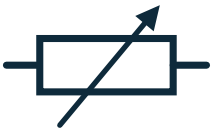
Variable voltage dividers

Core BUILD THE BASICS

C1 **State** the name of this component. **[1]**



C2 **State** what changes when you turn the knob of a variable resistor. **[1]**

C3 A variable resistor set to 4.7 kΩ is in series with 3.3 kΩ across 8.0 V. **Calculate** the total resistance. **[1]**

C4 For the circuit in C3, **calculate** the current. **[1]**

C5 **State** the purpose of a variable resistor in a sensing circuit. **[1]**

C6 **State** the Data Booklet rule used to find the variable resistor value. **[1]**

C7 V_s = 5 V, switch at 0.7 V. **State** the voltage across the top resistor. **[1]**

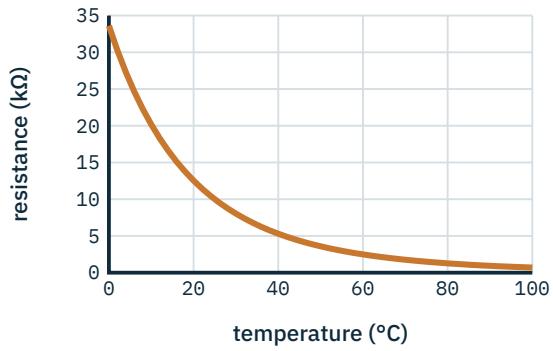
Stretch GO FURTHER

S1 A thermistor (top) is 12.5 kΩ at 20 °C. V_s = 5.0 V and the transistor switches at V_{in} = 0.7 V. **Calculate** R_{var} (bottom). **[3]**

Variable voltage dividers

S2 In S1, the variable resistor is reduced. **Describe** the effect on the switching temperature. **[2]**

S3 With V_s = 6.0 V, R_{var} = 2.2 kΩ (bottom) and V_{in} = 0.7 V, **calculate** the thermistor resistance at switching, then use the graph to find the temperature. **[3]**



S4 V_s = 5 V, thermistor (bottom) 20 kΩ at 10 °C, switch at 0.7 V. **Calculate** R_{var} (top). **[3]**

S5 **Calculate** V_{out} in S4 when R_{var} = 100 kΩ. **[2]**

S6 **Describe** the effect on the switching temperature of increasing R_{var} in S4. **[1]**

Exam Ready QUALIFICATIONS SCOTLAND STYLE

E1 **Explain** why a frost alarm uses a variable resistor instead of a fixed resistor. **[2]**

Variable voltage dividers

E2 A 9.0 V supply feeds a 2.2 kΩ resistor in series with a variable resistor. The variable resistor is increased. **State** the effect on the current and on the voltage across the 2.2 kΩ resistor. **[2]**

E3 In E2 the variable resistor is set to 6.8 kΩ. **Calculate** the total resistance and the current. **[2]**

E4 A night light (LDR bottom, variable resistor top) comes on too early in the evening. **Describe** the adjustment needed and explain why. **[2]**

Total: 29 marks. Use the Data Booklet. Show your working and give units.