



VCE Physics and VCE Systems Engineering: Table of electronic symbols

In response to requests from teachers the VCAA has produced a table of commonly used electronic symbols. Practising teachers have provided advice in the selection of recommended and alternative symbols that appear in the table. Students may expect to see either the recommended or alternative symbols on the VCE Physics and VCE Systems Engineering examination papers. Teachers and students are likely to encounter the symbols shown in the table, and other symbols, in other publications. Teachers are encouraged to ensure students are flexible in their understanding and recognition of electronic symbols.

From the table, individual symbols may be selected, cut or copied and pasted into other documents and may assist teachers in the preparation of tests, revision sheets and drawing circuit diagrams.

All symbols have been generated using the **Drawing** tools in *Microsoft Word*. Each has been '**Grouped**' so that it will remain intact when selected, copied and pasted to generate a circuit diagram.

The **recommended symbols** are provided in their acceptable orientation/s. The orientation of all symbols can be changed using the Drawing commands **Rotate Left**, **Rotate Right**, **Flip Vertical** or **Flip Horizontal**.

Aids in joining copied symbols by drawn lines on a required circuit diagram:

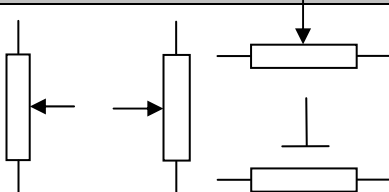
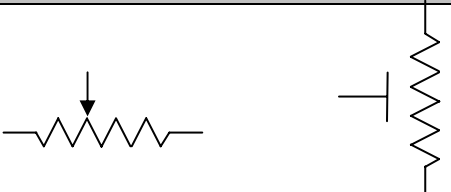
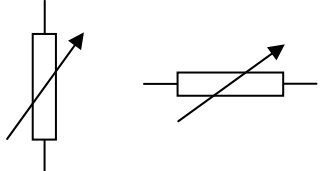

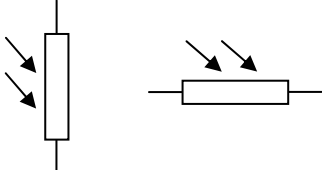
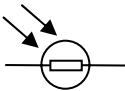
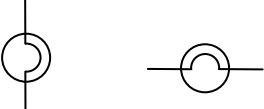

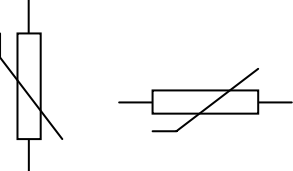
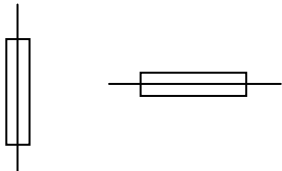
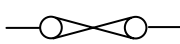
- On the **Drawing grid** set **Snap objects to other objects**.
- Under **AutoShapes**, select **Connectors**, then **Straight connector**.
- The dot (●) to indicate electrically connected points in the diagram can also be selected from the following table.

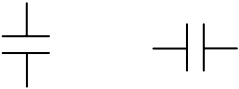



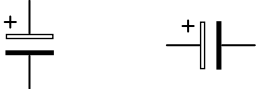

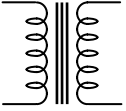
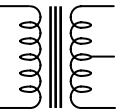
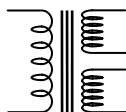
Enquiries regarding the table should be directed to the following Curriculum Managers:
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Science Manager, Maria James (03) 9651 4655 or james.maria.m@edumail.vic.gov.au

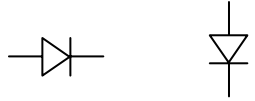
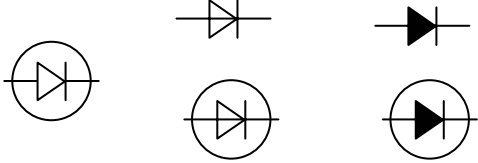
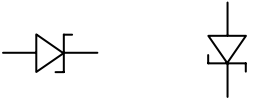
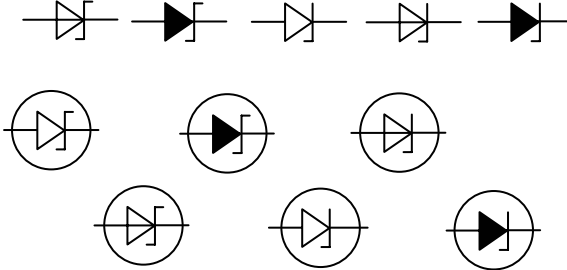
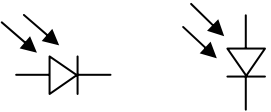
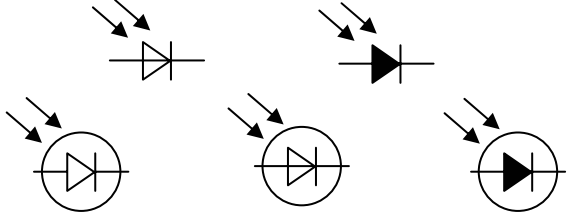

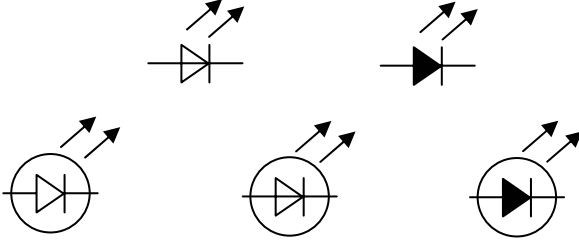
Electric and electronic symbols for VCE Physics and VCE Systems Engineering

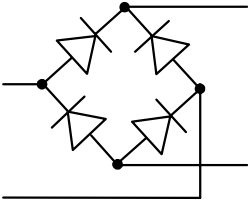
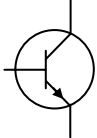
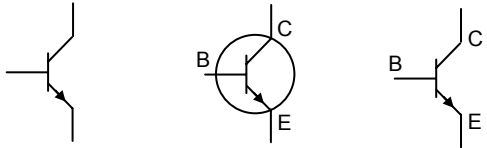
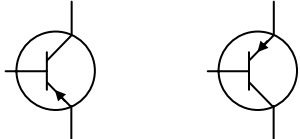
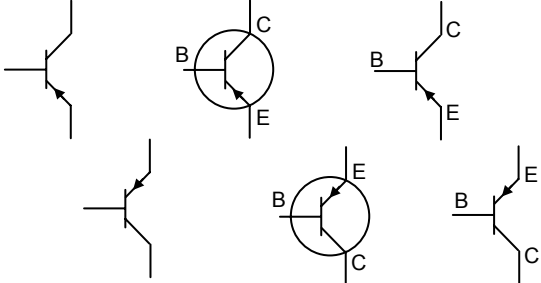
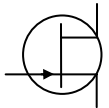
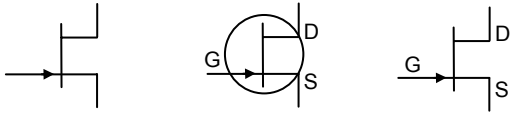
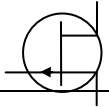
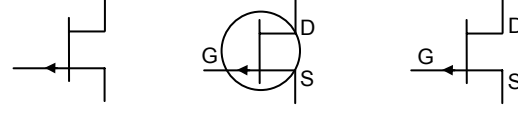
For each component a **recommended symbol** is shown in its normally accepted orientation/s, i.e. vertically and/or horizontally. In electronics there is a longstanding convention to show most components with a vertical orientation and for the circuit to read from the source or input on the left to the output or remaining circuit on the right. Other **alternative symbols** that may be encountered are also shown. **Notes** include relevant acceptance of symbol.

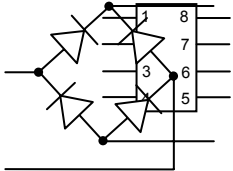
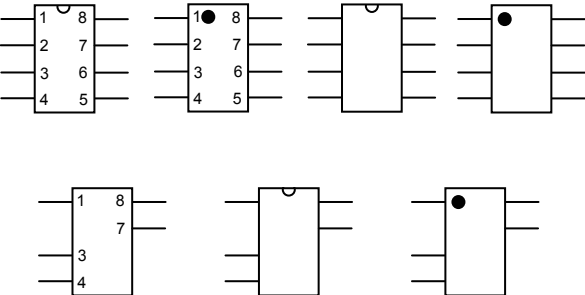
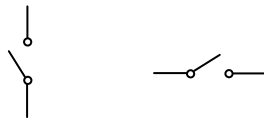

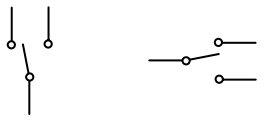

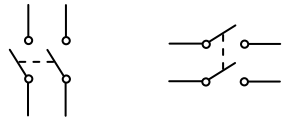

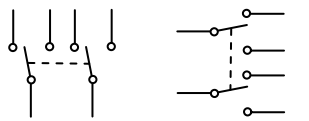

Component group	Component	Recommended symbol	Alternative symbols	Notes
sources	cell			
	battery, DC power supply			
	variable DC power supply			
	AC power supply			
resistors	resistor			Alternative symbol now regarded as outdated.

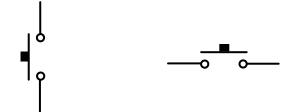

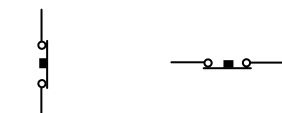

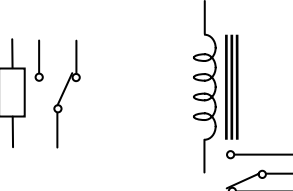
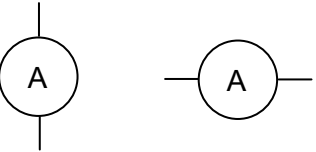
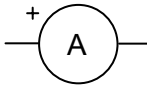
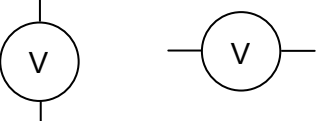
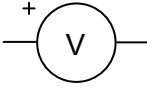
Component group	Component	Recommended symbol	Alternative symbols	Notes
	variable resistor, potentiometer, voltage divider			A variable resistor where the variation is achieved by use of a sliding contact.
	variable resistor			A general symbol for a variable resistor where the means of variation is not specified.
	light-dependent resistor (LDR)			
	filament globe			
	thermistor			
	fuse			

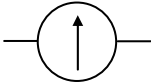
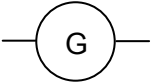
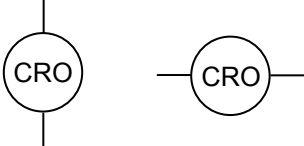
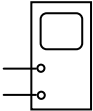
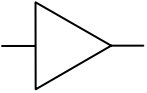
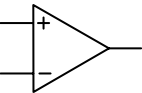
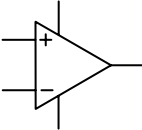
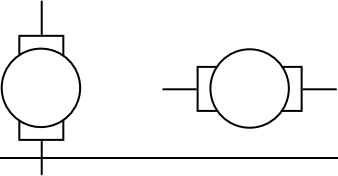
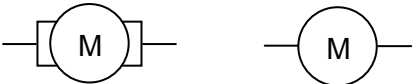
Component group	Component	Recommended symbol	Alternative symbols	Notes
capacitors	(non-polarised) capacitor			
	variable capacitor			
	polarised capacitor, electrolytic capacitor			
transformers	iron-cored transformer (one secondary winding)			
	iron-cored transformer (one secondary winding – centre-tapped)			
	iron-cored transformer (two secondary windings)			



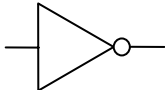
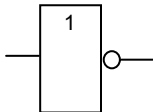
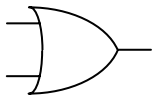
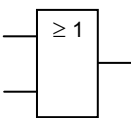
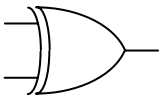

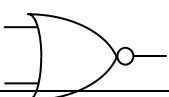
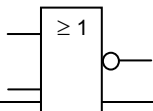
Component group	Component	Recommended symbol	Alternative symbols	Notes
diodes	junction diode			<p>Additional alternative symbols for all diodes include those where the single straight-line section of the symbol is shown as a heavier line.</p>
	Zener diode			
	photo diode			
	light-emitting diode (LED)			

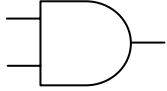
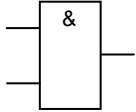
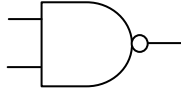
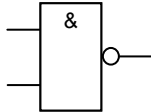
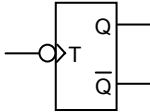
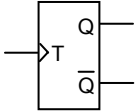


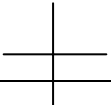
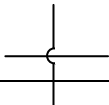
Component group	Component	Recommended symbol	Alternative symbols	Notes
	diode bridge	 <p>(Note that in an earlier version of this table, this symbol was incorrectly represented.)</p>		There are alternative forms using the other alternative symbols for the junction diode given above.
transistors	npn transistor			Additional alternative symbols for all transistors include those where the vertical straight-line section of the symbol is shown as a heavier line.
	pnp transistor			Both orientations of the recommended symbol are used depending on whether the <i>emitter</i> (E) is at the bottom or top.
	n-type junction field effect transistor (NJFET)			
	p-type junction field effect transistor (PJFET)			

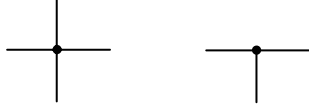
Component group	Component	Recommended symbol	Alternative symbols	Notes
integrated circuits	integrated circuit (IC)			<p>This example shows an IC with 8 connections. Others occur, e.g. 14 and 16. Under alternative symbols identifying marks are shown to indicate the numbering of the connections. Other conventions show only the connections used in a given circuit, here 1, 3, 4, 7 and 8.</p>
switches	single pole, single throw (SPST) switch			
	single pole, double throw (SPDT) switch			
	double pole, single throw (DPST) switch			
	double pole, double throw (DPDT) switch			

Component group	Component	Recommended symbol	Alternative symbols	Notes
	normally open (NO) switch			
	normally closed (NC) switch			
	relay			
meters	ammeter			
	voltmeter			

Component group	Component	Recommended symbol	Alternative symbols	Notes
	galvanometer			The alternative symbol is not recommended as it is sometimes used to indicate a <i>generator</i> .
	cathode ray oscilloscope (CRO)			Neither of these encountered symbols is widely used.
amplifiers	voltage amplifier			
	operational amplifier (op amp)			On the alternative symbol the two vertical connections are shown when it is connected to the power supply.
transducers	motor			

Component group	Component	Recommended symbol	Alternative symbols	Notes
	microphone			
	loudspeaker			
logic gates	NOT or invert gate			
	OR gate			
	XOR (exclusive OR) gate			
	NOR gate			

Component group	Component	Recommended symbol	Alternative symbols	Notes
	AND gate			
	NAND gate			
flip-flop	T (toggle) flip-flop	  falling edge triggered rising edge triggered		
external connections	earth			
	aerial			
circuit connections	non-connected leads			Alternative symbol regarded as outdated.

Component group	Component	Recommended symbol	Alternative symbols	Notes
	connected leads			
	dot for junction of connected leads	