

LAMPIRAN

Data sheet Arduino Nano

Arduino Nano (V2.3)

User Manual



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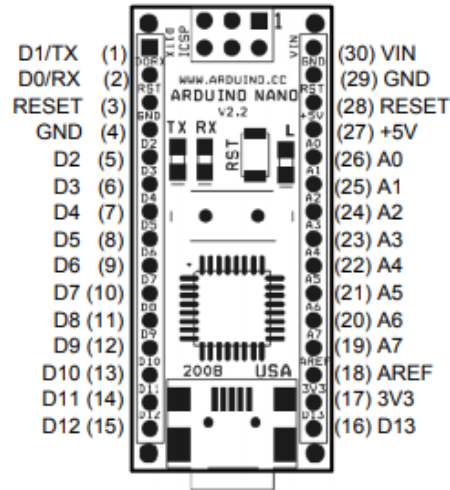
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More information:

www.arduino.cc

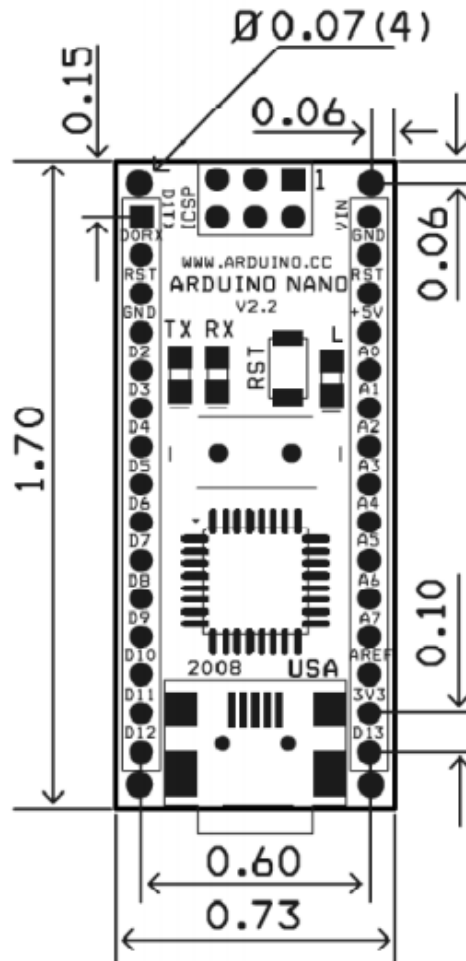
Rev. 2.3

Arduino Nano Pin Layout



Pin No.	Name	Type	Description
1-2, 5-16	D0-D13	I/O	Digital input/output port 0 to 13
3, 28	RESET	Input	Reset (active low)
4, 29	GND	PWR	Supply ground
17	3V3	Output	+3.3V output (from FTDI)
18	AREF	Input	ADC reference
19-26	A7-A0	Input	Analog input channel 0 to 7
27	+5V	Output or Input	+5V output (from on-board regulator) or +5V (input from external power supply)
30	VIN	PWR	Supply voltage

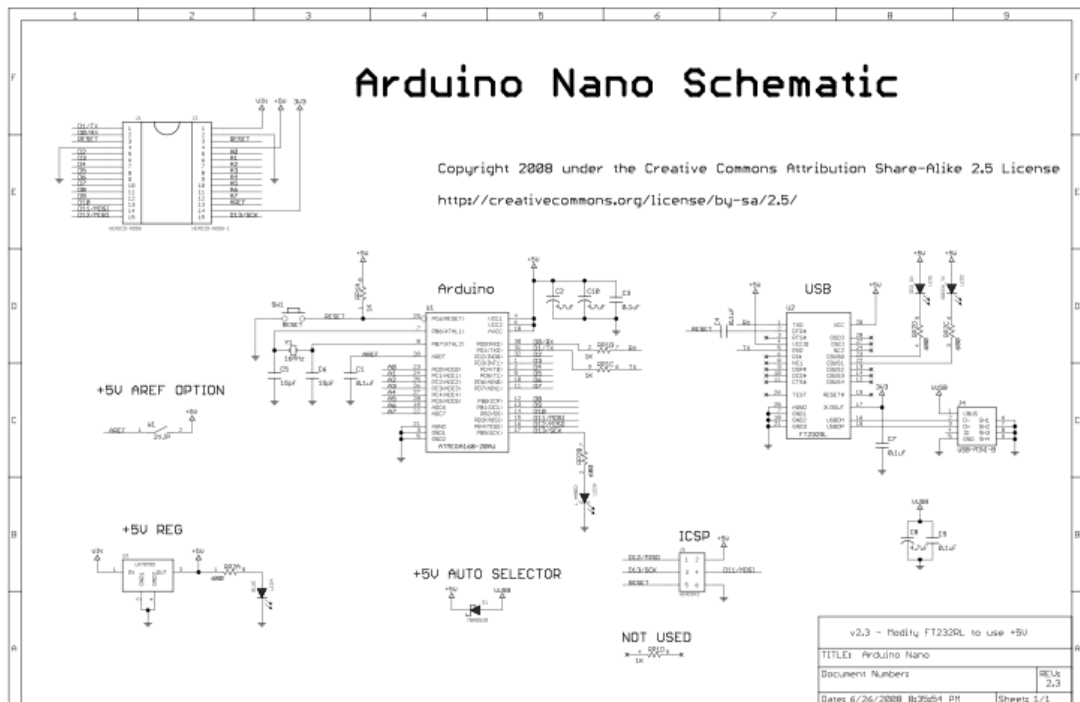
Arduino Nano Mechanical Drawing



ALL DIMENTIONS ARE IN INCHES

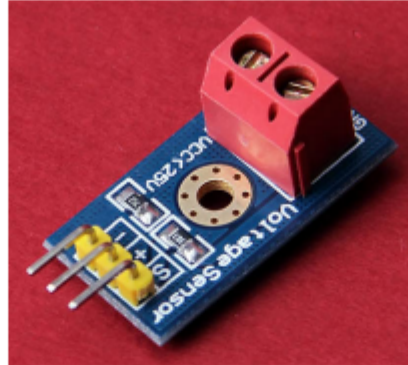
Arduino Nano Bill of Material

Item Number	Qty.	Ref. Dest.	Description	Mfg. P/N	MFG	Vendor P/N	Vendor
1	5	C1,C3,C4,C7,C9	Capacitor, 0.1uF 50V 10% Ceramic X7R 0805	CD805C104K5RACTU	Kemet	80-C0805C104K5R	Mouser
2	3	C2,C8,C10	Capacitor, 4.7uF 10V 10% Tantalum Case A	T491A475K010AT	Kemet	80-T491A475K010	Mouser
3	2	C5,C6	Capacitor, 18pF 50V 5% Ceramic NOP/COG 0805	CD805C180J5GACTU	Kemet	80-C0805C180J5G	Mouser
4	1	D1	Diode, Schottky 0.5A 20V	MBR0520LT1G	ONSem	863-MBR0520LT1G	Mouser
5	1	J1,J2	Headers, 36PS 1 Row	68000-136HLF	FCI	649-68000-136HLF	Mouser
6	1	J4	Connector, Mini-B Recept Rt. Angle	67503-1020	Molex	538-67503-1020	Mouser
7	1	J5	Headers, 72PS 2 Rows	67996-272HLF	FCI	649-67996-272HLF	Mouser
8	1	LD1	LED, Super Bright RED 100mcd 640nm 120degree 0805	APT2012SRCPRV	Kingbright	604-APT2012SRCPRV	Mouser
9	1	LD2	LED, Super Bright GREEN 50mcd 570nm 110degree 0805	APHCM2012CGCK-F01	Kingbright	604-APHCM2012CGCK	Mouser
10	1	LD3	LED, Super Bright ORANGE 160mcd 601nm 110degree 0805	APHCM2012SECK-F01	Kingbright	04-APHCM2012SECK	Mouser
11	1	LD4	LED, Super Bright BLUE 80mcd 470nm 110degree 0805	LTST-C170TBKT	Lite-On Inc	160-1579-1-ND	Digikey
12	1	R1	Resistor Pack, 1K +/-5% 62.5mW 4RES SMD	YC164-JR-071KL	Yageo	YC164J-1.0KCT-ND	Digikey
13	1	R2	Resistor Pack, 680 +/-5% 62.5mW 4RES SMD	YC164-JR-07680RL	Yageo	YC164J-680CT-ND	Digikey
14	1	SW1	Switch, Momentary Tact SPST 150gf 3.0x2.5mm	B3U-1000P	Omron	SW1020CT-ND	Digikey
15	1	U1	IC, Microcontroller RISC 16kB Flash, 0.5kB EEPROM, 23 I/O Pins	ATmega168-20AU	Atmel	556-ATMEGA168-20AU	Mouser
16	1	U2	IC, USB to SERIAL UART 28 Pins SSOP	FT232RL	FTDI	895-FT232RL	Mouser
17	1	U3	IC, Voltage regulator 5V, 500mA SOT-223	UA78M05CDCYRG3	TI	595-UA78M05CDCYRG3	Mouser
18	1	Y1	Cystal, 16MHz +/-20ppm HC-49/US Low Profile	ABL-16.000MHZ-B2	Abracon	815-ABL-16-B2	Mouser



Data sheet sensor tegangan dan sensor arus

Arduino Voltage Sensor Module



Description:

This module is based on resistance points pressure principle, and it can make the input voltage of red terminal reduce 5 times of original voltage.

The max Arduino analog input voltage is 5 V, so the input voltage of this module should be not more than $5\text{ V} \times 5 = 25\text{ V}$ (if for 3.3 V system, the input voltage should be not more than $3.3\text{ V} \times 5 = 16.5\text{ V}$).

Because the Arduino AVR chip have 10 bit AD, so this module simulation resolution is 0.00489 V ($5\text{ V} / 1023$), and the input voltage of this module should be more than $0.00489\text{ V} \times 5 = 0.02445\text{ V}$.

Special Parameters :

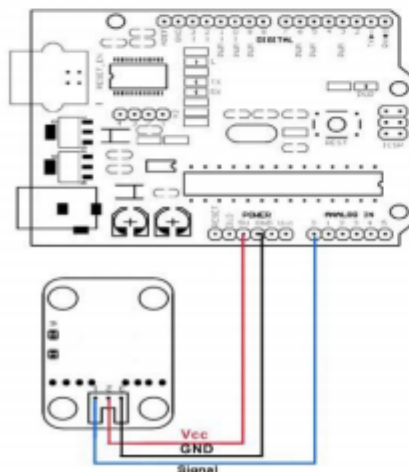
1-Voltage input range : DC0-25 V

2-Voltage detection range : DC0.02445 V-25 V

3-Voltage analog resolution : 0.00489 V

4-DC input interface : red terminal positive with VCC, negative with GND

Connecting Diagram:



EKT
Your Partner To Technology

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MAXIM

Precision, High-Side Current-Sense Amplifiers

MAX471/MAX472

General Description

The MAX471/MAX472 are complete, bidirectional, high-side current-sense amplifiers for portable PCs, telephones, and other systems where battery/DC power-line monitoring is critical. High-side power-line monitoring is especially useful in battery-powered systems, since it does not interfere with the ground paths of the battery chargers or monitors often found in "smart" batteries.

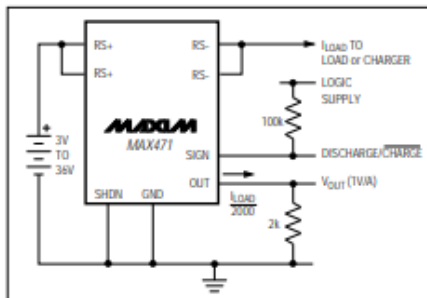
The MAX471 has an internal 35mΩ current-sense resistor and measures battery currents up to ±3A. For applications requiring higher current or increased flexibility, the MAX472 functions with external sense and gain-setting resistors. Both devices have a current output that can be converted to a ground-referred voltage with a single resistor, allowing a wide range of battery voltages and currents.

An open-collector SIGN output indicates current-flow direction, so the user can monitor whether a battery is being charged or discharged. Both devices operate from 3V to 36V, draw less than 100μA over temperature, and include a 18μA max shutdown mode.

Applications

Portable PCs:
Notebooks/Subnotebooks/Palmtops
Smart Battery Packs
Cellular Phones
Portable Phones
Portable Test/Measurement Systems
Battery-Operated Systems
Energy Management Systems

Typical Operating Circuit



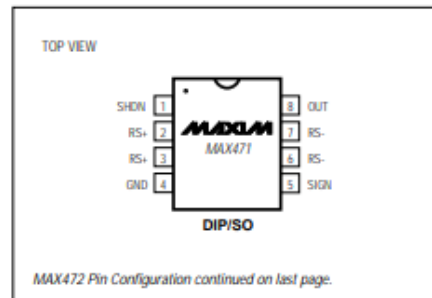
Features

- ♦ Complete High-Side Current Sensing
- ♦ Precision Internal Sense Resistor (MAX471)
- ♦ 2% Accuracy Over Temperature
- ♦ Monitors Both Charge and Discharge
- ♦ 3A Sense Capability with Internal Sense Resistor (MAX471)
- ♦ Higher Current-Sense Capability with External Sense Resistor (MAX472)
- ♦ 100μA Max Supply Current
- ♦ 18μA Max Shutdown Mode
- ♦ 3V to 36V Supply Operation
- ♦ 8-Pin DIP/SO Packages

Ordering Information

PART	TEMP. RANGE	PIN-PACKAGE
MAX471CPA	0°C to +70°C	8 Plastic DIP
MAX471CSA	0°C to +70°C	8 SO
MAX471EPA	-40°C to +85°C	8 Plastic DIP
MAX471ESA	-40°C to +85°C	8 SO
MAX472CPA	0°C to +70°C	8 Plastic DIP
MAX472CSA	0°C to +70°C	8 SO
MAX472EPA	-40°C to +85°C	8 Plastic DIP
MAX472ESA	-40°C to +85°C	8 SO

Pin Configurations


MAXIM

Maxim Integrated Products 1

 For free samples & the latest literature: <http://www.maxim-ic.com>, or phone 1-800-998-8800

Precision, High-Side Current-Sense Amplifiers

MAX471/MAX472

ABSOLUTE MAXIMUM RATINGS

Supply Voltage, RS+, RS-, VCC to GND	-0.3V, +40V
RMS Current, RS+ to RS- (MAX471 only)	±3.3A
Peak Current, (RS+ to RS-)	see Figure 5
Differential Input Voltage, RG1 to RG2 (MAX472 only)	±0.3V
Voltage at Any Pin Except SIGN	
MAX471 only	-0.3V to (RS+ - 0.3V)
MAX472 only	-0.3V to (VCC + 0.3V)
Voltage at SIGN	-0.3V to +40V
Current into SHDN, GND, OUT, RG1, RG2, VCC	±50mA
Current into SIGN	+10mA, -50mA

Continuous Power Dissipation (TA = +70°C)

MAX471 (Note 1):	
Plastic DIP (derate 17.5mW/°C above +70°C)	1.4W
SO (derate 9.9mW/°C above +70°C)	791mW
MAX472:	
Plastic DIP (derate 9.09mW/°C above +70°C)	727mW
SO (derate 5.88mW/°C above +70°C)	471mW
Operating Temperature Ranges	
MAX47_C_A	-0°C to +70°C
MAX47_E_A	-40°C to +85°C
Junction Temperature Range	-60°C to +150°C
Storage Temperature Range	-60°C to +160°C
Lead Temperature (soldering, 10sec)	+300°C

Note 1: Due to special packaging considerations, MAX471 (DIP, SO) has a higher power dissipation rating than the MAX472. RS+ and RS- must be soldered to large copper traces to achieve this dissipation rating.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS—MAX471

(RS+ = +3V to +36V, TA = TMIN to TMAX, unless otherwise noted. Typical values are at TA = +25°C.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS	
Supply Voltage	VRS+		3		36	V	
Supply Current	IRS+	ILOAD = 0A, excludes ISIGN		50	113	µA	
Sense Current	ILOAD				±3	ARMS	
Sense Resistor	RSENSE			35	70	mΩ	
Current-Sense Ratio	IOUT/ILOAD	ILOAD = 1A, RS+ = 10V	MAX471C	0.490	0.500	0.510	mA/A
			MAX471E	0.4875	0.500	0.5125	
No-Load OUT Error		ILOAD = 0A, RS+ = 10V			2.5	µA	
Low-Level OUT Error		ILOAD = 30mA, RS+ = 10V	MAX471C			±2.5	µA
			MAX471E			±3.0	
Power-Supply Rejection Ratio	PSRR	3V ≤ RS+ ≤ 36V, ILOAD = 1A			0.1	%/V	
SIGN Threshold (ILOAD required to switch SIGN)		MAX471C		±4.0	±6.0	mA	
		MAX471E			±7.0		
SIGN Output Leakage Current		VSIGN = 36V			1.0	µA	
SIGN Sink Current	IOL	VSIGN = 0.3V	0.1			mA	
Shutdown Supply Current	IRS+(SHDN)	VSHDN = 2.4V, VCC = 3V to 20V		1.5	18.0	µA	
SHDN Input Low Voltage	VIL				0.3	V	
SHDN Input Low Current	IIL	VSHDN = 0V			1.0	µA	
SHDN Input High Voltage	VH		2.4			V	
SHDN Input High Current	IHH	VSHDN = 2.4V			1.0	µA	
OUT Output Voltage Range	VOUT		0		VRS+ - 1.5	V	
OUT Output Resistance	ROUT	ILOAD = 3.0A, VOUT = 0V to (VRS+ - 1.5V)	1	3		MΩ	
OUT Rise, Fall Time	tr, tf	ILOAD = 50mA to 3.0A, ROUT = 2kΩ, COUT = 50pF, 10% to 90%		4		µs	
OUT Settling Time to 1% of Final Value	ts	ILOAD = 100mA to 3.0A, ROUT = 2kΩ, COUT = 50pF		15		µs	

SIM800L GSM Module

Technical Manual Rev 1r0



The SIM800L is a quad-band GSM/GPRS module, that works on frequencies GSM850MHz, EGSM900MHz,DCS1800MHz and PCS1900MHz where it can meet all the space requirements in user applications, such as smart phone, PDA and other mobile devices. It has a microSIM slot. antenna for the network signal, microphone, speaker pin outs and ring. The power supply requirements for this module is restrictly 3.4 to 4.4V DC with the minimum 2A. (Note: Do not use this directly to the Arduino board or any 5V source without regulator, it also needs a voltage translator for better serial communications).

Features:

- With power saving technique for low current consumption.
- Audio channel which includes two microphone input, a receiver output and a speaker output.
- External antenna pad

General Specifications:

Power Supply: 3.4 to 4.4VDC (4.0V Typical)
Current Required: 1A-2.6A(MAX)
Band Frequency: Quad-band
Default baud rate : 9600bps
Working Temperature range: -40 °C ~ +85 °C
SIM Interface: 1.3V, 3V
Timing Functions : Use AT Commands Set
PCB Dimensions: 23 mm x 25 mm

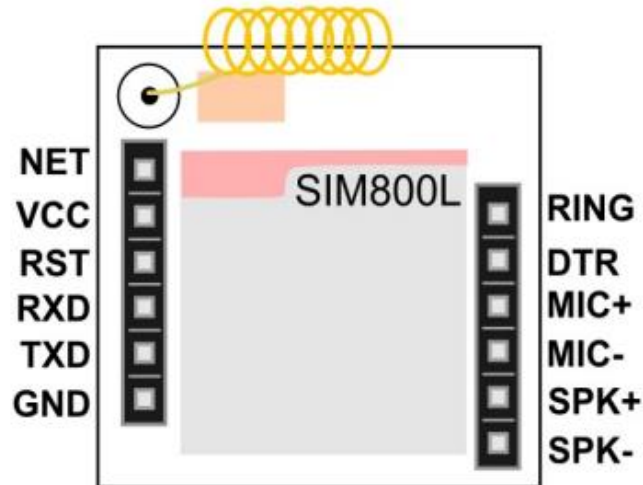
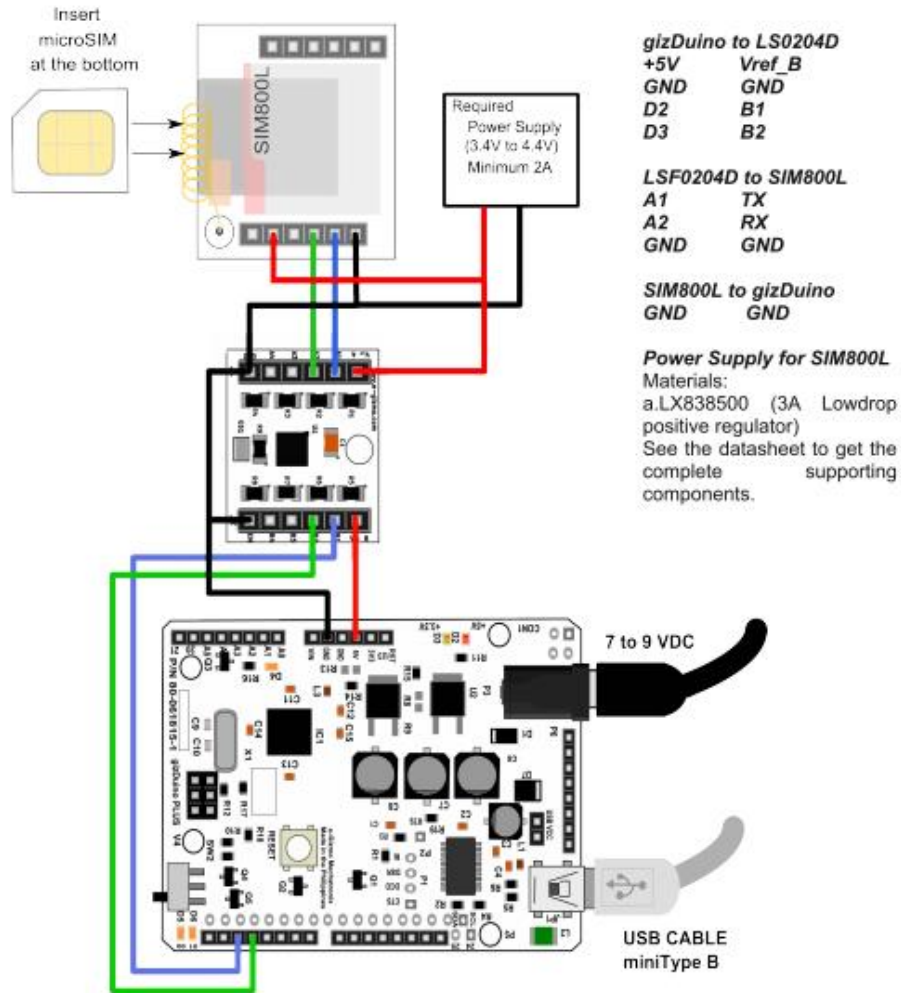


Figure 1. Major Part of SIM800L GSM Module with adaptor.

TABLE 1.

Name	Descriptions
GND	Ground
TXD	Transmit Data
RXD	Receive Data
RST	SIM Reset
VCC	4.0V Input Supply (Typical)
NET	Network Status
SPK-	Differential audio output (SpeakerN)
SPK+	Differential audio output (SpeakerP)
MIC-	Differential audio input (MicrophoneN)
MIC+	Differential audio input (MicrophoneP)
DTR	Data terminal ready
RING	Ring Indicator



Download the GPRS_Shield_Arduino library

1. Visit the Product page: goo.gl/7N7qFg
OR direct link: goo.gl/MgdMGC

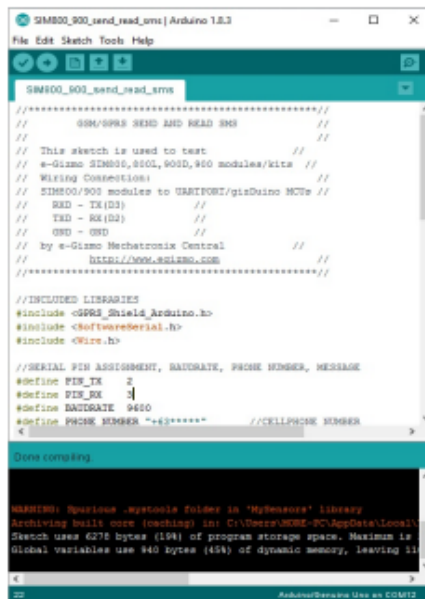
2. Unzip the file. Copy the GPRS_Shield_Arduino folder.

3. Go to My Documents>Arduino>libraries> (paste it)

4. Restart Arduino IDE.

Opening the Sample codes.

1. In Arduino IDE, File>Open..
Find the SIM800_900_send_read_sms.ino.



Codes Explanation

Make sure you included these libraries

```
//INCLUDED LIBRARIES
#include <GPRS_Shield_Arduino.h>
#include <SoftwareSerial.h>
#include <Wire.h>
```

Setting the Serial pin connections

```
#define PIN_TX 2
#define PIN_RX 3
#define BAUDRATE 9600
```

Note: If you are using...
a. gizDuino ATMEGA328P or Arduino UNO
b. gizDuino PLUS ATMEGA644P
you may use these boards in pin_tx 2 and pin_rx 3.

Furthermore, In...
a. gizDuino X ATMEGA1281
b. Arduino MEGA 2560
change the pins assignment to pin_tx 18 and pin_rx 19.

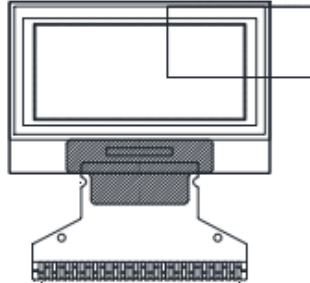
Set the Phone number and Compose your message.

```
#define PHONE_NUMBER "+63*****"
#define MESSAGE "YOUR_MESSAGE_HERE"
```

Upload this code. Wait for the SIM800L module to get a Signal then press RESET button.

If INIT ERROR occur, Check your connections and make sure you put a correct cellphone number and the module has a better signal.

128 x 64 Graphic OLED



FEATURES

- Type: graphic
- Display format: 128 x 64 dots
- Built-in controller: SSD1306BZ
- Duty cycle: 1/64
- +3 V power supply
- Interface: 6800, 8080, serial, and I²C
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



MECHANICAL DATA		
ITEM	STANDARD VALUE	UNIT
Module dimension	26.7 x 19.26 x 1.65	mm
Viewing area	23.938 x 12.058	
Active area	21.738 x 10.858	
Dot size	0.148 x 0.148	
Dot pitch	0.17 x 0.17	
Mounting hole	n/a	

ABSOLUTE MAXIMUM RATINGS				
ITEM	SYMBOL	STANDARD VALUE		UNIT
		MIN.	MAX.	
Supply voltage for logic ⁽¹⁾	V _{DD}	0	4	V
Supply voltage for display ⁽¹⁾⁽²⁾	V _{CC}	0	15	
Operating temperature	T _{OP}	-40	+80	°C
Storage temperature	T _{STG}	-40	+80	

Notes

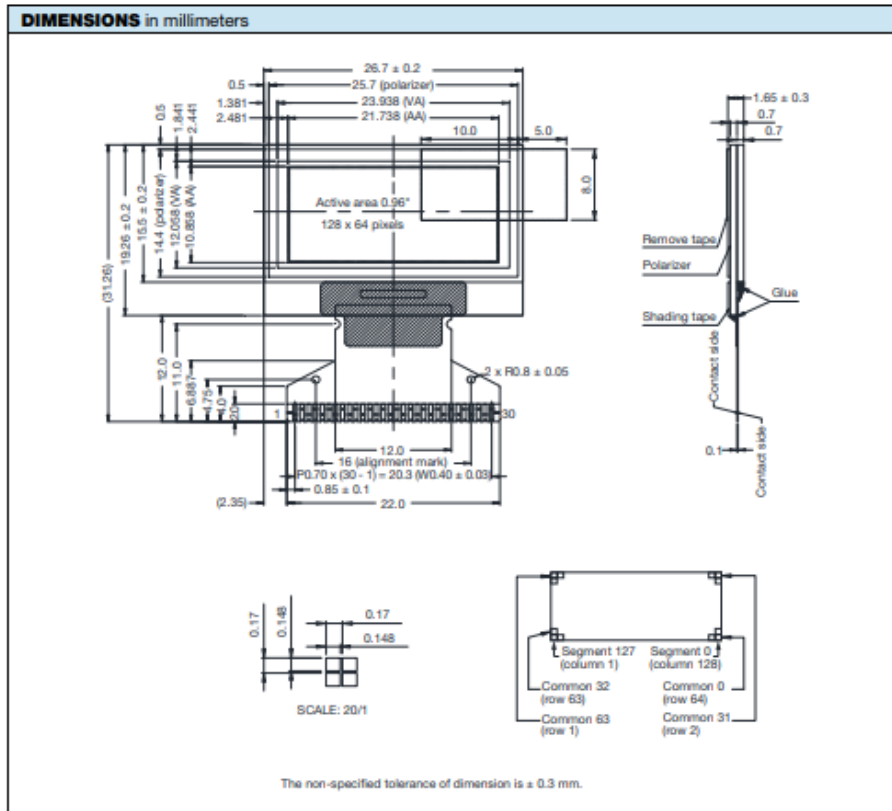
- ⁽¹⁾ All the above voltages are on the basis of "V_{SS} = 0 V".
⁽²⁾ When this module is used beyond the above absolute maximum ratings, permanent breakage of the module may occur. Also, for normal operations, it is desirable to use this module under the conditions according to section 6 "Electrical Characteristics". If this module is used beyond these conditions, malfunctioning of the module can occur and the reliability of the module may deteriorate.

ELECTRICAL CHARACTERISTICS						
ITEM	SYMBOL	CONDITION	STANDARD VALUE			UNIT
			MIN.	TYP.	MAX.	
Supply voltage for logic	V _{DD}	-	2.8	3.0	3.3	V
Supply voltage for display	V _{CC}	-	10	12	15	
Input high voltage	V _{IH}	-	0.8 V _{DD}	-	V _{DD(OH)}	
Input low voltage	V _{IL}	-	0	-	0.2 V _{DD}	
Output high voltage	V _{OH}	-	0.9 V _{DD}	-	V _{DD(OH)}	
Output low voltage	V _{OL}	-	0	-	0.1 V _{DD}	
50 % check board operating current	I _{CC}	V _{CC} = 12 V	9	10	12	mA

OPTIONS				
EMITTING COLOR				
YELLOW	GREEN	RED	BLUE	WHITE
-	-	-	Yes	-



INTERFACE PIN FUNCTION																														
PIN NO.	SYMBOL	FUNCTION																												
1	NC (GND)	Reserved pin (supporting pin) The supporting pins can reduce the influences from stresses on the function pins. These pins must be connected to external ground.																												
2	C2N	Positive terminal of the flying inverting capacitor negative terminal of the flying boost capacitor The charge-pump capacitors are required between the terminals. They must be floated when the converter is not used.																												
3	C2P																													
4	CTP																													
5	CTN																													
6	V _{BAT}	Power supply for DC/DC converter circuit This is the power supply pin for the internal buffer of the DC/DC voltage converter. It must be connected to external source when the converter is used. It should be connected to V _{DD} when the converter is not used.																												
7	NC	NC																												
8	V _{SS}	Ground of logic circuit This is a ground pin. It also acts as a reference for the logic pins. It must be connected to external ground.																												
9	V _{DD}	Power supply for logic circuit. This is a voltage supply pin. It must be connected to external source.																												
10	BS0	Communicating protocol select These pins are MCU interface selection input. See the following table:																												
11	BS1	<table border="1"> <thead> <tr> <th></th> <th>I²C</th> <th>3-wire SPI</th> <th>4-wire SPI</th> <th>8-bit 68XX parallel</th> <th>8-bit 80XX parallel</th> </tr> </thead> <tbody> <tr> <td>BS0</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>BS1</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>BS2</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> </tr> </tbody> </table>						I ² C	3-wire SPI	4-wire SPI	8-bit 68XX parallel	8-bit 80XX parallel	BS0	0	1	0	0	0	BS1	1	0	0	0	1	BS2	0	0	0	1	1
	I ² C	3-wire SPI	4-wire SPI	8-bit 68XX parallel	8-bit 80XX parallel																									
BS0	0	1	0	0	0																									
BS1	1	0	0	0	1																									
BS2	0	0	0	1	1																									
12	BS2																													
13	CS#	Chip select This pin is the chip select input. The chip is enabled for MCU communication only when CS# is pulled low.																												
14	RES#	Power reset for controller and driver This pin is reset signal input. When the pin is low, initialization of the chip is executed.																												
15	D/C#	Data / command control This pin is data / command control pin. When the pin is pulled high, the input at D7 to D0 is treated as display data. When the pin is pulled low, the input at D7 to D0 will be transferred to the command register. For detail relationship to MCU interface signals, please refer to the timing characteristics diagrams. When the pin is pulled high and serial interface mode is selected, the data at SDIN is treated as data. When it is pulled low, the data at SDIN will be transferred to the command register. In I ² C mode, this pin acts as SA0 for slave address selection.																												
16	R/W#	Read / write select or write This pin is MCU interface input. When interfacing to a 680X-series microprocessor, this pin will be used as read / write (R/W#) selection input. Pull this pin to "high" for read mode and pull it to "low" for write mode. When 80XX interface mode is selected, this pin will be the write (WR#) input. Data write operation is initiated when this pin is pulled low and the CS# is pulled low.																												
17	E/RD#	Read / write enable or read This pin is MCU interface input. When interfacing to a 680X-series microprocessor, this pin will be used as the enable (E) signal. Read / write operation is initiated when this pin is pulled high and the CS# is pulled low. When connecting to an 80XX-microprocessor, this pin receives the read (RD#) signal. Data read operation is initiated when this pin is pulled low and CS# is pulled low.																												
18 to 25	D0 to D7	Host data input / output bus These pins are 8-bit bi-directional data bus to be connected to the microprocessor's data bus. When serial mode is selected, D1 will be the serial data input SDIN and D0 will be the serial clock input SCLK. When I ² C mode is selected, D2 and D1 should be tied together and serve as SDA _{out} and SDA _{in} in application and D0 is the serial clock input SCL.																												
26	I _{REF}	Current reference for brightness adjustment This pin is segment current reference pin. A resistor should be connected between this pin and V _{SS} . Set the current lower than 12.5 μA.																												
27	V _{COMH}	Voltage output high level for COM signal This pin is the input pin for the voltage output high level for COM signals. A capacitor should be connected between this pin and V _{SS} .																												
28	V _{CC}	Power supply for OEL panel This is the most positive voltage supply pin of the chip. A stabilization capacitor should be connected between this pin and V _{SS} when the converter is used. It must be connected to external source when the converter is not used.																												
29	V _{LSS}	Ground of analog circuit This is an analog ground pin. It should be connected to V _{SS} externally.																												
30	NC (GND)	Reserved pin (supporting pin) The supporting pins can reduce the influences from stresses on the function pins. These pins must be connected to external ground.																												





1. Module Classification Information

OLED -128 O 064 -D B P P 3 N 0 0 000
 1 2 3 4 5 6 7 8 9 10 11 12 13

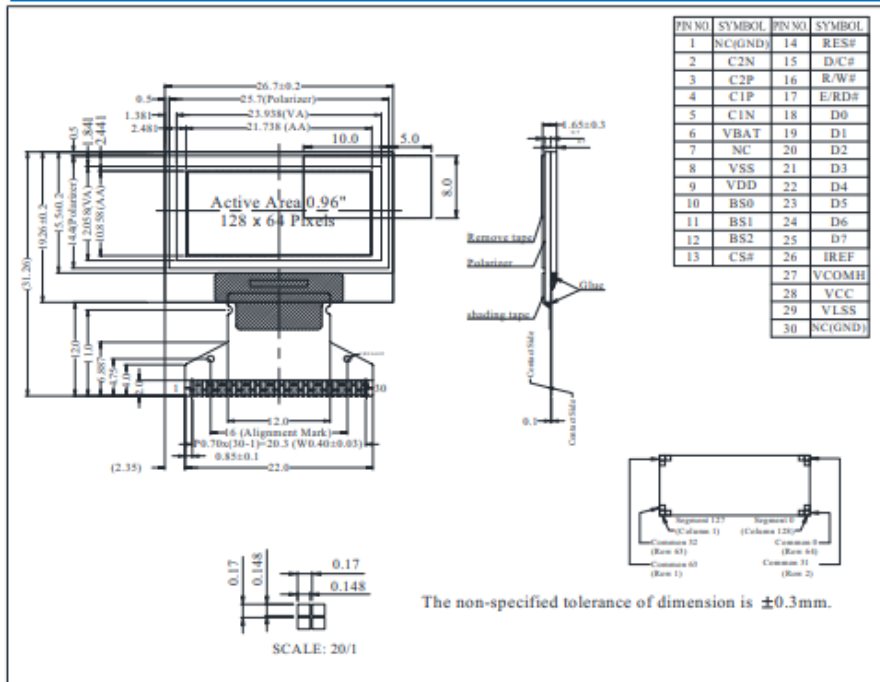
1	Brand : Vishay Intertechnology, Inc.		
2	Horizontal Format: 128 columns		
3	Display Type : N→Character Type, H→Graphic Type, Y→Tab Type , O→Cog Type		
4	Vertical Format: 64 Lines		
5	Series code: D		
6	Emitting Color	A : Amber	R : RED
		B : Blue	W : White
		G : Green	L : Yellow
7	Polarizer	P : With Polarizer; N: Without Polarizer	
8	Display Mode	P : Passive Matrix ; A: Active Matrix	
9	Driver Voltage	3: 3.0 V; 5: 5.0V	
10	Touch Panel	N : Without touch panel; T: With touch panel	
11	Products type	0 : Standard type 1. Sunlight Readable type 2. Transparent OLED (TOLED) 3. Flexible OLED 4. OLED for Lighting	
12	Product grades	Product grades: 0 : Standard(A-level) 2 : B-level 3 : C-level 4 : high class(AA-level) 5 : Customer offerings	
13	Serial No.	Application serial number(000-ZZZ)	



2. General Specification

Item	Dimension	Unit
Dot Matrix	128 x 64 Dots	—
Module dimension	26.7 × 19.26 × 1.65	mm
Active Area	21.738 × 10.858	mm
Pixel Size	0.148 × 0.148	mm
Pixel Pitch	0.17 × 0.17	mm
Display Mode	Passive Matrix	
Display Color	Blue	
Drive Duty	1/64 Duty	
IC	SSD1306BZ	

3. Contour Drawing & Block Diagram



Data sheet LED



深圳市昱申科技有限公司
CHINA YOUNG SUN LED TECHNOLOGY CO., LTD.

TEL: (86) 755-28079401 28079402 28079403 28079404 28079405
FAX: (86) 755-28079407 E-mail: info@100LED.com Web: www.100LED.com

Model No.: YSL-R531K3D-D2

Applications:

- Decorations
- Bill Inspector
- Incidental Lights
- Medical Appliance

Absolute Maximum Ratings: (Ta=25°C)

ITEMS	Symbol	Absolute Maximum Rating	Unit
Forward Current	I_f	20	mA
Peak Forward Current	I_{fP}	30	mA
Suggestion Using Current	I_{su}	16~18	mA
Reverse Voltage ($V_r=5V$)	I_r	10	uA
Power Dissipation	P_o	105	mW
Operation Temperature	T_{op}	-40 ~ 85	°C
Storage Temperature	T_{sto}	-40 ~ 100	°C
Lead Soldering Temperature	T_{sol}	Max. 260°C for 3 Sec. Max. (3mm from the base of the epoxy bulb)	

Absolute Maximum Ratings: (Ta=25°C)

ITEMS	Symbol	Test condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_f	$I_f=20mA$	1.8	---	2.2	V
Wavelength (nm) or TC(k)	$\Delta \lambda$	$I_f=20mA$	570	---	575	nm
*Luminous Intensity	I_v	$I_f=20mA$	150	---	200	mcd
50% Viewing Angle	$2\theta_{1/2}$	$I_f=20mA$	40	---	60	deg



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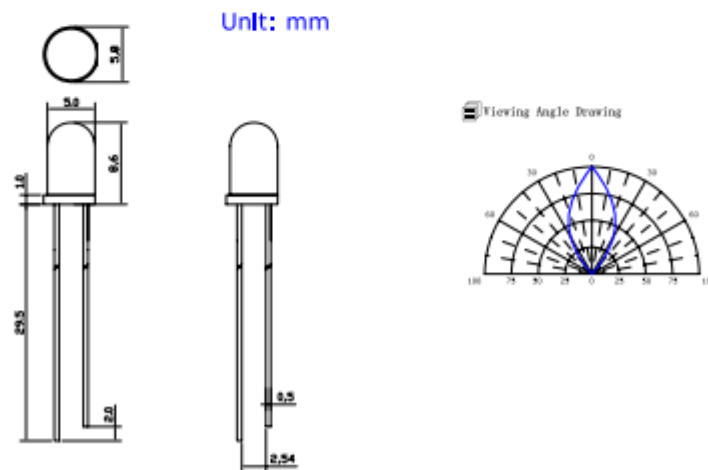
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Light Degradation In mcd: (I_F=20mA)

Colors	Light Degradation In mcd after Different Hours					
	216 Hrs	360 Hrs	792 Hrs	1104 Hrs	1992 Hrs	2328 Hrs
Red	1.52%	-1.22%	-3.10%	-4.68%	-5.72%	-8.27%
Yellow	-1.71%	-2.97%	-5.93%	-8.13%	-8.90%	-11.10%
Blue	3.13%	-0.33%	-3.84%	-8.23%	-21.32%	-24.92%
Green	-8.02%	-9.78%	-14.25%	-17.37%	-20.79%	-22.30%
Hours	48 Hrs	168 Hrs	336 Hrs	360Hrs	720 Hrs	1008 Hrs
Cool White	10.56%	6.72%	-2.29%	-7.68%	-17.32%	-22.48%
Pure White	13.66%	8.22%	-1.45%	-8.50%	-19.52%	-25.26%
Warm White	3.02%	-4.38%	-15.18%	-21.15%	-27.19%	-29.97%

Mechanical Dimensions:

- All dimension are in mm, tolerance is ± 0.2 mm unless otherwise noted
- An epoxy meniscus may extend about 1.5mm down the leads.
- Burr around bottom of epoxy may be 0.5mm Maximum



Address: 5/F, Building B, Anzhilong Indl., Qinghua East Road., Longhua Town, Shenzhen CHINA. 518109

www.100LED.com

ONE HUNDRED LED

PERFECT LED

Pemrograman Arduino IDE

1) *Daclare* atau pengenalan komponen

```
#include <SoftwareSerial.h>
#include "Adafruit_GFX.h"
#include "Adafruit_SSD1306.h"

#define SCREEN_WIDTH 128
#define SCREEN_HEIGHT 64

#define OLED_RESET -1
Adafruit_SSD1306 oled(SCREEN_WIDTH, SCREEN_HEIGHT,
    &Wire, OLED_RESET);

SoftwareSerial sim800l(11,12); // RX,TX for Arduino and for the
    module it's TXD RXD, they should be inverted
#define NUM_SAMPLES 10

unsigned char sample_count = 0;
const int voltageSensor = A0;
int sum = 0;

float vOUT = 0.0;
float vIN = 0.0;
float R1 = 30000.0;
float R2 = 7500.0;
int value = 0;

const int max471In = A1;

int RawValue= 0;
float Current = 0;
boolean statusSms=false;
```

```
const int pinYellow=10;
const int pinRed=9;
const int pinGreen=8;

char msgbuff[100];
```

2) Fungsi *Setup()*

```
void setup() {
    sim800l.begin(9600);

    pinMode(pinYellow,OUTPUT);
    pinMode(pinRed,OUTPUT);
    pinMode(pinGreen,OUTPUT);

    digitalWrite(pinYellow,HIGH);
    digitalWrite(pinRed,HIGH);
    digitalWrite(pinGreen,HIGH);

    pinMode(max471In, INPUT);

    // Initialized the OLED
    if(!oled.begin(SSD1306_SWITCHCAPVCC, 0x3C)) {
        for(;;);
    }

    oled.clearDisplay();
    oled.setTextColor(WHITE);
}
boolean statusWarning=false;
```

3) Fungsi *loop()*

```
void loop() {
    if(statusSms){
        SendSMS();
        statusSms=false;
    }

    while (sample_count < NUM_SAMPLES) {
        sum += analogRead(max471In);
        sample_count++;
        delay(10);
    }

    Current = ((sum * 5.0 )/(float)NUM_SAMPLES)/ 1023.0;

    sample_count = 0;
    sum = 0;

    while (sample_count < NUM_SAMPLES) {
        sum += analogRead(voltageSensor);
        sample_count++;
        delay(10);
    }

    vOUT = (((float)sum * 4.693) / (float)NUM_SAMPLES) /
    1023.0;
    vIN = vOUT / (R2/(R1+R2));

    sample_count = 0;
    sum = 0;

    vIN=vIN + 0.15;
```



```
updateDisplay();

delay(2000);
}

void updateDisplay() {
  // Clear the display
  oled.clearDisplay();

  oled.setTextSize(1);
  oled.setCursor(0,0);
  oled.print("Volt: ");
  oled.setTextSize(2);
  oled.setCursor(0,10);
  oled.print(vIN);
  oled.setTextSize(2);
  oled.print(" V");
  if(vIN >= 12.45){
    statusWarning=false;
    digitalWrite(pinYellow,HIGH);
    digitalWrite(pinRed,HIGH);
    digitalWrite(pinGreen,LOW);

  }else if(vIN >= 10 && vIN < 12.45){
    statusWarning=false;
    digitalWrite(pinYellow,LOW);
    digitalWrite(pinRed,HIGH);
    digitalWrite(pinGreen,HIGH);

  }else if(vIN < 10){
    if(!statusWarning){
      statusSms=true;
    }
  }
}
```

```

    }
    statusWarning=true;
    digitalWrite(pinYellow,HIGH);
    digitalWrite(pinRed,LOW);
    digitalWrite(pinGreen,HIGH);
    }

    oled.setTextSize(1);
    oled.setCursor(0, 35);
    oled.print("Ampere: ");
    oled.setTextSize(2);
    oled.setCursor(0, 45);
    oled.print(Current);
    oled.print(" A");

    // Update and show the display
    oled.display();
}
void SendSMS()
{
    sprintf(msgbuff,"Warning !!!, Tegangan Aki di Bawah
    Tegangan Normal V= %d",int(vIN));
    sim800l.print("AT+CMGF=1\r"); //Set the module
    to SMS mode
    delay(100);
    sim800l.print("AT+CMGS=\"082241093359\"\r"); //Your
    phone number don't forget to include your country code,
    example +212123456789"
    delay(500);
    sim800l.print(msgbuff); //This is the text to send to the
    phone number, don't make it too long or you have to modify
    the SoftwareSerial buffer
    delay(500);
}

```

```
sim800l.print((char)26);// (required according to the
    datasheet)
delay(500);
sim800l.println();
delay(500);

}
```


RIWAYAT HIDUP



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Tegal, Agustus 2021

Ahmad fachrizal meizir