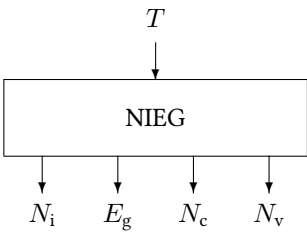


Block NIEG

The NIEG block calculates the intrinsic charge carrier density, the energy band gap and the effective densities of states in conduction and valence bands of a semiconductor as a function of the temperature.



Name	NIEG
Function	se0031
Inputs	1
Outputs	4
Parameters	5
Strings	0
Group	S

Inputs

- 1
- Temperature / °C

Outputs

- 1
- Intrinsic charge carrier density / cm⁻³
- 2
- Band gap / eV
- 3
- Effective density of states in the conduction band / cm⁻¹
- 4
- Effective density of states in the valence band / cm⁻¹

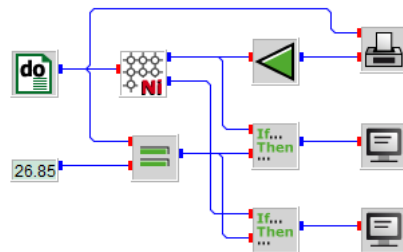
Parameters

- 1
- Relative electron mass $m_{r,n}$
- 2
- Relative hole mass $m_{r,p}$
- 3
- Band gap $E_g(0)$ / eV
- 4
- Band gap parameter a / eV K⁻¹
- 5
- Band gap parameter b / K

Strings

None

nieg.vseit



A **DO** block varies the temperature of a semiconductor from 10 to 30 degrees Celsius in steps of 0.01 degrees to calculate the intrinsic charge carrier density and the band gap of the material.

Two **IF** blocks filter the data for 26.85 degrees to display the respective values by **SCREEN** blocks as

Intrinsic charge carrier density = $0.94067118 \times 10^{10}$
Band gap = 1.12051928

A **PLOT** block displays the charge carrier density diluted by a factor 10^{-9} through the **ATT** block.

