HC103M2 is a capacitive humidity sensor with very short response time even at very low temperature. By this, the sensor is ideal for accurate measurement in the upper atmosphere with radiosondes and weather balloons.

The sensor is manufactured in state of the art thin film technology and is appropriate for SMD assembly. The design and the choice of materials lead to excellent linearity, high sensitivity and reproducible temperature dependence, which facilitate considerably the design in.

HC103M2 is supplied on tape and reel appropriate for standard SMD assembly machines.

### Typical Applications
- **Radiosondes**
- **Weather observation**

### Features
- Very short response time
- High sensitivity and outstanding linearity
- Reproducible temperature dependence

### Technical Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal capacitance ( C_0 ) (at 30 °C / 86°F)</td>
<td>160 ± 40 pF</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>0.55 pF / %RH</td>
</tr>
<tr>
<td>Working range Humidity</td>
<td>0...100 %RH</td>
</tr>
<tr>
<td>Temperature</td>
<td>-80...60 °C (-112...140 °F)</td>
</tr>
<tr>
<td>Linearity error (0...98 %RH)</td>
<td>&lt; ±2 %RH</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>1.9 ± 0.25 %RH</td>
</tr>
<tr>
<td>Response time RH ( t_{63} )</td>
<td></td>
</tr>
</tbody>
</table>

Temperature dependence

\[
dC = -0.0019 \cdot RH \cdot (T-30 °C) \ [\text{pF}]
\]

Loss tangent: < 0.05

Maximum supply voltage: 5 V max \( (V_{PP}) \)

Maximum DC voltage: < 5 mV

Operating frequency: 10...100 kHz, recommended 20 kHz

1) more details for \( t < -20 °C \) (68 °F) on request

### Sensor Characteristic

The average capacitance increases over the working range is around 55 pF.

The following linear approximation of the characteristic over the range 0–98 %RH leads to errors lower than < ±2 %RH.

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

with \( HC_0 = 3420 \pm 250 \text{ ppm } /\% \text{ RH} \)
For high accuracy requirements, the characteristic is described by the following polynomial:

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

whereby:

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

\[
A_1 = 2.6657 \times 10^{-3} \\
A_2 = -9.6134 \times 10^{-4} \\
A_3 = 1.1272 \times 10^{-4} \\
A_4 = -4.3 \times 10^{-6}
\]

**Mounting Instructions**

For shortest response time, in case of mounting onto a printed circuit board (PCB), HC103M2 shall be positioned over an opening to allow enough air circulation around the sensor. For best accuracy it is important to avoid moisture accumulation such as at the edge of the PCB by selecting appropriate board material or gold-plating the edge of the opening.

Please refer to the HC103M2 Handling Instructions at www.epluse.com/hc103m2.

**Assembling and Soldering**

HC103M2 is an SMD (surface mounted device) sensor, appropriate for automatic assembling with subsequent reflow soldering. Please refer to the Handling Instructions at www.epluse.com/hc103m2.

**Ordering Guide**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>TAPE AND REEL PACKAGING</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC103M2</td>
<td>TR0,5</td>
</tr>
<tr>
<td></td>
<td>500 sensors</td>
</tr>
<tr>
<td></td>
<td>TR1</td>
</tr>
<tr>
<td></td>
<td>1000 sensors</td>
</tr>
<tr>
<td></td>
<td>TR2,5</td>
</tr>
<tr>
<td></td>
<td>2500 sensors</td>
</tr>
</tbody>
</table>

**Order Example**

HC103M2-TR1

- Type: HC103M2
- Packaging: 1000 sensors