

Testing a transistor

Transistors can be damaged by heat when soldering or by misuse in a circuit. If you suspect that a transistor may be damaged there are two easy ways to test it:

1. Testing with a multimeter

Use a [multimeter](#) or a [simple tester](#) (battery, resistor and LED) to check each pair of leads for conduction. Set a digital multimeter to diode test and an analogue multimeter to a low resistance range.

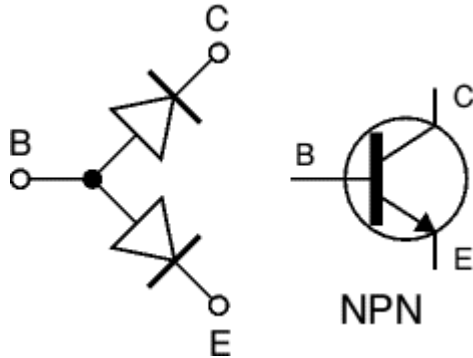
Test each pair of leads both ways (six tests in total):

The **base-emitter (BE)** junction should behave like a diode and **conduct one way only**.

The **base-collector (BC)** junction should behave like a diode and **conduct one way only**.

The **collector-emitter (CE)** should **not conduct either way**.

The diagram shows how the junctions behave in an NPN transistor. The diodes are reversed in a PNP transistor but the same test procedure can be used.



Testing an NPN transistor

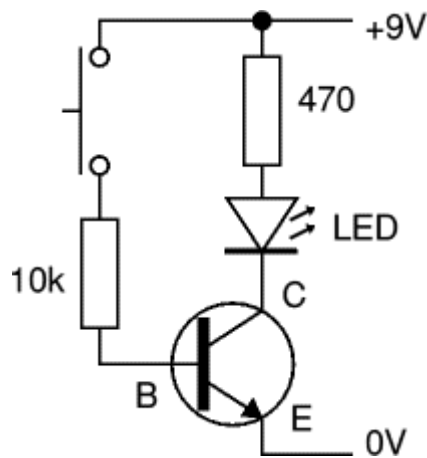
2. Testing in a simple circuit

Connect the transistor into the simple circuit shown. The supply voltage is not critical, anything between 5V and 12V is suitable. This circuit can be quickly built on [breadboard](#) for example. Take care to include the 10k resistor in the base connection or you will destroy the transistor as you test it!

If the transistor is OK the LED should light when the switch is pressed and not light when the switch is released.

To test a PNP transistor use the same circuit but reverse the LED and the supply voltage.

Some [multimeters](#) have a 'transistor test' function which provides a known base current and measures the collector current so as to display the transistor's DC current gain h_{FE} .



A simple switching circuit, to test an NPN transistor