

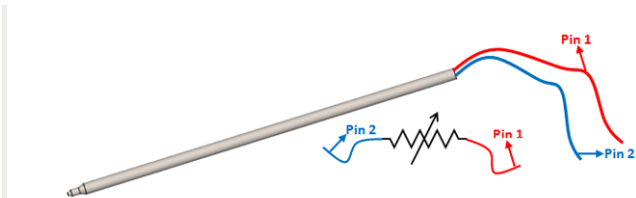
PT100 RTD Sensor

3 May 2018 - 0 Comments



(/sites/default/files/components/PT100-RTD-Sensor.jpg)

PT100 RTD Sensor



(/sites/default/files/component_pin/PT100-Sensor-Pinout.png)

PT100 Temperature Sensor Pinout

embedded
survey

We Want Your Feedback!
TAKE OUR SURVEY

SEMRUSH

Move your business forward
with content marketing

Pin Configuration

The **PT100 sensor** is just like a variable resistor, whose resistance varies with respect to the environment temperature. There are many types of PT100 sensors, the one we use here is a two wire one.

Pin Number	Pin Name	Description
1	Pin 1	One end of the variable Resistor

2	Pin 2	Other end of Variable Resistor
---	-------	--------------------------------

Features

- Platinum Resistant Thermometer (PRT)
- Temperature Range: -200°C to 850°C
- Resistance Range: 1.849K to 39.026K
- Accuracy: $\pm 0.1^\circ\text{C}$
- Nominal Resistance: 100 Ω at 0°C

Note: Complete Technical Details can be found at the **PT100 sensor datasheet** given at the end of this page.

Alternative PRTs

PT100 (3-Wire), PT100 (<https://components101.com/sensors/pt100-rtd-temperature-sensor>) (4-Wire), PT500, PT1000

Alternative Temperature Sensors

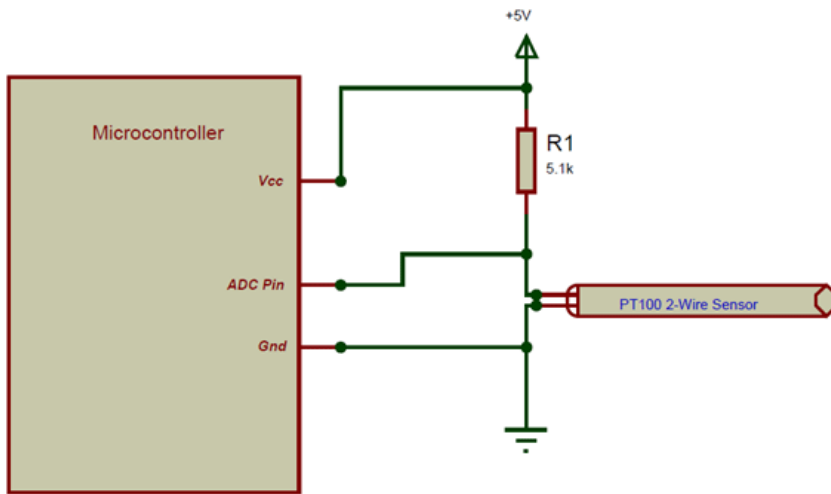
LM35 (<https://components101.com/lm35-temperature-sensor>), DHT11 (<https://components101.com/dht11-temperature-sensor>), DHT22 (<https://components101.com/sensors/dht22-pinout-specs-datasheet>), Thermocouple, TMP100 (<https://components101.com/sensors/tmp36-temperature-sensor>), LM75 (<https://components101.com/modules/lm75-temperature-sensor-module>), DS18B20, SHT15, LM35DZ (<https://components101.com/sensors/lm35-temperature-sensor>), TPA81, D6T

Where to Use the PT100 Sensor?

The **PT100** is a commonly used as industrial temperature sensor. It is known for its capability to **measure high range temperature** (200°C) with an accuracy of 0.1°C. The construction of the sensor is also simple and hence it can be used in rugged environments. One downside of this sensor is that it will not work out of the box. To get useful values of temperature one should use it along with a potential divider or a Wheatstone bridge. But since these sensors just work with variable voltage it is very easy to use them in projects. So if you are looking for a sensor with good range and decent accuracy which is relatively cheap then PT100 would be a great choice.

How to Use PT100 Sensor?

The **PT100 sensor** falls under the category of **PRTs (Platinum Resistant Thermometers)**. These sensors are nothing but a variable resistor which changes its resistance based on the temperature around it. So we need to build a small circuitry to measure the voltage across it. This circuitry can be as simple as a Potential divider or as complex as a Wheatstone bridge with Instrumentation amplifier. The design of the circuit depends on the accuracy needed for the project. Also there are many **types of PT100**, the one that we are discussing here is two wire sensors, and there are also sensors with 3-wires and even 4-wires. So to keep things simple let's discuss how to interface a 2-wire sensor to a MCU using a simple potential divider circuit.



The PT100 sensor that we are designing for has a variable resistance from 1.8K to 39.02K as mentioned in the features above. So we have to convert this variable resistance value to a voltage value of 0V to 5V so that our microcontroller can understand it (here I am using a 5V MCU). To do this we have used a simple potential divider, according to the voltage divider calculator when the value of Input voltage is 5V and R1 is 5.1K and the PT100 resistance is 1.8K (minimum) we will get an output voltage of 1.304V and when the value of PT100 is 39.02K (maximum) we will get an output voltage of 4.42. Both the output voltages are in range for the microcontrollers (<https://components101.com/microcontrollers>) ADC pin to read so we can proceed with the circuit. But for a circuit of this type the accuracy will be very less, if you require more accuracy you can dig deep into Wheatstone bridge and amplifiers.

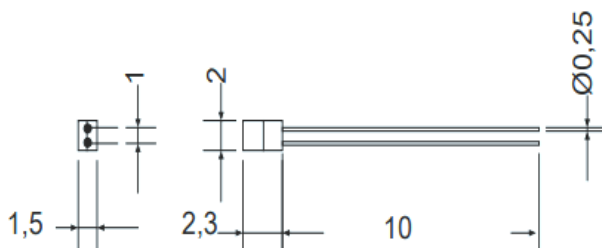
While calculating the value of resistance we also should consider the resistance of the wire, once the resistance value of the wire is known it will be compensated with the actual value. More details on this can be found in the datasheet below. Once you know the value of Resistance you can equate it to the value of temperature by using the below table-

°C	Ω	°C	Ω	°C	Ω	°C	Ω	°C	Ω	°C	Ω
-200	18.49	0	100.00	200	175.84	400	247.04	600	313.59	800	375.51
-190	22.80	10	103.90	210	179.51	410	250.48	610	316.80	810	378.48
-180	27.08	20	107.79	220	183.17	420	253.90	620	319.99	820	381.45
-170	31.32	30	111.67	230	186.82	430	257.32	630	323.18	830	384.40
-160	35.53	40	115.54	240	190.45	440	260.72	640	326.35	840	387.34
-150	39.71	50	119.40	250	194.07	450	264.11	650	329.51	850	390.26
-140	43.87	60	123.24	260	197.69	460	267.49	660	332.66		
-130	48.00	70	127.07	270	201.29	470	270.86	670	335.79		
-120	52.11	80	130.89	280	204.88	480	274.22	680	338.92		
-110	56.19	90	134.70	290	208.45	490	277.56	690	342.03		
-100	60.25	100	138.50	300	212.02	500	280.90	700	345.13		
-90	64.30	110	142.29	310	215.57	510	284.22	710	348.22		
-80	68.33	120	146.06	320	219.12	520	287.53	720	351.30		
-70	72.33	130	149.82	330	222.65	530	290.83	730	354.37		
-60	76.33	140	153.58	340	226.17	540	294.11	740	357.42		
-50	80.31	150	157.31	350	229.67	550	297.39	750	360.47		
-40	84.27	160	161.04	360	233.17	560	300.65	760	363.50		
-30	88.22	170	164.76	370	236.65	570	303.91	770	366.52		
-20	92.16	180	168.46	380	240.13	580	307.15	780	369.53		
-10	96.09	190	172.16	390	243.59	590	310.38	790	372.52		

Applications

- Measure high range Temperatures
- Rugged in construction hence can be used in harsh environments
- Measure duct temperatures
- Can measure a wide range of temperature with decent accuracy














2D – Model



Component Datasheet

Where to Buy

Click here to view more results for PT100 (https://analytics.oemsecrets.com/main.php?utm_campaign=article&utm_source=components101&utm_content=header&utm_medium=cc&event_link=https%3A%2F%2Fwww.o

	Distributor	Part Number	Stock	
	Distrelec	PT100 C RIMP RING 4.3 MM more	16	Buy Now (https://analytics.oemsecrets.com/main.php?p=PT100%20CRIMP%20RING%204
	RS	PT100M FOMP more	10425	Buy Now (https://
	Farnell	PT100M FOMP1 more	15306	Buy Now (https://analytics.oemsecrets.com/main.php?p=
	Mouser Electronics	PT100K N16 more	36	Buy Now (https://analytics.oemsecrets.com/main.php?p=PT100KN16&m=KYOCERA%20AVX&q=36&n=I
	Avnet Europe	PT100M FOMP more	0	Buy Now (https://analytics.oemsecrets.com
	Future Electronics	PT100R-1550HM more	0	Buy Now (https://analytics.oemsecrets.com/
	Transfer Multisort Elektronik	PT100M FOMP1 more	1295	Buy Now (https://analytics.oemsecrets.com/main.php?p=PT
	RS Americas	PT-10-000-K more	54	Buy Now (https://analytics.oemsecrets.com/n
	Rapid Electronics	PT+100 21A more	5	Buy Now (https://analytics.oemse
	Newark Electronics	PT100M FOMP1 more	1391	Buy Now (https://analytics.oemsecrets.com/main
	element14	PT100 PROBE 3.0 X 50MM 1M LEAD more	9	Buy Now (https://analytics.oemsecrets.com/main.php?p=PT100%20PR
	Digi-Key Electronics	PT100S N16 more	35	
	Chip One Stop	PT-1001	50	Buy Now (https://analytics.oemsecrets.com/main.php?p=PT-`01&m=

Find and Compare Electronic Components & Parts


Get more part information including pricing, lead time and technical specs using [oemsecrets.com](https://www.oemsecrets.com?utm_source=components101&utm_campaign=article&utm_content=site) (https://www.oemsecrets.com?utm_source=components101&utm_campaign=article&utm_content=site) part search

Search Now

Upload BOM (https://analytics.oemsecrets.com/main.php?utm_campaign=article&utm_source=components101&utm_content=bor)

FEATURED FROM OEMSECRETS.COM

Farnell Extends Traco Power Range



Your first choice for the most demanding and critical applications, Traco Power's new industrial power supply range is now available at Farnell.

[Read More](https://analytics.oemsecrets.com/main.php?utm_campaign=farnell) (https://analytics.oemsecrets.com/main.php?utm_campaign=farnell)

Tags

- TEMPERATURE SENSOR (/TAGS/TEMPERATURE-SENSOR)
- RTD SENSOR (/TAGS/RTD-SENSOR)
- SENSORS (/TAGS/SENSORS)

Related Post

Metal Robot Arm Clamp / Gripper / Paw | ThinkRobotics.in With MG996R

Ad thinkrobotics.in

Electric Vehicle Conference

Ad EE Times

TP4056 1A Li-Ion Lithium Battery charging Module with Current Protection - Micro USB from ElectronicsComp.com

Ad ElectronicsComp.com

MSME Loans | Top

Ad SIDBI Export I

Privacy is Under Your Control

Ad Facebook®

Engineering Survey

Ad Embedded Survey

Engineering Articles

Ad Power Electronics News

Electrical Engi

Ad EDN

<https://components101.com/sensors/pt100-rtd-temperature-sensor>

5/10

Join 20K+ subscribers

We will never spam you.

* indicates required

Enter Your Email Address

Enter Your Name

Subscribe

Be a part of our ever growing community.



Nordic Thingy:53 IoT Prototyping Platform (<https://bit.ly/3XLAZuh>)

(<https://bit.ly/3XLAZuh>) Nordic Semiconductor presents the Nordic Thingy:53 rapid prototyping platform based on the nRF5340



Front-End Modules for IoT and Smart Energy (<https://bit.ly/3kPCTeE>)

(<https://bit.ly/3kPCTeE>) Skyworks' Front-End Modules for IoT and Smart Energy featuring SKY85716-11



Waterproof USB Type-C® Connectors (<https://bit.ly/3DI0o5S>)

Amphenol Communications Solutions connectors are tailored for emerging product designs

(<https://bit.ly/3DI0o5S>)



3M™ TwinAx High Speed Cable Solutions (<https://bit.ly/3XO4YI5>)

(<https://bit.ly/3XO4YI5>) 3M™ TwinAx High Speed Cable Solutions: Thin, low profile cable with extremely tight bend radii



Digi-Key Products, Tools, and Resources for Innovation (<https://bit.ly/3kMb9rj>)

Digi-Key enables your ideas with products, tools, and resources to fuel your innovation

(<https://bit.ly/3kMb9rj>)



AVR® DB Family of Microcontrollers (<https://bit.ly/3WLKBnp>)

(<https://bit.ly/3WLKBnp>) Microchip's AVR DB family of microcontrollers is designed for demanding analog applications



MKP Series Class X2 EMI/RFI Suppression Capacitors (<https://bit.ly/3kl7QkO>)

This makes it easier to implement noise suppression with an optimal footprint and low BOM cost.

(<https://bit.ly/3kl7QkO>)



AUTOMATE® Type A Mini-FAKRA Cable Assemblies (<https://bit.ly/3HjHtJx>)

(<https://bit.ly/3HjHtJx>) Amphenol RF's AUTOMATE Type A Mini-FAKRA quad-port jack is designed with a compact, modular housing

LATEST PRODUCTS



(/news/sex0nx-automotive-grade-standard-smd-rectifiers-delivers-high-current-ratings-of-up-to-4-a)

SEx0Nx - Automotive Grade Standard SMD Rectifiers Delivers High Current Ratings of up to 4 A (/news/sex0nx-automotive-grade-standard-smd-rectifiers-delivers-high-current-ratings-of-up-to-4-a)

February 24, 2023



(/news/new-stm32u5-microcontrollers-for-increased-performance-and-energy-efficiency-in-iot-applications)

New STM32U5 Microcontrollers for increased Performance and Energy Efficiency in IoT Applications (/news/new-stm32u5-microcontrollers-for-increased-performance-and-energy-efficiency-in-iot-applications)

February 22, 2023



(/news/defence-logistics-agency-dla-qualified-multilayer-ceramic-capacitors-from-kyocera)

Defence Logistics Agency (DLA) Qualified Multilayer ceramic capacitors from Kyocera (/news/defence-logistics-agency-dla-qualified-multilayer-ceramic-capacitors-from-kyocera)

February 17, 2023

Components101 is a resource dedicated for electronics design engineers, covering product news, analysis and articles on latest electronics components.

IMPORTANT LINKS

- [Contact](#) (/contact)
- [Advertise](#) (/advertise)
- [Privacy Policy](#) (/privacy-policy)
- [Cookie Policy](#) (/cookie-policy)

POPULAR TAGS

- [Automotive](#) (https://components101.com/automotive-electronics)
- [IoT](#) (https://components101.com/iot-internet-of-things)
- [Audio](#) (https://components101.com/audio-electronics)
- [Medical](#) (https://components101.com/medical-electronics)
- [Industrial](#) (https://components101.com/industrial)

- **Wearable**
(<https://components101.com/wearables>)
- **Telecom/5G**
(<https://components101.com/telecom>)
- **Home Automation**
(<https://components101.com/home-automation>)
- **Electric vehicles**
(<https://components101.com/electric-vehicles>)
- **Artificial Intelligence**
(<https://components101.com/artificial-intelligence>)

Copyright 2021 © Components101. All rights reserved