

Exp No.	Title	Date
H4	Design of Lamp Dimmer Circuit Using Darlington Pair	7 August

AIM : Design of Lamp Dimmer Circuit Using Darlington Pair

DARLINGTON PAIR

A Darlington pair is two transistors that act as a single transistor but with a much higher current gain. This means that a tiny amount of current from a sensor, micro-controller or similar can be used to drive a larger load. An example circuit is shown below:

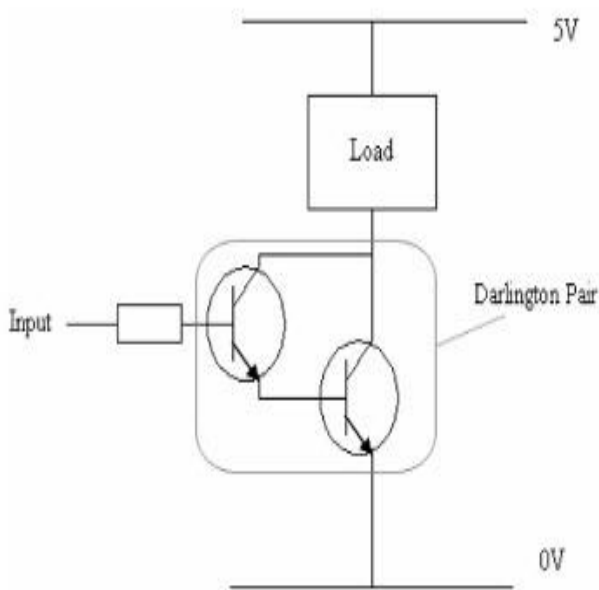


DIAGRAM OF Darlington Pair

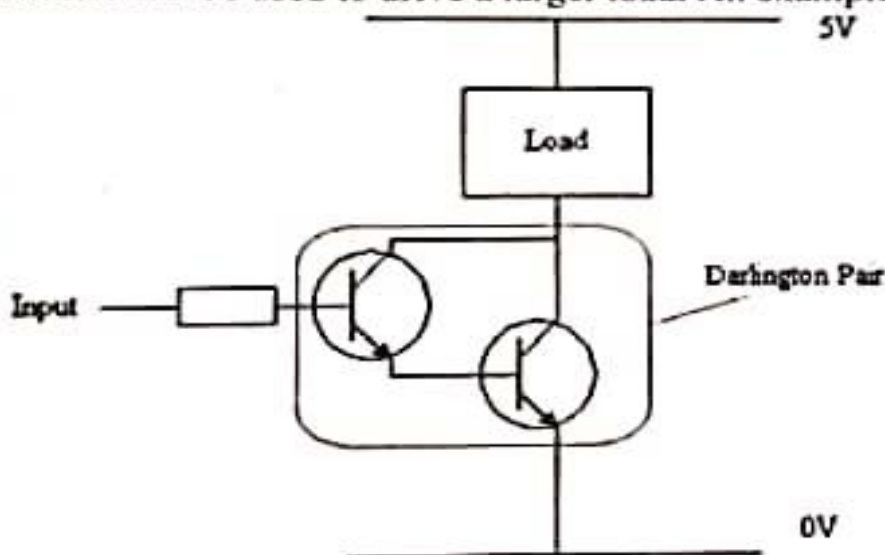
The Darlington Pair can be made from two transistors as shown in the diagram or Darlington Pair transistors are available where the two transistors are contained within the same package.

Apparatus Required

S. No.	Name of the apparatus	Range / Type	Quantity
1	BJT	BC547	2 Nos.
2	RPS	0 – 30 V	1 No.
3	Diode	1N4007	1 No.
4	Potentiometer	1 k Ω	1 No.
5	LED	-	1 No.
6	Breadboard	-	1 No.
7	Wires	-	Few

Theory:

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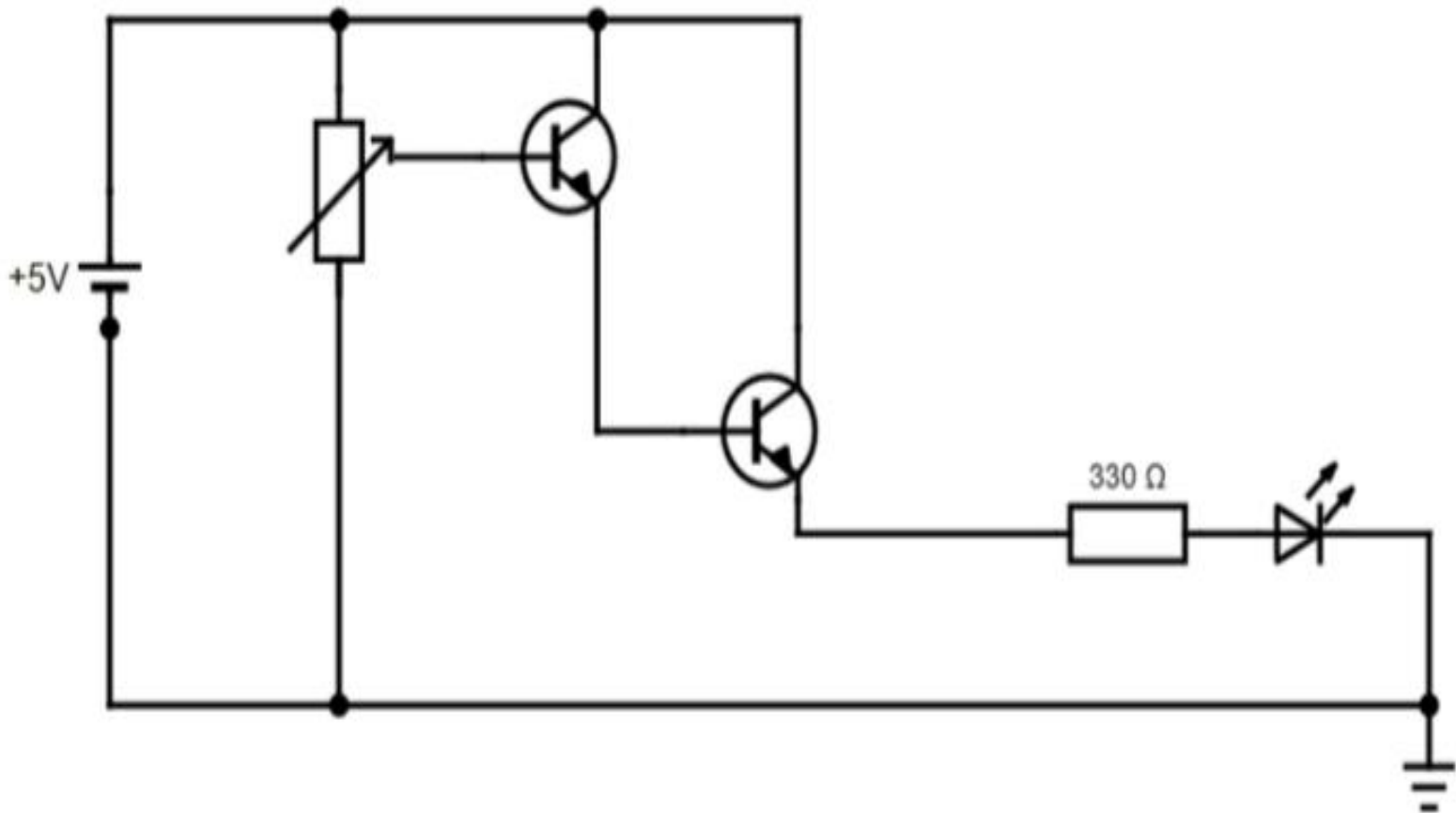
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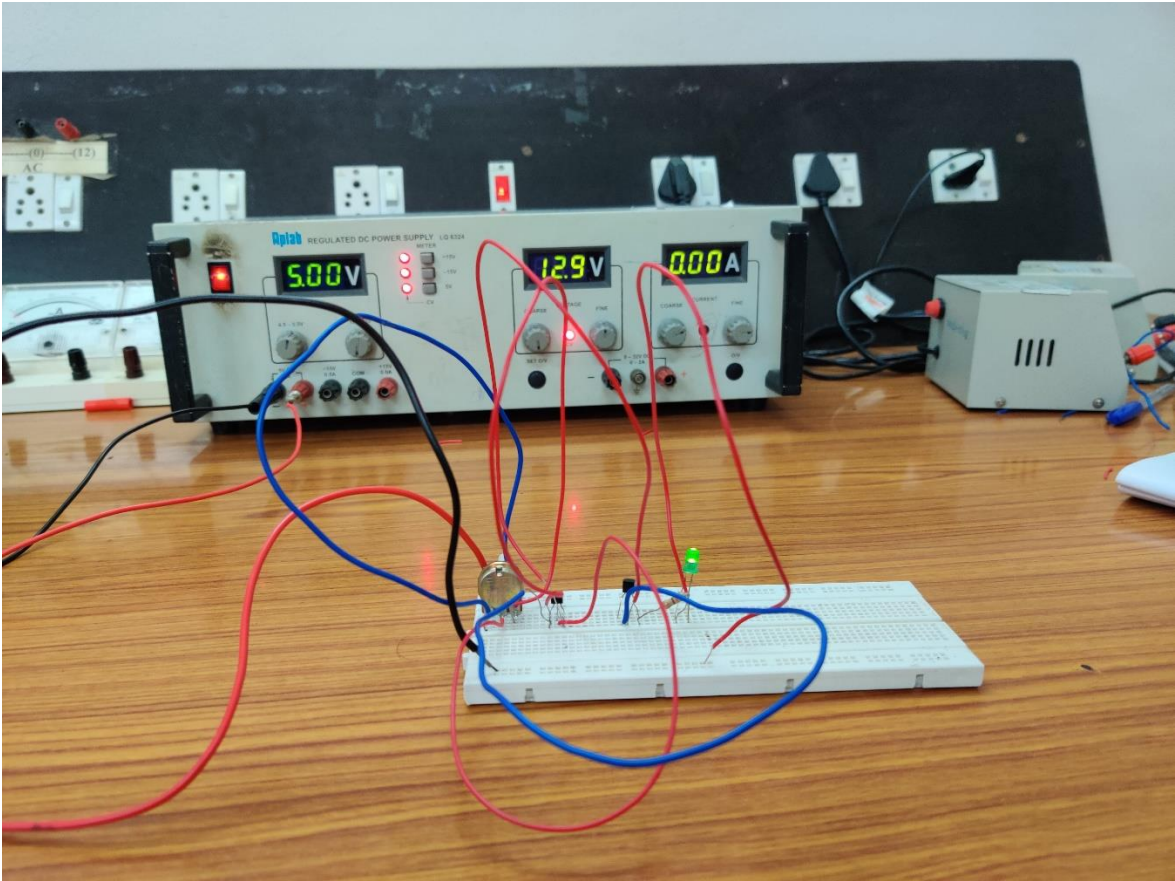
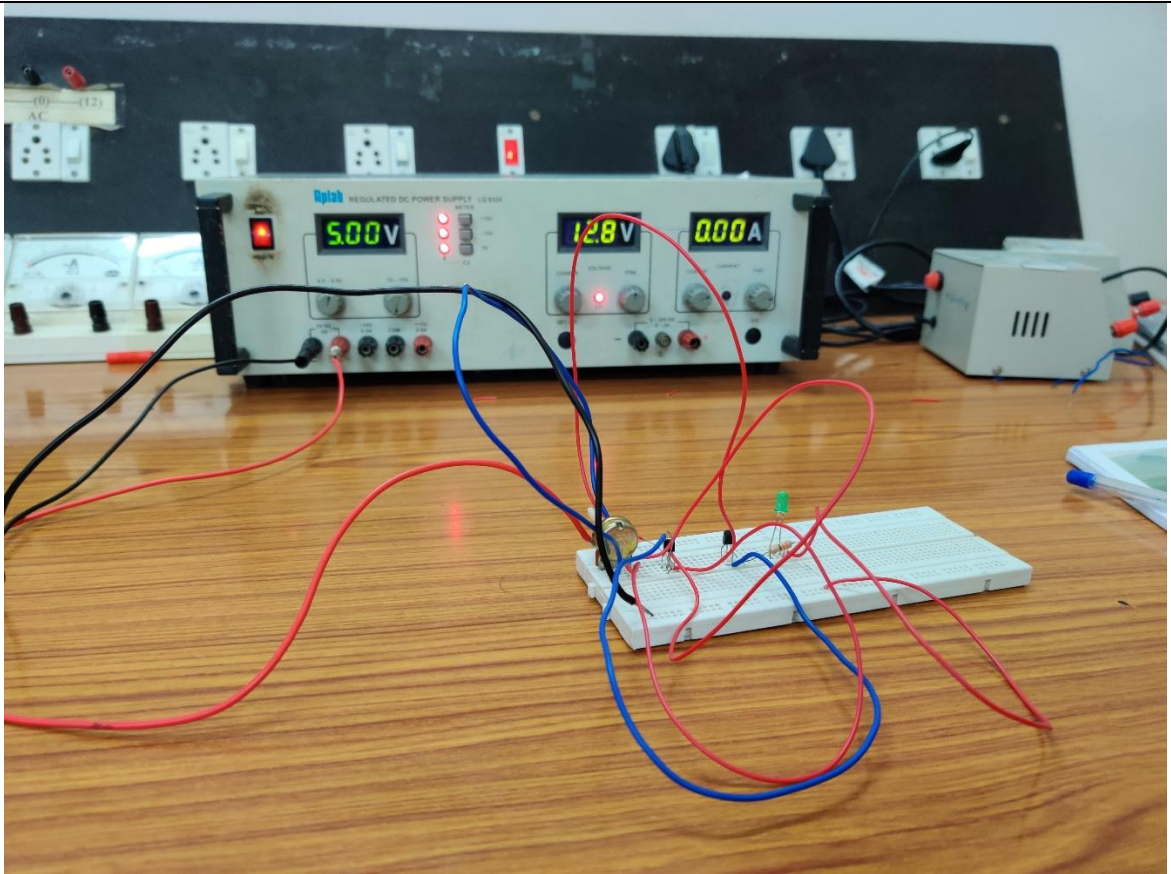
Transistors have a characteristic called current gain. This is referred to as its h_{FE} . The amount of current that can pass through the load in the circuit above when the transistor is turned on is:

$$\text{Load current} = \text{input current} \times \text{transistor gain (} h_{FE} \text{)}$$

The current gain varies for different transistors and can be looked up in the data sheet for the device. For a normal transistor this would typically be about 100. This would mean that the current available to drive the load would be 100 times larger than the input to the transistor. In some applications the amount of input current available to switch on a

CIRCUIT DIAGRAM :





RESULTS:

AS WE ARE CHANGING THE RESISTANCE THROUGH RHEOSTAT WHEN WE INCREASE THE RESISTANCE THE LIGHT INTENSITY STARTS INCREASING AND GETS MAXIMUM AT A FIXED VALUE.

AS WE ARE CHANGING THE RESISTANCE THROUGH RHEOSTAT WHEN WE DECREASE THE RESISTANCE THE TENSITY STARTS DECREASING AND GETS ZERO .

CONCLUSION AND INFERENCE :

A Darlington pair behaves like a single transistor with a high current gain (approximately the product of the gains of the two transistors).

Precautions:

- Avoid loose connections. Meters should be adjusted to null deflection.
- Connections must be verified before switching ON power supply.
- Power supply should be switched OFF before making/breaking circuit connections.
- Readings should be taken without parallax error.

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