lamaPLC: INA226 - current/voltage/power monitor with I²C communication

36V, 16-bit, ultra-precise i²c output current/voltage/power monitor w/alert

The INA226 is a current shunt and power monitor with an I²C or SMBUS-compatible interface. It monitors both a shunt voltage drop and bus supply voltage. Programmable calibration values, conversion times, and averaging, combined with an internal multiplier, enable direct readouts of current in amperes and power in watts.

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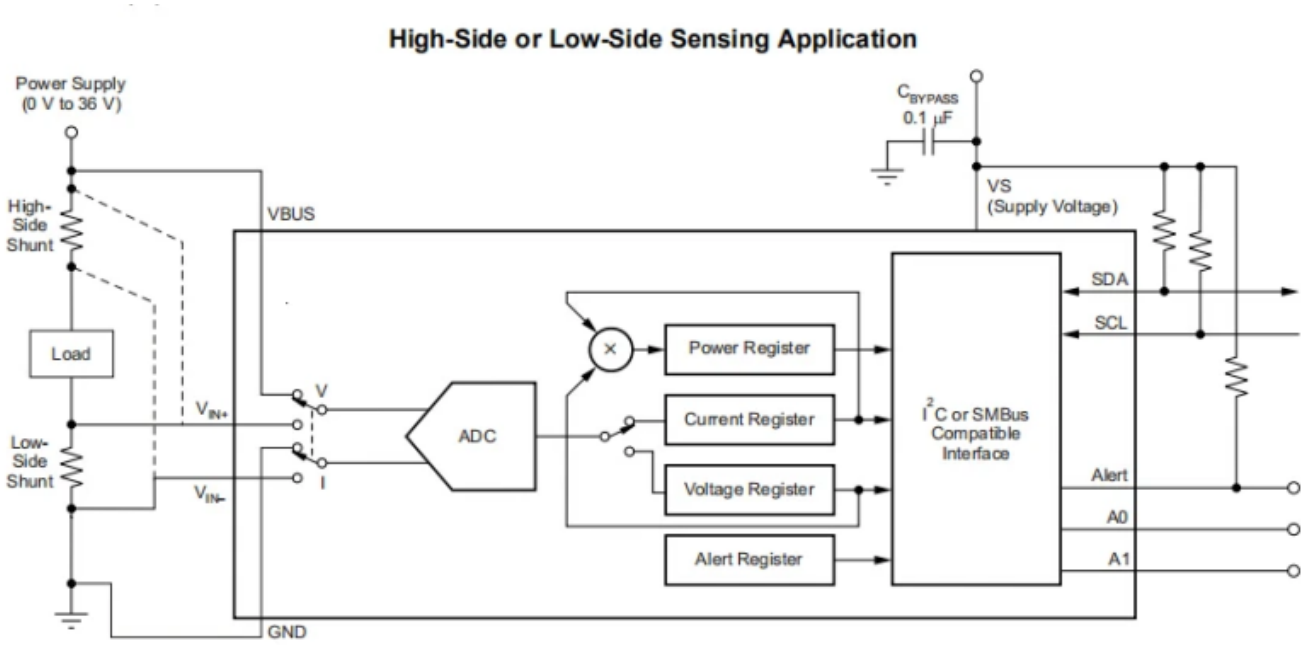
The INA226 supports the fast mode (1 kHz to 400 kHz) and high-speed mode (1 kHz to 2.94 MHz) transmission protocols. All data bytes are transmitted most significant byte first.



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coffee — or a few — please do so here.

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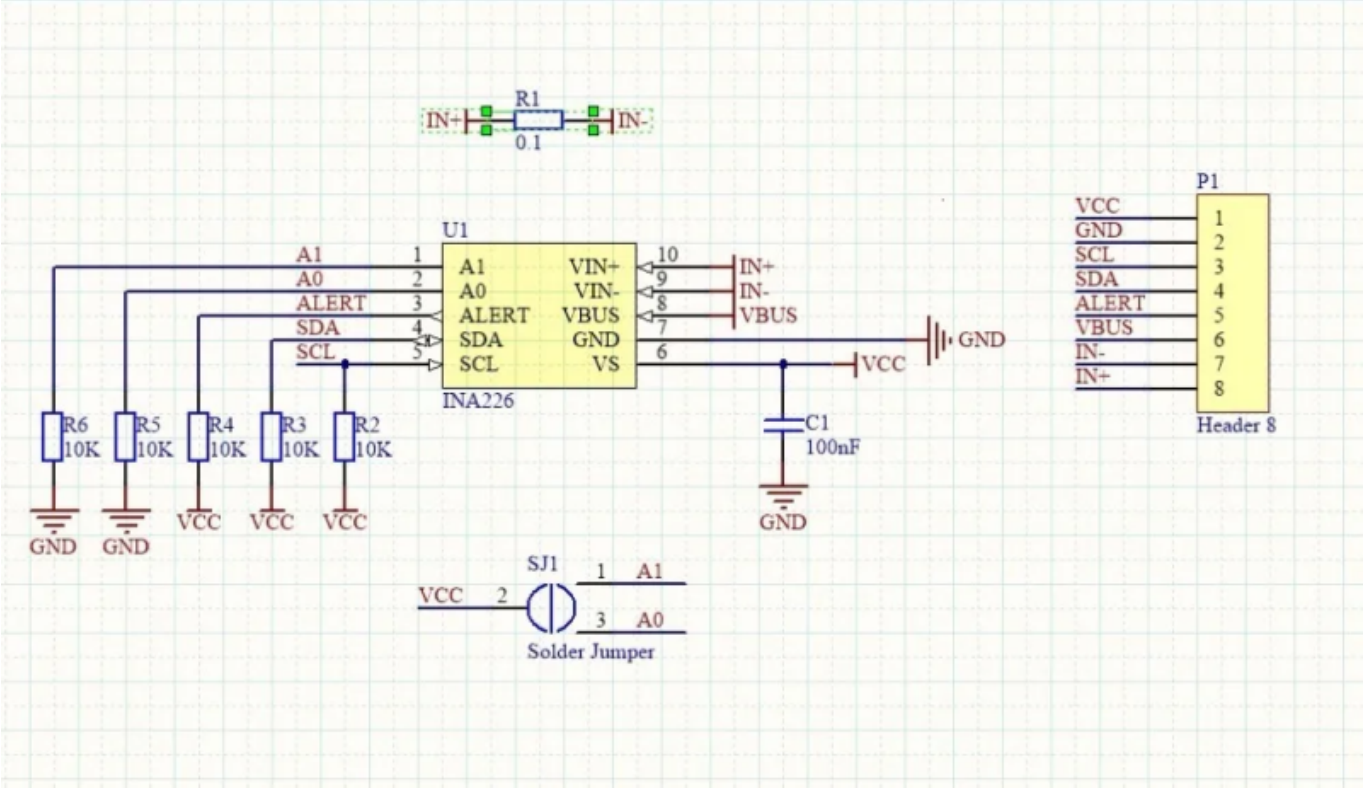
2026/02/14 23:38



Features

- Senses Bus Voltages: 0 V .. 36 V
- Shunt Voltage Maximum: 81.9 V
- Current Maximum: 20 A
- High-Side or Low-Side Sensing
- Reports Current, Voltage, and Power
- High Accuracy:
  - 0.1% Gain Error (Max)
  - 10 µV Offset (Max)
- Configurable Averaging Options
- 16 Programmable Addresses
- Operates from 2.7V to 5.5V Power Supply
- 10-Pin, DGS (VSSOP) Package

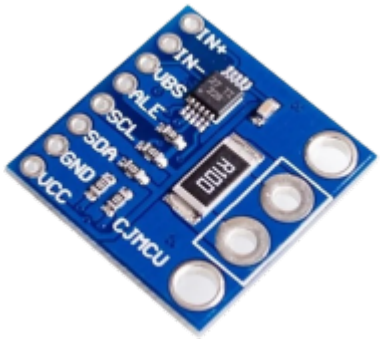
Differences between the INA219 and INA226

The main differences between the **INA219** and **INA226** lie in their measurement resolution, voltage-handling capabilities, and advanced features. The INA226 is considered the *"pro"* version for more

demanding applications.

Feature	Texas Instruments INA219	Texas Instruments INA226
ADC Resolution	12-bit	16-bit (16x more precise)
Max Bus Voltage	26 V	36 V
Shunt Voltage Range	±320 mV	(with PGA) ±81.92 mV
Programmable Gain Amplifier (PGA)	Yes (2x, 4x, 8x gain options)	No
Averaging Engine	Configurable filtering options	Built-in “DSP” engine, up to 1024 samples
Alert Pin	Not explicitly mentioned as programmable	Programmable alert for overcurrent/voltage conditions
Sensing Configuration	High-side only	High-side or low-side
Offset Voltage	Max 100 µV	Max 10 µV

Pin Description



Pin Name	Description
V+ / VS	**Power Supply:** 2.7V to 5.5V for the chip's own logic
GND	**Ground:** Reference point for power and I²C
SCL	**I²C Clock:** Connect to the microcontroller's SCL pin
SDA	**I²C Data:** Connect to the microcontroller's SDA pin
VBUS	**Bus Voltage Input:** Connect this to the high-side or load-side to measure the actual bus voltage (up to 36V)
IN+	**Shunt Positive:** Connect to the supply side of the external shunt resistor
IN-	**Shunt Negative:** Connect to the load side of the external shunt resistor
A0 & A1	**Address Pins:** Used to set the I²C address by tying them to GND, VS, SDA, or SCL
ALERT	**Programmable Alert:** Open-drain output that can trigger on over/under voltage or current thresholds

Typical Wiring (High-Side Sensing)

- **V+ and GND:** Connect to your microcontroller's 3.3V or 5V power and ground.
- **SDA and SCL:** Connect to your microcontroller's I²C pins.
- **IN+ and IN-:** Place the shunt resistor in series with your load's positive line. Connect IN+ before the resistor and IN- after it.
- **VBUS:** Connect this pin to IN- (load side) for standard high-side power monitoring.

INA226 I2C Address Table

The Texas Instruments INA226 supports up to 16 unique I²C addresses. The address is set by connecting the two address pins (A0 and A1) to one of four possible points: GND, VS (power supply), SDA, or SCL.

The default address is **0x40** (when both pins are connected to GND).

A1 Pin	A0 Pin	Hex Address
GND	GND	**0x40**
GND	VS	0x41
GND	SDA	0x42
GND	SCL	0x43
VS	GND	0x44
VS	VS	0x45
VS	SDA	0x46
VS	SCL	0x47
SDA	GND	0x48
SDA	VS	0x49
SDA	SDA	0x4A
SDA	SCL	0x4B
SCL	GND	0x4C
SCL	VS	0x4D
SCL	SDA	0x4E
SCL	SCL	0x4F

Arduino wiring

- VCC/VSS → Arduino 5V (or 3.3V)
- GND → Arduino GND
- SDA → Arduino SDA (A4 on Uno)
- SCL → Arduino SCL (A5 on Uno)

Arduino example code

In the Arduino IDE, go to *Tools* > *Manage Libraries*, search for "**INA226_WE**", and install the version by *Wollewald*.

This sketch initializes the sensor at the default address (**0x40**) and prints current, voltage, and power to the Serial Monitor.

```
#include <Wire.h>
#include <INA226_WE.h>

#define I2C_ADDRESS 0x40

INA226_WE ina226 = INA226_WE(I2C_ADDRESS);
```

```
void setup() {
  Serial.begin(9600);
  Wire.begin();

  // Initialize INA226
  if (!ina226.init()) {
    Serial.println("Failed to find INA226 chip. Check wiring!");
    while (1);
  }

  /*
     Optional: Calibrate for your shunt.
     Default is usually 0.1 Ohm.
     Parameters: (Shunt value in Ohms, Max expected current in Amps)
  */
  ina226.waitUntilConversionCompleted();
  Serial.println("INA226 Ready!");
}

void loop() {
  float shuntVoltage_mV = 0.0;
  float loadVoltage_V = 0.0;
  float busVoltage_V = 0.0;
  float current_mA = 0.0;
  float power_mW = 0.0;

  // Read values
  ina226.readAndClearFlags();
  shuntVoltage_mV = ina226.getShuntVoltage_mV();
  busVoltage_V = ina226.getBusVoltage_V();
  current_mA = ina226.getCurrent_mA();
  power_mW = ina226.getBusPower_mW();
  loadVoltage_V  = busVoltage_V + (shuntVoltage_mV / 1000);

  // Print results
  Serial.print("Bus Voltage:   "); Serial.print(busVoltage_V);
Serial.println(" V");
  Serial.print("Current:       "); Serial.print(current_mA);
Serial.println(" mA");
  Serial.print("Power:         "); Serial.print(power_mW); Serial.println("
mW");
  Serial.println("-----------------------------");

  delay(2000);
}
```

Sources

https://www.ti.com/product/INA226#tech-docs (Texas Instruments datasheet)

I²C topics on lamaPLC

Page	Date	Tags
• lamaPLC Communication: 1-Wire	2026/04/23 21:51	1-wire, communication, bus, microlan, i2c, uart, usart, ds18b20
• lamaPLC Communication: I²C	2025/09/23 21:25	i2c, i c, smbus, philips, bus, communication, arduino
• lamaPLC project: Sension SCD CO² measurement module	2026/04/15 19:34	scd30, scd40, scd41, iaq, ndir, sensor, i2c, arduino code
• LamaPLC: AHT10 Modul	2026/03/22 03:14	communication, i2c, temperature, humidity, sensor, aht, aht 10, modul
• LamaPLC: AHT20 / BMP280 Modul	2026/04/23 21:52	bmp280, aht20, adafruit, temperature, humidity, pressure, sensor, arduino, code, i2c
• LamaPLC: APDS - Avago ALS and proximity detection sensors with I²C communication	2026/04/23 21:52	avago, apds-9900, apds-9930, apds-9960, als, proximity, detection, gesture recognition, gesture, i2c, communication, sensor, arduino, code
• lamaPLC: Arduino Modul: BME680	2026/05/12 18:40	code, c, 2026, arduino, bme680, sensor, i2c, comunication
• lamaPLC: AS5600 Magnetic Induction Angle Measurement Sensor Module	2026/05/13 00:06	communication, i2c, as5600, as-5600, magnetic, induction, angle, sensor
• lamaPLC: Bi-Directional Logic Level Converter 3.3V ↔ 5V	2026/04/12 00:34	bi-directional, logic level converter, i2c, uart, spi
• LamaPLC: BMP/BME Bosch Temperature/Humidity/Pressure sensors with I²C communication	2026/04/23 21:52	bme280, bme680, bme688, bmp180, bmp280, hw-611, hw611, bosch, temperature, humidity, pressure, sensor, arduino, i2c, communication, ai, cjmcu, volatile organic compounds, vocs, volatile sulfur compounds, vscs, iaq
• LamaPLC: CJMCU-219/INA-219 breakout board/IC with I²C communication	2026/04/23 21:52	cjmcu-219, ina-219, ina219, breakout board, i2c, communication, sensor, voltage, current, arduino, code, cjmcu
• LamaPLC: CJMCU-3216 / AP-3216 integrated digital ambient light and proximity sensor module/IC with I²C communication	2026/04/23 21:52	cjmcu-3216, cjmcu, ap-3216, ap3216, ambient light, proximity, sensor, arduino, code, i2c, communication
• lamaPLC: CJMCU-811 CCS811 Gas Sensor (VOCs TVOC CO2)	2026/04/23 21:52	cjmcu-811, ccs811, gas, sensor, vocs, tvoc, eco2, co2, arduino, air quality metal oxide, mox, i2c, micropython, rp2040-eth
• LamaPLC: D6T Omron Non-Contact Thermal Sensors with I²C communication	2026/04/23 21:52	d6t, d6t-32l, d6t-44l, d6t-8l, d6t-1a, omron, non-contact, thermal, sensor, i2c, arduino, code
• LamaPLC: DPS Infineon Temperature/Pressure sensors with I2C communication	2026/04/23 21:52	dps310, infineon, temperature, pressure, sensor, arduino, i2c, communication, code
• lamaPLC: Energy, power, current, and voltage	2025/05/31 23:32	i2c, i c, communication, arduino, energy, power, current, sensor, ina226

• LamaPLC: ENS ScioSense Multi-gas sensors with I²C communication	2026/04/23 21:52	ens160, sciosense, gas-quality, i2c, communication, sensor, arduino, code, eco₂, tvoc, aqi, indoor air quality, iaq, co₂, voc
• lamaPLC: ESP32 / ESP8266	2025/11/22 00:07	esp8266, esp32, esp32-c2, esp32-c3, esp32-c5, esp32-c6, esp32-c61, esp32-h2, esp32-s2, esp32-s3, esp32-p4, espressif systems, communication, ethernet, ip, wi-fi, thread, zigbee, matter, homekit, bluetooth, mqtt, adc, spi, uart, i2c, i2s, rmt, pwm, usb, usb otg, twai
• LamaPLC: Gas sensors	2023/07/01 17:29	gas, sensor, i2c, onewire, communication, mq-3, mq-4, mq-5, mq-6, mq-7, mq-8, mq-9, mq-135, gm-102b, gm-302b, gm-502b, gm-702b, alcohol, ch4, natural gas, smoke, lng, co, co2, lpg, h2, iso-butane, nox, nh3, benzene, town gas, formaldehyde, propane, humidity, temperature, voc, grv gas sens v2
• lamaPLC: GY-511 6DOF sensor module	2026/03/22 01:44	stmicroelectronics, lsm303dlhc, i2c, lsm303, sensor, gy-511, 6dof, pololu, module, arduino
• LamaPLC: GY-9250 MPU-9250/6500 9-axis Attitude Sensor Board	2026/04/23 21:52	ak8963, gy-9250, mpu-9250, 9-axis, motion detection, magnetometer, communication, i c, i2c, spi
• LamaPLC: HDC Texas Instruments Temperature/humidity sensors with I²C communication	2026/04/23 21:52	sht21, htu21, si7021, gy-21, gy-213v, hdc1080, gy-213v-hdc1080, cjmcu, cjmcu-1080, texas instruments, temperature, humidity, sensor, i2c, communication, arduino, code
• lamaPLC: HT16K33 display controller	2026/04/23 21:51	i2c, 7-segment display, display, ht16k33, arduino
• LamaPLC: HTU TE Connectivity temperature/humidity sensors with I²C communication	2026/04/23 21:52	htu, htu31d, htu21d, htu20d, sht20, htu20, sht21, htu21, si7021, gy-21, gy-213v, hdc1080, si702, gy-20, sht31, htu31, si7031, gy-31, te connectivity, temperature, humidity, i2c, communication, sensor, arduino, code
• lamaPLC: INA modules with Arduino libraries	2026/04/23 21:52	i2c, i c, communication, arduino, energy, power, current, monitor, sensor, ina219, gy-219, ina226, gy-216, ina228, gy-228, ina237, ina238, ina260, ina3221, ina
• lamaPLC: INA226 - current/voltage/power monitor with I²C communication	2026/04/23 21:52	i2c, i c, communication, arduino, energy, power, current, monitor, sensor, ina226, ina219, ina
• lamaPLC: LCD 1602/2004 with I²C communication	2026/02/14 18:27	communication, i2c, display, lcd, 1602, 2004, hd44780, pcf8574, pcf8574t, pcf8574at, arduino

• LamaPLC: MAX30100/MAX30102 Heart Rate Click Sensor Module	2026/04/23 21:52	max30102, max30100, heart rate click, sensor, communication, i2c, arduino, code
• lamaPLC: MCP23017 / MCP23S17 16-Bit I/O Expander with Serial Interface I²C / SPI	2026/04/23 21:52	communication, i2c, mcp23017, mcp23s17, spi, i o expander, serial, cjmcu-2317, cjmcu
• lamaPLC: MLX90614 (GY-906) infrared non-contact thermometer	2026/05/08 00:03	communication, i2c, temperature, mlx90614, gy-906, modul, infrared, non-contact thermometer, dsp, pwm, smbus, hailege
• lamaPLC: PCF857x I/O Expander chip/modul with I²C communication	2026/05/14 15:21	communication, i2c, pcf857x, pcf8574, pcf8574a, pcf8575, i o expander, i o extension, nxp, texas instruments
• LamaPLC: Pixart PAJ7620U2 Gesture recognition sensors/module with I²C communication	2026/04/23 21:52	paj7620u2, gy-paj7620, pixart, gesture recognition, i2c, communication, sensor, arduino, code
• lamaPLC: RP2040_ETH_Modul: I²C scanner	2026/05/12 16:20	code, micropython, 2026, rp2040 eth, i2c, comunication
• lamaPLC: RP2040_ETH_Modul: MLX90614 simple	2026/05/12 17:06	code, micropython, 2026, rp2040 eth, i2c, communication, mlx90614
• lamaPLC: RP2040_ETH_Modul: Read BME 680/688 sensor data	2026/05/12 21:06	code, micropython, 2026, rp2040 eth, bme680, i2c, sensor, communication
• lamaPLC: RP2040_ETH_Modul: Read BME 680/688 sensor data and store in Modbus input registers	2026/05/12 18:58	code, micropython, 2026, rp2040 eth, bme680, i2c, sensor, communication
• LamaPLC: SC16IS750 / SC16IS752: One or two serial (UART) ports from microcontroller via I²C or SPI communication	2026/04/23 21:52	cjmcu-750, cjmcu-752, cjmcu, nxp, sc16is750, sc16is752, uart, serial, i2c, spi, modul, converter, arduino, code
• LamaPLC: SGP Sensirion TVOC/VOC sensors with I²C communication	2026/04/15 19:41	sgp30, sgp40, sgp41, sensirion, gas-sensor, i2c, communication, sensor, arduino, code, eco₂, voc, tvoc, indoor air quality, iaq, nox, hydrogen
• LamaPLC: SHT Sensirion Temperature/humidity sensor with I²C communication	2026/04/23 21:52	sht20, sht21, sht25, sht30, sht31, sht35, sht40, gy21, temperature, humidity, i2c, communication, sensor, arduino, code
• lamaPLC: Signal level converters	2026/02/14 23:47	pca9306, i2c, voltage, level, converter
• lamaPLC: st756x display drivers	2026/05/20 16:17	display, driver, i2c, spi, lcd, cog, oled, st7565, st7567, gm12864, gm12864-59n, gm12864-03a, gm12864-01a, gme12864-41
• lamaPLC: TCA9548A (HW617); Low-Voltage 8-Channel I²C Switch Module	2026/02/14 23:51	tca9548a, hw617, i2c, switch, communication, expansion board, arduino
• lamaPLC: TM1637 7-segment display	2026/02/14 18:26	i2c, 7-segment display, display, tm1637, arduino
• LamaPLC: TOFnnnC STMicroelectronics Time-of-Flight (ToF) sensors with I²C communication	2026/04/23 21:52	tof050c, vl6180, tof200c, vl53l0x, tof400c, vl53l1x, stmicroelectronics, time-of-flight, tof, i2c, communication, sensor, arduino, code

• LamaPLC: VL53Lnn STMicroelectronics time-of-flight (ToF) laser-ranging sensors with I²C communication	2026/04/23 21:52	vl53l0x, vl53l1x, vl53l0 1xv2, gy-530, time-of-flight, tof, laser-ranging, i2c, communication, sensor, arduino, code
• LamaPLC: VL6180X STMicroelectronics Time-of-Flight (ToF) sensor with I²C communication	2026/04/23 21:52	vl6180x, stmicroelectronics, time-of-flight, tof, i2c, communication, sensor, arduino, code
• lamaPLC: XGZP68xx: Silicon Pressure Sensors/Module	2026/05/15 15:17	communication, i2c, sensor, modul, pressure, cfsensor, xgzp68xx, xgzp6810d, xgzp6857d, xgzp6859d, xgzp6887d, xgzp6897d, xgzp6899a, piezoresistive, capacitive
• Magnetic angle sensors	2026/03/05 21:19	magnetic angle sensor, magnetic flux, sensor, spi, i2c, pwm, communication, modul, as5047p, as5600, mt6701, mt6816, mt6835, tle5012b, amr, gmr, tmr, anisotropic magnetoresistive
• SSH1106/SSD1306 OLED Display with I²C communication	2026/02/14 18:27	i2c, oled, display, ssd1306, sh1106, ssh1106, arduino, cmos

I2c, I²C, communication, Arduino, energy, power, current, monitor, sensor, INA226, INA219, INA