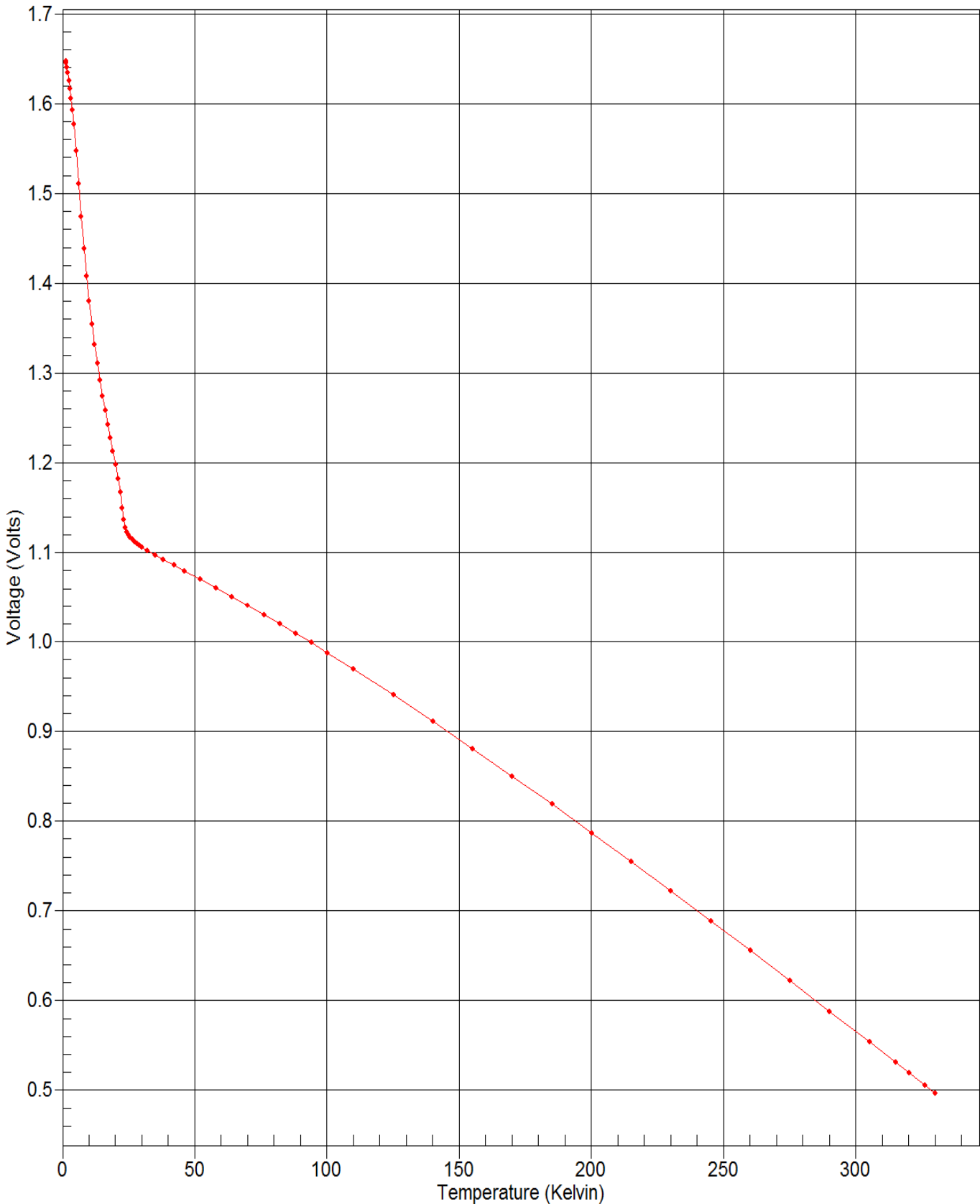


DATA PLOT

Calibration Report: 679216
Sensor Model: DT-670-SD-1.4L
Sensor Type: Silicon Diode

Sales Order: 74557-D6026620
Serial Number: D6026620
Temperature Range: 1.40K to 325K



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TEST DATA

Calibration Report: 679216
Sensor Model: DT-670-SD-1.4L
Sensor Type: Silicon Diode

Sales Order: 74557-D6026620
Serial Number: D6026620
Temperature Range: 1.40K to 325K

Index	Temp. (K)	Voltage (V)	Excitation	Index	Temp. (K)	Voltage (V)	Excitation
1	1.20142	1.64768	10µA±0.1%	41	35.1497	1.09737	10µA±0.1%
2	1.29671	1.64656	10µA±0.1%	42	38.1496	1.09244	10µA±0.1%
3	1.39734	1.64527	10µA±0.1%	43	42.1547	1.08606	10µA±0.1%
4	1.70217	1.64060	10µA±0.1%	44	46.1533	1.07972	10µA±0.1%
5	2.00078	1.63493	10µA±0.1%	45	52.1537	1.07011	10µA±0.1%
6	2.40002	1.62605	10µA±0.1%	46	58.1478	1.06040	10µA±0.1%
7	2.80011	1.61633	10µA±0.1%	47	64.1371	1.05055	10µA±0.1%
8	3.19824	1.60623	10µA±0.1%	48	70.1300	1.04054	10µA±0.1%
9	3.70194	1.59263	10µA±0.1%	49	76.1252	1.03035	10µA±0.1%
10	4.20399	1.57756	10µA±0.1%	50	82.1133	1.01999	10µA±0.1%
11	5.08963	1.54737	10µA±0.1%	51	88.1092	1.00943	10µA±0.1%
12	6.08213	1.51094	10µA±0.1%	52	94.1064	0.998694	10µA±0.1%
13	7.09514	1.47390	10µA±0.1%	53	100.107	0.987779	10µA±0.1%
14	8.10199	1.43905	10µA±0.1%	54	110.109	0.969214	10µA±0.1%
15	9.11114	1.40773	10µA±0.1%	55	125.089	0.940609	10µA±0.1%
16	10.1272	1.37968	10µA±0.1%	56	140.081	0.911136	10µA±0.1%
17	11.1490	1.35428	10µA±0.1%	57	155.087	0.880914	10µA±0.1%
18	12.1619	1.33142	10µA±0.1%	58	170.088	0.850085	10µA±0.1%
19	13.1664	1.31071	10µA±0.1%	59	185.077	0.818745	10µA±0.1%
20	14.1628	1.29185	10µA±0.1%	60	200.086	0.786889	10µA±0.1%
21	15.1524	1.27449	10µA±0.1%	61	215.087	0.754613	10µA±0.1%
22	16.1304	1.25835	10µA±0.1%	62	230.088	0.721942	10µA±0.1%
23	17.1060	1.24294	10µA±0.1%	63	245.086	0.688906	10µA±0.1%
24	18.0822	1.22795	10µA±0.1%	64	260.081	0.655540	10µA±0.1%
25	19.0594	1.21307	10µA±0.1%	65	275.081	0.621847	10µA±0.1%
26	20.0365	1.19795	10µA±0.1%	66	290.097	0.587841	10µA±0.1%
27	21.0213	1.18182	10µA±0.1%	67	305.104	0.553630	10µA±0.1%
28	21.8130	1.16717	10µA±0.1%	68	315.124	0.530668	10µA±0.1%
29	22.6059	1.14994	10µA±0.1%	69	320.123	0.519186	10µA±0.1%
30	23.2067	1.13696	10µA±0.1%	70	326.117	0.505398	10µA±0.1%
31	23.8060	1.12802	10µA±0.1%	71	330.126	0.496167	10µA±0.1%
32	24.4067	1.12282	10µA±0.1%				
33	25.0094	1.11952	10µA±0.1%				
34	25.6273	1.11706	10µA±0.1%				
35	26.4305	1.11453	10µA±0.1%				
36	27.2508	1.11239	10µA±0.1%				
37	28.0648	1.11051	10µA±0.1%				
38	29.0811	1.10836	10µA±0.1%				
39	30.0954	1.10636	10µA±0.1%				
40	32.1265	1.10260	10µA±0.1%				



UNCERTAINTY ANALYSIS

Calibration Report: 679216
 Sensor Model: DT-670-SD-1.4L
 Sensor Type: Silicon Diode

Sales Order: 74557-D6026620
 Serial Number: D6026620
 Temperature Range: 1.40K to 325K

Calibration Data Uncertainty

The uncertainties of the measured calibration data for Lake Shore's sensors are summarized in the table below. The values given are the combined uncertainty of the temperature measurement and the resistance or voltage measurement expressed as an equivalent temperature uncertainty in millikelvin (mK). Note that the values are the calibration uncertainty only and do not include the stability of the temperature sensor. The uncertainty analysis has followed the guidelines for determining measurement uncertainty as outlined in the ISO Guide to the Expression of Uncertainty in Measurement, NIST Technical Note 1297, and ANSI/NCSL Z540-2-1997. Since the uncertainty varies with temperature due to the variation of the sensor sensitivity and excitation, the table gives typical values at several different temperatures throughout the range of the calibration. The uncertainty is based on an approximate 95% confidence level with a coverage factor $k = 2$.

T (K)	Uncertainty (\pm mK)													
	GR	Cernox (CX)					RX			Platinum		RF-800	Diode	
		1010	1030	1050	1070	1080	102A	103A	202A	100 Ω	25 Ω	27 Ω		
1.4	4	4	4	4			4	4	4				5	7
4.2	4	4	4	4	4		4	6	5				5	5
10	4	5	5	4	4		10	15	12				7	6
20	8	10	9	8	8	8	35	35	28	9	10		13	9
30	9	13	11	9	9	9	76	61	46	9	9		14	31
50	11	18	14	12	12	11				10	10		13	37
100	20	29	22	17	16	14				11	12		12	32
300		78	60	46	45	36				24	24		25	35
400		124	94	74	72	60				45	45		45	49
500										51	51			54

Polynomial Fit Uncertainty

When a sensor is used to measure temperature, a polynomial fit to the measured calibration data is often used to convert the sensor resistance (R) or voltage (V) to a temperature (T). How well the polynomial represents the sensor calibration data is another source of uncertainty when using the sensor. In the polynomials provided with this set of calibration data, the standard deviation of the fit can be used as an estimate of this additional temperature uncertainty. The standard deviation of fit is determined from the following equation:

$$\sigma_{fit}^2 = \frac{\sum_{i=1}^N (T_i - T_{i,calc})^2}{N - n} = \frac{N}{N - n} (\Delta T_{RMS})^2$$

where

- σ_{fit} = standard deviation of the fit
- T_i = measured temperature for point i
- $T_{i,calc}$ = the temperature calculated from the polynomial equation for point i
- N = number of data points in fit range
- n = number of fit coefficients
- ΔT_{RMS} = root mean square deviation of fit

A value of ΔT_{RMS} is given for each range of fit.

F008-04-00_B (01/17/11)



POLYNOMIAL EQUATION

Calibration Report: 679216
Sensor Model: DT-670-SD-1.4L
Sensor Type: Silicon Diode

Sales Order: 74557-D6026620
Serial Number: D6026620
Temperature Range: 1.40K to 325K

Polynomial Type: Chebychev
Useful Range of Fit:

1.40 K to 12.2 K
1.645 Volts to 1.331 Volts

Lower and Upper limits of Voltage used in computing Chebychev coefficients:
ZL = 1.291850709 ZU = 1.647677417

Order	Coefficient	Std. Deviation of Coefficient	Ratio (Coeff./Std Dev.)
0	7.530571	2.3292E-03	3233.06
1	-6.048261	3.3790E-03	-1789.94
2	0.262788	3.4506E-03	76.16
3	-0.380561	3.2352E-03	-117.63
4	-0.070342	3.0809E-03	-22.83
5	-0.026088	3.0132E-03	-8.66
6	-0.013187	2.9909E-03	-4.41
7	-0.010782	2.9892E-03	-3.61
8	-0.009238	3.0559E-03	-3.02
9	-0.009818	3.2365E-03	-3.03
10	-0.013899	3.2298E-03	-4.30

Z = Voltage

$$k = ((Z-ZL)-(ZU-Z))/(ZU-ZL)$$

Temp. (K) = $\sum A_i \cdot \text{COS}(i \cdot \text{ARCCOS}(k))$, where $0 \leq i \leq 10$
and the A_i 's are the coefficients in the table above.

POLYNOMIAL EQUATION

Calibration Report: 679216
Sensor Model: DT-670-SD-1.4L
Sensor Type: Silicon Diode

Sales Order: 74557-D6026620
Serial Number: D6026620
Temperature Range: 1.40K to 325K

Polynomial Type: Chebychev
Temp. (K) vs. Voltage

	V Meas. (V)	T Meas. (K)	T Eq. (K)	T diff. (mK)
1	1.647677	1.20142	1.21118	-9.76
2	1.646564	1.29671	1.29654	0.17
3	1.645270	1.39734	1.39063	6.71
4	1.640602	1.70217	1.69245	9.73
5	1.634929	2.00078	2.00079	-0.01
6	1.626049	2.40002	2.40881	-8.79
7	1.616325	2.80011	2.80576	-5.65
8	1.606228	3.19824	3.19447	3.76
9	1.592632	3.70194	3.69297	8.96
10	1.577558	4.20399	4.20572	-1.73
11	1.547375	5.08963	5.09838	-8.75
12	1.510945	6.08213	6.07316	8.97
13	1.473896	7.09514	7.09824	-3.10
14	1.439049	8.10199	8.10659	-4.60
15	1.407734	9.11114	9.10410	7.04
16	1.379682	10.12717	10.12842	-1.24
17	1.354283	11.14898	11.15485	-5.87
18	1.331424	12.16190	12.15515	6.74
19	1.310707	13.16644	13.16962	-3.18
20	1.291851	14.16278	14.16220	0.58

Order of Fit = 10 RMS error of fit = 6.21 mK
Largest absolute error = -9.76 mK at data point no. 1



POLYNOMIAL EQUATION

Calibration Report: 679216
Sensor Model: DT-670-SD-1.4L
Sensor Type: Silicon Diode

Sales Order: 74557-D6026620
Serial Number: D6026620
Temperature Range: 1.40K to 325K

Polynomial Type: Chebychev
Useful Range of Fit:

12.2 K to 25.0 K
1.331 Volts to 1.120 Volts

Lower and Upper limits of Voltage used in computing Chebychev coefficients:
ZL = 1.114534046 ZU = 1.379682449

Order	Coefficient	Std. Deviation of Coefficient	Ratio (Coeff./Std Dev.)
0	17.230210	8.8076E-03	1956.28
1	-7.722063	1.6033E-02	-481.65
2	0.458450	1.3488E-02	33.99
3	-0.007828	1.0473E-02	-0.75
4	0.213899	7.0813E-03	30.21
5	-0.274545	5.9979E-03	-45.77
6	0.219641	8.1528E-03	26.94
7	-0.115747	1.1314E-02	-10.23
8	0.105968	1.2286E-02	8.63
9	-0.025700	1.1855E-02	-2.17
10	0.045012	9.2600E-03	4.86

Z = Voltage

$$k = ((Z-ZL)-(ZU-Z))/(ZU-ZL)$$

Temp. (K) = $\sum A_i \cdot \text{COS}(i \cdot \text{ARCCOS}(k))$, where $0 \leq i \leq 10$
and the A_i 's are the coefficients in the table above.

POLYNOMIAL EQUATION

Calibration Report: 679216
Sensor Model: DT-670-SD-1.4L
Sensor Type: Silicon Diode

Sales Order: 74557-D6026620
Serial Number: D6026620
Temperature Range: 1.40K to 325K

Polynomial Type: Chebychev
Temp. (K) vs. Voltage

	V Meas. (V)	T Meas. (K)	T Eq. (K)	T diff. (mK)
16	1.379682	10.12842	10.12730	-0.12
17	1.354283	11.15485	11.14752	1.46
18	1.331424	12.15515	12.16853	-6.63
19	1.310707	13.16644	13.15276	13.68
20	1.291851	14.16278	14.17194	-9.16
21	1.274491	15.15244	15.16058	-8.14
22	1.258347	16.13037	16.12232	8.05
23	1.242943	17.10604	17.09568	10.36
24	1.227949	18.08219	18.08631	-4.12
25	1.213069	19.05937	19.07290	-13.54
26	1.197951	20.03651	20.03722	-0.71
27	1.181822	21.02130	21.00319	18.11
28	1.167168	21.81297	21.81391	-0.94
29	1.149938	22.60588	22.63118	-25.30
30	1.136961	23.20672	23.18873	17.99
31	1.128018	23.80597	23.78734	18.62
32	1.122821	24.40673	24.41908	-12.35
33	1.119519	25.00940	25.02622	-16.82
34	1.117056	25.62726	25.62911	-1.85
35	1.114534	26.43047	26.41906	11.41

Order of Fit = 10 RMS error of fit = 12.18 mK
Largest absolute error = -25.30 mK at data point no. 29



POLYNOMIAL EQUATION

Calibration Report: 679216
Sensor Model: DT-670-SD-1.4L
Sensor Type: Silicon Diode

Sales Order: 74557-D6026620
Serial Number: D6026620
Temperature Range: 1.40K to 325K

Polynomial Type: Chebychev
Useful Range of Fit:

25.0 K to 88.1 K
1.120 Volts to 1.009 Volts

Lower and Upper limits of Voltage used in computing Chebychev coefficients:
ZL = 0.9877787908 ZU = 1.128017698

Order	Coefficient	Std. Deviation of Coefficient	Ratio (Coeff./Std Dev.)
0	60.032099	8.8273E-03	6800.73
1	-39.955405	1.5544E-02	-2570.44
2	1.099952	1.4792E-02	74.36
3	1.521702	1.0587E-02	143.73
4	0.859769	7.7522E-03	110.91
5	0.345305	3.6094E-03	95.67
6	0.071899	4.0236E-03	17.87
7	-0.029681	7.4423E-03	-3.99
8	-0.062717	1.0554E-02	-5.94
9	-0.028222	1.1422E-02	-2.47
10	-0.031279	1.1786E-02	-2.65
11	-0.004588	9.2222E-03	-0.50
12	-0.013799	6.5707E-03	-2.10

Z = Voltage

$$k = ((Z-ZL)-(ZU-Z))/(ZU-ZL)$$

Temp. (K) = $\sum A_i * \text{COS}(i * \text{ARCCOS}(k))$, where $0 \leq i \leq 12$
and the A_i 's are the coefficients in the table above.

POLYNOMIAL EQUATION

Calibration Report: 679216
Sensor Model: DT-670-SD-1.4L
Sensor Type: Silicon Diode

Sales Order: 74557-D6026620
Serial Number: D6026620
Temperature Range: 1.40K to 325K

Polynomial Type: Chebychev
Temp. (K) vs. Voltage

	V Meas. (V)	T Meas. (K)	T Eq. (K)	T diff. (mK)
31	1.128018	23.78734	23.80504	0.93
32	1.122821	24.41908	24.41591	-9.18
33	1.119519	25.02622	24.99483	14.56
34	1.117056	25.62726	25.62115	6.11
35	1.114534	26.43047	26.43865	-8.17
36	1.112389	27.25082	27.26249	-11.67
37	1.110508	28.06481	28.07085	-6.04
38	1.108359	29.08111	29.07827	2.84
39	1.106357	30.09544	30.08504	10.40
40	1.102597	32.12650	32.11675	9.75
41	1.097369	35.14969	35.15650	-6.80
42	1.092444	38.14960	38.15950	-9.90
43	1.086062	42.15473	42.14896	5.77
44	1.079716	46.15330	46.14763	5.66
45	1.070109	52.15367	52.15998	-6.31
46	1.060398	58.14782	58.14664	1.18
47	1.050554	64.13706	64.13434	2.72
48	1.040540	70.12997	70.13310	-3.13
49	1.030347	76.12518	76.12341	1.77
50	1.019985	82.11331	82.11392	-0.61
51	1.009431	88.10918	88.10906	0.13
52	0.9986943	94.10643	94.10644	-0.01
53	0.9877788	100.10681	100.10681	0.00

Order of Fit = 12 RMS error of fit = 6.78 mK
Largest absolute error = 14.56 mK at data point no. 33



POLYNOMIAL EQUATION

Calibration Report: 679216
Sensor Model: DT-670-SD-1.4L
Sensor Type: Silicon Diode

Sales Order: 74557-D6026620
Serial Number: D6026620
Temperature Range: 1.40K to 325K

Polynomial Type: Chebychev
Useful Range of Fit:

88.1 K to 325. K
1.009 Volts to 0.5080 Volts

Lower and Upper limits of Voltage used in computing Chebychev coefficients:
ZL = 0.4961669288 ZU = 1.03034667

Order	Coefficient	Std. Deviation of Coefficient	Ratio (Coeff./Std Dev.)
0	207.333057	1.4553E-04	1424705.77
1	-126.040927	2.0989E-04	-600503.14
2	-3.967413	2.0577E-04	-19280.96
3	-0.883684	2.1242E-04	-4160.01
4	-0.227963	2.1157E-04	-1077.47
5	-0.076770	2.0308E-04	-378.02
6	-0.014513	1.9604E-04	-74.03
7	0.000686	1.9521E-04	3.52
8	0.001658	1.9787E-04	8.38
9	0.000620	1.9797E-04	3.13
10	0.000532	1.9552E-04	2.72

Z = Voltage

$$k = ((Z-ZL)-(ZU-Z))/(ZU-ZL)$$

Temp. (K) = $\sum A_i \cdot \text{COS}(i \cdot \text{ARCCOS}(k))$, where $0 \leq i \leq 10$
and the A_i 's are the coefficients in the table above.

POLYNOMIAL EQUATION

Calibration Report: 679216
Sensor Model: DT-670-SD-1.4L
Sensor Type: Silicon Diode

Sales Order: 74557-D6026620
Serial Number: D6026620
Temperature Range: 1.40K to 325K

Polynomial Type: Chebychev
Temp. (K) vs. Voltage

	V Meas. (V)	T Meas. (K)	T Eq. (K)	T diff. (mK)
49	1.030347	76.12341	76.12528	-0.10
50	1.019985	82.11392	82.11326	0.05
51	1.009431	88.10906	88.10882	0.37
52	0.9986943	94.10643	94.10660	-0.17
53	0.9877788	100.10681	100.10702	-0.21
54	0.9692136	110.10859	110.10882	-0.22
55	0.9406093	125.08892	125.08843	0.49
56	0.9111361	140.08091	140.08093	-0.02
57	0.8809138	155.08704	155.08736	-0.32
58	0.8500853	170.08833	170.08823	0.10
59	0.8187448	185.07723	185.07742	-0.20
60	0.7868885	200.08583	200.08532	0.51
61	0.7546132	215.08684	215.08707	-0.24
62	0.7219416	230.08824	230.08805	0.19
63	0.6889061	245.08565	245.08647	-0.82
64	0.6555395	260.08071	260.08005	0.66
65	0.6218467	275.08141	275.08080	0.61
66	0.5878410	290.09730	290.09867	-1.38
67	0.5536296	305.10442	305.10335	1.07
68	0.5306683	315.12432	315.12460	-0.29
69	0.5191863	320.12318	320.12320	-0.02
70	0.5053982	326.11656	326.11678	-0.21
71	0.4961669	330.12559	330.12543	0.16

Order of Fit = 10 RMS error of fit = 0.50 mK
Largest absolute error = -1.38 mK at data point no. 66

INTERPOLATION TABLE

Calibration Report: 679216
 Sensor Model: DT-670-SD-1.4L
 Sensor Type: Silicon Diode

Sales Order: 74557-D6026620
 Serial Number: D6026620
 Temperature Range: 1.40K to 325K

Temp (K)	Volts (V)	dV/dT (mV/K)	Temp (K)	Volts (V)	dV/dT (mV/K)
1.400	1.64523	-13.484	15.50	1.26865	-16.625
1.500	1.64383	-14.689	16.00	1.26045	-16.197
1.600	1.64230	-15.927	16.50	1.25244	-15.846
1.700	1.64064	-17.198	17.00	1.24459	-15.574
1.800	1.63886	-18.438	17.50	1.23686	-15.378
1.900	1.63696	-19.575	18.00	1.22920	-15.255
2.000	1.63495	-20.610	18.50	1.22159	-15.212
2.100	1.63284	-21.530	19.00	1.21398	-15.262
2.200	1.63064	-22.324	19.50	1.20631	-15.426
2.300	1.62838	-22.992	20.00	1.19853	-15.731
2.400	1.62605	-23.533	21.00	1.18219	-17.188
2.500	1.62367	-23.976	22.00	1.16331	-21.067
2.600	1.62126	-24.350	23.00	1.14113	-21.267
2.700	1.61881	-24.654	24.00	1.12602	-9.3779
2.800	1.61633	-24.889	25.00	1.11956	-4.5870
2.900	1.61383	-25.103	26.00	1.11582	-3.1476
3.000	1.61131	-25.346	27.00	1.11301	-2.5336
3.100	1.60876	-25.617	28.00	1.11065	-2.2213
3.200	1.60618	-25.918	29.00	1.10852	-2.0446
3.300	1.60357	-26.268	30.00	1.10654	-1.9307
3.400	1.60093	-26.686	31.00	1.10465	-1.8555
3.500	1.59823	-27.172	32.00	1.10282	-1.7974
3.600	1.59549	-27.726	33.00	1.10105	-1.7523
3.700	1.59269	-28.348	34.00	1.09932	-1.7137
3.800	1.58982	-29.007	35.00	1.09762	-1.6816
3.900	1.58689	-29.668	36.00	1.09595	-1.6552
4.000	1.58389	-30.333	37.00	1.09431	-1.6331
4.200	1.57768	-31.670	38.00	1.09269	-1.6153
4.400	1.57122	-32.927	39.00	1.09108	-1.6017
4.600	1.56453	-34.003	40.00	1.08948	-1.5920
4.800	1.55763	-34.898	42.00	1.08631	-1.5841
5.000	1.55058	-35.613	44.00	1.08314	-1.5862
5.200	1.54340	-36.156	46.00	1.07996	-1.5912
5.400	1.53613	-36.567	48.00	1.07677	-1.5977
5.600	1.52878	-36.851	50.00	1.07357	-1.6039
5.800	1.52139	-37.009	52.00	1.07036	-1.6098
6.000	1.51399	-37.041	54.00	1.06713	-1.6158
6.500	1.49553	-36.724	56.00	1.06389	-1.6226
7.000	1.47732	-36.057	58.00	1.06064	-1.6303
7.500	1.45954	-34.979	60.00	1.05737	-1.6385
8.000	1.44243	-33.356	65.00	1.04912	-1.6610
8.500	1.42624	-31.406	70.00	1.04076	-1.6848
9.000	1.41100	-29.592	75.00	1.03227	-1.7095
9.500	1.39663	-27.941	77.35	1.02824	-1.7214
10.00	1.38303	-26.479	80.00	1.02366	-1.7348
10.50	1.37012	-25.181	85.00	1.01493	-1.7597
11.00	1.35783	-23.983	90.00	1.00606	-1.7848
11.50	1.34612	-22.879	95.00	0.997080	-1.8091
12.00	1.33494	-21.860	100.0	0.987975	-1.8328
12.50	1.32425	-20.915	105.0	0.978753	-1.8559
13.00	1.31401	-20.018	110.0	0.969418	-1.8780
13.50	1.30422	-19.173	115.0	0.959974	-1.8991
14.00	1.29483	-18.407	120.0	0.950428	-1.9194
14.50	1.28580	-17.723	125.0	0.940782	-1.9388
15.00	1.27709	-17.130	130.0	0.931041	-1.9572



INTERPOLATION TABLE

Calibration Report: 679216
Sensor Model: DT-670-SD-1.4L
Sensor Type: Silicon Diode

Sales Order: 74557-D6026620
Serial Number: D6026620
Temperature Range: 1.40K to 325K

<u>Temp (K)</u>	<u>Volts (V)</u>	<u>dV/dT (mV/K)</u>	<u>Temp (K)</u>	<u>Volts (V)</u>	<u>dV/dT (mV/K)</u>
135.0	0.921212	-1.9746	235.0	0.711162	-2.1988
140.0	0.911297	-1.9910	240.0	0.700148	-2.2066
145.0	0.901303	-2.0066	245.0	0.689096	-2.2142
150.0	0.891233	-2.0213	250.0	0.678007	-2.2215
155.0	0.881091	-2.0353	255.0	0.666881	-2.2287
160.0	0.870881	-2.0486	260.0	0.655720	-2.2358
165.0	0.860606	-2.0613	265.0	0.644524	-2.2427
170.0	0.850268	-2.0736	270.0	0.633294	-2.2494
175.0	0.839871	-2.0853	273.15	0.626202	-2.2535
180.0	0.829417	-2.0964	275.0	0.622030	-2.2559
185.0	0.818908	-2.1071	280.0	0.610736	-2.2619
190.0	0.808346	-2.1174	285.0	0.599412	-2.2674
195.0	0.797734	-2.1275	290.0	0.588062	-2.2724
200.0	0.787072	-2.1373	295.0	0.576689	-2.2771
205.0	0.776361	-2.1469	300.0	0.565291	-2.2820
210.0	0.765604	-2.1561	305.0	0.553868	-2.2870
215.0	0.754801	-2.1649	310.0	0.542421	-2.2917
220.0	0.743955	-2.1735	315.0	0.530954	-2.2952
225.0	0.733066	-2.1820	320.0	0.519469	-2.2986
230.0	0.722135	-2.1905	325.0	0.507968	-2.3016



THERMAL CYCLE TESTING

Sensor Model: DT-670-SD-1.4L

Serial Number: D6026620

Sensor Type: Silicon Diode

This sensor was tested for repeatability through rapid thermal cycles from room temperature into liquid helium. During this test, the following four lead voltage values were recorded:

Approximately 305 K:	0.554 V
Liquid Nitrogen:	1.028 V
Liquid Helium:	1.578 V

The nitrogen and helium values were recorded in OPEN dewars, so precision comparisons with calibration values or other thermal cycle test values should not be made.

Recommended Operating Parameters:

For diode sensors calibrated by LSCI, the current is maintained at the constant values listed on the Test Data page. In order to minimize calibration offsets due to the nonlinear voltage-current relationship in the diode sensor, these same guidelines should be followed in using the sensor.



BREAKPOINTS 340 FORMAT

Calibration Report: 679216

Sensor Model: DT-670-SD-1.4L

Sensor Type: Silicon Diode

Sales Order: 74557-D6026620

Serial Number: D6026620

Temperature Range: 1.40K to 325K

Name: DT-670-SD-1.4L

Serial number: D6026620

Format: 2 ;Volts/Kelvin

Limit: 325.0

Coefficient: 1 ;Negative

Point 1: 9.06000e-02,500.000	Point 56: 1.12160, 24.600
Point 2: .110239,491.000	Point 57: 1.12353, 24.300
Point 3: .136555,479.500	Point 58: 1.12511, 24.100
Point 4: .179181,461.500	Point 59: 1.12699, 23.900
Point 5: .265393,425.500	Point 60: 1.12926, 23.700
Point 6: .349522,390.000	Point 61: 1.13200, 23.500
Point 7: .452797,346.000	Point 62: 1.13524, 23.300
Point 8: .507992,325.000	Point 63: 1.14106, 23.000
Point 9: .552746,305.500	Point 64: 1.16127, 22.100
Point 10: .590355,289.000	Point 65: 1.17143, 21.600
Point 11: .625435,273.500	Point 66: 1.18227, 21.000
Point 12: .656858,259.500	Point 67: 1.19543, 20.200
Point 13: .686902,246.000	Point 68: 1.21018, 19.250
Point 14: .715577,233.000	Point 69: 1.23606, 17.550
Point 15: .742889,220.500	Point 70: 1.25005, 16.650
Point 16: .768855,208.500	Point 71: 1.26204, 15.900
Point 17: .793495,197.000	Point 72: 1.27281, 15.250
Point 18: .816818,186.000	Point 73: 1.28312, 14.650
Point 19: .838847,175.500	Point 74: 1.29296, 14.100
Point 20: .859594,165.500	Point 75: 1.30323, 13.550
Point 21: .879073,156.000	Point 76: 1.31398, 13.000
Point 22: .897302,147.000	Point 77: 1.32525, 12.450
Point 23: .914298,138.500	Point 78: 1.33600, 11.950
Point 24: .930079,130.500	Point 79: 1.34722, 11.450
Point 25: .944668,123.000	Point 80: 1.35899, 10.950
Point 26: .959042,115.500	Point 81: 1.37133, 10.450
Point 27: .972245,108.500	Point 82: 1.38431, 9.950
Point 28: .985238,101.500	Point 83: 1.39658, 9.500
Point 29: .995276, 96.000	Point 84: 1.40947, 9.050
Point 30: 1.00339, 91.500	Point 85: 1.42307, 8.600
Point 31: 1.01140, 87.000	Point 86: 1.43741, 8.150
Point 32: 1.01932, 82.500	Point 87: 1.45425, 7.650
Point 33: 1.02713, 78.000	Point 88: 1.47546, 7.050
Point 34: 1.03484, 73.500	Point 89: 1.50836, 6.150
Point 35: 1.04245, 69.000	Point 90: 1.53620, 5.400
Point 36: 1.04996, 64.500	Point 91: 1.55630, 4.840
Point 37: 1.05869, 59.200	Point 92: 1.56996, 4.440
Point 38: 1.06714, 54.000	Point 93: 1.58088, 4.100
Point 39: 1.07614, 48.400	Point 94: 1.58868, 3.840
Point 40: 1.08631, 42.000	Point 95: 1.59524, 3.610
Point 41: 1.09091, 39.100	Point 96: 1.60201, 3.360
Point 42: 1.09479, 36.700	Point 97: 1.61006, 3.050
Point 43: 1.09795, 34.800	Point 98: 1.61908, 2.690
Point 44: 1.10087, 33.100	Point 99: 1.62560, 2.420
Point 45: 1.10354, 31.600	Point 100: 1.63044, 2.210
Point 46: 1.10596, 30.300	Point 101: 1.63413, 2.040
Point 47: 1.10811, 29.200	Point 102: 1.63717, 1.890
Point 48: 1.10998, 28.300	Point 103: 1.63978, 1.750
Point 49: 1.11155, 27.600	Point 104: 1.64199, 1.620
Point 50: 1.11300, 27.000	Point 105: 1.64384, 1.500
Point 51: 1.11433, 26.500	Point 106: 1.64524, 1.400
Point 52: 1.11580, 26.000	
Point 53: 1.11714, 25.600	
Point 54: 1.11867, 25.200	
Point 55: 1.12002, 24.900	

Note: Breakpoints outside of the calibration range were added from the standard curve. These extra points conform to reduced accuracy specifications and are added as a convenience to the customer.



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F010-04-00_B 06/21/2011

BREAKPOINTS 91C/93C/330 FORMAT

Calibration Report: 679216
Sensor Model: DT-670-SD-1.4L
Sensor Type: Silicon Diode

Sales Order: 74557-D6026620
Serial Number: D6026620
Temperature Range: 1.40K to 325K

Interpolation Method: Straight Line
Limit: 325.0 (Kelvin)
Format: 2 (Volts/Kelvin)
Number of Breakpoints: 36

No.	Units	Temperature (K)	No.	Units	Temperature (K)
1	0.147030	475.0	21	1.11059	28.0
2	0.218700	445.0	22	1.11301	27.0
3	0.326000	400.0	23	1.11582	26.0
4	0.490260	330.0	24	1.11956	25.0
5	0.508080	325.0	25	1.12602	24.0
6	0.588120	290.0	26	1.14113	23.0
7	0.655810	260.0	27	1.16331	22.0
8	0.722230	230.0	28	1.18219	21.0
9	0.776430	205.0	29	1.27645	15.0
10	0.829510	180.0	30	1.32360	12.5
11	0.870930	160.0	31	1.38199	10.0
12	0.911380	140.0	32	1.45790	7.5
13	0.950520	120.0	33	1.57258	4.4
14	0.978790	105.0	34	1.62236	2.6
15	1.00613	90.0	35	1.64277	1.6
16	1.03234	75.0	36	1.64516	1.4
17	1.05743	60.0			
18	1.08320	44.0			
19	1.09588	36.0			
20	1.10458	31.0			

Note: Breakpoints outside of the calibration range were added from the standard curve. These extra points conform to reduced accuracy specifications and are added as a convenience to the customer.

