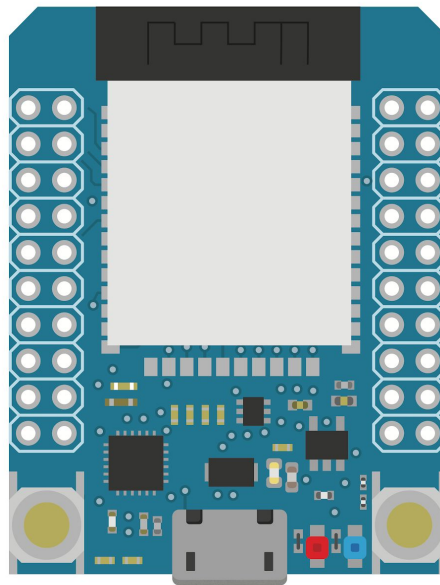


# Wia Dot One



Wi-Fi & Bluetooth connected Internet of Things development kit  
powered by an Espressif ESP32-WROOM-32 module

**Model number: DOTONE**

**Datasheet v.1.1**

## Features

- Module specs
  - Two low-power Xtensa® 32-bit LX6 microprocessors
  - Internal memory includes:
    - 448 KBytes ROM for booting and core functions
    - 520 KBytes on-chip SRAM
    - 8 KBytes SRAM in RTC SLOW
    - 8 KBytes SRAM in RTC FAST
    - 1 Kbit of EFUSE, 256 bits MAC
  - 4MB flash memory
  - 40-MHz crystal oscillator
  - Active, modem-sleep, light-sleep, deep-sleep and hibernation power modes
  - FCC/CE-RED/IC/TELEC/KCC/SRRC/NCC certified
  - Uses FreeRTOS real-time operating system with hardware acceleration
- Wi-Fi Specs
  - Single band 2.4Ghz IEEE 802.11 b/g/n/d/e/i/k/r
  - Supports wireless data rates of up to 150 Mbps
  - Wi-Fi modes Station/softAP/SoftAP+station/P2P
  - Security WPA/WPA2/WPA2-Enterprise/WPS
  - Encryption AES/RSA/ECC/SHA
  - IPv4, IPv6, SSL, TCP/UDP/HTTP/FTP/MQTT
  - Wi-Fi Alliance certified
- Bluetooth Specs
  - Bluetooth v4.2 BR/EDR and BLE specification
  - BQB certified
- Interfaces
  - SD-card, UART, SPI, SDIO, I2C, LED PWM, Motor PWM, I2S , IR, GPIO, capacitive touch sensor, ADC, DAC, hall sensor, temperature sensor
- Other Specs
  - On-board status (red) and function (blue) LEDs
  - Pre-soldered 40-pin headers
  - CE marked and RoHS green certified
- Easy to setup and use
  - Official iOS and Android apps
  - Configure with mobile app within a few minutes
  - Connects to the Wia Cloud out of the box
  - Send code over-the-air (OTA) through the Wia Web IDE
  - Integrate with 3rd party services using Flow Builder, a drag-and-drop editor in the Wia Cloud for integrations and webhooks
  - Device monitoring through the Wia Cloud

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## Functional Description

### Overview

Build it all with the Dot One, Wia's Internet of Things hardware development kit that allows you to create your own connected devices.

### Features

- Espressif ESP32-WROOM-32 module
- Two low-power Xtensa® 32-bit LX6 microprocessors
- Single band 2.4Ghz IEEE 802.11 b/g/n/d/e/i/k/r Wi-Fi
- Bluetooth v4.2 BR/EDR and BLE
- SD-card, UART, SPI, SDIO, I2C, LED PWM, Motor PWM, I2S , IR, GPIO, capacitive touch sensor, ADC, DAC, hall sensor, temperature sensor interfaces
- 40-pin headers for IO
- Powered via micro USB
- Connects to the Wia Cloud out of the box
- FCC/CE-RED/IC/TELEC/KCC/SRRC/NCC certified

## Interfaces

### Power

Power to the Dot One is supplied via the on-board 5V micro USB connector or 3.3V directly via the VCC pin. When the Dot One is powered via the USB port, VCC will output a voltage of approximately 5V. The 3.3V pin can also be used as an output with maximum current output of 500mA. All of the IO pins run at 3.3V.

### RF

#### *Wi-Fi Radio Characteristics of ESP-WROOM-32 Module*

Parameter	Condition	Min	Typical	Max	Unit
Input frequency	-	2412	-	2484	MHz
Output impedance	-	-	-	-	-
TX Power	11n MCS7	12	13	14	dBm
	11b mode	17.5	18.5	20	dBm
Sensitivity	11b, 1Mbps	-	-98	-	dBm
	11b, 11 Mbps	-	-89	-	dBm
	11g, 6 Mbps	-	-92	-	dBm
	11g, 54 Mbps	-	-74	-	dBm
	11n, HT20, MCS0	-	-91	-	dBm
	11n, HT20, MCS7	-	-71	-	dBm

	11n, HT20, MCS0	-	-89	-	dBm
	11n, HT40, MCS7	-	-69	-	dBm
Adjacent channel rejection	11g, 6 Mbps	-	31	-	dB
	11g, 54 Mbps	-	14	-	dB
	11n, HT20, MCS0	-	31	-	dB
	11n, HT20, MCS7	-	13	-	dB

### BLE Radio Receiver Characteristics

Parameter	Condition	Min	Typical	Max	Unit
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 + 1 MHz	-	-5	-	dB
	F = F0 - 1MHz	-	-5	-	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
Out-of-band blocking performance	30 MHz ~ 2000 MHz	-10	-	-	dBm
	2000 MHz ~ 2400 MHz	-27	-	-	dBm
	2500 MHz ~ 3000 MHz	-27	-	-	dBm
	3000 MHz ~ 12.5 GHz	-10	-	-	dBm
Intermodulation	-	-36	-	-	dBm

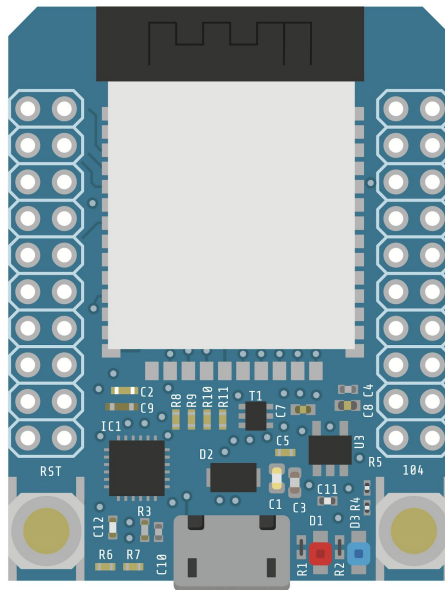
*BLE Radio Transmitter Characteristics*

Parameter	Condition	Min	Typical	Max	Unit
RF transmit power	-	-	0	-	dBm
Gain control step	-	-	3	-	dBm
RF power control range	-	-12	-	+12	dBm
Adjacent channel transmit power	$F = F_0 \pm 2 \text{ MHz}$	-	-52	-	dBm
	$F = F_0 \pm 3 \text{ MHz}$	-	-58	-	dBm
	$F = F_0 \pm > 3 \text{ MHz}$	-	-60	-	dBm
$\Delta f_{1\text{avg}}$	-	-	-	265	kHz
$\Delta f_{2\text{max}}$	-	247	-	-	kHz
$\Delta f_{2\text{avg}}/\Delta f_{1\text{avg}}$	-	-	-0.92	-	-
ICFT	-	-	-10	-	kHz
Drift rate	-	-	0.7	-	kHz/50 $\mu\text{s}$
Drift	-	-	2	-	kHz

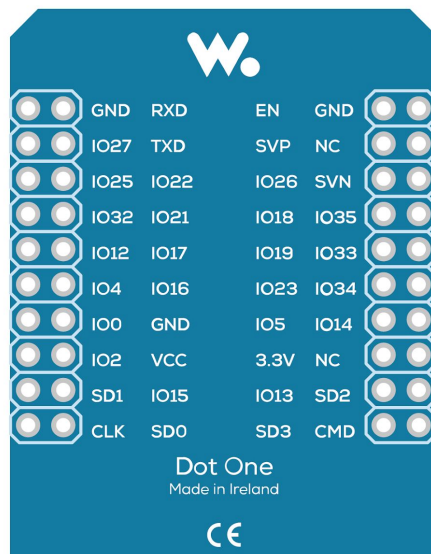
## Pin and Button Definitions

### Pin Markings

*Top*



*Bottom*



## Pin Description

Pin	Function
IO0	GPIO, ADC2_1
IO2	GPIO, ADC2_2
IO4	GPIO, ADC2_0
IO5	GPIO, VSPI_CS0
IO12	GPIO, ADC2_5, HSPI_MISO
IO13	GPIO, ADC2_4, HSPI_MOSI
IO14	GPIO, ADC2_6, HSPI_CLK
IO15	GPIO, ADC2_3, HSPI_CS0
IO16	GPIO, UART2_RX
IO17	GPIO, UART2_TX
IO18	GPIO, VSPI_CLK, SDA
IO19	GPIO, VSPI_MISO, SCL
IO21	GPIO
IO22	GPIO
IO23	GPIO, VSPI_MOSI
IO25	GPIO, ADC2_8, DAC1
IO26	GPIO, ADC2_9, DAC2
IO27	GPIO, ADC2_7
IO32	GPIO, ADC1_4
IO33	GPIO, ADC1_5
IO34	GPIO, ADC1_6
IO35	GPIO, ADC1_7
GND	GROUND
RXD	GPIO3, UART0_RX
TXD	GPIO1, UART0_TX
EN	MODULE-ENABLE SIGNAL. ACTIVE HIGH
GND	GROUND
SVP (SENSOR_VN)	GPIO36, ADC1_CH0
NC	NO CONNECTION



SVN (SENSOR_VP)	GPIO39, ADC1_CH3
NC	NO CONNECTION
SVN (SENSOR_VP)	GPIO39, ADC1_CH3
GND	GROUND
VCC	POWER SUPPLY
3.3V	3.3V REGULATED OUTPUT
SD1	GPIO8, SPI_MOSI
SD2	GPIO9, UART1_RX
CLK	GPIO6, SPI_CLK
SD0	GPIO7, SPI_MISO
SD3	GPIO10, UART1_TX
CMD	GPIO11, SPI_CS0

## Technical Specifications

### Absolute Maximum Ratings

Stresses beyond the absolute maximum ratings listed in the table below may cause permanent damage to the device. These are stress ratings only, and do not refer to the functional operation of the device that should follow the recommended operating conditions.

### Recommended Operating Conditions

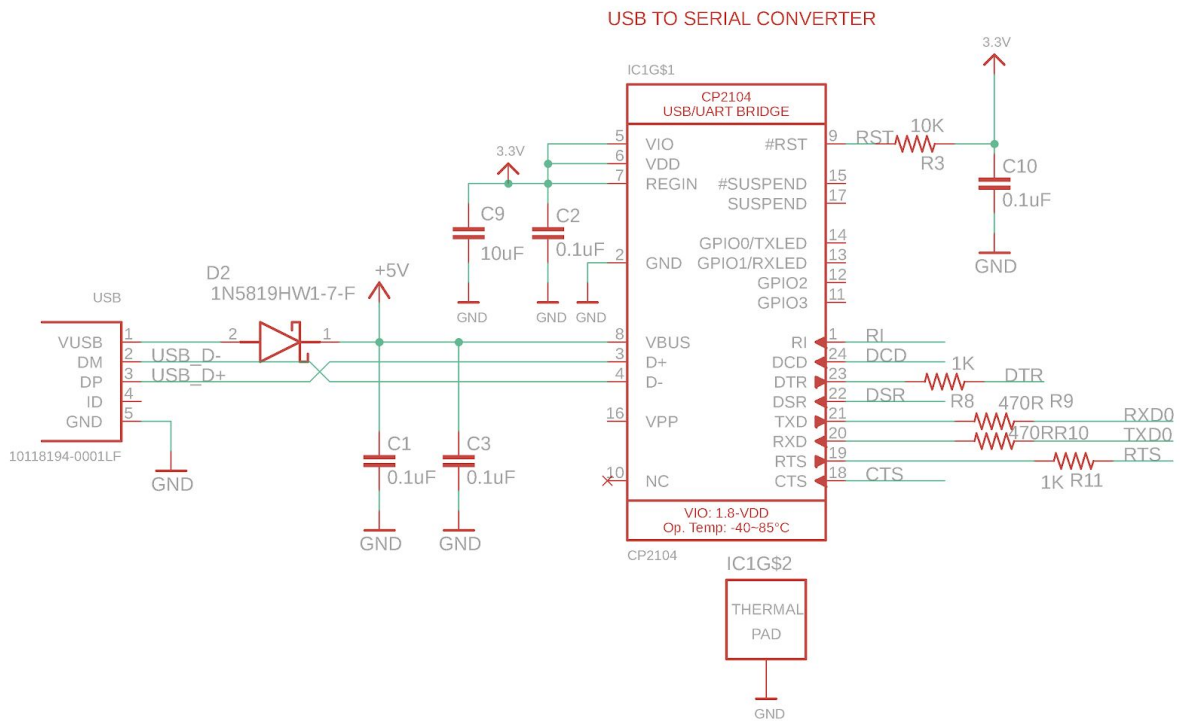
Parameter	Min	Max	Unit
Power Supply Voltage	2.7	3.6	V
Power Supply Current	0.5A	-	A
Storage Temperature	-40	85	°C

### Dimensions and Weight

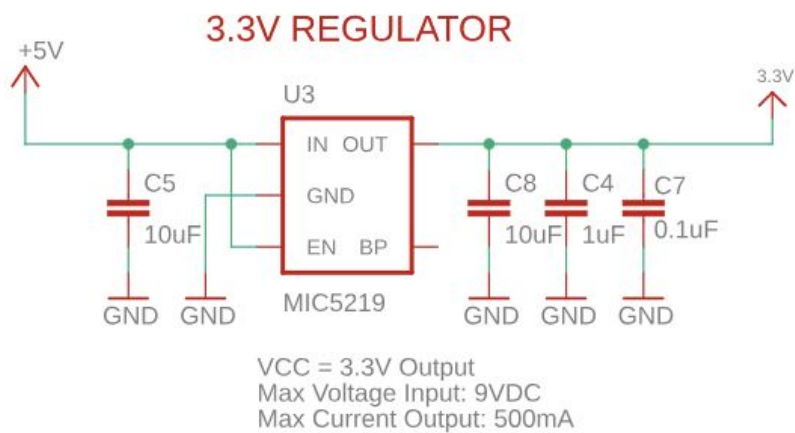
<b>Width</b>	31.00mm
<b>Height</b>	40.00mm
<b>Weight</b>	TBC

## Schematics

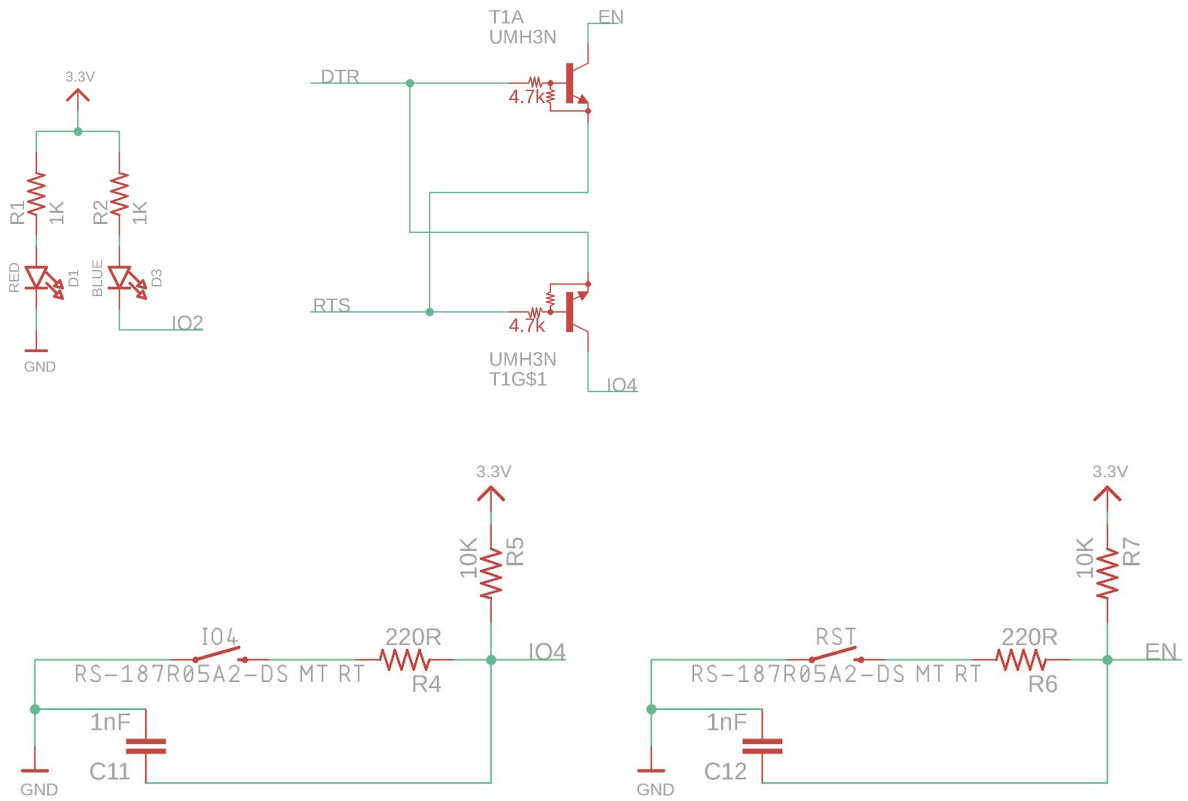
### USB



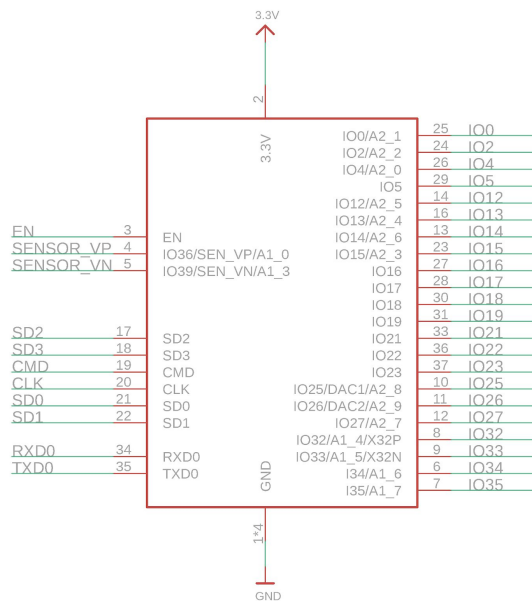
### Power

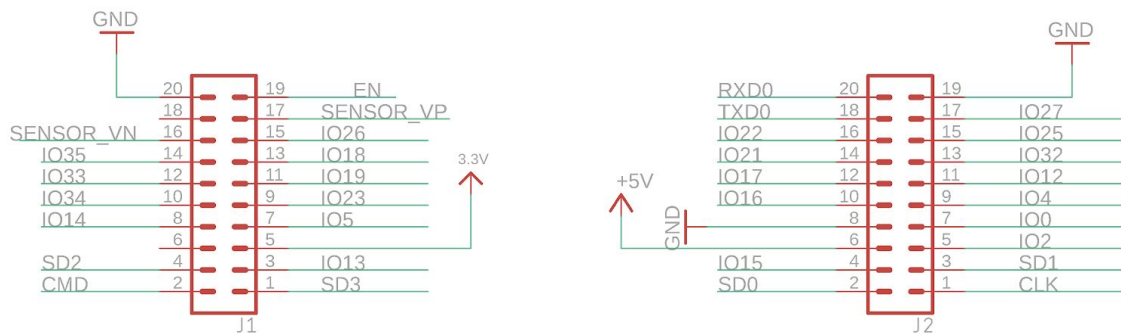


User I/O



ESP-WROOM-32 Module





## Bill of Materials

Reference Designator	Part Description	Part Package	Manufacturers Name	Manufacturers Part Number
C1, C2, C3, C7, C10	CAP CER 0.1UF 10V X5R 0402	CAP-0402	Samsung Electro-Mechanics	CL05A104MP5NNNC
C4	CAP CER 1UF 10V X5R 0402	CAP-0402	Yageo	CC0402KRX5R6BB105
C5, C8, C9	CAP CER 10UF 10V X5R 0603	CAP 0603	Murata Electronics North America	GRM188R61A106ME69D
C11, C12	CAP CER 0402 1NF 100V C0G 10%	CAP-0402	KEMET	C0402C102K1GCAUTO
D1	LED RED CLEAR 0805 SMD	0805 SMD	Würth Electronics Inc.	150080RS75000
D2	DIODE SBR 40V 1A SOD123F	SOD123F	Diodes Incorporated	1N5819HW1-7-F
D3	LED BLUE CLEAR 0805 SMD	0805 SMD	Würth Electronics Inc.	150080BS75000
IC1	IC SGL USB-TO-UART BRIDGE 24QFN	24QFN	Silicon Labs	CP2104-F03-GMR
J1, J2	QTY. 4 SHORT 2X10 STACKABLE HEAD	TH	Schmartboard, Inc.	920-0133-01
R1, R2, R8, R11	RES SMD 1K OHM 0.5% 1/16W 0402	RES-0402	Susumu	RR0510P-102-D
R3, R5, R7	RES SMD 10K OHM 0.5% 1/16W 0402	RES-0402	Susumu	RR0510P-103-D
R4, R6	RES SMD 220 OHM 0.5% 1/16W 0402	RES-0402	Susumu	RR0510P-221-D
R9, R10	RES SMD 470 OHM 0.5% 1/16W 0402	RES-0402	Susumu	RR0510P-471-D
RST, IO4	SWITCH TACTILE SPST-NO 0.05A 12V	SMD	C&K	RS-187R05A2-DS MT RT
T1	TRANS 2NPN PREBIAS 0.15W UMT6	SOT363	Rohm Semiconductor	UMH3NTN
U3	IC REG LINEAR 3.3V	SOT23-5	Microchip Technology	MIC5219-3.3YM5-TR

	500MA SOT23-5			
USB	CONN RCPT USB2.0 MICRO B SMD R/A	USB	Amphenol ICC (FCI)	10118194-0001LF
X2	SMD MODULE, ESP32-D0WDQ6, 32MBIT	SMD	Espressif Systems	ESP32-WROOM-32

## Qualifications and Approvals

### ESP-WROOM-32 Module

Certification	Issue Date	Link
ESP32-WROOM-32 FCC (Wi-Fi + BT4.0) Certification	13th April 2018	<a href="https://www.espressif.com/sites/default/files/esp32-wroom-32_fcc_wi-fi_bt4.0_certificate.pdf">https://www.espressif.com/sites/default/files/esp32-wroom-32_fcc_wi-fi_bt4.0_certificate.pdf</a>
ESP32-WROOM-32 FCC (BT) Certification	13th April 2018	<a href="https://www.espressif.com/sites/default/files/esp32-wroom-32_fcc_bt_certificate.pdf">https://www.espressif.com/sites/default/files/esp32-wroom-32_fcc_bt_certificate.pdf</a>
ESP32-WROOM-32 CE Certification	13th April 2018	<a href="https://www.espressif.com/sites/default/files/esp32-wroom-32_ce_certificate.pdf">https://www.espressif.com/sites/default/files/esp32-wroom-32_ce_certificate.pdf</a>
ESP32-WROOM-32 IC Certification	13th April 2018	<a href="https://www.espressif.com/sites/default/files/esp32-wroom-32_ic_certificate.pdf">https://www.espressif.com/sites/default/files/esp32-wroom-32_ic_certificate.pdf</a>
ESP32-WROOM-32 NCC Certification	13th April 2018	<a href="https://www.espressif.com/sites/default/files/esp32-wroom-32_ncc_certificate.pdf">https://www.espressif.com/sites/default/files/esp32-wroom-32_ncc_certificate.pdf</a>
ESP32-WROOM-32 KCC Certification	13th April 2018	<a href="https://www.espressif.com/sites/default/files/esp32-wroom-32_kcc_certificate.pdf">https://www.espressif.com/sites/default/files/esp32-wroom-32_kcc_certificate.pdf</a>
ESP32-WROOM-32 MIC Certification	13th April 2018	<a href="https://www.espressif.com/sites/default/files/esp32-wroom-32_mic_certificate.pdf">https://www.espressif.com/sites/default/files/esp32-wroom-32_mic_certificate.pdf</a>
ESP32-WROOM-32 SRRC Certification	31st May 2018	<a href="https://www.espressif.com/sites/default/files/esp32-wroom-32_srcc_certificate.pdf">https://www.espressif.com/sites/default/files/esp32-wroom-32_srcc_certificate.pdf</a>
ESP32-WROOM-32 BQB Certification	13th December 2017	<a href="https://www.espressif.com/sites/default/files/esp-wroom-32_bqb_certificate.pdf">https://www.espressif.com/sites/default/files/esp-wroom-32_bqb_certificate.pdf</a>
ESP32-WROOM-32 CE Certificate Appendix	21st August 2018	<a href="https://www.espressif.com/sites/default/files/ESP32-WROOM-32_CE_Certificate_Appendix.pdf">https://www.espressif.com/sites/default/files/ESP32-WROOM-32_CE_Certificate_Appendix.pdf</a>
ESP32-WROOM-32 Wi-Fi Certification	13th September 2018	<a href="https://www.espressif.com/sites/default/files/ESP32-WROOM-32_Wi-Fi_Certificate.pdf">https://www.espressif.com/sites/default/files/ESP32-WROOM-32_Wi-Fi_Certificate.pdf</a>

## Revision History

Revision	Date	Author	Comments
DRAFT	15th January 2019	CL	Initial draft version
v.1	20th February 2019	ANS	Version 1 - Presented to CEI for testing purposes
v.1.1	23rd April 2019	ANS	Version 1.1 - Voltage reduced

## Contact

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