PVsyst数据库及其应用

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坎德拉学院

- ✓ PVsyst气象数据库及其使用
- ✓ 光伏组件数据库及组件外特性
- ✓ 逆变器数据库及逆变器外特性

光伏组件数据库及组件外特性

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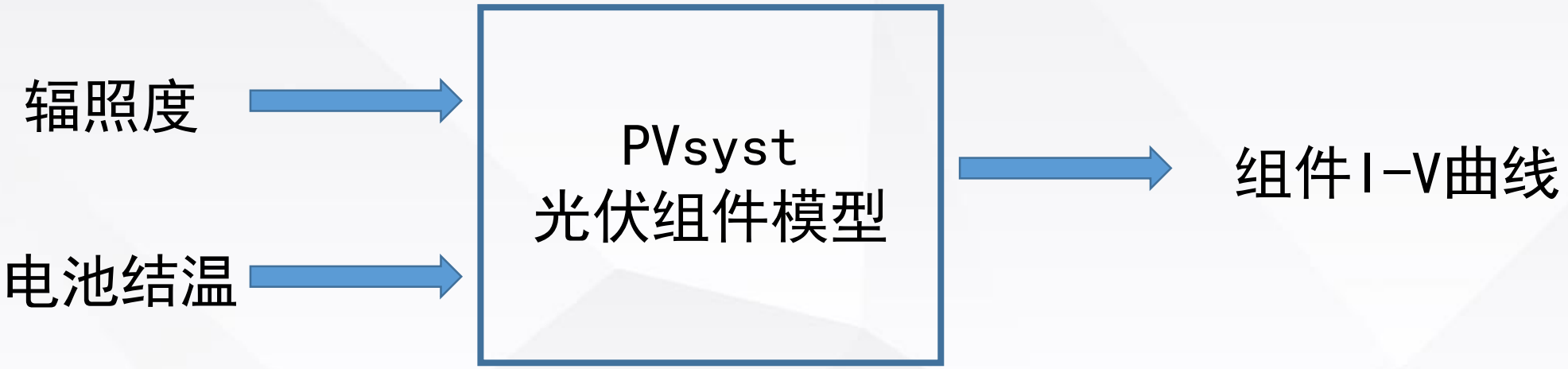
组件数据库使用演示

从PHOTON导入组件模型演示

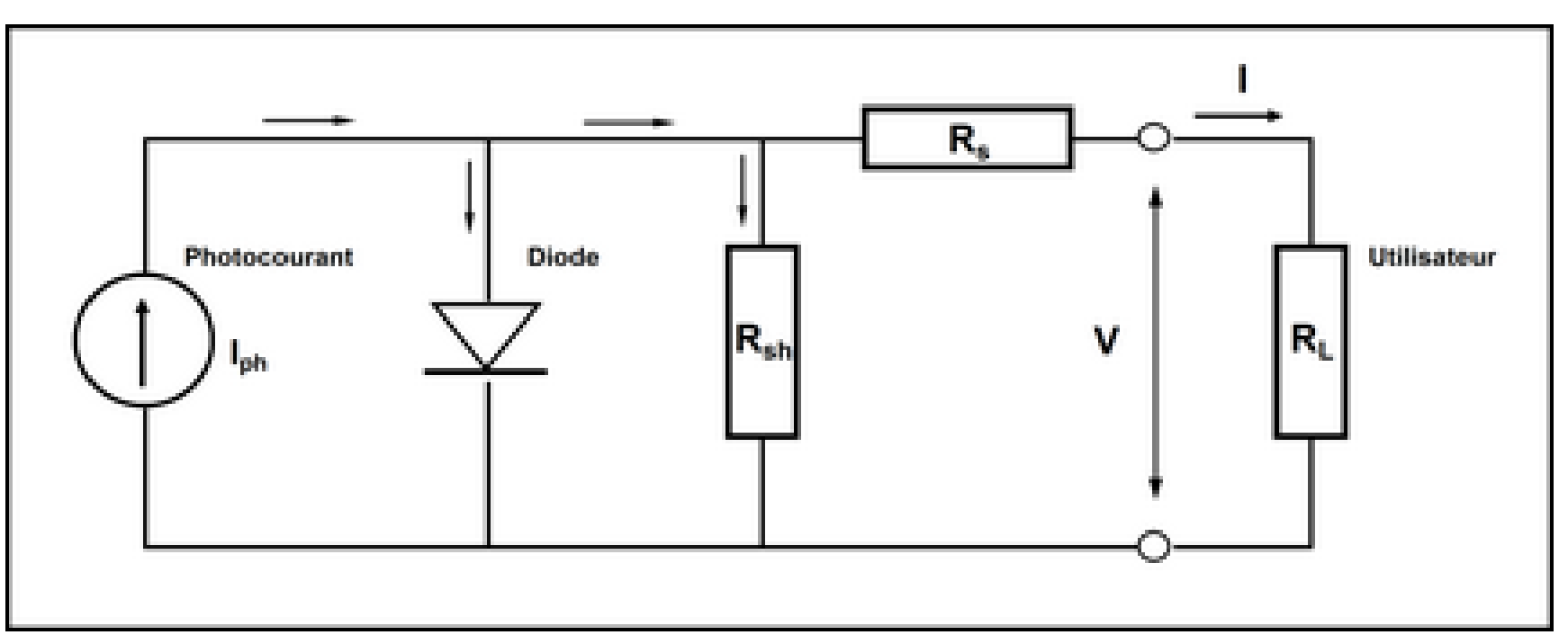
www.photon.info是一个独立第三方的网站，他的网站有最新的各个组件制造商的datasheet，并且是统一格式的。



1查表法

2公式法

光伏组件的理论模型---“单二极管模型”



光伏组件的理论模型---“单二极管模型”

$$I = I_{ph} - I_o \left[\exp\left(q \cdot (V+I \cdot R_s) / (N_{cs} \cdot Gamma \cdot k \cdot T_c)\right) - 1 \right] - (V + I \cdot R_s) / R_{sh}$$

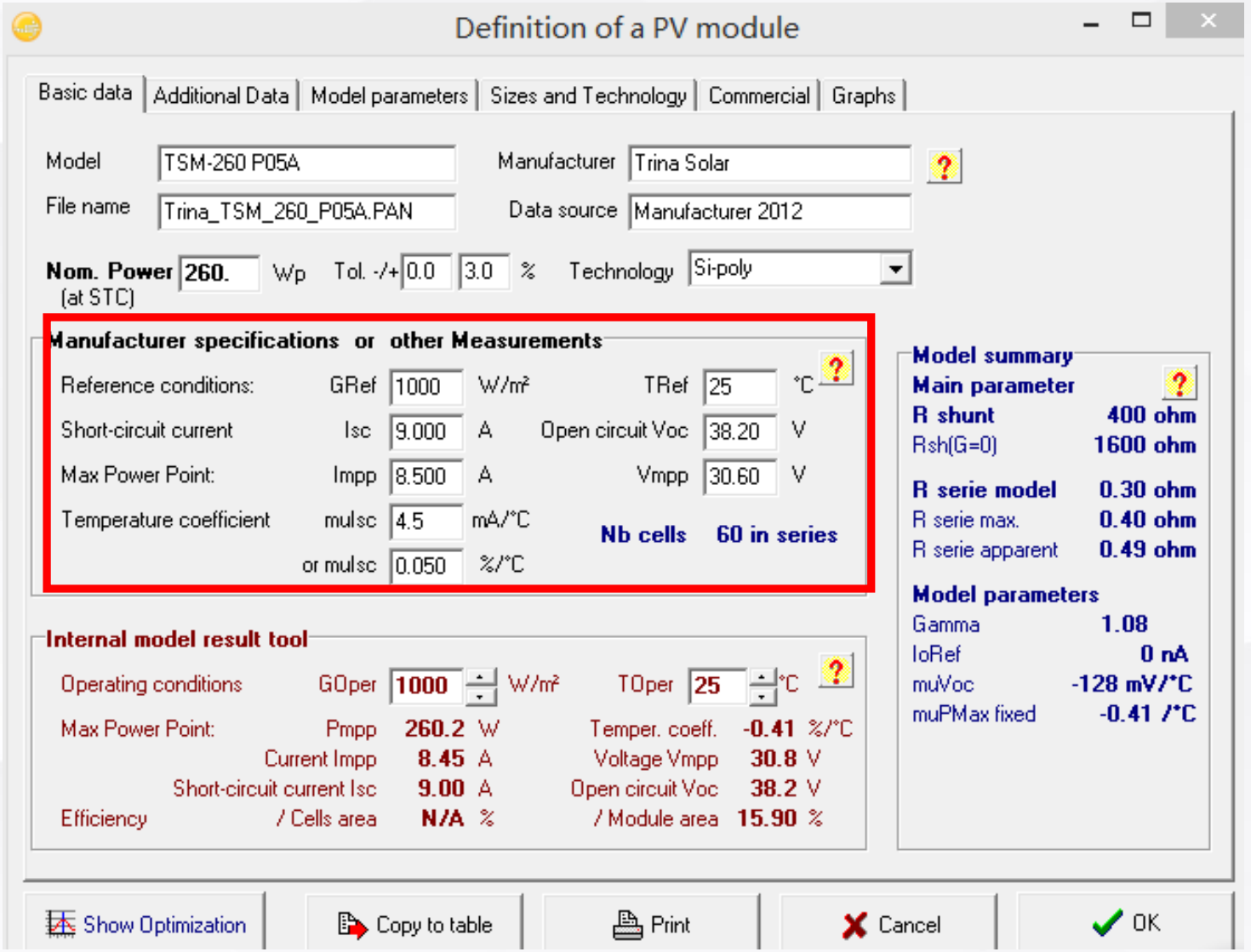
with :

I	=	Current supplied by the module [A].
V	=	Voltage at the terminals of the module [V].
I_{ph}	=	Photocurrent [A], proportional to the irradiance G, with a correction as function of T_c (see below).
ID	=	Diode current, is the product Io · [exp( ) -1].
I_o	=	inverse saturation current, depending on the temperature [A] (see expression below).
R_s	=	Series resistance [ohm].
R_{sh}	=	Shunt resistance [ohm].
q	=	Charge of the electron = 1.602·E-19 Coulomb
k	=	Bolzmann's constant = 1.381 E-23 J/K.
Gamma	=	Diode quality factor, normally between 1 and 2
N_{cs}	=	Number of cells in series.
T_c	=	Effective temperature of the cells [Kelvin]

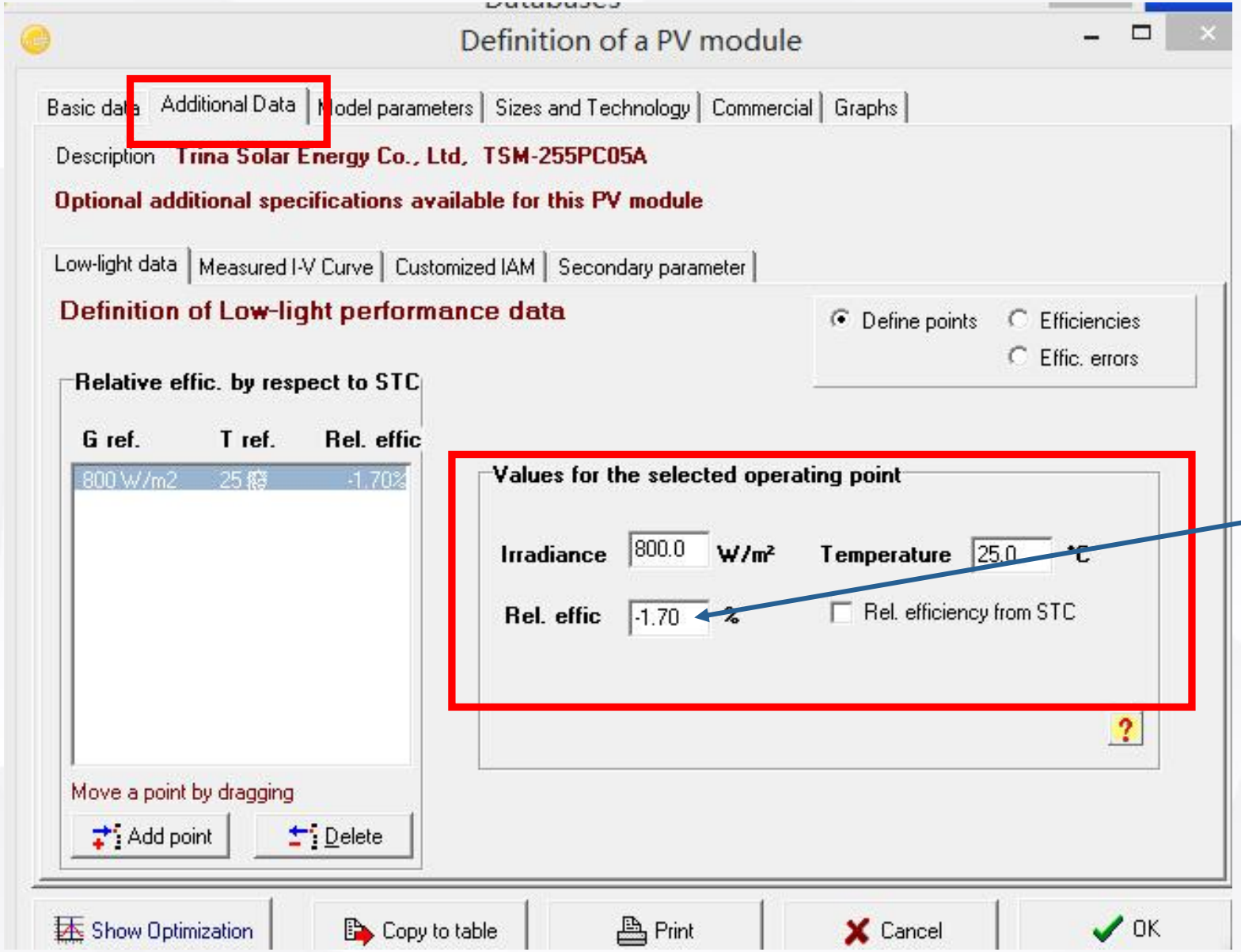
Electrical data		
Voc at 1000 W / m²	38,2	V
Isc at 1000 W / m²	9	A
Voc at -10°C and 1000 W / m²	42,48	V
Vmpp at 70°C and 1000 W / m²	26,19	V
Coefficient of voltage	-0,32	%/°C
Coefficient of current	0,053	%/°C
Coefficient of power	-0,41	%/°C
NOCT at 800 W / m²	44	°C
Max system voltage EU	1000	V
Max system voltage US		V
Serial resistance		ohms
Isolation resistance		ohms

	Vmpp		Impp	
1000 W / m²	30,6	V	8,5	A
950 W / m²		V		A
900 W / m²		V		A
850 W / m²		V		A
800 W / m²	27,5	V	6,91	A
750 W / m²		V		A
700 W / m²		V		A
650 W / m²		V		A
600 W / m²		V		A
550 W / m²		V		A
500 W / m²		V		A
450 W / m²		V		A
400 W / m²		V		A
350 W / m²		V		A
300 W / m²		V		A
250 W / m²		V		A
200 W / m²		V		A
150 W / m²		V		A
100 W / m²		V		A

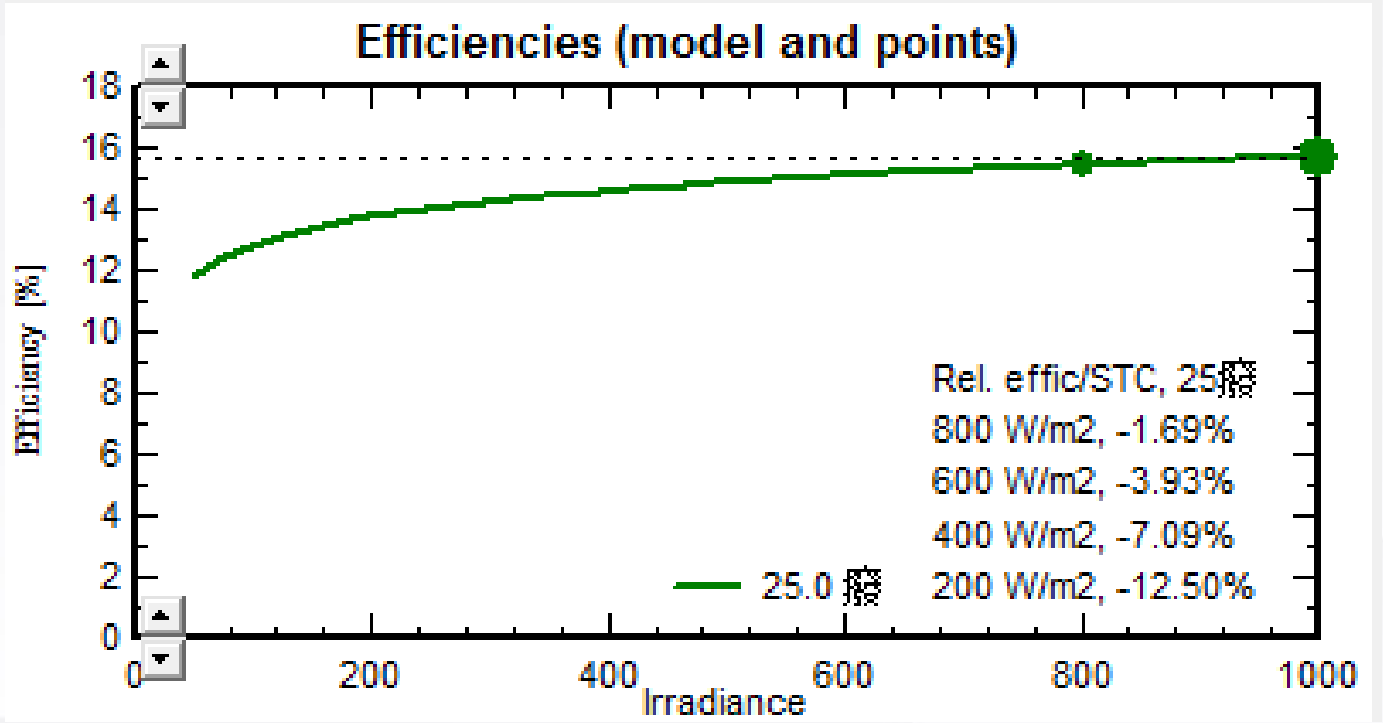
通过这些参数将公式中的未知数计算出来


Definition of a PV module
Basic data
Additional Data
Model parameters
Sizes and Technology
Commercial
Graphs
Model
TSM-260 P05A
Manufacturer
Trina Solar
File name
Trina_TSM_260_P05A.PAN
Data source
Manufacturer 2012
Nom. Power (at STC)
260.
Wp
Tol. -/+
0.0
3.0
%
Technology
Si-poly
Manufacturer specifications or other Measurements
Reference conditions:
GRef
1000
W/m²
TRef
25
°C
Short-circuit current
Isc
9.000
A
Open circuit Voc
38.20
V
Max Power Point:
Impp
8.500
A
Vmpp
30.60
V
Temperature coefficient
mulsc
4.5
mA/°C
Nb cells
60 in series
or mulsc
0.050
%/°C
Internal model result tool
Operating conditions
GOper
1000
W/m²
TOper
25
°C
Max Power Point:
Pmpp
260.2
W
Temper. coeff.
-0.41
%/°C
Current Impp
8.45
A
Voltage Vmpp
30.8
V
Short-circuit current Isc
9.00
A
Open circuit Voc
38.2
V
Efficiency
/ Cells area
N/A
%
/ Module area
15.90
%
Model summary
Main parameter
R shunt
400 ohm
Rsh(G=0)
1600 ohm
R serie model
0.30 ohm
R serie max.
0.40 ohm
R serie apparent
0.49 ohm
Model parameters
Gamma
1.08
IoRef
0 nA
muVoc
-128 mV/°C
muPMax fixed
-0.41 /°C
Show Optimization
Copy to table
Print
Cancel
OK

Electrical data			Vmpp		Impp	
Voc at 1000 W / m²	38,2	V	1000 W / m²	30,6 V	8,5	A
Isc at 1000 W / m²	9	A	950 W / m²	V		A
Voc at -10°C and 1000 W / m²	42,48	V	900 W / m²	V		A
Vmpp at 70°C and 1000 W / m²	26,19	V	850 W / m²	V		A
Coefficient of voltage	-0,32	%/°C	800 W / m²	27,5 V	6,91	A
Coefficient of current	0,053	%/°C	750 W / m²	V		A
Coefficient of power	-0,41	%/°C	700 W / m²	V		A
NOCT at 800 W / m²	44	°C	650 W / m²	V		A
Max system voltage EU	1000	V	600 W / m²	V		A
Max system voltage US		V	550 W / m²	V		A
Serial resistance		ohms	500 W / m²	V		A
Isolation resistance		ohms	450 W / m²	V		A
			400 W / m²	V		A
			350 W / m²	V		A
			300 W / m²	V		A
			250 W / m²	V		A
			200 W / m²	V		A
			150 W / m²	V		A
			100 W / m²	V		A



工作电压*工作电流，再根据峰值功率温度系数折算到电池结温25°时，并除以260，再除以0.8，减去1，就是这里的数值。

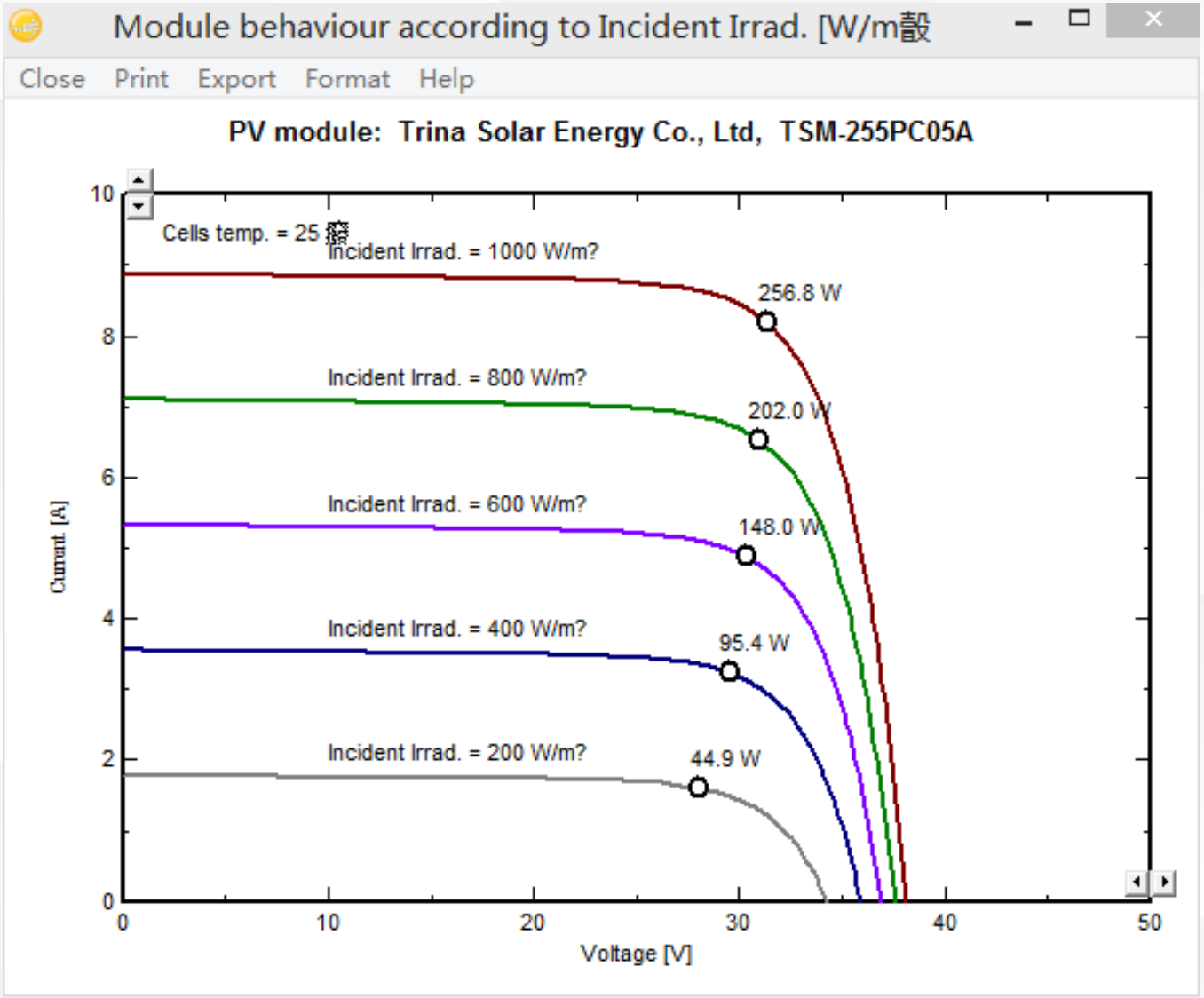


晶硅组件的弱光性，在低辐照情况下光电转换效率明显降低！（供参考）

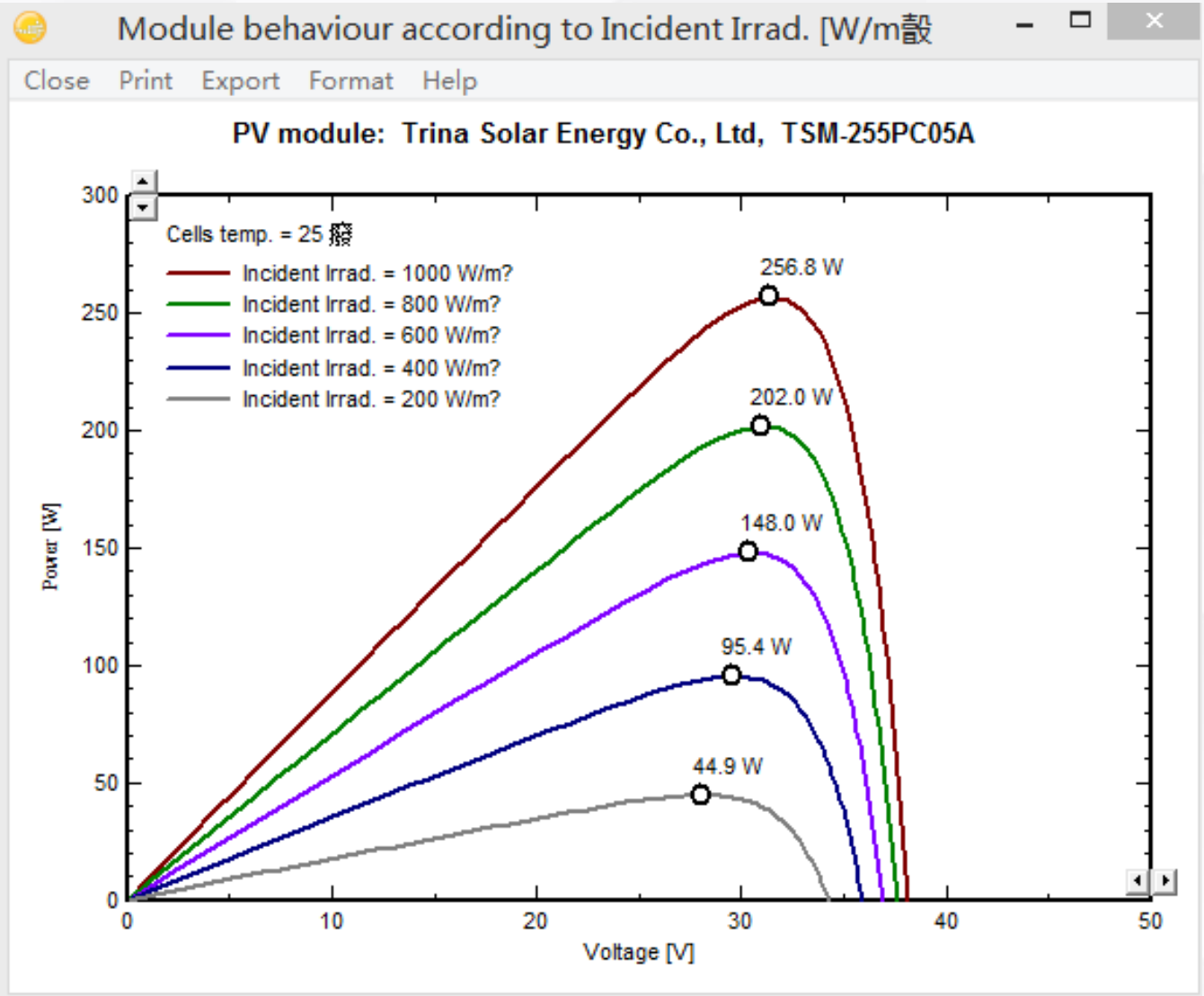
大家可以试试：

（1）将上述的工作电压按开路电压温度系数折算到25℃结温，按短路电流温度系数折算到25℃结温，两种相乘；
（2）直接将工作电压*工作电流，然后按峰值功率温度系数折算到25℃结温；

两个数值是否相同？



在一定的温度下，短路电流与辐照度成正比；开路电压受辐照度影响很小，特别是400W/m²以上。



在一定的温度下，功率与电压的关系呈斜抛物线状。

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