St. Name: Sachin Barvekar

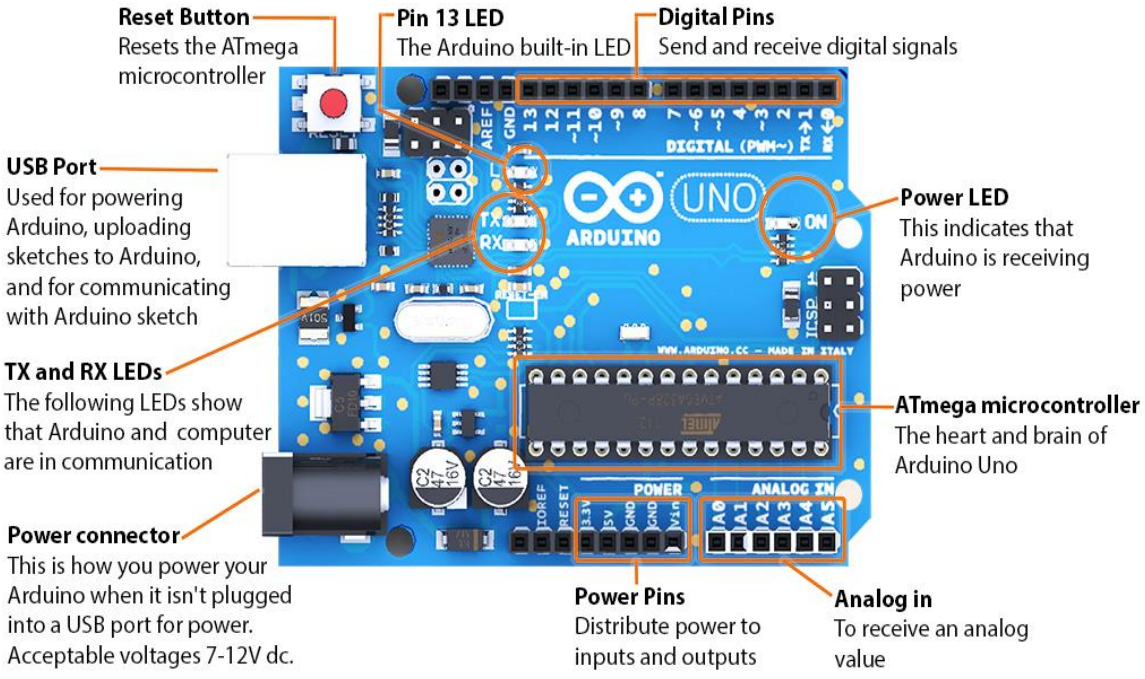
Component Name: Arduino Learing kit

Component Info:

1. Arduino UNO:

- **What is Arduino?**
  The **Arduino** is an open-source physical **computing platform** that you can use for sensing both digital and analog input signals and for **sending digital and analog output signals to control devices**.

- **Major Parts of Arduino UNO:**



1. **ATmega microcontroller:** The heart or the brain of the device is that the central processing unit (CPU). **It regulates everything that happens in the system.**

2. **USB Port:** Used for powering Arduino Uno, uploading sketches to Arduino, and for communicating with Arduino sketch**.**

3. **Reset Button:** Resets or completely stops the Arduino program when held down for a time**.**

4. LED's:

- **ON is green, which means your Arduino is powered.**
- **RX and TX tell you that the Board is receiving or transmitting the data.**
- **L is a special LED that connected to digital pin 13. It's great for testing to check whether your board is functioning as you want.**

5. Power pins: **The power pins can be used to distribute power to inputs and outputs anywhere it is needed**.

- **IOREF Pin**:(input output refresh vtg pin) used to operate microcontroller.
- **Reset Pin:** used for reset program.
- **3.3 v and 5v pin:** used to delivered dc regulated supply.
- **Vin (**voltage in): used to supply a voltage (V) equal to the one supplied by the external supply jack (for example, 9V). You may also use this pin to deliver power from another source to the **Arduino**.
  GND labels the pins: that are essential to complete circuits. All these pins are linked and called common ground.

6. Analog in:

To receive an analog value, use analog in pins. A range of analog values is taken. In this case, the range is the same 0V to 5V as with the digital pins, but the value can be at any point — 0.1, 0.2, 0.3, 0.4, and so on.
Use these pins with **analogRead().**

7. Digital pins:

The Arduino pins can be programmed as inputs and outputs. You can send and receive digital signals using digital pins. Digital means that the pins have two states: on and off. Electrically terms, both states mean 0 or 5 volts, but no values in between.
Use these pins with digitalRead(), digitalWrite(), and analogWrite(). The analogWrite() function only works on pins that have the PWM symbol (~).

There are analog out pins on the board, but they're hidden in the digital pins marked with the (~) symbol as PWM. PWM means pulse-width modulation, a technique that you can use to give the impression of analog output using digital pins. **The (~) symbol appears next to digital pins 3, 5, 6, 9, 10, and 11, indicating the presence of six PWM-capable pins.**

8. ICSP(In ckt serial programming): used to programming Arduino with the help of another Arduino.

Application of Arduino:

Real-world monitoring

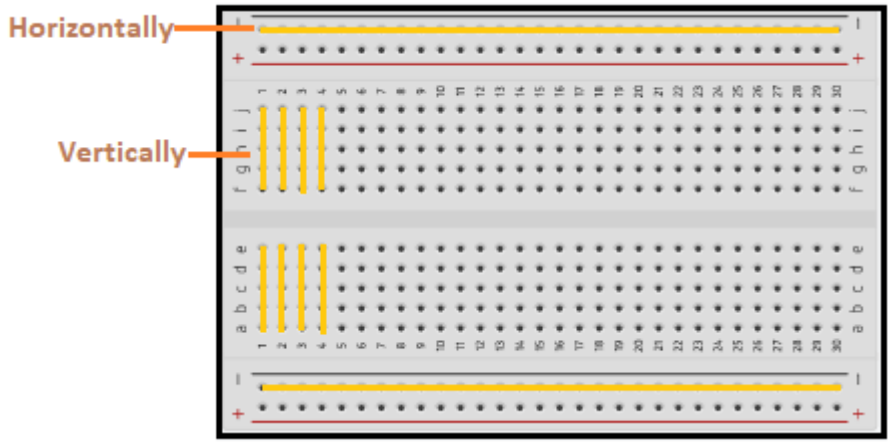
- Automated weather station
- Lightning detector

Small-scale control

- Little robots
- Rocket Model
- Aircraft model
- Simple compact machine tools CNC.

2. 400 holes breadboard:

The breadboard is a white rectangular board with small embedded holes to insert electronic components. It is commonly used in electronics projects.



Advantages of Breadboard:

- **Reusable**

  Today, Solderless boards are mostly used in various applications. It does not require any soldering to fix the components. Hence, it can be reused.

- **Lightweight**

  The breadboard is made of white plastic, which is light in weight.

- **Inexpensive**

  The breadboards are easily available. It also cost less.

- **Easy to use:**

  It does not involve any complex parts. We can easily insert the required number of components.

- **No drilling required:**
  The hoes are already embedded in the board. Hence, we do not require any drilling to insert the electronic components.

3. Resitors:

A resistor is an electrical component that limits or regulates the flow of electrical current in an electronic circuit.

4. Light Dependent Resistor – LDR

The LDR (Light Dependent Resistor) is also known as a Photo resistor. It is a simple device that has the characteristic of changing its resistance based on the amount of light that hits it. Its resistance will be lower when a light is shone on it. **When the light is removed the resistance will be at it's highest.**

The LDR could be used to detect day or night to control some device. If you wanted to know if the light goes out when the fridge door closes then the LDR with an Arduino could be used to answer that question. The LDR will not give you an accurate reading to the amount of light but it will enable you to detect a transition between the amount of light that is available.

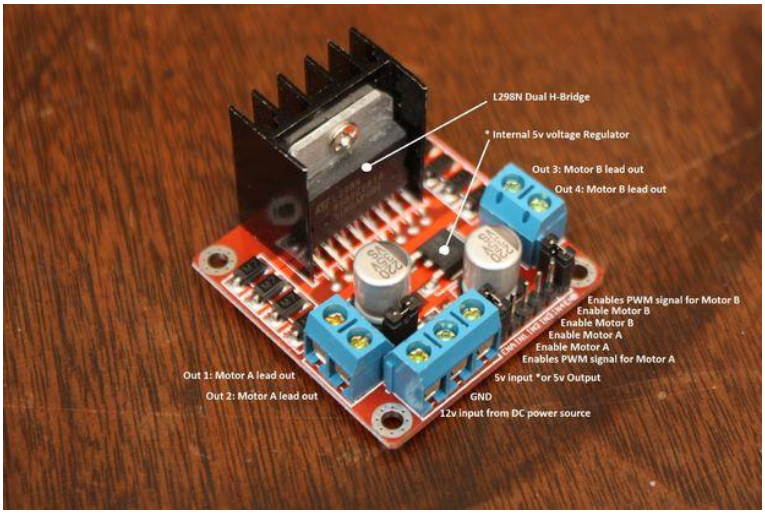
Package Includes :

1 × UNO R3 CH340.
1× USB CABLE.
1 × 400 holes breadboard.
5 × LED lights red.
5× LED lights green.
5 × LED lights yellow.
10 × Resistor 220 ohm.
10 × Resistor 1K.
10× Resistor 10K.
10 × Resistor 100K.
2 × 5mm 5528 LDR Photoresistor.
2 × Red Caps.
2× White Caps.
2 ×Blue Caps.
6 × Buttons.
1 × 9V Battery Connector.
2 × 1*40pin 2.54mm Pin Header.
20pin Male to Male Dupont Cable.

St. Name **:** Priti Shashikant Suryawanshi.

Component Name: L298N 2-A Based Motor Driver Module

Component Information :



This L298N Based Motor Driver Module – 2A is a high-power motor driver perfect for driving DC Motors and Stepper Motors. It uses the popular L298 motor driver IC and has the onboard 5V regulator which it can supply to an external circuit. It can control up to 4 DC motors, or 2 DC motors with directional and speed control

This L298N Based Motor Driver Module – 2A is perfect for robotics and mechatronics projects and perfect for controlling motors from microcontrollers, switches, relays, etc. Perfect for driving DC and Stepper motors for micro mouse, line-following robots, robot arms, etc.

Specifications:

1. Logical voltage: 5V
2. Drive voltage: 5V-35V
3. Logical current: 0-36mA
4. Drive current: 2A (max. single bridge)
5. Max power: 25W
6. Dimensions: 44 x 44 x 28 (LxWxH)mm
7. Weight: 26 gm

Sr no	Component Name	Description
1.	L298N Dual H-Bridge Motor	Used to control motor speed and rotation direction.
2.	Internal 5v Voltage Regulator	It is an integrated circuit designed to maintain a constant output voltage despite changes in input voltage and load.
3.	Motor Lead	They are the attached wires or cables that come off the motor and connect to the power supply to energize the motor
4.	Motor Driver IC	They are current amplifiers and are an essential component of motor interfacing.

How It Works:

An H-Bridge is a circuit that can drive a current in either polarity and be controlled by *Pulse Width Modulation (PWM).

* Pulse Width Modulation is a means in controlling the duration of an electronic pulse. In motors try to imagine the brush as a water wheel and electrons as the flowing droplets of water. The voltage would be the water flowing over the wheel at a constant rate, the more water flowing the higher the voltage. Motors are rated at certain voltages and can be damaged if the voltage is applied to heavily or if it is dropped quickly to slow the motor down. Thus PWM. Take the water wheel analogy and think of the water hitting it in pulses but at a constant flow. The longer the pulses the faster the wheel will turn, the shorter the pulses, the slower the water wheel will turn. Motors will last much longer and be more reliable if controlled through PWM.

Pins:

1. Out1: Motor A lead out
2. Out2: Motor A lead out
3. Out3: Motor B lead out
4. Out4: Mo (Can actually be from 5v-35v, just marked as 12v)
5. GND: Ground
6. 5V: 5V input (unnecessary if your power source is 7V-35V, if the power source is 7V-35V then it can act as a 5v out)
7. EnA: Enables PWM signal for Motor A
8. In1: Enable Motor A
9. In2: Enable Motor A
10. In3: Enable Motor B
11. In4: Enable Motor B
12. EnB: Enables PWM signal for Motor B

Usage:

H-bridges are typically used in controlling motors' speed and direction but can be used for other projects such as driving the brightness of certain lighting projects such as high-powered LED arrays.

Features:

1. Current Sense for each motor.
2. Heatsink for better performance.
3. Power-On LED indicator.
4. Drives up to 4 motors.

Package Used:

1 x L298N Based Motor Driver Module – 2A (Standard Quality)

Component Name: L298N 2a based motor driver Module – good quality

Specifications:

1. Current Sense for each motor.
2. Heatsink for better performance.
3. Power-On LED indicator.
4. Double H bridge Drive Chip: L298N.
5. Operating Voltage (VDC): 5~35
6. Peak Current (A): 2
7. Continuous Current (A): 0-36mA
8. No. of Channels: 2
9. Over-Current Protection (A): Yes
10. Thermal Protection: Yes

Features:

1. Maximum motor supply current: 2A per motor.
2. Current Sense for each motor.
3. Heatsink for better performance.
4. Power-On LED indicator.
5. Double H bridge Drive Chip: L298N.

Package Used:

1 x L298N 2A Based Motor Driver Module – Good Quality

St. Name: Rupali Bhauso Bhandalkar

First Component Name: N20-6V-600 Rpm Micro Metal Gear Motor

Component Info:

Fig. N20-6V-600 Rpm Micro Metal Gear Motor

Introduction :

- N20-6V-600 Rpm Micro Metal Gear Motor has small volume, torsion big, all metal gear, durable, not easy to wear
- N20 Micro Gear 6V 600 RPM DC Motor (High Torque) is lightweight, high torque, and low RPM motor.

Important Parts Of Gear Motor:

1.Gear:

- Gears are used to reduce the speed of the motor while increasing its torque.

Terminologies Of Gear Motors

1.Torque:

- The torque output of a motor is the amount of rotational force that the motor develops.
- Measured in either inch pounds (in-lbs), Newton meters (N-m)

2.RPM:

- RPM stands for revolutions per minute.
- It's used as a measure of how fast any machine is operating at a given time

Work of Gear Motors in Ardiuno:

- The main work of an N20-6V-600 RPM micro metal gear motor in Arduino is to provide controlled rotary motion.

Used Gear Motors in Ardiuno:

- When used with Arduino, the motor can be programmed to rotate at a specific speed and direction.
- The N20 motor can be used to drive wheels or joints in a robot.

Applications:

- Boat, Car, Electric Bicycle, Fan, Home Appliance

Features

1. This is a DC Mini Metal Gear Motor, ideal for making robots
2. Lightweight, high torque and low RPM.
3. Fine craftsmanship, durable, not easy to wear.
4. With excellent stall characteristics, can climb hills easily.
5. You can also easily mount a wheel on the motor's output shaft

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Second Component Name: N20-6V-600 Rpm Micro Metal Gear Motor With Encoder
Component Info:

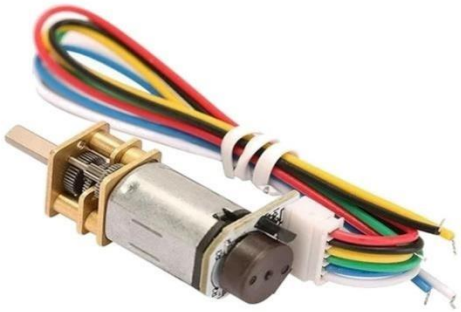

Fig. N20-6V-600 Rpm Micro Metal Gear Motor With Encoder

Introduction:

- The N20-6V-600 RPM Micro Metal Gear Motor with encoder is commonly used with Arduino and other microcontroller platforms in various projects due to its specific features and capabilities

Encoder:

- The presence of an encoder is significant.
- An encoder is a device that translates the position or movement of an object into an electrical signal that can be read and interpreted by a controller.

- In the context of a motor, an encoder provides feedback on the motor's speed and position, allowing for precise control.

Specifications:

Sr.No.	Parameter	N20-6V-600 Rpm Micro Metal Gear Motor	N20-6V-600 Rpm Micro Metal Gear Motor With Encoder
1.	RPM	600	600
2.	Stall Current (A)	0.6	0.6
3.	Rate l Torque(kg-cm)	0.14	0.14
4.	Stall Torque(Kg-Cm)	0.54	0.54
5.	Operating Voltage (VDC)	3 ~ 6	3 ~ 6
6.	Motor Body Size (Diameter) (mm)	12	12
7.	Shaft Type	D-type, Single Side	D-type, Single Side
8.	Shaft Diameter (mm)	3	3
9.	Size	N20	N20
10.	Weight (gm)	12	12
11.	Encoder	Without Encoder	With Encoder
12.	Price	1,367rs.	794rs.

Difference Between N20-6V-600 Rpm Micro Metal Gear Motor And N20-6V-600 Rpm Micro Metal Gear Motor With Encoder

Sr.No.	N20-6V-600 Rpm Micro Metal Gear Motor	N20-6V-600 Rpm Micro Metal Gear Motor With Encoder
1.	It typically consists of a small DC motor and a gearbox (metal gears) to reduce the speed and increase torque.	The encoder is a feedback device that provides information about the motor's speed and position.
2.	can be used for various applications where precise control of speed and position is not It critical	This feedback is valuable for applications that require precise control and feedback

----------**********----------

Second Component Name: 3PI miniQ Car wheel Tyre 44mm DC Gear Motor Wheel
Component Info:

Fig. 3PI miniQ Car wheel Tyre 44mm DC Gear Motor Wheel

Specification:

1. Wheel Outer Diameter: 44MM
2. Wheel width: 18 mm
3. Tire material: Rubber
4. Color: Black & White
5. Weight: 18 gm
6. Coder Accuracy: 12 pulses per revolution
7. Wheel weight: 19.4 gm.

Features:

1. Coder Accuracy: 12 pulses per revolution
2. Heavy Duty Material
3. Durable and specially design 3PI miniQ Car wheel

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St. Name: Arati Santosh Gawali

Component Name 1: orange 7.4V 360mAh 30C 2S lithium polymer battery pack

Component Info:

1. Voltage (V) :7.4V
    - It is a 2 cell battery because each cell typically has a nominal voltage of 3.7V . so ,2 cell give you a total of 7.4V

2. Capacity (mAh): 360mAh
    - Measure in milliampere-hours(mAh)
    - This is the capacity of battery

3. Discharge Rate (C) : 30C (10.5A)
    - It is 30 times the capacity(30C) to calculate the maximum continuous current , you can use
    - The formula:Maximum current (in amps)=capacity(in ampere_hours)*C rating

4. Number of cells (S) :2S
    - This indicates the number of cells connected in series in this case it is a 2-cell battery

5. Price: 550rs

6. Weight : 32gm

7. Application :

    - Drones
    - electrical vehicals
    - Use in line following bot to supply power for motor driver

Component Name 2: PCB

1. Introduction:
    - "PCB" stands for Printed Circuit Board
    - The design of a PCB is crucial for the proper functioning of electronic circuits
    - PCBs can be single-layer, double-layer, or multi-layer, depending on the complexity of the circuit.

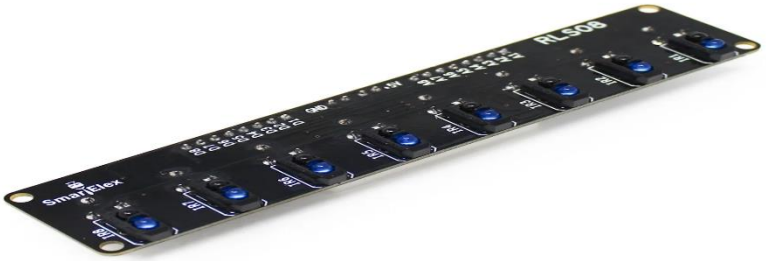
ANALOG AND DIGITAL LINE SENSOR

INTRODUCTION

This SmartElex RLS-08 Analog & Digital Line Sensor Array has 8 IR LED/phototransistor pairs, making it a great detector for a line-following robot. Each sensor has its own digital and analog output also a potentiometer to adjust the sensitivity of the individual sensors.

The TCRT5000 reflectance sensors array is intended as a line sensor, but it can be used as a general-purpose proximity or reflectance sensor. The module is a convenient carrier for eight IR emitter and receiver (photoresistor/photodiodes) pairs evenly spaced at intervals.

A ***Proximity Sensor*** detects nearby objects without physical contact by emitting an electromagnetic field or radiation, such as infrared, and analyzing changes in the field or return signal. The sensed object is known as the proximity sensor's target. Autonics Sensor includes capacitive and inductive proximity sensors, operating at 10VDC ~ 30VDC with different detection distances from 0.5cm to 5 cm, output types, and outer thread sizes. Capacitive sensors are suitable for plastic targets, while inductive sensors require metal targets.

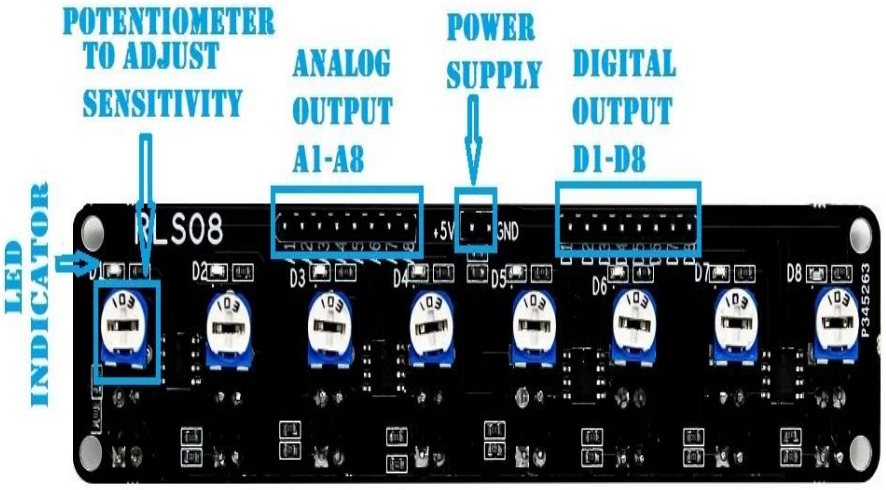


Each phototransistor equips a pull-up resistor to form a voltage divider that produces an analog voltage output between 0 V and VIN (which is typically 5 V) as a function of the reflected IR. The lower output voltage is an indication of greater reflection.

The outputs are all independent, but the LEDs are arranged in pairs to halve current consumption. The LEDs are controlled by a MOSFET with a gate normally pulled high, allowing the LEDs to be turned off by setting the MOSFET gate to a low voltage. Turning the LEDs off might be advantageous for limiting power consumption when the sensors are not in use or for varying the effective brightness of the LEDs through PWM control.

SPECIFICATION AND FEATURES

1. Operating voltage: 4.5V to 5.0 V
2. Supply current: 150 mA
3. Output format: 8 Analog and Digital Voltage.
4. Optimal sensing distance: 3 mm.
5. Maximum recommended sensing distance :6 mm
6. Potentiometer to adjust the sensitivity of the individual sensors.
7. The module is a convenient carrier for eight IR emitter and receiver pairs evenly paced.
8. Distance Between two IR Sensor: 15mm.
9. Board Dimension :- 120x26mm
10. The array has mounting holes of 3mm diameter for easy mounting



L293D

MOTOR DRIVER MODULE

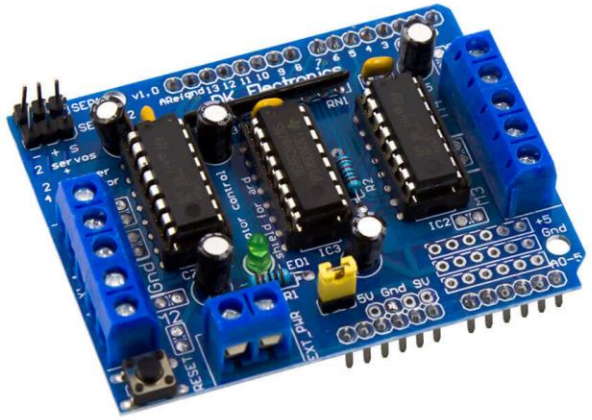
NAME: ADITI WALUNJ

Introduction

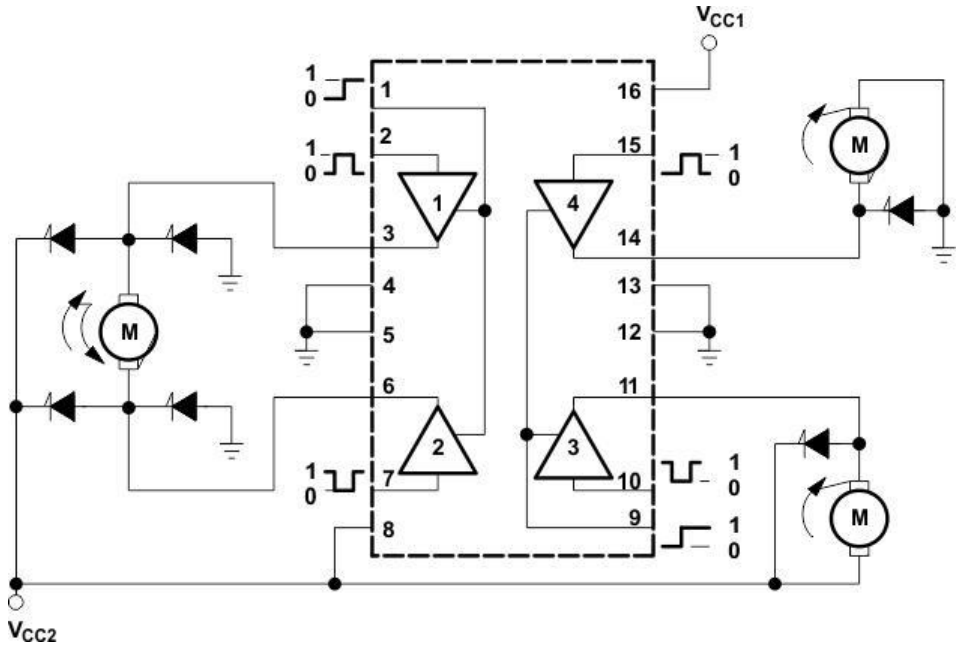
- A motor driver is an integrated circuit chip which is usually used to control motors in an autonomous robot
- Motor Driver acts as an interface between Arduino and the Motors
- L293D is a 16 pin Integrated circuit,with eight pins on each side dedicated to controlling motor
- 2- Input pins
- 2-Output pins
- It consists of two H bridges
- H bridge is a simplest circuit for controlling a low current rated motor

- The L293D is designed to provide bidirectional drive currents of up to 600 mA at voltages from 4.5V to 36V
- Both devices are designed to drive inductive loads such as Relays, Solenoids,DC and Bipolar stepping motors,as well as other high current/high voltage loads in positive supply application

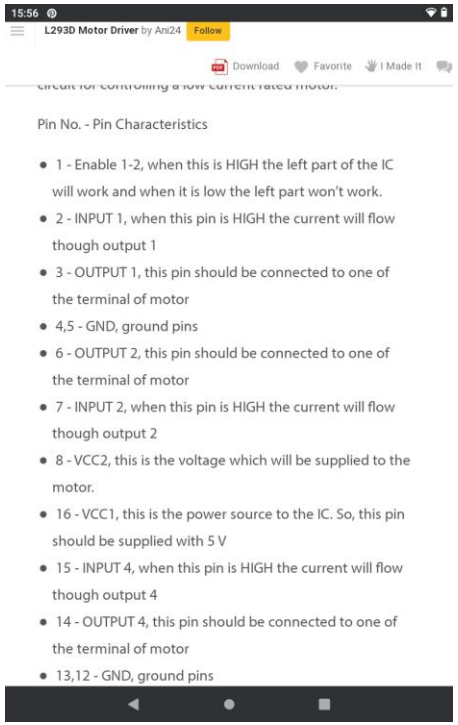
Motor Driver Module



Structure



Pin number and Pin Characteristics



Characteristics Table

Input 1.	Input2.	Enable 1,2	Result
0.	0.	1	Stop
0.	1.	1	Anti- Clockwise
1.	0.	1	Clockwise
1.	1.	1	Stop

Parameters

- Vs ABS (max) (V):- 36
- Rating:- Catlog
- Operating temperature range :- 0-70° C

Features

- Wide Supply-Voltage Range: 4.5 V to 36 V
- Separate Input-Logic Supply
- Internal ESD Protection
- High-Noise-Immunity Inputs
- Output Current 1 A Per Channel (600 mA for
- L293D)
- Peak Output Current 2 A Per Channel (1.2 A for
- L293D)
- Output Clamp Diodes for Inductive Transient
- Suppression (L293D)

Caster Wheel

- A caster is a non-powered wheel that is designed to be fitted to the bottom of a bigger object and used to move it. Caster wheels are used in shopping carts, office chairs, medical beds, and material handling equipment.


Caster Wheel
IQSdirectory.com

- A double wheel castor aligns two separate twin wheels side-by-side, for better stability
- Compound castors are two-piece single wheels, made from fixed concentric discs that rotate together around one axis. This can potentially offer greater overall strength in load-bearing applications

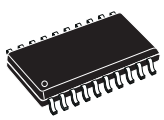
What is the purpose of using?

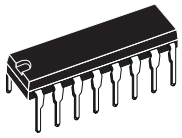
- Most castors are used simply to make a heavy or cumbersome piece of furniture or machinery – the ‘vehicle’ – easier to move. Affixing small, unobtrusive wheels to the bottom of any large or bulky item is a great way to make it more mobile in certain scenarios.

L293D
L293DD

PUSH-PULL FOUR CHANNEL DRIVER WITH DIODES

- 600mA OUTPUT CURRENT CAPABILITY PER CHANNEL
- 1.2A PEAK OUTPUT CURRENT (non repetitive) PER CHANNEL
- ENABLE FACILITY
- OVERTEMPERATURE PROTECTION
- LOGICAL "0" INPUT VOLTAGE UP TO 1.5 V (HIGH NOISE IMMUNITY)
- INTERNAL CLAMP DIODES





SO(12+4+4) **Powerdip (12+2+2)**

ORDERING NUMBERS:

L293DD L293D

DESCRIPTION

The Device is a monolithic integrated high voltage, high current four channel driver designed to accept standard DTL or TTL logic levels and drive inductive loads (such as relays solenoides, DC and stepping motors) and switching power transistors.

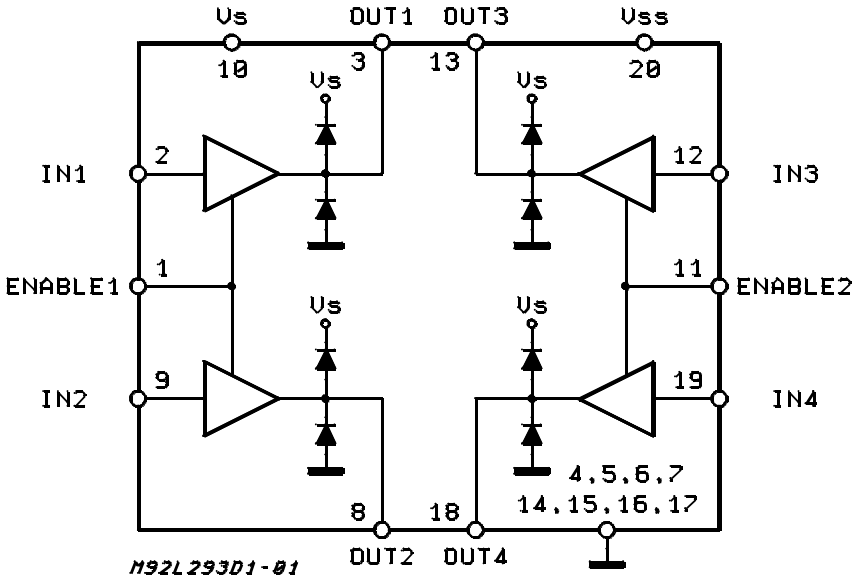
To simplify use as two bridges each pair of channels is equipped with an enable input. A separate supply input is provided for the logic, allowing operation at a lower voltage and internal clamp diodes are included.

This device is suitable for use in switching applications at frequencies up to 5 kHz.

The L293D is assembled in a 16 lead plastic packaage which has 4 center pins connected together and used for heatsinking

The L293DD is assembled in a 20 lead surface mount which has 8 center pins connected together and used for heatsinking.

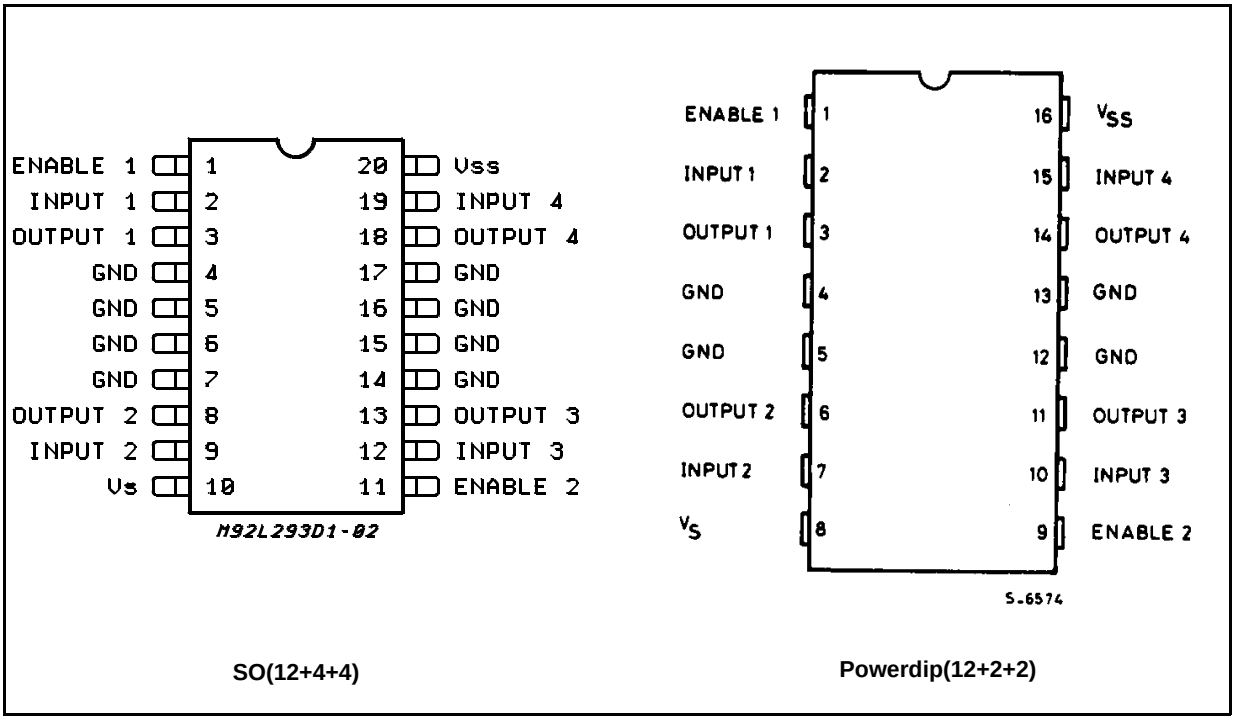
BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_S	Supply Voltage	36	V
V_{SS}	Logic Supply Voltage	36	V
V_i	Input Voltage	7	V
V_{en}	Enable Voltage	7	V
I_o	Peak Output Current (100 µs non repetitive)	1.2	A
P_{tot}	Total Power Dissipation at T_{pins} = 90 °C	4	W
T_{stg}, T_j	Storage and Junction Temperature	– 40 to 150	°C

PIN CONNECTIONS (Top view)



SO(12+4+4) **Powerdip(12+2+2)**

THERMAL DATA

Symbol	Decription		DIP	SO	Unit
$R_{th\ j\text{-}pins}$	Thermal Resistance Junction-pins	max.	–	14	°C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance junction-ambient	max.	80	50 (*)	°C/W
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	max.	14	–	

(*) With 6sq. cm on board heatsink.

ELECTRICAL CHARACTERISTICS (for each channel, V_S = 24 V, V_{SS} = 5 V, T_{amb} = 25 °C, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_S	Supply Voltage (pin 10)		V_{SS}		36	V
V_{SS}	Logic Supply Voltage (pin 20)		4.5		36	V
I_S	Total Quiescent Supply Current (pin 10)	V_i = L ; I_O = 0 ; V_{en} = H		2	6	mA
		V_i = H ; I_O = 0 ; V_{en} = H		16	24	mA
		V_{en} = L			4	mA
I_{SS}	Total Quiescent Logic Supply Current (pin 20)	V_i = L ; I_O = 0 ; V_{en} = H		44	60	mA
		V_i = H ; I_O = 0 ; V_{en} = H		16	22	mA
		V_{en} = L		16	24	mA
V_{IL}	Input Low Voltage (pin 2, 9, 12, 19)		– 0.3		1.5	V
V_{IH}	Input High Voltage (pin 2, 9, 12, 19)	$V_{SS} \leq 7$ V	2.3		V_{SS}	V
		$V_{SS} > 7$ V	2.3		7	V
I_{IL}	Low Voltage Input Current (pin 2, 9, 12, 19)	V_{IL} = 1.5 V			– 10	µA
I_{IH}	High Voltage Input Current (pin 2, 9, 12, 19)	2.3 V ≤ V_{IH} ≤ V_{SS} – 0.6 V		30	100	µA
$V_{en\ L}$	Enable Low Voltage (pin 1, 11)		– 0.3		1.5	V
$V_{en\ H}$	Enable High Voltage (pin 1, 11)	$V_{SS} \leq 7$ V	2.3		V_{SS}	V
		$V_{SS} > 7$ V	2.3		7	V
$I_{en\ L}$	Low Voltage Enable Current (pin 1, 11)	$V_{en\ L}$ = 1.5 V		– 30	– 100	µA
$I_{en\ H}$	High Voltage Enable Current (pin 1, 11)	2.3 V ≤ $V_{en\ H}$ ≤ V_{SS} – 0.6 V			± 10	µA
$V_{CE(sat)H}$	Source Output Saturation Voltage (pins 3, 8, 13, 18)	I_O = – 0.6 A		1.4	1.8	V
$V_{CE(sat)L}$	Sink Output Saturation Voltage (pins 3, 8, 13, 18)	I_O = + 0.6 A		1.2	1.8	V
V_F	Clamp Diode Forward Voltage	I_O = 600nA		1.3		V
t_r	Rise Time (*)	0.1 to 0.9 V_O		250		ns
t_f	Fall Time (*)	0.9 to 0.1 V_O		250		ns
t_{on}	Turn-on Delay (*)	0.5 V_i to 0.5 V_O		750		ns
t_{off}	Turn-off Delay (*)	0.5 V_i to 0.5 V_O		200		ns

(*) See fig. 1.

TRUTH TABLE (one channel)

Input	Enable (*)	Output
H	H	H
L	H	L
H	L	Z
L	L	Z

Z = High output impedance
(*) Relative to the considered channel

Figure 1: Switching Times

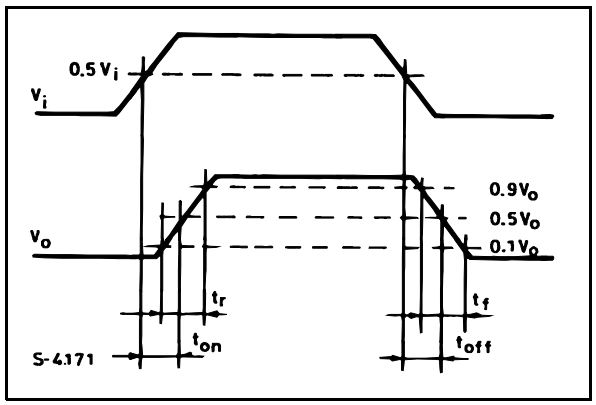
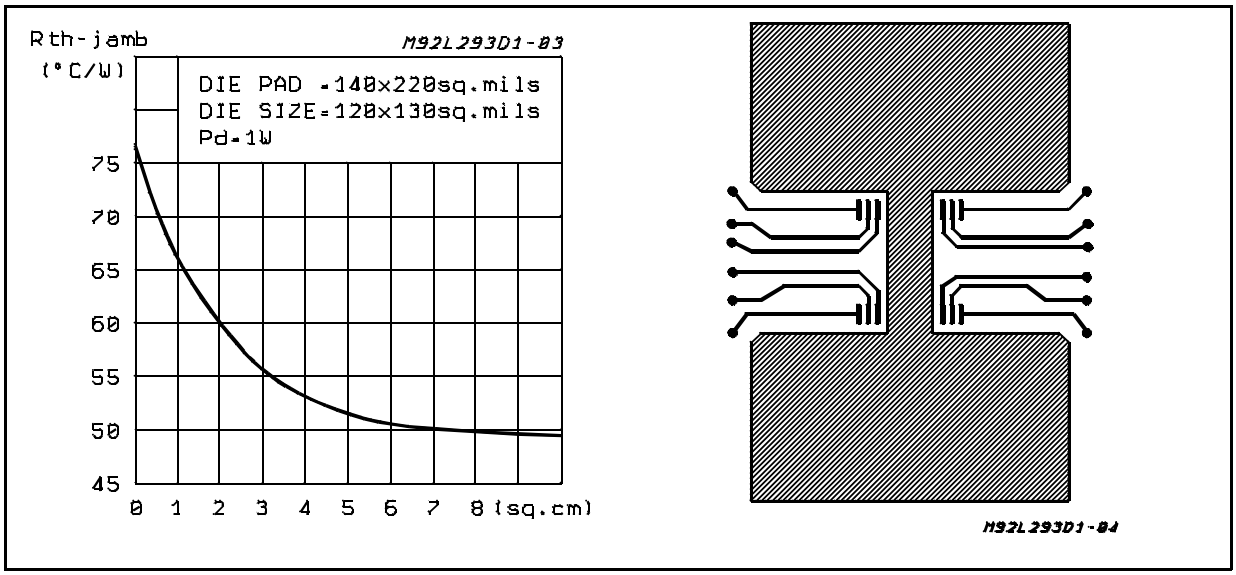
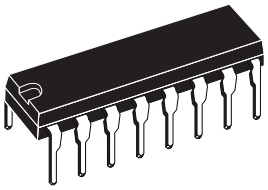


Figure 2: Junction to ambient thermal resistance vs. area on board heatsink (SO12+4+4 package)

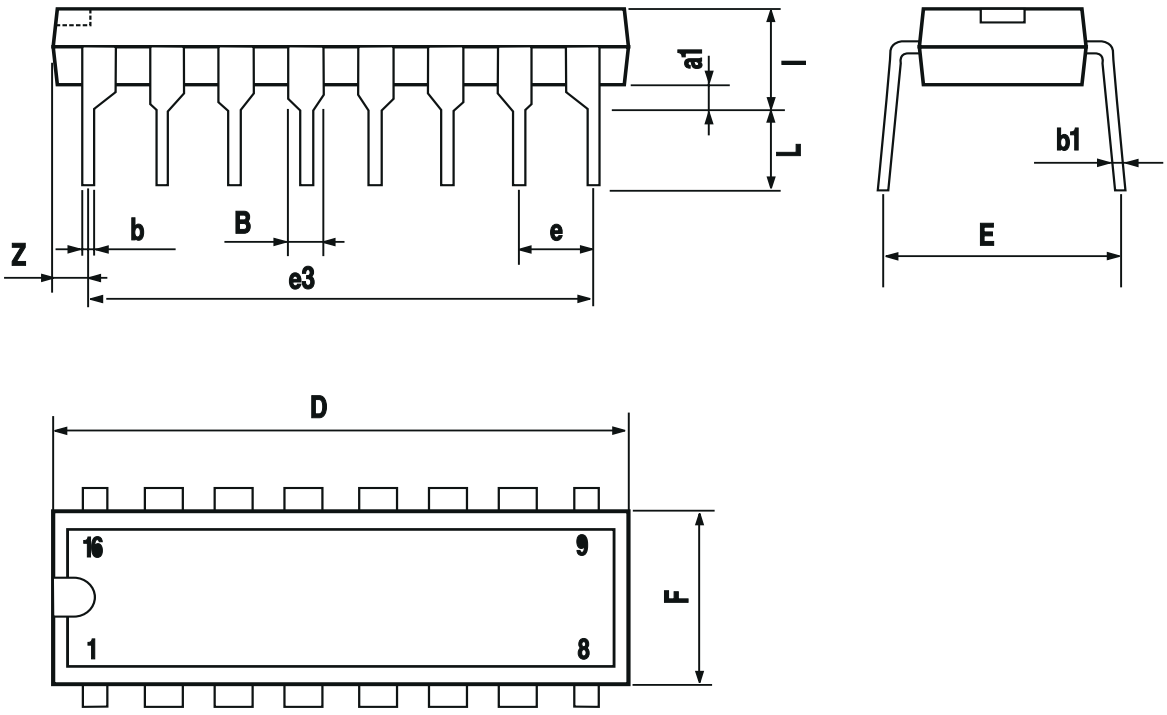


DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	0.85		1.40	0.033		0.055
b		0.50			0.020	
b1	0.38		0.50	0.015		0.020
D			20.0			0.787
E		8.80			0.346	
e		2.54			0.100	
e3		17.78			0.700	
F			7.10			0.280
I			5.10			0.201
L		3.30			0.130	
Z			1.27			0.050

OUTLINE AND MECHANICAL DATA

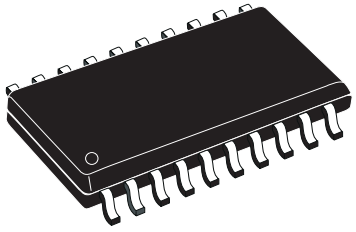


Powerdip 16

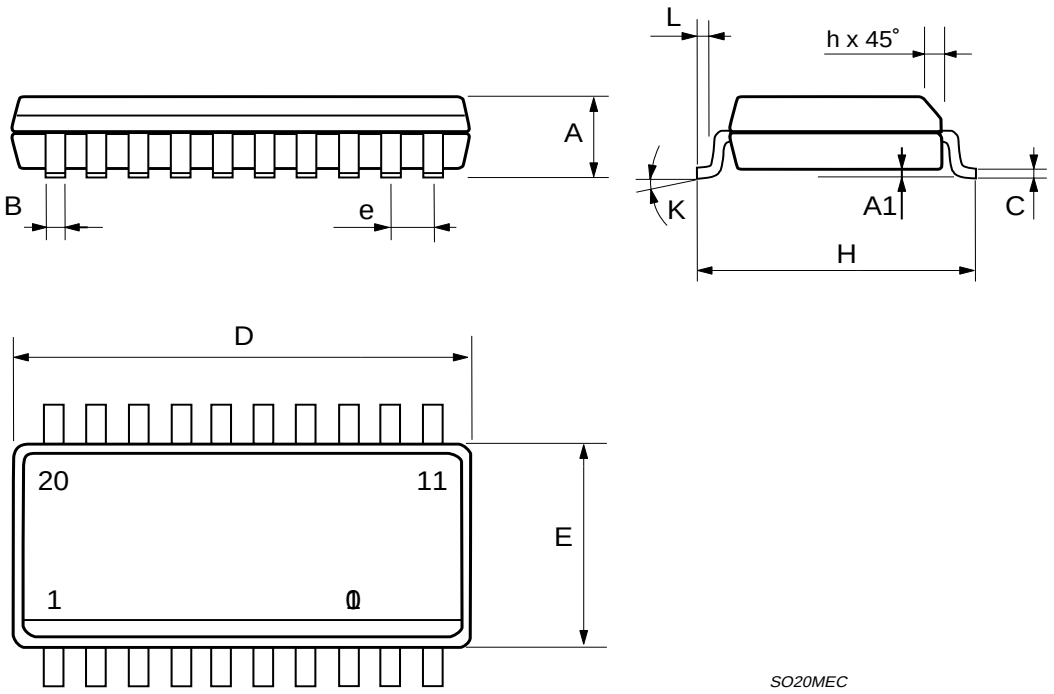


DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.35		2.65	0.093		0.104
A1	0.1		0.3	0.004		0.012
B	0.33		0.51	0.013		0.020
C	0.23		0.32	0.009		0.013
D	12.6		13	0.496		0.512
E	7.4		7.6	0.291		0.299
e		1.27			0.050	
H	10		10.65	0.394		0.419
h	0.25		0.75	0.010		0.030
L	0.4		1.27	0.016		0.050
K	0˚ (min.)8˚ (max.)					

OUTLINE AND MECHANICAL DATA



SO20

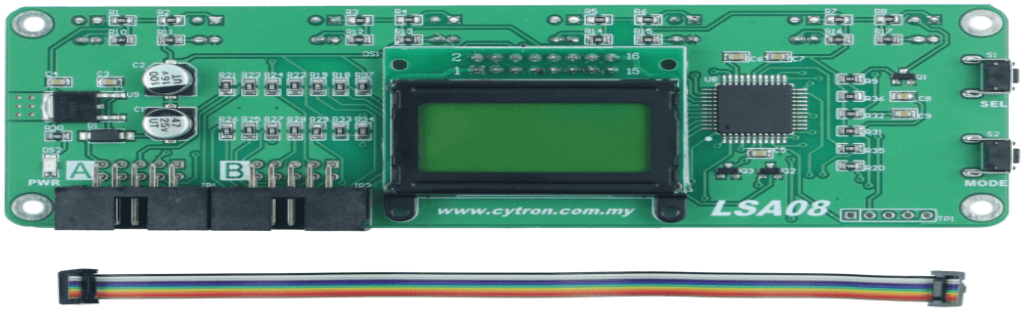


SO20MEC

St. Name: - Shreya Balaji Boga

Component Name 1: - Advanced Auto- Calibrating Line sensor (LSA08)

Component Info: - LSA08 (Advance Line Following Sensor Bar) consist of 8 sensors pair. LSA08 is typically used for embedded system or robots for line following task. The specially selected wavelength of super bright green LED as the sensor's transmitter enables LSA08 to operate on various different colour surfaces. LSA08 is capable to operate on surface with colour of Red, Green, Blue, White, Black, Gray and possibly other colours with distinct brightness different. The LSA08 has several different output modes, for the convenience of use for any system. Namely, the digital output port (8 parallel output line), the serial communication port (UART) and the analog output port.



Specification: -

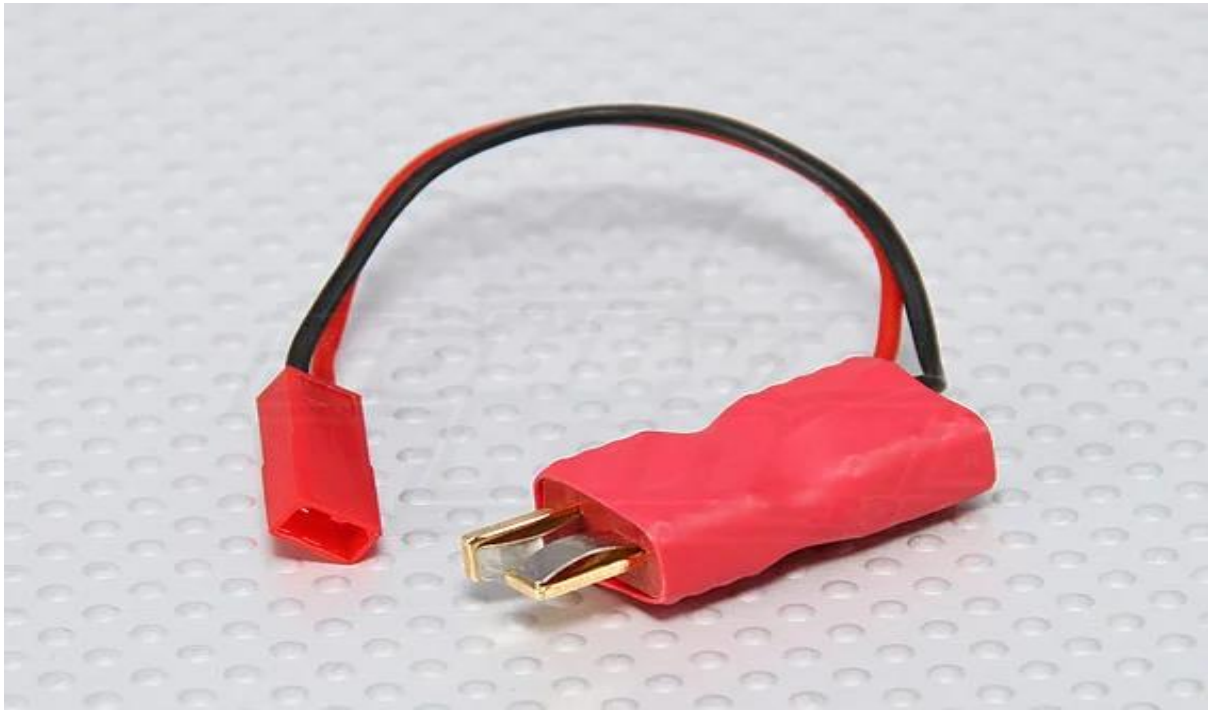
1.	Operating Voltage (VDC)	12
2.	Refresh Rate (Hz)	200
3.	Length (mm)	134
4.	Width (mm)	45
5.	Height	18
6.	Weight	45

Features: -

1. 8 sensor pairs spaced 16mm.
2. 12V input power.
3. Onboard Mode and a Select button for instant configuration of LSA08.
4. 3 Different output mode (digital output port, UART output port, analog output port).
5. LCD display unit showing 8 sensors analog value with bar chart and line position.
6. Simple Auto-Calibration function to the line following surface.
7. Junction Pulse (JPULSE) for detecting junction crossing and junction counting.
8. Power polarity protection.
9. Low current consumption (typically 26mA).
10. Works on glossy or reflective surface.
11. Refresh rate up to 200Hz.

Component Name 2: - T-connector power line adaptor lead

Component Info: - This is a SafeConnect Nylon T-connector Male to Nylon T-connector Female with JST Male In-line Power Adapter Lead. Use this adapter to power a stand-alone BEC, an electronic accessory such as a cooling fan, LED lights, etc. Be aware of the voltage limits of the device you connect to the JST plug lead to make sure that it can handle the voltage of the main battery connected to this adapter.



Specification: -

1.	Connector Material	Gold Plated connector, Nylon case
2.	Length of cable (cm)	10

How it works: -

The powerline adapter works by taking electricity from an electrical outlet and transforming it into a radio frequency signal that is then transmitted by the adapter over your existing wiring. This allows you to use the same outlet as both an input for power and an output for data transmission.