DevLab Module Datasheet

Complete Technical Specifications

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DevLab Electronics

Versión: v1.0

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System Topology

Figure 1: System Topology

1 DevLab Overview

DevLab is a compact embedded module with Wi-Fi and Bluetooth capabilities, designed for IoT applications and rapid prototyping.

1.1 Features

- **Dual-core microcontroller** (240 MHz)
- **Up to 27 GPIOs** configurable
- **Integrated wireless support** (Wi-Fi & Bluetooth)
- **Low power consumption** modes
- **Extensive peripheral support**

1.2 Technical Specifications

1.2.1 Processor & Memory

Parameter	Value	Unit	Notes
CPU	Dual-core Xtensa LX6	240 MHz	32-bit RISC
Flash Memory	4 MB	MB	External SPI Flash
SRAM	520 KB	KB	Internal SRAM
RTC Memory	16 KB	KB	Ultra Low Power

1.2.2 Power Specifications

Parameter	Min	Typ	Max	Unit	Conditions
Supply Voltage	2.2	3.3	3.6	V	Normal Operation
Active Current	-	160	260	mA	Wi-Fi Tx @ 19.5dBm
Sleep Current	-	5	10	ţA	Deep Sleep Mode
Standby Current	-	240	350	ţA	Light Sleep Mode

1.2.3 Wireless Capabilities

Wi-Fi Specifications

- **Standards**: 802.11 b/g/n (2.4 GHz)

Pinout Diagram

Figure 2: Pinout Diagram

- **Data Rate**: Up to 150 Mbps
- **Output Power**: +19.5 dBm max
- **Antenna**: Integrated PCB antenna

Bluetooth Specifications

- **Version**: Bluetooth v4.2 BR/EDR and BLE
- **Output Power**: +9 dBm max
- **Range**: Up to 100m (open field)

1.3 GPIO Configuration

1.3.1 Available Pins

Pin	Function	Voltage	Drive Current	Special Features
GPIO0	Digital I/O	3.3V	40 mA	Boot control
GPIO1	UART0_TXD	3.3V	40 mA	Default debug output
GPIO2	Digital I/O	3.3V	40 mA	LED control
GPIO3	UART0_RXD	3.3V	-	Default debug input
GPIO4-5	Digital I/O	3.3V	40 mA	General purpose

1.3.2 ADC Capabilities

The module includes a 12-bit SAR ADC with the following characteristics:

- **Resolution**: 12-bit (4096 levels)
- **Input Range**: 0 - 3.3V
- **Channels**: 8 channels available
- **Sampling Rate**: Up to 2 Msps

1.4 Communication Interfaces

1.4.1 UART

- **Channels**: 3 hardware UART controllers
- **Baud Rate**: Up to 5 Mbps
- **Features**: Hardware flow control, DMA support

Physical Dimensions

Figure 3: Physical Dimensions

Top View

Figure 4: Top View

1.4.2 SPI

- **Channels**: 4 SPI controllers
- **Speed**: Up to 80 MHz
- **Modes**: Master/Slave operation
- **Features**: DMA support, flexible pin mapping

1.4.3 I2C

- **Channels**: 2 I2C controllers

- **Speed**: Standard (100 kHz), Fast (400 kHz), Fast+ (1 MHz)
- **Features**: Multi-master support, 7/10-bit addressing

1.5 Physical Characteristics

1.5.1 Package Information

Parameter	Value	Unit
Package Type	QFN-48	-
Dimensions	6 x 6 x 0.9	mm
Pin Pitch	0.4	mm
Weight	0.5	g

1.5.2 Environmental Specifications

Parameter	Min	Max	Unit	Conditions
Operating Temperature	-40	+85	řC	Commercial grade
Storage Temperature	-55	+125	řC	-

Bottom View

Figure 5: Bottom View

Parameter	Min	Max	Unit	Conditions
Humidity	10	95	%RH	Non-condensing

1.6 Software Support

1.6.1 Development Environment

- **Arduino IDE**: Full support with ESP32 core
- **ESP-IDF**: Native Espressif framework
- **PlatformIO**: Cross-platform IDE support
- **MicroPython**: Python support for rapid development

1.6.2 Key Libraries

- WiFi & Bluetooth connectivity
- FreeRTOS real-time operating system
- Hardware abstraction layer (HAL)
- Over-the-air (OTA) update support

1.7 Applications

The DevLab module is ideal for:

1. **IoT Sensors & Actuators**
    - Environmental monitoring
    - Smart home devices
    - Industrial automation
2. **Prototyping & Development**
    - Rapid proof-of-concept
    - Educational projects
    - Research applications
3. **Commercial Products**
    - Smart appliances
    - Wearable devices
    - Connected lighting

Circuit Schematic

Figure 6: Circuit Schematic

1.8 Safety & Compliance

1.8.1 Certifications

- **FCC**: Part 15.247 (USA)
- **CE**: EN 300 328, EN 301 489 (Europe)
- **IC**: RSS-210 (Canada)

1.8.2 Safety Features

- **ESD Protection**: ś2kV HBM on all pins
- **Latch-up Immunity**: ś100mA
- **Thermal Protection**: Automatic thermal shutdown

1.9 Ordering Information

Part Number	Description	Package	MOQ
DEVLAB-001	Standard Module	Tray	100
DEVLAB-001R	RoHS Compliant	Tape & Reel	1000
DEVLAB-DEV	Development Kit	Individual Box	1

1.10 Revision History

Version	Date	Changes
1.0	2025-07-18	Initial release

1.11 Schematics

For technical support and additional information, visit our website or contact our engineering team.