

JavaScript seems to be disabled in your browser.
You must have JavaScript enabled in your browser to utilize the functionality of this website.

- [Blog](#)
- [Resources](#)
- [Gallery](#)
- [Services](#)
- [Log In](#)
- [My Wishlist](#)
- [Log In](#)

- [Blog](#)
- [Resources](#)
- [Gallery](#)
- [Services](#)
- [My Account](#)
- [Checkout](#)
- [My Wishlist](#)
- [Log In](#)

£

Search: Search

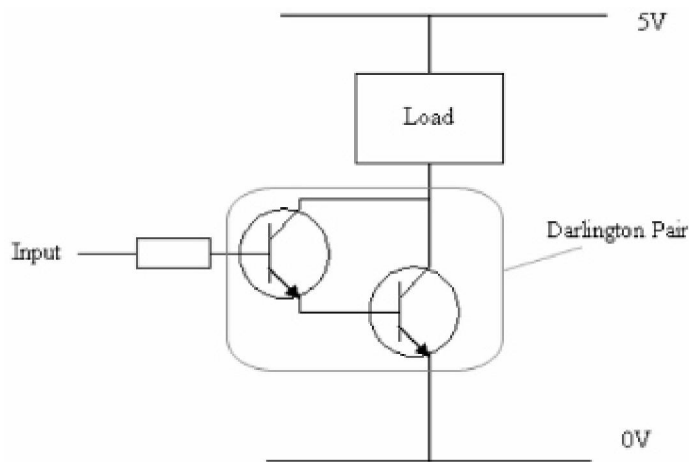
My Cart:
0 item(s) - £0.00

- [Blog](#)
- [Resources](#)
- [Gallery](#)
- [Services](#)
- [My Account](#)
- [My Cart](#)
- [Checkout](#)
- [My Wishlist](#)
- [Log In](#)

PRODUCTS

How A Darlington Pair Transistor Works

A Darlington pair is two [transistors](#) that act as a single transistor but with a much higher current gain.



What is current gain?

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 when connected to a transistor that is turned on equals the input current x the gain of the transistor (h_{FE})

The current gain varies for different transistors and can be looked up in the data sheet for the device. Typically it may be 100. This would mean that the current available to drive the load would be 100 times larger than the input to the transistor.

Why use a Darlington Pair?

In some application the amount of input current available to switch on a transistor is very low. This may mean that a single transistor may not be able to pass sufficient current required by the load.

As stated earlier this equals the input current x the gain of the transistor (h_{FE}). If it is not possible to increase the input current then we need to increase the gain of the transistor. This can be achieved by using a Darlington Pair.

A Darlington Pair acts as one transistor but with a current gain that equals:

Total current gain ($h_{FE \text{ total}}$) = current gain of transistor 1 ($h_{FE \text{ t1}}$) x current gain of transistor 2 ($h_{FE \text{ t2}}$)

So for example if you had two transistors with a current gain (h_{FE}) = 100:

$$(h_{FE \text{ total}}) = 100 \times 100$$

$$(h_{FE \text{ total}}) = 10,000$$

You can see that this gives a vastly increased current gain when compared to a single transistor. Therefore this will allow a very low input current to switch a much bigger load current.

Base Activation Voltage

Normally to turn on a transistor the base input voltage of the transistor will need to be greater than 0.7V. As two transistors are used in a Darlington Pair this value is doubled. Therefore the base voltage will need to be greater than $0.7V \times 2 = 1.4V$.

It is also worth noting that the voltage drop across collector and emitter pins of the Darlington Pair when the turn on will be around 0.9V. Therefore if the supply voltage is 5V (as above) the voltage across the load will be around 4.1V ($5V - 0.9V$)



← *Previous Post* *Next Post* →

 Springer

● Name


[illegible]

Page 10 of 10

--	--

--	--

--	--



Recent Posts

- [New Product Update: Kits, Kits, and Yet More Kits!](#)
- [SpaceHack Game by York Hackspace](#)
- [Video SparkFun Inventor's Kit V3.0](#)
- [New Product Update: a Beginner Parts Kit, a Resistor Kit, a Power Supply with Interchangeable AC Pins, and More!](#)
- [Design & Make the Future 2014](#)

- [Motor Control](#)

Newsletter

Sign up to our newsletter to get the latest product and company information:

Sign Up

Share

-
-
-

Tweets

-



-

7 hours ago **Kitronik**

[@Kitronik](#)

Arduino Blog Blog Archive Whats the future of board games? Some students are making it connected: <http://t.co/5UAmJnLBmk>

</div> your browser does not support iframes!

ABOUT KITRONIK

- [About Us](#)
- [Contact Us](#)
- [Online Catalogue](#)
- [Leave Feedback](#)
- [Customer Testimonials](#)
- [WEEE Recycling](#)
- [Press Information](#)

ORDERING

- [Ordering & Returns](#)
- [Delivery Information](#)
- [Bulk Buy Discounts](#)
- [Distributors](#)
- [Become a Distributor](#)
- [Website Policies](#)
- [Terms & Conditions](#)

MY ACCOUNT

- [Sign In](#)
- [View Cart](#)
- [My Wishlist](#)
- [My Order History](#)
- [Checkout](#)

Secured by

sage | pay

VISA PayPal



CONTACTS

Kitronik Ltd,
Unit 3a, Shipstones Business Centre,
North Gate, Nottingham, NG7 7FN, UK.
Tel: +44 (0) 845 8380781
Fax: +44 (0) 845 8380782
sales@kitronik.co.uk

Website by [Absolute](#)