Temperature Compensation

The M2006 as well as most available PIR sensors are temperature compensated to avoid any change in parameters with change in the environment temperature.
However, the passive infrared motion detection depends on the difference in temperature between the object and its environment. Theoretically, no detection would be possible if the object has the same temperature as the like it's background.
I practice, different surfaces emit different levels of infrared radiation. A simple example, nearly everybody has experienced, is the triggering of a sensor light by moving branches of a tree.
In general, the PIR detection of humans is most sensitive at low temperatures and becomes less sensitive towards 37 degree Celsius (body temperature). Above the body temperature, the sensitivity increases again.
The M2006C allows the adjustment of the threshold depending on the environment temperature. A temperature dependent voltage connected to the TCOMP input allows the threshold to be multiplied by a factors, which ranges from 1.875 (extreme low temperature) down to 0.5 (body temperature) and up to 0.75 (highest temperature). The sensitivity change is defined by the user, who defines the external resistor / NTC network.

Generation of a temperature dependent Voltage

The following table lists the influence on the comparator threshold as a function of the voltage on TCOMP. The voltage range and the characteristic allow for maximum flexibility, depending on the users preferences.
All voltages are related to VDD of the specific device, (generated by on chip voltage regulator). With a resistor network supplied from VDD, the actual value of VDD is eliminated from the equations.
The TCOMP factor is used, to multiply the threshold value, selected through the sensitivity inputs.

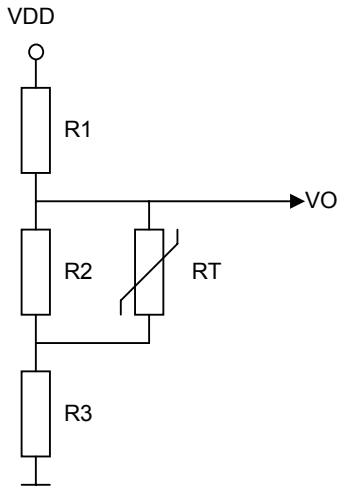
Example
The detector should trigger at PIR sensor output voltages above 160µV. From the threshold table, we select 16 (setting ZZ).

The temperature compensation should not change the threshold by more than a factor of 2 over the range from -10ºC to 70 ºC. The voltage on TCOMP should change from 24/128 * VDD to 19/128 * VDD

Settings DT1,DT0	Sensitivity units	Sensitivity µV
00	1	14
0Z	2	28
01	4	56
Z0	8	112
ZZ	16	224
Z1	32	448
10	64	896
1Z,11	128	1792

Pin voltage/ V_{DD}	TCOMP factor Correction	
<16/128	7/8	
17/128	6/8	
18/128	5/8	
19/128	4/8	VO2 (fixed)
20/128	4/8	
21/128	5/8	
22/128	6/8	
23/128	7/8	
24/128	8/8	VO1
25/128	9/8	
26/128	10/8	
27/128	11/8	
28/128	12/8	
29/128	13/8	
30/128	14/8	
>31/128	15/8	

TCOMP Network



R3 = (R2//RT2 * (1/VDD – 1/VO2) + R2//RT1 * (1/VO1 – 1/VDD)) / (1/VO2 – 1/VO1)

R1 = (VDD/VO2 - 1) * (R3 + R2//RT2)

RT1 = Resistor Value @ VO1
RT2 = Resistor Value @ VO2

Procedure:
Define Correction factor for threshold over the required temperature range.

Look up on table
VO1 = required voltage on TCOMP at low operating temperature
VO2 = required voltage on TCOMP at 37 Degree Celsius = VDD * 19.5/128

Use Diagram supplied with NTC
RT1 = resistor value at low operating temperature
RT2 = resistor value at 37 Degree Celsius

Choose R2.

Calculate R1 and R3.

Check, if equation solves.
If not, repeat with different R2.

Check, if total resistance is high enough, to avoid unnecessary power consumption.
If not repeat calculation with higher R2.