



SSW101B
Single-chip IEEE 802.11b/g/n 1T1R
Wireless Network Controller
with USB Interface

Product Brief Version 1.3



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REVISION HISTORY

Revision No.	Description	Date
1.0	<ul style="list-style-type: none">Initial release	12/21/2018
1.1	<ul style="list-style-type: none">Updated GPIO maximum current in DC Electrical Characteristics	05/05/2019
1.2	<ul style="list-style-type: none">Updated Block Diagram	10/14/2019
1.3	<ul style="list-style-type: none">Updated for clarity	11/20/2019

1. OVERVIEW

1.1. General Description

The SSW101B is a highly integrated Wi-Fi single chip which includes one spatial stream transmission, short guard interval (400ns GI), and transmission over 20MHz and 40MHz bandwidth. SSW101B fully supports all data rates of IEEE 802.11b, 802.11g, and 802.11n. SSW101B WLAN MAC supports 802.11e for multimedia applications, 802.11i security, and 802.11n for enhanced MAC protocol efficiency. Frame aggregation techniques such as A-MPDU are also supported for improving throughput performance. The SSW101B is designed to support standard based features in the areas of security, being fully compatible with WiFi- Alliance, WMM, WPS and P2P specifications, giving end users the greatest performance any time and in any circumstance.

1.2. Block Diagram

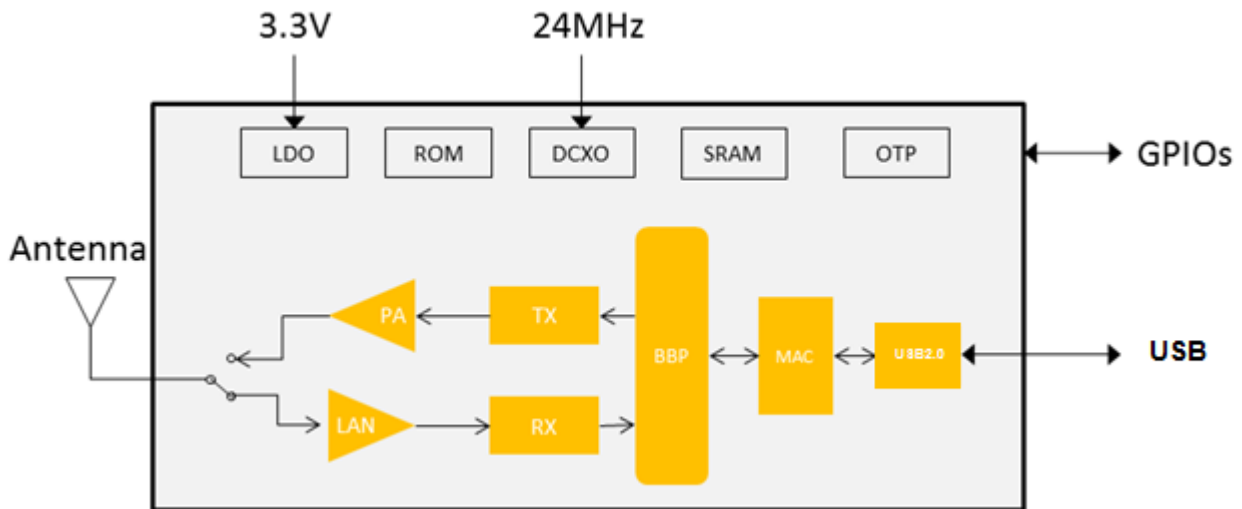


Figure 1: SSW101B Block Diagram

1.3. SSW101B Feature List

- IEEE 802.11 b/g/n/e/i/n/w client
- Embedded high-performance 32-bit RISC microprocessor speed up to 150MHz
- Highly integrated RF with 40nm CMOS technology
- WLAM MAC, a 1T1R capable WLAN baseband, and WLAN RF in a single chip
- Integrated PA, LNA, Balun and T/R switch
- Support A-MPDU transmit and receive for throughput improvement
- Support A-MSDU reception
- Support STBC stream reception
- Support Short-GI of 802.11n
- Supports both 20MHz and 40MHz bandwidth transmission
- 4x4mm², 28pin QFN package
- Security support Hardware Crypto Engine for Advanced Fast Security, Including WEP, TKIP, AES and 802.11w
- USB device interface speed up to 480Mbps
- Supports STA and AP mode
- Support 24.0MHz crystal as default with internal oscillator
- Auto-calibration

2. PIN INFORMATION

2.1. Pin Map

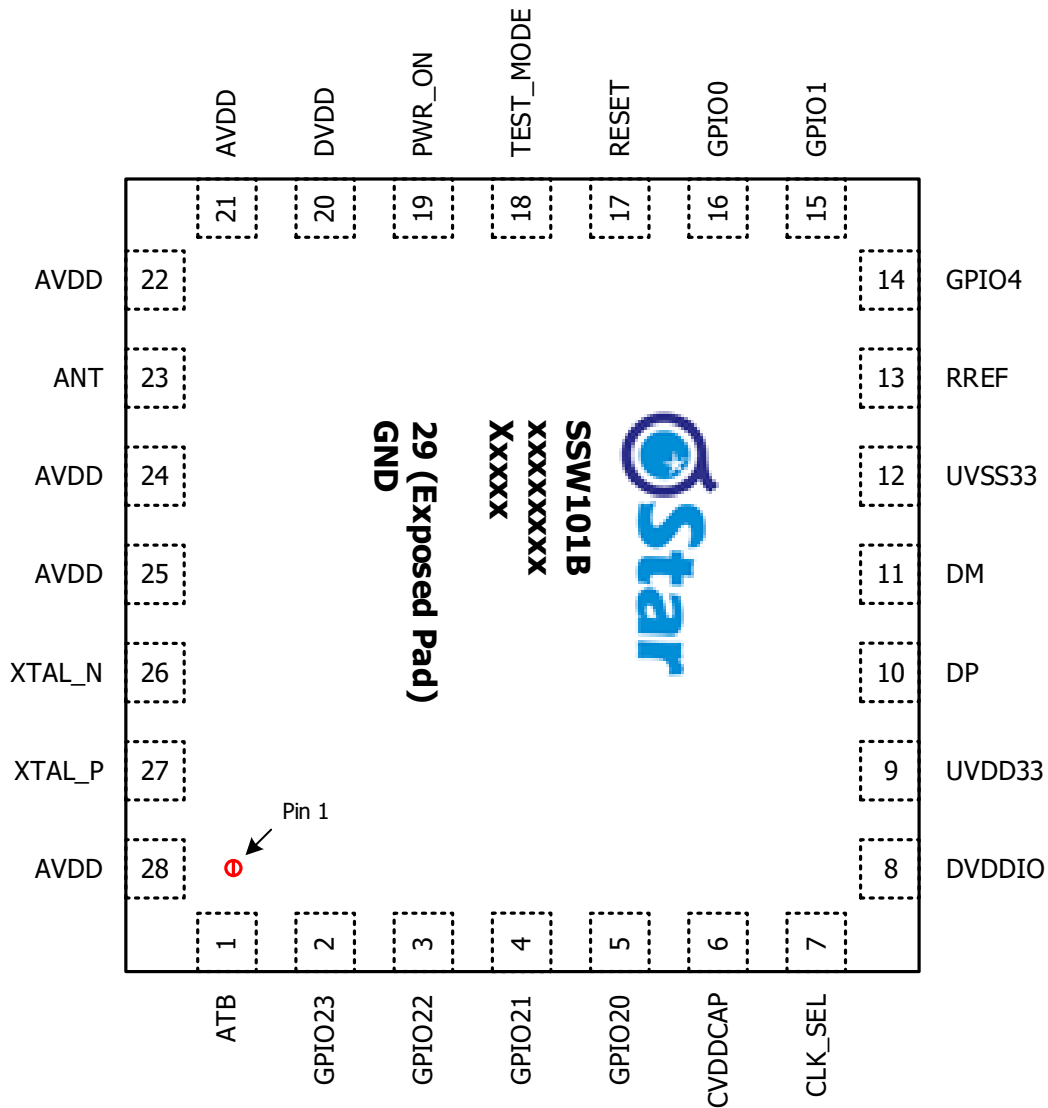


Figure 2: SSW101B Pin Map (Top View)

2.2. Pin Table

Pin Number	Pin Name	Type	Pin Description
Test			
1	ATB	Output	test pin
18	TEST_MODE	Input	Test mode selection, let it floating in normal mode.
USB interface			
10	DP	I/O	USB2.0 DP
11	DM	I/O	USB2.0 DM
13	RREF	Output	Bias resistor for USB block Requirement: 12kohm ($\pm 1\%$)
Power supply			
6	CVDDCAP	PWR	VDD1.1V for digital core. It is only connected with decouple capacitance. Digital core power is supplied by LDO on chip to reduce power source for BOM cost reduction.
8	DVDDIO	PWR	VDD 3.3V for digital IO
9	UVDD33	PWR	VDD 3.3V for USB transceiver
20	DVDD	PWR	VDD 3.3V for digital
21	AVDD	PWR	VDD 3.3V for analog
22	AVDD	PWR	VDD 3.3V for analog
24	AVDD	PWR	VDD 3.3V for analog
25	AVDD	PWR	VDD 3.3V for analog
28	AVDD	PWR	VDD 3.3V for analog
GPIO			
2	GPIO23	I/O	UART[2] RTS/; SPI[2] CS; I2C[2] SCL; GPIO; PWM
3	GPIO22	I/O	UART[2] CTS/; SPI[2] MOSI; I2C[2] SDA; GPIO; PWM
4	GPIO21	I/O	UART[2] TXD; SPI[2] MISO; GPIO; PWM
5	GPIO20	I/O	UART[2] RXD; SPI[2] CLK; GPIO; PWM
14	GPIO4	I/O	GPIO
15	GPIO1	I/O	UART[1] TXD; GPIO; PWM; I2C SCL;
16	GPIO0	I/O	UART[1] RXD; GPIO; PWM; I2C SDA;
Power control			
17	RESET	Input	Hardware reset pin, low active
19	PWR_ON	Input	Power enable pin, low level is chip power down

Pin Number	Pin Name	Type	Pin Description
Clock			
7	CLK_SEL	Input	If uses 24MHz crystal, let it floating
26	XTAL_N	Output	Oscillator output
27	XTAL_P	Input	Oscillator input
Antenna interface			
23	ANT	I/O	2.4GHz radio signal input/output from/to antenna
GND			
12	UVSS33	GND	Ground for USB transceiver
29 (Exposed Pad)	GND	GND	Ground for power supplies

3. ELECTRICAL CHARACTERISTICS

3.1. Recommended Operating conditions

Parameter	Description	Min	Max	Unit
DVDDIO UVDD33 DVDD	Digital 3.3V power supplies voltage	-0.2	5.0	V
AVDD	Analog 3.3V power supplies voltage	-0.2	5.0	V
T _{stg}	Storage temperature	-60	150	°C
T _j	Junction temperature		125	°C

Note: Permanent device damage may occur if the absolute maximum ratings are exceeded.

3.2. Thermal Data

Parameter	Description	Value	Unit
T _{oper}	Operating ambient temperature range	-40 ~ +85	°C
R _{thjc}	Junction-case thermal resistance	15.5	°C/W
R _{thja}	Junction-ambient thermal resistance	30.8	°C/W

3.3. DC Electrical Specifications

Parameter	Description	Min	Typical	Max	Unit
UVDD33	USB transceiver operating voltage	2.98	3.3	3.63	V
AVDD	Analog module 3.3V operating voltage	2.98	3.3	3.63	V
DVDDIO DVDD	Digital module 3.3V operation voltage	2.98	3.3	3.63	V
V _{IL}	Low level input voltage (I, I/O)	-0.2		0.8	V
V _{IH}	High level input voltage (I, I/O)	2.0		3.6	V
V _{T+}	Schmitt trig Low to High threshold (I, I/O)	1.54	1.65	1.74	V
V _{T-}	Schmitt trig High to Low threshold (I, I/O)	0.95	1.02	1.09	V
V _{OL}	Low level output voltage (O, I/O)			0.4	V
V _{OH}	High level output voltage (O, I/O)	2.4			V
I _{GPO}	GPOs, STATUS			9.5	mA

Note: Exposure beyond recommended operating conditions may affect device reliability.

3.4. Requirements to Peripheral Circuits

3.4.1 Power Supply Recommendation

Power Module	Parameter	Requirement	Unit
3.3V power supply	Rated voltage	3.3	V
	Voltage tolerance	≤10	%
	Rated current	≥400	mA
	Ripple	<115	mV

3.4.2 External Crystal

Note: If a 24MHz external crystal is used, the specification of the crystal should be as below:

Parameter	Description	Min	Typ	Max	Unit
Frequency	Nominal frequency		24.0000		MHz
Tolerance	Frequency measured at 25°C±3°C		±10	±20	ppm
ESR	Equivalent series resistance			40	Ω
C _{Load}	Load capacitance	8	15	16	pF
C _{Shunt}	Shunt capacitance		5		pF
DL	Drive level		120		μW
Aging	Aging per year in 10 years		±5		ppm
Temp Drift	Drift of frequency over the operating temperature range			±20	ppm

Note: If a 40MHz external crystal is used, the specification of the crystal should be as below:

Parameter	Description	Min	Typ	Max	Unit
Frequency	Nominal frequency		40.0000		MHz
Tolerance	Frequency measured at 25°C±3°C		±10	±20	ppm
ESR	Equivalent series resistance			40	Ω
C _{Load}	Load capacitance	8	15	16	pF
C _{Shunt}	Shunt capacitance		5		pF
DL	Drive level		120		μW
Aging	Aging per year in 10 years		±5		ppm
Temp Drift	Drift of frequency over the operating temperature range			±20	ppm

4. MECHANICAL DIMENSIONS

4.1. Chip Package Drawing

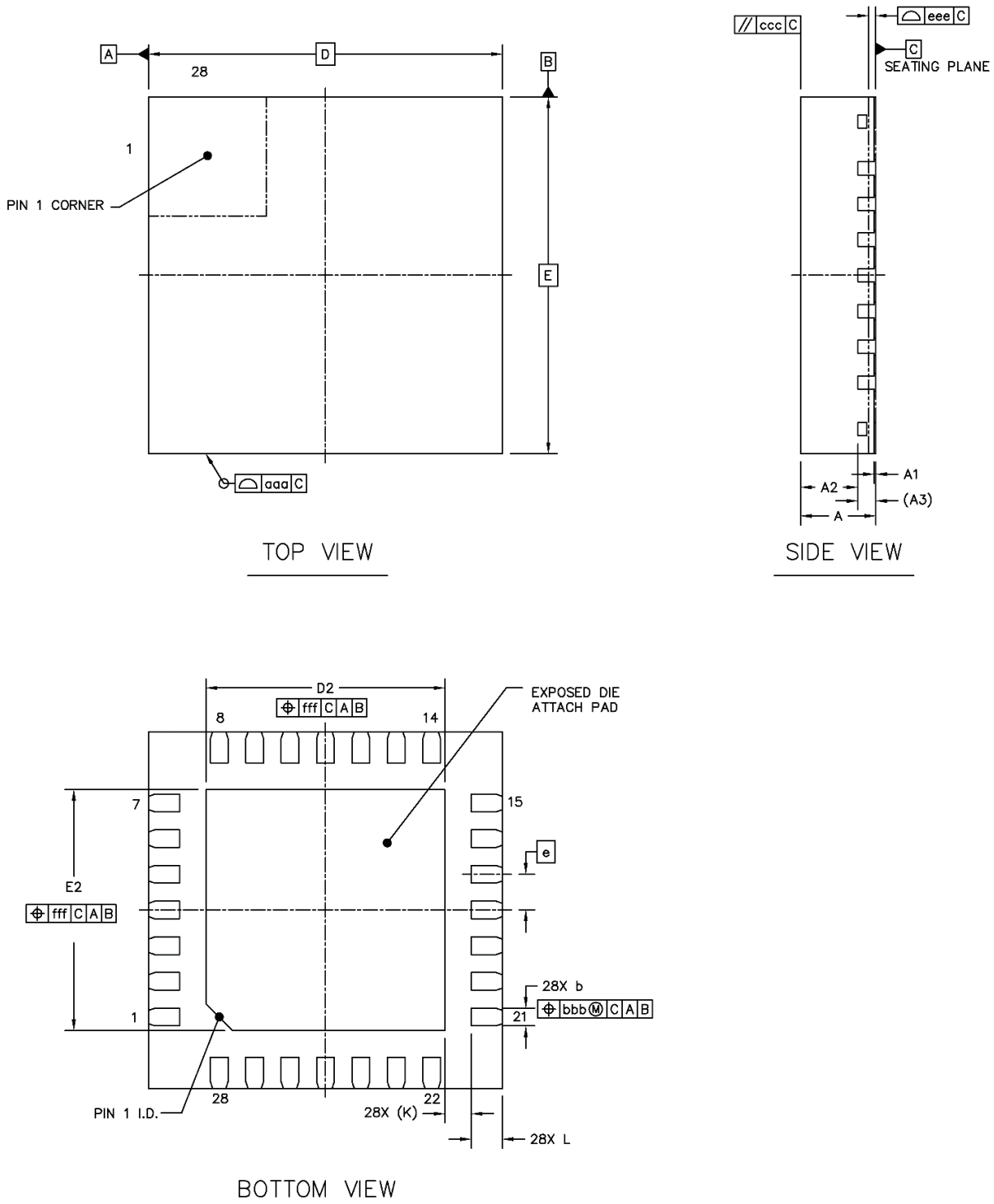


Figure 3: SSW101B Package Drawing

4.2. Dimensions of Packaging Parameters

		SYMBOL	MIM	NOM	MAX
TOTAL THICKNESS		A	0.8	0.85	0.9
STAND OFF		A1	0	0.02	0.05
MOLD THICKNESS		A2	---	0.647	---
L/F THICKNESS		A3	0.203 REF		
LEAD WIDTH		b	0.15	0.2	0.25
BODY SIZE	X	D	4 BSC		
	Y	E	4 BSC		
LEAD PITCH		e	0.4 BSC		
EP SIZE	X	D2	2.6	2.7	EP SIZE
	Y	E2	2.6	2.7	
LEAD LENGTH		L	0.25	0.35	0.45
LEAD TIP TO EXPOSED PAD EDGE		K	0.3 REF		
PACKAGE EDGE TOLERANCE		aaa	0.1		
MOLD FLATNESS		ccc	0.1		
COPLANARITY		eee	0.08		
LEAD OFFSET		bbb	0.1		
EXPOSE PAD OFFSET		fff	0.1		

Unit: mm