PRODUCT SPECIFICATION

Product Name	AI7931LD
Version	H
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Document History

Date	Revised Contents	Revised By	Version
2022/05/25	Initial Version	Ivan	A
2022/06/16	1) Update Bluetooth Current Consumption 2) Add Power Mode	Ivan	B
2022/08/23	Add FCC/CE information in POD and Product Marking	Ivan	C
2022/09/26	Modify Platform Features	Ivan	D
2022/11/09	Update Power Mode Data	Ivan	E
2023/02/20	Modify Electrical Characteristics Modify SMT Preparation Modify Packing Information	Ivan	F
2023/07/05	Modify Power Mode Power Consumption	Ivan	G
2023/11/07	Add Power Mode Measurement Conditions	Ivan	H

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1. Description

AcSiP Technology Corp. introduces a low-cost and low-power consumption IoT module. This stand-alone module is designed for internet of things (IoT) devices with smart connection and cloud application/services. AI7931LD is a highly integrated IoT module that features an ARM® Cortex-M33 application processor, a low power 1x1 802.11a/b/g/n/ac/ax dual-band Wi-Fi subsystem, a Bluetooth v5.0 subsystem and a Power Management Unit (PMU).

The Wi-Fi subsystem and a Bluetooth v5.0 subsystem offer feature-rich wireless connectivity at high standards, and deliver reliable, cost-effective throughput from an extended distance.

The AI7931LD is designed to support standard based features in the areas of security, quality of service and international regulations, giving end users the greatest performance any time and in any circumstance.

The AI7931LD is based on ARM® Cortex-M33 with floating point microcontroller (MCU) including SRAM/ROM memory. The module also supports rich peripheral interfaces, including SDIO, SPI master, I2C, I2S_IN, IR input, UART, AUXADC, PWM, and GPIOs.

1.1 Platform Features

Platform

- ARM® Cortex-M33 MCU with FPU with up to 300MHz clock speed
- Embedded 1MB SRAM and 4MB PSRAM
- Embedded 16MB serial flash with eXecute In Place (XIP) and on-the-fly AES
- Supports hardware crypto engines including AES, DES/3DES, SHA, ECC, TRNG for network security
- Supports up to 22 general purpose IOs, which are multiplexed with SDIO, SPI Master, UART, I2C, I2S_IN, AUXADC, PWM and GPIO interfaces
- Supports 12 DMA channels

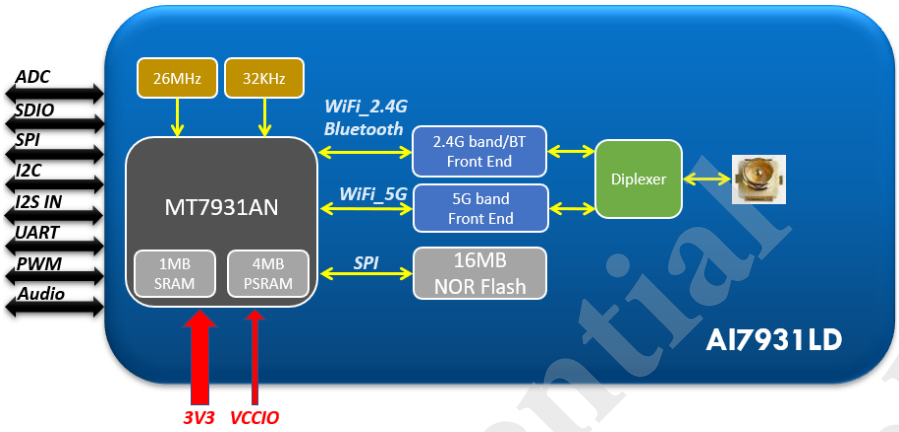
Wi-Fi

- IEEE 802.11 1T1R a/b/g/n/ac/ax 5GHz and 2.4GHz bands
- Supports 1x1 20MHz bandwidth, MCS0~8(256-QAM) in 2.4G/5GHz band
- Support uplink MU-OFDMA TX and downlink MU-OFDMA RX
- Support Tx LDPC (Low-density parity check)
- Support Rx STBC
- Wi-Fi security WFA WPA/WPA2/WPA3 personal
- QOS supports of WFA WMM
- Support CSI (Channel Signal Information)

Bluetooth

- BT5.0 2M_PHY / Long Range / Advertising Extension / SAM / CS#2 / High Duty Cycle Non-Connectable ADV
- BT4.2 Link Layer Privacy / LE Secure Connection / LE Data Packet Length Extension / Link Layer Extended Scanner Filter Policies
- BT4.1 Link Layer Topology / Secure Connection
- BT4.0 BLE only mode
- Up to 8 BLE link
- Packet loss concealment
- Channel quality driven data rate adaptation
- Channel assessment and WB RSSI for AFH
- Supports Bluetooth/Wi-Fi coexistence

1.2 Block Diagram



1.3 Specification

AI7931LD	
Chipset	MT7931AN (Wi-Fi 6 + BLE5.0)
Core	ARM Cortex-M33 with FPU
FPU Clock Speed	300MHz
SRAM	1MB
PSRAM for Applications	4MB
NOR Flash	16MB
Antenna connector	I-PEX (MHF® I)
Operation Condition	
Temperature	Operating : -40℃ ~ +85℃ Storage : -40℃ ~ +105℃
Humidity	Operating : 10 ~ 95% (Non-Condensing) Storage : 5 ~ 95% (Non-Condensing)
Mechanical Information	
Dimension	32mm x 32mm x 2.7mm (Typ.)
Package	LGA -104 Pin Type. Module with shielding cover
Certification	
FCC ID	2ADWC-AI7931LD
CE	EN300328 / EN301893 / EN300440 / EN301489-1-17 / EN62311 / EN62368-1

2. Electrical Characteristics

2.1 Operating Voltage Range

Symbol	Parameter	Min.	Typ.	Max.	Unit	Input / Output
BASE_3V3	3.3V Supply Voltage	2.97	3.3	3.63	V	I
VCCIO_L	Internal Flash Supply Voltage & SDIO Domain	2.97	3.3	3.63	V	I
IC_VCCIO	GPIO Domain	1.62 2.97	1.8 3.3	1.98 3.63	V	I
PHYLDO_OUT	1.8V Output	1.62	1.8	1.98	V	O
MIC_MICBIAS0	MICBIAS Output	1.8	1.85	2.2	V	O

2.2 RF Characteristics

2.2.1 RF Characteristics for 802.11b 11M

802.11b Transmit (Conductive)					
Item	**Condition**	**Min.**	**Typ.**	**Max.**	**Unit**
Frequency Range		Channel 1		Channel 13	
Tx Power Level	DQPSK	19	21	23	dBm
Frequency Tolerance		-15	0	15	ppm
Spectral Mask	11MHz→22MHz	-	40	-	dBr
	＞22MHz	-	53	-	dBr
Modulation Accuracy	All Data Rate	-	15	-	%
802.11b Receiver (Conductive)					
Item	**Condition**	**Min.**	**Typ.**	**Max.**	**Unit**
Frequency Range		Channel 1		Channel 13	
Min. Input	CCK-11M PER<10%	-89	-87	-85	dBm

2.2.2 RF Characteristics for 802.11g 54M

802.11g Transmit (Conductive)					
Item	**Condition**	**Min.**	**Typ.**	**Max.**	**Unit**
Frequency Range		Channel 1		Channel 13	
Tx Power Level	OFDM	15	17	19	dBm
Frequency Tolerance		-15	0	15	ppm
Modulation Accuracy	All Data Rate	-	-25	-	dB
802.11g Receiver (Conductive)					
Item	**Condition**	**Min.**	**Typ.**	**Max.**	**Unit**
Frequency Range		Channel 1		Channel 13	
Min. Input	54Mbps PER<10%	-76.5	-74.5	-72.5	dBm

2.2.3 RF Characteristics for 802.11n MCS7

802.11n_HT20 Transmit (Conductive)					
Item	**Condition**	**Min.**	**Typ.**	**Max.**	**Unit**
Frequency Range		Channel 1		Channel 13	
Tx Power Level	OFDM	15	17	19	dBm
Frequency Tolerance		-15	0	15	ppm
Modulation Accuracy	All Data Rate	-	-28	-	dB
802.11n_HT20 Receiver (Conductive)					
Item	**Condition**	**Min.**	**Typ.**	**Max.**	**Unit**
Frequency Range		Channel 1		Channel 13	
Min. Input	MCS7 PER<10%	-74.5	-72.5	-70.5	dBm

2.2.4 RF Characteristics for 802.11ax MCS8

802.11ax_HT20 Transmit (Conductive)					
Item	**Condition**	**Min.**	**Typ.**	**Max.**	**Unit**
Frequency Range		Channel 1		Channel 13	
Tx Power Level	OFDM	14	16	18	dBm
Frequency Tolerance		-15	0	15	ppm
Modulation Accuracy	All Data Rate	-	-33	-	dB
802.11ax_HT20 Receiver (Conductive)					
Item	**Condition**	**Min.**	**Typ.**	**Max.**	**Unit**
Frequency Range		Channel 1		Channel 13	
Min. Input	MCS8 PER<10%	-69.5	-67.5	-65.5	dBm

2.2.5 RF Characteristics for 5G 802.11a 54M

5G 802.11a Transmit (Conductive)					
Item	**Condition**	**Min.**	**Typ.**	**Max.**	**Unit**
Frequency Range		5180		5825	MHz
Tx Power Level	OFDM	15	17	19	dBm
Frequency Tolerance		-15	0	15	ppm
Modulation Accuracy	All data rate	-	-25	-	dB
5G 802.11a Receiver (Conductive)					
Item	**Condition**	**Min.**	**Typ.**	**Max.**	**Unit**
Frequency Range		Channel 1		Channel 13	
Min. Input	54Mbps PER<10%	-76	-74	-72	dBm

2.2.6 RF Characteristics for 5G 802.11n MCS7

5G 802.11n_HT20 Transmit (Conductive)					
Item	**Condition**	**Min.**	**Typ.**	**Max.**	**Unit**
Frequency Range		5180		5825	MHz
Tx Power Level	OFDM	15	17	19	dBm
Frequency Tolerance		-15	0	15	ppm
Modulation Accuracy	All Data Rate	-	-28	-	dB
5G 802.11n_HT20 Receiver (Conductive)					
Item	**Condition**	**Min.**	**Typ.**	**Max.**	**Unit**
Frequency Range		5180		5825	MHz
Min. Input	MCS7 PER<10%	-74	-72	-70	dBm

2.2.7 RF Characteristics for 5G 802.11ax MCS8

5G 802.11ax_HT20 Transmit (Conductive)					
Item	**Condition**	**Min.**	**Typ.**	**Max.**	**Unit**
Frequency Range		5180		5825	MHz
Tx Power Level	OFDM	14	16	18	dBm
Frequency Tolerance		-15	0	15	ppm
Modulation Accuracy	All Data Rate	-	-33	-	dB
5G 802.11ax_HT20 Receiver (Conductive)					
Item	**Condition**	**Min.**	**Typ.**	**Max.**	**Unit**
Frequency Range		5180		5825	MHz
Min. Input	MCS8 PER<10%	-69	-67	-65	dBm

2.2.8 Bluetooth RF Specifications

Bluetooth Tx Power (Conductive)					
Item	**Condition**	**Min.**	**Typ.**	**Max.**	**Unit**
Bluetooth Tx Power	LE Mode – 1Mbps	-	9	-	dBm
	LE Mode – 2Mbps	-	9	-	dBm
	LE Mode – 500kbps	-	9	-	dBm
	LE Mode – 125kbps	-	9	-	dBm
Bluetooth Rx Sensitivity (Conductive)					
Item	**Condition**	**Min.**	**Typ.**	**Max.**	**Unit**
Bluetooth Rx Sensitivity (PER < 30.8%)	LE Mode – 1Mbps	-98	-96	-94	dBm
	LE Mode – 2Mbps	-95	-93	-91	dBm
	LE Mode – 500kbps	-99	-97	-95	dBm
	LE Mode – 125kbps	-104	-102	-100	dBm

2.3 RF Power Consumption

Wi-Fi

Description	Current （Average）	
	AI7931LD	Unit
2.4GHz-Band Receiver	38	mA
2.4GHz-Band Transmit 802.11b 11M @21dBm	313	mA
2.4GHz-Band Transmit 802.11g 54M @17dBm	180	mA
2.4GHz-Band Transmit 802.11n MCS7 @17dBm	178	mA
2.4GHz-Band Transmit 802.11ax MCS8 @16dBm	168	mA
5GHz-Band Receiver	44	mA
5GHz-Band Transmit 802.11a 54M @17dBm	292	mA
5GHz-Band Transmit 802.11n MCS7 @17dBm	296	mA
5GHz-Band Transmit 802.11ax MCS8 @16dBm	274	mA

Bluetooth

Description	Current （Average）	
	AI7931LD	Unit
Bluetooth Receiver	24	mA
Bluetooth Tx Power LE Mode – 1Mbps @9dBm	60	mA
Bluetooth Tx Power LE Mode – 2Mbps @9dBm	48	mA
Bluetooth Tx Power LE Mode – 500kbps @9dBm	65	mA
Bluetooth Tx Power LE Mode – 125kbps @9dBm	68	mA
BLE Advertising 120ms / 120ms (Min. / Max. Interval)	15	mA
BLE Full Scan Interval：200ms	24	mA
BLE Connection Interval：7.5ms	15	mA

2.4 Power Mode

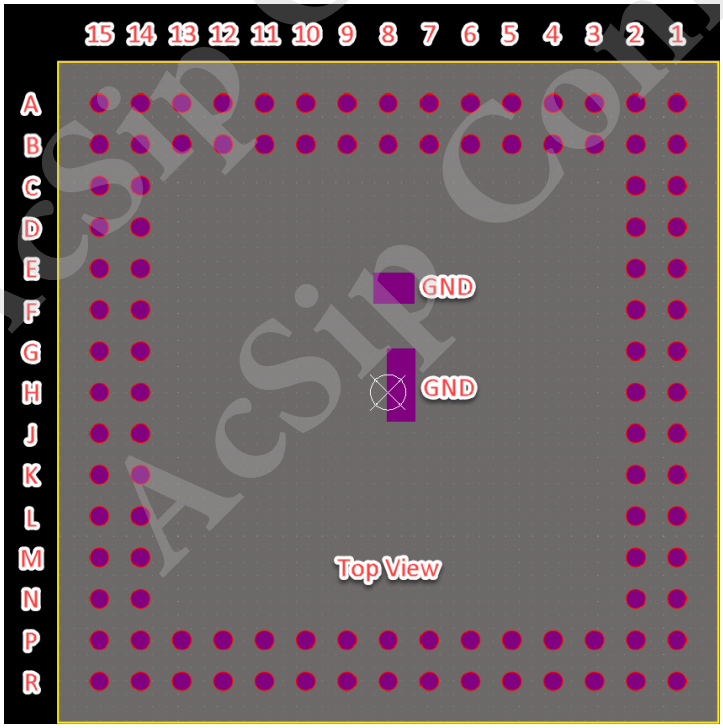
Power Modes	MCU Clock	MCU Bus	Wi-Fi	Clock	SRAM / PSRAM	Peripheral	Wake Up Source	Wake Up Latency	Power Consumption
Active	300MHz	Active	On / Off	PLL / XTAL	Active	On	--	--	10.6mA[1]
Idle	Gated	Active	On / Off	PLL / XTAL	Active	On	All IRQ	< 1ms	8.1mA[1]
Legacy Sleep (PSRAM On)	Gated	Gated	Off	XTAL	Sleep/On	On	All IRQ	< 1ms	2.3mA
Deep Sleep	Power Off	Power Off	Off	External 32kHz	Sleep	Power Off	Restricted IRQ[2]	< 10ms	0.42mA

1. The test condition is at 25℃ and 3.3V. Power consumed by connectivity is not considered.
2. List of modules available to signal IRQ as wake up source in deep sleep:
   - GPT(32K), SDIO slave, EINT, WIFI, BT, UART(CM33), RTC timer
3. Power Consumption Measurement Settings:
   - GPIO: GPIO 0 ~ GPIO 5 are Flash Pin Setting; GPIO 48 & GPIO 50 are UART TX/RX Pin.
   - Set other GPIO to GPIO Mode / Direction Input / High Z.

3. Pin Definition

Pin No.	Pin Name	Pin No.	Pin Name
A1	NC	C15	NC
A2	NC	D1	NC
A3	NC	D2	NC
A4	NC	D14	GND
A5	NC	D15	NC
A6	GND	E1	AU_AMP_VOLP
A7	NC	E2	NC
A8	GPIO_T_9 (= KPCOL_0)	E14	GPIO_T_6 (= GPIO_B_3)
A9	GND	E15	GND
A10	GND	F1	AU_AMP_VORP
A11	GND	F2	NC
A12	NC	F14	GPIO_T_8 (= GPIO_B_1)
A13	GND	F15	NC
A14	GND	G1	NC
A15	GND	G2	GPIO_T_3
B1	NC	G14	GND
B2	NC	G15	GND
B3	NC	H1	GND
B4	NC	H2	GPIO_T_1
B5	BASE_3V3_R	H14	GND
B6	NC	H15	NC
B7	NC	J1	AU_VIN0_P
B8	GPIO_T_7 (= KPROW_1)	J2	GND
B9	NC	J14	GND
B10	GND	J15	NC
B11	BASE_3V3_L	K1	AU0_VIN0_N
B12	BASE_3V3_L	K2	NC
B13	GND	K14	IC_VCCIO
B14	GND	K15	GND
B15	GND	L1	AU0_VIN1_N
C1	GND	L2	NC
C2	NC	L14	GND
C14	GND	L15	SDIO_CMD

Pin No.	Pin Name	Pin No.	Pin Name
M1	AU0_VIN1_P	P12	GPIO_B_1
M2	GND	P13	SDIO_DAT2
M14	KEY_SYSRST_B	P14	SDIO_DAT3
M15	SDIO_DAT1	P15	SDIO_DAT0
N1	GND	R1	GND
N2	PHYLDO_1V8	R2	NC
N14	VCCIO_L	R3	NC
N15	SDIO_CLK	R4	GND
P1	MIC_BIAS0	R5	NC
P2	GND	R6	NC
P3	GND	R7	NC
P4	BASE_3V3_B	R8	GPIO_B_10
P5	BASE_3V3_B	R9	GPIO_B_6
P6	GND	R10	GPIO_B_2
P7	NC	R11	GPIO_B_8
P8	GPIO_B_12	R12	GPIO_B_5
P9	GPIO_B_9	R13	GPIO_B_3
P10	GPIO_B_11	R14	GPIO_B_0
P11	GPIO_B_7	R15	GND



3.1 PinMux

IO Name	CR Value Default*	Name	Dir	Default		Description
				Dir	PU/PD	
PAD_SYSRST_B	NA	PAD_SYSRST_B			PU	Chip hardware fundamental reset pin
SDIO_CLK	0000	GPIO[6]	I/O	I	PD	GPIO 6
	0001*	SDIO_CLK	I			SDIO Clock
	0010	MSDC0_CLK	O			MSDC Clock
	0011	SPIM0_SCK	O			SPI0 (Master) Clock
	0100	CM33_GPIO_EINT0	I			CM33 EINT0
	0101	DEBUG_0	O			Debug Signal 0
	0110	ANT_SEL0	O			Antenna Select 0
	0111	RSVD	I			RSVD
SDIO_CMD	0000	GPIO[7]	I/O	I	PU	GPIO 7
	0001*	SDIO_CMD	I/O			SDIO CMD
	0010	MSDC0_CMD	I/O			MSDC CMD
	0011	SPIM0_CS_N	O			SPI0 (Master) Chip Select
	0100	CM33_GPIO_EINT1	I			CM33 EINT1
	0101	DEBUG_1	O			Debug Signal 1
	0110	ANT_SEL1	O			Antenna Select 1
	0111	RSVD	I			RSVD
SDIO_DAT0	0000	GPIO[8]	I/O	I	PU	GPIO 8
	0001*	SDIO_DAT0	O			SDIO Data[0]
	0010	MSDC0_DAT0	I/O			MSDC0 Data[0]
	0011	SPIM0_MISO	I			SPI0 (Master) Input
	0100	UART0_RTS	O			UART0 RTS
	0101	DEBUG_2	O			Debug Signal 2
	0110	ANT_SEL2	O			Antenna Select 2
	0111	CM33_GPIO_EINT0	I			CM33 EINT0

IO Name	CR Value Default*	Name	Dir	Default		Description
				Dir	PU/PD	
SDIO_DAT1	0000	GPIO[9]	I/O	I	PU	GPIO9
	0001*	SDIO_DAT1	I/O			SDIO Data[1]
	0010	MSDC0_DAT1	I/O			MSDC0 Data[1]
	0011	SPIM0_MOSI	O			SPI0 (Master) Output
	0100	UART0_CTS	I			UART0 CTS
	0101	DEBUG_3	O			Debug Signal 3
	0110	ANT_SEL3	O			Antenna Select 3
	0111	CM33_GPIO_EINT1	I			CM33 EINT1
SDIO_DAT2	0000	GPIO[10]	I/O	I	PU	GPIO 10
	0001*	SDIO_DAT2	I/O			SDIO Data[2]
	0010	MSDC0_DAT2	I/O			MSDC0 Data[2]
	0011	I2SIN_DAT0	I			I2S In Data0
	0100	UART0_RX	I			UART0 RX
	0101	DEBUG_4	O			Debug Signal 4
	0110	I2C0_SCL	O			I2C0 Clock
	0111	CM33_GPIO_EINT2	I			CM33 EINT2
SDIO_DAT3	0000	GPIO[11]	I/O	I	PU	GPIO 11
	0001*	SDIO_DAT3	I/O			SDIO Data[3]
	0010	MSDC0_DAT3	I/O			MSDC Data[3]
	0011	I2SO_DAT0	O			I2SO Data
	0100	UART0_TX	O			UART0 TX
	0101	DEBUG_5	O			Debug Signal 5
	0110	I2C0_SDA	I/O			I2C0 Data
	0111	CM33_GPIO_EINT3	I			CM33 EINT3
GPIO_B_0	0000	GPIO[12]	I/O	O	PU	GPIO 12
	0001*	CONN_BGF_UART0_TXD	O			BT General UART TX
	0010	MSDC0_RST	O			MSDC0 Reset
	0011	CONN_BT_TXD	O			BT Debug UART TX
	0100	WIFI_TXD	O			Wi-Fi Debug UART TX
	0101	DEBUG_6	O			Debug Signal 6
	0110	ANT_SEL3	O			Antenna Select 3
	0111	CM33_GPIO_EINT4	I			CM33 EINT4

IO Name	CR Value Default*	Name	Dir	Default		Description
				Dir	PU/PD	
GPIO_B_1	0000	GPIO[13]	I/O	I	PU	GPIO 13
	0001*	RSVD	I			RSVD
	0010	SPIM1_SCK	O			SPIM1 (Master) Clock
	0011	I2SO_BCK	O			I2SO BCK
	0100	UART1_RX	I			UART1 RX
	0101	DEBUG_7	O			Debug Signal 7
	0110	ANT_SEL4	O			Antenna Select 4
	0111	CM33_GPIO_EINT5	I			CM33 EINT5
GPIO_B_2	0000	GPIO[14]	I/O	O	PD	GPIO 14
	0001*	RSVD	O			RSVD
	0010	SPIM1_MOSI	O			SPI1 (Master) Output
	0011	I2SO_LRCK	O			I2SO LRCK
	0100	RSVD				RSVD
	0101	DEBUG_8	O			Debug Signal 8
	0110	ANT_SEL5	O			Antenna Select 5
	0111	CM33_GPIO_EINT6	I			CM33 EINT6
GPIO_B_3	0000	GPIO[15]	I/O	I	PD	GPIO 15
	0001*	RSVD	I			RSVD
	0010	SPIM1_MISO	I			SPI1 (Master) Input
	0011	I2SO_MCK	O			I2STX MCLK
	0100	I2SIN_MCK	O			I2SRX MCK
	0101	DEBUG_9	O			Debug Signal 9
	0110	ANT_SEL6	O			Antenna Select 6
	0111	CM33_GPIO_EINT7	I			CM33 EINT7
GPIO_B_5 (AUXADC)	0000	GPIO[17]	I/O	I	PU	GPIO 17
	0001*	CONN_BGF_UART0_RXD	I			BT General UART RX
	0010	UART0_RX	I			UART0 RX
	0011	TDMIN_MCLK	I			TDMIN MCLK
	0100	DMIC_CLK0	O			DMIC CLK0
	0101	DEBUG_11	O			Debug Signal 11
	0110	ANT_SEL8	O			Antenna Select 8
	0111	CM33_GPIO_EINT9	I			CM33 EINT9

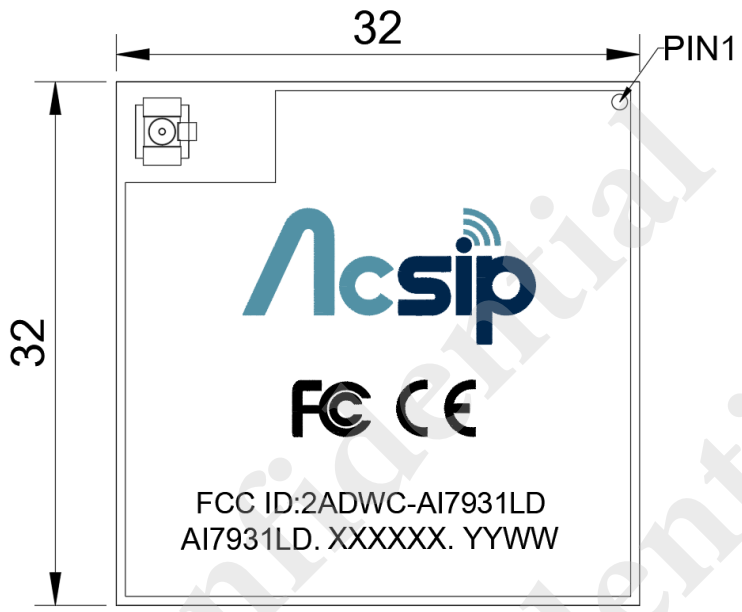
IO Name	CR Value Default*	Name	Dir	Default		Description
				Dir	PU/PD	
GPIO_B_6 (AUXADC)	0000	GPIO[18]	I/O	O	PU	GPIO 18
	0001*	CONN_BT_TXD	O			BT Debug UART TX
	0010	UART0_TX	O			UART0 TX
	0011	TDMIN_BCK	I			TDMIN BCK
	0100	DMIC_DAT0	I			DMIC DAT0
	0101	UART1_RX	I			UART1 RX
	0110	IR_IN	I			IR RX Input
	0111	CM33_GPIO_EINT10	I			CM33 EINT10
GPIO_B_7 (AUXADC)	0000	GPIO[19]	I/O	O	PD	GPIO 19
	0001*	WIFI_TXD	O			Wi-Fi Debug UART TX
	0010	UART0_RTS	O			UART0 RTS
	0011	I2C1_SDA	I/O			I2C1 Data
	0100	I2SIN_LRCK	O			I2SIN LRCK
	0101	UART1_TX	O			UART1 TX
	0110	PTA_EXT_IF_FREQ	I			External PTA Frequency
	0111	CM33_GPIO_EINT11	I			CM33 EINT11
GPIO_B_8 (AUXADC)	0000	GPIO[20]	I/O	I	PD	GPIO 20
	0001*	CONN_WF_MCU_AICE_TCKC	I			Wi-Fi N10 SWD
	0010	UART0_CTS	I			UART0 Control
	0011	I2C1_SCL	O			I2C1 Clock
	0100	I2SIN_BCK	O			I2SIN BCK
	0101	DEBUG_12	O			Debug Signal 12
	0110	PTA_EXT_IF_ACT	I			External PTA Active
	0111	CM33_GPIO_EINT12	I			CM33 EINT12
GPIO_B_9 (AUXADC)	0000	GPIO[21]	I/O	I	PU	GPIO 21
	0001*	CONN_WF_MCU_AICE_TMSC	I/O			Wi-Fi N10 SWD
	0010	PTA_EXT_IF_PRI	I/O			External PTA Priority
	0011	TDMIN_LRCK	I/O			TDMIN LRCK
	0100	DMIC_DAT1	I			DMIC DAT1
	0101	DEBUG_13	O			Debug Signal 13
	0110	ANT_SEL9	O			Antenna Select 9
	0111	CM33_GPIO_EINT13	I			CM33 EINT13

IO Name	CR Value Default*	Name	Dir	Default		Description
				Dir	PU/PD	
GPIO_B_10 (AUXADC)	0000	GPIO[22]	I/O	I	PD	GPIO 22
	0001*	CONN_BGF_MCU_AICE_TCKC	I			BT N10 SWD
	0010	PTA_EXT_IF_WLAN_ACT	O			External PTA WLAN Active
	0011	TDMIN_DI	I			TDMIN DI
	0100	DMIC_DAT2	I			DMIC Data2
	0101	DEBUG_14	O			Debug Signal 14
	0110	ANT_SEL10	O			Antenna Select 10
	0111	CM33_GPIO_EINT14	I			CM33 EINT14
GPIO_B_11 (AUXADC)	0000	GPIO[23]	I/O	I	PU	GPIO 23
	0001*	CONN_BGF_MCU_AICE_TMSC	I/O			BT N10 SWD
	0010	DSP_URXD0	I			DSP UART RX
	0011	I2C0_SDA	I/O			I2C0 Data
	0100	DMIC_DAT3	I			DMIC Data3
	0101	DEBUG_15	O			Debug Signal 15
	0110	ANT_SEL11	O			Antenna Select 11
	0111	CM33_GPIO_EINT15	I			CM33 EINT15
GPIO_B_12 (AUXADC)	0000	GPIO[24]	I/O	O	PU	GPIO 24
	0001*	ADSP_JTAG_TDO	O			DSP JTAG
	0010	DSP_UTXD0	O			DSP UART TX
	0011	I2C0_SCL	O			I2C0 Clock
	0100	DMIC_CLK1	O			DMIC CLK1
	0101	RSVD	O			RSVD
	0110	ANT_SEL12	O			Antenna Select 12
	0111	CM33_GPIO_EINT16	I			CM33 EINT16

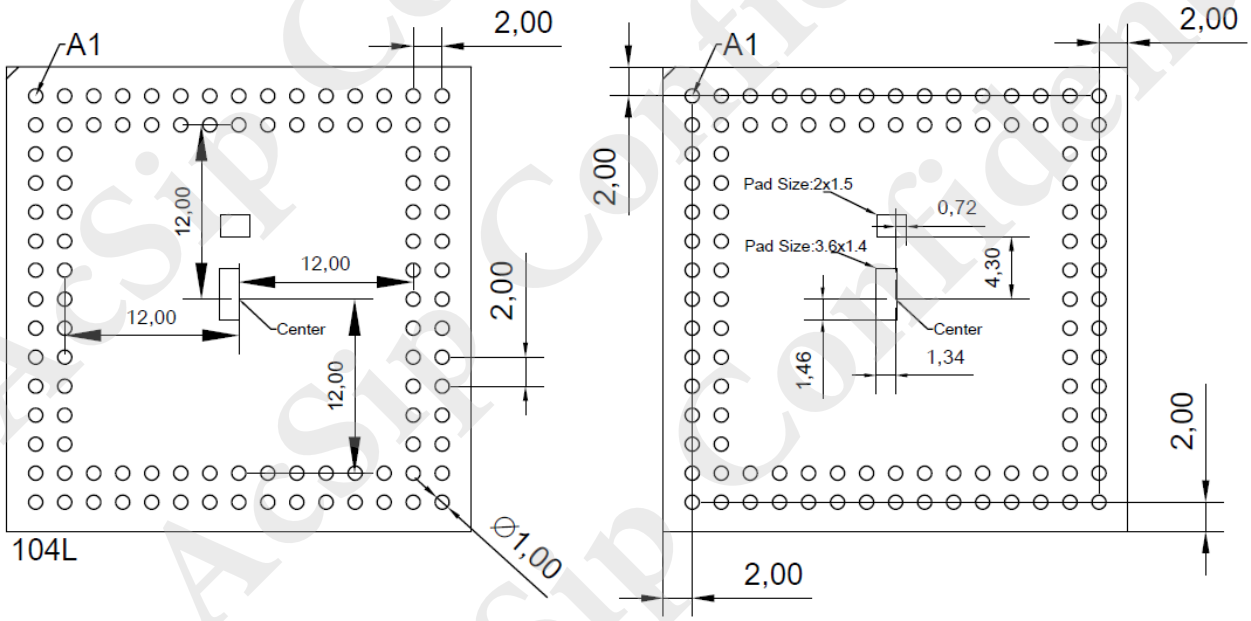
IO Name	CR Value Default*	Name	Dir	Default		Description
				Dir	PU/PD	
GPIO_T_1	0000	GPIO[42]	I/O	I	PD	GPIO 42
	0001	RSVD	I			RSVD
	0010*	DBSYS_SWCLK_TCLK	I			CM33_SWD (Default)
	0011	UART1_RX	I			UART1 RX
	0100	UART0_RX	I			UART0 RX
	0101	DSP_URXD0	I			DSP UART RX
	0110	ANT_SEL3	O			Antenna Select 3
	0111	CM33_GPIO_EINT1	I			CM33 EINT1
GPIO_T_3	0000	GPIO[44]	I/O	I	PD	GPIO 44
	0001	RSVD	I/O			RSVD
	0010*	DBSYS_SWDIO_TMS	I			CM33_SWD (Default)
	0011	UART1_TX	O			UART1 TX
	0100	UART0_TX	O			UART0 TX
	0101	DSP_UTXD0	O			DSP UART TX
	0110	ANT_SEL5	O			Antenna Select 5
	0111	CM33_GPIO_EINT18	I			CM33 EINT18
KPROW_1	0000	GPIO[48]	I/O	I	PU	GPIO 48
	0001*	CM33_UART_RX	I			CM33 UART RX (default)
	0010	RSVD	O			RSVD
	0011	KEYPAD_KPROW_1	I/O			KEYPAD_KPROW_1
	0100	DSP_URXD0	I			DSP UART RX
	0101	PWM_3	O			PWM 3
	0110	ANT_SEL9	O			Antenna Select 9
	0111	AUDIO_DEBUG_IN_0	I			AUDIO_DEBUG_IN_0
KPCOL_0	0000	GPIO[50]	I/O	O	PU	GPIO 50
	0001*	CM33_UART_TX	O			CM33 UART TX (default)
	0010	RSVD	O			RSVD
	0011	KEYPAD_KPCOL_0	I			KEYPAD_KPCOL_0
	0100	DSP_UTXD0	O			DSP UART TX
	0101	PWM_5	O			PWM 5
	0110	ANT_SEL11	O			Antenna Select 11
	0111	AUDIO_DEBUG_IN_2	I			AUDIO_DEBUG_IN_2

4. Mechanical Dimensions

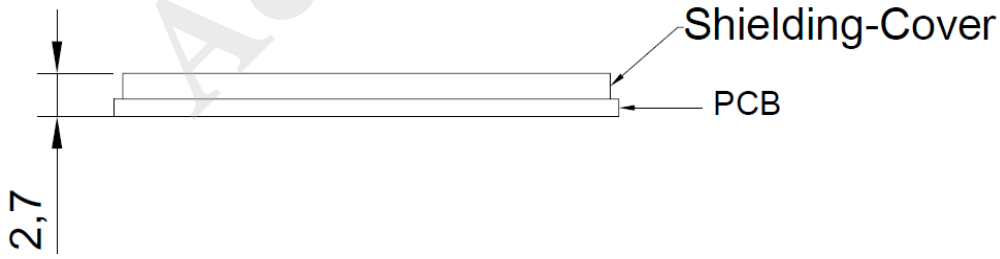
Unit: mm (Typ.)



Top View

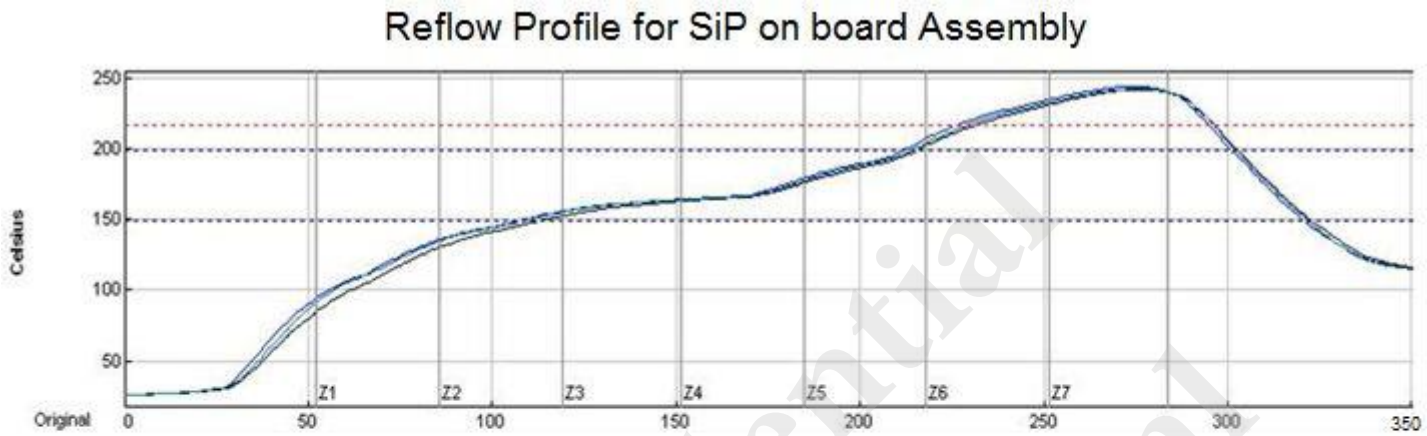


Bottom View



Side View

5. Recommended Reflow Profile



Preheat time	150℃—200℃: 105+/-15sec
Dwell time	Over 220℃: 70+5/-10 sec
Peak Temp	240 +10/-5℃
Ramp Up/Down Rate	Up: 3 +0/-2 ℃/ sec Down: 2 +0/-1℃/ sec

6. Module Preparation

6.1 Handling

Handling the module must wear the anti-static wrist strap to avoid ESD damage. After each module is aligned and tested, it should be transport and storage with anti -static tray and packing. This protective package must be remained in suitable environment until the module is assembled and soldered onto the main board.

6.2 SMT Preparation

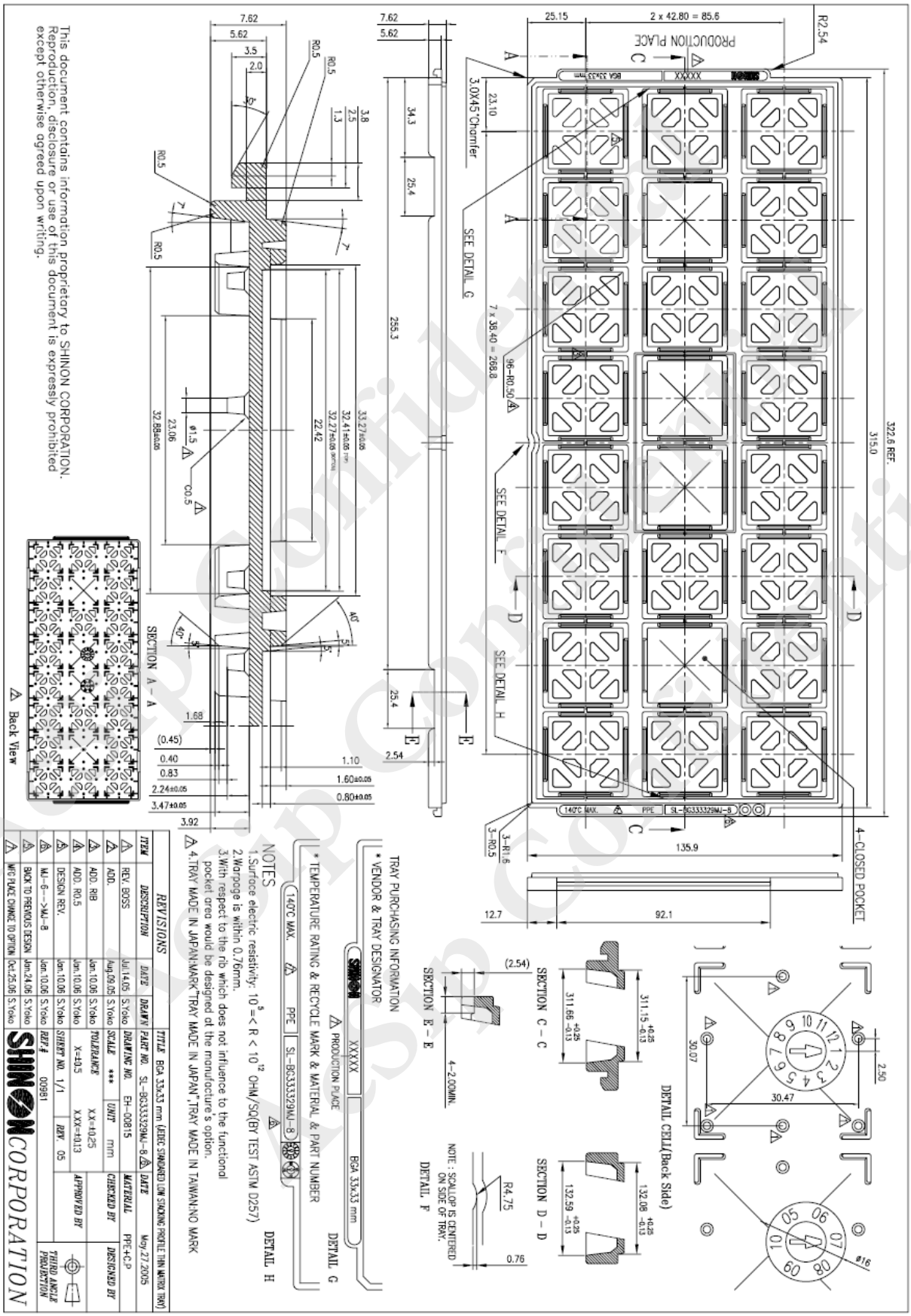
1. Calculated shelf life in sealed bag: 6 months at < 40℃ and < 90% relative humidity (RH).
2. Peak package body temperature: 250℃.
3. Moisture sensitivity level: 3
4. After bag was opened, devices that will be subjected to reflow solder or other high temperature process must.
   A. Mounted within: 168 hours of factory conditions < 30℃/60%RH.
   B. Stored at ≦10%RH with N2 flow box.
5. Devices require baking, before mounting, if:
   A. Package bag does not keep in vacuumed while first time open.
   B. Humidity Indicator Card is > 10% when read at 23±5℃.
   C. Expose at 3A condition over 8 hours or Expose at 3B condition over 24 hours.
6. If baking is required, devices may be baked for 12 hours at 125±5℃
7. Reflow condition: Please refer to IPC / JEDEC-J-STD-033

7. Package Information

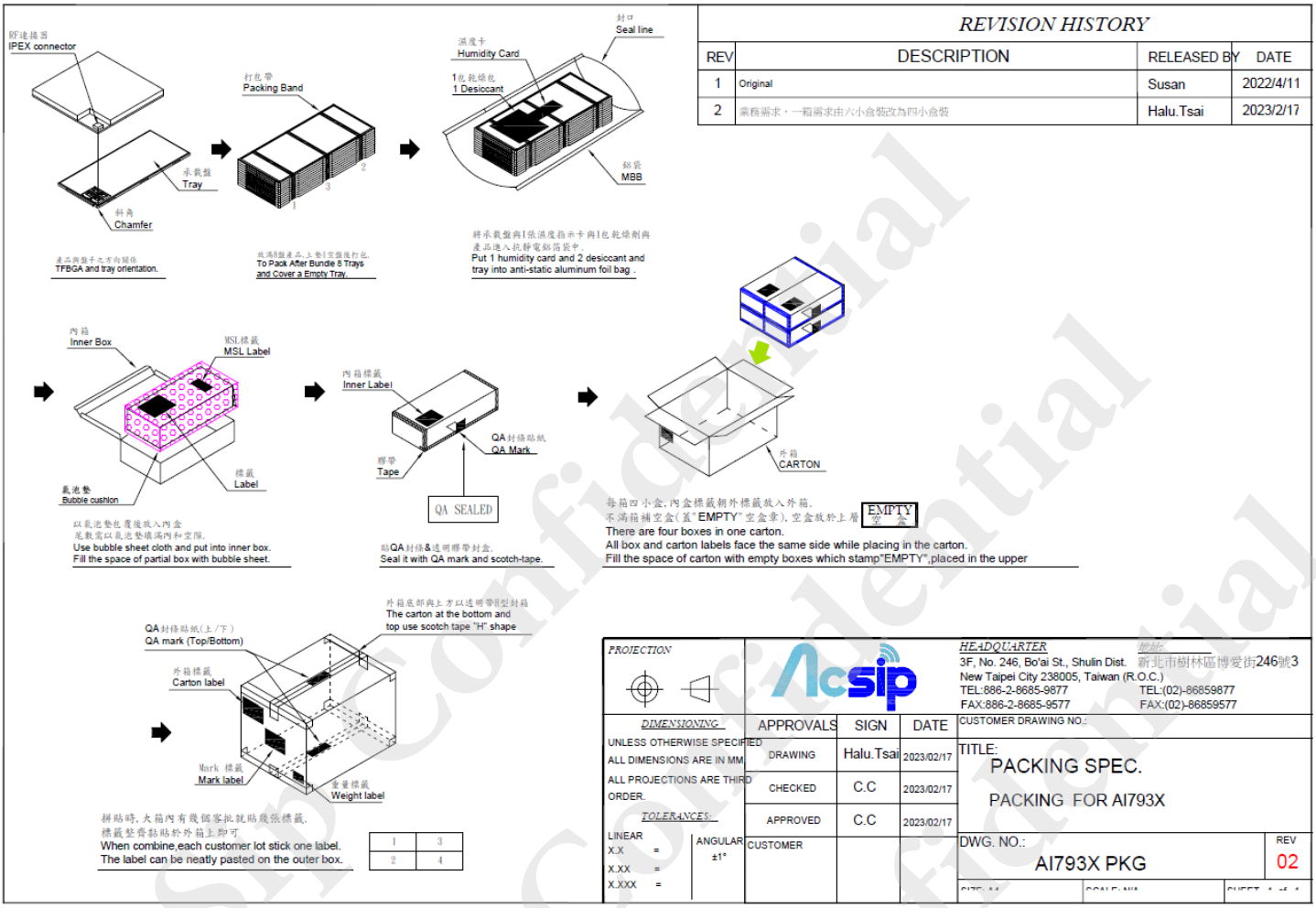
7.1 Product Making

Figures below detail the standard product marking for all AcSiP Corp. products. Reference to the applicable line number and table for a full detail of all the variables.

7.2 Tray Dimension



7.3 Packing Information



7.4 Humidity Indicator Card

Dry Wet

Indicates 指示點:
10%,20%,30,40%,50%,60% relative humidity
10%,20%,30,40%,50%,60% 相對濕度

Color Change 顏色變化:
Brown (Dry) ---> Blue (Wet)
棕色 (乾燥) ---> 藍色 (潮溼)