



MasTec Limited

The Ingenious Devices and Smartworks Company

Unit 1 #7 Torrens Road : East Tamaki : Auckland 1701 : New Zealand

Phone 64 9 273 4200: Fax 64 9 273 9500 : Mobile 027 4906 168

Email info@mastec.co.nz : Web Site www.mastec.co.nz

Smart Works Systems Temperature Probe

Model # Probe SWST1

LM35DZ Probe Element Precision Centigrade Temperature Sensors

General Description

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of $\pm 1/4^\circ\text{C}$ at room temperature and $\pm 3/4^\circ\text{C}$ over a full -55 to $+150^\circ\text{C}$ temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only $60\ \mu\text{A}$ from its supply, it has very low self-heating, less than 0.1°C in still air. The LM35 is rated to operate over a -55 to $+150^\circ\text{C}$ temperature range, while the LM35C is rated for a -40 to $+110^\circ\text{C}$ range (-10° with improved accuracy).

Features

- Calibrated directly in $^\circ\text{C}$ Celsius (Centigrade)
- Linear $+10.0\ \text{mV}/^\circ\text{C}$ scale factor
- 0.5°C accuracy guaranteeable (at $+25^\circ\text{C}$)
- Rated for full -55 to $+150^\circ\text{C}$ range
- Suitable for remote applications
- Low cost due to wafer-level trimming
- Operates from 4 to 30 volts
- Less than $60\ \mu\text{A}$ current drain
- Low self-heating, 0.08°C in still air
- Nonlinearity only $\pm 14^\circ\text{C}$ typical
- Low impedance output, $0.1\ \text{W}$ for $1\ \text{mA}$ load

For full specs download <http://www.national.com/pf/LM/LM35.html>

Typical Applications

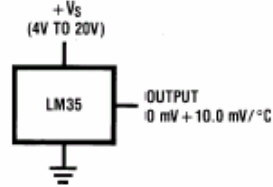


FIGURE 1.
Basic Centigrade Temperature Sensor
(+2°C to +150°C)

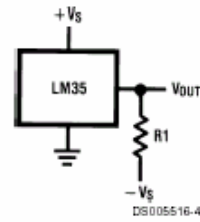


FIGURE 2.
Full-Range Centigrade Temperature Sensor
Choose $R1 = -V_S/50 \mu A$
 $V_{OUT} = +1,500 \text{ mV at } +150^\circ C$
 $= +250 \text{ mV at } +25^\circ C$
 $= -550 \text{ mV at } -55^\circ C$

Wiring:- Probe SWST1

| | |
|--------|---------------|
| Green | Ground |
| Red | +V Supply |
| Yellow | Output 10mV/V |

Typically these probes are easy to install using a 5VDC supply across red +ve and green Ground.

Our experience with calibration of these devices is that they are usable without calibration within the specs sheet.

By adding a ice point and a boiling distilled water point, the accuracy is enhanced greatly just with the $y=mx+b$ formula.

Typically we can get to +/- .1 degree for 0-100 degrees C.

For high accuracy we recommend a four point calibration and a polynomial correction.

SWS has been using this same probe for 10 years in its Window/Wall/Façade testing systems and has found that even after many years the probes remain in spec.

We do not recommend immersing the probe and cable in to liquid only ever immerse the thermowell.

The probe has a one year warranty from date of delivery.