A

FW Version. : C140

ALPS Spec. No. : rev. 1.0.4

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## Hardware Specification

### Bluetooth™ Module

Model number	Function	Revision
UGZZC-505A	BLUETOOTH™ Version 4.1 (Class2)	1.0.4

**Model number**

Digit	Definition	Contents
Digit 1~3	Major model number	UGZ: Wireless products for the in-vehicle
Digit 4	Destination	Z: World wide
Digit 5	Minor model number	C
Digit 6	Specification	X: Engineering sample
		-: Mass production
Digit 7	Series number	5: TC35668
Digit 8~9	Customer number	**: Customer dependent and types
Digit 10	Revision number	*: A~Z

**CONFIDENTIALITY NOTES:**

This document contains confidential information, which shall not be provided to any third parties without agreement notice.

**CAUTION:**

- ◆ This product ( or technology ) is subject to the Japanese Foreign Exchange and Foreign Trade law ,and is required to obtain an export license of the Japanese governmental agency , when exported from Japan.
- ◆ Do not use the product that is dropped in your process.
- ◆ Do not leave and treat the product in a place where it is subjected to strong magnetism or static electricity.
- ◆ The BLUETOOTH trademarks are owned by Bluetooth SIG, Inc., U.S.A.
- ◆ Nozzle pressure for module mounting must be a 1N to 3N static load.
- ◆ This product contains capability to upgrade own firmware via UART interface. This feature can be used for development purpose only. Firmware upgrade by end user in the market may be restricted by regulatory rule depending on each country. ALPS will not own any responsibilities of infringement of each country's regulatory raw for firmware upgrade.
- ◆ ALPS guarantees performance only for the standard configuration. In case of any modifications on standard configuration settings by customer, the original guarantee will no longer be applied. If there is any objections on product quality, all analysis on the module performances will be done based only on ALPS standard configuration.

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**1. GENERAL**

1-1. General Description

This document contains the specification pertinent to the BLUETOOTH™ module.

1-2. Features

1-2-1. **Product Overview**

This product is a radio frequency transceiver module compatible for BLUETOOTH™ Version 4.1 (excludes BLE) system.

This product supports a UART host interface for connecting the BLUETOOTH™ to the host processor.

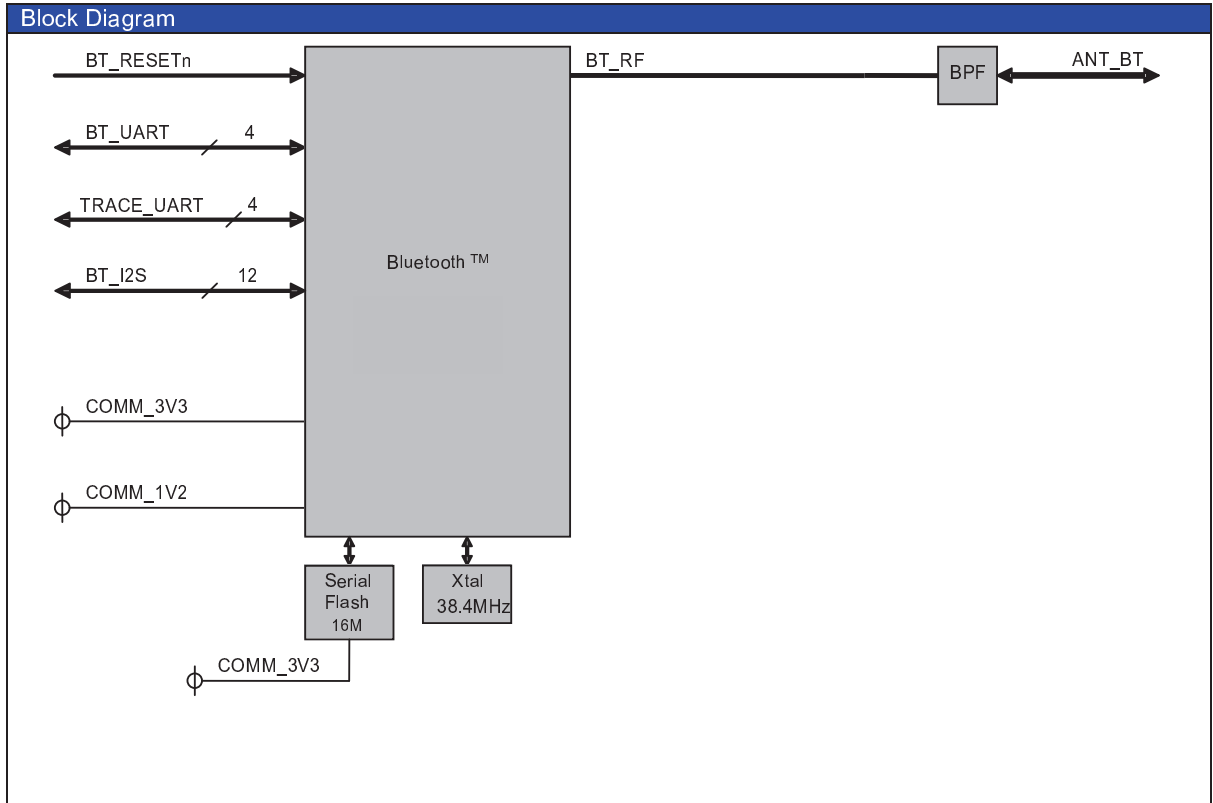
◆ **UART Host Interface**

This product supports an audio interface for connecting the Bluetooth™ to the CODEC IC.

◆ **I<sup>2</sup>S Audio Interface**

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1-2-2. Block Diagram



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1-3. Abbreviations

For the purposes of this document, the following abbreviations apply:

Abbreviation	Definition
A	Ampere
AIO	Analog Input / Output
BALUN	Balance Un-balance circuit
BB	Base Band
BDR	Basic Data Rates
BPF	Band Pass Filter
bps	Bit Per Second
BPSK	Binary Phase Shift Keying
BT	Bluetooth™
CCK	Complimentary Code Keying
Co-ex	Co-existence
CPU	Central Processing Unit
CTS	Clear to Send
dBc	Electric power ratio to carrier
dBm	dB relative to 1 mW. (1 mW = 0 dBm)
DPSK	Differential Phase Shift Keying
DQPSK	Differential Quaternary Phase Shift Keying
DSSS	Direct Sequence Spread Spectrum
EDR	Enhanced Data Rates
ESD	Electrostatic Discharge
E <sup>2</sup> PROM	Electrically Erasable Programmable Read Only Memory
FEC	Front End Control
FER	Frame Error Ratio
GI	Guard Interval
GND	Ground
PIO	Programmable Input / Output
HCI	Host Controller Interface
Hz	Hertz
H4DS	H4 Deep Sleep
I <sup>2</sup> C	Inter-Integrated Circuit Interface
I <sup>2</sup> S	Inter-IC Sound interface
IC	Integrated Circuit
IEEE	Institute of Electronic and Electrical Engineers
I/O	Input / Output
LAN	Local Area Network
LDO	Low Drop Out regulator IC
LED	Light Emitting Diode
MAC	Media Access Control
Max.	Maximum
MCS	Modulation and Coding Scheme

Abbreviation	Definition
Min.	Minimum
NC	Non Connection
OFDM	Orthogonal Frequency Division Multiplexing
PA	Power Amplifier
PCB	Printed Circuit Board
PCM	Pulse Code Modulation
PER	Packet Error Ratio
ppm	Parts Per Million
PTA	Packet Traffic Arbitration
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase Shift Keying
RAM	Random Access Memory
RF	Radio Frequency
RH	Relative humidity
ROM	Read Only Memory
RSSI	Received Signal Strength Indication
RTS	Request To Send
RX	Receive
s	second
SCO	Synchronous Connection-Oriented
SDIO	Secure Digital Input / Output
SoC	System on Chip
SPI	Serial Peripheral Interface
Typ.	Typical
TX	Transmit
UART	Universal Asynchronous Receiver / Transmitter
V	Volt
WCS	Wireless Coexistence System
Wi-Fi™	Wireless Fidelity
WLAN	Wireless Local Area Network
X'tal	Crystal
XO	Crystal Oscillator
°C	degrees Celsius

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## 2. ELECTRICAL CHARACTERISTICS

### 2-1. Absolute Maximum Ratings

Items	Conditions
Storage Temperature	-40 ~ +95 [°C]
Storage Humidity	~ 90 [%] RH (no-condensing)

Pin No. / Pin Name	Conditions
5. COMM_3V3	-0.3 ~ 3.6 [V]
12. COMM_1V2	-0.3 ~ 1.8 [V]
--. Digital Input Pins	$V_{SS} - 0.3 \sim V_{CC33} + 0.3$ [V] <sup>**1)</sup>

Note 1: The input maximum voltage must not exceed the  $V_{CC}$  absolute maximum voltage.

### 2-2. Operating Conditions

Items	Conditions
Operating Temperature	Nominal: +15 ~ +35 [°C]
	Extreme: -40 ~ +85 [°C]

Pin No. / Pin Name	Conditions
5. COMM_3V3	Nominal: 3.3 [V]
	Extreme: $3.3 \pm 0.2$ [V]
12. COMM_1V2	Nominal: 1.2 [V]
	Extreme: $1.2 \pm 0.08$ [V]

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2-2-1. Digital Input / Output Operating Conditions

Pin No. / Pin Name	Conditions
<i>Powered from COMM_3V3 supply voltage</i>	
6. BT_UART_RTS	$V_{IN\_Low}$ : -0.3 ~ $0.2 * V_{CC33}$ [V]
7. BT_UART_TX	$V_{IN\_High}$ : $0.8 * V_{CC33}$ ~ $V_{CC33} + 0.3$ [V]
8. BT_UART_CTS	
9. BT_UART_RX	$V_{OUT\_Low}^{*1)}$ : ~ 0.4 [V] $V_{OUT\_High}^{*2)}$ : $V_{CC33} - 0.6$ ~ $V_{CC33}$ [V]
	Note1: $I_{OUT\_Low} = +4.0$ [mA] Note2: $I_{OUT\_High} = -4.0$ [mA]
<i>Powered from COMM_3V3 supply voltage</i>	
30. TRACE_UART_RTS	$V_{IN\_Low}$ : -0.3 ~ $0.2 * V_{CC33}$ [V]
31. TRACE_UART_TX	$V_{IN\_High}$ : $0.8 * V_{CC33}$ ~ $V_{CC33} + 0.3$ [V]
32. TRACE_UART_CTS	
33. TRACE_UART_RX	$V_{OUT\_Low}^{*1)}$ : ~ 0.4 [V] $V_{OUT\_High}^{*2)}$ : $V_{CC33} - 0.6$ ~ $V_{CC33}$ [V]
	Note1: $I_{OUT\_Low} = +4.0$ [mA] Note2: $I_{OUT\_High} = -4.0$ [mA]
<i>Powered from COMM_3V3 supply voltage</i>	
19. BT_VOICE_OUT	$V_{IN\_Low}$ : -0.3 ~ $0.2 * V_{CC33}$ [V]
20. BT_VOICE_IN	$V_{IN\_High}$ : $0.8 * V_{CC33}$ ~ $V_{CC33} + 0.3$ [V]
21. BT_VOICE_WS	
22. BT_VOICE_CLK	$V_{OUT\_Low}^{*1)}$ : ~ 0.4 [V] $V_{OUT\_High}^{*2)}$ : $V_{CC33} - 0.6$ ~ $V_{CC33}$ [V]
	Note1: $I_{OUT\_Low} = +4.0$ [mA] Note2: $I_{OUT\_High} = -4.0$ [mA]
<i>Powered from COMM_3V3 supply voltage</i>	
24. BT_AV_OUT	$V_{IN\_Low}$ : -0.3 ~ $0.2 * V_{CC33}$ [V]
25. REFERENCE_IN	$V_{IN\_High}$ : $0.8 * V_{CC33}$ ~ $V_{CC33} + 0.3$ [V]
26. BT_AV_WS	
28. BT_AV_CLK	$V_{OUT\_Low}^{*1)}$ : ~ 0.4 [V] $V_{OUT\_High}^{*2)}$ : $V_{CC33} - 0.6$ ~ $V_{CC33}$ [V]
	Note1: $I_{OUT\_Low} = +4.0$ [mA] Note2: $I_{OUT\_High} = -4.0$ [mA]
<i>Powered from COMM_3V3 supply voltage</i>	
14. OPT_AUDIO_OUT	$V_{IN\_Low}$ : -0.3 ~ $0.2 * V_{CC33}$ [V]
15. OPT_AUDIO_IN	$V_{IN\_High}$ : $0.8 * V_{CC33}$ ~ $V_{CC33} + 0.3$ [V]
16. OPT_AUDIO_WS	
18. OPT_AUDIO_CLK	$V_{OUT\_Low}^{*1)}$ : ~ 0.4 [V] $V_{OUT\_High}^{*2)}$ : $V_{CC33} - 0.6$ ~ $V_{CC33}$ [V]
	Note1: $I_{OUT\_Low} = +4.0$ [mA] Note2: $I_{OUT\_High} = -4.0$ [mA]
<i>Powered from COMM_3V3 supply voltage</i>	
11. BT_RESETh	$V_{IN\_Low}$ : -0.3 ~ $0.2 * V_{CC33}$ [V] $V_{IN\_High}$ : $0.8 * V_{CC33}$ ~ $V_{CC33} + 0.3$ [V]
<i>Powered from COMM_3V3 supply voltage</i>	
23. BT_CONF[2]	$V_{IN\_Low}$ : -0.3 ~ $0.2 * V_{CC33}$ [V]
29. BT_CONF[1]	$V_{IN\_High}$ : $0.8 * V_{CC33}$ ~ $V_{CC33} + 0.3$ [V]

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2-3. DC Characteristics

The following specifications are guaranteed for nominal supply voltage and nominal temperature, unless otherwise specified. The limiting current of the power supply needs a steady design with the margin from the maximum of the current consumption.

2-3-1. Maximum Current Consumptions

Condition	V <sub>CC33</sub> =3.3V [mA] <sup>*1)</sup>			V <sub>CC12</sub> =1.2V [mA] <sup>*2)</sup>		
	Min.	Typ.	Max.	Min.	Typ.	Max.
-	-	-	125	-	-	300

Note: This is applied at extreme conditions.

Note 1: Total current of COMM\_3V3.

Note 2: Total current of COMM\_1V2.

Output power level of Bluetooth™ is typical +0 dBm.

2-3-2. Receiver Current Consumptions

Data Rate [Mbps]	V <sub>CC33</sub> =3.3V [mA] <sup>*1)</sup>			V <sub>CC12</sub> =1.2V [mA] <sup>*2)</sup>		
	Min.	Typ.	Max.	Min.	Typ.	Max.
1 <sup>*3)</sup>	-	-	125	-	-	300
2 <sup>*3)</sup>	-	-	125	-	-	300
3 <sup>*3)</sup>	-	-	125	-	-	300

Note: This is applied at extreme conditions.

Note 1: Total current of COMM\_3V3.

Note 2: Total current of COMM\_1V2.

Note 3: Input power level is typical -70dBm.

2-3-3. Transmitter Current Consumptions

Data Rate [Mbps]	V <sub>CC33</sub> =3.3V [mA] <sup>*1)</sup>			V <sub>CC12</sub> =1.2V [mA] <sup>*2)</sup>		
	Min.	Typ.	Max.	Min.	Typ.	Max.
1 <sup>*3)</sup>	-	-	125	-	-	300
2 <sup>*4)</sup>	-	-	125	-	-	300
3 <sup>*4)</sup>	-	-	125	-	-	300

Note: This is applied at extreme conditions.

Note 1: Total current of COMM\_3V3.

Note 2: Total current of COMM\_1V2.

Note 3: Output power level is typical +0 dBm.

Note 4: The same power setting value as 1[Mbps].

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### 3. RADIO CHARACTERISTICS

#### 3-1. Common Physical Layer Characteristics

Items	Conditions
Operating Frequency [MHz]	2402 ~ 2480 <sup>(1)</sup>
Operating channel spacing [MHz]	1
Number of Channel	79 <sup>(1)</sup>
Modulation	TDD <sup>(2)</sup>

Note 1: The frequency and number of channels follows the regulatory domain.

Note 2: Data Rate, Modulation and System

Data Rate [Mbps]	Modulation	System
1	GFSK BbT = 0.5	BDR
2	$\pi/4$ -DQPSK	EDR
3	8DPSK	

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3-2. Receiver Characteristics

The following specifications are guaranteed for nominal supply voltage and nominal temperature, unless otherwise specified.

Tested by HCI Tester. (UART)

3-2-1. Sensitivity

Data Rate [Mbps]	Min.	Typ.	Max.	Units
1 <sup>(1)</sup>	-	-	-70	dBm
2 <sup>(2)</sup>	-	-	-70	
3 <sup>(2)(3)</sup>	-	-	-70	

Note: This is applied at extreme conditions.

Note 1: BER < 0.1%, Dirty=on.

Note 2: BER < 0.01%, Dirty=on.

Note 3: This is not applied at extreme conditions.

3-2-2. Maximum Input Level

Data Rate [Mbps]	Min.	Typ.	Max.	Units
1	-20	-	-	dBm
2	-20	-	-	
3	-20	-	-	

Note: BER < 0.1%, Dirty=off.

3-2-2-1. C/I Performance

Data Rate [Mbps]	Interfering Frequency [MHz]	Min.	Typ.	Max.	Units
1	Co-channel interference <sup>(1)</sup>	-	-	+11	dB
	Adjacent ±1 <sup>(1)</sup>	-	-	0	
	Adjacent ±2 <sup>(1)</sup>	-	-	-30	
	Adjacent ≥ ±3 <sup>(2)</sup>	-	-	-40	
	Image <sup>(2)</sup>	-	-	-9	
	Adjacent ±1 to image <sup>(2)</sup>	-	-	-20	
2	Co-channel interference <sup>(1)</sup>	-	-	+13	dB
	Adjacent ±1 <sup>(1)</sup>	-	-	0	
	Adjacent ±2 <sup>(1)</sup>	-	-	-30	
	Adjacent ≥ ±3 <sup>(2)</sup>	-	-	-40	
	Image <sup>(2)</sup>	-	-	-7	
	Adjacent ±1 to image <sup>(2)</sup>	-	-	-20	
3	Co-channel interference <sup>(1)</sup>	-	-	+21	dB
	Adjacent ±1 <sup>(1)</sup>	-	-	+5	
	Adjacent ±2 <sup>(1)</sup>	-	-	-25	
	Adjacent ≥ ±3 <sup>(2)</sup>	-	-	-33	
	Image <sup>(2)</sup>	-	-	0	
	Adjacent ±1 to image <sup>(2)</sup>	-	-	-13	

Note: BER < 0.1 [%], Dirty=off, fIMAGE = f<sub>C</sub> - 1 [MHz]

If two channel specifications from the above table are applicable to the same channel, the more relaxed specification applies.

Applied the relaxed interference requirement of BLUETOOTH™ specification.

Note 1: Input a wanted signal at 10 [dB] greater than minimum input level sensitivity specification.

Note 2: Input a wanted signal at 3 [dB] greater than minimum input level sensitivity specification.

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**3-2-3. Inter-modulation Performance**

Data Rate [Mbps]	Min.	Typ.	Max.	Units
1	-39	-	-	dBm

Note: BER < 0.1%, Dirty=off  
 Input a wanted signal at 6dB greater than minimum input level sensitivity specification.  
 Input the interference signal  $f_1$  and  $f_2$ . The  $f_1$  and  $f_2$  are  $f_{\text{wanted\_signal}} = 2 \times f_1 - f_2$  and  $|f_2 - f_1| = 3, 4$  and  $5$  [MHz]. The interference signal  $f_1$  is a carrier wave signal, the interference signal  $f_2$  is modulated signal.

**3-2-4. Blocking Performance**

Data Rate [Mbps]	Interfering Frequency [MHz]	Min.	Typ.	Max.	Units
1	30 ~ 2000	-10	-	-	dBm
	2000 ~ 2400	-27	-	-	
	2500 ~ 3000	-27	-	-	
	3000 ~ 12750	-10	-	-	

Note: BER < 0.1%, Dirty=off,  $f_c = 2460\text{MHz}(58\text{ch})$   
 Applied the relaxed interference requirement of Bluetooth specification  
 Input a wanted signal at 3dB greater than minimum input level sensitivity specification.  
 Interference signal is a carrier wave signal.

**3-2-5. Out-of-band Spurious Emission**

Data Rate [Mbps]	Frequency Range [MHz]	Min.	Typ.	Max.	Units
1	30 ~ 1000	-	-	-57	dBm/100kHz
	1000 ~ 2387	-	-	-47	
	2387 ~ 2400	-	-	-47	
	2483.5 ~ 2496.5	-	-	-47	
	2496.5 ~ 12500	-	-	-47	

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**3-3. Transmitter Characteristics**

The following specifications are guaranteed for nominal supply voltage and nominal temperature, unless otherwise specified.

Tested by HCI Tester. (UART)

**3-3-1. Average Power**

Data Rate [Mbps]	Min.	Typ.	Max.	Units
1	-6	0	+4	dBm
2				
3				

Note: This is applied at extreme conditions.

**3-3-2. Relative Transmit Power**

Data Rate [Mbps]	Min.	Typ.	Max.	Units
2	-4	-	+1	dB
3				

Note: This is applied at extreme conditions.

**3-3-3. Initial Carrier Frequency Tolerance**

Data Rate [Mbps]	Min.	Typ.	Max.	Units
1	-	-	±75	kHz

Note: This is applied at extreme conditions.

**3-3-4. Carrier Frequency Drift**

Data Rate [Mbps]		Min.	Typ.	Max.	Units
1	1 [slot]	-	-	±25	kHz
	3 [slot]	-	-	±40	
	5 [slot]	-	-	±40	
	Drift Rate	-	-	±20	kHz/50us

Note: This is applied at extreme conditions.

**3-3-5. Carrier Frequency Stability**

Data Rate [Mbps]		Min.	Typ.	Max.	Units
2 3	omega i	-	-	±75	kHz
	omega o max.	-	-	±10	
	omega i+o	-	-	±75	

Note: This is applied at extreme conditions.

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**3-3-6. Modulation Characteristics**

Data Rate [Mbps]		Min.	Typ.	Max.	Units
1	00001111 ( $df1_{avg}$ )	140	-	175	kHz
	01010101 ( $df2_{max}$ )	115	-	-	
	01010101 ( $df2_{avg}/df1_{avg}$ )	80	-	-	%

Note: This is applied at extreme conditions.

**3-3-7. Modulation Accuracy**

Data Rate [Mbps]		Min.	Typ.	Max.	Units
2	RMS DEVM	-	-	20	%
	99% DEVM	-	-	30	
	Peak DEVM	-	-	35	
3	RMS DEVM	-	-	13	%
	99% DEVM	-	-	20	
	Peak DEVM	-	-	25	

Note: This is applied at extreme conditions.

**3-3-8. Output Spectrum - 20dB Bandwidth \*1)**

Data Rate [Mbps]	Min.	Typ.	Max.	Units
1	-	-	1.0	MHz

Note: This is applied at extreme conditions.

Note 1: The transmit power shall be measured in the following conditions.

Items	Conditions
-	RBW: 10 [kHz], VBW: 30 [kHz]

**3-3-9. Output Spectrum - Adjacent Channel Power \*1)**

Data Rate [Mbps]		Min.	Typ.	Max.	Units
1	$ M-N  = 2$	-	-	-20	dBm
	$ M-N  \geq 3$	-	-	-40	

Note: This is applied at extreme conditions.

M = Transmit channel  
N = Measured channel

Note 1: The transmit power shall be measured in the following conditions.

Items	Conditions
$ M-N  = 2$	RBW: 100 [kHz], VBW: 300 [kHz]
$ M-N  \geq 3$ *2)	RBW: 100 [kHz], VBW: 300 [kHz]

Note 2: Exceptions are allowed in up to three bands of 1MHz width centered on a frequency which is an integer multiple of 1 [MHz]. They must, however, comply with an absolute value of -20 [dBm].

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**3-3-10. In-band Spurious Emission**

Data Rate [Mbps]		Min.	Typ.	Max.	Units
2	M-N  = 1	-	-	-26	dBm
3	M-N  = 2	-	-	-20	
	M-N  ≥ 3 <sup>*1)</sup>	-	-	-40	

Note: This is applied at extreme conditions.  
M = Transmit channel  
N = Measured channel

Note 1: When the measurement of this item becomes possible, the specification limit value of this item is discussed and decided. This specification limit value of this item is a standard value of BLUETOOTH™ specification.

**3-3-11. Out-of-band Spurious Emission**

Data Rate [Mbps]	Frequency Range [MHz]	Min.	Typ.	Max.	Units
1	30 ~ 1000	-	-	-36	dBm/100kHz
	1000 ~ 2387	-	-	-30	
	2387 ~ 2400	-	-	-26	
	2483.5 ~ 2496.5	-	-	-26	
	2496.5 ~ 12500	-	-	-30	
	1800 ~ 1900	-	-	-47	
	5150 ~ 5300	-	-	-47	

Note: Output power level is typical +0 [dBm].

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### 4. RESET CONFIGURATION

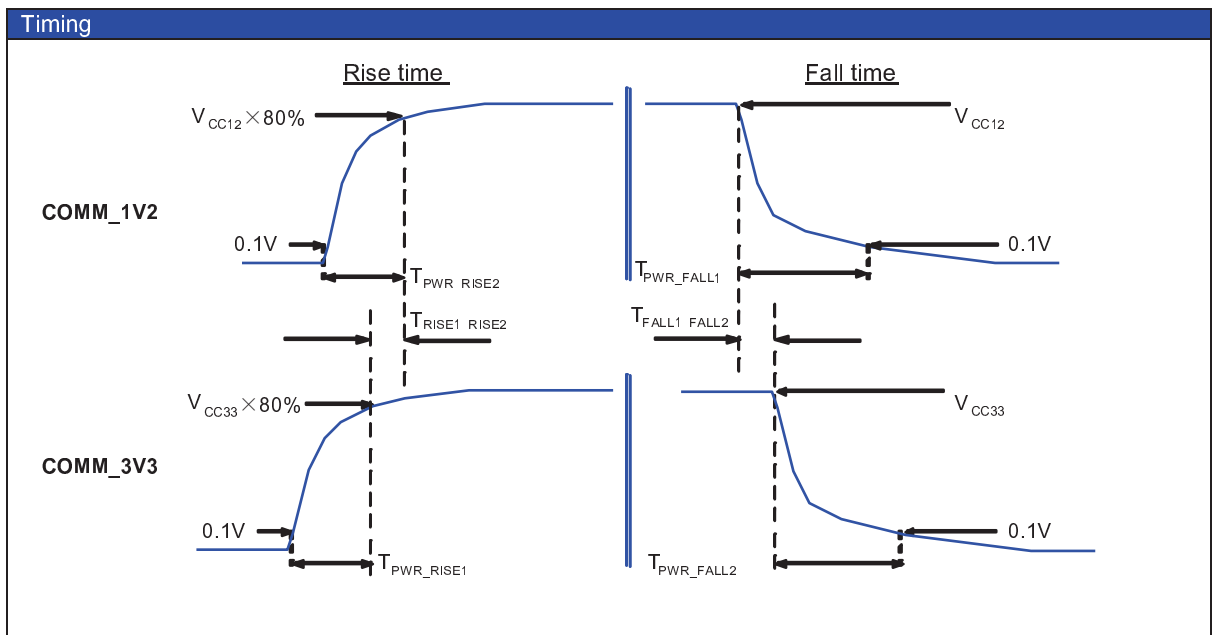
The product is reset to its default operating state under the following conditions:

The following specifications are guaranteed for nominal supply voltage and nominal temperature, unless otherwise specified.

#### 4-1. Rise Time and Fall Time

##### 4-1-1. Power Supply

In rise time, The order of turning on two power supplies recommends to first turn on COMM\_3V3, then turn on COMM\_1V2 within 10μ sec. (should not be the order in reverse)  
 In fall time, The order of turning off two power supplies recommends to first turn off COMM\_1V2, then turn off COMM\_3V3 within 10μ sec. (should not be the order in reverse)

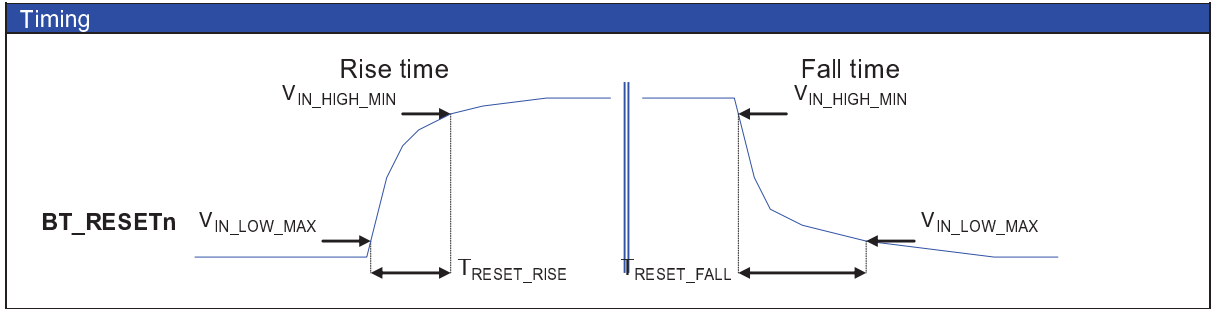


Symbol	Parameter	Min.	Typ.	Max.	Units
T <sub>PWR_RISE1</sub>	Rise time of COMM_3V3	0.01	-	10	ms
T <sub>PWR_RISE2</sub>	Rise time of COMM_1V2	0.01	-	10	ms
T <sub>PWR_FALL1</sub>	Fall time of COMM_1V2	0 ≤	-	-	ms
T <sub>PWR_FALL2</sub>	Fall time of COMM_3V3	0 ≤	-	-	ms
T <sub>RISE1-RISE2</sub>	Time from T <sub>PWR_RISE1</sub> to T <sub>PWR_RISE2</sub>	0		10	μs
T <sub>FALL1-FALL2</sub>	Time from T <sub>PWR_FALL1</sub> to T <sub>PWR_FALL2</sub>	0		10	μs

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4-1-2. Reset Signal



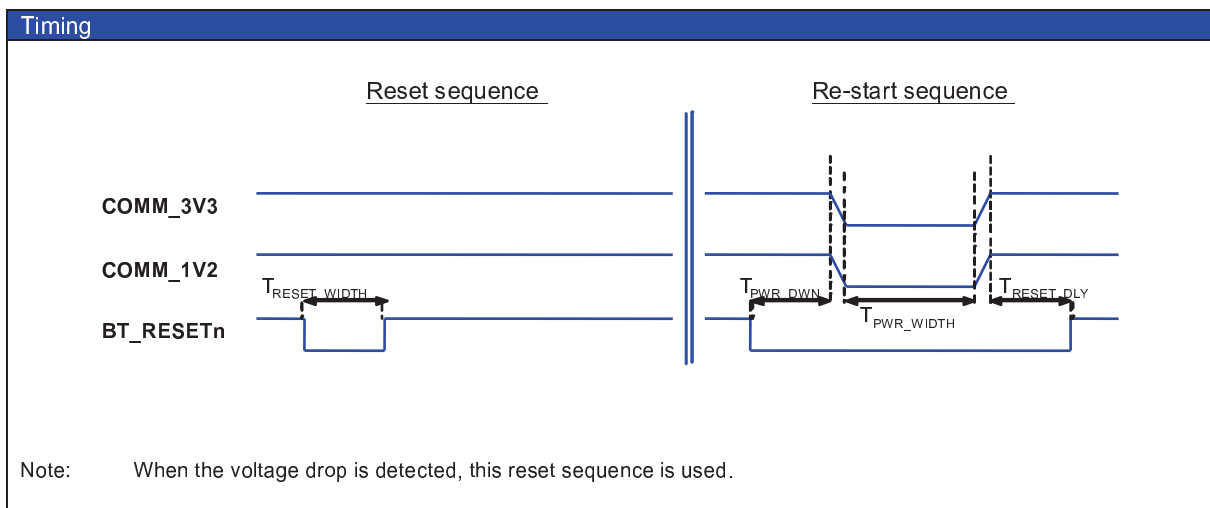
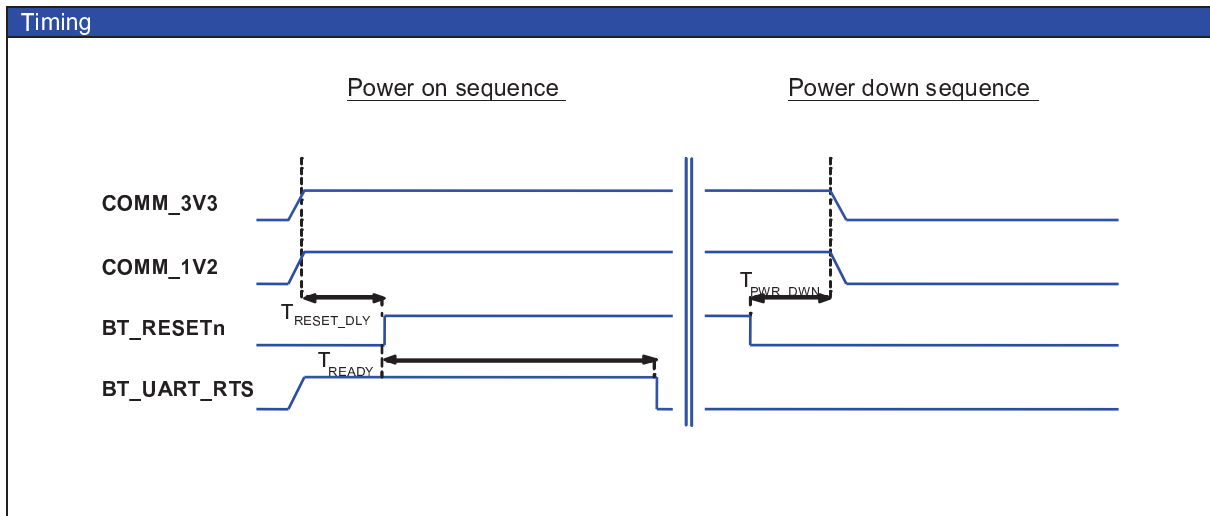
Symbol	Parameter	Min.	Typ.	Max.	Units
T <sub>RESET_RISE</sub>	Rise time	0 ≤	-	-	μs
T <sub>RESET_FALL</sub>	Fall time	0 ≤	-	-	ms

					DSGD.				
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SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.					

### 4-2. Sequence

The following power sequences are recommended:

- ◆ When BT\_RESETn is asserted (High), a Power On Reset (POR) is performed. Provide stable power supply to power supply pins (COMM\_3V3 and COMM\_1V2) is pre-requisite for successful POR.
- ◆ Provide the power supply to power supply pins before driving any I/O pins.



Symbol	Parameter	Min.	Typ.	Max.	Units
T <sub>RESET_DLY</sub>	Valid power to RESETn de-asserted	5	-	-	ms
T <sub>PWR_DWN</sub>	RESETn assert to power off	2	-	-	us
T <sub>RESET_WIDTH</sub>	RESETn pulse width	1	-	-	us
T <sub>PWR_WIDTH</sub>	Power down width (less than 0.1V) <sup>(1)</sup>	5	-	-	ms
T <sub>READY</sub> <sup>(2)</sup>	RESETn de-assert to UART active	-	-	-	ms

Note 1: Wait until the voltage of the power supply line falls enough.  
 Note 2: This is time that UART\_RTS can be asserted the high.

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## 5. HOST INTERFACE CHARACTERISTICS

The following specifications are guaranteed for nominal supply voltage and nominal temperature, unless otherwise specified.

### 5-1. UART Interface

The Bluetooth™ part has a standard UART serial interface that provides a simple mechanism for communicating using RS232 protocol.

Parameter	Conditions	Value
Baud rate <sup>(1)</sup>	Minimum	115,200 [bps]
	Maximum	4,000,000 [bps]
Flow control	Hardware (RTS / CTS)	
Parity	None	
Number of stop bits	1	
Bits per byte	8	

Note 1: At first, the host interface needs to connect by 921,600 [bps]. If the baud rate want to use by other than 921,600 [bps], it needs to execute a specific HCI command and Command Complete Event.

#### 5-1-1. UART Default Settings

Parameter	Conditions
Baud rate	921,600 [bps]
Flow control	Hardware (RTS / CTS)
Parity	None
Number of stop bits	1
Bits per byte	8

Note: It is booted by default setting when the Power On Sequence or Reset Sequence was executed.

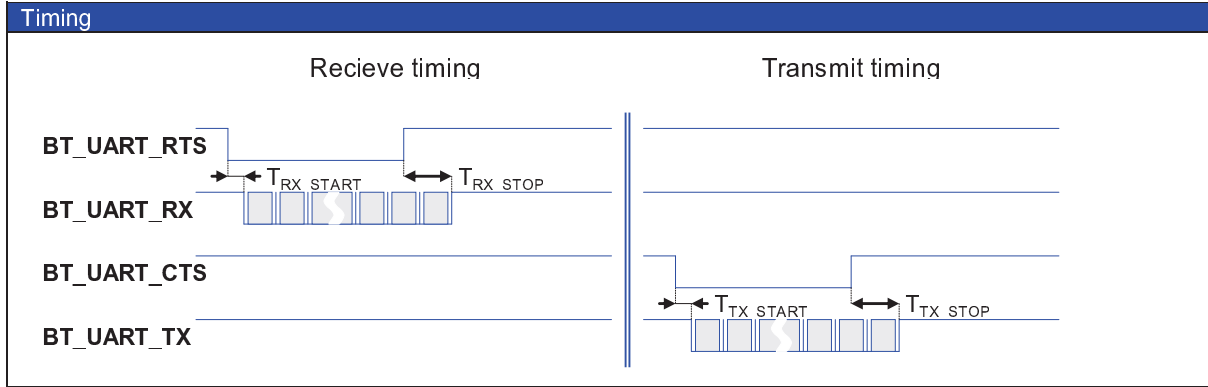
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					CHKD.	TITLE	UGZZC-505A SPECIFICATION		
					APPD.				
						<b>ALPS ELECTRIC CO., LTD.</b>			
SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.					

5-1-2. Signal Description

Pin No. / Pin Name	I/O	Description	Signal
6. BT_UART_RTS	O	[UART] Request to send (active low)	RTS
7. BT_UART_TX	O	[UART] Data output (active high)	TXD
8. BT_UART_CTS	I	[UART] Clear to send (active low)	CTS
9. BT_UART_RX	I	[UART] Data input (active high)	RXD
11. BT_RESETh	I	Reset input (active low)	RSTh

Note: I/O status : I = input / O = output / B = bi-directional / P = power supply.

5-1-3. Timing with Hardware Flow Control



Symbol	Parameter	Min.	Typ.	Max.	Units
T <sub>RX_START</sub>	Send the flow control (RTS asserted) to receive data (RX)	0<	-	-	ms
T <sub>RX_STOP</sub>	Send the flow control (RTS de-asserted) to stop data (RX)	-	-	16	byte
T <sub>TX_START</sub>	Receive the flow control (CTS asserted) to send data (TX)	0<	-	-	ms
T <sub>TX_STOP</sub>	Receive the flow control (CTS de-asserted) to stop data (TX)	-	-	1	byte

5-2. TRACE UART Interface

Same as "5-1.UART Interface" part

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## 6. AUDIO INTERFACE CHARACTERISTICS

The following specifications are guaranteed for nominal supply voltage and nominal temperature, unless otherwise specified.

### 6-1. I<sup>2</sup>S Interface

The digital audio interface supports the industry standard formats for I<sup>2</sup>S, left-justified or right-justified.

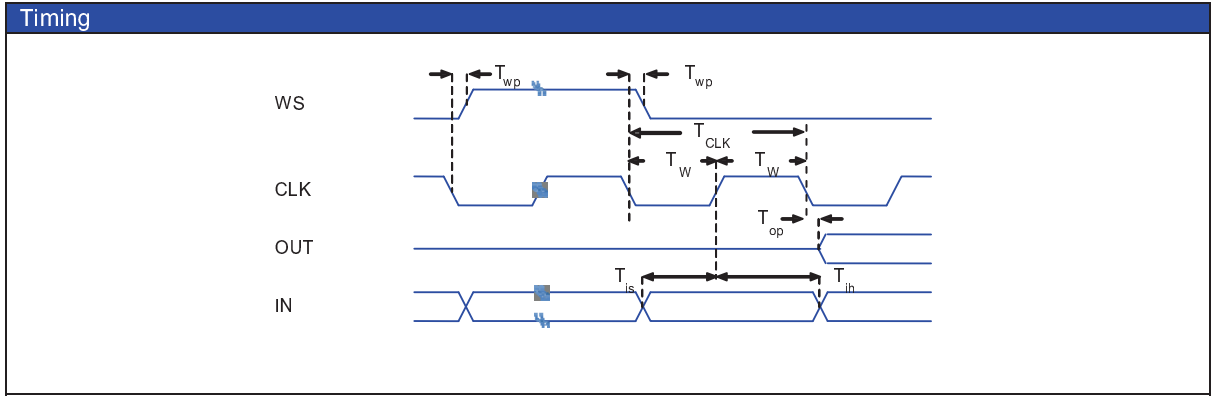
#### 6-1-1. Signal Description

Pin Name	I/O	Description	Signal
14.OPT_AUDIO_OUT	O	[I <sup>2</sup> S] Data output (optional)	OUT
15.OPT_AUDIO_IN	I	[I <sup>2</sup> S] Data input (optional)	IN
16.OPT_AUDIO_WS	B	[I <sup>2</sup> S] Word select output (master mode) (optional) Word select input (slave mode) (optional)	WS
18.OPT_AUDIO_CLK	B	[I <sup>2</sup> S] Clock output (master mode) (optional) Clock input (slave mode) (optional)	SCK
19.BT_VOICE_OUT	O	[I <sup>2</sup> S] Data output	OUT
20.BT_VOICE_IN	I	[I <sup>2</sup> S] Data input	IN
21.BT_VOICE_WS	B	[I <sup>2</sup> S] Word select output (master mode) Word select input (slave mode)	WS
22.BT_VOICE_CLK	B	[I <sup>2</sup> S] Clock output (master mode) Clock input (slave mode)	SCK
24.BT_AV_OUT	O	[I <sup>2</sup> S] Data output	OUT
25.REFERENCE_IN	I	[I <sup>2</sup> S] Data input	IN
26.BT_AV_WS	B	[I <sup>2</sup> S] Word select output (master mode) Word select input (slave mode)	WS
28.BT_AV_CLK	B	[I <sup>2</sup> S] Clock output (master mode) Clock input (slave mode)	SCK

Note: I/O status : I = input / O = output / B = bi-directional / P = power supply.

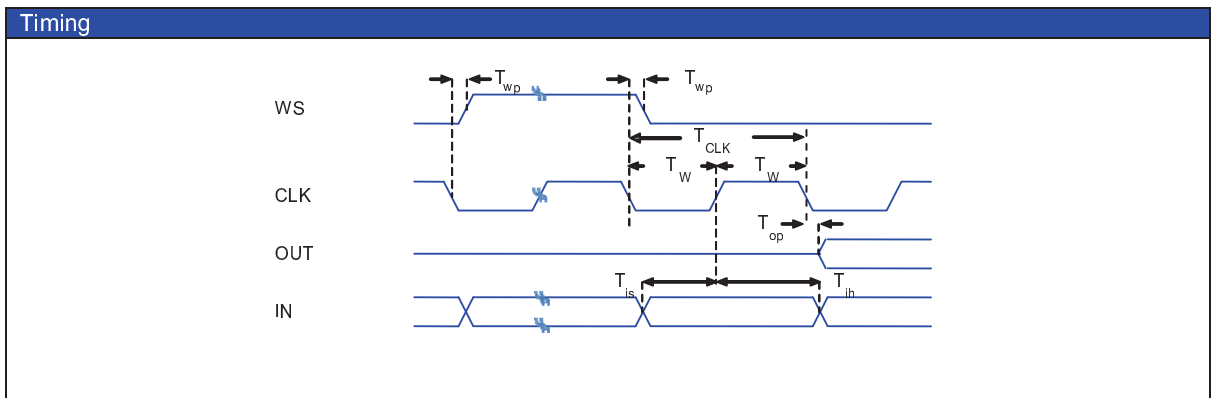
					DSGD.			
					CHKD.	TITLE UGZZC-505A SPECIFICATION		
					APPD.			
					<b>ALPS ELECTRIC CO., LTD.</b>			
SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.				

6-1-2. Master Mode Timing



Symbol	Parameter	Min.	Max.	Units
$T_{CLK}$	Cycle time	167	15625	ns
$T_W$	High or low pulse width	$0.5 \cdot T_{CLK}$		ns
$T_{is}$	IN setup time	25		ns
$T_{ih}$	IN hold time	0		ns
$T_{op}$	OUT propagation time	0	15	ns
$T_{wp}$	WS propagation time	0	15	ns

6-1-3. Slave Mode Timing



Symbol	Parameter	Min.	Max.	Units
$T_{CLK}$	Cycle time	81		ns
$T_W$	High or low pulse width	$0.4 \cdot T_{CLK}$		ns
$T_{is}$	IN setup time	8		ns
$T_{ih}$	IN hold time	0	-	ns
$T_{op}$	OUT propagation time	0	19	ns
$T_{wp}$	WS propagation time	0	19	ns

					DSGD.			
					CHKD.	TITLE UGZZC-505A SPECIFICATION		
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SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.				

## 7. TEST INTERFACE CHARACTERISTICS

The following pins are used to select Profile/HCI/FW Download mode.

### 7-1. Configuration Settings

#### 7-1-1. Profile mode(Default)

Until BT\_UART\_RTS is asserted (Low), BT\_CONF need to fixed to low to use Profile mode.

Pin No. / Pin Name	I/O	Description	Signal
29. BT_CONF[1]	I	[Config] This should be fixed to low.	-
23. BT_CONF[2]	I	[Config] This should be fixed to low.	-

Note: I/O status : I = input / O = output / B = bi-directional / P = power supply.

#### 7-1-2. HCI mode(RF test)

Until BT\_UART\_RTS is asserted (Low), BT\_CONF need to fixed to high/low to use HCI mode

Pin No. / Pin Name	I/O	Description	Signal
29. BT_CONF[1]	I	[Config] This should be fixed to high.	-
23. BT_CONF[2]	I	[Config] This should be fixed to low.	-

Note: I/O status : I = input / O = output / B = bi-directional / P = power supply.

#### 7-1-3. FW Download mode

Until BT\_UART\_RTS is asserted (Low), BT\_CONF need to fixed to high to use FW Download mode

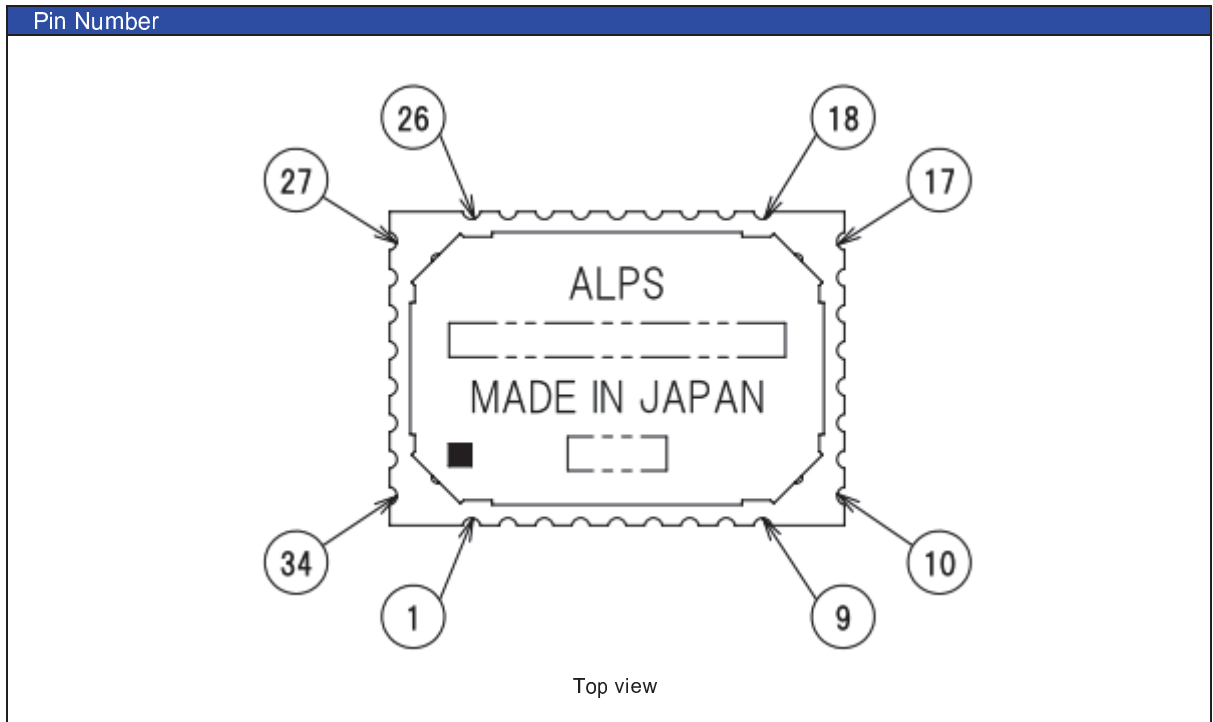
Pin No. / Pin Name	I/O	Description	Signal
29. BT_CONF[1]	I	[Config] This should be fixed to high.	-
23. BT_CONF[2]	I	[Config] This should be fixed to high.	-

Note: I/O status : I = input / O = output / B = bi-directional / P = power supply.

					DSGD.				
					CHKD.	TITLE	UGZZC-505A SPECIFICATION		
					APPD.				
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SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.					

## 8. PIN CHARACTERISTICS

### 8-1. Pin Layout



### 8-2. Pin Assignment

Pin No.	Pin Name	I/O	Description
1	GND	-	Ground
2	ANT	B	Antenna port for Bluetooth™
3	GND	-	Ground
4	GND	-	Ground
5	COMM_3V3 <sup>*1)</sup>	P	[VCC] Power supply for I/O controller
6	BT_UART_RTS	O	[UART] Request to send
7	BT_UART_TX	O	[UART] Data output
8	BT_UART_CTS	I	[UART] Clear to send
9	BT_UART_RX	I	[UART] Data input
10	GND	-	Ground
11	BT_RESETn	I	Reset input (active low)
12	COMM_1V2 <sup>*1)</sup>	P	[VCC] Power supply
13	GND	-	Ground
14	OPT_AUDIO_OUT	O	[I <sup>2</sup> S] Data output (optional)
15	OPT_AUDIO_IN	I	[I <sup>2</sup> S] Data input (optional)

					DSGD.				
					CHKD.	TITLE			
						UGZZC-505A	SPECIFICATION		
					APPD.				
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SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.					



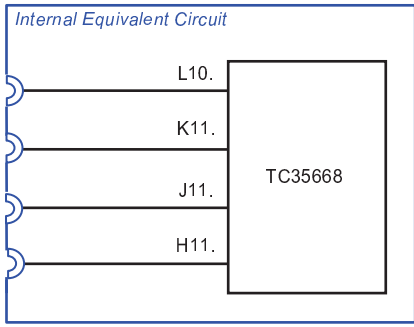
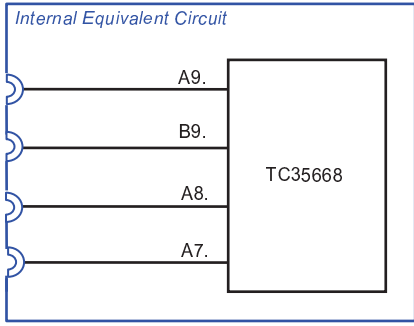
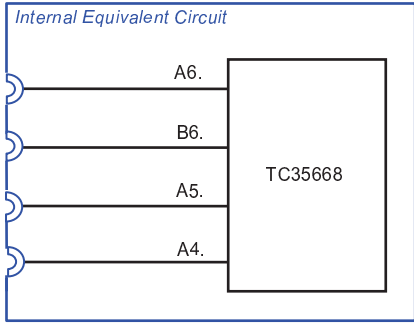
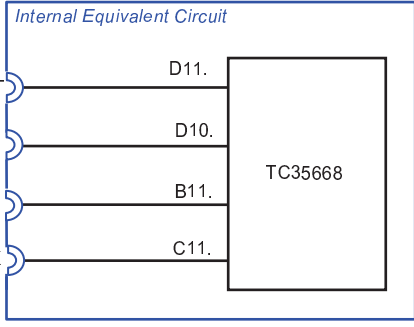
Pin No.	Pin Name	I/O	Description
16	OPT_AUDIO_WS	B	[I <sup>2</sup> S] Word select output (master mode) (optional) Word select input (slave mode) (optional)
17	GND	-	Ground
18	OPT_AUDIO_CLK	B	[I <sup>2</sup> S] Clock output (master mode) (optional) Clock input (slave mode) (optional)
19	BT_VOICE_OUT	O	[I <sup>2</sup> S] Data output
20	BT_VOICE_IN	I	[I <sup>2</sup> S] Data input
21	BT_VOICE_WS	B	[I <sup>2</sup> S] Word select output (master mode) Word select input (slave mode)
22	BT_VOICE_CLK	B	[I <sup>2</sup> S] Clock output (master mode) Clock input (slave mode)
23	BT_CONF[2]	I	[Config] Configuration(mode select) BT CONF[1]=L / BT CONF[2]=L:Profile BT CONF[1]=H / BT CONF[2]=L:HCI BT CONF[1]=H / BT CONF[2]=H:FW Download
24	BT_AV_OUT	O	[I <sup>2</sup> S] Data output
25	REFERENCE_IN	I	[I <sup>2</sup> S] Data input
26	BT_AV_WS	B	[I <sup>2</sup> S] Word select output (master mode) Word select input (slave mode)
27	GND	-	Ground
28	BT_AV_CLK	B	[I <sup>2</sup> S] Clock output (master mode) Clock input (slave mode)
29	BT_CONF[1]	I	[Config] Configuration(mode select) BT CONF[1]=L / BT CONF[2]=L:Profile BT CONF[1]=H / BT CONF[2]=L:HCI BT CONF[1]=H / BT CONF[2]=H:FW Download
30	TRACE_UART_RTS	O	[UART] Request to send
31	TRACE_UART_TX	O	[UART] Data output
32	TRACE_UART_CTS	I	[UART] Clear to send
33	TRACE_UART_RX	I	[UART] Data input
34	GND	-	Ground

Note: I/O status : I = input / O = output / B = bi-directional / P = power supply.  
As for the un-used signal pin, it processes as well as NC (non-connection).

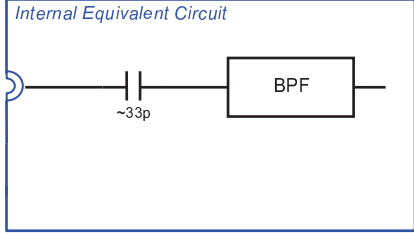
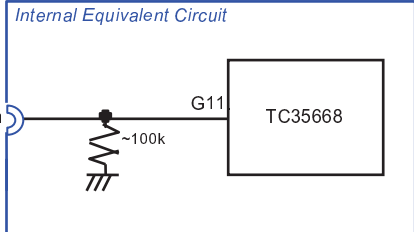
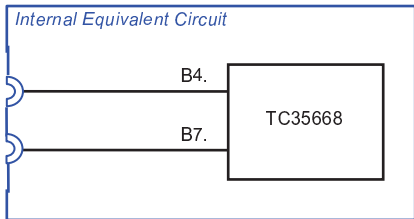
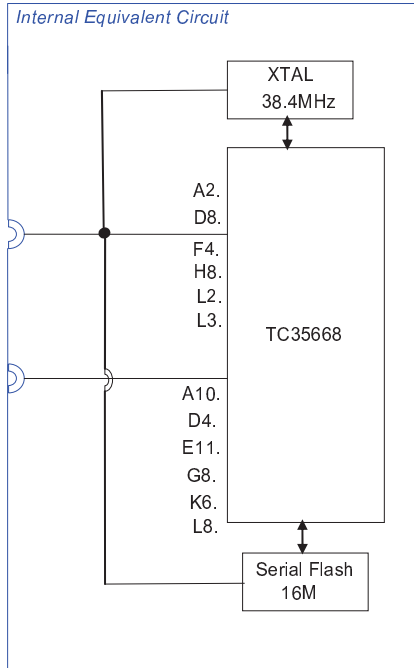
Note 1: In order to stabilize module performances, the below de-coupling capacitors would be required on application platform.  
4.7μF ~ 10μF Capacitor and 100pF ~ 0.1μ F Capacitor.

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					CHKD.	TITLE UGZZC-505A SPECIFICATION		
					APPD.			
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SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.				

8-3. Internal Equivalent Circuit

Pin No. / Pin Name	Internal Equivalent Circuit
6. BT_UART_RTS 7. BT_UART_TX 8. BT_UART_CTS 9. BT_UART_RX	 <p><i>Internal Equivalent Circuit</i></p> <p>6. BT_UART_RTS (L10.)                      7. BT_UART_TX (K11.)                      8. BT_UART_CTS (J11.)                      9. BT_UART_RX (H11.)</p> <p>TC35668</p>
19. BT_VOICE_OUT 20. BT_VOICE_IN 21. BT_VOICE_WS 22. BT_VOICE_CLK	 <p><i>Internal Equivalent Circuit</i></p> <p>19. BT_VOICE_OUT (A9.)                      20. BT_VOICE_IN (B9.)                      21. BT_VOICE_WS (A8.)                      22. BT_VOICE_CLK (A7.)</p> <p>TC35668</p>
24. BT_AV_OUT 25. REFERENCE_IN 26. BT_AV_WS 28. BT_AV_CLK	 <p><i>Internal Equivalent Circuit</i></p> <p>24. BT_AV_OUT (A6.)                      25. REFERENCE_IN (B6.)                      26. BT_AV_WS (A5.)                      28. BT_AV_CLK (A4.)</p> <p>TC35668</p>
14. OPT_AUDIO_OUT 15. OPT_AUDIO_IN 16. OPT_AUDIO_WS 18. OPT_AUDIO_CLK	 <p><i>Internal Equivalent Circuit</i></p> <p>14. OPT_AUDIO_OUT (D11.)                      15. OPT_AUDIO_IN (D10.)                      16. OPT_AUDIO_WS (B11.)                      18. OPT_AUDIO_CLK (C11.)</p> <p>TC35668</p>

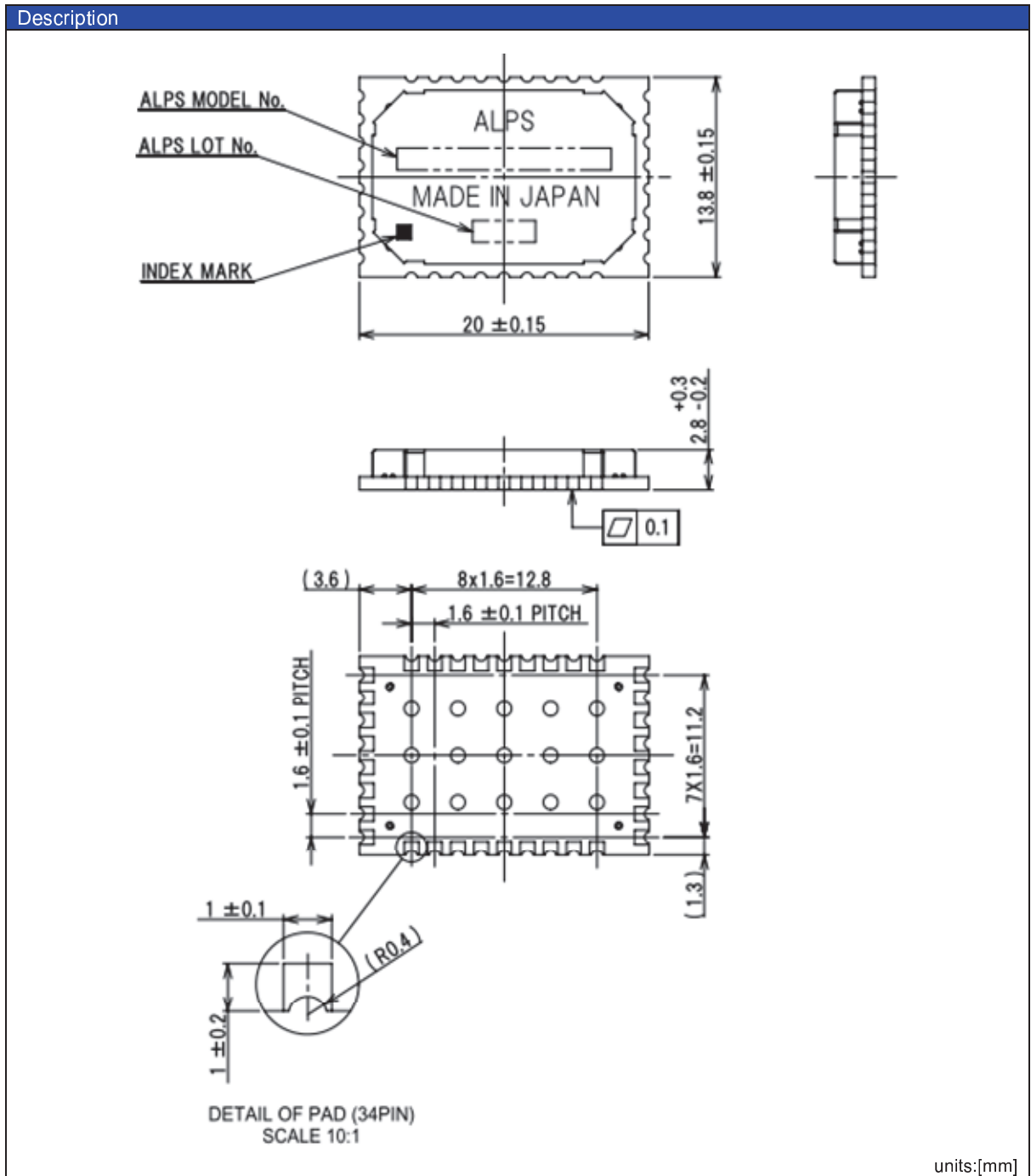
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					CHKD.	TITLE			
						UGZZC-505A		SPECIFICATION	
					APPD.				
<b>ALPS ELECTRIC CO., LTD.</b>									
SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.					

Pin No. / Pin Name	Internal Equivalent Circuit
2. ANT	
11. BT_RESETn / on-board pull-down	
29. BT_CONF[1] 23. BT_CONF[2]	
5. COMM_3V3 12. COMM_1V2	

					DSGD.			
					CHKD.	TITLE UGZZC-505A SPECIFICATION		
					APPD.			
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SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.				

### 9. MECHANICAL CHARACTERISTICS

#### 9-1. Mechanical Description

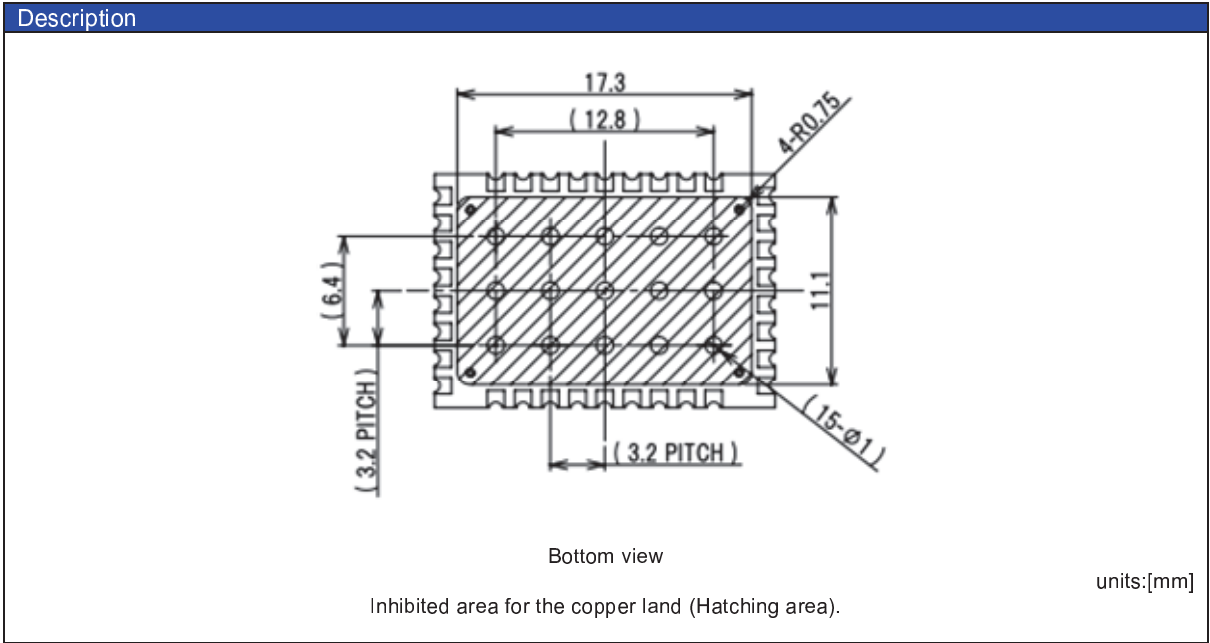


units:[mm]

Note: Tolerances are ±0.3mm, unless otherwise specified.  
 ALPS Lot Number must comply with ALPS numbering rules.  
 Dimensions in ( ) : It is reference dimension.  
 The bottom PADS are not used. Therefore, these do not solder.

					DSGD.				
					CHKD.	TITLE	UGZZC-505A SPECIFICATION		
					APPD.				
						<b>ALPS ELECTRIC CO., LTD.</b>			
SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.					

9-2. Inhibited Area



Note: Tolerances are  $\pm 0.3$ mm, unless otherwise specified.  
 The bottom PADS are not used. Therefore, these do not solder.

9-3. Mass

Typ. 1.3 [g]

					DSGD.				
					CHKD.	TITLE	UGZZC-505A SPECIFICATION		
					APPD.				
<b>ALPS ELECTRIC CO., LTD.</b>									
SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.					

**10. APPLICATIONS**

This document is preliminary which will be changed without any notice.

For the export of products which are controlled items subject to foreign and domestic export laws and regulations, you must obtain approval and/or follow the formalities of such laws and regulations.

Products must not be used for military and/or antisocial purposes such as terrorism, and shall not be supplied to any party intending to use the products for such purposes.

Unless provided otherwise, the products have been designed and manufactured for application to equipment and devices which are sold to end-users in the market, such as AV (audio visual) equipment, home electric equipment, office and commercial electronic equipment, information and communication equipment or amusement equipment. The products are not intended for use in, and must not be used for, any application of nuclear equipment, driving control equipment for aerospace or any other unauthorized use.

With the exception of the above mentioned banned applications, for applications involving high levels of safety and liability such as medical equipment, burglar alarm equipment, disaster prevention equipment and undersea equipment, please contact an ALPS sales representative and/or evaluate the total system on the applicability. Also, implement a fail-safe design, protection circuit, redundant circuit, malfunction protection and/or fire protection into the complete system for safety and reliability of the total system.

Before using products which were not specifically designed for use in automotive applications, please contact an ALPS sales representative.

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SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.					

## Packing Specification

Model number	Function	Revision
UGZCC-505A	BLUETOOTH™ Version 4.1 (Class2)	1.0.4

**Model number**

Digit	Definition	Contents
Digit 1~3	Major model number	UGZ: Wireless products for the in-vehicle
Digit 4	Destination	Z: World wide
Digit 5	Minor model number	C
Digit 6	Specification	X: Engineering sample
		-: Mass production
Digit 7	Series number	5: TC35668
Digit 8~9	Customer number	**: Customer dependent and types
Digit 10	Revision number	*: A~Z

**CONFIDENTIALITY NOTES:**

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**CAUTION:**

- ◆ This product ( or technology ) is subject to the Japanese Foreign Exchange and Foreign Trade law ,and is required to obtain an export license of the Japanese governmental agency , when exported from Japan.
- ◆ Do not use the product that is dropped in your process.
- ◆ Do not leave and treat the product in a place where it is subjected to strong magnetism or static electricity.
- ◆ The BLUETOOTH trademarks are owned by Bluetooth SIG, Inc., U.S.A.
- ◆ Nozzle pressure for module mounting must be a 1N to 3N static load.
- ◆ This product contains capability to upgrade own firmware via UART interface. This feature can be used for development purpose only. Firmware upgrade by end user in the market may be restricted by regulatory rule depending on each country. ALPS will not own any responsibilities of infringement of each country's regulatory raw for firmware upgrade.
- ◆ ALPS guarantees performance only for the standard configuration. In case of any modifications on standard configuration settings by customer, the original guarantee will no longer be applied. If there is any objections on product quality, all analysis on the module performances will be done based only on ALPS standard configuration.

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**Contents**

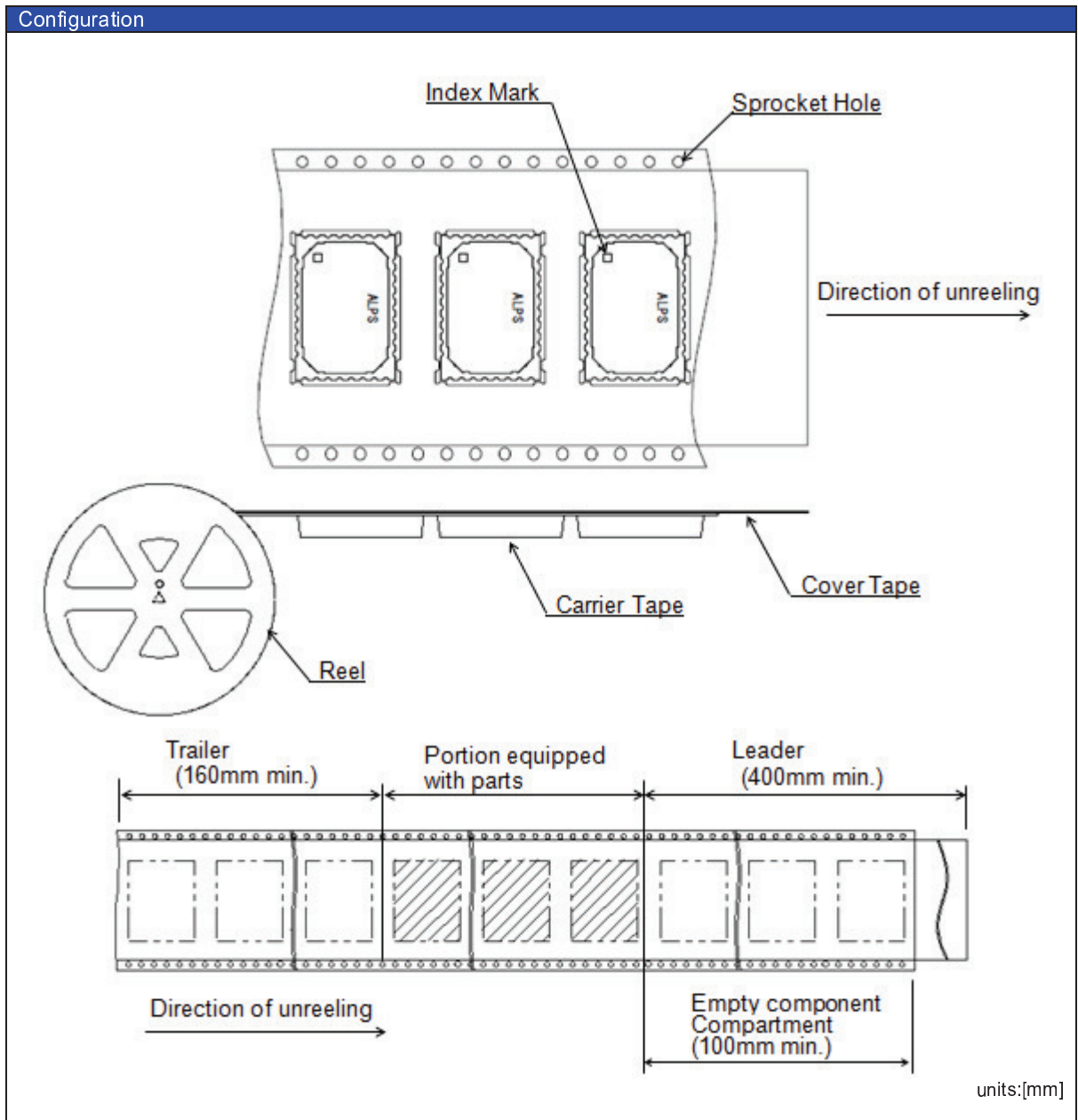
- 1. Taping Description
  - 1-1. Configuration
  - 1-2. Dimensions
  - 1-3. Characteristics of Carrier and Cover Tapes
- 2. Packing Description
  - 2-1. Packing Description
  - 2-2. Label Description
    - 2-2-1. Shipment Label Description
    - 2-2-2. Exclusive Use Barcode Label Description
  - 2-3. Storage Conditions
- 3. Marking Description

					DSGD.				
					CHKD.	TITLE			
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**1. TAPING DESCRIPTION**

**1-1. Configuration**

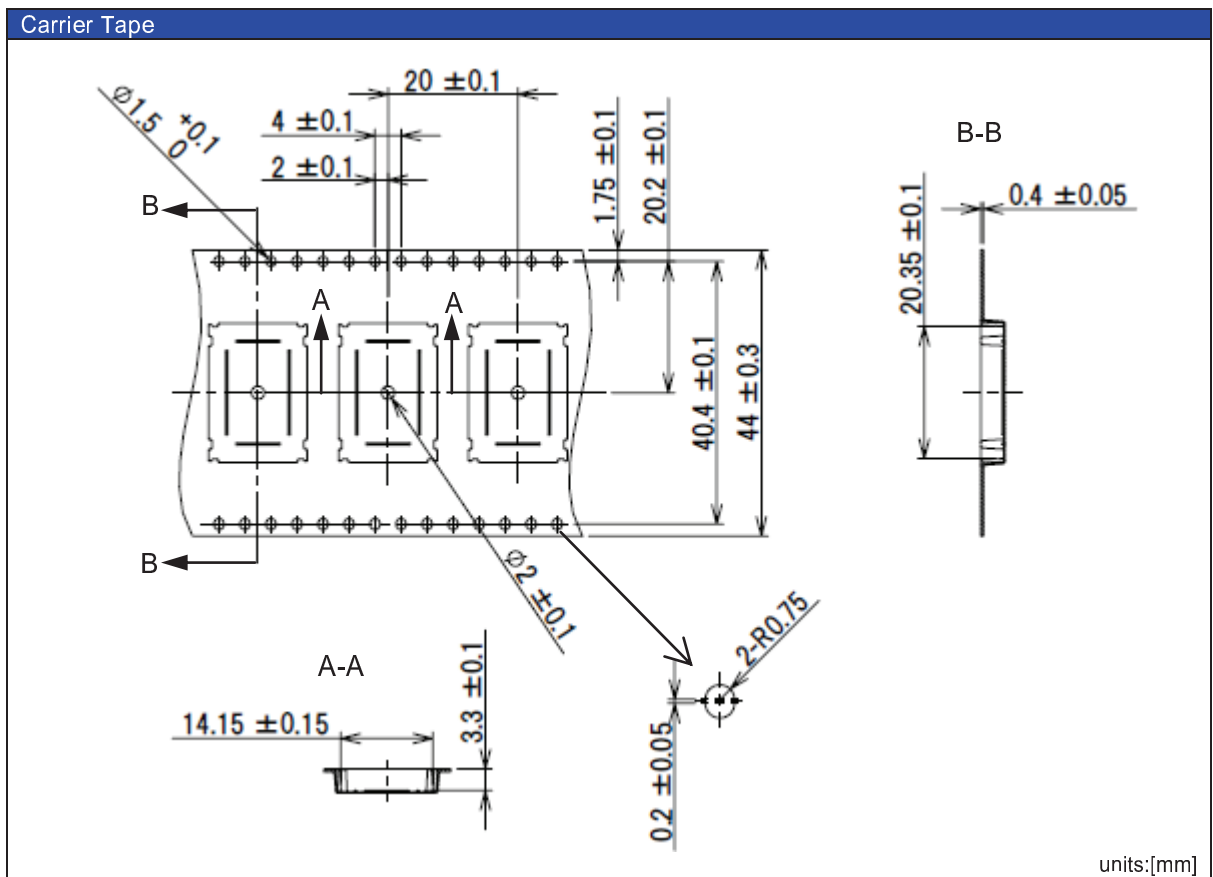
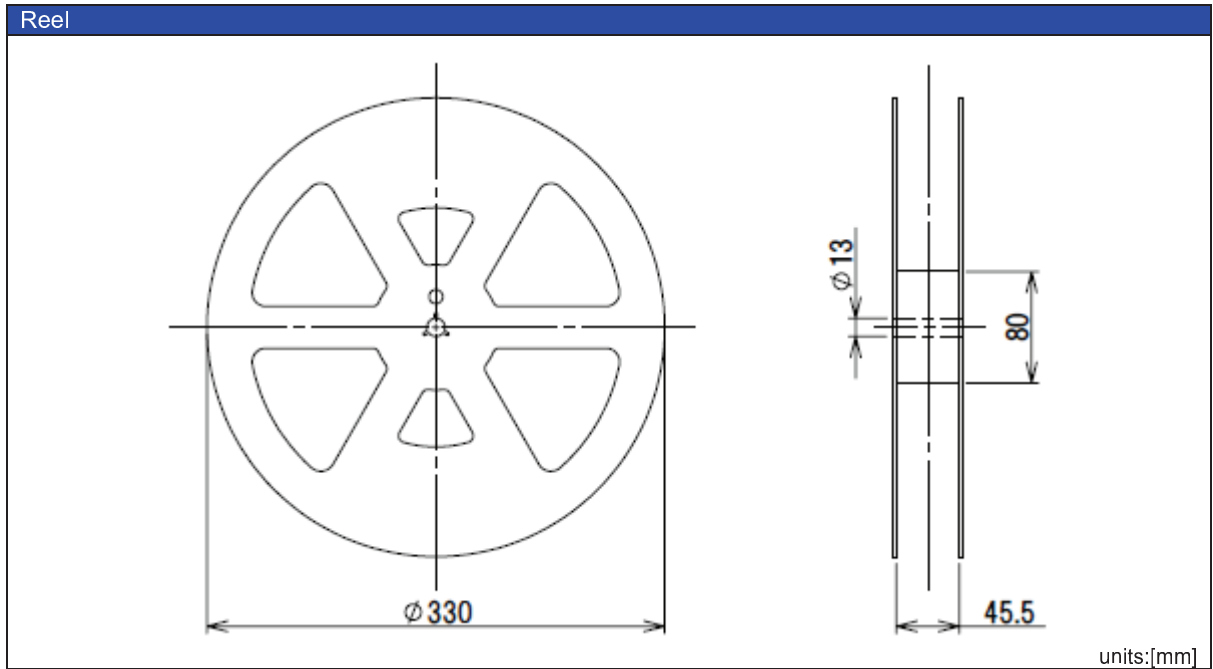


**Construction and Materials**

Packaging type	Parts	Material
Taping	Reel	Conductive PS
	Carrier Tape	Conductive PS
	Cover Tape	Antistatic PET

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1-2. Dimensions



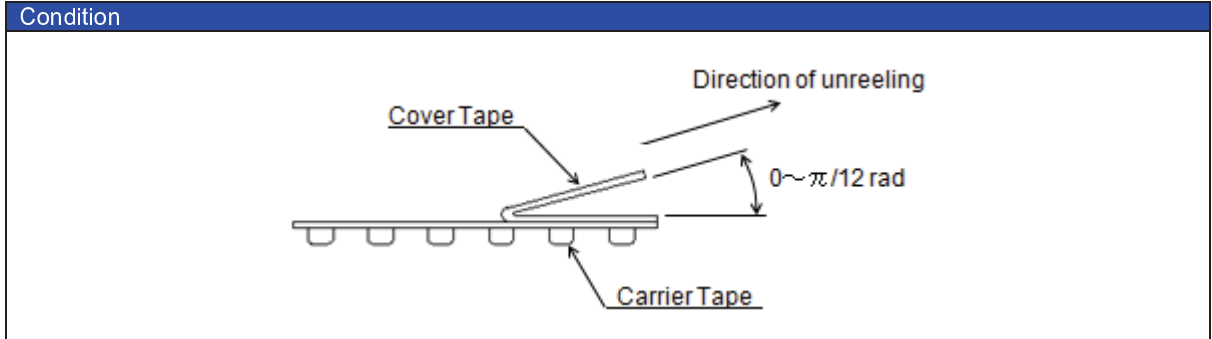
					DSGD.				
					CHKD.	TITLE	UGZZC-505A SPECIFICATION		
					APPD.				
						<b>ALPS ELECTRIC CO., LTD.</b>			
SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.					

**1-3. Characteristics of Carrier and Cover Tapes**

1) Peeling strength of cover tape.

Peeling strength of cover tape shall be 0.1 N to 1.3 N and tested as follows.

\*) Peeling speed of cover tape shall be 300 [mm/min].



2) Cover tape shall not close the pilot holes or protrude from the carrier tape.

3) Minimum bending radius taping package.

Falling off of the Module or breakage of taping package shall not occur at minimum bending radius of 50 [mm].

4) Strength of carrier tape and cover tape

Carrier tape: When a tensile force of 10 N is applied in the direction of unreeling of the tape, the tape shall withstand this force.

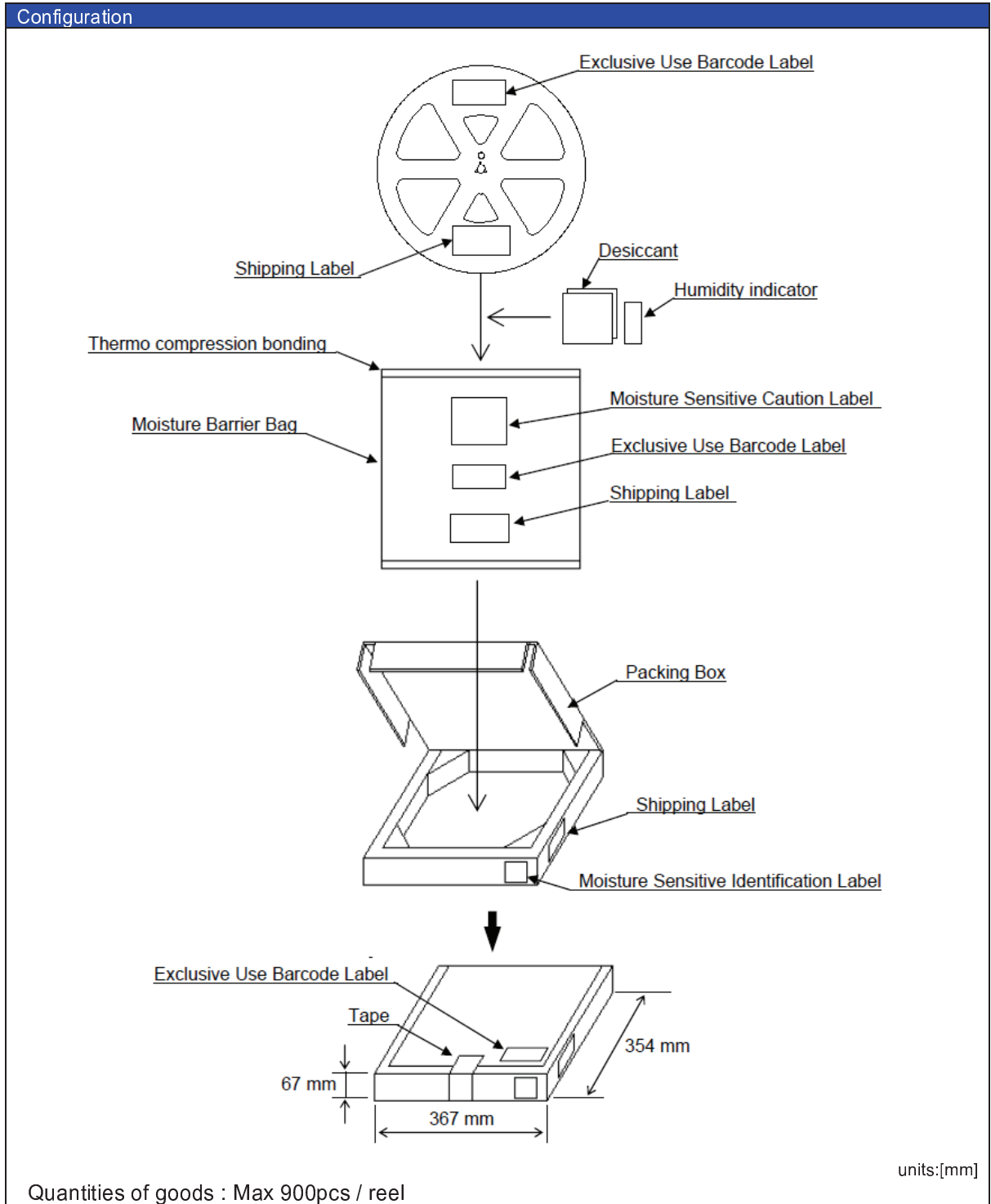
Cover tape: When a tensile force 10 N is applied to the tape, the tape shall withstand this force.

5) The number of parts missed from the carrier tape shall be 1 maximum per reel.

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## 2. PACKING DESCRIPTION

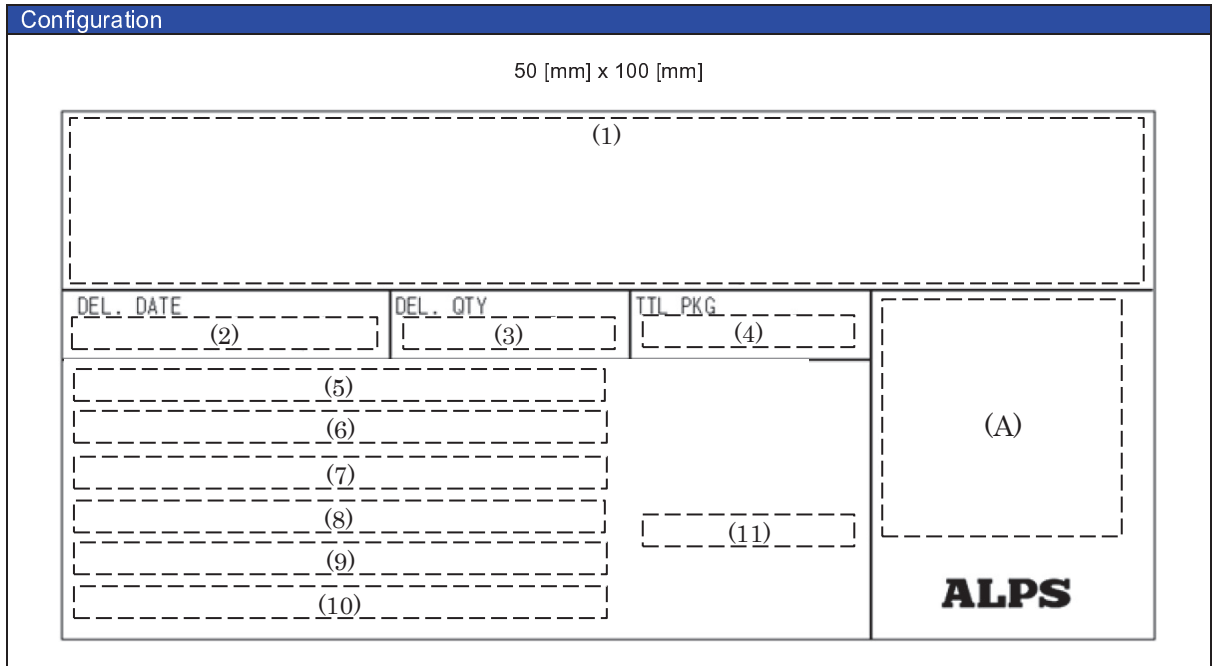
### 2-1. Packing Description



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**2-2. Label Description**

**2-2-1. Shipment Label Description**



Number	Description
(1)	ALPS Internal Use *) Including description for RoHS
(2)	Delivery Date *) ALPS use column : Optional writing area
(3)	Quantity *) ALPS use column : Optional writing area
(4)	Total Package Quantity *) ALPS use column : Optional writing area
(5)	Label ID *) ALPS internal administrative information
(6)	Country of Origin
(7)	Customer Code / Customer Name
(8)	Customer Model Number
(9)	ALPS Model Number
(10)	Lot Number
(11)	Quantity in Package

Number	QR Code Description
(A)	Customer Code
	Customer Model Number
	ALPS Model Number
	Quantity
	Any other ALPS internal use

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**2-2-2.Exclusive Use Barcode Label Description**

- LGE Standard 2D Barcode Formats
  - Standard 2D Barcode



- 2D QR Barcode Construction:  
 LGE P/N(11) + "!" + Seq. no(3) + "!" + Marker P/N + "!" + Lot No + "!" + Qty(5)

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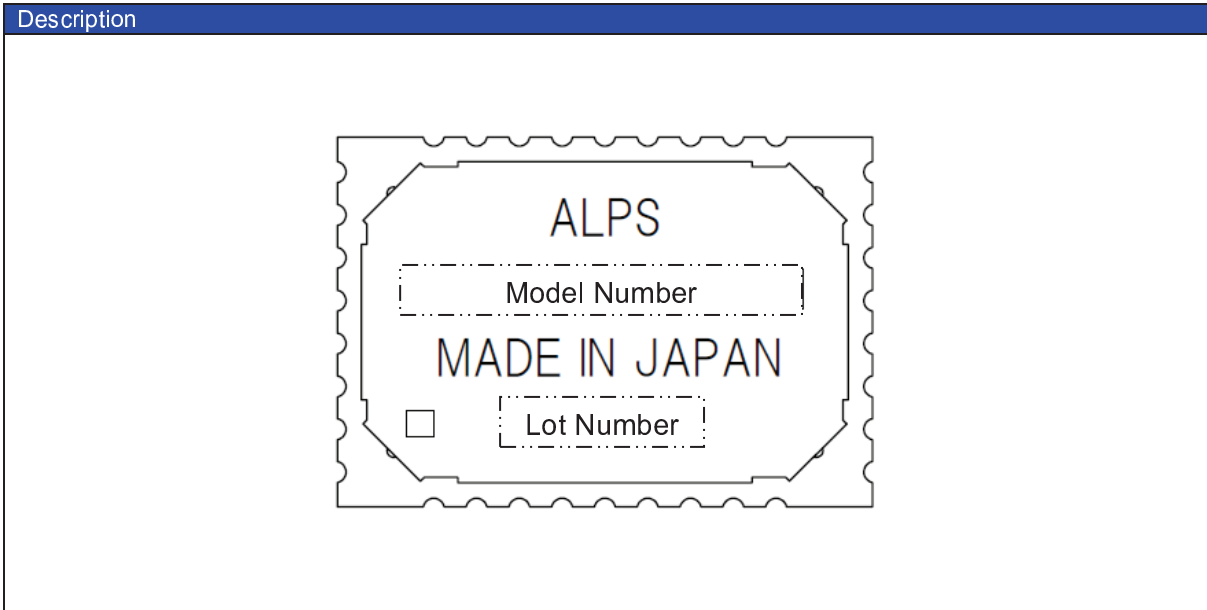
**2-3. Storage Conditions**

The following conditions shall be kept for soldering and keeping in storage this product.

1. Shelf life in dry bag: 12 months at 5 ~ 40 °C and < 85 % RH.
2. After dry bag is opened, module that will be subjected to soldering reflow or equivalent processing must be:
  - a) Mounted within 168 hours at factory condition of < 30 °C / 60 % RH, or
  - b) Stored at < 30 °C / 10 % RH.
3. Modules require baking, before mounting, if:
  - a) Humidity Indicator Card is >10 % when read at 23 °C ± 5 °C, or
  - b) Item 2.a) or 2.b) are not met.
4. If baking is required, device may be baked for 216 hours at 40 ~ 45 °C and < 5 % RH for low-temperature device containers.

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**3. MARKING DESCRIPTION**



Composition																															
Model Number	The ten digits "UGZC□□□□□"																														
Lot Number	The three digits □□□"    ——— Time Bucket (A ~ E)    ——— Month Code <table border="1" style="margin-left: 40px;"> <tr><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th></tr> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr> <tr><th>Jul</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr> <tr><td>7</td><td>8</td><td>9</td><td>O</td><td>N</td><td>D</td></tr> </table>    ——— Year Code <table border="1" style="margin-left: 40px;"> <tr><th>CY2014</th><th>CY2015</th><th>CY2016</th></tr> <tr><td>4</td><td>5</td><td>6</td></tr> </table>	Jan	Feb	Mar	Apr	May	Jun	1	2	3	4	5	6	Jul	Aug	Sep	Oct	Nov	Dec	7	8	9	O	N	D	CY2014	CY2015	CY2016	4	5	6
Jan	Feb	Mar	Apr	May	Jun																										
1	2	3	4	5	6																										
Jul	Aug	Sep	Oct	Nov	Dec																										
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CY2014	CY2015	CY2016																													
4	5	6																													
Note: Last number of Christian year.																															

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					CHKD.	TITLE UGZC-505A SPECIFICATION			
					APPD.				
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## Design Information

Model number	Function	Revision
UGZCC-505A	BLUETOOTH™ Version 4.1 (Class2)	1.0.4

**Model number**

Digit	Definition	Contents
Digit 1~3	Major model number	UGZ: Wireless products for the in-vehicle
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		-: Mass production
Digit 7	Series number	5: TC35668
Digit 8~9	Customer number	** : Customer dependent and types
Digit 10	Revision number	* : A~Z

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- ◆ Do not use the product that is dropped in your process.
- ◆ Do not leave and treat the product in a place where it is subjected to strong magnetism or static electricity.
- ◆ The BLUETOOTH trademarks are owned by Bluetooth SIG, Inc., U.S.A.
- ◆ Nozzle pressure for module mounting must be a 1N to 3N static load.

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					APPD.				
					<b>ALPS ELECTRIC CO., LTD.</b>				
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**Contents**

- 1. General
- 2. Electrical Design Information
  - 2-1. Power Supply Circuits
  - 2-2. RF Connection Circuits
    - 2-2-1. Connect a general antenna
    - 2-2-2. Connect a tuned antenna
  - 2-3. Hardware Reset Circuits
  - 2-4. Hardware Configuration Circuits
  - 2-5. Host Interface Circuits
    - 2-5-1. Bluetooth™ Host Interface
      - 2-5-1-1. UART Interface
  - 2-6. Audio Interface Circuits
    - 2-6-1. Bluetooth™ Audio Interface
      - 2-6-1-1. I<sup>2</sup>S Interface (AV)
      - 2-6-1-2. I<sup>2</sup>S Interface (VOICE)
      - 2-6-1-3. I<sup>2</sup>S Interface (AUDIO)
- 3. Mechanical Design Information
  - 3-1. Soldering Conditions
    - 3-1-1. Reflow heat resistance
  - 3-2. Copper Land Design
  - 3-3. Solder Stop Mask Design
  - 3-4. Solder Print Mask Design

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### 1. GENERAL

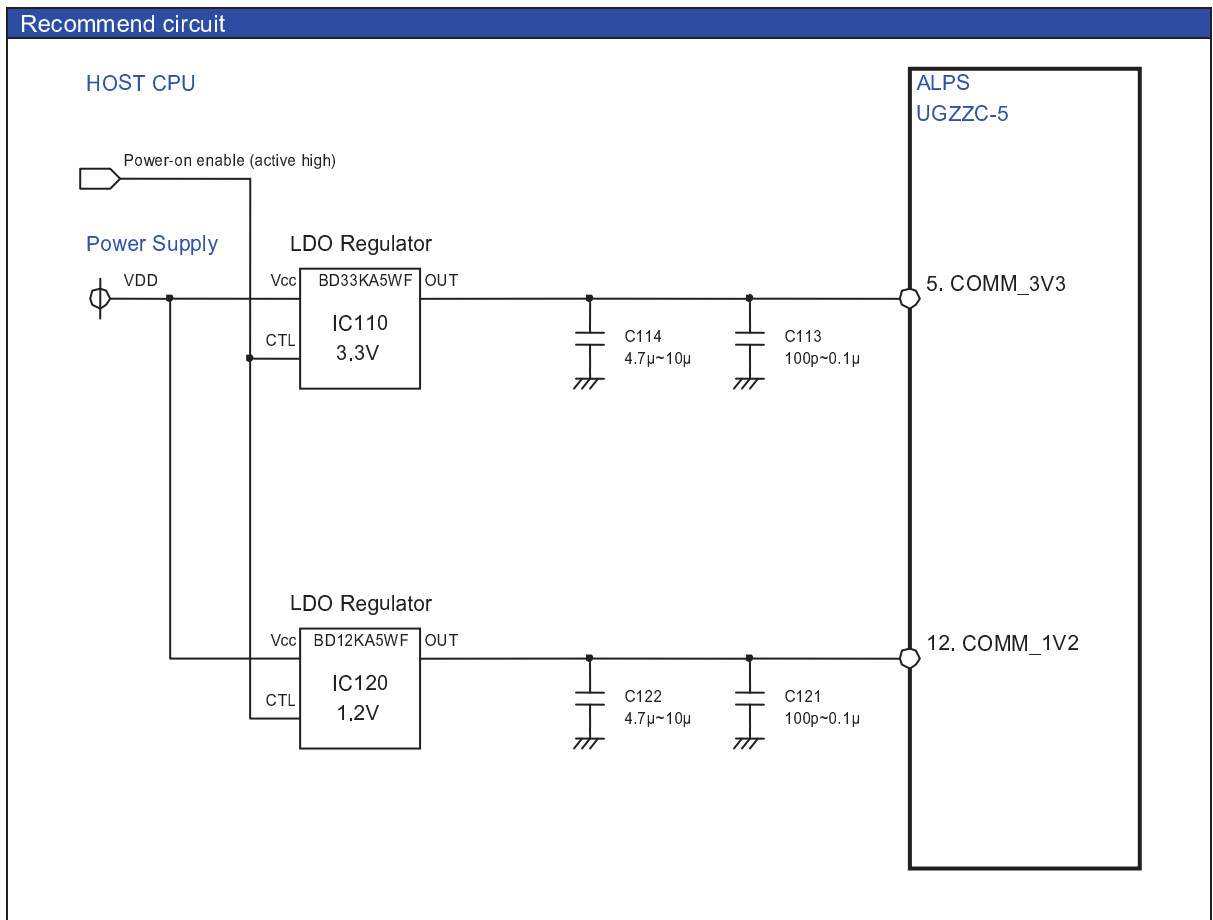
This document contains the reference schematics. However, it is necessary to optimize according to the specification of selected Host CPU.

### 2. ELECTRICAL DESIGN INFORMATION

#### 2-1. Power Supply Circuits

Thermal shutdown circuit and over-current protection circuit are recommended to be prepared. Please all bypass capacitors as close as possible to the terminals. In addition, the low ESL capacitor is recommended.

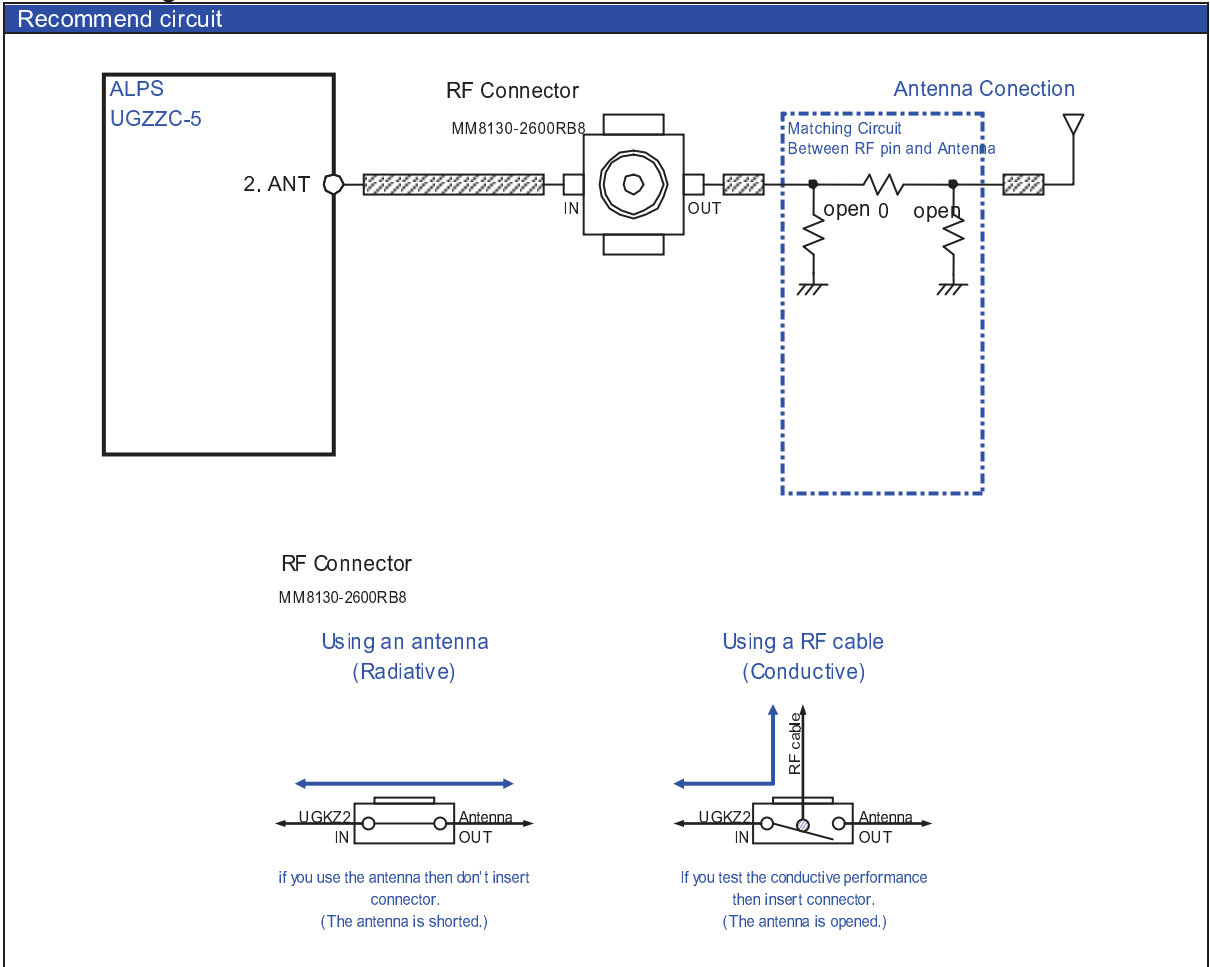
The share of regulator IC and the set to other voltage of the interface are possible besides a recommended circuits. However, take care about operating condition and stability condition.



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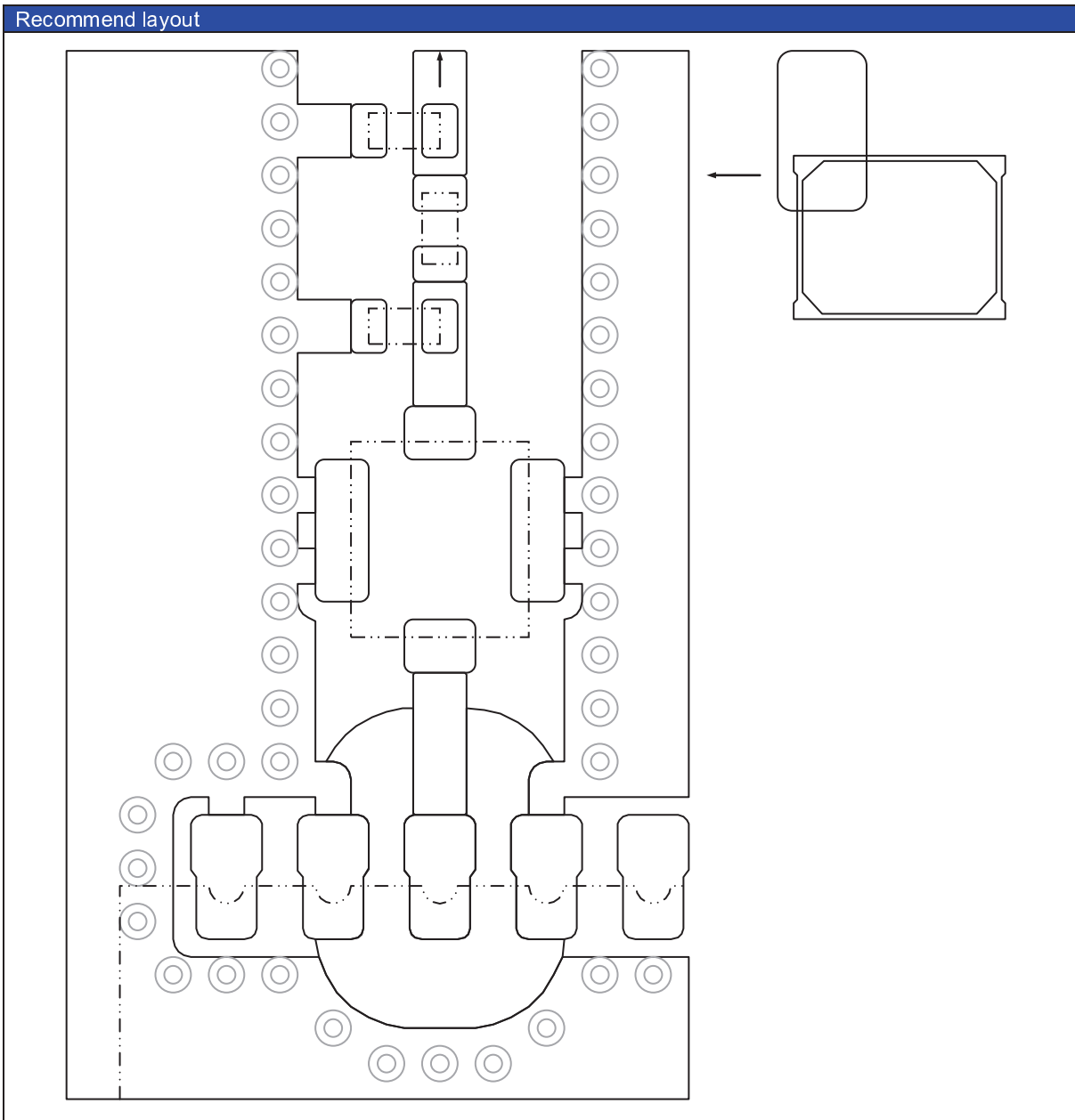
2-2. RF Connection Circuits

2-2-1. Connect a general antenna



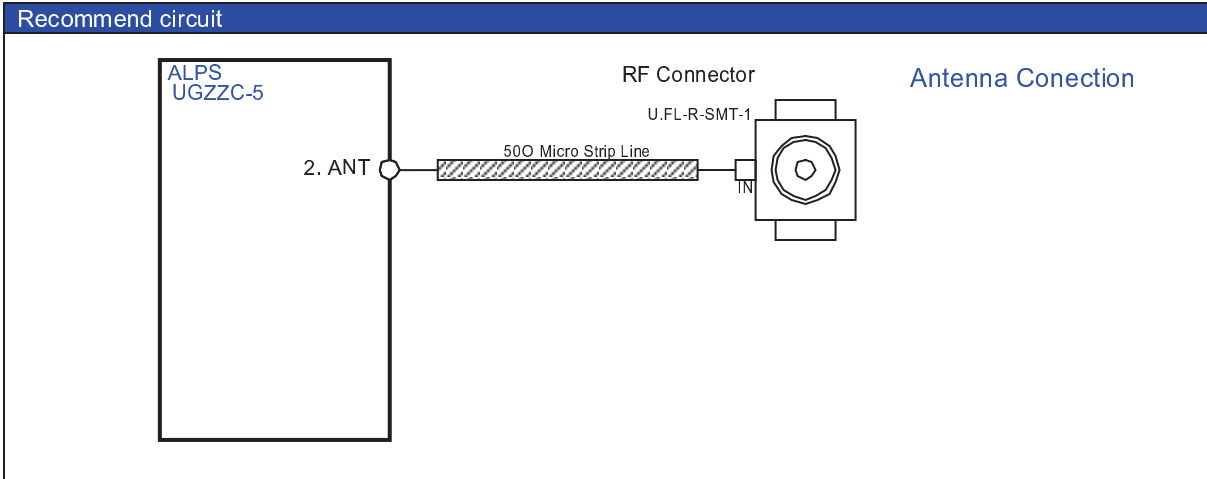
Note: The ground recommend to avoid the ANT pad and to be designed. In addition, the impedance of micro strip line should be use the 50Ω from ANT pad to RF connector, and its length should be shortest connecting.

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SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.				

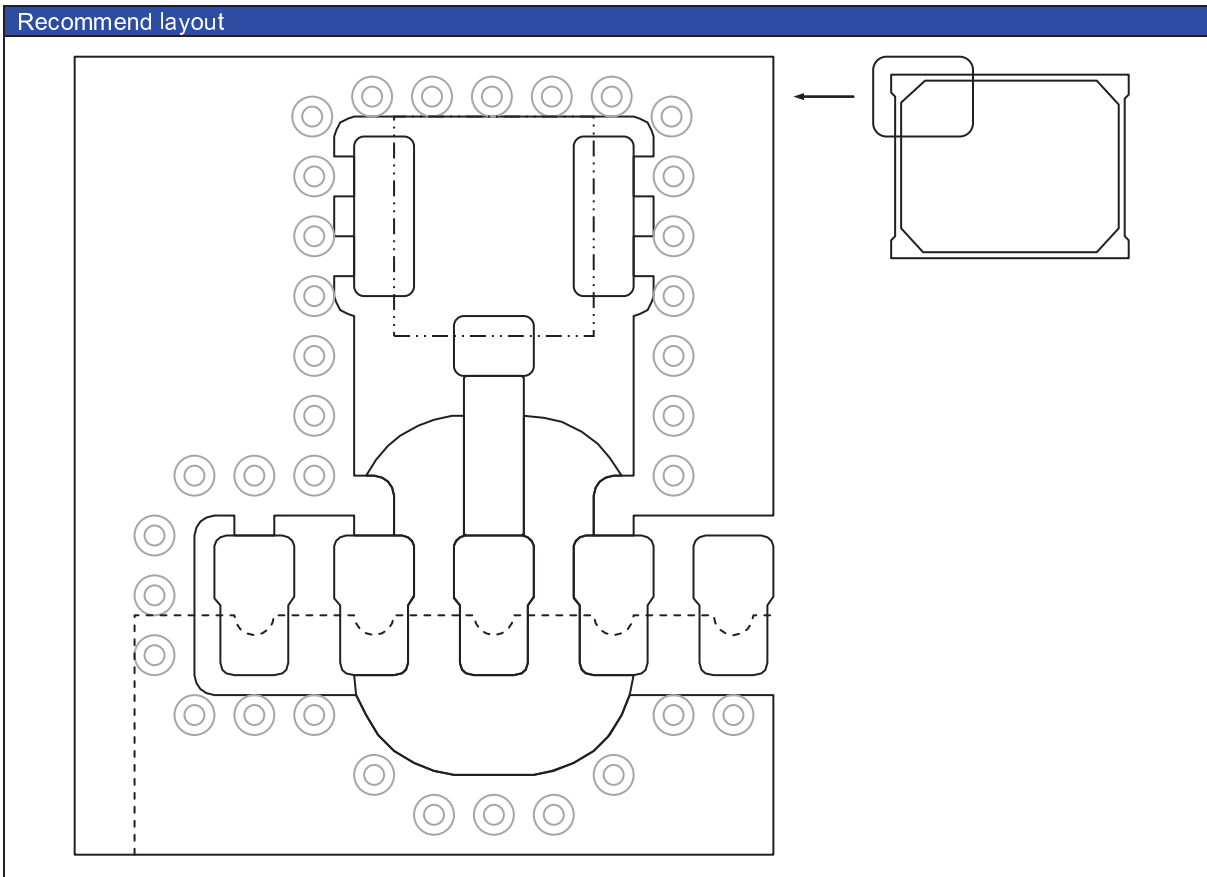


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					CHKD.	TITLE			
					APPD.	UGZZC-505A	INFORMATION		
						<b>ALPS ELECTRIC CO., LTD.</b>			
SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.					

**2-2-2. Connect a tuned antenna**



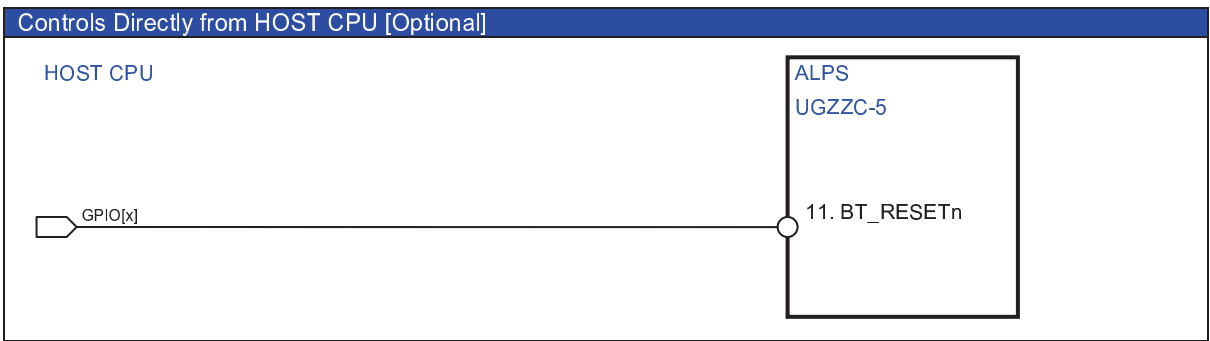
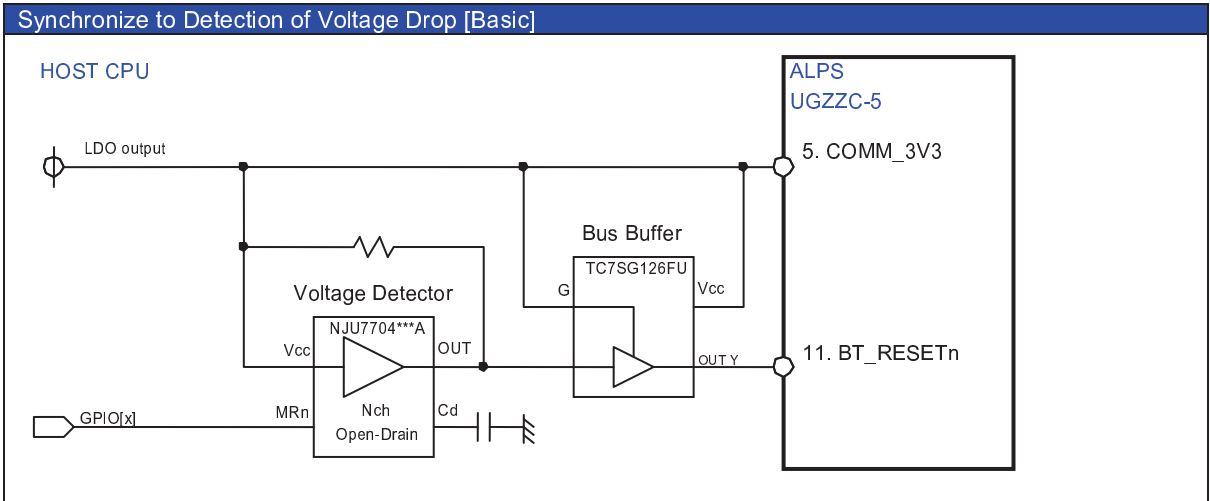
Note: The ground recommend to avoid the ANT pad and to be designed. In addition, the impedance of micro strip line should be use the 50Ω from ANT pad to RF connector, and its length should be shortest connecting.



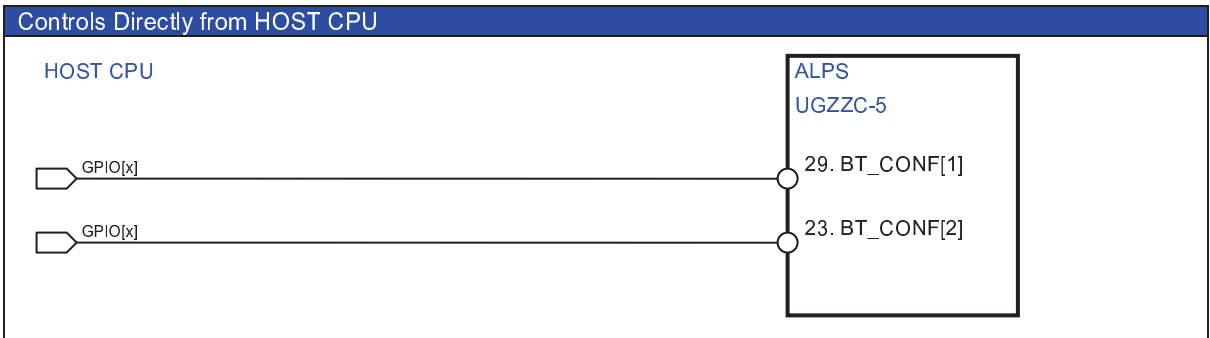
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					APPD.			
					<b>ALPS ELECTRIC CO., LTD.</b>			
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### 2-3. Hardware Reset Circuits

Proper design are important for optimal operation of the digital circuitry.



### 2-4. Hardware Configuration Circuits



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					<b>ALPS ELECTRIC CO., LTD.</b>			
SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.				

**2-1. Host Interface Circuits**

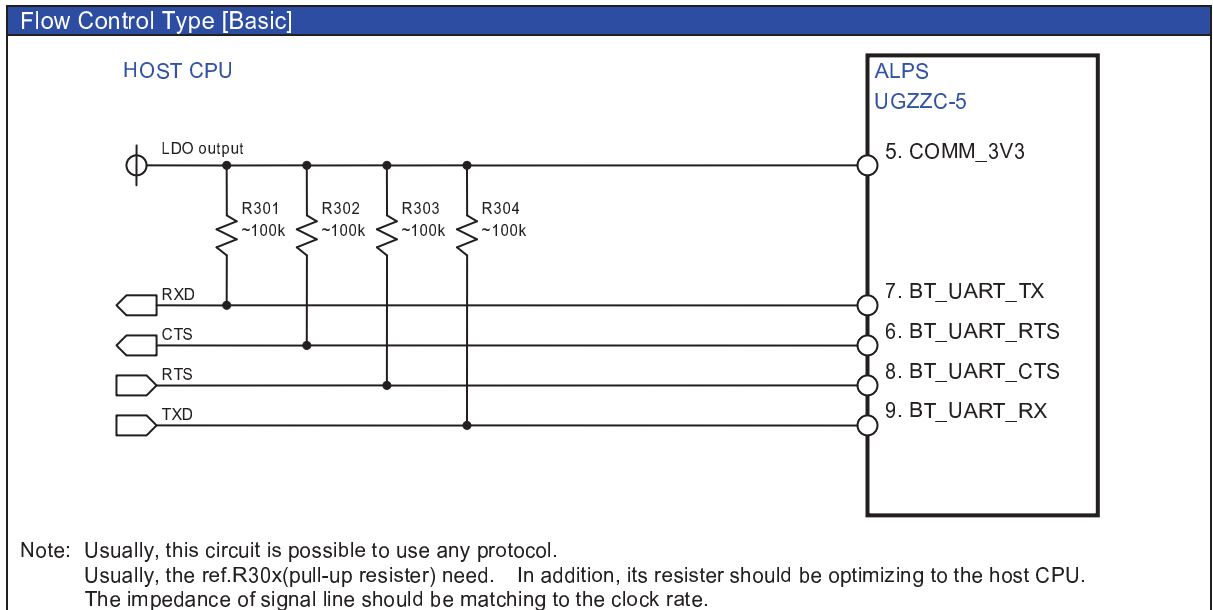
Proper design of data lines and clock lines are important for optimal operation of the digital circuitry. To prevent latch-up, short or some possible issues, keep drive voltage and current within range as specified.

**2-1-1. Bluetooth™ Host Interface**

The I/O voltage of UGZZC-5 and HOST CPU needs designing to same voltage.

The appropriate setting of protocol refers to the chapter "Configuration Settings".

**2-1-1-1. UART Interface**

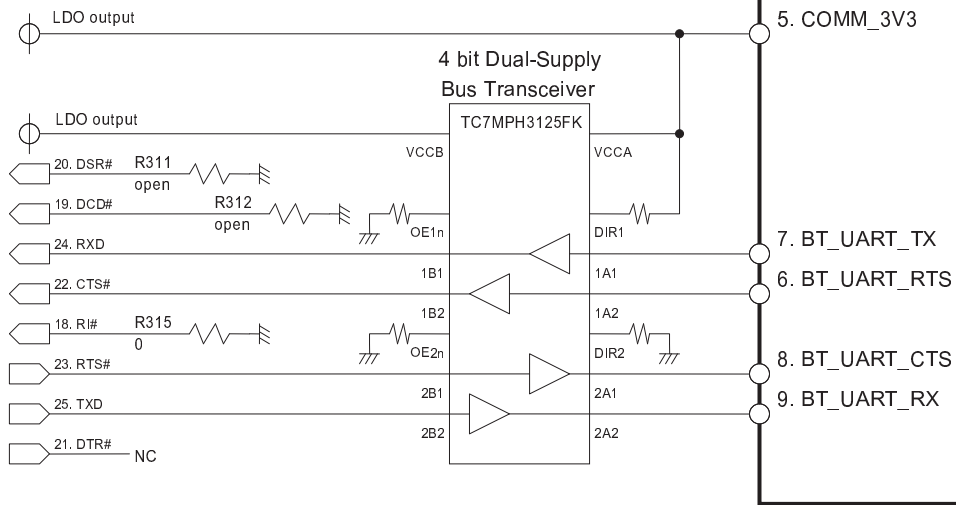


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<b>ALPS ELECTRIC CO., LTD.</b>								
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Converts to USB

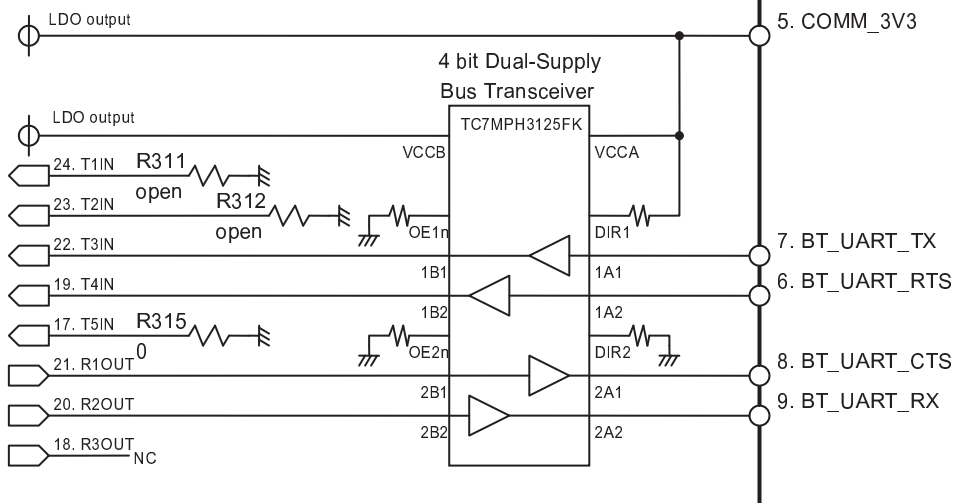
FTDI - FT232HL



Note: Usually, this circuit is possible to use any protocol. If COMM\_3V3 was supplied 3.3V, the Bus Transceiver can be removed, and connect directly.

Converts to RS232

MAXIM - MAX3237



Note: Usually, this circuit is possible to use any protocol. If COMM\_3V3 was supplied 3.3V, the Bus Transceiver can be removed, and connect directly.

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					<b>ALPS ELECTRIC CO., LTD.</b>			
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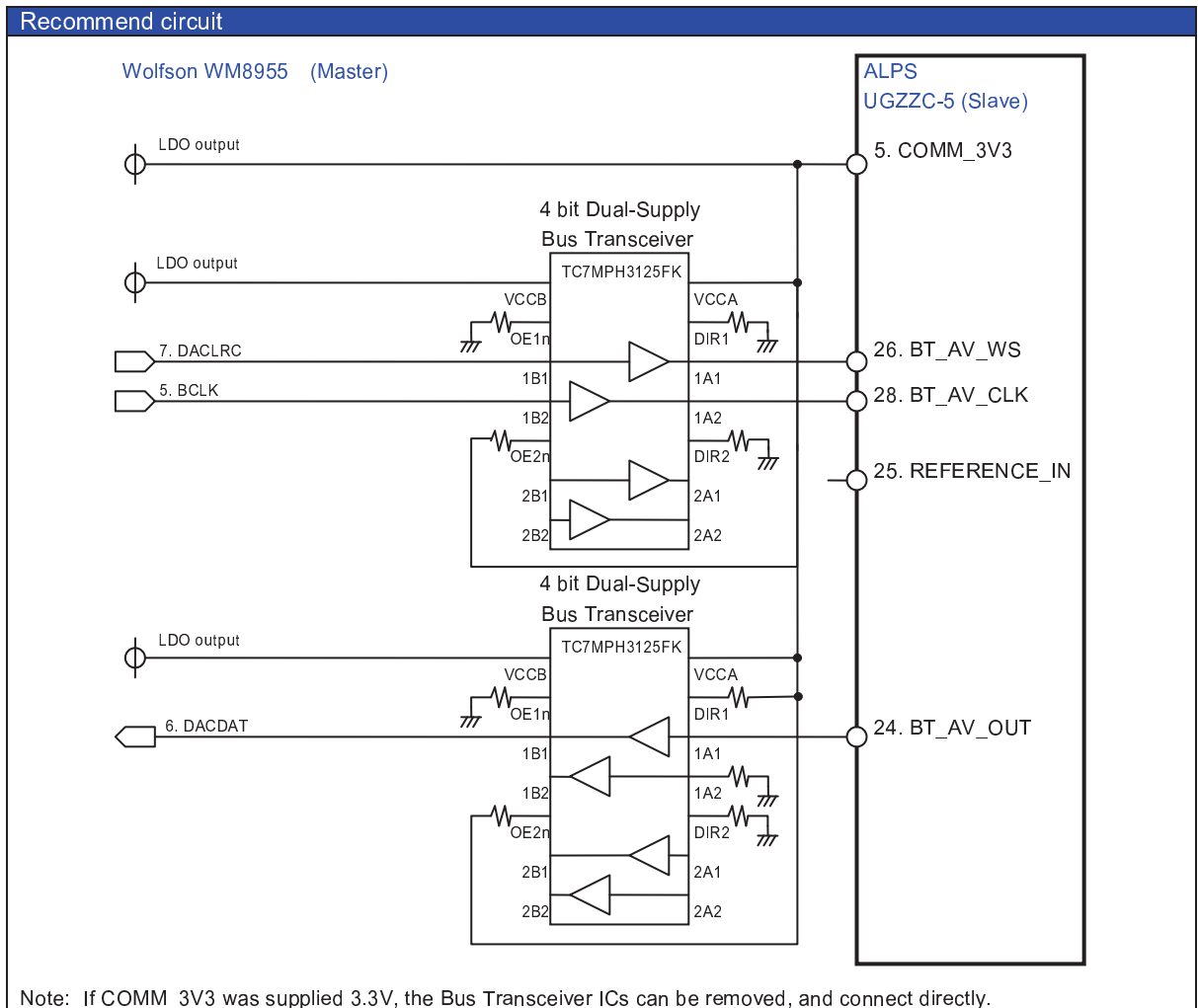
2-□. □udio □nterface Circuits

Proper design of data lines and clock lines are important for optimal operation of the digital circuitry. To prevent latch-up, short or some possible issues, keep drive voltage and current within range as specified.

2-□-□. □uetoot□™ □udio □nterface

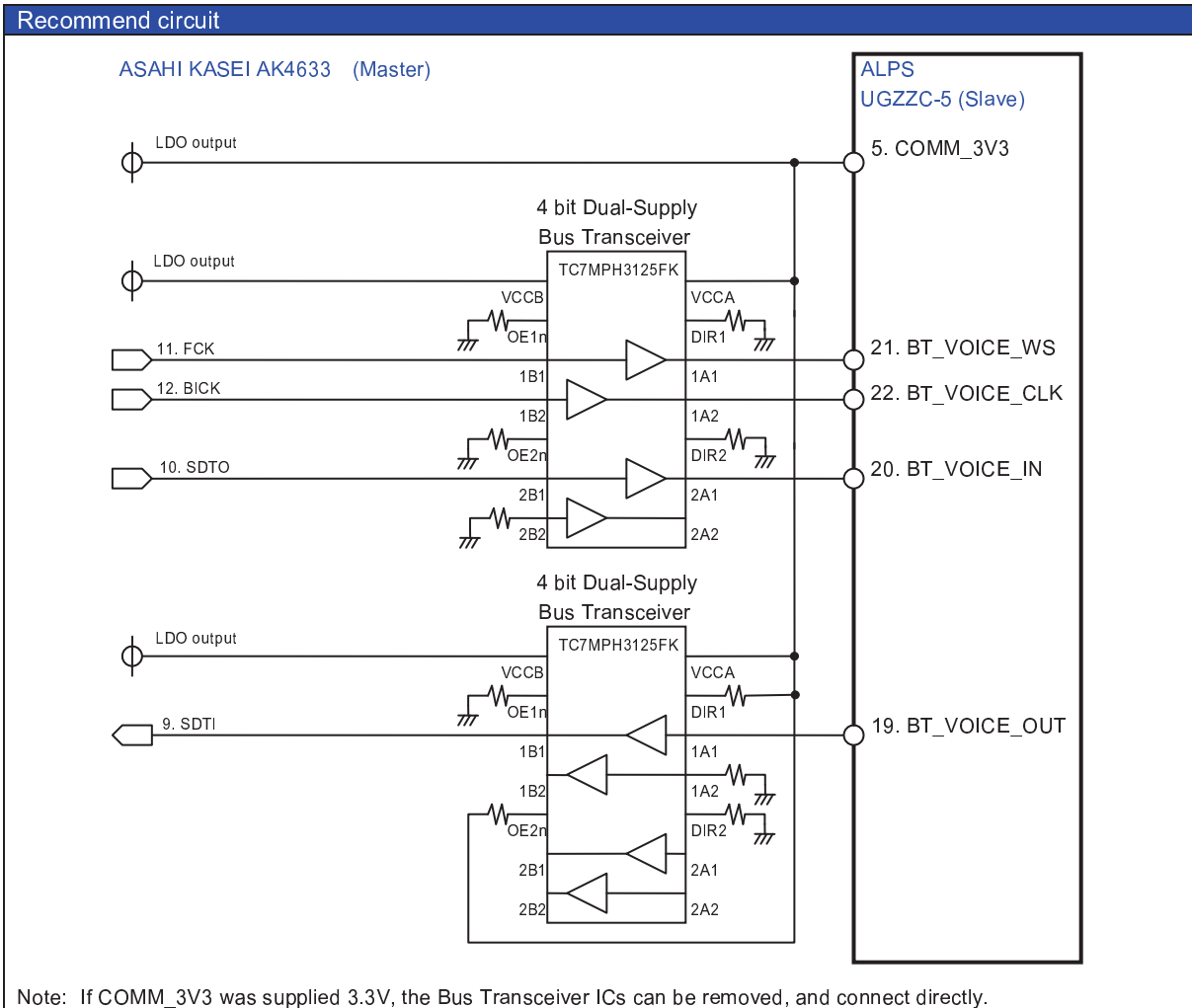
The I/O voltage of UGZZC-5 and CODEC needs designing to same voltage.

2-□-□-□. □□ □nterface □□□□



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					CHKD.	TITLE		
					APPD.	UGZZC-505A INFORMATION		
<b>ALPS ELECTRIC CO., LTD.</b>								
SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.				

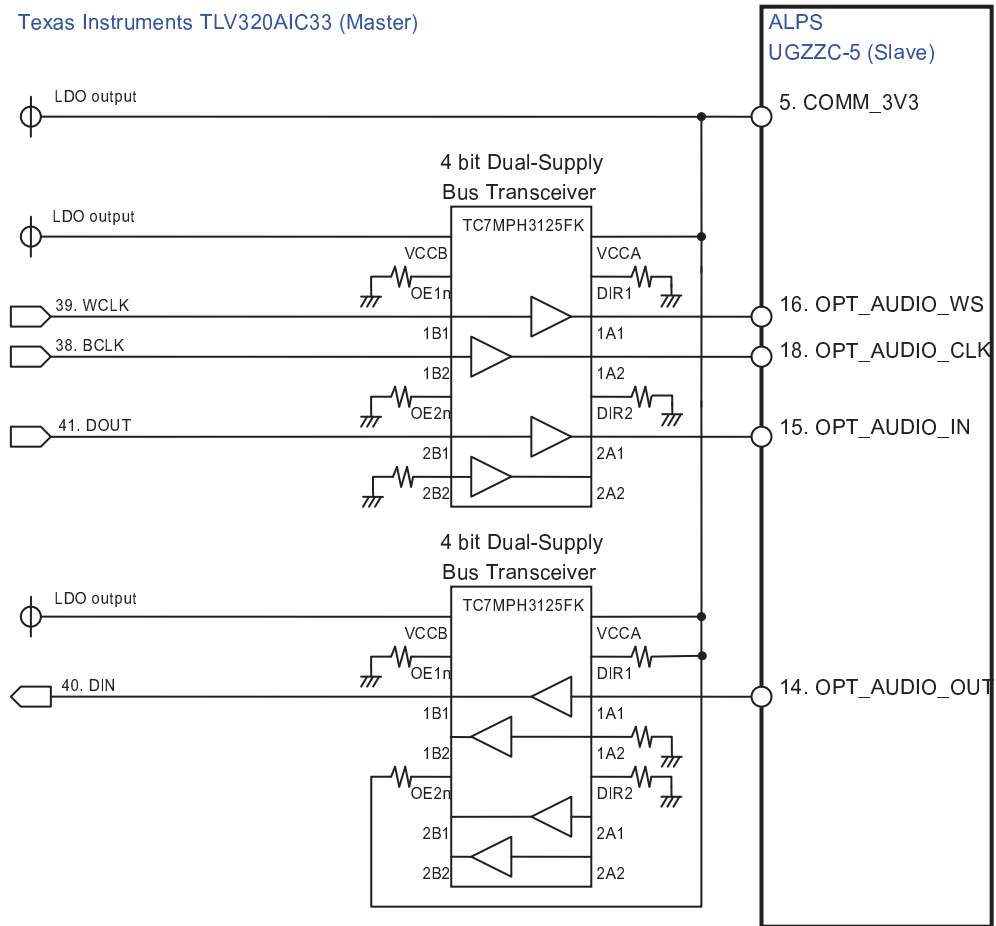
2-□-□-2. 2□ interface □□□C□□



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					APPD.	UGZZC-505A	INFORMATION	
<b>ALPS ELECTRIC CO., LTD.</b>								
SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.				

2-□-□-□. 2□ interface □□□□□□

Recommend circuit



Note: If COMM\_3V3 was supplied 3.3V, the Bus Transceiver ICs can be removed, and connect directly.

					DSGD.			
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					APPD.			
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SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.				

1. 1.1 CH 1.1 C 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1

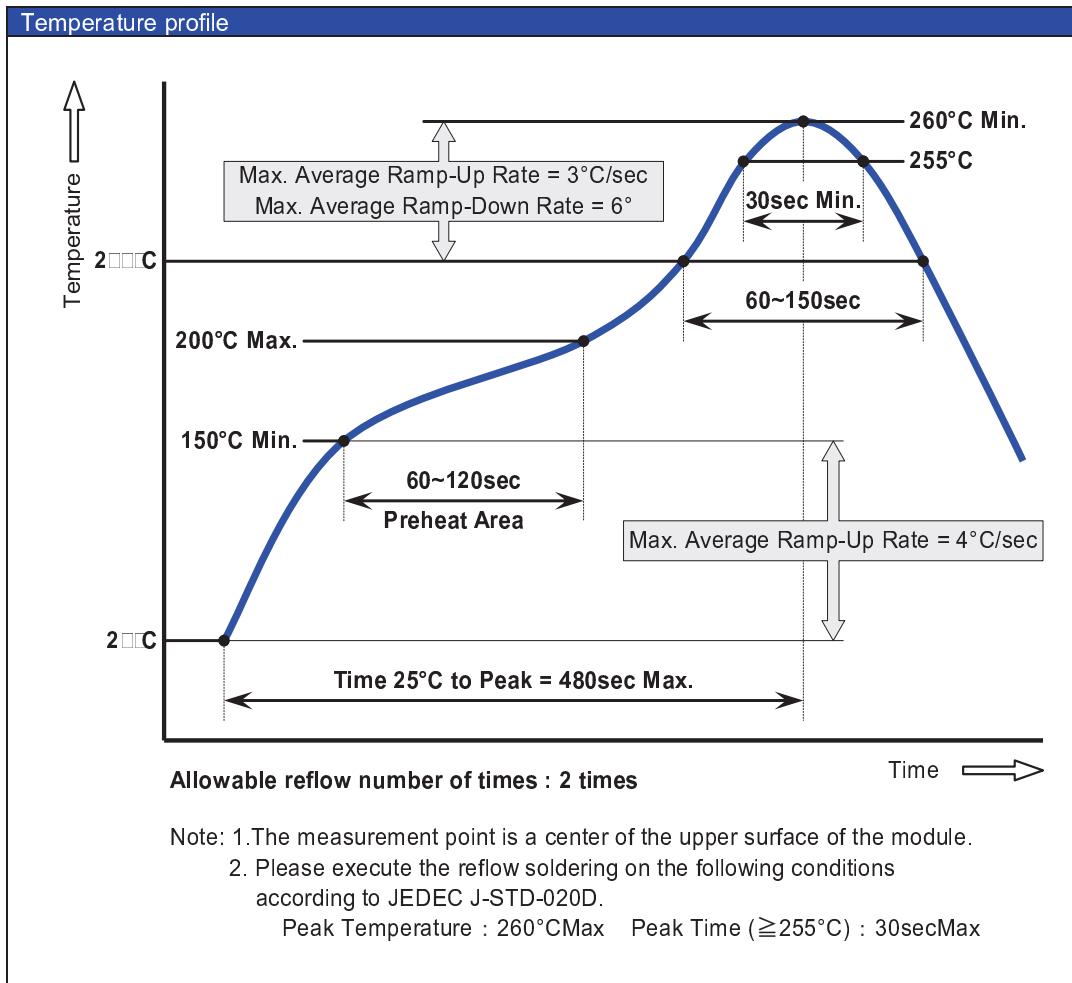
Recommended Copper Land and Solder Stop Mask (Resist) on Customer's Mother Board and Solder Print Mask (Metal Mask) Dimensions for Better Soldering with UGZZC-5.

The following drawings have been verified based on ALPS recommended reflow soldering condition and reference PCB. The reflow solderability should vary in accordance to thickness of PCB, reflow condition and pattern layout etc. If the customer will apply these conditions (Copper Land, Solder Stop Mask, Solder Print Mask, etc), further verification or modification of these parameters may be necessary.

As for the NC pin, please solder to the NC foot print pattern of the Main Board.

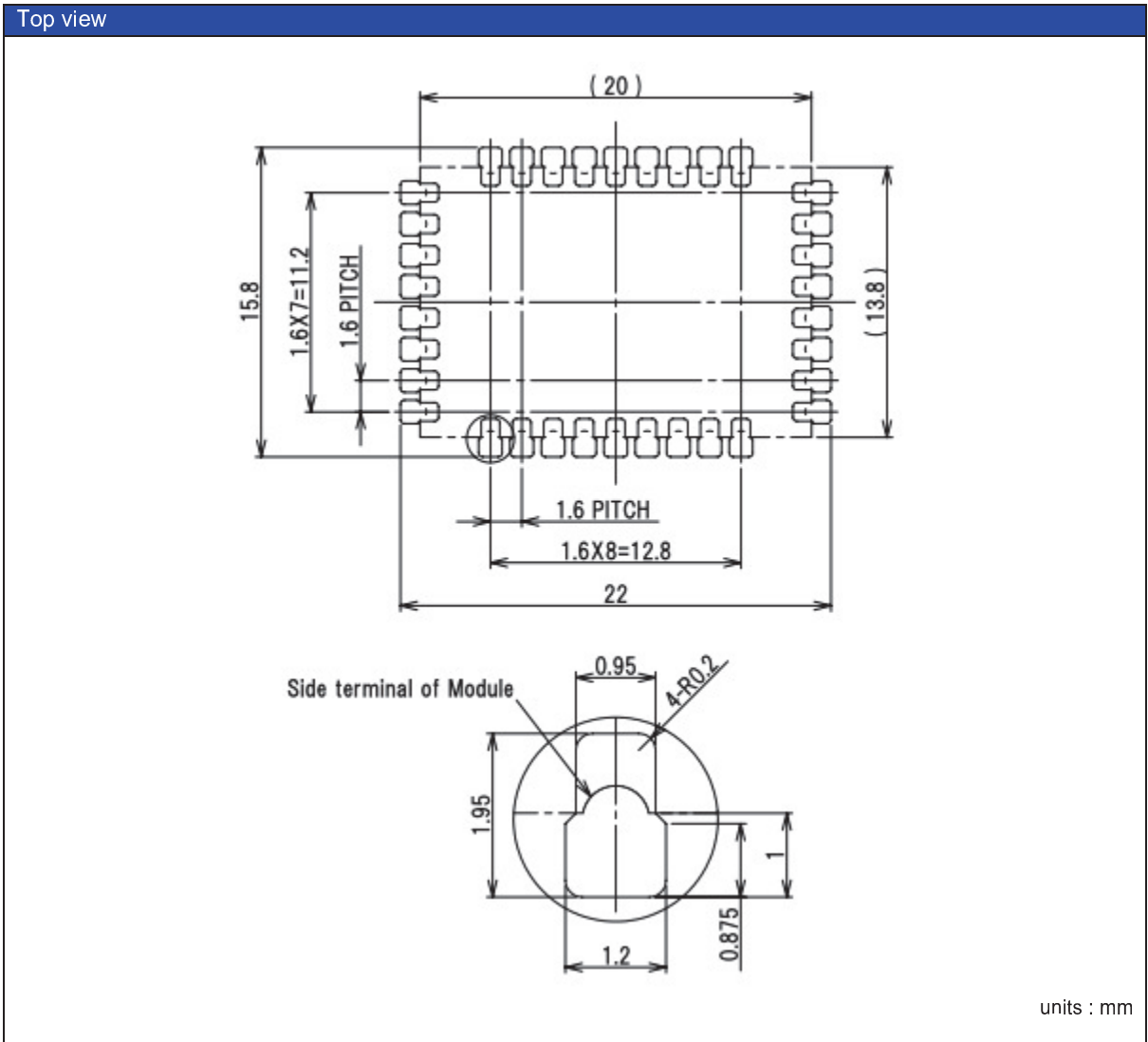
1.1.1.1 Soldering Conditions

1.1.1.1.1 Reflow Heat resistance



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					APPD.				
<b>ALPS ELECTRIC CO., LTD.</b>									
SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.					

3.2. Connector Design

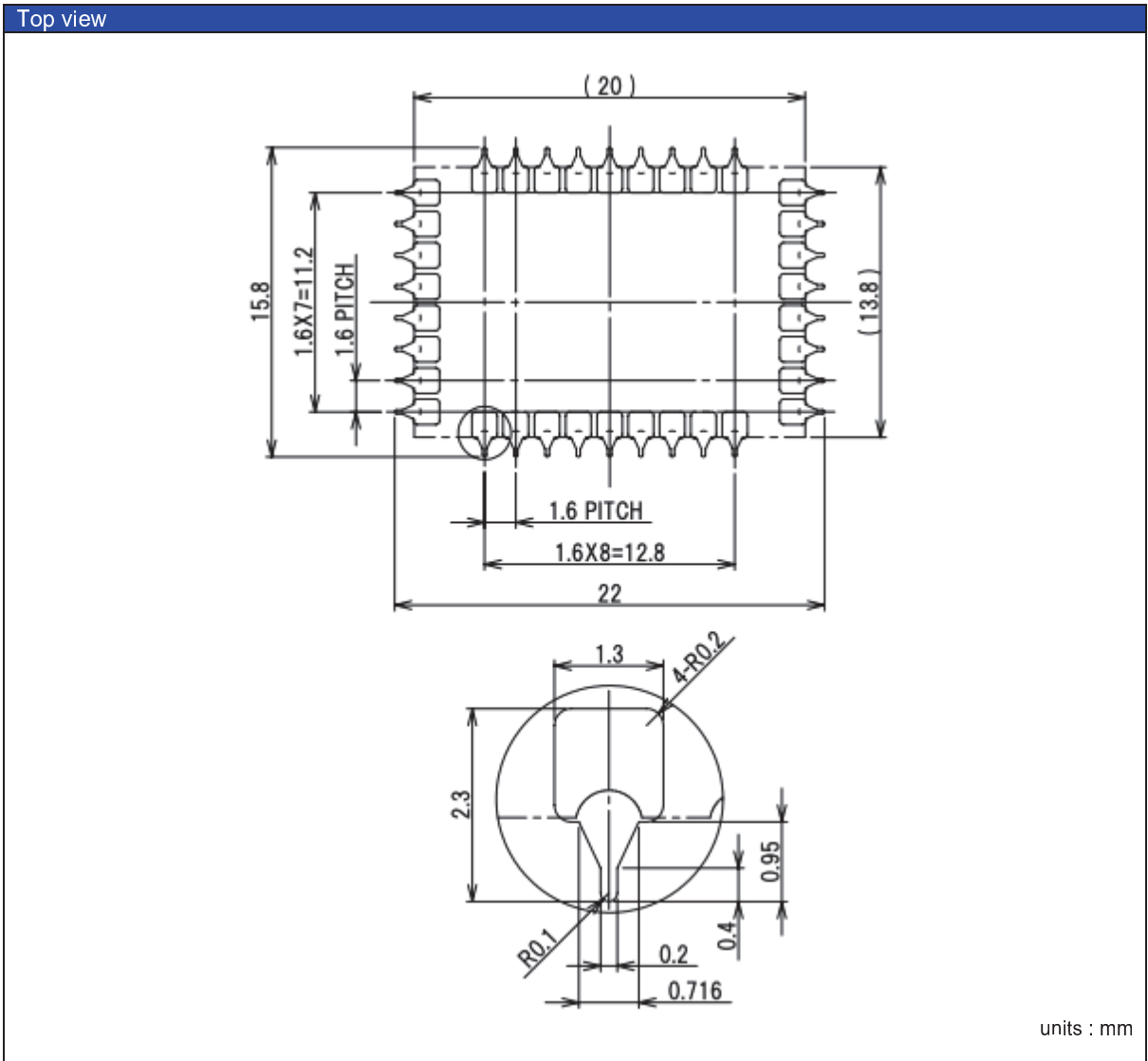


units : mm

Note: Tolerances are ±0.1mm, unless otherwise specified.  
Dimensions in ( ) : It is reference dimension.

					DSGD.				
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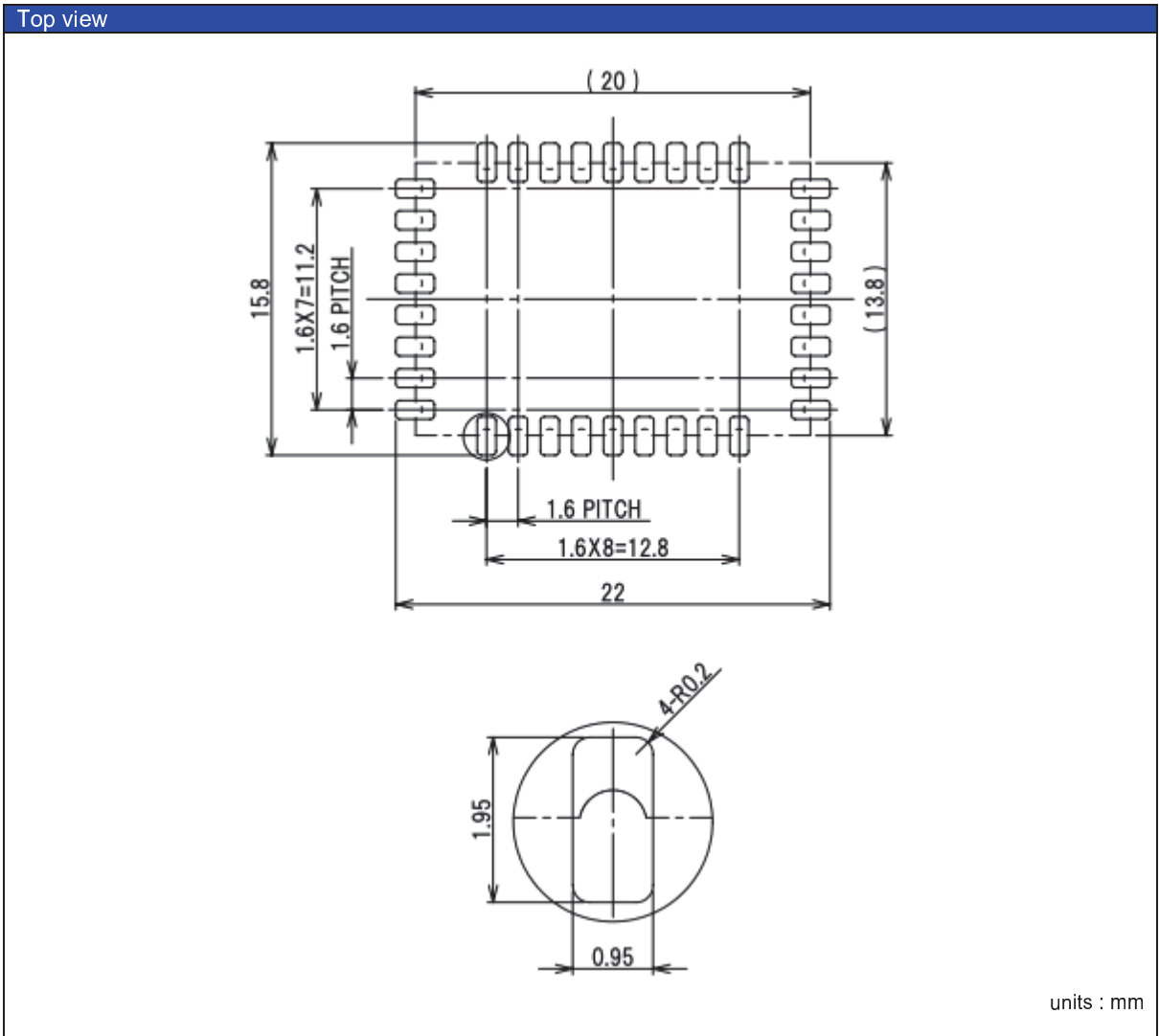
3.3. Color to Mask Design



Note: Tolerances are  $\pm 0.1$ mm, unless otherwise specified.  
 Dimensions in ( ) : It is reference dimension.

					DSGD.				
					CHKD.	TITLE	UGZZC-505A INFORMATION		
					APPD.				
					<b>ALPS ELECTRIC CO., LTD.</b>				
SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.					

3.4. Color Print Mask Design



Note: Tolerances are  $\pm 0.1$ mm, unless otherwise specified.  
 Dimensions in ( ) : It is reference dimension.  
 Metal thickness = 0.12~0.15 [mm]

					DSGD.			
					CHKD.	TITLE	UGZZC-505A	INFORMATION
					APPD.			
					<b>ALPS ELECTRIC CO., LTD.</b>			
SYMB.	DATA OR NO.	APPD.	CHKD.	DSGD.				



## Record of Revisions

Date	Present Contents	New Contents / Reason	Design By
15.Jun.2015 (Rev.1.0.0)	New	First release - Base documents - UGZC-505A_HardwareSpecification_Rev100_15Jun2015 UGZC-505A_PackingSpecification_Rev100_15Jun2015 UGZC-505A_DesignInformation_Rev100_15Jun2015	H.Yatsu
06.Oct.2015 (Rev.1.0.1)	-Cover page p.1 Document number R150043 Firmware version B200 ALPS Spec. No. 1.0.0  p.4 1-2-1. Product Overview This product is a radio frequency transceiver module compatible for BLUETOOTH™ Version 4.0 (excludes BLE) system.  -UGZC-505A_HardwareSpecification_Rev100_15Jun2015 p.2 Function "BLUETOOTH™ Version 3.0/Version 4.0 (Class2)" -UGZC-505A_PackingSpecification_Rev100_15Jun2015 p.31 Function "BLUETOOTH™ Version 3.0/Version 4.0 (Class2)" -UGZC-505A_DesignInformation_Rev100_15Jun2015 p.41 Function "BLUETOOTH™ Version 3.0/Version 4.0 (Class2)"	-Cover page p.1 Document number R150070 Firmware version C120 ALPS Spec. No. 1.0.1  p.4 1-2-1. Product Overview This product is a radio frequency transceiver module compatible for BLUETOOTH™ Version 4.1 (excludes BLE) system.  -UGZC-505A_HardwareSpecification_Rev101_06Oct2015 p.2 Function "BLUETOOTH™ Version 4.1 (Class2)" -UGZC-505A_PackingSpecification_Rev101_06Oct2015 p.31 Function "BLUETOOTH™ Version 4.1 (Class2)" -UGZC-505A_DesignInformation_Rev101_06Oct2015 p.41 Function "BLUETOOTH™ Version 4.1 (Class2)"	H.Yatsu
17.Nov.2015 (Rev.1.0.2)	-Cover page p.1 Document number R150070 Firmware version C120 ALPS Spec. No. 1.0.1  -UGZC-505A_HardwareSpecification_Rev101_06Oct2015 -UGZC-505A_PackingSpecification_Rev101_06Oct2015 -UGZC-505A_DesignInformation_Rev101_06Oct2015	-Cover page p.1 Document number R150084 Firmware version C130 ALPS Spec. No. 1.0.2  -UGZC-505A_HardwareSpecification_Rev102_17Nov2015 -UGZC-505A_PackingSpecification_Rev102_17Nov2015 -UGZC-505A_DesignInformation_Rev102_17Nov2015	H.Yatsu
27.Nov.2015 (Rev.1.0.3)	-Cover page p.1 Document number R150084 Firmware version C130 ALPS Spec. No. 1.0.2  -UGZC-505A_HardwareSpecification_Rev102_17Nov2015 -UGZC-505A_PackingSpecification_Rev102_17Nov2015 -UGZC-505A_DesignInformation_Rev102_17Nov2015	-Cover page p.1 Document number R150089 Firmware version C140 ALPS Spec. No. 1.0.3  -UGZC-505A_HardwareSpecification_Rev103_27Nov2015 -UGZC-505A_PackingSpecification_Rev103_27Nov2015 -UGZC-505A_DesignInformation_Rev103_27Nov2015	H.Yatsu
16.Dec.2015 (Rev.1.0.4)	-Cover page p.1 Document number R150089 ALPS Spec. No. 1.0.3  -UGZC-505A_HardwareSpecification_Rev103_27Nov2015 -UGZC-505A_PackingSpecification_Rev103_27Nov2015  P38 2-2-2.Exclusive Use Barcode Label Description ■2D QR Barcode Construction: LGE P/N(11) + Seq. no(3) + Marker P/N + Lot No + Qty(5)  -UGZC-505A_DesignInformation_Rev103_27Nov2015	-Cover page p.1 Document number R150102 ALPS Spec. No. 1.0.4  -UGZC-505A_HardwareSpecification_Rev104_16Dec2015 -UGZC-505A_PackingSpecification_Rev104_16Dec2015  P38 2-2-2.Exclusive Use Barcode Label Description ■2D QR Barcode Construction: LGE P/N(11) + "!" + Seq. no(3) + "!" + Marker P/N + "!" + Lot No + "!" + Qty(5)  -UGZC-505A_DesignInformation_Rev104_16Dec2015	H.Yatsu

## FCC Information

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions :

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for CLASS B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try correct the interference by one or more of the following measures:

- 1.1. Reorient or relocate the receiving antenna.
- 1.2. Increase the separation between the equipment and receiver.
- 1.3. Connect the equipment into an outlet on a circuit different from that to which receiver is connected.
- 1.4. Consult the dealer or experienced radio/TV technician for help.

## WARNING

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

## IC Information

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme avec Industrie Canada RSS standard exempts de licence(s), Son utilisation est soumise à Les deux conditions suivantes: (1) cet appareil ne peut pas provoquer d'interférences et (2) cet appareil doit accepter Toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement du dispositif.

## Information for OEM Integrator

This device is intended only for OEM integrators under the following conditions:

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
- 2) The transmitter module may not be co-located with any other transmitter or antenna.

### End product labelling

The label for end product must include "Contains FCC ID: BEJ-LGBTM, IC ID: 7414C-LGBTM

"CAUTION : Exposure to Radio Frequency Radiation.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment must be installed and operated with minimum distance of 20cm between the radiator and your body. This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users."

\* Antenna Type: Chip Antenna

\* Antenna Gain: 3.5 dBi