

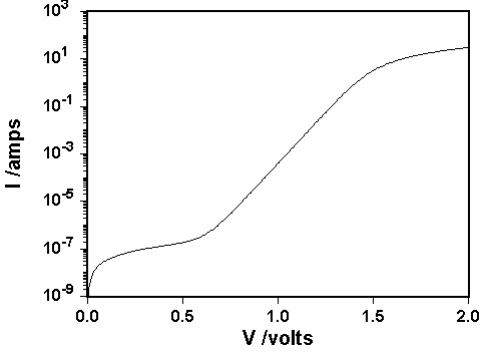
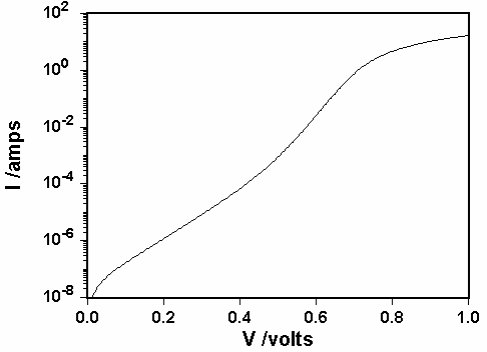
Solar Cell

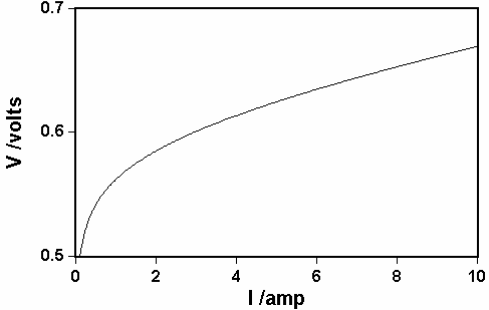
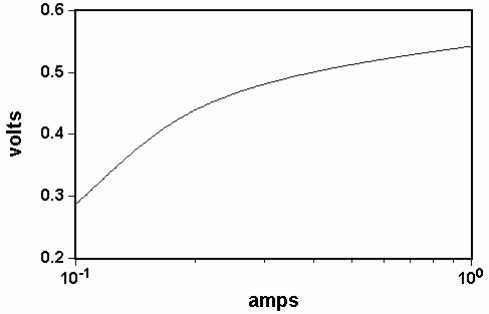
FitAll Function Library

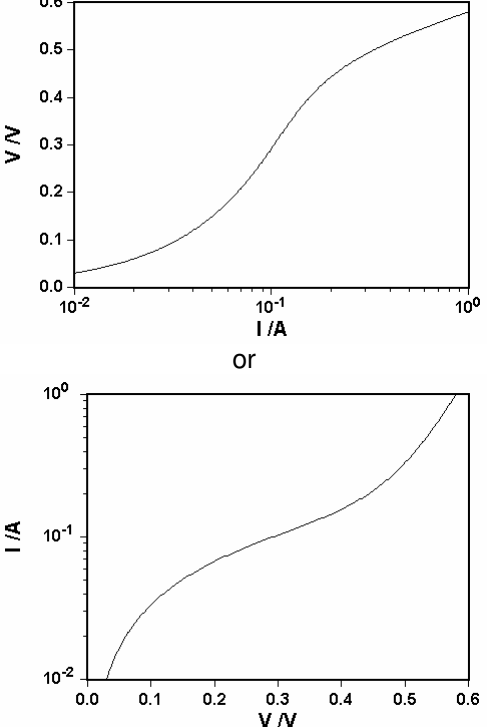
In the function definitions:

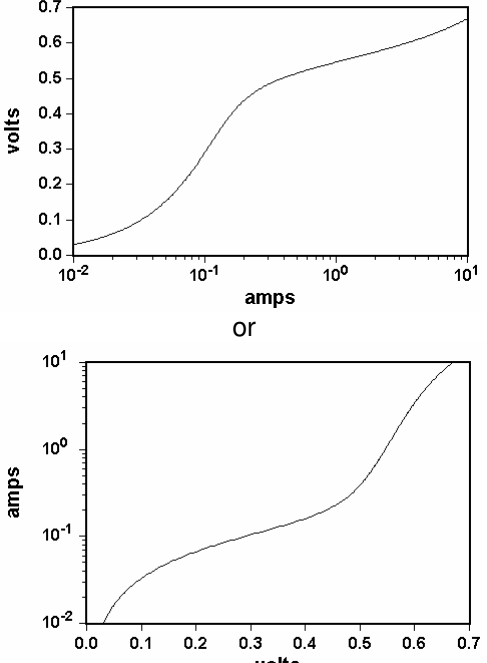
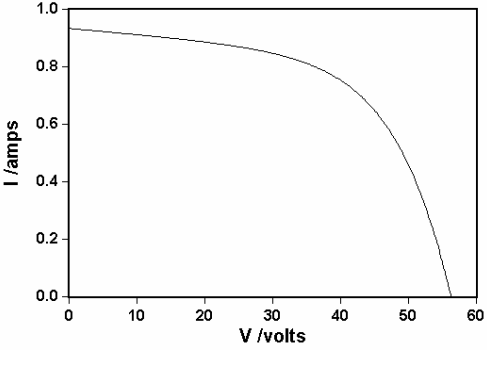
1. Y is the dependent variable.
2. The X's are the independent variables.
3. The K's are constants, the values of which can be changed at runtime.
4. The P's are the parameters that are resolved / determined.

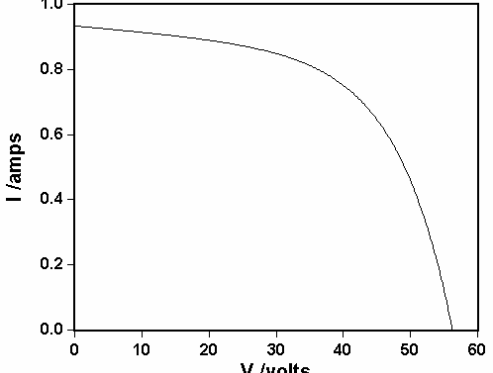
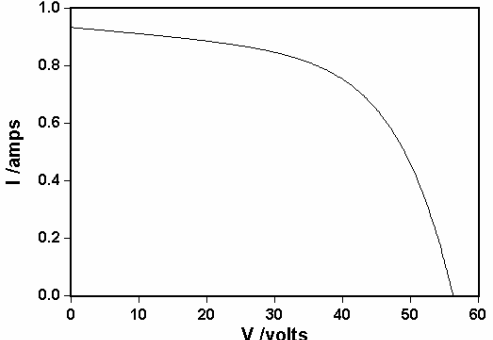
Ftn#	Function Name / Description	Function Definition [Equation (General Form and/or an Example)]	Example Fit Graph
0501	Solar Cell: Dark Current-Voltage: Ideal Number of variations: 2	$Y = P2 * \left\{ e^{\left[\frac{K1 * X}{(273.15 + K2)} \right]} - 1 \right\} + \frac{X}{P1}$ <p style="text-align: center;">or</p> $Y = P2 * \left\{ e^{\left[\frac{K1 * (X - Y * P3)}{(273.15 + K2)} \right]} - 1 \right\} + \frac{(X - Y * P3)}{P1}$	

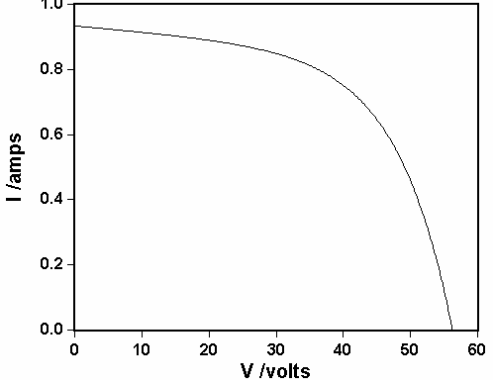
Ftn#	Function Name / Description	Function Definition [Equation (General Form and/or an Example)]	Example Fit Graph
0502	Solar Cell: Dark Current-Voltage: Non-Ideal Number of variations: 2	$Y = P2 * \left\{ e^{\left[\frac{K1 * X}{((273.15 + K2) * P3)} \right] - 1} \right\} + \frac{X}{P1}$ <p style="text-align: center;">or</p> $Y = P2 * \left\{ e^{\left[\frac{K1 * (X - Y * P4)}{((273.15 + K2) * P3)} \right] - 1} \right\} + \frac{(X - Y * P4)}{P1}$	
0503	Solar Cell: Dark Current-Voltage: Sum of Ideal and Non-Ideal: Number of variations: 2	$Y = P2 * \left\{ e^{\left[\frac{K1 * X}{(273.15 + K2)} \right] - 1} \right\} + P3 * \left\{ e^{\left[\frac{K1 * X}{(273.15 + K2) * P4} \right] - 1} \right\} + \frac{X}{P1}$ <p style="text-align: center;">or</p> $Y = P2 * \left\{ e^{\left[\frac{K1 * (X - Y * P5)}{(273.15 * K2)} \right] - 1} \right\} + P3 * \left\{ e^{\left[\frac{K1 * (X - Y * P5)}{((273.15 + K2) * P4)} \right] - 1} \right\} + \frac{(X - Y * P5)}{P1}$	

Ftn#	Function Name / Description	Function Definition [Equation (General Form and/or an Example)]	Example Fit Graph
0504	Solar Cell: Dark I-V: Model 1: High I-range Number of variations: 1	$Y = \frac{K3 * (273.15 + K2)}{K1} * \ln \left \frac{(X + P1)}{P1} \right + X * P2$	
0505	Solar Cell: Dark I-V: Model 2: Mid I-range Number of variations: 1	$Y = P1 * \left(X - P2 * \left\{ e^{\left[\frac{K1 * Y}{(273.15 + K2)} \right] - 1} \right\} - P3 * \left\{ e^{\left[\frac{K1 * Y}{(P4 * (273.15 + K2))} \right] - 1} \right\} \right)$	

Ftn#	Function Name / Description	Function Definition [Equation (General Form and/or an Example)]	Example Fit Graph
0506	Solar Cell: Dark I-V: Model 3: Low I-range Number of variations: 1	$Y = P1 * \left(X - P2 * \left\{ e^{\left[\frac{K1 * Y}{(P3 * (273.15 + K2))} \right] - 1} \right\} \right)$	 <p>The top graph plots V/V (y-axis, 0.0 to 0.6) against I/A (x-axis, logarithmic scale from 10⁻² to 10⁰). The curve shows a typical solar cell characteristic, starting near zero current at low voltages and increasing as voltage increases.</p> <p>or</p> <p>The bottom graph plots I/A (y-axis, logarithmic scale from 10⁻² to 10⁰) against V/V (x-axis, 0.0 to 0.6). This graph shows the current increasing with voltage, characteristic of a solar cell in the low current range.</p>

Ftn#	Function Name / Description	Function Definition [Equation (General Form and/or an Example)]	Example Fit Graph
0507	Solar Cell: Dark I-V: Model 4: Full I-range Number of variations: 1	$Y = P1 * \left(X - P2 * \left\{ e^{-\left[\frac{K1 * (Y - X * P5)}{(273.15 + K2)} \right]} - 1 \right\} - P3 * \left\{ e^{-\left[\frac{K1 * (Y - X * P5)}{(P4 * (273.15 + K2))} \right]} - 1 \right\} \right) + X * P5$	
0508	[New in version 6.1]. Solar Cell: Light I-V: 2 Parameters & 6-Constants Number of variations: 1 Note: Previously available only in the DK2 custom edition.	$Y = K4 * \{A\} + [(K4 * P2 - K3) * \{A\} + K3 - X - Y * P2] * \left[\frac{K6 - K4 * \{B\}}{(K4 * P2 - K3) * \{B\} + K3 - K5 - K6 * P2} \right]$ <p>in which</p> $A = \frac{e^{k_o * K3} - e^{k_o * (X + Y * P2)}}{e^{k_o * K3} - e^{k_o * K4 * P2}},$ $B = \frac{e^{k_o * K3} - e^{k_o * (K5 + K6 * P2)}}{e^{k_o * K3} - e^{k_o * K4 * P2}},$ $k_o = \frac{K1}{P1 * (273.15 + K2)}$	

Ftn#	Function Name / Description	Function Definition [Equation (General Form and/or an Example)]	Example Fit Graph
0509	<p>[New in version 6.1]. Solar Cell: Light I-V: 2 Parameters & 4-Constants; Rs=0</p> <p>Number of variations: 1</p> <p>Note: Previously available only in the DK2 custom edition.</p>	$Y = K4 * \{A\} + [(- K3) * \{A\} + K3 - X] / P2$ <p>in which</p> $A = \frac{e^{k_o * K3} - e^{k_o * X}}{e^{k_o * K3} - 1},$ $k_o = \frac{K1}{P1 * (273.15 + K2)}$	
0510	<p>[New in version 6.1]. Solar Cell: Light I-V: 6 Parameters & 2 Constants</p> <p>Number of variations: 1</p>	$Y = P4 * \{A\} + [(P4 * P2 - P3) * \{A\} + P3 - X - Y * P2] * \left[\frac{P6 - P4 * \{B\}}{(P4 * P2 - P3) * \{B\} + P3 - P5 - P6 * P2} \right]$ <p>in which</p> $A = \frac{e^{k_o * P3} - e^{k_o * (X + Y * P2)}}{e^{k_o * P3} - e^{k_o * P4 * P2}},$ $B = \frac{e^{k_o * K3} - e^{k_o * (P5 + P6 * P2)}}{e^{k_o * P3} - e^{k_o * P4 * P2}},$ $k_o = \frac{K1}{P1 * (273.15 + K2)}$	

Ftn#	Function Name / Description	Function Definition [Equation (General Form and/or an Example)]	Example Fit Graph
0511	<p>[New in version 6.1]. Solar Cell: Light I-V: 4 Parameters & 2 Constants; Rs=0</p> <p>Number of variations: 1</p>	$Y = P4 * \{A\} + [(- P3) * \{A\} + P3 - X]/P2$ <p>in which</p> $A = \frac{e^{k_o * P3} - e^{k_o * X}}{e^{k_o * P3} - 1},$ $k_o = \frac{K1}{P1 * (273.15 + K2)}$	 <p>The graph shows a typical solar cell I-V characteristic. The y-axis is labeled 'I / amps' and ranges from 0.0 to 1.0. The x-axis is labeled 'V / volts' and ranges from 0 to 60. The curve starts at approximately 0.95 A at 0 V, remains relatively flat until about 30 V, then curves downwards to reach 0 A at approximately 55 V.</p>