MEASUREMENT FREQUENCY INFLUENCE

In this data sheet, all capacitance measurements are done @ 10 kHz / 1Volt. However, the sensor can operate without restriction from 5 kHz to 300 kHz

POLARISATION

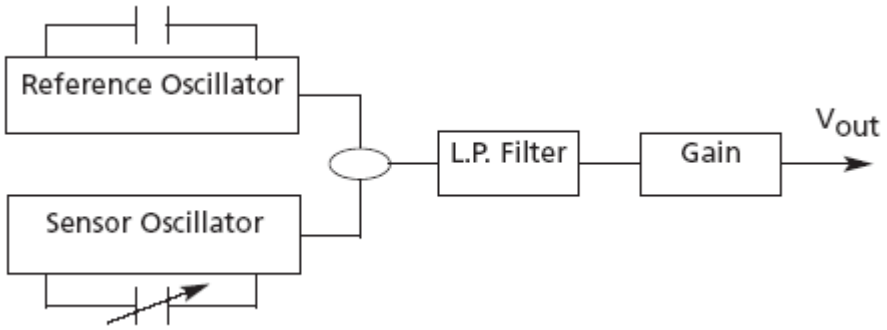
In order to get a better reproducibility during measurements, always connect the case of the header (pin 2) to the ground of the circuit. The case of the header is located on the opposite side of the tab.

SOLDERING INSTRUCTIONS

We recommend taking specific attention to soldering conditions to get the best performance of MEAS-France sensors. See Application Note. To get it, please contact: humidity.application@te.com.

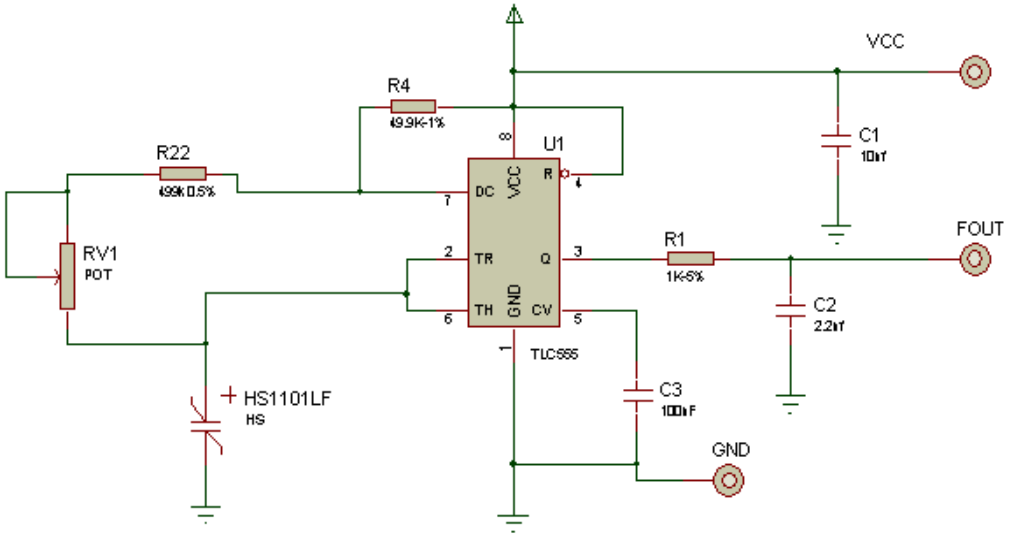
PROPORTIONAL VOLTAGE OUTPUT CIRCUIT

BLOCK DIAGRAM



FREQUENCY OUTPUT CIRCUIT

CIRCUIT



Note: R22=499kΩ / R4=49.9kΩ / R1=1 kΩ / RV1=50 kΩ potentiometer / C1=10nF / C2=2.2nF / C3=100nF

This circuit is the typical astable design for 555. The HS1101LF, used as variable capacitor, is connected to the TRIG and THRES pin. Pin 7 is used as a short circuit pin for resistor R4.
The HS1101LF equivalent capacitor is charged through R22 and R4 to the threshold voltage (approximately 0.67Vcc) and discharged through R22 only to the trigger level (approximately 0.33Vcc) since R4 is shorten to ground by pin 7.
Since the charge and discharge of the sensor run through different resistors, R22 and R4, the duty cycle is determined by:

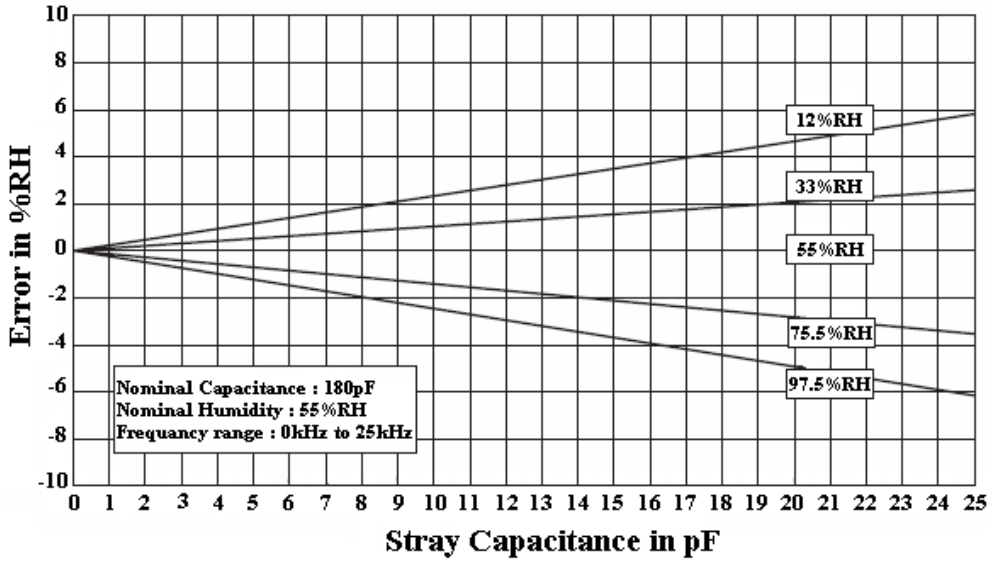
- **thigh = C@%RH*(R22+R4)*ln2**
- **tlow= C@%RH*R22*ln2**
- **F = 1/(thigh+tlow) = 1/(C@%RH*(R4+2*R22)*ln2)**
- **Output duty cycle = thigh*F = R22/(R4+2*R22)**

To provide an output duty cycle close to 50%, R4 should be very low compared to R22 but never under a minimum value. Resistor R3 is a short circuit protection. 555 must be a CMOS version

TYPICAL RESPONSE LOOK-UP TABLE

RH (%)	**0**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**
Fout (Hz)	-	-	7155	7080	7010	6945	6880	6820	6760	6705	6650
RH (%)	**55**	**60**	**65**	**70**	**75**	**80**	**85**	**90**	**95**	**100**	
Fout (Hz)	6600	6550	6500	6450	6400	6355	6305	6260	6210	-	

MEASUREMENT ERROR VS STRAY CAPACITANCE



- Special attention is required in order to minimize stray capacitance in the layout. The added capacitance will act as a parallel capacitance with the sensor and create a measurement error.
- A careful coating of PCB and components must be implemented to prevent unexpected deviations of Fout in high humidity conditions.