• Description

SemeaTech EC DEMO BOARD is a general testing module specifically designed for SemeaTech electrochemical gas sensors, which was developed to meet a wide range of sensor evaluation and testing demands. Once sensors are connected to the board, the SIG pin outputs a voltage signal corresponding to the sensor's operating status. By monitoring this voltage signal, users can observe the sensors' performance in real time. When sensors detect different concentrations of target gases, the output voltage on SIG pin changes accordingly. This board can be used to verify sensor functionality, determine whether sensors are damaged and ensure that sensors are operating properly and not affected by circuit-level issues

EC DEMO BOARD is compatible with SemeaTech's 3-Series, 4-Series, 7-Series, and mini-Series electrochemical sensors.

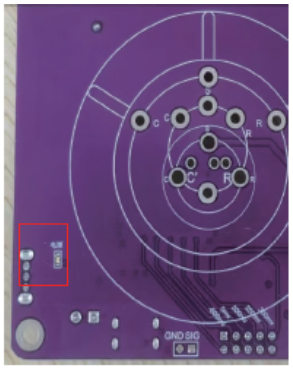
• General Information

Dimension:	10cm*8cm
Input Voltage:	3.3v-5v
Operating Current:	About 300μA
Power Supply:	Type-C、3.81 mm Connector、AAA Battery
Load Resistor (Current-to-Voltage Gain):	R13(10k)(User-adjustable and replaceable)
SIG Zero-point Voltage:	1.50v(+-0.05v)

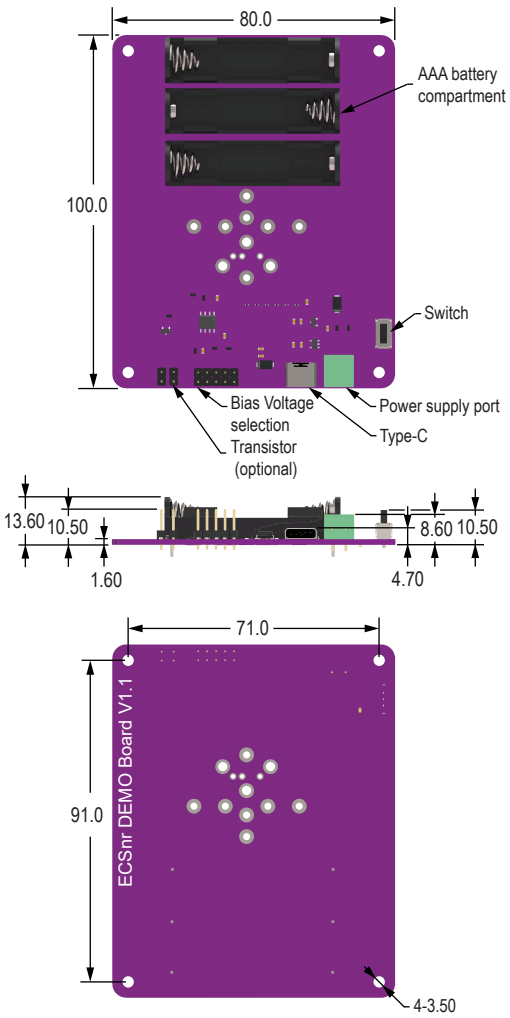
• Usage Instructions

1. Power Supply Method

The device supports two power supply modes: battery power and external power. The modes can be switched by using the toggle switch. When the switch is set to the "Battery" position, the device will operate using the internal batteries. When the switch is set to the "External" position, the device will be powered via either the USB Type-C port or the terminal block. Once the external power is connected, power indicator light will turn on, indicating that the device is successfully powered.



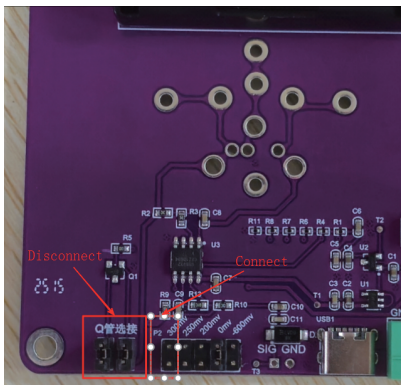
• Product Dimensions



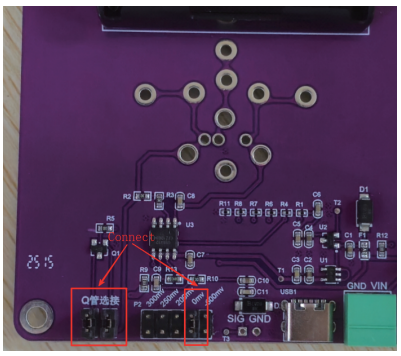
All dimensions in mm

All tolerances ±0.20mm unless otherwise stated

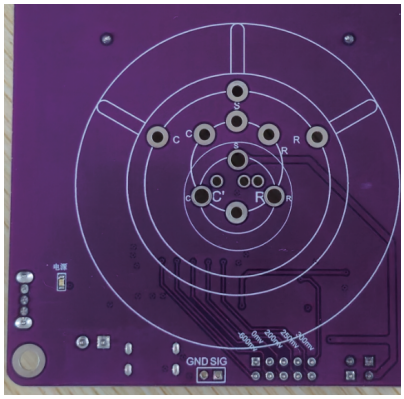
2. Bias Voltage Jumper Settings:
Adjust the jumper caps at the Q transistor position and the bias selection terminals based on whether the sensor under test requires a bias voltage and the required bias level.
2.1 Sensors with bias voltage:
For sensors that require bias voltage, first remove the two jumper caps at the Q transistor selection position. Then, place the jumper cap on the bias selection terminal at the desired bias voltage position, ensuring the top and bottom pins are connected.
For example, to set a 300 mV bias voltage, configure the jumper as shown in the diagram.



2.2 Unbiased sensors
For unbiased sensors, connect both jumper caps at the Q transistor selection position, and place the jumper cap on the bias selection terminal at the position marked 0 mV, ensuring the top and bottom pins are connected.

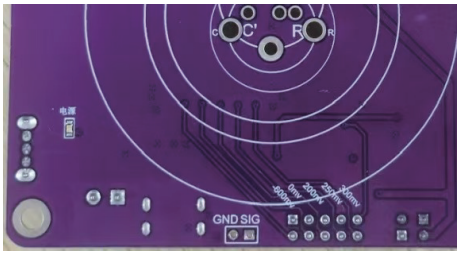


3. Sensor Connection
Insert the sensor to be tested into the corresponding socket as shown in the diagram. Allow it to stabilize for a period of time until the SIG signal stabilizes before proceeding to the next measurement step."



4. Signal Output and Measurement:

During device operation, the SIG port outputs a voltage signal. This signal can be directly measured using instruments such as a multimeter. Alternatively, it can be connected to data acquisition devices, microcontrollers, or similar systems for data reading and further processing.



Instructions for Use

After correctly inserting the sensor and powering it on, it is necessary to wait for a certain period to allow sensor to operate stably under powered conditions and reach the normal working state, so that the signal output stabilizes around the baseline. When the sensor is stable, the theoretical zero-point voltage of the Sig output signal should be 1.50 V. The actual value may have a deviation of up to ±0.05 V, which is considered normal.

fter stabilization, the voltage value of the SIG signal, VSIG , is given by:

VSIG=V0+(I×R13)

This means the sensor output current I, after passing through the transimpedance amplifier, is converted into a voltage that is added on top of the reference voltage V0. The magnitude of the added voltage is equal to the sensor output current I multiplied by the feedback resistor R13 . The amplifier resistor R13 (in 0603 package) inside the transimpedance amplifier can be replaced as needed to adjust the amplification factor.

Selection and Replacement of the Amplification Resistor

The amplification resistor R13 is set to 10kΩ by default, soldered at the position shown in the diagram below. If you need to change the amplification factor, please replace this resistor with another one in a 0603 package by soldering.