

HC109

SMD Humidity Sensors for Mass Applications

Typical Applications

automotive - air conditioning
 home appliances
 photocopy machines

Features

SMD mounting
 high reproducibility
 wettable
 very good long term stability
 small size construction

Technical Data

Sensor	HC109
Nominal capacitance C_0 (at 30°C / 86°F)	80 ± 12 pF
C_{76} (at 30°C / 86°F)	100.8 ± 15.1 pF
Response time t_{90}	< 6 sec.
Sensitivity	0.27 pF /% RH
Temperature dependence	$dC = -0.00095 \cdot RH \cdot (T-30^\circ C)$ [pF]
Working range	humidity: 0...100% RH temperature: -40...120°C (-40...248°F)
Linearity error (0...98% RH)	< ± 1.5% RH
Hysteresis	1.7 ± 0.15% RH
Long term stability at 20-30°C (68-86°F) / 20-80%RH	drift < 1.5 % / year
Loss tangent	< 0.05 typical
Maximum supply voltage (no DC voltage)	5V max (Upp)
Maximum DC voltage	< 5mV
Operating frequency	10...100 kHz, recommended 20kHz
Packaging	tray 101.6x101.6 mm (4x4") tape and reel
	not available refer to ordering guide

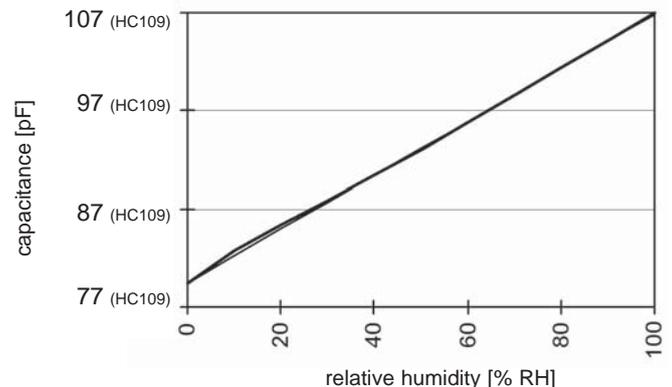
Characteristics

The average increase of capacitance over the working range is 27.5pF (HC109). For the range of 0–98% RH linear approximation is possible, errors will be lower than < ± 1.5% RH.

The sensor characteristic is determined by the following linear formula:

$$C(RH) = C_0 \cdot [1 + HC_0 \cdot RH]$$

with $HC_0 = 3420 \pm 191$ ppm /% RH



For high accuracy requirements, the sensitivity is determined by the following polynomial:

$$C(RH) = C_0 \cdot [1 + HC_0 \cdot RH + K(RH)]$$

whereby:

$$K(RH) = A_1 \cdot RH + A_2 \cdot RH^{1.5} + A_3 \cdot RH^2 + A_4 \cdot RH^{2.5}$$

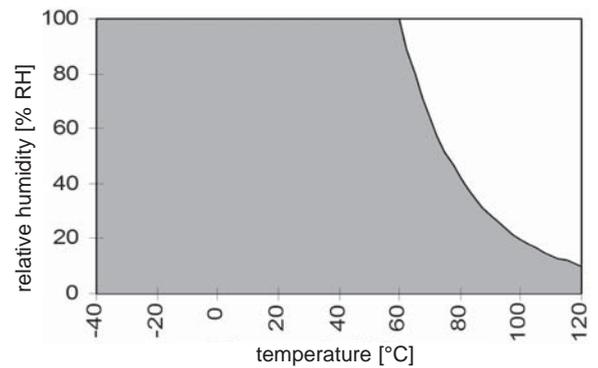
$A_1 = 2.6657E^{-3}$ $A_2 = -9.6134E^{-4}$
 $A_3 = 1.1272E^{-4}$ $A_4 = -4.3E^{-6}$

Working Range

The working range of the humidity sensors/HC109 is shown with regard to the humidity / temperature limits.

Although the sensors would not fail beyond the limits, the specification is guaranteed only within the working range.

In applications with high humidity at high temperatures the time factor shall be considered.

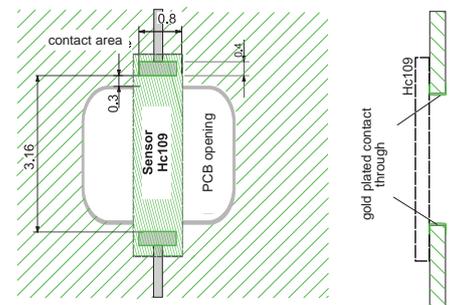
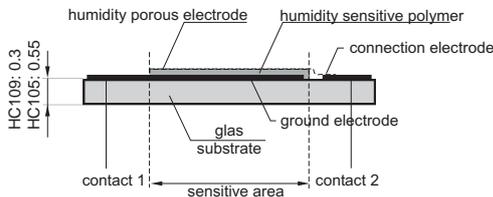


Dimensions (mm)

1 mm = 0.03937" / 1" = 25.4 mm

Mounting Instructions

HC109



To allow full access of the air, the humidity sensor should be positioned over an opening in the printed circuit board (PCB).

False readings because of humidity assimilation at the front side of the PCB should be avoided as much as possible by using gold-plated-through holes.

Assembling and Soldering

HC105/HC109 sensor series are designed for SMD automatic assembling with subsequent reflow-soldering.

Recommended SMD equipment:

- Automatic tooling machine with suction pipette
- Optical control for sensor identification

Ordering Guide

Order Example

TYPE	PACKAGING
capacitive humidity sensor 80 pF (109)	500 sensors per reel (TR0,5) 1000 sensors per reel (TR1) 2500 sensors per reel (TR2,5) 10000 sensors per reel (TR10)
HC	

HC109TR1

SMD humidity sensor

Type: HC109

Packaging: 1000 sensors per reel