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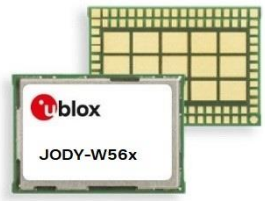
JODY-W5 series

Host-based multiradio modules with Wi-Fi 6 and Bluetooth 5.4

Data sheet



Abstract

Targeted towards system integrators and design engineers, this technical data sheet includes the functional description, pin definition, specifications, country approval status, handling instructions, and ordering information for JODY-W5 host-based multiradio modules. Supporting 802.11b/g/n/ac/ax and dual-mode Bluetooth 5.4 connectivity, JODY-W5 is ideal for in-vehicle infotainment and telematic applications that demand high data rates, such as in-car hotspots and Wi-Fi display applications like Apple CarPlay or video streaming across multiple clients. The module connects to the host through PCIe or SDIO interfaces for Wi-Fi and High-Speed UART for Bluetooth.

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Product status	Corresponding content status	
Functional Sample	Draft	For functional testing. Revised and supplementary data will be published later.
In Development / Prototype	Objective specification	Target values. Revised and supplementary data will be published later.
Engineering Sample	Advance information	Data based on early testing. Revised and supplementary data will be published later.
Initial Production	Early production information	Data from product verification. Revised and supplementary data may be published later.
Mass Production / End of Life	Production information	Document contains the final product specification.

This document applies to the following products:

Product name	Type number	Chipset	PCN reference	Product status
JODY-W562-A	JODY-W562-00A-00	AW611	N/A	Engineering Samples
JODY-W562-A	JODY-W562-01A-00	AW611	N/A	Engineering Samples
JODY-W562-A	JODY-W562-21A-00	AW611	N/A	Engineering Samples

Contents

1 Functional description

1.1 Overview

The JODY-W5 series comprises compact, host-based, multi-radio modules based on the NXP® chipset. The modules enable Wi-Fi, Bluetooth and Bluetooth Low Energy (LE) communication and are ideal for automotive and industrial applications. The chipsets used in the automotive grade JODY-W5 modules are AEC-Q100 compliant.

JODY-W5 modules can be operated in the following modes:

- Wi-Fi 1x1 802.11b/g/n/a/ac/ax in 2.4 GHz or 5 GHz
- Dual-mode Bluetooth 5.4 (including isochronous channels for LE audio) can be operated fully simultaneous with Wi-Fi

JODY-W5 modules undergo extended automotive qualification testing in accordance with u-blox Qualification Policy based on AEC-Q104 and are manufactured in line with ISO/TS 16949.
JODY-W5 connects to the host processor running Linux or Android, through SDIO, or High-Speed UART interfaces.

1.2 Applications

JODY-W5 series modules are suitable for a broad range of automotive applications, including:

- Rapid sync-n-go applications and fast content download to vehicles
- In-vehicle infotainment systems
- Hands-free equipment (Bluetooth)
- Telematic systems (Control Units and Head Units)
- Two-wheel applications
- Remote diagnostic applications
- Communication for EV charging
- Applications for demanding operating environments up to 105 °C

1.3 Block diagram

Figure 1 shows the various components and interfaces supported in JODY-W5 series modules.

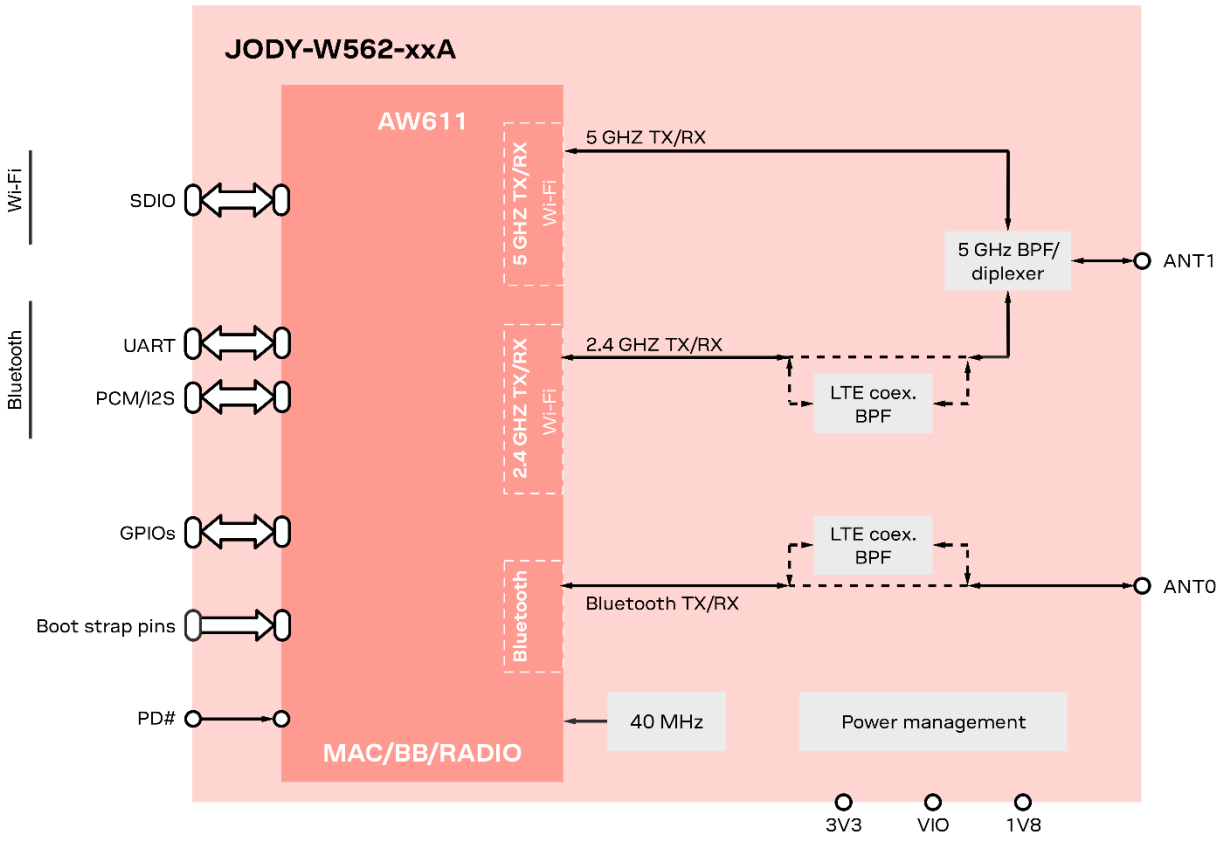

Figure 1: JODY-W562-xxA block diagram

JODY-W5 variants with a dedicated LTE Coexistence Filter (2.4 GHz BPF) are available on request. Coexistence band pass filters (BPF) are only needed if LTE bands 7, 38, 40, and 41 are used.

The type numbers and corresponding configuration options for JODY-W5 series modules are shown in Table 1.

Type number	Antenna configuration		LTE Coexistance BPF	
	ANT0	ANT1	WiFi BPF	Bluetooth BPF
JODY-W562-00A-00	Bluetooth	2.4 and 5 GHz Wi-Fi	No	No
JODY-W562-01A-00	Bluetooth	2.4 and 5 GHz Wi-Fi	No	No
JODY-W562-21A-00	Bluetooth	2.4 and 5 GHz Wi-Fi	Yes	Yes

Table 1: Supported JODY-W5 configurations

1.4 Product features

Item	JODY-W562-00A	JODY-W562-01A	JODY-W562-21A
Grade	Automotive Grade 3	Automotive Grade 2	Automotive Grade 2
Chipset	NXP AW611HN/A1AMP	NXP AW611HN/A1BMP	NXP AW611HN/A1BMP
Antenna type	Two antenna pins for Wi-Fi and Bluetooth	Two antenna pins for Wi-Fi and Bluetooth	Two antenna pins for Wi-Fi and Bluetooth
Supported Wi-Fi radio modes	IEEE 802.11 b/g/n/a/ac/ax	IEEE 802.11 b/g/n/a/ac/ax	IEEE 802.11 b/g/n/a/ac/ax
Supported Wi-Fi bands	2.4 / 5 GHz	2.4 / 5 GHz	2.4 / 5 GHz
Max. Wi-Fi output power	20 dBm (at antenna pin)	20 dBm (at antenna pin)	18 dBm (at antenna pin)
Bluetooth version	5.4	5.4	5.4
Bluetooth profiles	HCI	HCI	HCI
Supported Bluetooth radio modes	Bluetooth BDR/EDR Bluetooth Low Energy (LE)	Bluetooth BDR/EDR Bluetooth Low Energy (LE)	Bluetooth BDR/EDR Bluetooth Low Energy (LE)
Supported BLE data rates	1 Mbps 2 Mbps 500 kbps 125 kbps	1 Mbps 2 Mbps 500 kbps 125 kbps	1 Mbps 2 Mbps 500 kbps 125 kbps
LTE coexistence filter	no	no	yes
OS support	Linux / Android	Linux / Android	Linux / Android
Interfaces	SDIO 3.0 (Wi-Fi/Bluetooth) UART (Bluetooth) PCM (Bluetooth digital audio)	SDIO 3.0 (Wi-Fi/Bluetooth) UART (Bluetooth) PCM (Bluetooth digital audio)	SDIO 3.0 (Wi-Fi/Bluetooth) UART (Bluetooth) PCM (Bluetooth digital audio)
Features	Micro access point with max. 16 connected clients	Micro access point with max. 16 connected clients	Micro access point with max. 16 connected clients
	Simultaneous client and access point mode	Simultaneous client and access point mode	Simultaneous client and access point mode
	WPA/WPA2/WPA3	WPA/WPA2/WPA3	WPA/WPA2/WPA3
	RF parameters/MAC addresses in OTP	RF parameters/MAC addresses in OTP	RF parameters/MAC addresses in OTP
Max. ambient operating temperature	85 °C	105 °C	105 °C
Module size	19.8 x 13.8 mm	19.8 x 13.8 mm	19.8 x 13.8 mm

Table 2: JODY-W5 series product features

For further information about the supported features, see also the JODY-W5 product summary [3].

1.4.1 Wi-Fi features

- Standards: IEEE 802.11b/g/n/a/ac/ax/az/e/h/i/k/mc/r/u/v/w/z[1]
- IEEE 802.11ax PHY data rates up to 480 Mbit/s (80 MHz, 1SS)
- Supports up to 16 stations in AP mode
- Support DFS radar pulse detection
- 20/40/80 MHz bandwidth
- SDIO 3.0 host interface for Wi-Fi
- Deep sleep low power mode
- Simultaneous client and access point operation
- Supports simultaneous station, access point and P2P modes
- 128-bit AES hardware crypto engine. BIP/GMAC, AES/CCMP, AES/CMAC, AES/GCMP
- WPA/WPA2/WPA3 and WAPI encryption
  Wi-Fi Simultaneous operation modes
- Access Point (AP) simultaneous operation
  - AP + AP
  - AP + STA
- Point-to-Point (P2P) simultaneous operation
  - P2P + STA
  - P2P + AP

1.4.2 Bluetooth features

- Bluetooth 5.4 with Bluetooth Low Energy (LE)
- Bluetooth Class 1 and 2
- BDR and EDR packet types – 1 Mbit/s (GFSK), 2 Mbit/s (π/4DQPSK), and 3 Mbit/s (8DPSK)
- Simultaneous active ACL connection support
- LE 2 Mbit/s PHY
- LE support up to 16 simultaneous central/peripheral connections
- LE secure connection
- LE Privacy 1.2
- LE Data Length Extension
- LE Advertising Extension
- LE long range
- LE power control
- Isochronous channels (ISOC) supporting LE Audio and Auracast™ Broadcast Audio
- Standard UART HCI transport layer
- PCM (or I2S) interface for voice applications (shared pins)

1.4.3 General product features

- Driver support for Linux and Android
- Coexistence with cellular and other on-chip radios
- Small footprint (19.8 mm x 13.8 mm), LGA package
- Automotive qualification tests (climatic, mechanical, and operating life tests) in accordance with ISO 16750-4 planned

[1] 802.1u in STA mode only

1.4.4 Reserved MAC addresses

JODY-W5 series modules have four consecutive MAC addresses that are unique for each module variant. The first two of these four addresses are configured during production.

The first address is used for Bluetooth communication, while the second address is configured for Wi-Fi communication. The Data Matrix Code shown on the product label includes the Bluetooth MAC address, as described in the Labeling and ordering information. The remaining two MAC addresses are not used in the manufacturing configuration but are reserved for module usage.

MAC address	Assignment	Last two bits of MAC address	Example
Module1, address 1	Bluetooth	0b00	*D4:CA:6E:44:00:04*
Module1, address 2	Wi-Fi	0b01	D4:CA:6E:44:00:05
Module1, address 3	(free for use)	0b10	D4:CA:6E:44:00:06
Module1, address 4	(free for use)	0b11	D4:CA:6E:44:00:07
Module2, address 1	Bluetooth	0b00	*D4:CA:6E:44:00:08*
Module2, address 2	Wi-Fi	0b01	D4:CA:6E:44:00:09
Module2, address 3	(free for use)	0b10	D4:CA:6E:44:00:0A
Module2, address 4	(free for use)	0b11	D4:CA:6E:44:00:0B

Table 3: MAC address assignment

For further information about using the MAC address for secondary Wi-Fi interfaces, see also “Configuration of Bluetooth power levels” in the JODY-W5 system integration manual [2].

2 Interfaces

2.1 Host interface configuration

JODY-W5 series provides two configuration pins, **CONFIG[0]** and **CONFIG[1]**, for selecting the host interface configuration. Additional configuration pins are used to set parameters following a reset. To set a configuration bit to 0, attach a 100 kΩ resistor to GND. No external pull-up resistor is required to set a configuration bit to 1. Table 4 and Table 5 show all strapping options.

CONFIG[1]	CONFIG[0]	Wi-Fi	Bluetooth/ Bluetooth LE	Firmware download	Number of SDIO functions
1	1	SDIO	UART	SDIO+UART (parallel/serial)	1 (Wi-Fi)
Reserved	Reserved				

Table 4: Host interface configuration options

Additional configuration pins are listed in Table 5.

Pin	Name	Description
81	RF_CNTL3_P	1 = 40 MHz (reference clock frequency select)
80	RF_CNTL4_N	Reserved. Set to 1.

Table 5: Additional configuration pins

2.2 SDIO interface

JODY-W5 supports an SDIO device interface that conforms to the industry standard SDIO 3.0 specification, including default speed (25 MHz), high-speed (50 MHz), SDR12/25/50/104 (12/25/50/104 MB/s), and DDR50 (50 MB/s) modes. The interface supports 1-bit and 4-bit SDIO transfer modes at the full clock range up to 208 MHz for SDR104. All mandatory SDIO commands are supported.

Host controllers access the Wi-Fi functions of JODY-W5 series modules using the SDIO bus protocol. The interface supports 4-bit SDIO transfer mode at the full clock range up to 208 MHz.

All bus speed modes are supported with a signal voltage of 1.8 V only.

Bus speed mode	Max clock frequency [MHz]	Signal voltage [V]	Max. bus speed [MB/s]
DS: Default Speed	25	1.8	12.5
HS: High Speed	50	1.8	25
SDR12	25	1.8	12.5
SDR25	50	1.8	25
SDR50	100	1.8	50
SDR104	208	1.8	104
DDR50	50	1.8	50

Table 6: Supported SDIO bus speed modes

2.2.1 Default speed and high-speed modes (1.8 V)

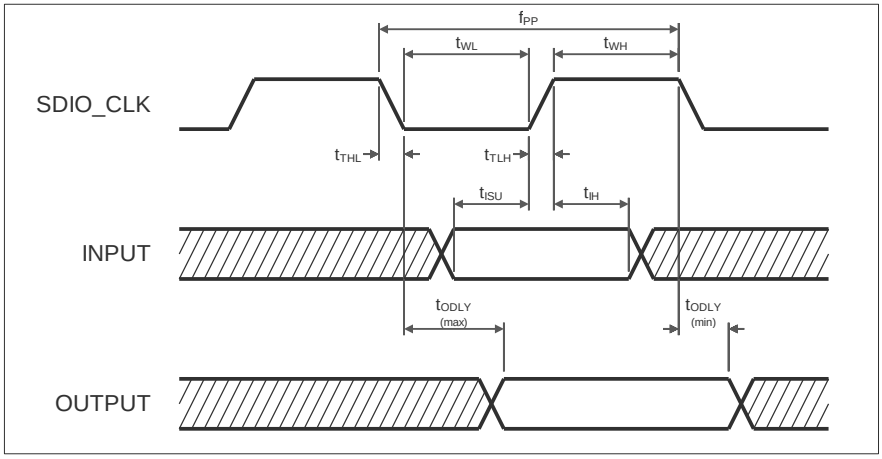

Figure 2: SDIO Protocol timing diagram - default speed mode (1.8 V)

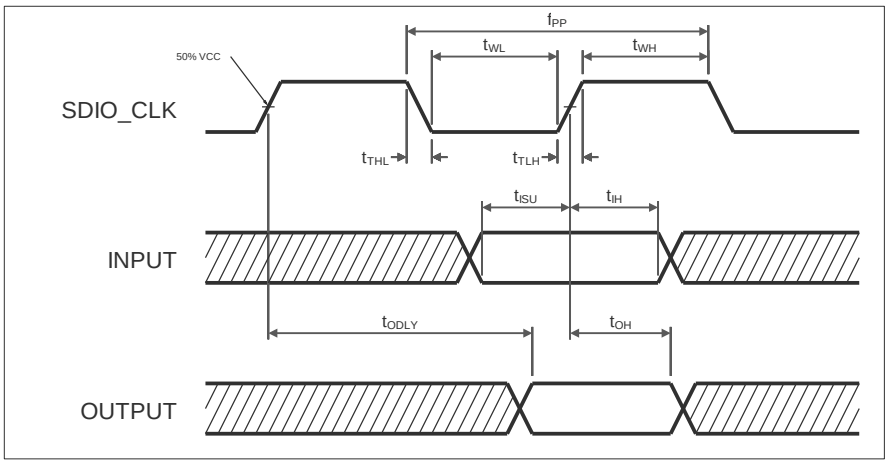

Figure 3: SDIO Protocol timing diagram – high speed mode (1.8 V)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
f_{PP}	Clock frequency – Data Transfer Mode	Normal	0	-	25	MHz
		High speed	0	-	50	MHz
f_{OD}	Clock frequency – Identification Mode	Normal	0		400	kHz
		High speed	0	-	400	kHz
t_{WL}	Clock low time	Normal	10	-	-	ns
		High speed	7	-	-	ns
t_{WH}	Clock high time	Normal	10	-	-	ns
		High speed	7	-	-	ns
t_{TLH}	Clock rise time	Normal	-	-	10	ns
		High speed	-	-	3	ns
t_{THL}	Clock fall time	Normal	-	-	10	ns
		High speed	-	-	3	ns
t_{ISU}	Input setup time	Normal	5	-	-	ns
		High speed	6	-	-	ns

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
t_{IH}	Input hold time	Normal	5	-	-	ns
		High speed	2	-	-	ns
t_{ODLY}	Output delay time	Normal	-	-	14	ns
t_{ODLY}	Output delay time CL ≤ 40 pF (1 card)	High speed	-	-	14	ns
t_{OH}	Output hold time	High speed	2.5	-	-	ns

Table 7: SDIO timing data – Default speed, High speed modes (1.8 V)

2.2.2 SDR12, SDR25, SDR50 modes (up to 100 MHz, 1.8 V)

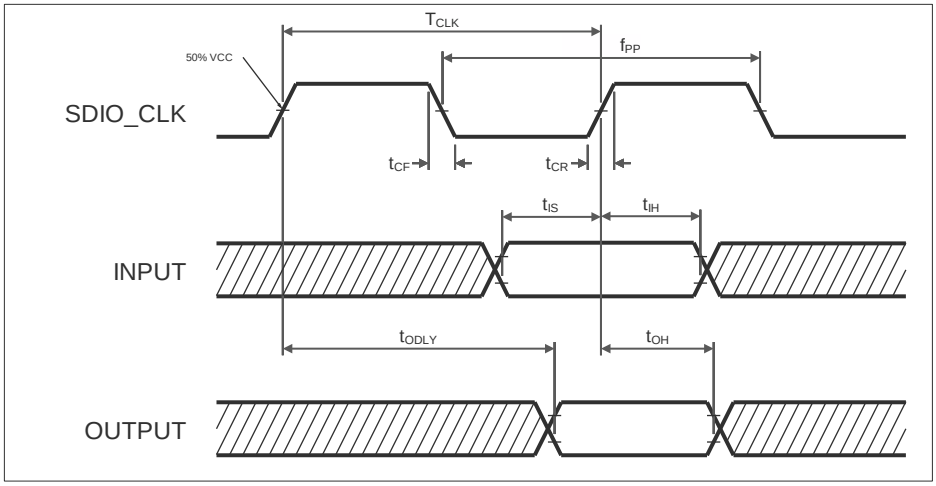

Figure 4: SDIO protocol timing diagram – SDR12, SDR25, SDR50 modes (up to 100 MHz, 1.8 V)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
f_{PP}	Clock frequency	SDR12	0	-	25	MHz
		SDR25	0	-	50	MHz
		SDR50	0	-	100	MHz
t_{IS}	Input setup time	SDR12/25/50	5/6/3	-	-	ns
t_{IH}	Input hold time	SDR12/25/50	5/2/0.8	-	-	ns
T_{CLK}	Clock time	SDR12/25/50	40/10/10	-	-	ns
t_{CR}, t_{CF}	Rise time, fall time T_{CR}, T_{CF} < 2 ns (max) at 100 MHz C_{CARD} = 10 pF	SDR12/25/50		-	0.2*T_{CLK}	ns
t_{ODLY}	Output delay time $C_L \leq 30$ pF	SDR12/25/50	-	-	14/14/7.5	ns
t_{OH}	Output hold time C_L = 15 pF	SDR12/25/50	1.5	-	-	ns

Table 8: SDIO timing data – SDR12, SDR25, SDR50 modes (up to 100 MHz, 1.8 V)

2.2.3 SDR104 mode (208 MHz, 1.8 V)

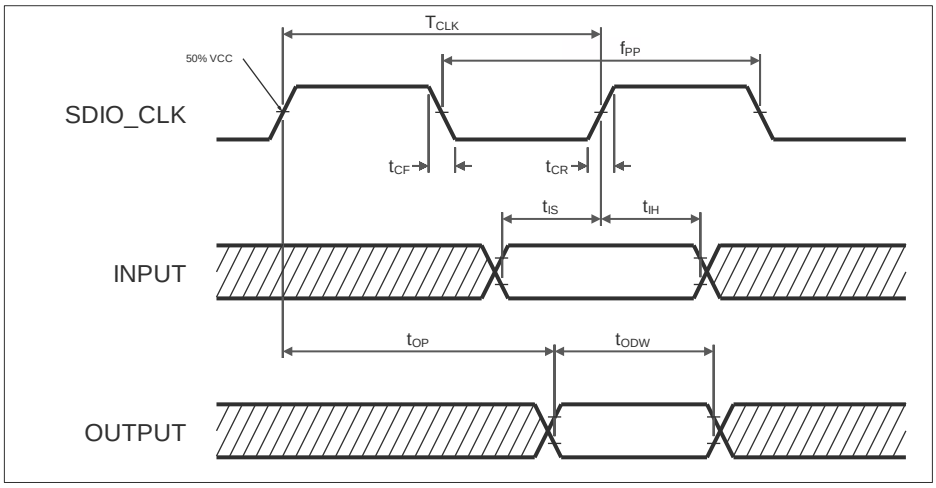

Figure 5: SDIO protocol timing diagram – SDR104 mode (208 MHz, 1.8 V)

Symbol	Parameter	Condition	Min.	Typ	Max.	Units
f_{PP}	Clock frequency	SDR104	0	-	208	MHz
t_{IS}	Input setup time	SDR104	1.4	-	-	ns
t_{IH}	Input hold time	SDR104	0.8	-	-	ns
T_{CLK}	Clock time	SDR104	4.8	-	-	ns
t_{CR}, t_{CF}	Rise time, fall time T_{CR}, T_{CF} < 0.96 ns (max) at 208 MHz C_{CARD} = 10 pF	SDR104		-	0.2*T_{CLK}	ns
t_{OP}	Card output phase	SDR104	0	-	2	ns
t_{ODW}	Output timing of variable data window	SDR104	2.88	-	-	ns

Table 9: SDIO timing data – SDR104 mode (208 MHz) (1.8 V)

2.2.4 DDR50 Mode (50 MHz, 1.8 V)

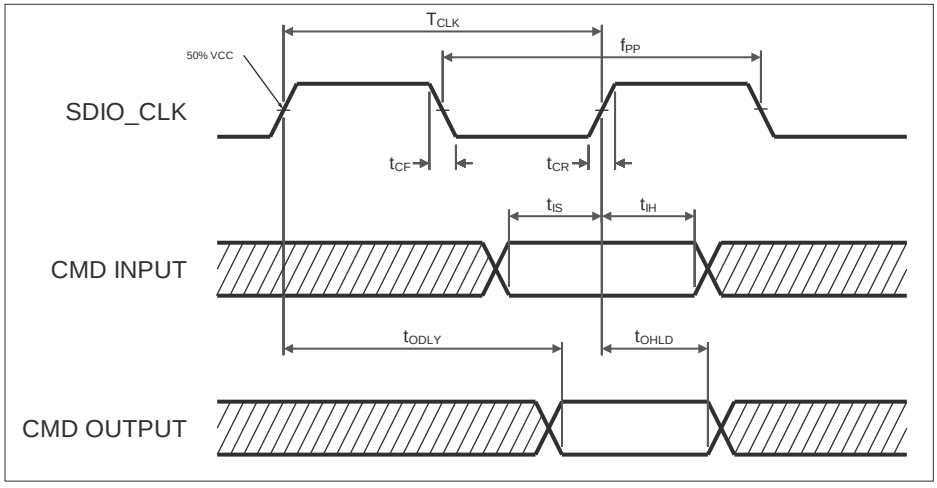

Figure 6: SDIO CMD timing diagram – DDR50 mode (50 MHz, 1.8 V)

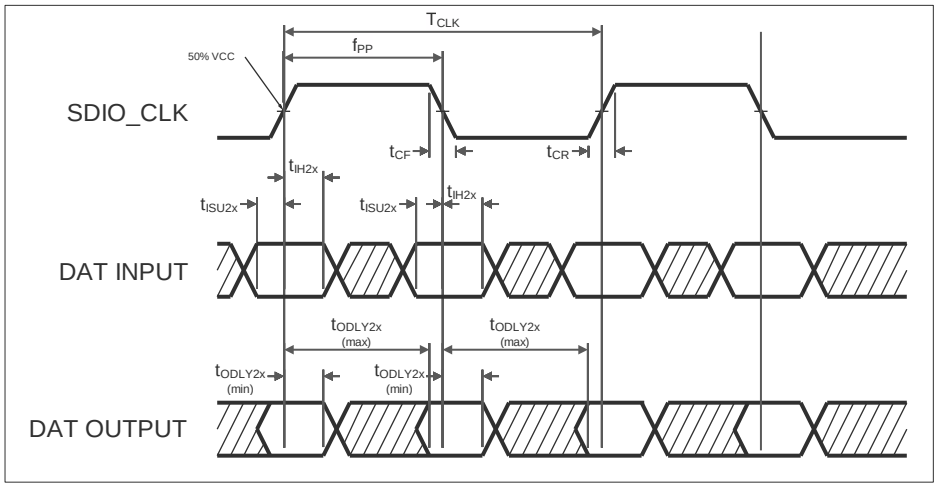

Figure 7: SDIO DAT [3:0] timing diagram – DDR50 mode (50 MHz, 1.8 V)

Symbol	Parameter	Condition	Min.	Typ	Max.	Units
Clock						
T_{CLK}	Clock time 50 MHz (max) between rising edges	DDR50	20	-	-	ns
t_{CR}, t_{CF}	Rise time, fall time TCR, TCF < 4.00 ns (max) at 50 MHz CCARD = 10 pF	DDR50	-	-	0.2*T_{CLK}	ns
Clock Duty		DDR50	45	-	55	%
CMD Input (referenced to clock rising edge)						
t_{IS}	Input setup time CCARD ≤ 10 pF (1 card)	DDR50	6	-	-	ns
t_{IH}	Input hold time CCARD ≤ 10 pF (1 card)	DDR50	0.8	-	-	ns
CMD Output (referenced to clock rising edge)						
t_{ODLY}	Output delay time during data transfer mode CL ≤ 30 pF (1 card)	DDR50	-	-	13.7	ns
t_{OHLD}	Output hold time CL ≥ 15 pF (1 card)	DDR50	1.5	-	-	ns
DAT[3:0] Input (referenced to clock rising and falling edges)						
t_{IS2x}	Input setup time CCARD ≤ 10 pF (1 card)	DDR50	3			ns
t_{IH2x}	Input hold time CCARD ≤ 10 pF (1 card)	DDR50	0.8			ns
DAT[3:0] Output (referenced to clock rising and falling edges)						
t_{ODLY2x} (max)	Output delay time during data transfer mode CL ≤ 25 pF (1 card)	DDR50			7.0	ns
t_{ODLY2x} (min)	Output hold time CL ≥ 15 pF (1 card)	DDR50	1.5			ns

Table 10: SDIO timing data – DDR50 mode (50 MHz, 1.8 V)

2.3 High Speed UART interface

JODY-W5 series modules support a high-speed Universal Asynchronous Receiver/Transmitter (UART) interface that is compliant with the industry standard 16550 specification. The baud rate is adjustable from 1200 bps to 3.0 Mbit/s and the default baud rate after reset is 115.2 Kbps. The acceptable deviation from the UART Rx target baud rate is ±3%.

The main features of the UART interface include:

- FIFO mode permanently selected for transmit and receive operations
- Two pins (36 and 37) for transmit and receive operations
- Two flow control pins (38 and 39)
- Interrupt triggers for low-power, high throughput operation
- High throughput (up to 3 Mbps)

Baud rate		
1200	76800	1382400
2400	**115200**	1500000
4800	230400	1843200
9600	460800	2000000
19200	500000	2100000
38400	921600	2764800
57600	1000000	**3000000**

Table 11: Supported UART baud rates

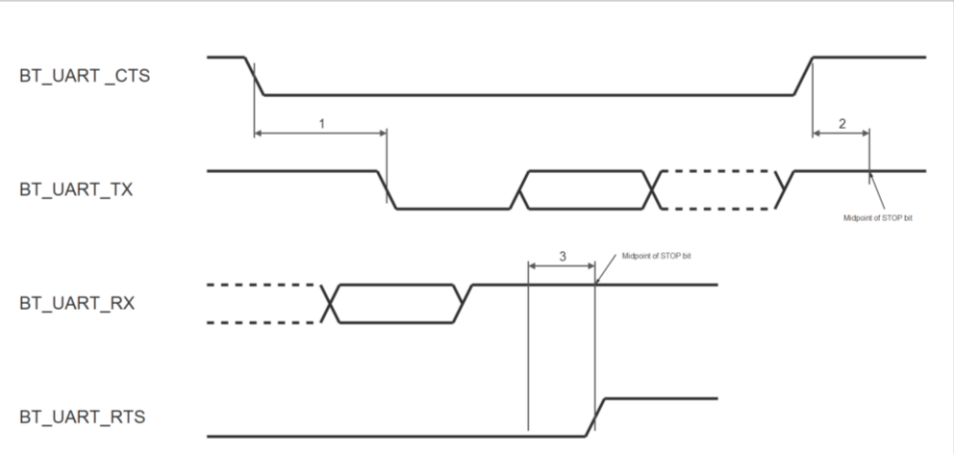

Figure 8: UART timing characteristics

Reference	Characteristic	Min.	Typ.	Max.	Units
1	Delay time, BT_UART_CTS low to BT_UART_TX valid	-	-	1.5	Bit period
2	Setup time, BT_UART_CTS high before midpoint of stop bit	-	-	0.5	Bit period
3	Delay time, midpoint of stop bit to BT_UART_RTS high	-	-	0.5	Bit period

Table 12: UART timing specification

2.4 PCM interface

JODY-W5 series modules include a Pulse Code Modulation (PCM) interface that supports:

- *Central* or *Peripheral* modes
- PCM bit width size of 8 bits or 16 bits
- Up to four slots with configurable bit width and start positions
- Tri-state PCM interface capability
- Short frame and long frame synchronization
- Pins shared with I2S pins
- I2S *Central* and *Peripheral* modes for I2S, MSB, and LSB audio interfaces

In PCM central mode, the interface generates a 2 MHz or a 2.048 MHz **PCM_CLK** and 8 kHz **PCM_SYNC** signal.

In *Peripheral* mode, the interface has both **PCM_CLK** and **PCM_SYNC** inputs that allow another unit on the PCM bus to generate the signals.

2.4.1 PCM interface specifications

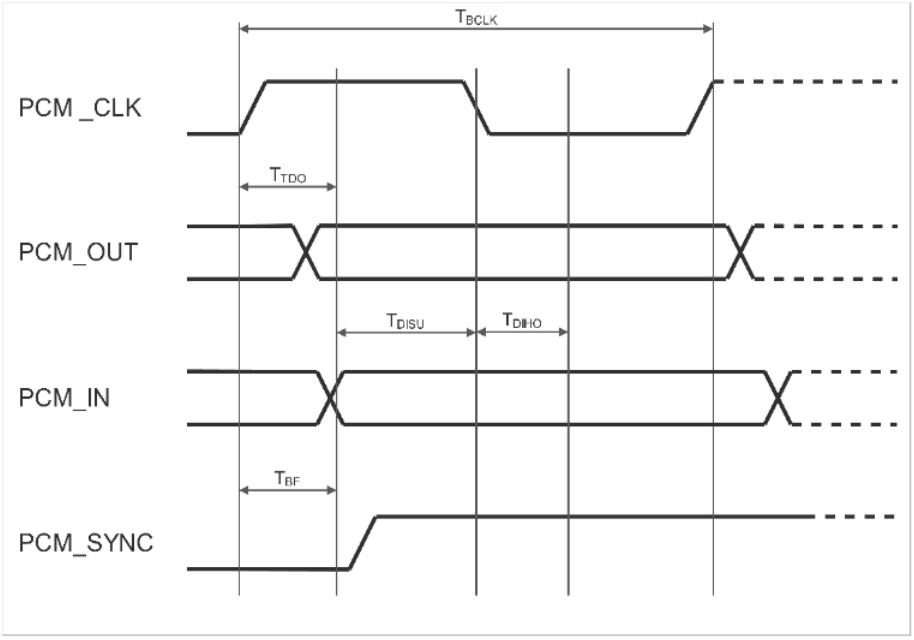

Figure 9: PCM timing specification – Central mode

Symbol	Parameter	Condition	Min.	Typ	Max.	Units
FBCLK	PCM clock frequency	-	-	2/2.048	-	MHz
Duty Cycle$_{BCLK}$	-		0.4	0.5	0.6	-
$T_{BCLK\ rise/fall}$	-	-	-	3	-	ns
T_{DO}	-	-	-	-	15	ns
T_{DISU}	-	-	20	-	-	ns
T_{DIHO}	-	-	15	-	-	ns
T_{BF}	-	-	-	-	15	ns

Table 13: PCM timing specification – Central mode

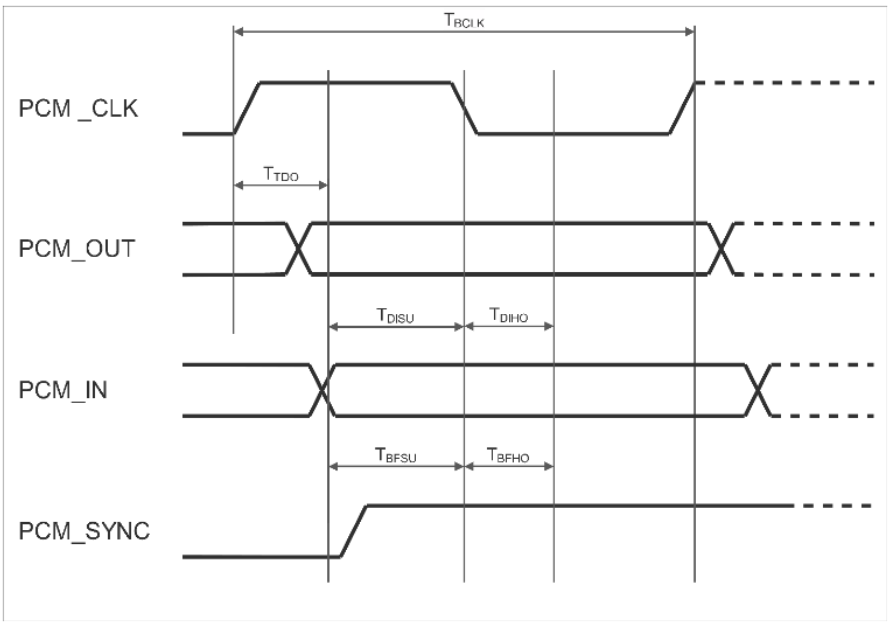

Figure 10: PCM timing specification – Peripheral mode

Symbol	Parameter	Condition	Min.	Typ	Max.	Units
FBCLK	PCM clock frequency	-	0.512	2/2.048	4	MHz
Duty Cycle$_{BCLK}$	-		0.4	0.5	0.6	-
$T_{BCLK\ rise/fall}$	-	-	-	3	-	ns
T_{DO}	-	-	-	-	30	ns
T_{DISU}	-	-	15	-	-	ns
T_{DIHO}	-	-	10	-	-	ns
T_{BFSU}	-	-	15	-	-	ns
T_{BFHO}	-	-	10	-	-	ns

Table 14: PCM timing specification – Peripheral mode

3 Pin definition

3.1 Pin description

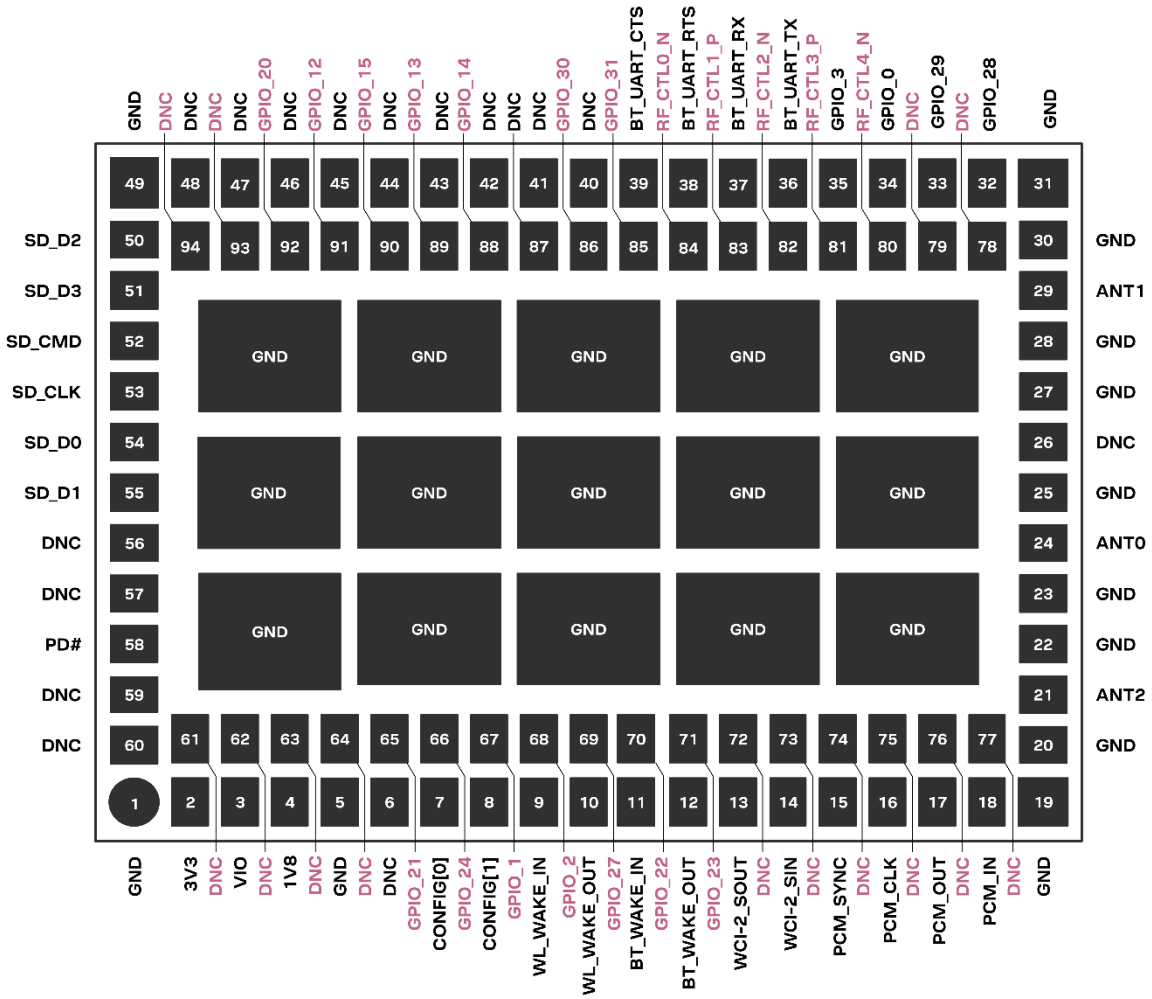

Figure 11: JODY-W5 pin assignment (top view)

No.	Name	Pin type[2]	Chipset pin	Description	Power domain
1	GND	GND		Ground	
2	3V3	PWR	47, 48 AVDD33	3.3 V analog power supply	3V3
3	VIO	PWR		VIO supply (1.8 V or 3.3 V)	VIO
4	1V8	PWR	22-28, 33, 35, 39, 41, 43, 49, 53, 61-63, 65-68, 71	1.8 V analog power supply	1V8
5	GND	GND		Ground	
6	DNC		DNC	Reserved for CONFIG[2]	
7	CONFIG[0]	I	CONFIG_HOST_BOOT[0]	Firmware boot options. See also Configuration pins.	1V8

[2] I/O notations: I=Input, O=Output, I/O=Input or Output, OD=Open Drain, NC=Not Connected, DNC=Do not connect, PWR=Power, GND=Ground, RF=Radio i/f

No.	Name	Pin type[2]	Chipset pin	Description	Power domain
8	CONFIG[1]	I	CONFIG_HOST_BOOT[1]	Firmware boot options. See also Configuration pins.	1V8
9	WL_WAKE_IN	I/O	WL_WAKE_IN / GPIO[16]	Multi-functional pin: • WiFi radio wake-up input signal • GPIO [16]	VIO
10	WL_WAKE_OUT	I/O	WL_WAKE_OUT / GPIO[17]	Multi-functional pin: • WiFi radio wake-up output signal • GPIO [17]	VIO
11	BT_WAKE_IN	I/O	BT_WAKE_IN / GPIO[18]	Multi-functional pin: Bluetooth radio wake-up input signal GPIO [18]	VIO
12	BT_WAKE_OUT	I/O	BT_WAKE_OUT / GPIO[19]	Multi-functional pin: • Bluetooth radio wake-up output signal • GPIO [19]	VIO
13	WCI-2_SOUT	I/O	WCI-2_SOUT / GPIO[26]	Multi-functional pin: • WCI-2 Transmit signal to external radio (output) • GPIO[26]	VIO
14	WCI-2_SIN	I/O	WCI-2_SIN / GPIO[25]	Multi-functional pin: • WCI-2 Transmit signal to external radio (input) • GPIO[25]	VIO
15	PCM_SYNC	I/O	GPIO[7] / PCM_SYNC/ I2S_LRCLK	Multi-functional pin: • GPIO • PCM sync can be output (central) or input (peripheral mode) • I2S word select / left-right clock can be output (central) or input (peripheral mode).	VIO
16	PCM_CLK	I/O	GPIO[4] / PCM_CLK / I2S_BCLK	Multi-functional pin: • GPIO • PCM clock can be output (central) or input (peripheral mode) • I2S bit clock can be output (central) or input (peripheral mode)	VIO
17	PCM_OUT	I/O	GPIO[5] / PCM_DOUT / I2S_DOUT	Multi-functional pin: • GPIO • PCM data output • I2S data output	VIO
18	PCM_IN	I/O	GPIO[6] / PCM_DIN / I2S_DIN	Multi-functional pin: • GPIO • PCM data input • I2S data input	VIO
19	GND	GND		Ground	
20	GND	GND		Ground	
21	DNC		DNC	Do Not Connect. RF pin.	
22	GND	GND		Ground	
23	GND	GND		Ground	
24	ANT0	I/O, RF		RF pin: • JODY-W562-xxA: Bluetooth	
25	GND	GND		Ground	
26	DNC		DNC	Do not connect	

No.	Name	Pin type[2]	Chipset pin	Description	Power domain
27	GND	GND		Ground	
28	GND	GND		Ground	
29	ANT1	I/O, RF		RF pin: • JODY-W562-xxA: Wi-Fi 2 +5	
30	GND	GND		Ground	
31	GND	GND		Ground	
32	GPIO_28	I/0	GPIO[28] / JTAG_TCK	Multi-functional pin: • GPIO • JTAG test data clock (input)	VIO
33	GPIO_29	I/0	GPIO[29] / JTAG_TMS	Multi-functional pin: • GPIO • JTAG controller select (input)	VIO
34	GPIO_0	I/0	GPIO[0]/ XOSC_EN	Multi-functional pin: • GPIO • Oscillator enable (output)	VIO
35	GPIO_3	I/0	GPIO[3] / PCM_MCLK/ I2S_CCLK	Multi-functional pin: • GPIO • PCM main clock (output) (optional) • I2S CCLK (output) (optional)	VIO
36	BT_UART_TX	I/O	GPIO[11] / UART_TX	Multi-functional pin: • GPIO • UART serial data output	VIO
37	BT_UART_RX	I/O	GPIO[10] / UART_RX	Multi-functional pin: • GPIO • UART serial data input (active high)	VIO
38	BT_UART_RTS	I/O	GPIO[9] / UART_RTS	Multi-functional pin: • GPIO • UART active-low request-to-send signal	VIO
39	BT_UART_CTS	I/O	GPIO[8] / UART_CTS	Multi-functional pin: • GPIO • UART active-high clear-to-send signal (active high)	VIO
40	DNC		DNC	Do Not Connect.	
41	DNC		DNC	Do Not Connect.	
42	DNC		DNC	Do Not Connect.	
43	DNC		DNC	Do Not Connect.	
44	DNC		DNC	Do Not Connect.	
45	DNC		DNC	Do Not Connect.	
46	DNC		DNC	Do Not Connect.	
47	DNC		DNC	Do Not Connect.	
48	DNC		DNC	Do Not Connect.	
49	GND	GND		Ground	
50	SD_D2	I/O	SD_DAT[2]	SDIO data line bit [2]	1V8
51	SD_D3	I/O	SD_DAT[3]	SDIO data line bit [3]	1V8
52	SD_CMD	I/O	SD_CMD	SDIO command line	1V8
53	SD_CLK	I	SD_CLK	SDIO clock input	1V8
54	SD_D0	I/O	SD_DAT[0]	SDIO data line bit [0]	1V8
55	SD_D1	I/O	SD_DAT[1]	SDIO data line bit [1]	1V8
56	DNC	DNC		Do not connect	

No.	Name	Pin type[2]	Chipset pin	Description	Power domain
57	DNC	DNC		Do not connect	
58	PD#	I	PDn	Power-down interface of the chipset: • 0 = power-down mode • 1 = normal mode Can accept an input of 1.8 V to 4.5 V. Internal 51 kΩ pull-up to 1V8 on this pin.	1V8
59-64	DNC	DNC		Do not connect	
65	GPIO_21	I/O	GPIO[21] / SD_INT	Multi-functional pin: • GPIO • SDIO interrupt signal (output)	VIO
66	GPIO_24	I/O	GPIO[24]	GPIO	VIO
67	GPIO_1	I/O	GPIO[1] / IND_RST_WL	Multi-functional pin: • GPIO • Independent software reset for WiFi	VIO
68	GPIO_2	I/O	GPIO[2] / IND_RST_BT	Multi-functional pin: • GPIO • Independent software reset for Bluetooth	VIO
69	GPIO_27	I/O	GPIO[27]	GPIO	VIO
70	GPIO_22	I/O	GPIO[22]	GPIO	VIO
71	GPIO_23	I/O	GPIO[23]	GPIO	VIO
72	DNC	DNC		Do not connect	
73	DNC	DNC		Do not connect	
74	DNC	DNC		Do not connect	
75	DNC	DNC		Do not connect	
76	DNC	DNC		Do not connect	
77	DNC	DNC		Do not connect	
78	DNC	DNC		Do not connect	
79	DNC	DNC		Do not connect	
80	RF_CNTL4_N	I/O	RF_CNTL4_N	RF control input/output	VIO
81	RF_CNTL3_P	I/O	RF_CNTL3_P / CONFIG_XOSC_SEL	RF control input/output	VIO
82	RF_CNTL2_N	O	RF_CNTL2_N	RF control output low	VIO
83	RF_CNTL1_P	O	RF_CNTL1_P	RF control output high	VIO
84	RF_CNTL0_N	O	RF_CNTL0_N	RF control output low	VIO
85	GPIO_31	I/O	GPIO[31] / JTAG_TDO	Multi-functional pin: • GPIO • JTAG test data signal (output)	VIO
86	GPIO_30	I/O	GPIO[30] / JTAG_TDI	Multi-functional pin: • GPIO • JTAG test data signal (input).	VIO
87	DNC	DNC		Do not connect	
88	GPIO_14	I/O	GPIO[14] / EXT_GNT	Multi-functional pin: • GPIO • PTA external radio grant signal (output)	VIO
89	GPIO_13	I/O	GPIO[13] / EXT_REQ	Multi-functional pin: • GPIO • PTA request from the external radio (input)	VIO

No.	Name	Pin type[2]	Chipset pin	Description	Power domain
90	GPIO_15	I/O	GPIO[15] / EXT_PRI	Multi-functional pin: • GPIO • PTA external radio priority signal (input)	VIO
91	GPIO_12	I/O	GPIO[12] / EXT_STATE	Multi-functional pin: • GPIO • PTA External radio state input signal.	VIO
92	GPIO_20	I/O	GPIO[20] / EXT_FRQ	Multi-functional pin: • GPIO • PTA external radio frequency signal (input)	VIO
93	DNC		DNC	Do not connect	
94	DNC		DNC	Do not connect	
EP	GND	GND	Exposed die pad	15 exposed ground/thermal pins. Connect to ground.	

Table 15: JODY-W5 series pin description

4 Electrical specifications

⚠ Stressing the device above one or more of the Absolute maximum ratings can cause permanent damage. These are stress ratings only. Operating the module at these or at any conditions other than those specified in the Operating conditions should be avoided. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

☞ All given application information is only advisory and does not form part of the specification.

4.1 Absolute maximum ratings

Symbol	Description	Min.	Max.	Units
3V3	Power supply voltage	-	3.96	V
VIO	I/O supply voltage 1.8 V	-	2.16	V
	I/O supply voltage 3.3 V		3.96	V
1V8	Analog power supply voltage 1.8 V	-	2.16	V
$T_{STORAGE}$	Storage temperature JODY-W562-xxA	-55	+125	°C

Table 16: Absolute maximum ratings

⚠ The product is not protected against overvoltage or reversed voltages. Voltage spikes exceeding the power supply voltage specification described in Table 16 must be limited to values within the specified boundaries by using appropriate protection devices.

4.2 Maximum ESD ratings

Applicability	Min.	Max.	Units
Human Body Model (HBM), according to AEC-Q100-002	-2000	+2000	V
Charged Device Model (CDM), all pins according to AEC-Q100-011	-500	+500	V

Table 17: Maximum ESD ratings

4.3 Operating conditions

Symbol	Parameter	Min.	Typ.	Max.	Units
3V3	Power supply voltage	3.14	3.3	3.46	V
VIO	I/O supply voltage 1.8 V	1.71	1.8	1.89	V
	I/O supply voltage 3.3 V	3.14	3.3	3.46	V
1V8	Analog power supply voltage 1.8 V	1.72	1.8	1.89	V
T_A	Ambient operating temperature JODY-W562-00A	-40	-	+85	°C
Ripple Noise	Peak-to-peak voltage ripple on all supply lines	-	-	10	mV

Table 18: Operating conditions

4.4 Wi-Fi power consumption

Peak current condition	Temperature	VBAT (3.3 V) [mA]	1V8 (1.8 V) [mA]
11ax, 5 GHz, 80 MHz, MCS11 receive + 21dBm Bluetooth LE transmit at 85 °C	Room temperature	0.2	644
5 GHz digital predistortion (DPD) + Bluetooth LE transmit at 21 dBm	85 °C	368	900
Firmware Initialization	Room temperature	368	497

Table 19: Peak current consumption

⚠ The given values are not measured but are extracted from the AW611 chipset datasheet.

Wi-Fi operation modes	VBAT (3.3 V) [mA]	1V8 (1.8 V) [mA]	VIO (3.3 V) [mA]
Power – save modes			
Power down	0.03	0.86	0.07
BT only sleep mode	0.03	1.04	0.2
Wi-Fi only sleep mode	0.03	1.96	0.12
Wi-Fi and Bluetooth in deep-sleep	0.03	0.62	0.27
IEEE Power Save 2.4G, DTIM 10	0.03	1.91	0.22
IEEE Power Save 2.4G, DTIM 5	0.03	1.91	0.22
IEEE Power Save 2.4G, DTIM 3	0.03	1.92	0.22
IEEE Power Save 2.4G, DTIM 1	0.03	1.92	0.23
IEEE Power Save 5G, DTIM 10	0.03	1.9	0.22
IEEE Power Save 5G, DTIM 5	0.03	1.91	0.22
IEEE Power Save 5G, DTIM 3	0.03	1.92	0.23
IEEE Power Save 5G, DTIM 1	0.03	1.9	0.22
Active transmit modes (Bluetooth off)	VBAT (3.3 V) [mA]	1V8 (1.8 V) [mA]	VIO (1.8 V) [mA]
2.4GHz CCK 11Mbps, BW20, Ch6, 20 dBm	246	149	0.07
2.4GHz, 11g, 54Mbps, BW20, Ch6, 19dBm	202	155	0.07
2.4GHz, 11n, MCS7, HT20, Ch6, 18 dBm	187	155	0.07
2.4GHz, 11n, MCS7, HT40, Ch6, 18 dBm	181	159	0.07
2.4GHz, 11ax, MCS0, VHT20, Ch6, 20 dBm	244	178	0.07
2.4GHz, 11ax, MCS11, VHT20, Ch6, 15 dBm	154	153	0.07
2.4GHz, 11ax, MCS0, VHT40, Ch6, 20 dBm	249	186	0.07
2.4GHz, 11ax, MCS11, VHT40, Ch6, 15 dBm	149	158	0.07
5GHz, 11n, MCS0, HT20, Ch100, 19 dBm	287	238	0.07
5GHz, 11n, MCS7, HT20, Ch100, 18 dBm	243	208	0.07
5GHz, 11ax, MCS0, VHT20, Ch100, 19 dBm	294	241	0.07
5GHz, 11ax, MCS11, VHT20, Ch100, 15 dBm	188	206	0.07
5GHz, 11ax, MCS0, VHT40, Ch102, 19 dBm	281	261	0.07
5GHz, 11ax, MCS11, VHT40, Ch102, 14 dBm	169	212	0.07
5GHz, 11ax, MCS0, VHT80, Ch106, 19dBm	288	264	0.07
5GHz, 11ax, MCS11, VHT80, Ch106, 14dBm	168	218	0.07

Wi-Fi operation modes	VBAT (3.3 V) [mA]	1V8 (1.8 V) [mA]	VIO (3.3 V) [mA]
Receive modes (Bluetooth off)			
2.4GHz, 11b, 11 Mbps, BW20	0.12	100	TBD
2.4GHz, 11g, 54 Mbps, BW20	0.12	118	TBD
2.4GHz, 11n, MCS7, BW20	0.12	123	TBD
2.4GHz, 11n, MCS7, BW40	0.12	138	TBD
2.4GHz, 11ax, MCS11, BW20	0.12	125	TBD
2.4GHz, 11ax, MCS11, BW40	0.12	140	TBD
5GHz, 11a, 54 Mbps, BW20	0.12	132	TBD
5 GHz, 802.11n, 20 MHz, MCS7	0.12	136	TBD
5 GHz, 802.11n, 40 MHz, MCS7	0.12	150	TBD
Wi-Fi operation modes	**VBAT (3.3 V) [mA]**	**1V8 (1.8 V) [mA]**	**VIO (1.8 V) [mA]**
5 GHz, 802.11ac, 20 MHz, MCS8	0.12	137	TBD
5 GHz, 802.11ac, 40 MHz, MCS9	0.12	151	TBD
5 GHz, 802.11ac, 80 MHz, MCS9	0.12	180	TBD
5 GHz, 802.11ax, 20 MHz, MCS11	0.12	141	TBD
5 GHz, 802.11ax, 40 MHz, MCS11	0.12	153	TBD
5 GHz, 802.11ax, 80 MHz, MCS11	0.12	181	TBD

Table 20: Wi-Fi radio typical current consumption with different modes of operation

⚠ The given Wi-Fi current consumption values in the receive modes are not measured but extracted from the AW611 chipset datasheet.

4.5 Bluetooth power consumption

Bluetooth operation modes	VBAT (3.3 V) [mA]	1V8 (1.8 V) [mA]	VIO (1.8 V) [mA]
Operating modes			
Bluetooth alone (SDIO not connected)	TBD	TBD	TBD
Bluetooth classic inquiry scan	TBD	TBD	TBD
Bluetooth classic page scan	TBD	TBD	TBD
Bluetooth LE advertisement	TBD	TBD	TBD
Bluetooth LE scanning	TBD	TBD	TBD
Active transmit mode			
Bluetooth classic DH3, 4 dBm	0.22	172	0.06
Bluetooth classic DH3, 20 dBm	0.22	344	0.06
EDR, 4dBm, 3Mbps	0.22	148	0.06
EDR, 10dBm, 3Mbps	0.22	148	0.06
BLE, 4dBm, 1Mbps	0.22	165	0.06
BLE, 19dBm, 1Mbps	0.22	289	0.06
Active receive mode			
BDR peak receive, DH5, 1 Mbps	TBD	TBD	TBD

Table 21: Bluetooth radio typical current consumption with different operating modes

4.6 Digital pad ratings

Symbol	Parameter	VIO	Min.	Max.	Units
V_{IH}	Input high voltage	1.8 V - 3.3 V	0.7*VIO	VIO+0.4	V
V_{IL}	Input low voltage	1.8 V - 3.3 V	-0.4	0.3*VIO	V
V_{HYS}	Input hysteresis	1.8 V - 3.3 V	100	-	mV
V_{OH}	Output high voltage	1.8 V - 3.3 V	VIO-0.4	-	V
V_{OL}	Output low voltage	1.8 V - 3.3 V	-	0.4	V

Table 22: DC characteristics VIO

4.7 Power-down specifications

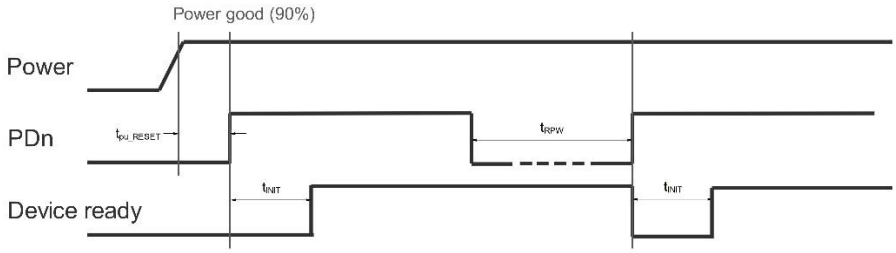

Figure 12: JODY-W5 PDn (power-down) timing

Symbol	Parameter	Min.	Max.	Units
t_{PU_RESET}	Valid power to PDn deasserted	0	--	ms
t_{RPW}	PDn pulse width	1	--	µs
V_{IH}	Input high voltage	1.4	4.5	V
V_{IL}	Input low voltage	-0.4	0.5	V

Table 23: PDn pin specification

4.8 Radio specifications

4.8.1 Bluetooth

Parameter	Specification
RF Frequency Range	2.4 – 2.5 GHz
Supported Modes	Bluetooth 5.4
Number of channels	79 (BDR/EDR)
	40 (LE)
Modulation	1 Mbps: GFSK (BDR) 2 Mbps: π/4 DQPSK (EDR) 3 Mbps: 8DQPSK (EDR)
Transmit Power (JW562-00A/01A)	Class 1 BDR: 18 dBm
	Class 1 EDR: 8 dBm
	Class 1 BLE: 16 dBm
Receiver sensitivity (JW562-00A/01A)	BDR -94.6 dBm ± 1.5 dB (1DH1)
	EDR -93.5 dBm ± 1.5 dB (2DH1)
	BLE -105.9 dBm ± 1.5 dB (125k)

Table 24: Bluetooth radio parameters

⚠ Note: The BT TX output power and RX sensitivity for JODY-W562-21A should be reduced by 2 dB

4.8.2 Wi-Fi

Parameter	Operation mode	Specification
RF Frequency range	802.11b/g/n	2.400 – 2.500 GHz
	802.11a/n/ac/ax	4.900 – 5.925 GHz
Modulation	802.11b	CCK and DSSS
	802.11a/g/n/ac/ax	OFDM/OFDMA
Supported data rates	802.11b	1/2/5.5/11 Mbps
	802.11a/g	6/9/12/18/24/36/48/54 Mbps
	802.11n SISO	MCS0 - MCS7 (150 Mbps)
	802.11ac SISO	MCS0 – MCS9 (433 Mbps)
	802.11ax SISO	MCS0 – MCS11 (600 Mbps)
Supported channel bandwidth	802.11n	20/40 MHz
	802.11ac	20/40/80 MHz
	802.11ax	20/40/80 MHz
Supported guard interval (GI)	802.11n	400/800 ns
	802.11ac	Short guard interval supported
	802.11ax	800/1600/3200 ns

Table 25: Wi-Fi radio features and specifications

Parameter	Frequency	Operation mode	802.11 EVM limit	Output power (output power tolerance ±2 dB (typ))
Maximum transmit power	2.4 GHz	DSSS/CCK, 20 MHz	-9 dB	19 dBm
		MCS7, 64-QAM, 20 MHz	-27 dB	18 dBm
		MCS8, 256-QAM, 20 MHz	-30 dB	17 dBm
		MCS11, 1024-QAM, 20 MHz	-35 dB	16 dBm
		MCS7, 64-QAM, 40 MHz	-27 dB	17 dBm
		MCS9, 256-QAM, 40 MHz	-32 dB	17 dBm
		MCS11, 1024-QAM, 40 MHz	-35 dB	16 dBm
	5 GHz	MCS7, 64-QAM, 20 MHz	-27 dB	17 dBm
		MCS8, 256-QAM, 20 MHz	-30 dB	16 dBm
		MCS11, 1024-QAM, 20 MHz	-35 dB	14 dBm
		MCS7, 64-QAM, 40 MHz	-27 dB	16 dBm
		MCS9, 256-QAM, 40 MHz	-30 dB	14 dBm
		MCS11, 1024-QAM, 40 MHz	-35 dB	12 dBm
		MCS7, 64-QAM, 80 MHz	-27 dB	14 dBm
		MCS9, 256-QAM, 80 MHz	-30 dB	13 dBm
		MCS11, 1024-QAM, 80 MHz	-35 dB	11 dBm
JODY-W5 series modules support dual-band Wi-Fi with 802.11b/g/n/a/ac/ax operation in the 2.4 GHz and 5 GHz radio bands.				

Table 26: Wi-Fi Radio maximum transmit power parameter

⚠ Note 1: The output power tolerance ±2 dB (typ) is given for temperature range -40 to 85 °C. The output power tolerance in temperature range -40 to +105 °C is ±3 dB (typ)

⚠ Note 2: The output power in 2.4 GHz range for JODY-W562-21A is 2 dB less compared to that of JODY-W562-00A/01A.

Band	Operating mode	Data rate	Bandwidth	Sensitivity [dBm]
2.4 GHz	802.11b	1 Mbps	20 MHz	-97.8
		11 Mbps		-89.9
	802.11g	6 Mbps		-93.2
		54 Mbps		-76.5
	802.11n	MCS0		-92.5
		MCS7		-73.7
	802.11ax	MCS0		-93.1
		MCS9		-70.3
		MCS11		-64.2
	802.11n	MCS0	40 MHz	-89.4
		MCS7		-71.3
	802.11ax	MCS0		-90.2
		MCS9		-68
		MCS11		-61.5
5 GHz	802.11a	6 Mbps	20 MHz	-91.3
		54 Mbps		-74.6
	802.11ac	MCS0	20 MHz	-90.6
		MCS7		-72.6
		MCS0	40 MHz	-87.6
		MCS8		-65.9
		MCS9		-64.4
		MCS0	80 MHz	-83.7
		MCS8		-62.7
		MCS9		-61
	802.11ax	MCS0	20 MHz	-91.4
		MCS9		-68.3
		MCS11		-62.2
		MCS0	40 MHz	-88.2
		MCS9		-67.3
		MCS11		-62.8
		MCS0	80 MHz	-84.8
		MCS9		-63.3
		MCS11		-57.9

Table 27: Wi-Fi radio sensitivity

⚠ Note: The RX sensitivity in 2.4 GHz range for JODY-W562-21A is 2 dB less compared to that for JODY-W562-00A/01A

5 Software

JODY-W5 series modules are based on the NXP AW611 chipset and the drivers and firmware required to operate JODY-W5 series modules are developed by NXP. A firmware binary is downloaded by the host operating system driver at start-up.

The modules support the following software options:

- Open-source Linux/Android driver (`mxm_mwifiex`) for mainstream use is available free of charge and already integrated into the Linux BSP for NXP i.MX application processors
- Proprietary Linux/Android drivers providing different feature packs
- MCUXpresso Wi-Fi/Bluetooth support for supported NXP MCUs

The software packages typically include:

- Dedicated kernel driver that binds the Wi-Fi device to the kernel. Driver sources are provided.
- Dedicated Wi-Fi firmware image that is uploaded during initialization of the Wi-Fi device.
- Dedicated Bluetooth firmware image that is uploaded during initialization of the Bluetooth device.
- Laboratory and manufacturing tools.

6 Mechanical specifications

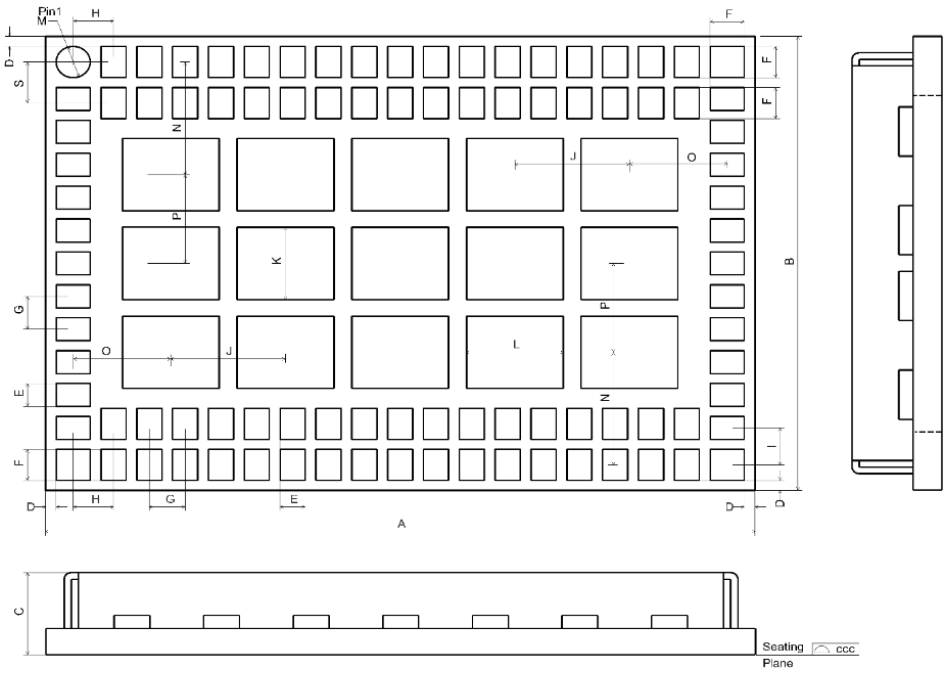

Figure 13: JODY-W5 series dimensions (bottom view)

Parameter	Description	Typical		Tolerance	
A	Module length [mm]	19.8	(779.5 mil)	+0.35/-0.1	(+13.8/-3.9 mil)
B	Module width [mm]	13.8	(543.3 mil)	+0.2/-0.2	(+7.9/-7.9 mil)
C	Module thickness [mm]	2.5	(98.4 mil)	+0.2/-0.2	(+7.9/-7.9 mil)
ccc	Seating plane coplanarity [mm]	<0.1	(3.94 mil)		
D	PCB edge-to-pin Edge [mm]	0.3	(11.8 mil)	+0.20/-0.20	(+7.9/-7.9 mil)
E	Pin width [mm]	0.7	(27.6 mil)	+0.05/-0.05	(+2.0/-2.0 mil)
F	Pin length [mm]	0.95	(37.4 mil)	+0.05/-0.05	(+2.0/-2.0 mil)
G	Pin to pin pitch [mm]	1.0	(39.4 mil)	+0.02/-0.02	(+0.8/-0.8 mil)
H	Horizontal corner pin-to-pin pitch [mm]	1.125	(44.3 mil)	+0.02/-0.02	(+0.8/-0.8 mil)
I	Lateral corner pin-to-pin pitch [mm]	1.125	(44.3 mil)	+0.02/-0.02	(+0.8/-0.8 mil)
J	Horizontal thermal pads pitch [mm]	3.2	(126.0 mil)	+0.02/-0.02	(+0.8/-0.8 mil)
K	Thermal pad height [mm]	2.2	(86 6 mil)	+0.1/-0.1	(+3.9/-3.9 mil)
L	Thermal pad length [mm]	2.7	(106.3 mil)	+0.1/-0.1	(+3.9/-3.9 mil)
M	Pin 1 diameter [mm]	0.95	(37.4 mil)	+0.05/-0.05	(+2.0/-2.0 mil)
N	Horizontal pin-to-thermal pad pitch [mm]	3.425	(134.8 mil)	+0.02/-0.02	(+0.8/-0.8 mil)
O	Lateral pin-to-thermal pad distance [mm]	2.725	(107.3 mil)	+0.02/-0.02	(+0.8/-0.8 mil)
P	Lateral thermal pads pitch [mm]	2.7	(106.3 mil)	+0.02/-0.02	(+0.8/-0.8 mil)
R	Reserved area for future module variants	1.55	(61.0 mil)	+0.05/-0.05	(+2.0/-2.0 mil)
S	Horizontal pins row pitch [mm]	1.25	(49.2 mil)	+0.02/-0.02	(+0.8/-0.8 mil)

Table 28: Description of mechanical parameters

6.1 Module weight

Module	Typ	Unit
JODY-W562-A	1.4	g

Table 29: Module weight

7 Qualifications and approvals

7.1 Country approvals

Table 30 describes the status of JODY-W5 module certification in each country/region.

Country/region	JODY-W562-00A
Canada	Ongoing
Europe	Ongoing
Great Britain	Ongoing
USA	Ongoing

Table 30: Country approval status

Additional country certifications can be progressed upon request. Contact your local support team for further information.

☞ For detailed information about the regulatory requirements that must be met when using JODY-W5 modules in an end product, see the system integration manual [2].

7.2 Approved antennas

JODY-W5 is to be tested and approved for use with single- and dual-band antennas. For the list of antennas that are pre-approved for use with JODY-W5, see the system integration manual [2].

7.3 Bluetooth qualification

JODY-W5 is to be qualified for Bluetooth 5.4 "Controller Subsystem" operation and is listed as a qualified design (QD ID: **TBD**) with the Bluetooth Special Interest Group (SIG). This means that there is no need to do any further qualification if the module is combined with a host stack that is qualified for Bluetooth as a "Host Subsystem".

8 Product handling

8.1 Packaging

For efficient production, production lot set-up, and tear-down, JODY-W5 series modules are delivered as hermetically sealed devices on tape and reel. For more information about the packaging, shipment, storage, and handling of the modules, see the Product packaging reference guide [1].

8.1.1 Reels

JODY-W5 series modules are deliverable in quantities of 500 pieces on a reel. The modules are shipped on reel Type A4 reels, as described in the Product packaging reference guide [1].

8.1.2 Tapes

Figure 14 shows the position, dimensions, and orientation of the JODY-W5 modules as they are delivered on tape.

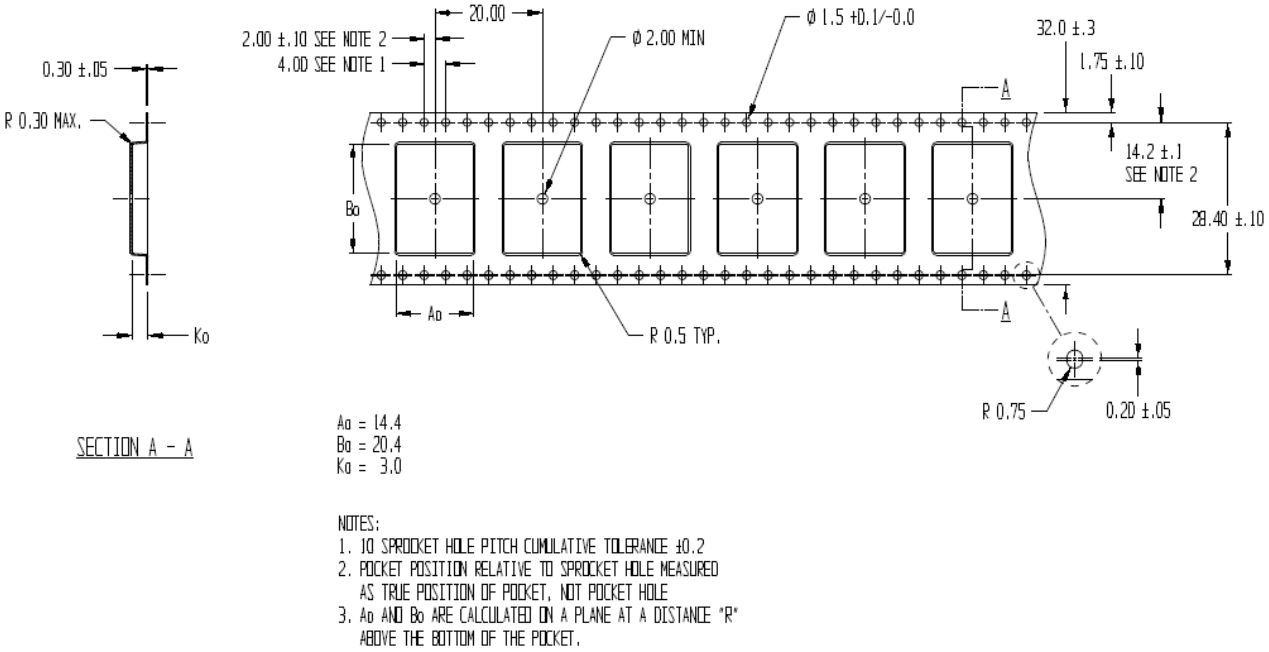

Figure 14: JODY-W5 tape dimensions

8.2 Shipment, storage, and handling

8.2.1 Moisture sensitivity levels

⚠ JODY-W5 series automotive-grade modules are rated at moisture sensitivity level 3. See moisture sensitive warning label on each shipping bag for detailed information.

After opening the dry pack, modules must be mounted within 168 hours in factory conditions of maximum 30 °C/60%RH. Otherwise, the module must be stored at less than 10%RH. Modules require baking if the humidity indicator card shows more than 10% when read at 23±5 °C or if the conditions mentioned above are not met. For information about the bake procedure, see also the J-STD-033B standard.

For more information regarding MSL (Moisture Sensitivity Level), labeling, and storage, see also the Product packaging reference guide [1].

8.2.2 Mounting process and soldering recommendations

JODY-W5 series modules are approved for two reflow cycles.

⚠ Reflow soldering profiles must be selected in accordance with u-blox soldering recommendations described in the system integration manual [2]. Failure to observe these recommendations can result in severe damage to the product.

8.2.3 ESD handling precautions

⚠ JODY-W5 series modules are Electrostatic Sensitive Devices that demand the observance of special handling precautions against electrostatic damage. Failure to observe these precautions can result in severe damage to the product.

Proper ESD handling and packaging procedures must be applied throughout the processing, handling, and operation of any application that incorporates JODY-W5 series modules. ESD precautions should be implemented on the application board where the module is mounted.

For further information about the handling of JODY-W5 series modules, see also the JODY-W5 system integration manual [2].

9 Labeling and ordering information

9.1 Product labeling

The labels applied to JODY-W5 series modules include important product information, including the data matrix code that incorporates the module serial number.

Figure 15 shows the label applied to JODY-W5 series modules. Each of the given label references are described in Table 31.

Figure 15: JODY-W5 series sample label

Detailed descriptions of the label components are shown in Table 31.

Reference	Description
1	Product (model) name: Type number with the product version.
2	Minor product version
3	Date of production encoded YY/WW (year/week)
4	FCC/ISED ID with which the module has been listed (TBC, when available)
5	Data Matrix with unique serial number comprising 19 alphanumeric symbols: - The first 3 symbols are used for production tracking and are an abbreviated representation of the Type number that is unique to each module variant. - The following 12 symbols represent the unique hexadecimal Bluetooth address of the module AABBCCDDEEFF, and The last 4 symbols represent the hardware and firmware version encoded HHFF.
6	u-blox logo. The red dot above the logo represents the physical location of pin 1.

Table 31: JODY-W5 series label references

9.2 Product identifiers

Table 32: Product code formats

describes the three product identifiers, namely the Type number, Model name and Ordering code.

Format	Description	Nomenclature
Model name	Describes the form factor, platform technology and platform variant. Used mostly in product documentation like this data sheet, the model name represents the most common identity for all u-blox products	PPPP-TGVV
Ordering code	Comprises the model name – with additional identifiers to describe the major product version and quality grade	PPPP-TGVV-TTQ
Type number	Comprises the model name and ordering code – with additional identifiers to describe minor product versions.	PPPP -TGVV-TTQ-XX

Table 32: Product code formats

Table 33 describes the identification codes associated with each module variant.

Code	Description	Example
PPPP	Form factor	JODY
TG	Platform T – Dominant technology, For example, W: Wi-Fi, B: Bluetooth G - Generation	W5
VV	Variant based on the same platform; range [00...99]	64
TT	Major product version	00
Q	Quality grade A: Automotive B: Professional C: Standard	A
XX	Minor product version (not relevant for certification)	00

Table 33: Part identification codes

9.3 Ordering codes

Ordering code	Product name	Product
JODY-W562-00A	JODY-W562-00A	Automotive grade module based on NXP AW611 transceiver (automotive grade 3). Equipped with a single Wi-Fi antenna and one Bluetooth antenna, the module has an operational temperature of -40 ^{0}C to +85 ^{0}C.
JODY-W562-01A	JODY-W562-01A	Automotive grade module based on NXP AW611 transceiver (automotive grade 2). Equipped with a single Wi-Fi antenna and single Bluetooth antenna, the module has an operational temperature of -40 ^{0}C to +105 ^{0}C.
JODY-W562-21A	JODY-W562-21A	Automotive grade module based on NXP AW611 transceiver (automotive grade 2). Equipped with a single Wi-Fi antenna and single Bluetooth antenna, the module has an operational temperature of -40 ^{0}C to +105 ^{0}C and LTE filter for Wi-Fi 2.4GHz and for Bluetooth

Table 34: Product ordering codes

Appendix

A Glossary

Abbreviation	Definition
AC	Alternating Current
ACL	Asynchronous Connection-oriented Logical transport
BLE	Bluetooth Low Energy
CMD	Command
DC	Direct Current
DDR	Double Data Rate
ESD	Electrostatic Sensitive Devices
FCC	Federal Communications Commission
FIFO	First In, First Out
GI	Guard interval
GND	Ground
GPIO	General-purpose input/output
HD	High Definition
HCI	Host Controller Interface
ISED	Innovation, Science and Economic Development Canada
ISM	Industrial, scientific, and medical
LE	Bluetooth Low Energy
LTE	Long Term Evolution
LULA	Limited Use License Agreement
MAC	Medium Access Control
MIMO	Multiple Input Multiple Output
MWS	Mobile Wireless Standards
MSL	Moisture sensitivity level
NFC	Near-Field Communication
OEM	Original equipment manufacturer
P2P	Peer-to-peer
P2P (GC)	P2P Client
P2P (GO)	P2P Group Owner
PCB	Printed Circuit Board
PCI	Peripheral Component Interconnect
PCIe	PCI Express
PCN	Product Change Notification
PCM	Pulse-code modulation
POR	Power-on reset
RED	Radio Equipment Directive
RF	Radio Frequency
RSDB	Real Simultaneous Dual Band
RSS	Radio Standards Specification

Abbreviation	Definition
RH	Relative humidity
RoHS	Restriction of Hazardous Substances
SAR	Specific Absorption Rate
SCO	Synchronous Connection-Oriented
SDIO	Secure Digital Input Output
SDR	Single Data Rate
SISO	Single-input single-output
SMD	Surface-mount Device
STA	Station
TBD	To be defined
USB	Universal Serial Bus
UART	Universal Asynchronous Receiver/Transmitter
VSDB	Virtual Simultaneous Dual Band
WAPI	WLAN Authentication and Privacy Infrastructure
WLAN	Wireless Local Area Network
WPA	WiFi Protected Access

Table 35: Explanation of the abbreviations and terms used

Related documents

[1] Product packaging reference guide, UBX-14001652
[2] JODY-W5 series, system integration manual, UBX-23001477
[3] JODY-W5 product summary, UBX-23007124

☞ For product change notifications and regular updates of u-blox documentation, register on our website, www.u-blox.com.

Revision history

Revision	Date	Name	Comments
R01	28-Jun-2023	vbak	Initial release
R02	16-Feb-2024	vbak	Added JODY-W562-21A variant in Block diagram and Ordering codes. Current consumption updated in Wi-Fi power consumption and Bluetooth power consumption. Updated Radio specifications and Operating conditions. Added S dimension in Mechanical specifications.
R03	12-Apr-2024	dawa	Revised disclosure restriction status only.
R04	24-Jul-2024	vbak, frca, mzes	Added Module weight. Corrected description of WL_WAKE_OUT and BT_WAKE_OUT in Table 15. Updated Wi-Fi and Bluetooth current consumption data in Table 20 and Table 21.

Contact

u-blox AG

Address: Zürcherstrasse 68
8800 Thalwil
Switzerland

For further support and contact information, visit us at www.u-blox.com/support.