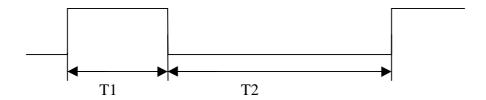TMP04 a second source for Smartec SMT16030 TO92.

Sometimes questions are received about a second source for the Smartec temperature sensor.
Please find below a brief overview of the replacement of the SMT16030 by TMP04.

From the specs of the TMP04:
$$T(C) = 235 - (400 * T1/T2)$$

Where: T1 is the up time of the output
       T2 is the down time of the output.

The Smartec sensor uses the duty cycle. The relation between the duty cycle and the temp (T in °C) is:

$$DC = .320 + 0.00470 * T$$

Calculation comparing to the spec of the TMP04 the above formula can be written as:

$$T = 212.8 * (T1/(T1+T2))$$

or in case a negative coefficient is needed:

$$T = 144.7 - 212.8 * (T2/(T1+T2))$$

So the changes in the software are both the constant values and the add of times to obtain the duty cycle. The figures on the right side of the decimal point will give an higher accuracy.

TMP04   accuracy 4 °C
SMT160-30 TO92   accuracy 2 °C

In case lower accuracy is needed the figures right of the decimal point can be neglected and the constants can be roundup to the nearest integer value.

Due to a lower power consumption of the Smartec device, the selfheating is lower so a higher accuracy is obtained.