## Data Graph



## Data

| Pt# | amps | volts | SigmaY |
| --- | --- | --- | --- |
| 1 | 1.710E-0002 | 5.330E-0002 | 5.300E-0003 |
| 2 | 2.890E-0002 | 8.960E-0002 | 9.000E-0003 |
| 3 | 4.090E-0002 | 1.260E-0001 | 1.300E-0002 |
| 4 | 5.290E-0002 | 1.610E-0001 | 1.600E-0002 |
| 5 | 6.520E-0002 | 1.970E-0001 | 2.000E-0002 |
| 6 | 7.790E-0002 | 2.310E-0001 | 2.300E-0002 |
| 7 | 9.050E-0002 | 2.650E-0001 | 2.600E-0002 |
| 8 | 1.040E-0001 | 2.970E-0001 | 3.000E-0002 |
| 9 | 1.180E-0001 | 3.290E-0001 | 3.300E-0002 |
| 10 | 1.320E-0001 | 3.590E-0001 | 3.600E-0002 |
| 11 | 1.490E-0001 | 3.860E-0001 | 3.900E-0002 |
| 12 | 1.670E-0001 | 4.090E-0001 | 4.100E-0002 |
| 13 | 1.870E-0001 | 4.290E-0001 | 4.300E-0002 |
| 14 | 2.080E-0001 | 4.450E-0001 | 4.400E-0002 |
| 15 | 2.320E-0001 | 4.570E-0001 | 4.600E-0002 |
| 16 | 2.560E-0001 | 4.680E-0001 | 4.700E-0002 |
| 17 | 2.810E-0001 | 4.760E-0001 | 4.800E-0002 |
| 18 | 3.070E-0001 | 4.830E-0001 | 4.800E-0002 |
| 19 | 3.330E-0001 | 4.890E-0001 | 4.900E-0002 |
| 20 | 3.600E-0001 | 4.940E-0001 | 4.900E-0002 |
| 21 | 3.870E-0001 | 4.990E-0001 | 5.000E-0002 |
| 22 | 4.150E-0001 | 5.030E-0001 | 5.000E-0002 |
| 23 | 4.160E-0001 | 5.030E-0001 | 5.000E-0002 |
| 24 | 1.020E+0000 | 5.480E-0001 | 5.500E-0002 |
| 25 | 1.630E+0000 | 5.680E-0001 | 5.700E-0002 |
| 26 | 2.250E+0000 | 5.810E-0001 | 5.800E-0002 |
| 27 | 2.870E+0000 | 5.920E-0001 | 5.900E-0002 |
| 28 | 3.480E+0000 | 6.010E-0001 | 6.000E-0002 |
| 29 | 4.100E+0000 | 6.080E-0001 | 6.100E-0002 |
| 30 | 4.700E+0000 | 6.150E-0001 | 6.100E-0002 |

## Fit Graph



## Fit

|  |  |
| --- | --- |
| File: | c:\users\public\fitall10\data\f0507tst.dta |
| Title: | F0507: Test Data |
| Sub-Title: |  |
| Function: | 0507..Dark I-V: Model 4A: Full I-Range |
| Analysis Method: | Nonlinear Least Squares (nls) |
| Analysis Range: | 1 to 30 of 30 |
| Weighted as: | 1 |
| Variance: | 1.23599271676699E-6 |
| Std. Dev. of Fit: | 0.00111175209321457 |
| Iterations: | 22 |

| Parameter | Name | Value | Std. Dev. | RSD /% |
| --- | --- | --- | --- | --- |
| 1 | Rsh /Ω | 3.086E+0000 | 1.814E-0002 | 0.59 |
| 2 | Id1 /A | 4.463E-0010 | 2.301E-0011 | 5.16 |
| 3 | Id2 /A | 1.376E-0004 | 3.719E-0005 | 27.03 |
| 4 | n2 | 2.929E+0000 | 1.343E-0001 | 4.58 |
| 5 | Rs /Ω | 6.070E-0003 | 3.415E-0004 | 5.63 |
| Constant |  |  |  |  |
| 1 | q/k /C°K/J | 1.164E+0004 |  |  |
| 2 | t /°C | 2.500E+0001 |  |  |
| 3 | Ns | 1.000E+0000 |  |  |
| 4 | Np | 1.000E+0000 |  |  |
| 5 | Max V /V | 9.225E-0001 |  |  |

## Residuals Graph



## Residuals

|  |  |
| --- | --- |
| File: | c:\users\public\fitall10\data\f0507tst.dta |
| Title: | F0507: Test Data |
| Sub-Title: |  |
| Function: | 0507..Dark I-V: Model 4A: Full I-Range |
| Analysis Method: | Nonlinear Least Squares (nls) |
| Analysis Range: | 1 to 30 of 30 |
| Weighted as: | 1 |
| Variance: | 1.23599271676699E-6 |
| Std. Dev. of Fit: | 0.00111175209321457 |
| Iterations: | 22 |

| Pt# | amps | volts | SigmaY | Ycalc | Y-Ycalc |
| --- | --- | --- | --- | --- | --- |
| 1 | 1.710E-0002 | 5.330E-0002 | 5.300E-0003 | 5.244E-0002 | 8.574E-0004 |
| 2 | 2.890E-0002 | 8.960E-0002 | 9.000E-0003 | 8.840E-0002 | 1.197E-0003 |
| 3 | 4.090E-0002 | 1.260E-0001 | 1.300E-0002 | 1.247E-0001 | 1.348E-0003 |
| 4 | 5.290E-0002 | 1.610E-0001 | 1.600E-0002 | 1.604E-0001 | 6.042E-0004 |
| 5 | 6.520E-0002 | 1.970E-0001 | 2.000E-0002 | 1.962E-0001 | 7.690E-0004 |
| 6 | 7.790E-0002 | 2.310E-0001 | 2.300E-0002 | 2.320E-0001 | -9.689E-0004 |
| 7 | 9.050E-0002 | 2.650E-0001 | 2.600E-0002 | 2.656E-0001 | -6.383E-0004 |
| 8 | 1.040E-0001 | 2.970E-0001 | 3.000E-0002 | 2.991E-0001 | -2.100E-0003 |
| 9 | 1.180E-0001 | 3.290E-0001 | 3.300E-0002 | 3.303E-0001 | -1.317E-0003 |
| 10 | 1.320E-0001 | 3.590E-0001 | 3.600E-0002 | 3.576E-0001 | 1.433E-0003 |
| 11 | 1.490E-0001 | 3.860E-0001 | 3.900E-0002 | 3.852E-0001 | 7.959E-0004 |
| 12 | 1.670E-0001 | 4.090E-0001 | 4.100E-0002 | 4.084E-0001 | 5.705E-0004 |
| 13 | 1.870E-0001 | 4.290E-0001 | 4.300E-0002 | 4.282E-0001 | 7.888E-0004 |
| 14 | 2.080E-0001 | 4.450E-0001 | 4.400E-0002 | 4.439E-0001 | 1.113E-0003 |
| 15 | 2.320E-0001 | 4.570E-0001 | 4.600E-0002 | 4.574E-0001 | -4.011E-0004 |
| 16 | 2.560E-0001 | 4.680E-0001 | 4.700E-0002 | 4.678E-0001 | 2.213E-0004 |
| 17 | 2.810E-0001 | 4.760E-0001 | 4.800E-0002 | 4.764E-0001 | -3.580E-0004 |
| 18 | 3.070E-0001 | 4.830E-0001 | 4.800E-0002 | 4.836E-0001 | -6.181E-0004 |
| 19 | 3.330E-0001 | 4.890E-0001 | 4.900E-0002 | 4.897E-0001 | -6.744E-0004 |
| 20 | 3.600E-0001 | 4.940E-0001 | 4.900E-0002 | 4.950E-0001 | -1.031E-0003 |
| 21 | 3.870E-0001 | 4.990E-0001 | 5.000E-0002 | 4.997E-0001 | -6.715E-0004 |
| 22 | 4.150E-0001 | 5.030E-0001 | 5.000E-0002 | 5.039E-0001 | -8.997E-0004 |
| 23 | 4.160E-0001 | 5.030E-0001 | 5.000E-0002 | 5.040E-0001 | -1.041E-0003 |
| 24 | 1.020E+0000 | 5.480E-0001 | 5.500E-0002 | 5.468E-0001 | 1.207E-0003 |
| 25 | 1.630E+0000 | 5.680E-0001 | 5.700E-0002 | 5.663E-0001 | 1.728E-0003 |
| 26 | 2.250E+0000 | 5.810E-0001 | 5.800E-0002 | 5.800E-0001 | 9.516E-0004 |
| 27 | 2.870E+0000 | 5.920E-0001 | 5.900E-0002 | 5.911E-0001 | 9.334E-0004 |
| 28 | 3.480E+0000 | 6.010E-0001 | 6.000E-0002 | 6.004E-0001 | 6.290E-0004 |
| 29 | 4.100E+0000 | 6.080E-0001 | 6.100E-0002 | 6.088E-0001 | -8.185E-0004 |
| 30 | 4.700E+0000 | 6.150E-0001 | 6.100E-0002 | 6.163E-0001 | -1.313E-0003 |

## Residuals Distribution Graph



## Residuals Distribution

|  |  |
| --- | --- |
| File: | c:\users\public\fitall10\data\f0507tst.dta |
| Title: | F0507: Test Data |
| Sub-Title: |  |
| Function: | 0507..Dark I-V: Model 4A: Full I-Range |
| Analysis Method: | Nonlinear Least Squares (nls) |
| Analysis Range: | 1 to 30 of 30 |
| Weighted as: | 1 |
| Variance: | 1.23599271676699E-6 |
| Std. Dev. of Fit: | 0.00111175209321457 |
| Iterations: | 22 |

| Std. Dev.'s from Best Fit | # of Pts | % of Pts |
| --- | --- | --- |
| -6.5 to -5.5 | 0 | 0.00 |
| -5.5 to -4.5 | 0 | 0.00 |
| -4.5 to -3.5 | 0 | 0.00 |
| -3.5 to -2.5 | 0 | 0.00 |
| -2.5 to -1.5 | 1 | 3.33 |
| -1.5 to -0.5 | 14 | 46.67 |
| -0.5 to 0.5 | 3 | 10.00 |
|  0.5 to 1.5 | 11 | 36.67 |
|  1.5 to 2.5 | 1 | 3.33 |
|  2.5 to 3.5 | 0 | 0.00 |
|  3.5 to 4.5 | 0 | 0.00 |
|  4.5 to 5.5 | 0 | 0.00 |

## Sensitivities Graph



## Sensitivities

|  |  |
| --- | --- |
| File: | c:\users\public\fitall10\data\f0507tst.dta |
| Title: | F0507: Test Data |
| Sub-Title: |  |
| Function: | 0507..Dark I-V: Model 4A: Full I-Range |
| Analysis Method: | Nonlinear Least Squares (nls) |
| Analysis Range: | 1 to 30 of 30 |
| Weighted as: | 1 |
| Variance: | 1.23599271676699E-6 |
| Std. Dev. of Fit: | 0.00111175209321457 |
| Iterations: | 22 |

| Pt# | amps | volts | SigmaY | (∂Y/∂P1)\*P1 | (∂Y/∂P2)\*P2 | (∂Y/∂P3)\*P3 | (∂Y/∂P4)\*P4 | (∂Y/∂P5)\*P5 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 1.710E-0002 | 5.330E-0002 | 5.300E-0003 | 5.175E-0002 | -9.154E-0009 | -4.238E-0004 | 5.887E-0004 | 1.038E-0004 |
| 2 | 2.890E-0002 | 8.960E-0002 | 9.000E-0003 | 8.664E-0002 | -4.107E-0008 | -9.350E-0004 | 1.591E-0003 | 1.754E-0004 |
| 3 | 4.090E-0002 | 1.260E-0001 | 1.300E-0002 | 1.208E-0001 | -1.710E-0007 | -1.754E-0003 | 3.593E-0003 | 2.483E-0004 |
| 4 | 5.290E-0002 | 1.610E-0001 | 1.600E-0002 | 1.528E-0001 | -6.807E-0007 | -3.020E-0003 | 7.310E-0003 | 3.211E-0004 |
| 5 | 6.520E-0002 | 1.970E-0001 | 2.000E-0002 | 1.818E-0001 | -2.680E-0006 | -4.973E-0003 | 1.402E-0002 | 3.958E-0004 |
| 6 | 7.790E-0002 | 2.310E-0001 | 2.300E-0002 | 2.059E-0001 | -1.034E-0005 | -7.894E-0003 | 2.554E-0002 | 4.729E-0004 |
| 7 | 9.050E-0002 | 2.650E-0001 | 2.600E-0002 | 2.217E-0001 | -3.611E-0005 | -1.182E-0002 | 4.304E-0002 | 5.493E-0004 |
| 8 | 1.040E-0001 | 2.970E-0001 | 3.000E-0002 | 2.280E-0001 | -1.215E-0004 | -1.703E-0002 | 6.908E-0002 | 6.313E-0004 |
| 9 | 1.180E-0001 | 3.290E-0001 | 3.300E-0002 | 2.227E-0001 | -3.624E-0004 | -2.297E-0002 | 1.022E-0001 | 7.163E-0004 |
| 10 | 1.320E-0001 | 3.590E-0001 | 3.600E-0002 | 2.074E-0001 | -9.010E-0004 | -2.850E-0002 | 1.368E-0001 | 8.012E-0004 |
| 11 | 1.490E-0001 | 3.860E-0001 | 3.900E-0002 | 1.805E-0001 | -2.133E-0003 | -3.332E-0002 | 1.718E-0001 | 9.044E-0004 |
| 12 | 1.670E-0001 | 4.090E-0001 | 4.100E-0002 | 1.491E-0001 | -4.099E-0003 | -3.539E-0002 | 1.931E-0001 | 1.014E-0003 |
| 13 | 1.870E-0001 | 4.290E-0001 | 4.300E-0002 | 1.178E-0001 | -6.657E-0003 | -3.470E-0002 | 1.983E-0001 | 1.135E-0003 |
| 14 | 2.080E-0001 | 4.450E-0001 | 4.400E-0002 | 9.218E-0002 | -9.227E-0003 | -3.226E-0002 | 1.909E-0001 | 1.263E-0003 |
| 15 | 2.320E-0001 | 4.570E-0001 | 4.600E-0002 | 7.133E-0002 | -1.168E-0002 | -2.898E-0002 | 1.766E-0001 | 1.408E-0003 |
| 16 | 2.560E-0001 | 4.680E-0001 | 4.700E-0002 | 5.695E-0002 | -1.360E-0002 | -2.594E-0002 | 1.616E-0001 | 1.554E-0003 |
| 17 | 2.810E-0001 | 4.760E-0001 | 4.800E-0002 | 4.644E-0002 | -1.514E-0002 | -2.326E-0002 | 1.475E-0001 | 1.706E-0003 |
| 18 | 3.070E-0001 | 4.830E-0001 | 4.800E-0002 | 3.864E-0002 | -1.638E-0002 | -2.096E-0002 | 1.349E-0001 | 1.863E-0003 |
| 19 | 3.330E-0001 | 4.890E-0001 | 4.900E-0002 | 3.291E-0002 | -1.735E-0002 | -1.908E-0002 | 1.243E-0001 | 2.021E-0003 |
| 20 | 3.600E-0001 | 4.940E-0001 | 4.900E-0002 | 2.841E-0002 | -1.816E-0002 | -1.747E-0002 | 1.150E-0001 | 2.185E-0003 |
| 21 | 3.870E-0001 | 4.990E-0001 | 5.000E-0002 | 2.493E-0002 | -1.881E-0002 | -1.613E-0002 | 1.071E-0001 | 2.349E-0003 |
| 22 | 4.150E-0001 | 5.030E-0001 | 5.000E-0002 | 2.208E-0002 | -1.936E-0002 | -1.496E-0002 | 1.002E-0001 | 2.519E-0003 |
| 23 | 4.160E-0001 | 5.030E-0001 | 5.000E-0002 | 2.199E-0002 | -1.938E-0002 | -1.492E-0002 | 9.993E-0002 | 2.525E-0003 |
| 24 | 1.020E+0000 | 5.480E-0001 | 5.500E-0002 | 6.138E-0003 | -2.309E-0002 | -6.510E-0003 | 4.696E-0002 | 6.191E-0003 |
| 25 | 1.630E+0000 | 5.680E-0001 | 5.700E-0002 | 3.532E-0003 | -2.391E-0002 | -4.493E-0003 | 3.335E-0002 | 9.894E-0003 |
| 26 | 2.250E+0000 | 5.810E-0001 | 5.800E-0002 | 2.471E-0003 | -2.429E-0002 | -3.528E-0003 | 2.666E-0002 | 1.366E-0002 |
| 27 | 2.870E+0000 | 5.920E-0001 | 5.900E-0002 | 1.902E-0003 | -2.451E-0002 | -2.955E-0003 | 2.261E-0002 | 1.742E-0002 |
| 28 | 3.480E+0000 | 6.010E-0001 | 6.000E-0002 | 1.553E-0003 | -2.466E-0002 | -2.574E-0003 | 1.989E-0002 | 2.112E-0002 |
| 29 | 4.100E+0000 | 6.080E-0001 | 6.100E-0002 | 1.309E-0003 | -2.477E-0002 | -2.292E-0003 | 1.785E-0002 | 2.489E-0002 |
| 30 | 4.700E+0000 | 6.150E-0001 | 6.100E-0002 | 1.137E-0003 | -2.485E-0002 | -2.082E-0003 | 1.633E-0002 | 2.853E-0002 |

## Standard Stats

|  |  |
| --- | --- |
| File: | c:\users\public\fitall10\data\f0507tst.dta |
| Title: | F0507: Test Data |
| Sub-Title: |  |
| Analysis Range: | 1 to 30 of 30 |

| Col. Name | Minimum | Mean | Median | Maximum | Std. Dev. | Ave. Dev. | Skew | Kurtosis |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| amps | 1.710E-0002 | 8.158E-0001 | 2.440E-0001 | 4.700E+0000 | 1.303E+0000 | 9.559E-0001 | 1.789E+0000 | 4.865E+0000 |
| volts | 5.330E-0002 | 4.087E-0001 | 4.625E-0001 | 6.150E-0001 | 1.633E-0001 | 1.335E-0001 | -6.809E-0001 | 2.267E+0000 |
| SigmaY | 5.300E-0003 | 4.088E-0002 | 4.650E-0002 | 6.100E-0002 | 1.627E-0002 | 1.329E-0002 | -6.863E-0001 | 2.272E+0000 |

## Pearson's R (Lin. Corr. Coeff.)

|  |  |
| --- | --- |
| File: | c:\users\public\fitall10\data\f0507tst.dta |
| Title: | F0507: Test Data |
| Sub-Title: |  |
| Analysis Range: | 1 to 30 of 30 |

| Column1 | Column2 | R | R^2 | ProbR | Z |
| --- | --- | --- | --- | --- | --- |
| amps | volts | 6.336E-0001 | 4.014E-0001 | 1.710E-0004 | 7.474E-0001 |
| amps | SigmaY | 6.317E-0001 | 3.990E-0001 | 1.812E-0004 | 7.442E-0001 |
| volts | SigmaY | 9.999E-0001 | 9.997E-0001 | 2.675E-0051 | 4.784E+0000 |

## Kendall's Tau

|  |  |
| --- | --- |
| File: | c:\users\public\fitall10\data\f0507tst.dta |
| Title: | F0507: Test Data |
| Sub-Title: |  |
| Analysis Range: | 1 to 30 of 30 |

| Column1 | Column2 | Tau | ZTau | ProbTau |
| --- | --- | --- | --- | --- |
| amps | volts | 9.988E-0001 | 7.752E+0000 | 9.051E-0015 |
| amps | SigmaY | 9.931E-0001 | 7.707E+0000 | 1.287E-0014 |
| volts | SigmaY | 9.942E-0001 | 7.716E+0000 | 1.200E-0014 |

## Spearman's Rank Order

|  |  |
| --- | --- |
| File: | c:\users\public\fitall10\data\f0507tst.dta |
| Title: | F0507: Test Data |
| Sub-Title: |  |
| Analysis Range: | 1 to 30 of 30 |

| Column1 | Column2 | Rs | ProbRs |
| --- | --- | --- | --- |
| amps | volts | 9.994E-0001 | 6.633E-0043 |
| amps | SigmaY | 9.961E-0001 | 4.492E-0031 |
| volts | SigmaY | 9.958E-0001 | 1.424E-0030 |

## Sum Squared Difference Of Rank

|  |  |
| --- | --- |
| File: | c:\users\public\fitall10\data\f0507tst.dta |
| Title: | F0507: Test Data |
| Sub-Title: |  |
| Analysis Range: | 1 to 30 of 30 |

| Column1 | Column2 | D | ZD | ProbD |
| --- | --- | --- | --- | --- |
| amps | volts | 5.000E-0001 | -5.385E+0000 | 7.262E-0008 |
| amps | SigmaY | 3.500E+0000 | -5.381E+0000 | 7.409E-0008 |
| volts | SigmaY | 3.000E+0000 | -5.382E+0000 | 7.384E-0008 |

## Info

|  |  |
| --- | --- |
| Data |  |
|  Directory: | c:\users\public\fitall10\data\ |
|  File: | f0507tst.dta |
|  Saved?: | True |
|  Title: | F0507: Test Data |
|  Sub-Title: |  |
|  Points: | 30 |
|  Max. Points: | 1024 |
|  Columns: | 3 |
|  Max. Columns: | 32 |
|  |  |
| Function: |  |
|  Name: | 0507..Dark I-V: Model 4A: Full I-Range |
|  Parameters: | 5 |
|  Constants: | 5 |
|  Variables: | 1 |
|  |  |
| FitAll | Research Edition |
|  Version: | 10.0.0.564 (32 Bit) |
|  SN: | FA010R- |
|  Libraries: | FFL: User Requested Ftns 10.0.0.15 (32 Bit) |
|  | FFL: Basic 10.0.0.57 (32 Bit) |
|  | FFL: Scripted Ftns 10.0.0.44 (32 Bit) |
|  | FFL: Binding + Growth Curves 10.0.0.18 (32 Bit) |
|  | FFL: Peaks 10.0.0.14 (32 Bit) |
|  | FFL: Chemistry 10.0.0.13 (32 Bit) |
|  | FFL: Solar Cell 10.0.0.14 (32 Bit) |
|  | FFL: Examples 10.0.0.20 (32 Bit) |
|  |  |
| MS Windows version: | 10.0.0.19041 (64 Bit) |
| MS Word Version: | 12.0.6787.5000 |
| LibreOffice Version:  | 6.4.7.2 |