



# Acuity Series AC3031 20 to 500 mbar Low Pressure Sensor Die with in-line metal

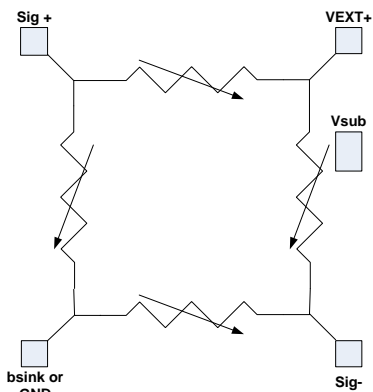
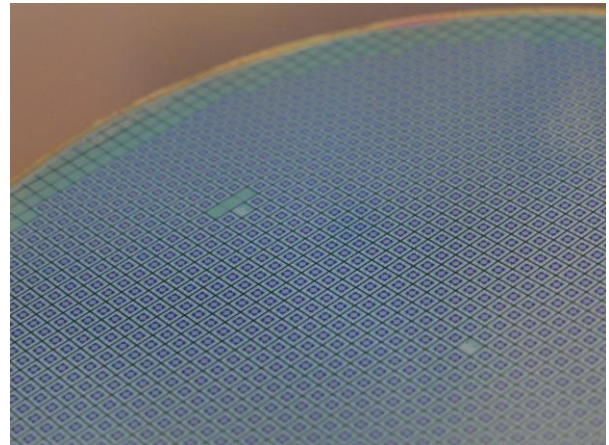
Acuity Incorporated  
Fremont, California  
USA 94539

The AC3031 pressure die is a special metal layout of the AC3030 low-pressure die. It features a closed bridge configuration with all wirebond pads along one edge. This facilitates direct wirebonding from the sensor to signal processing ASICs.

The AC3030 series die has been designed to replace existing low-pressure die with a much smaller foot-print, and improved zero-stability, reduced g-sensitivity and reduced sensitivity to humidity.

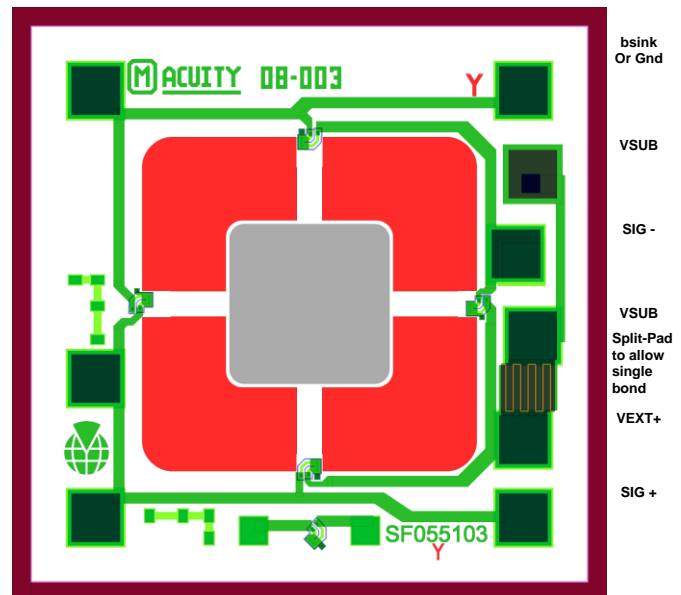
Based on the same basic structure and sensing element as the lower pressure AC3050 series, the AC3031 is a small (1.6 mm square) die that was originally optimized for 20 mbar to 100 mbar full-scale. The AC3031 can be driven to higher pressures with good performance, or further amplified for lower pressure sensitivity.

Suitable for a wide range of packages, it is particularly designed for low-pressure differential sensing in such applications as HVAC, air-flow, and a variety of industrial pressure and flow applications.



**Equivalent Circuit Diagram**

*For maximum performance, VSub (Pad 8) should be tied to the highest voltage in the circuit.*



**Pin-out of Acuity AC3031  
Low-Pressure Die**

+ Sig increases and -Sig decreases  
when pressure is applied to the top of the die



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| Specification                 |   | Acuity Low Pressure Sensor - AC3031 |         |       |                             | Note |
|-------------------------------|---|-------------------------------------|---------|-------|-----------------------------|------|
|                               |   | Min                                 | Nominal | Max   | Unit                        |      |
| <b>Mechanical</b>             |   |                                     |         |       |                             |      |
| Stepping size                 | X | 1.599                               | 1.600   | 1.601 | mm                          |      |
|                               | Y | 1.599                               | 1.600   | 1.601 | mm                          |      |
| Unconstrained wafer thickness | Z | 0.401                               | 0.406   | 0.411 | mm                          |      |
| <b>Electrical</b>             |   |                                     |         |       |                             |      |
| <b>Resistance</b>             |   |                                     |         |       |                             |      |
| Bridge resistance - 3.5k      |   | 3.25                                | 3.70    | 4.25  | kohms                       | 1    |
| TCR                           |   | 2300                                | 2800    | 3100  | ppm/degree C                | 2    |
| Resistance Ratiometricity     |   | -1.0                                | 0.1     | 1.0   | %                           | 3    |
| <b>Offset</b>                 |   |                                     |         |       |                             |      |
| Offset - No Pressure          |   | -100.0                              | 0.0     | 25.0  | mV                          | 1    |
| Offset Ratiometricity         |   | -0.2                                | 0       | 0.2   | mV/V                        | 3    |
| TCO                           |   | -25                                 | 2       | 25    | microV/V/degree C           | 2    |
| <b>Leakage</b>                |   |                                     |         |       |                             |      |
| Current Leakage - individual  |   | 0.1                                 | 1.2     | 20    | nA                          | 4    |
| <b>Sensitivity</b>            |   |                                     |         |       |                             |      |
| Span                          |   | 30                                  | 55      | 82    | mV for 20, 50, and 100 mBar | 5    |
|                               |   | 105                                 | 150     | 200   | mV for 200 and 500 mBar     | 5    |
| TCS                           |   | -2100                               | -1800   | -1400 | ppm/degree C                | 2    |
| Pressure Nonlinearity         |   | -0.75                               | 0.15    | 0.75  | %                           | 6    |
| Pressure Nonlinearity - F/B   |   | -1.25                               | 0.15    | 1.25  | %                           | 7    |
| <b>Mechanical Pressure</b>    |   |                                     |         |       |                             |      |
| Full Scale Pressure Ranges    |   | 20, 50, 100, 200, and 500           |         |       | mBar                        | 8    |
| Overpressure - Burst          |   | >15X                                |         |       | FS Pressure                 | 9    |
| Overpressure - Proof          |   | >5X                                 |         |       | FS Pressure                 | 9    |

**Note**

- 1 Measured at 5.0 volts
- 2 Measured at +25 and +70 °C, normalized by reading at 25 °C
- 3 Measured at -2.5 and 5.0 Volts, normalized by reading at 5.0 volts
- 4 Measured from VSub substrate contact to any Resistor Pad at 10 V
- 5 Full scale output at 5 Volt drive and rated pressure
- 6 1/2 TBNL (Terminal Base Nonlinearity at 0, 50%, and 100% FS) with topside pressure
- 7 Ratio of sensitivity with +FS and - FS pressures applied
- 8 For custom pressure ranges, consult Acuity.
- 9 For 200 and 500 mBar, Burst Pressure is >5X and Proof Pressure is >3X

**Ordering Information:**

**AC3031-XXX**

where XXX = 020 for 20 mBar,  
= 050 for 50 mBar,  
= 100 for 100 mBar,  
= 200 for 200 mBar, and  
= 500 for 500 mBar

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