

**SMARTEC ANTURISSAMME KAAPELI 1m, MONINAPALIITIN (3 -NAP)  
RASTERI 2.54mm, SOPII ESIM. PIIKKIRIMAAN TAI VASTAKAPPALEESEEN.  
TO-18 KOTELO, KUTISTESUKAN SISÄLLÄ. VIRRANKULUTUS < 250uA.  
KÄYTTÖJÄNNITE 5V.**

**HUOMAA, ETTÄ ANTURIA VOI KÄYTTÄÄ MYÖS ANALOGISEEN LÄMPÖ-  
TILOJEN MITTAUKSIIN.**

**KÄYTTÖJÄNNITE = RUSKEA JOHTO  
GND = VALKOINEN JOHTO  
DUTY CYCLE OUT = VIHREÄ**

### PRODUCT DESCRIPTION

The SMT160-30 is a three terminal integrated temperature sensor, with a duty-cycle output. Two terminals are used for the power supply of 5 Volts and the third terminal carries the output signal. A duty cycle modulated output is used because this output is interpretable by a microprocessor without A-D converter, while the analogue information is still available.

The SMT160-30 (TO18 model) has an overall accuracy of 0.7 °C in the range from -30 °C to +100 °C and an accuracy of 1.2 °C from -45 to +130 °C. This makes the sensor especially useful in all applications where "human" (climate control, food processing etc.) conditions are to be controlled. The CMOS output of the sensor can handle cable length up to 20 meters. This makes the SMT160-30 very useful in remote sensing and control applications.

## The SMARTEC temperature sensors

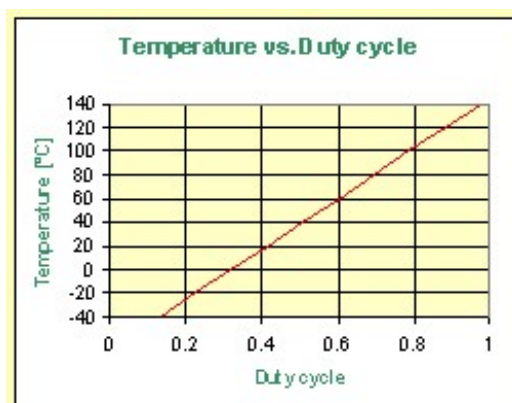
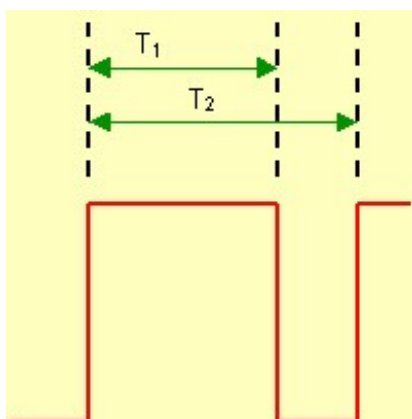
### FUNCTIONAL DESCRIPTION

The SMT160-30 is a three terminal integrated temperature sensor, with a duty cycle output. Two terminals are used for the power supply of 5 volt and the third terminal carries the output signal. This output is standard microcontroller compatible and can be connected directly to most processors.

By measuring both T1 and T2, the temperature can be easily computed from  $T1/T2 = 0.32 + 0.0047 * t$  (°C) (the diagram right).

If the output signal is measured with an analogue device, the temperature can be obtained as well. The mean voltage (and the RMS value as well) is directly proportional to the duty cycle and the supply voltage. So  $V_{out} / V_{dd}$  represents T1 / T2 just as well.

In this way the temperature can be measured in an analogue way as well as digitally equally simple and accurate.



## The SMARTEC temperature sensors

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### Most Important Features

- Absolute accuracy  $.7\text{ }^{\circ}\text{C}$
- Linear output within  $.2\text{ }^{\circ}\text{C}$
- Output fully digital interpretable
- Output fully analogue interpretable
- Calibrated on chip.
- TTL, CMOS compatible
- Temperature range  $175\text{ }^{\circ}\text{C}$  ( $-45$  to  $+130\text{ }^{\circ}\text{C}$ )
- Directly connectable to data input of micro processor
- Easy multiplexing when using more sensors to one micro processor
- Low power consumption
- No A-D converter necessary

### Typical Applications

- Heater systems
- Air conditioners
- Climatizing units
- Washing machines
- Home appliances
- Temperature compensation in intelligent systems