



# Grove - High Temperature Sensor

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Wiki: [http://www.seeedstudio.com/wiki/Grove - High Temperature Sensor](http://www.seeedstudio.com/wiki/Grove_-_High_Temperature_Sensor)

Bazaar: <http://www.seeedstudio.com/depot/Grove-High-Temperature-Sensor-p-1810.html>

## Document Revision History

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| Revision | Date         | Author    | Description |
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*Under the supervision of Seeed Technology Inc., this manual has been compiled and published which covered the latest product description and specification. The content of this manual is subject to change without notice.*

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## 1. Introduction

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Thermocouples are very sensitive, requiring a good amplifier with a cold - compensation reference. The Grove - Temperature Sensor USES a K type thermocouple Temperature detection, with a Thermistor to detect the ambient Temperature as Temperature compensation. The detectable range of this Sensor is - 50-600°C , and The accuracy is  $\pm(2.0\% + 2^{\circ}\text{C})$ .

## 2. Specification

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|                                                                  |                 |
|------------------------------------------------------------------|-----------------|
| Voltage                                                          | 3.3 ~ 5V        |
| Max power rating at 25°C                                         | 300mW           |
| Operating temperature range                                      | -40 ~ +125 °C   |
| The temperature measurement range is                             | -50 ~ +600°C    |
| Amplifier output voltage range                                   | 0 ~ 3.3 V mv    |
| Cold junction compensation (environment temperature measurement) |                 |
| Thermocouple temperature measurement accuracy                    | ± 2.0% (+ 2 °C) |

## 3. Demonstration

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Here is an example to show you how to read temperature information from the sensor.

We need a Seeeduino V3.0 and a Grove - High Temperature Sensor.

### 3.1 Hardware Installation

There's a I2C Port on Seeeduino, actually it's connect to A4 and A5 else. So we can use this port to read data from the sensor.

Let's plug this sensor to I2C port of Seeeduino.

### 3.2 Download Code and Upload

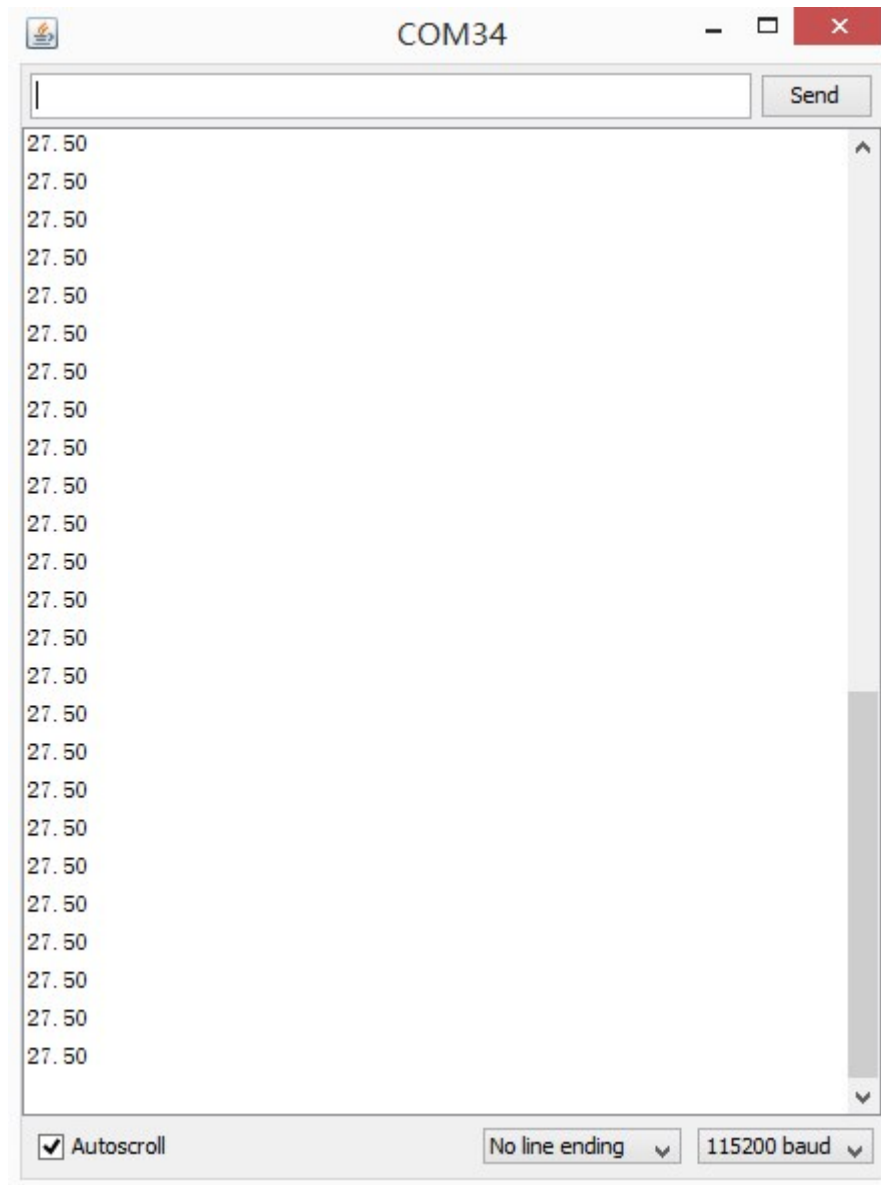
You can download the library in [here](#)

Then extract the library the Library folder of Arduino, open the demo in examples folder.

Then upload it to your Seeeduino.

### 3.3 Open Serial Monitor and Get Data

Then, open your Serial Monitor, you can find the temperature in Celsius here.



### 3.4 K type thermocouple indexing table

As a reference, the following is K type thermocouple indexing table.

| 0  | -5   | -10  | -15  | -20  | -25  | -30  | -35  | -40  | -45  | -50  | -55  | -60  | -65  | -70  | -75  | -80  | -85  | -90  | -95  | -100 |
|----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| -2 | -5.8 | -5.9 | -6.0 | -6.0 | -6.1 | -6.2 | -6.2 | -6.3 | -6.3 | -6.3 | -6.4 | -6.4 | -6.4 | -6.4 | -6.4 | -6.4 | -6.4 | -6.4 | -6.4 | -6.4 |
| 00 | 914  | 654  | 346  | 99   | 584  | 127  | 618  | 056  | 438  | 765  | 036  | 251  | 411  | 518  | 577  |      |      |      |      |      |
| -1 | -3.5 | -3.7 | -3.8 | -3.9 | -4.1 | -4.2 | -4.4 | -4.5 | -4.6 | -4.7 | -4.9 | -5.0 | -5.1 | -5.2 | -5.3 | -5.4 | -5.5 | -5.6 | -5.7 | -5.8 |
| 00 | 536  | 046  | 523  | 969  | 382  | 761  | 106  | 416  | 69   | 927  | 127  | 289  | 412  | 496  | 54   | 542  | 503  | 422  | 297  | 128  |
| 0  | 0    | -0.1 | -0.3 | -0.5 | -0.7 | -0.9 | -1.1 | -1.3 | -1.5 | -1.7 | -1.8 | -2.0 | -2.2 | -2.4 | -2.5 | -2.7 | -2.9 | -3.0 | -3.2 | -3.3 |
|    | 0    | 966  | 919  | 855  | 775  | 678  | 561  | 425  | 269  | 093  | 894  | 673  | 428  | 16   | 866  | 547  | 201  | 828  | 427  | 996  |
| 0  | 0    | 5    | 10   | 15   | 20   | 25   | 30   | 35   | 40   | 45   | 50   | 55   | 60   | 65   | 70   | 75   | 80   | 85   | 90   | 95   |
| 0  | 0    | 0.19 | 0.39 | 0.59 | 0.79 | 1.00 | 1.20 | 1.40 | 1.61 | 1.81 | 2.02 | 2.22 | 2.43 | 2.64 | 2.85 | 3.05 | 3.26 | 3.47 | 3.68 | 3.88 |
|    | 0    | 79   | 69   | 7    | 81   | 02   | 33   | 71   | 18   | 71   | 31   | 96   | 65   | 37   | 12   | 89   | 66   | 43   | 19   | 92   |
| 10 | 4.09 | 4.30 | 4.50 | 4.71 | 4.91 | 5.12 | 5.32 | 5.53 | 5.73 | 5.93 | 6.13 | 6.33 | 6.54 | 6.74 | 6.94 | 7.14 | 7.34 | 7.53 | 7.73 | 7.93 |
| 0  | 62   | 29   | 91   | 47   | 99   | 44   | 84   | 17   | 45   | 67   | 83   | 95   | 02   | 06   | 06   | 04   | 96   | 91   | 87   | 85   |
| 20 | 8.13 | 8.33 | 8.53 | 8.73 | 8.93 | 9.14 | 9.34 | 9.54 | 9.74 | 9.95 | 10.1 | 10.3 | 10.5 | 10.7 | 10.9 | 11.1 | 11.3 | 11.5 | 11.7 | 12.0 |
| 0  | 85   | 84   | 86   | 91   | 99   | 11   | 27   | 47   | 72   | 534  | 571  | 613  | 659  | 709  | 763  | 821  | 882  | 947  | 015  | 086  |
| 30 | 12.2 | 12.4 | 12.6 | 12.8 | 13.0 | 13.2 | 13.4 | 13.6 | 13.8 | 14.0 | 14.2 | 14.5 | 14.7 | 14.9 | 15.1 | 15.3 | 15.5 | 15.7 | 15.9 | 16.1 |
| 0  | 086  | 159  | 236  | 315  | 396  | 48   | 566  | 654  | 745  | 837  | 931  | 028  | 126  | 226  | 327  | 431  | 536  | 642  | 75   | 86   |
| 40 | 16.3 | 16.6 | 16.8 | 17.0 | 17.2 | 17.4 | 17.6 | 17.8 | 18.0 | 18.3 | 18.5 | 18.7 | 18.9 | 19.1 | 19.3 | 19.5 | 19.7 | 20.0 | 20.2 | 20.4 |
| 0  | 971  | 084  | 198  | 314  | 431  | 549  | 669  | 789  | 911  | 034  | 158  | 283  | 409  | 536  | 663  | 792  | 921  | 051  | 181  | 312  |
| 50 | 20.6 | 20.8 | 21.0 | 21.2 | 21.4 | 21.7 | 21.9 | 22.1 | 22.3 | 22.5 | 22.7 | 22.9 | 23.2 | 23.4 | 23.6 | 23.8 | 24.0 | 24.2 | 24.4 | 24.6 |
| 0  | 443  | 574  | 706  | 838  | 971  | 103  | 236  | 368  | 5    | 632  | 764  | 896  | 027  | 158  | 288  | 418  | 547  | 675  | 802  | 929  |
| 60 | 24.9 | 25.1 | 25.3 | 25.5 | 25.7 | 25.9 | 26.1 | 26.3 | 26.6 | 26.8 | 27.0 | 27.2 | 27.4 | 27.6 | 27.8 | 28.0 | 28.2 | 28.4 | 28.7 | 28.9 |
| 0  | 055  | 179  | 303  | 426  | 547  | 668  | 786  | 904  | 02   | 135  | 249  | 36   | 471  | 579  | 686  | 791  | 895  | 996  | 096  | 194  |
| 70 | 29.1 | 29.3 | 29.5 | 29.7 | 29.9 | 30.1 | 30.3 | 30.5 | 30.7 | 31.0 | 31.2 | 31.4 | 31.6 | 31.8 | 32.0 | 32.2 | 32.4 | 32.6 | 32.8 | 33.0 |
| 0  | 29   | 384  | 476  | 565  | 653  | 739  | 822  | 904  | 983  | 06   | 135  | 207  | 277  | 345  | 41   | 474  | 534  | 593  | 649  | 703  |
| 80 | 33.2 | 33.4 | 33.6 | 33.8 | 34.0 | 34.2 | 34.5 | 34.7 | 34.9 | 35.1 | 35.3 | 35.5 | 35.7 | 35.9 | 36.1 | 36.3 | 36.5 | 36.7 | 36.9 | 37.1 |
| 0  | 754  | 803  | 849  | 893  | 934  | 973  | 01   | 044  | 075  | 104  | 131  | 155  | 177  | 196  | 212  | 226  | 238  | 247  | 254  | 258  |
| 90 | 37.3 | 37.5 | 37.7 | 37.9 | 38.1 | 38.3 | 38.5 | 38.7 | 38.9 | 39.1 | 39.3 | 39.5 | 39.7 | 39.9 | 40.1 | 40.2 | 40.4 | 40.6 | 40.8 | 41.0 |
| 0  | 259  | 258  | 255  | 249  | 24   | 229  | 215  | 199  | 18   | 159  | 135  | 109  | 08   | 049  | 015  | 978  | 939  | 897  | 853  | 806  |
| 10 | 41.2 | 41.4 | 41.6 | 41.8 | 42.0 | 42.2 | 42.4 | 42.6 | 42.8 | 43.0 | 43.2 | 43.4 | 43.5 | 43.7 | 43.9 | 44.1 | 44.3 | 44.5 | 44.7 | 44.9 |
| 00 | 756  | 704  | 649  | 591  | 531  | 468  | 403  | 334  | 263  | 189  | 112  | 033  | 951  | 866  | 777  | 687  | 593  | 496  | 396  | 293  |
| 11 | 45.1 | 45.3 | 45.4 | 45.6 | 45.8 | 46.0 | 46.2 | 46.4 | 46.6 | 46.8 | 46.9 | 47.1 | 47.3 | 47.5 | 47.7 | 47.9 | 48.1 | 48.2 | 48.4 | 48.6 |
| 00 | 187  | 078  | 966  | 851  | 733  | 611  | 487  | 359  | 227  | 093  | 955  | 813  | 668  | 52   | 368  | 213  | 054  | 892  | 726  | 556  |
| 12 | 48.8 | 49.0 | 49.2 | 49.3 | 49.5 | 49.7 | 49.9 | 50.1 | 50.2 | 50.4 | 50.6 | 50.8 | 51.0 | 51.1 | 51.3 | 51.5 | 51.7 | 51.8 | 52.0 | 52.2 |
| 00 | 382  | 205  | 024  | 84   | 651  | 459  | 263  | 062  | 858  | 651  | 439  | 223  | 003  | 78   | 552  | 32   | 085  | 845  | 602  | 354  |
| 13 | 52.4 | 52.5 | 52.7 | 52.9 | 53.1 | 53.2 | 53.4 | 53.6 | 53.7 | 53.9 | 54.1 | 54.3 | 54.4 | 54.6 | 54.8 |      |      |      |      |      |
| 00 | 103  | 847  | 588  | 325  | 058  | 787  | 512  | 234  | 952  | 666  | 377  | 084  | 788  | 489  | 186  |      |      |      |      |      |

## 4. Resource

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[Grove - High Temperature Sensor PDF](#)

[Grove - High Temperature Sensor Eagle File](#)

[High Temperature Sensor Library](#)

[Datasheet OPA333 PDF](#)

[Datasheet LMV358 PDF](#)

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