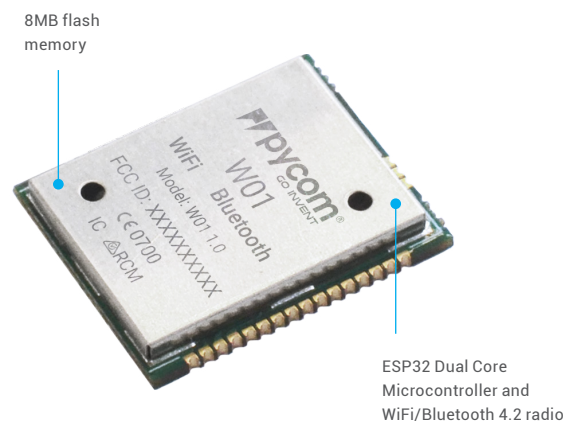


# W01

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**Size**  
20mm x 16mm x 2.7mm

**Operating temperature**  
-40 to +85 °C

## 1.0 Overview

Introducing the W01 OEM Module. The tiny MicroPython enabled Wifi & Bluetooth IoT development platform. With a 1KM WiFi range, state of the art Espressif ESP32 chipset and dual processor, the W01 is all about taking the Internet of Things to the next level. Create and connect your things everywhere. Fast.

## 2.0 Features

- Powerful CPU, BLE and state of the art WiFi radio
- Can also double up as a Nano LoRa gateway
- MicroPython enabled
- Can be directly surface mount inside your product like a regular component
- Ultra-low power usage: a fraction compared to other connected micro controllers

## 4/1 T f d dbupot

### 3.1 CPU

- Xtensa® dual-core 32-bit LX6 microprocessor(s), up to 600 DMIPS
- Hardware floating point acceleration
- Python multi-threading
- An extra ULP-coprocessor that can monitor GPIOs, the ADC channels and control most of the internal peripherals during deep-sleep mode while only consuming 25uA.

### 4/3 N f n ps

- RAM: 520KB + 4MB
- External flash: 8MB

### 3.3 WiFi

- 802.11b/g/n 16mbps

### 4/5 Cnrfuppi

- Low energy and classic

### 3.5 RTC

- Running at 150kHz

### 4/7 Tfdvsu

- SSL/TLS support
- WPA Enterprise security

### 4/8 I bti 0fods upo

- SHA
- MD5
- DES
- AES

## 5/1 Cnpdl E bhsbn

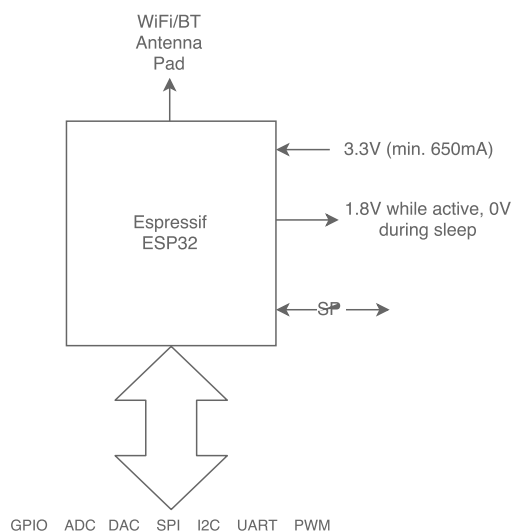


Figure 1 – System block diagram

23/01/18

## 7/1 Module Pinout

Table 1 – Module pinout

Pin	ESP32 Pin	Pin Name	Function	BED	PWM	RTC†	Notes
1	–	–	Ground				
2		–	Reset				Active Low
3	3	P0	RX0 (Programming)		•		Used by the bootloader and to program the module
4	1	P1	TX0 (Programming)		•		Used by the bootloader and to program the module
5	0	P2		2*	•	•	If tied to GND during boot the device will enter bootloader mode
6	4	P3	TX1	2*	•	•	
7	15	P4	RX1	2*	•	•	JTAG TDO, SD card CMD
8	5	P5			•		
9	27	P6		2*	•	•	
10	19	P7			•		
11	2	P8		2*	•	•	SD card DAT0
12	12	P9	SDA	2*	•	•	JTAG TDI
13	13	P10	SCL (I2C) / CLK (SPI)	2*	•	•	JTAG TCK
14	22	P11	MOSI		•		
15	21	P12			•		If tied to 3.3V during boot the device enters safe boot mode, JTAG MISO
16		–	Ground				
17		–	Ground				
18		–	WiFi/BT antenna				50 Ohm impedance required
19		–	Ground				
20		–	Ground				

## 7/1 Module Pinout

Table 1 – Module pinout

Pin	ESP32 Pin	Pin Name	Function	GPIO	BED	PWM	RTC†	Output
21		–	Ground					
22	36	P13			1		•	Input only
23	37	P14	MISO		1		•	Input only
24	38	P15			1		•	Input only
25	39	P16			1		•	Input only
26	35	P17			1		•	Input only
27	34	P18			1		•	Input only
28	32	P19			1	•	•	
29	33	P20			1	•	•	
30	26	P21			2*	•	•	DAC
31	25	P22			2*	•	•	DAC
32	14	P23			2*	•	•	JTAG TMS, SD card SCLK
33	–	–	3.3V input					This supply should be able to source 650mA
34	–	–	Ground					
35	–	–	1.8V Output					Only when the device is active, during deep sleep this drops to 0V

† The pins on the RTC power domain can be used during deep sleep, specifically GPIO pins will maintain their state while in deep sleep.

\* ADC2 is currently not supported in the micropython firmware

## 7/2 Pin Remapping

The ESP32 features comprehensive pin remapping functionality. This allows peripherals to be mapped onto almost any available GPIO pins. The above table merely shows the default assignments. For example, the default mapping has the SPI and I2C clocks overlapping, meaning both cannot be used simultaneously without

remapping one to a different pin. For a detailed guide of what peripheral can be assigned to what pins please read “Appendix A – ESP32 Pin Lists” of the ESP32 datasheet.

## 8/ FT 43 fs if sbm

Table 2 – Peripherals

fs if sbm	Dpvou	ot
UART	3	Remappable to any GPIO. Note: P13–18 can only be mapped to RX or CTS since they are input only.
I2C	2	Remappable to any GPIO except P13–18 since they are input only and I2C is bi-directional.
SPI	3	Remappable to any GPIO. Note: P13–18 can only be mapped to MISO since they are input only.
CAN*	1	Remappable to any GPIO. Note: P13–18 can only be mapped to RX since they are input only.
JTAG	1	TDO = P4, TDI = P9, TCK = P10, TMS = P24
PWM	1	All GPIO except P13–18 which are input only
ADC	18	Fixed mapping, see Table 1, Only ADC 1 is supported in our micropython firmware.
DAC	2	Only available on P21 and P22
SD	1	DAT0 = P8, SCLK = P23, CMD = P4

\* Requires an external CAN bus transceiver, we recommend the SN65HVD230 from Texas Instruments.

For a more detailed description of the ESP32 peripherals along with peripherals not currently supported by our firmware, please check the ESP32 datasheet.

### 7.1 RTC

Our modules by default all use the internal RC oscillator at 150kHz for the RTC. If you require better accuracy/stability you can connect a 32.768 kHz crystal (or TCXO) externally on pins P19 and P20 (or P19 for a TCXO)

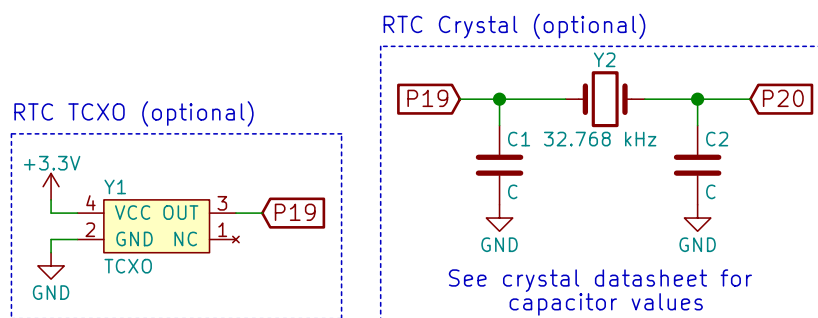


Figure 3 – External RTC crystal circuits



## 9/1 sphsbn n oh u f efwdf

### 9/2 VBSU

By default, the modules run an interactive python REPL on UART0 which is connected to P0 (RX) and P1 (TX) running at 115200 baud. Code can be run via this interactive REPL or you can use our PyMakr plugin for Atom or Visual Studio Code to upload code to the board.

### 9/3 G

By default, the W01 also acts as a Wi-Fi access point. .  
SSID: wipy-wlan-XXXX  
Password: www.pycom.io  
Once connected to the W01's Wi-Fi network you can access it in two ways.

### 9/3/2 Uf rfu

Running on port 23 is a telnet server. This acts in a very similar way to the UART. It presents you with an interactive REPL and can also be used to upload code via PyMakr.

### 9/3/3 GU

The W01 also runs a FTP server that allows you to copy files to and from the device, include an SD card if one is connected. To connect to this FTP server, you need to use plain FTP (un-encrypted) with the following credentials:  
User: micro  
Password: python

## /1 Cppun pef t

### /2 Cppupbef sn pef

In order to update the firmware of the W01 device, it needs to be placed into bootloader mode. In order to do this, P2 needs to be connected to ground when the device reboots. Once in bootloader mode you can use the Pycom firmware update tool to update to the latest official firmware. If you are developing your own firmware based on our open-source firmware, a flashing script is provided with the source code.

### /3 Tbgf cppu

The micropython firmware features a safe boot feature that skips the boot.py and main.py scripts and goes straight to the REPL. This is useful if the device is programmed with code that causes the device to crash or become inaccessible. To access this mode, you need to connect P12 to 3.3V and reset the device. Upon entering safe boot mode, the on-board LED will begin to blink orange. Depending on the duration the pin is held at 3.3V, a different firmware will be run.

Table 3 – Boot modes

1 4 Tf dpoet	4 7 Tf dpoet
Current firmware without running boot.py or main.py	Previous firmware if the firmware was uploaded via OTA (without running boot.py and main.py)

## 21.1 Power supply

The module requires a single regulated 3V3 power supply. The 1V8 pin is only an output which is enabled whenever the module is in active mode. During deepsleep the 1V8 signal goes low. Do not supply power to the 1V8 pin, and never use this pin as a power supply, only as a control signal.

## 21.2 Power consumption by feature

Table 4 – Power consumption by feature

Feature	Mode	Power consumption	Current	Power
Idle (no radios)	–	34	–	mA
WiFi AP	–	110	–	mA
WiFi client	–	123	–	mA
Bluetooth	–	107	–	mA
Deep sleep	–	5.40	–	µA

## 22/1 Nfn ps Nb

### 22/2 Gbt i

Table 5 – Flash memory map

Name	Eftds upo	Tubsubeesft t	Size
NVS	Non-volatile RAM area. Used by the NVS API	0x9000	0x7000
Firmware Slot 0	First firmware slot. Factory firmware is flashed here	0x10000	0x180000
OTA info	Information about the current active firmware	0x190000	0x1000
Firmware Slot 1	Second firmware slot	0x1A0000	0x180000
File system (1)	504KB file system on devices with 4MB flash	0x380000	0x7F000
Config	Config area for LoRa, Sigfox and LTE	0x3FF000	0x1000
File system (2)	4MB file system on devices with 8MB flash	0x400000	0x400000

### 22/3 SBN

Table 6 – RAM memory map

Name	Eftds upo	Size
On-chip SRAM	Internal RAM memory used by the 2 xtensa CPUs	520KB
Fast RTC RAM	Fast RAM area accessible by the xtensa cores during boot and sleep modes	8KB
Slow RTC RAM	Slow RAM area accessible by the Ultra-Low Power Coprocessor during deep sleep	8KB
External pSRAM	External QSPI RAM memory clocked @ 40MHz	4MB

## 22/4 SPN boe fGvt f t

Table 7 – Miscellaneous memory

Name	Eftds upo	Size
On-chip ROM	Contains core functions and boot code.	448KB
eFuse	256 bits are used for the system (MAC address and chip configuration) and the remaining 768 bits are reserved for customer applications, including Flash-Encryption and Chip-ID	1kbit

## 12.0 WiFi

### 23/2 Tx power & bandwidth

- 802.11 b/g/n/e/i
- 802.11 n (2.4 GHz), up to 150 Mbps
- 802.11 e: QoS for wireless multimedia technology
- WMM-PS, UAPSD
- A-MPDU and A-MSDU aggregation
- Block ACK
- Fragmentation and defragmentation
- Automatic Beacon monitoring/scanning
- 802.11 i security features: pre-authentication and TSN
- Wi-Fi Protected Access (WPA/WPA2/WPA2-Enterprise/Wi-Fi Protected Setup (WPS)
- Infrastructure BSS Station mode/SoftAP mode
- Wi-Fi Direct (P2P), P2P Discovery, P2P Group Owner mode and P2P Power Management

### 23/3 Thermal budget

Table 8 – WiFi specifications

Efficiency	No	U /	Nby	Vo u
Input Frequency	2412	–	2484	MHz
Tx power Output power of PA for 72.2 Mbps	13	14	15	dBm
Output power of PA for 11b mode	19.5	20	20.5	dBm
Sensitivity				
DSSS, 1Mbps	–	–	98	dBm
CCK, 11 Mbps	–	–	91	dBm
OFDM, 6 Mbps	–	–	93	dBm
OFDM, 54 Mbps	–	–	75	dBm
HT20, MCS0	–	–	93	dBm
HT20, MCS7	–	–	73	dBm
HT40, MCS0	–	–	90	dBm
HT40, MCS7	–	–	70	dBm
MCS32	–	–	89	dBm
Adjacent channel rejection				
OFDM, 6 Mbps	–	37	–	dB
OFDM, 54 Mbps	–	21	–	dB
HT20, MCS0	–	37	–	dB
HT20, MCS7	–	20	–	dB

## 24/1 Cnrf uppu

### 24/2 Tv psafe gfbwst

- Compliant with Bluetooth v4.2 BR/EDR and BLE specification
- Class-1, class-2 and class-3 transmitter without external power amplifier
- Enhanced power control
- +12 dBm transmitting power
- NZIF receiver with -97 dBm sensitivity
- Adaptive Frequency Hopping (AFH)
- Standard HCI based on SDIO/SPI/UART
- High-speed UART HCI, up to 4 Mbps
- BT 4.2 controller and host stack
- Service Discover Protocol (SDP)
- General Access Profile (GAP)
- Security Manage Protocol (SMP)
- ATT/GATT
- HID
- All GATT-based profile supported
- SPP-like GATT-based profile
- BLE Beacon
- A2DP/AVRCP/SPP, HSP/HFP, RFCOMM
- CVSD and SBC for audio codec
- Bluetooth Piconet and Scatternet

## 24/3 T fd dbupo

### 24/3/2 Sf df wfs Cbt dEub Sbuf

Table 9 – Receiver (basic data rate) speci-cations

Parameter	N o	U /	Nby	Vo u
Sensitivity @0.1% BER	–	–94	–	dBm
Maximum received signal @0.1% BER	0	–	–	dBm
Co-channel C/I	–	+7	–	dB
Adjacent channel selectivity C/I	F = F0 + 1 MHz	–	–6	dB
	F = F0 – 1 MHz	–	–6	dB
	F = F0 + 2 MHz	–	–25	dB
	F = F0 – 2 MHz	–	–33	dB
	F = F0 + 3 MHz	–	–25	dB
	F = F0 – 3 MHz	–	–45	dB
Out-of-band blocking performance	30MHz ~ 2000MHz	–10	–	dBm
	2000MHz ~ 2400MHz	–27	–	dBm
	2500MHz ~ 3000MHz	–27	–	dBm
	3000MHz ~ 12.5GHz	–10	–	dBm
Intermodulation	–36	–	–	dBm

### 24/3/3 Sfd f s F o i b o d f e E b u b S b u f

Table 10 – Receiver (basic data rate) specifications

Parameter	N o	U /	N by	Vo u
$\pi/4$ DQPSK				
Sensitivity @0.1% BER	–	–90	–	dBm
Maximum received signal @0.1% BER	–	0	–	dBm
Co-channel C/I	–	11	–	dB
Adjacent channel selectivity C/I	F = F0 + 1 MHz	–	–7	dB
	F = F0 – 1 MHz	–	–7	dB
	F = F0 + 2 MHz	–	–25	dB
	F = F0 – 2 MHz	–	–35	dB
	F = F0 + 3 MHz	–	–25	dB
	F = F0 – 3 MHz	–	–45	dB
8DPSK				
Sensitivity @0.1% BER	–	–84	–	dBm
Maximum received signal @0.1% BER	–	–5	–	dBm
C/I c-channel	–	18	–	dB
Adjacent channel selectivity C/I	F = F0 + 1 MHz	–	2	dB
	F = F0 – 1 MHz	–	2	dB
	F = F0 + 2 MHz	–	–25	dB
	F = F0 – 2 MHz	–	–25	dB
	F = F0 + 3 MHz	–	–25	dB
	F = F0 – 3 MHz	–	–38	dB

## 24/3/4 S f d f w f s C m f u p p u i M F

Table 11 – Receiver (BLE) speci-cations

Parameter	N o	U /	N by	Vo u
Sensitivity @30.8% PER	–	–97	–	dBm
Maximum received signal @30.8% PER	0	–	–	dBm
Co-channel C/I	–	+10	–	dB
Adjacent channel selectivity C/I	F = F0 + 1MHz	–	–5	dB
	F = F0 – 1MHz	–	–5	dB
	F = F0 + 2MHz	–	–25	dB
	F = F0 – 2MHz	–	–35	dB
	F = F0 + 3MHz	–	–35	dB
	F = F0 – 3MHz	–	–45	dB
Out-of-band blocking performance	30MHz ~ 2000MHz	–10	–	dB
	2000MHz ~ 2400MHz	–27	–	dBm
	2500MHz ~ 3000MHz	–27	–	dBm
	3000MHz ~ 12.5GHZ	–10	–	dBm
Intermodulation	–36	–	–	dBm

## 24/35 Usbotn ufs Cbt dEub Sbuf

Table 12 – Transmitter (basic data rate) speci-cations

Parameter		N o	U /	Nby	Vo u
RF transmit power		–	0	–	dBm
Gain control step		–	±3	–	dBm
RF power control range		–12	–	+12	dBm
+20 dB bandwidth		–	0.9	–	MHz
Adjacent channel transmit power	F = F0 + 1 MHz	–	–24	–	dBm
	F = F0 – 1 MHz	–	–16.1	–	dBm
	F = F0 + 2 MHz	–	–40.8	–	dBm
	F = F0 – 2 MHz	–	–35.6	–	dBm
	F = F0 + 3 MHz	–	–45.7	–	dBm
	F = F0 – 3 MHz	–	–40.2	–	dBm
	F = F0 + >3 MHz	–	45.6	–	dBm
	F = F0 – >3 MHz	–	44.6	–	dBm
$\Delta f_{1_{avg}}$		–	–	155	KHz
$\Delta f_{2_{max}}$		133.7			KHz
$\Delta f_{2_{avg}}/\Delta f_{1_{avg}}$		–	0.92	–	–
ICFT		–	–7	–	KHz
Drift rate		–	0.7	–	KHz/50µs
Drift (1 slot packet)		–	6	–	KHz
Drift (5 slot packet)		–	6	–	KHz



## 24.3.6 Usbotn ufs Foi bodfe Ebub Sbuf

Table 13 – Transmitter (enhanced data rate) speci-cations

Parameter		N o	U /	Nby	Vo u
RF transmit power		–	0	–	dBm
Gain control step		–	±3	–	dBm
RF power control range		–12	–	+12	dBm
π/4 DQPSK max w0		–	–0.72	–	KHz
π/4 DQPSK max wi		–	–6	–	KHz
π/4 DQPSK max  wi + w0		–	–7.42	–	KHz
8DPSK max w0		–	0.7	–	KHz
8DPSK max wi		–	–9.6	–	KHz
8DPSK max  wi + w0			–10		KHz
π/4 DQPSK modulation accuracy	RMS DEVM	–	4.28	–	%
	99% DEVM	–	–	30	%
	Peak DEVM	–	13.3	–	%
8 DPSK modulation accuracy	RMS DEVM	–	5.8	–	%
	99% DEVM	–		20	%
	Peak DEVM	–	14	–	%
In–band spurious emissions	F = F0 + 1MHz	–	–34	–	dBm
	F = F0 – 1MHz	–	–40.2	–	dBm
	F = F0 + 2MHz	–	–34	–	dBm
	F = F0 – 2MHz	–	–36	–	dBm
	F = F0 + 3MHz	–	–38	–	dBm
	F = F0 – 3MHz	–	–40.3	–	dBm
	F = F0 ± >3MHz	–	–	–41.5	dBm
EDR differential phase coding		–	100	–	%

## 24/3/7 Usbotn ufs Cmfuppi MF

Table 14 – Transmitter (BLE) speci-cations

Parameter		N o	U /	Nby	Vo u
RF transmit power		–	0	–	dBm
Gain control step		–	±3	–	dBm
RF power control range		–12	–	+12	dBm
Adjacent channel transmit power	F = F0 + 1MHz	–	–14.6	–	dBm
	F = F0 – 1MHz	–	–12.7	–	dBm
	F = F0 + 2MHz	–	–44.3	–	dBm
	F = F0 – 2MHz	–	–38.7	–	dBm
	F = F0 + 3MHz	–	–49.2	–	dBm
	F = F0 – 3MHz	–	–44.7	–	dBm
	F = F0 + >3MHz	–	–50	–	dBm
	F = F0 – >3MHz	–	–50	–	dBm
Δf1 <sub>avg</sub>		–	–	265	KHz
Δf2 <sub>max</sub>		247	–	–	KHz
Δf2 <sub>avg</sub> /Δf1 <sub>avg</sub>		–	–0.92	–	–
ICFT		–	–10	–	KHz
Drift rate		–	0.7	–	KHz/50μs
Drift		–	2	–	KHz

## 25/1 Frhdsdbndi bsbduf stut

### 25/2 Bctpmuf n by n vn sbuht

Table 15 – Absolute maximum ratings

Parameter	T n cpm	N o	U /	Nby	Vo u
Supply Input Voltage	$V_{IN}$	3.5	–	5.5	V
Supply Output Current	$I_{OUT}$	–	–	1.2	A
Supply Output Voltage	$V_{3V3}$	–	3.3	–	V
Storage Temperature	$T_{STR}$	–	–	–	°C
Operating Temperature	$T_{OPR}$	–40	–	85	°C
Moisture Sensitivity Level	MSL	–	1	–	–

## 25/3 o vOPvu vudi bsbduf stut

Table 22 – Input/Output characteristics

Parameter	T n cpm	N o	U /	Nby	Vo u
Input low voltage	$V_{IL}$	–0.3	–	$0.25 \times V_{3V3}$	V
Input high voltage	$V_{IH}$	$0.75 \times V_{3V3}$	–	$V_{3V3} + 0.3$	V
Max Input sink current	$I_{SINK}$	–	6	12	mA
Input leakage current	$I_{IL}$	–	–	50	nA
Input pin capacitance	$C_{pin}$	–	–	2	pF
Output low voltage	$V_{OL}$	$0.1 \times V_{3V3}$	–	–	V
Output high voltage	$V_{OH}$	$0.8 \times V_{3V3}$	–	–	V
Max Output source current	$I_{SOURCE}$	–	6	12	mA

## 26/1 Non-volatile Storage of Data

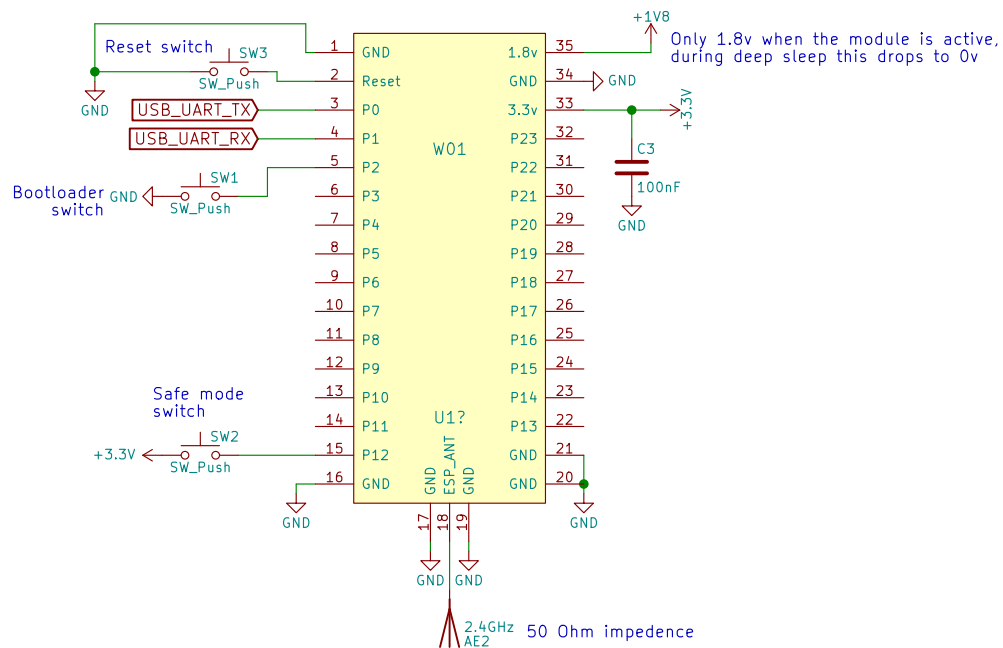


Figure 4 – Minimum required circuit

27/1 N fdi bo dbmT f d dbupot

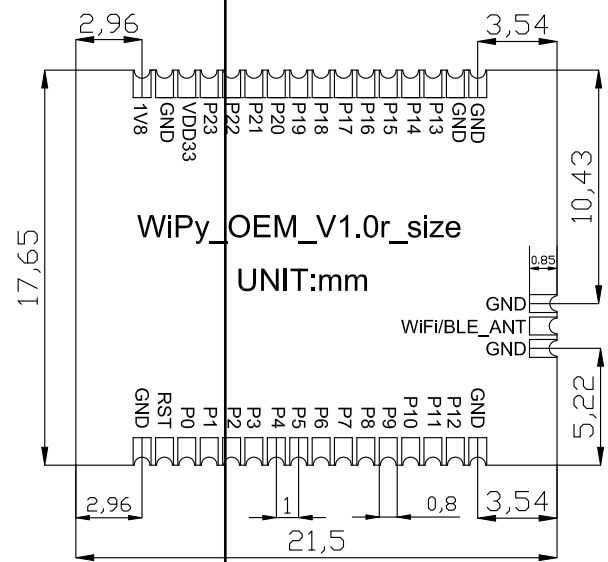


Figure 5 – Mechanical drawing (top down view)

28/1 Sf dpn n f oef e Mboe buuf sot

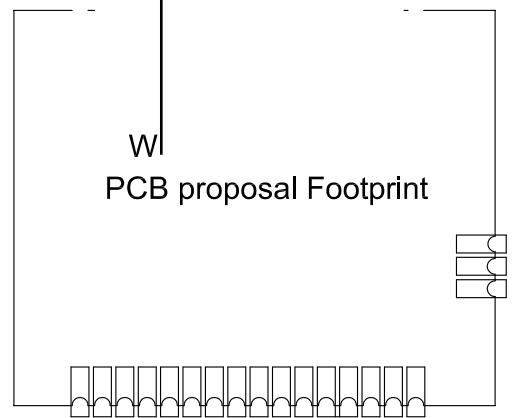


Figure 6 – Recommended land pattern

## 29/1 Eff ho Dpot ef Dsupot

### 29/2 Boufoob n febof

Our OEM modules are intended to be used with a 50-ohm antenna. They are also required to be connected to the antenna by a 50-ohm grounded co-planar waveguide (as shown in the reference design below with the yellow lines) or a microstrip.

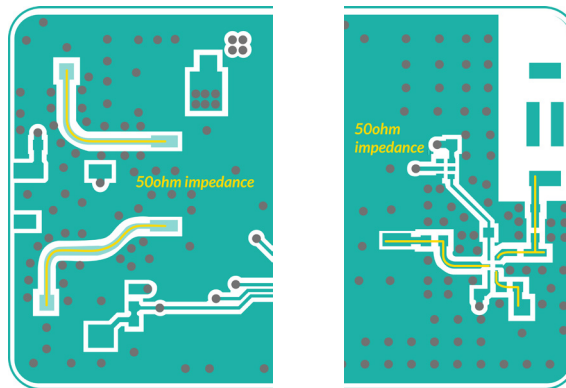


Figure 7 – 50-ohm impedance antenna connections

### 29/3 Eff trrf px fs

When selecting a voltage regulator for your application ensure that it has a low power mode, and that this is enabled when the device enters deep sleep. We also recommend cutting off power to all non-essential components such as LEDs, logic gates, sensors etc. when the device is in deep sleep. This can be done using the circuit shown right:

This circuit uses the 1.8V output of the module to cut off supply to non-essential circuitry. The 1.8V output is only active when the module is running, when it goes to deep sleep it drops to 0V. The non-essential circuitry is then powered from the "ACTIVE\_POWER" bus.

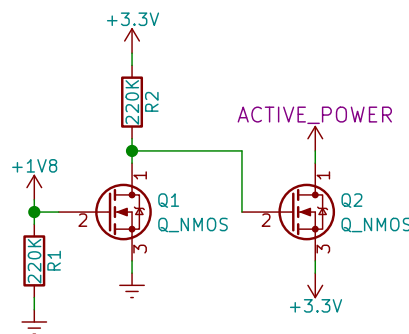


Figure 8 – Power switch for deep sleep mode

#### 29/4 Sf sf odf th pvu

Below you will find the designs for our universal reference board that fits all of our OEM modules. The design files can be downloaded from our website.

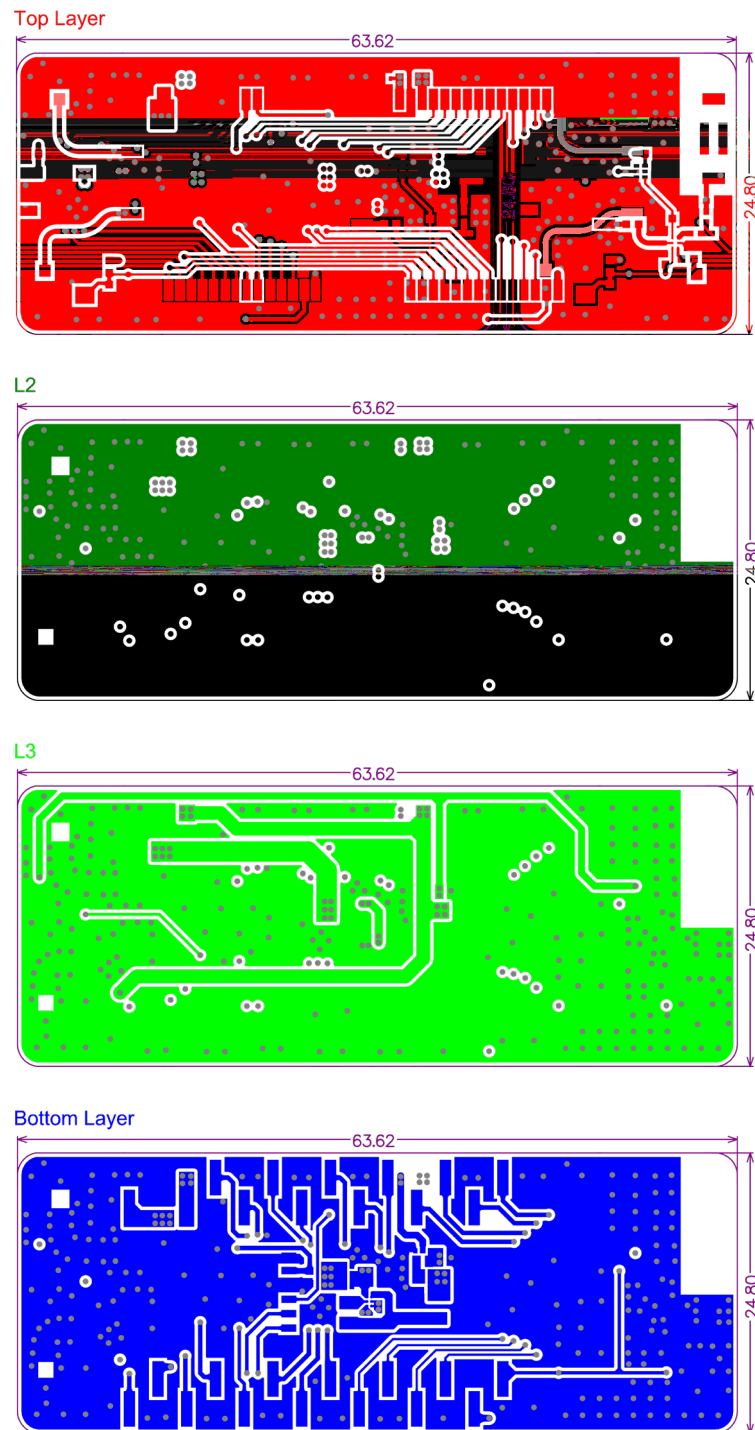


Figure 9 – PCB layers for reference design – Units: mm





## 31/1 Pæfsoh oðsn bupo

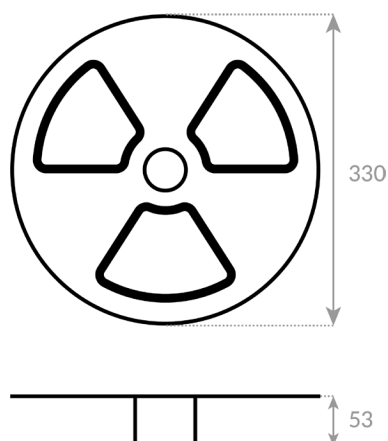
Table 22 – Ordering information

spevduFBO	Eftds upo
0700461341550	W01 – OEM version of WiPy 3.0
0700461908708	Reel of 250 W01 OEM modules
0700461908920	Reel of 500 W01 OEM modules

## 32/1 bdl bh oh

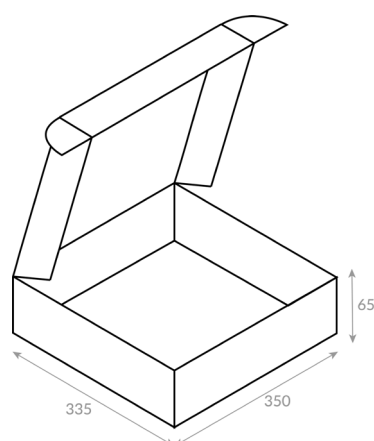
### 32/2 Sffm

Figure 11 – Mechanical drawing of reel – Units: mm



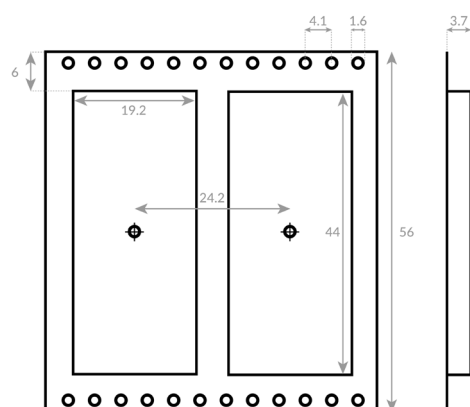
### 32/4 Cpy

Figure 13 – Mechanical drawing of reel box – Units: mm



## 21.2 Tape

Figure 12 – Mechanical drawing of reel tape – Units: mm



### 33/1 Df su dbupo

FCC 2AJMTWIPY01R  
IC 22263-WIPY01R  
CE 0700

Copies of the certificates can be found on our website.

### 34/1 Sf hvr bups ogpn bupo

#### 34/2 FV Sf hvr bups Dpogpn bodf

Hereby, Pycom Ltd declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC

#### 34/3 Gf ef sbn Dpn n vo dbupo Dpn n tt po ouf sf sf od f Tubuf n fou

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.
2. This device must accept any interference received, including interference that may cause undesired operation.

CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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 to correct the interference by one or more of the following measures:

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

#### 34/3/2 SG bso oh Tubuf n fou

To comply with FCC RF exposure compliance requirements, the antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

#### 34/3/3 PFN ouf hsbpsdpoe upot

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.

As long as the two conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements.

The module is limited to OEM installation ONLY. The module is limited to installation in mobile or fixed application. We hereby acknowledge our responsibility to provide guidance to the host manufacturer in the event that they require assistance for ensuring compliance with the Part 15 Subpart B requirements.

IMPORTANT NOTE: In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

#### 34/3/4 Foe spevdumbcf moh

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. The final end product must be labelled in a visible area with the following: "Contains FCC ID: 2AJMTWIPY01R". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

The following FCC part 15.19 statement has to also be available on the label:

This device complies with Part 15 of 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.

#### 34/3/5 Nbovbmogpn bupo up u f Foe Vt f s

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

In the user manual of the end product, the end user has to be informed that the equipment complies with FCC radio-frequency exposure guidelines set forth for an uncontrolled environment.

The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

The end user manual shall include all required regulatory information/warning as show in this manual.

The maximum operating ambient temperature of the equipment declared by the manufacturer is -40~+85C

Receiver category 3

### 35/1 Sfw t pol tups

Table 23 – Document revision history

Wf st po 2/1	o ubnSf rfbt f
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