E+E *YOUR PARTNER IN SENSOR TECHNOLOGY*

ELEKTRONIK®
Ges.m.b.H.

HC103/HC105

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

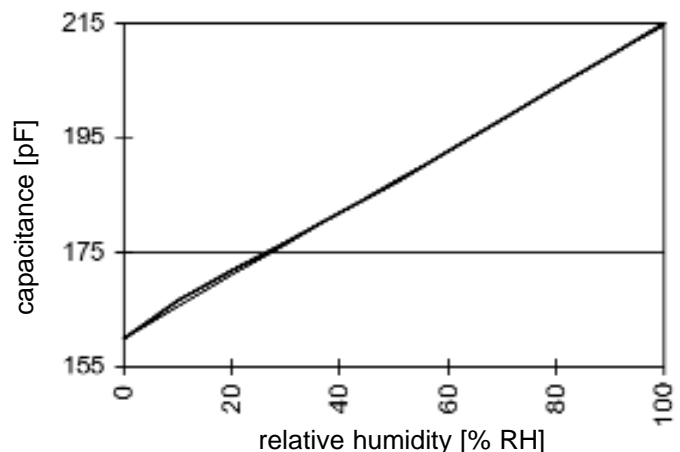| Sensor		HC103	HC105
Nominal capacitance	C_0 (at 30°C / 86°F)	160 ± 16 pF	160 ± 16 pF
	C_{76} (at 30°C / 86°F)	201.6 ± 20.3 pF	201.6 ± 20.3 pF
Response time t_{90}		< 6 sec.	
Sensitivity		0.55 pF /% RH	
Temperature dependence		dC = -0.0019*RH*(T-30°C) [pF]	
Working range	humidity	0...100% RH	
	temperature	-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)		5 V max (Upp)	
Maximum DC voltage		< 5 mV	
Operating frequency		10...100 kHz, recommended 20kHz	
Packaging	tray 101.6x101.6 mm (4x4")	240 sensors	420 sensors
	tape and reel	refer to ordering guide	refer to ordering guide

Characteristics

The average increase of capacitance over the working range is 55pF. 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:

$C(RH) = C_0 * [1 + HC_0 * RH]$
with $HC_0 = 3420 ± 191$ ppm /% RH

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

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

whereby:

$K(RH) = A_1*RH + A_2*RH^{1.5} + A_3*RH^2 + A_4*RH^{2.5}$
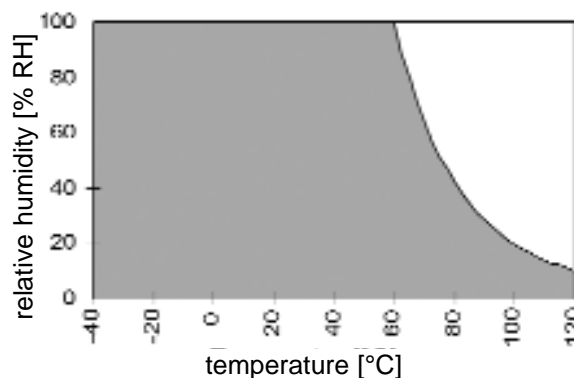$A_1 = 2.6657E^{-3}$ $A_2 = -9.6134E^{-4}$
$A_3 = 1.1272E^{-4}$ $A_4 = -4.3E^{-6}$

Working Range

The working range of the humidity sensors HC103/HC105 is shown with regard to the humidity / temperature limits.
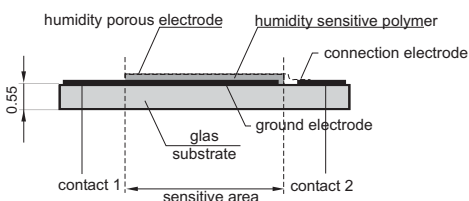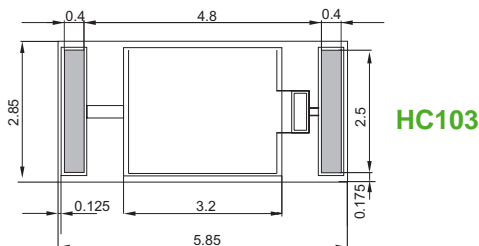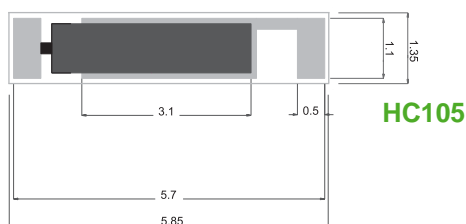
Although the sensors would not fail beyond the limits, the specification is guaranteed only within the working range.
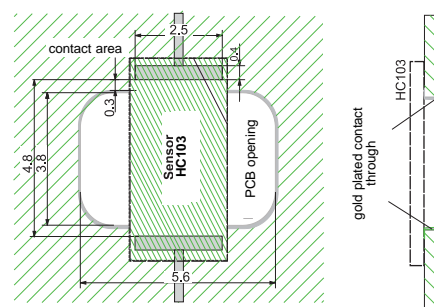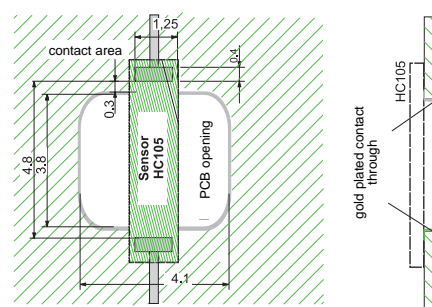In applications with high humidity at high temperatures the time factor shall be considered.

Dimensions (mm)

1 mm = 0.03937" / 1" = 25.4 mm

HC105

HC103

Mounting Instructions

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

HC103/HC105 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

TYPE	PACKAGING
capacitive humidity sensor 160 pF **(103)**	tray (HC103: 240 sensors, HC105: 420 sensors) **(no code)**
capacitive humidity sensor 160 pF **(105)**	500 sensors per reel **(TR0,5)**
	1000 sensors per reel **(TR1)**
	2500 sensors per reel **(TR2,5)**
	10000 sensors per reel **(TR10)**
HC-	

Order Example

HC-103TR1
SMD humidity sensor

Type: HC103
Packaging: 1000 sensors per reel

HC103/HC105