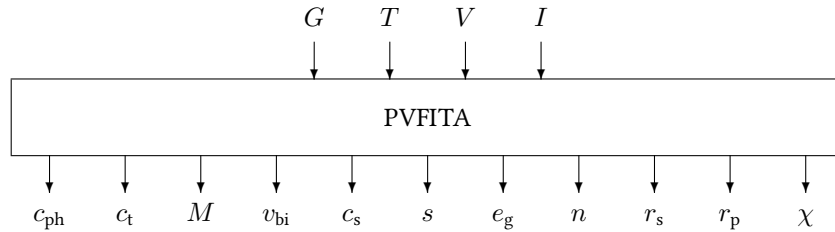


Block PVFITA

The PVFITA block performs a modified one-diode-model fit on I-V curves of a (micro-) amorphous PV module connected to the block's inputs.



Name	PVFITA
Function	se0005
Inputs	4
Outputs	11
Parameters	33 ... [34]
Strings	5
Group	I

Inputs

- 1 Global radiation / W m^{-2}
- 2 Module temperature / $^{\circ}\text{C}$
- 3 Module voltage / V
- 4 Module current / A

Outputs

- 1 Photocurrent parameter $c_{\text{ph}} / \text{V}^{-1}$
- 2 Temperature coefficient $c_{\text{t}} / \text{V}^{-1} \text{K}^{-1}$
- 3 Merten parameter M / V^{-1}
- 4 Built-in voltage parameter v_{bi} / V
- 5 Saturation current parameter $c_{\text{s}} / \text{A m}^{-2} \text{K}^{-s}$
- 6 Temperature exponent s
- 7 Bandgap parameter e_{g} / eV
- 8 Diode quality parameter n
- 9 Series resistance $r_{\text{s}} / \Omega \text{m}^2$
- 10 Parallel resistance $r_{\text{p}} / \Omega \text{m}^2$
- 11 Accuracy χ

Parameters

- 1 Fit procedure
 - 0 Nelder Mead downhill simplex method
 - 1 Marquard Levenberg algorithm (not yet implemented)
- 2 Number of cells in series
- 3 Number of cells in parallel
- 4 Area of a single cell / m^2
- 5 Module area / m^2
- 6 Minimum photocurrent parameter / V^{-1}
- 7 Maximum photocurrent parameter / V^{-1}
- 8 Minimum temperature coefficient / $\text{V}^{-1}\text{K}^{-1}$
- 9 Maximum temperature coefficient / $\text{V}^{-1}\text{K}^{-1}$
- 10 Minimum Merten parameter / V^{-1}
- 11 Maximum Merten parameter / V^{-1}
- 12 Minimum built-in voltage / V
- 13 Maximum built-in voltage / V
- 14 Minimum saturation-current parameter $\text{A m}^{-2} \text{K}^{-s}$
- 15 Maximum saturation-current parameter $\text{A m}^{-2} \text{K}^{-s}$
- 16 Minimum temperature exponent
- 17 Maximum temperature exponent
- 18 Minimum bandgap parameter / eV
- 19 Maximum bandgap parameter / eV
- 20 Minimum diode-quality parameter
- 21 Maximum diode-quality parameter
- 22 Minimum series resistance / Ωm^2
- 23 Maximum series resistance / Ωm^2
- 24 Minimum parallel resistance / Ωm^2
- 25 Maximum parallel resistance / Ωm^2
- 26 Module tolerance plus / % > 0
- 27 Module tolerance minus / % < 0
- 28 Characteristic module length / m
- 29 Module weight / kg
- 30 Absorption coefficient α
- 31 Emission coefficient ϵ
- 32 Specific module heat capacity / $\text{J kg}^{-1} \text{K}^{-1}$
- 33 NOCT temperature / $^{\circ}\text{C}$
- 34 Overwrite mode
 - 0 Generate error (default)
 - 1 Overwrite

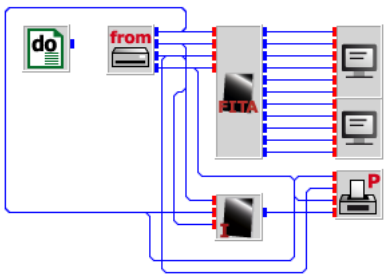
Strings

- 1 INSEL module ID (max. eight characters)
- 2 Path to .bp file

- 3 Module name
- 4 Manufacturer
- 5 Cell type (e. g., micromorphous)

Description The **PVFITA** block can be used to determine the parameters for block **PVAI** and **PVAV**, respectively.

`pvfita.vseit`



A file with measured I - V curve data named `pvfita.dat`, located in the `examples/data` directory for standard test conditions is read by a **READ** block driven by a **DO** block. The radiation and module temperature are set by two **CONST** blocks to 1000 W/m^2 and $25 \text{ }^\circ\text{C}$, respectively.

The tupels (G, T, V, I) are fed to the **PVFITA** block which performs the parameter fit.

Two **SCREEN** blocks are used to show the parameters.

```
0.10807E+00 0.65624E-04 0.58518E+01 0.18123E+01 0.99146E+01 0.23929E+01
0.68577E+00 0.34136E+01 0.65709E-03 0.13827E+02 0.79720E-02
```

As final result a file named pvfita.bp is generated.

[pvfita.bp](#)

```
% Filename      pvfita.bp
% Module        No name
% Manufacturer   No name
% Cell type      Mircroamorphous

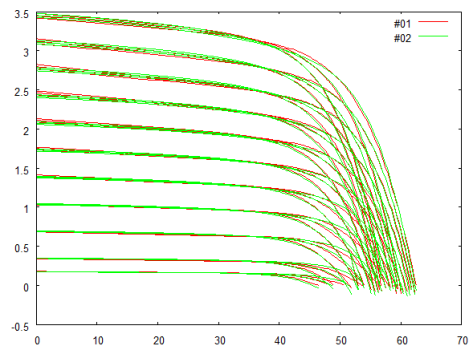
% Mode must be set externally
45              % Number of cells in series N_s per module
4               % Number of cells in parallel N_p per module
1               % Number of modules in series M_s
1               % Number of modules in parallel M_p
0.0075          % Cell area A_c (m^2)
1.420           % Module area A_m (m^2)

% Electrical parameters
0.108074E+00    % Short-circuit current parameter c_ph (V^-1)
0.656252E-04    % Isc temperature coefficient c_t (V^-1 K^-1)
0.585197E+01    % Merten parameter M (V^-1)
0.181235E+01    % Built-in voltage parameter v_bi (V)
0.991458E+01    % Coeff. of sat. current density c_s (A m^-2 K^-s)
0.239290E+01    % Temperature exponent of sat. current density s
0.685773E+00    % Band gap parameter (eV)
3.413680        % Diode ideality factor
0.657086E-03    % Series resistance r_s (Ohm m^2)
0.138270E+02    % Parallel resistance r_p (Ohm m^2)
5.0             % Module tolerance plus
-5.0            % Module tolerance minus

% Thermal parameters
1.409           % Characteristic module length l_m (m)
19.000          % Module weight m_m (kg)
0.70            % Default absorption coefficient a
0.85            % Default emission factor epsilon
900.0           % Default specific heat of a module C_mod (J kg^-1 K^-1)
47.0            % Nominal operating cell temperature NOCT (degrees C)
25.0            % Intial value of cell temperature (degrees C)

% Numerical parameters
0.100000E-02    % Error tolerance
100.0           % Maximum number of iterations
```

The parameters have been incorporated into the `pvfita.vseit` example using a [PVAI](#) block in order to demonstrate the quality of the fit. The [PLOT](#) block then shows the measured data (red curves) and the simulated points (green curves).



Remark In the current version 8.2 no mechanism is included to create a VSEit entity for a [PVAI](#) block with the fitted parameters. A workaround uses the following idea:

Open the generated `.bp` file with a text editor, add these line

```
s 1 pvai
p 1 0          % Mode
```

to the top of the file, save the file as `somename.ins` and use the [File – Import](#) function of VSEit. This will create the wanted [PVAI](#) block.

See also Blocks [PVAI](#) and [PVAV](#).