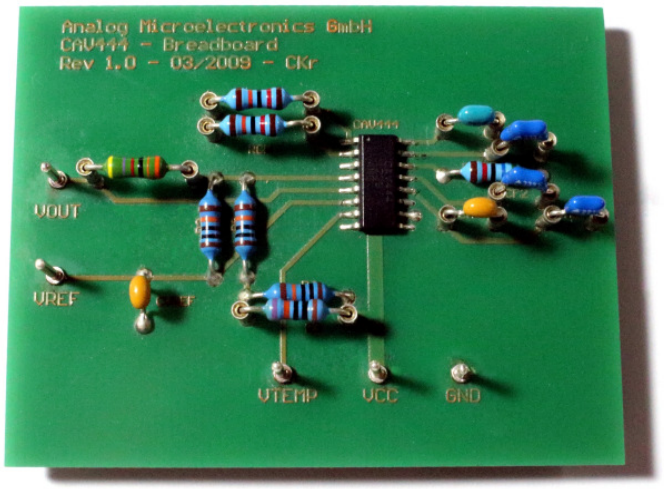
BBCAV444
Breadboard for linear C/V-converter IC CAV444

User Guide

Breadboard CAV444



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INTRODUCTION

BBCAV444 enables quick and easy operation of the IC CAV444, which is useful for all measurements designed to convert a capacitive input signal into a voltage that is proportional to the value of the connected capacitance.

BBCAV444 is designed to investigate the CAV444 (integrated capacitance-to-voltage converter with linear transfer function) with ceramic capacitors mounted on sockets on the PCB, but it can also be used for the readout of capacitive sensor heads to study complete sensor systems.

The BBCAV444 is pre-assembled with exchangeable components dimensioned for a measurement range from 22 pF up to 220 pF. The user can easily adapt the capacitive measurement range by exchanging a few external components. The dimensioning of these components can be done with the Excel-Sheet Kali_CAV444.

SCHEMATIC OF BBCAV444

The schematic realized on BBCAV444 is shown in *Figure 1*. The measurement capacitance value C_M is evaluated by CAV444, which generates an amplified DC-output voltage V_{OUT}. This output voltage V_{OUT} can be measured versus GND or as a differential output voltage $V_{DIFF} = V_{OUT} - V_{REF}$. V_{DIFF} is strictly proportional to the value of C_M. The gain and offset of the output stage can be adjusted by the trimming resistors R_1 and R_3.

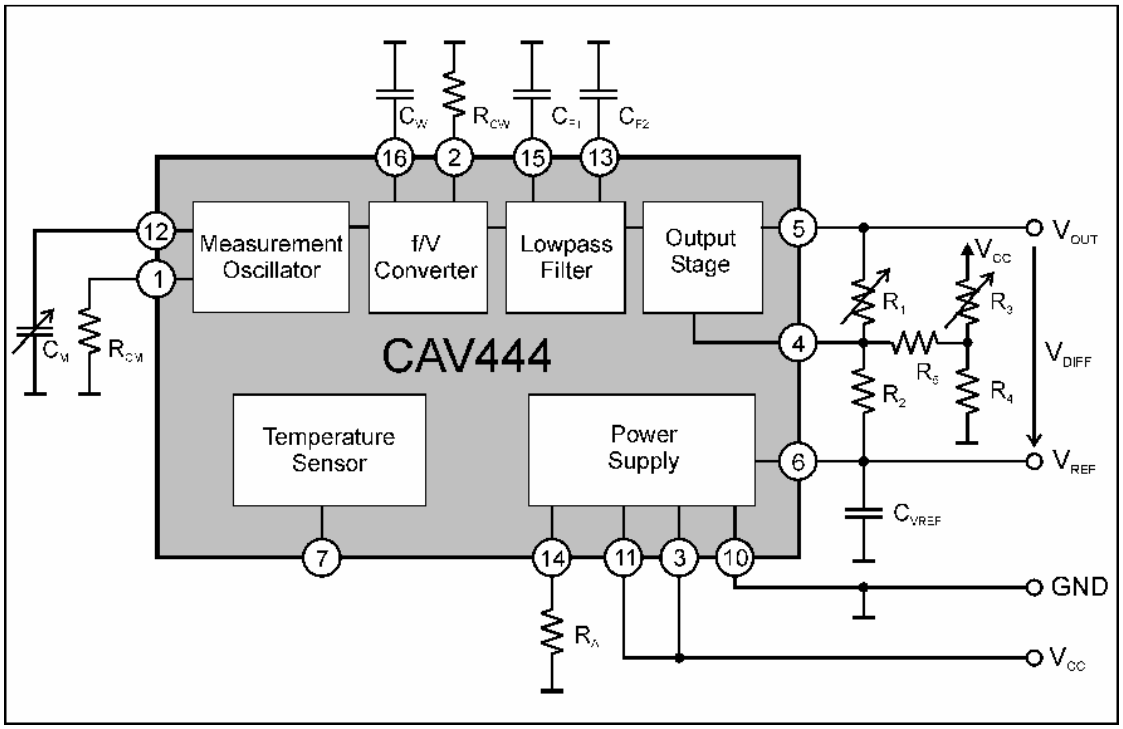

Figure 1: **Schematic of BBCAV444**

LAYOUT

The layout of the BBCAV444 is illustrated in *Figure 2*. The measurement capacitor is realized by a parallel connection of CM and CM2. Therewith the user has the possibility to combine different fixed capacitors to get values different to the E-series.

Instead of fixed capacitors the user can connect a capacitive measurement head to CM's socket to create a capacitive senor system.

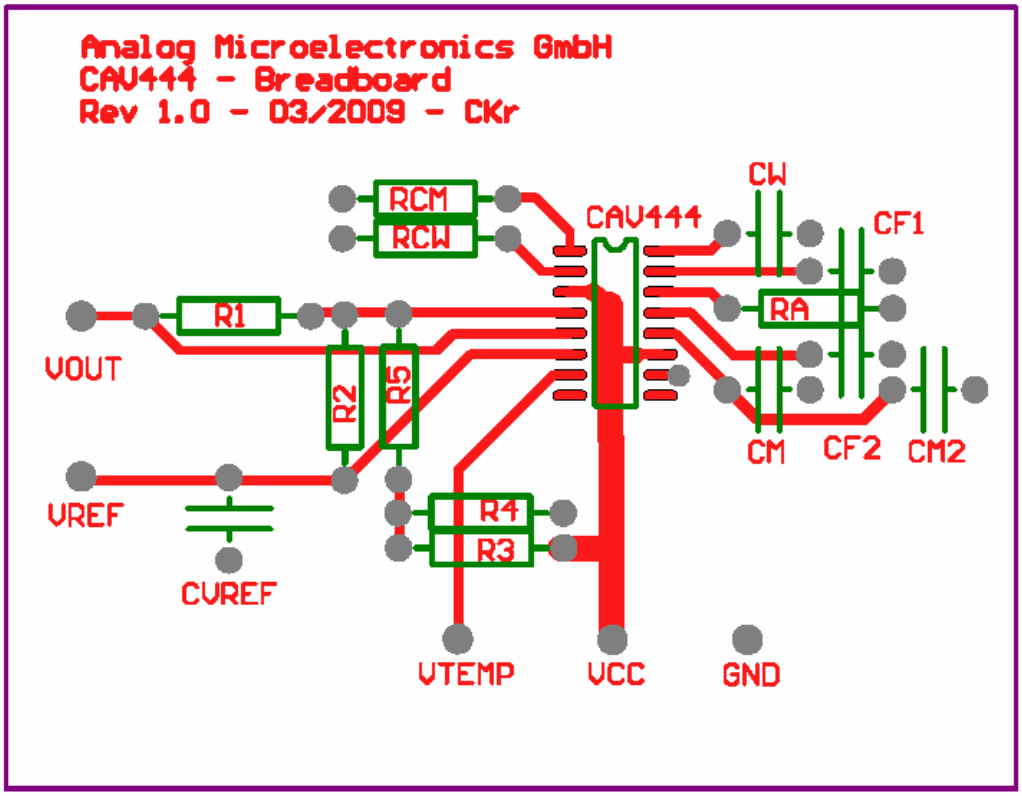

***Figure 2*: Layout of BBCAV444**

DIMENSIONING

Component	Symbol	Value	Description
Measurement Capacitor	C_M	22 pF	Ceramic capacitor, 5% Tol., NP0
Measurement Capacitor 2	C_{M2}	220 pF	Ceramic capacitor, 5% Tol., NP0
Converter Capacitor	C_W	330 pF	Ceramic capacitor, 5% Tol., NP0
Oscillator Current Resistor	R_{CM}	120 K	Metal film resistor, 1% Tol., TK 50
Converter Current Resistor	R_{CW}	120 K	Metal film resistor, 1% Tol., TK 50
f/V-Biasing Resistor	R_A	56 K	Metal film resistor, 1% Tol., TK 50
LP-Filter Capacitor 1	C_{F1}	33 nF	Ceramic capacitor, 10% Tol., X7R
LP-Filter Capacitor 2	C_{F2}	33 nF	Ceramic capacitor, 10% Tol., X7R
Resistor	R_2	100 K	Metal film resistor, 1% Tol., TK 50
Resistor	R_4	100 K	Metal film resistor, 1% Tol., TK 50
Resistor	R_5	100 K	Metal film resistor, 1% Tol., TK 50
Trimming Resistor Gain	$R_{1(meas)}$	33 K	Metal film resistor, 0.1% Tol., TK 25
Trimming Resistor Offset	$R_{3(meas)}$	100 K	Metal film resistor, 0.1% Tol., TK 25
C_{VREF}	C_{VREF}	100 nF	Ceramic capacitor, 10% Tol., X7R
IC1	IC1	CAV444	CAV444, SO16 package

Table 1: **Dimensioning BBCAV444 (factory preset)**

Notes:

1) The listed values for the trimming resistors R_1 and R_3 are the initial values at the beginning of the trimming process (see the description of the Excel-Sheet Kali_CAV444.xls). During the trimming procedure (calibration procedure) they have to be substituted by the individual calculated values.
2) The measurement capacitor is realized by a parallel connection of CM and CM2

ORDERING CODE

Ordering Code	Description
BBCAV444	Breadboard CAV444