ChipCap

The Fully Calibrated Humidity and Temperature Solution
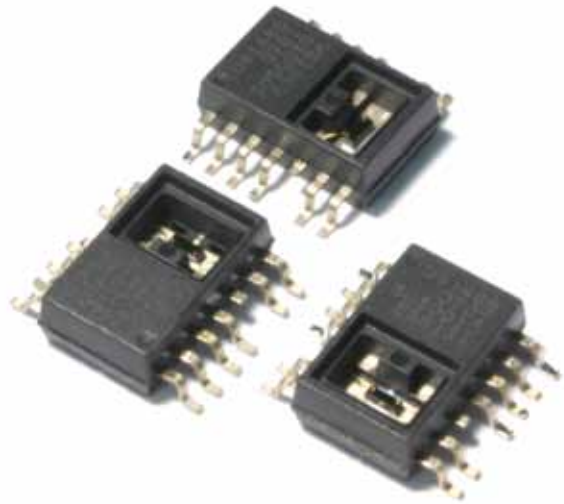
Features

- Simultaneous relative humidity and temperature outputs

- Precision accuracy ±2% RH, ±0.6°C

- Resolution 0.4% RH

- Factory selectable analog or digital outputs

- Output configurations available:
  Voltage 0V to 1V
  10 to 90% of VDD
  ZACwire™ digital output (8-bit humidity)

- Factory calibrated, ready to use

- Designed for automated assembly

- Supply voltage: 3.0V to 5.5V

- Low quiescent current: 0.5mA@5V, 25°C

- SOP 14 package

Applications

- HVAC Controls
  — Humidistats
  — Enthalpy control
  — Indoor air quality (IAQ)
  — Humidifiers
  — Dehumidifiers

- Instrumentation
  — Portable instruments
  — Data loggers and recorders
  — Weather stations

- Medical
  — Nebulizers
  — Oxygen air
  — CPAP/Sleep apnea devices

- Automotive
  — Cabin climate control
  — Defrost control

- Appliances and white goods

- OEM assemblies available

ChipCap—The Fully Calibrated Humidity and Temperature Sensor

The ChipCap series humidity sensor by GE offers a new standard in the field of accurate relative humidity measurement. Based on a capacitive polymer sensing technology, this device offers signal conditioning and temperature compensation for a single SoC (Systemon-Chip) solution. The device is very simple to use, fully tested and calibrated for accuracy on delivery—no further calibration is needed. ChipCap can be incorporated into an assembly or finished sensor to meet customer specifications. The measurement is accurate to ±2% from 20% to 80% RH and ±3% across the entire humidity range. Long term stability is excellent. The temperature accuracy is ±1°C from 0°C to +70°C. Dual outputs provide humidity and temperature as 0V to 1V, or 0.5V to 4.5V ratiometric or available with digital output (the ZACwire one-wire interface).

Accurate, Repeatable Humidity and Temperature Measurement

ChipCap provides either analog or digital interfaces on a single, 5VDC-powered chip. The package is highly resistant to chemical vapors and other contaminants. ChipCap sensors are precalibrated and offer high interchangeability. They also fully recover from condensing environments and may be used across a wide range of both temperature and relative humidity ranges.

ChipCap relative humidity sensors change capacitance in direct proportion to ambient relative humidity. An internal solid-state band gap provides temperature measurement. This integral design reduces overall cost and complexity and improves reliability.
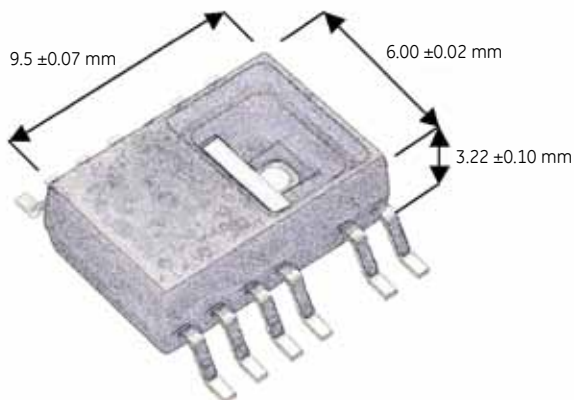
Small, Integrated Package for Automated Assembly

ChipCap contains the entire signal conditioning circuitry on a single silicon die. The sensor and circuitry are integrated into a small footprint SoC to save board real estate. ChipCap is shipped in tube packaging for automated insertion on surface mount technology (SMT) circuit boards. Tape and reel packaging is available upon request for high volume applications.

Digital Interface

Analog Interface

9.5 ±0.07 mm

6.00 ±0.02 mm

3.22 ±0.10 mm
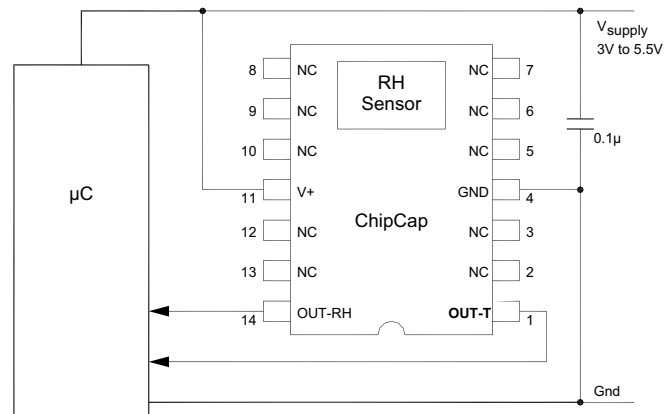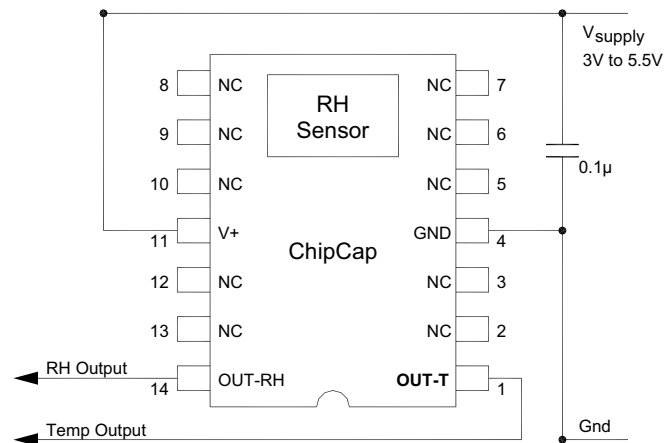
Linear mode:
%RH = Vout * 100
Tc = Vout * 200 -50

Ratiometric mode:
%RH = ((Vout - (0.1 * Vsupply))/(0.8 * Vsupply)) * 100
Tc = ((Vout - (0.1 * Vsupply))/(0.8 * Vsupply)) * 200 - 50

ChipCap Specifications

Relative Humidity

RH Sensor
Planar Capacitive Polymer

RH Range
0 to 100% RH

RH Accuracy @ 25°C
±2% from 20% to 80%
±3% from 0% to 20% and 80% to 100%

RH Resolution
0.4% RH

Temperature

Temperature Sensor
Integral band gap PTAT

Temperature Scale
-50°C to 150°C

Temperature Accuracy
±0.6°C at 25°C (see graph below)

Temperature Resolution
0.2°C

Power Supply

Reverse Polarity Protection
12.5 VDC, 100µA (15VDC, 60s)

Voltage Supply
3 to 5.5 VDC

Current Supply
500 microamps @ 5 VDC, 25°C

Outputs

RH Voltage Output (Ratiometric)
$Vout = (Vsupply/5)(0.5+(.04*RH))$; 0.5 to 4.5V ratiometric;
5VDC nom.

RH Voltage Output (Linear, 0-1V)
$Vout = 0.01(RH)$

RH Digital Output
Manchester 8-bit encoded
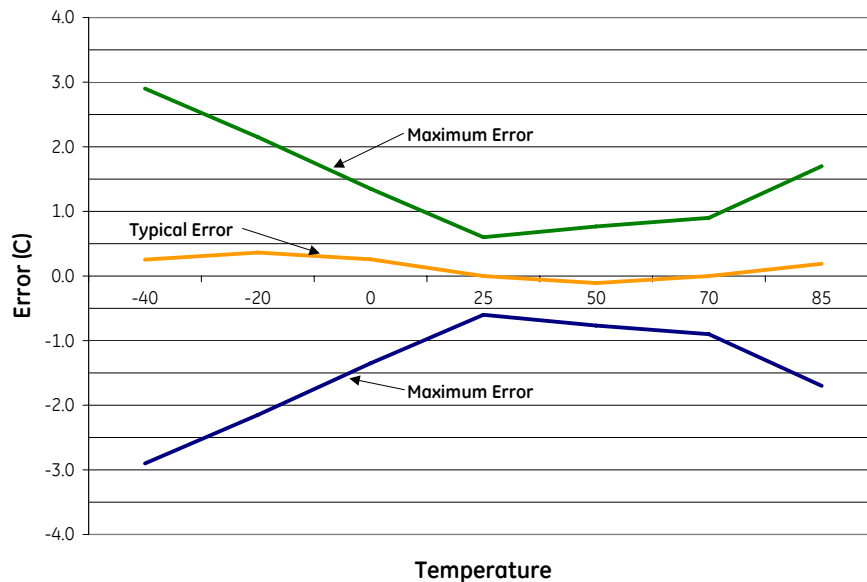
Temperature Voltage Output (Ratiometric)
$Vout = (Vsupply/5)(1.5 + (.02*T°C))$; 0.5 to 4.5V
ratiometric; 5VDC nom.

Temperature Voltage Output (Linear)
$Vout = (0.005T °C) +0.25$

Temperature Digital Output
Manchester 10-bit encoded

Environmental

Operating Temperature Range
-40°C to 85°C

Operating RH Range
0 to 100 % RH, non-condensing

Packaging

Packaging
SOP-14, SMD

Soldering
The ChipCap can be soldered using standard reflow ovens (including lead free soldering) at a maximum of 260°C for 30 seconds.

Pin Connection
4 Pin; +V, Gnd, RHout, Tout

Absolute Maximum Ratings					
Symbol	Parameter	Min.	Max.	Units	Notes
Vdd	DC Supply Voltage	-0.3	6	V	
Vio	Voltage at all Analog and Digital I/O pins	-0.3	Vdd + 0.3	V	
Ta	Ambient Temperature (operation)	-50 -40	150 85	°C °C	ASIC RH Sensor
Tstrg	Storage Temperature	-55	150	°C	
Tj	Junction Temperature	-55	160	°C	

Recommended Operation Conditions						
Symbol	Parameter	Min.	Type	Max.	Units	Notes
Vdd	Analog DC Supply	3	5	5.5	V	
Idd	Supply Current		550		µA	25°C
Vss	Analog Ground		0.0		V	
To	Ambient Temperature	-40	27	85	°C	
Cvdd	External Capacitance between Vdd and Vss	100	220	470	nF	
C_{LD}	Digital Output Load (only capacitive, no resistive)			100	pF	
C_{LA}	Analog Output Load Capaictance			5	nF	
R_{LA}	Analog Output Load Resistance	5			KΩ	

Compliance
CE and RoHs

Ordering Information

ChipCap is available in 3 output options and sold in tubes of 50 sensors.

- Part no CHIPCAP-L-50-TUBE

  50 X ChipCap RH and Temperature Sensor, 0-1VDC Linear Output

- Part no CHIPCAP-R-50-TUBE

  50 X Ratiometric Output (5VDC Nominal)

- Part no CHIPCAP-D-50-TUBE

  50 X ChipCap RH and Temperature Sensor, Digital Output

Sample Size Quantities

5 sensor sample packs.

Part no. CHIPCAP-S-D_TUBE
Part no. CHIPCAP-S-R_TUBE
Part no. CHIPCAP-S-L_TUBE

www.gesensinginspection.com

920-426D