

KD4400AP

Absolute Pressure Sensor, 20 to 400 kPa

The KD4400AP is a monolithic piezoresistive absolute pressure sensor from k-data (www.k-data.org) with on-chip signal conditioning, temperature compensation and calibration. It measures 20 to 400 kPa (2.9 to 58 psi) and delivers a ratiometric 0.2 to 4.8 V output at a 5.0 V supply, in a ported unibody package with two mounting holes.



KD4400AP, ported unibody package, front view

Parameter	Value
Pressure range	20 to 400 kPa (2.9 to 58 psi), absolute
Output	0.2 to 4.8 V, ratiometric to supply
Supply voltage	5.0 V (4.64 to 5.36 V)
Accuracy	±1.5 % VFSS maximum, 0 to 85 °C
Sensitivity	12.1 mV/kPa
Response time	1.0 ms typical
Temperature compensation	Compensated over -40 to +125 °C; accuracy specified 0 to 85 °C
Package	Ported unibody, axial port, 6 pins, 2 mounting holes
Marking	KD4400AP

Features and typical applications

Features

- 1.5 % maximum error over 0 °C to 85 °C
- Temperature compensated over -40 °C to +125 °C
- On-chip signal conditioning: 0.2 V at 20 kPa to 4.8 V at 400 kPa
- Ratiometric output within the specified supply range
- Temperature error factor of only 1.75 at +125 °C
- Durable epoxy unibody element with pressure port and two mounting holes
- Well suited to microcontroller and microprocessor systems with A/D inputs

Typical applications

- Manifold absolute pressure (MAP) and turbo boost sensing in engine control
- Industrial controls
- Microprocessor- or microcontroller-based measurement systems

Ordering information and pin assignment

The KD4400AP is offered in one package variant: the ported unibody with axial pressure port.

Device type	Options	Package	Order number	Device marking
Ported element	Absolute, axial port	Unibody, 6 pins, 2 mounting holes	KD4400AP	KD4400AP

Pin	Name	Function
1	VOUT	Analog output, ratiometric to VS
2	GND	Ground
3	VS	Supply voltage, 5.0 V
4	N/C	Internal device connection (see note 2)
5	N/C	Internal device connection (see note 2)
6	N/C	Internal device connection (see note 2)

1. Pin 1 is marked by the notch in the lead. With the label facing you and the port pointing up, pin 1 is the left-most lead.
2. Pins 4, 5 and 6 are internal device connections. Do not connect them to external circuitry or ground.

Block diagram

Sensing element and two on-chip stages deliver VOUT

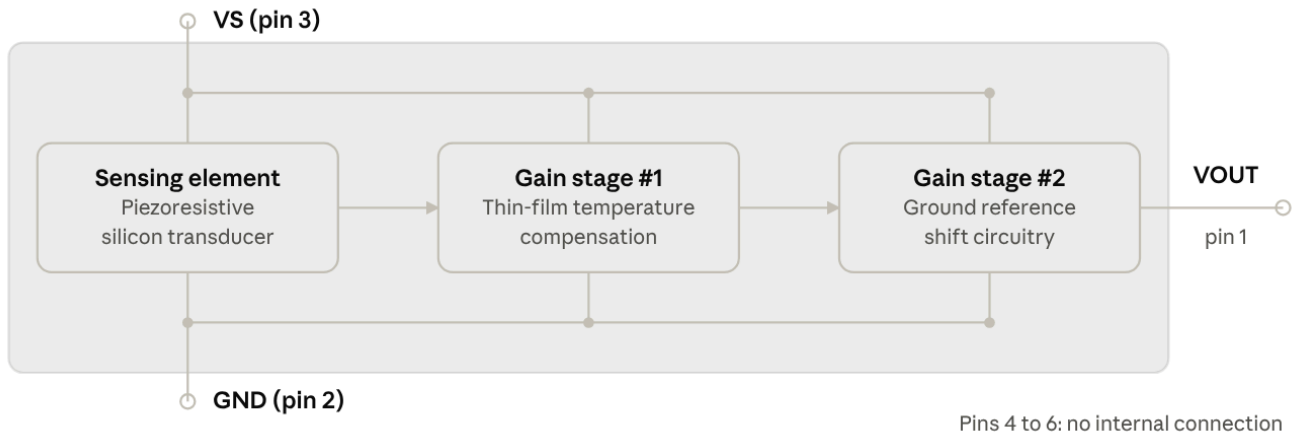


Figure 1 · Block diagram of the integrated sensor

The sensing element, the thin-film temperature compensation and both gain stages sit on one monolithic silicon die. Only VS, GND and VOUT are connected.

Maximum ratings

TC = 25 °C unless otherwise noted.

Rating	Symbol	Value	Unit
Maximum pressure (P1 > P2) (1)	PMAX	700	kPa
Storage temperature	TSTG	-40 to +125	°C
Operating temperature	TA	-40 to +125	°C
Output source current at full-scale output (2)	IO+	0.5	mAdc
Output sink current at minimum pressure offset (2)	IO-	-0.5	mAdc

- Exposure beyond the specified limits may cause permanent damage or degradation to the device.
- Maximum output current is controlled by the effective impedance from VOUT to GND or VOUT to VS in the application circuit.

Operating characteristics

VS = 5.0 VDC, TA = 25 °C unless otherwise noted, P1 > P2. The decoupling circuit shown in the recommended circuit section is required to meet the electrical specifications.

Characteristic	Symbol	Min	Typ	Max	Unit
Pressure range (1)	POP	20	—	400	kPa
Supply voltage (2)	VS	4.64	5.0	5.36	VDC
Supply current	IO	—	6.0	10	mAdc
Minimum pressure offset, 0 to 85 °C, VS = 5.0 V (3)	VOFF	0.133	0.200	0.267	VDC
Full-scale output, 0 to 85 °C, VS = 5.0 V (4)	VFSO	4.733	4.800	4.866	VDC
Full-scale span, 0 to 85 °C, VS = 5.0 V (5)	VFSS	4.467	4.600	4.733	VDC
Accuracy, 0 to 85 °C (6)	—	—	—	±1.5	%VFSS
Sensitivity	$\Delta V/\Delta P$	—	12.1	—	mV/kPa
Response time (7)	tR	—	1.0	—	ms
Warm-up time (8)	—	—	—	20	ms
Offset stability (9)	—	—	—	±0.25	%VFSS

- 1.0 kPa (kilopascal) equals 0.145 psi.
- The device is ratiometric within this specified excitation range.
- Offset (VOFF) is the output voltage at the minimum rated pressure.
- Full-scale output (VFSO) is the output voltage at the maximum or full rated pressure.
- Full-scale span (VFSS) is the algebraic difference between the output voltage at full rated pressure and the output voltage at the minimum rated pressure.
- Accuracy (error budget) consists of the following:
 - Linearity: output deviation at any temperature from a straight-line relationship with pressure over the specified pressure range.
 - Temperature hysteresis: output deviation at any temperature within the operating temperature range, after the temperature is cycled to and from the minimum or maximum operating temperature points, with zero differential pressure applied.
 - Pressure hysteresis: output deviation at any pressure within the specified range, when this pressure is cycled to and from the minimum or maximum rated pressure, at 25 °C.
 - TcSpan: output deviation over the temperature range of 0 to 85 °C, relative to 25 °C.
 - TcOffset: output deviation with minimum rated pressure applied, over the temperature range of 0 to 85 °C, relative to 25 °C.
 - Variation from nominal: the variation from nominal values, for offset or full-scale span, as a percent of VFSS, at 25 °C.
- Response time is the time for the output to go from 10 % to 90 % of its final value when subjected to a specified step change in pressure.
- Warm-up time is the time required for the product to meet the specified output voltage after the pressure has stabilized.
- Offset stability is the output deviation after 1000 cycles of pulsed pressure and temperature cycling with bias.

Recommended power supply decoupling and output filtering

Decouple VS and filter VOUT at the sensor pins

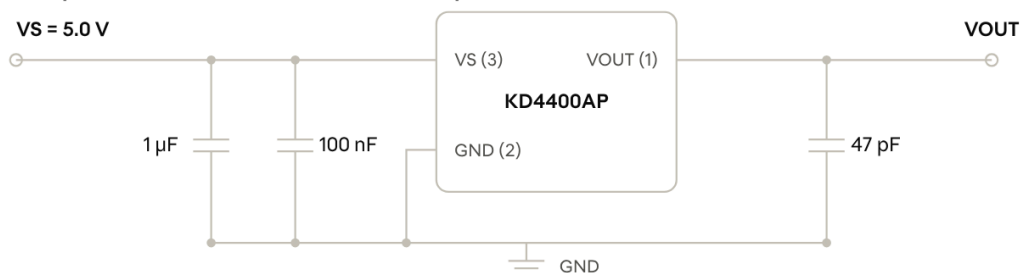


Figure 2 · Recommended power supply decoupling and output filtering

Place the 1 µF and 100 nF capacitors from VS to GND and the 47 pF capacitor from VOUT to GND as close to the sensor pins as possible. Treat these values as a starting point and verify them in the target application.

Output versus absolute pressure

Output rises linearly from 0.2 V at 20 kPa to 4.8 V at 400 kPa

VS = 5.0 V, 0 to 85 °C; the shaded band spans minimum to maximum

Output voltage VOUT (V)

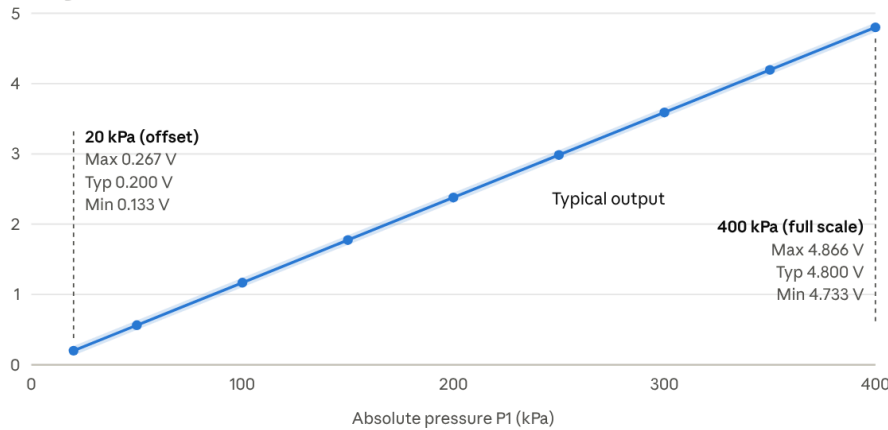


Figure 3 · Output versus absolute pressure, computed from the transfer function below

The output is linear over the full range with a sensitivity of 12.1 mV/kPa at a 5.0 V supply. The minimum and maximum curves are the typical curve ± 0.067 V, which corresponds to the ± 5.5 kPa pressure error band.

Transfer function and error bands

The nominal output follows the transfer function below, where P is the absolute pressure in kPa and VS = 5.0 $\pm$ 0.36 VDC. The pressure error is ± 5.5 kPa over the 20 to 400 kPa range; outside 0 to 85 °C the temperature error factor scales it.

$$V_{OUT} = V_S \times (0.002421 \times P - 0.00842) \pm (\text{Pressure Error} \times \text{Temperature Factor} \times 0.002421 \times V_S)$$

Temperature error factor is 1 from 0 to 85 °C and rises to 3 at -40 °C

The factor multiplies the pressure error band; linear between the plotted points

Temperature error factor

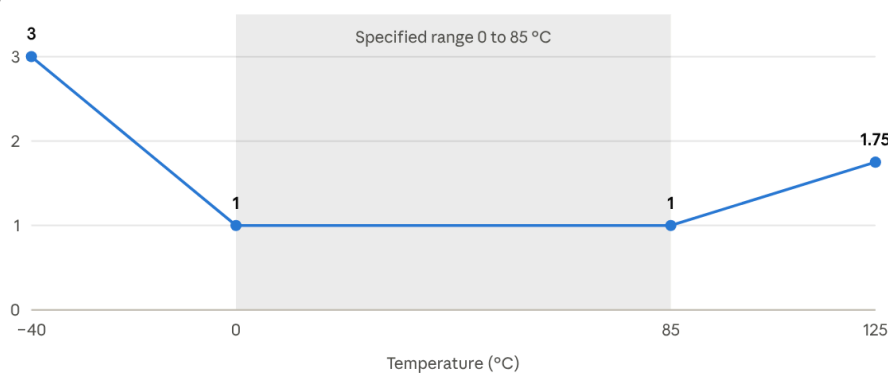


Figure 4 · Temperature error factor versus temperature

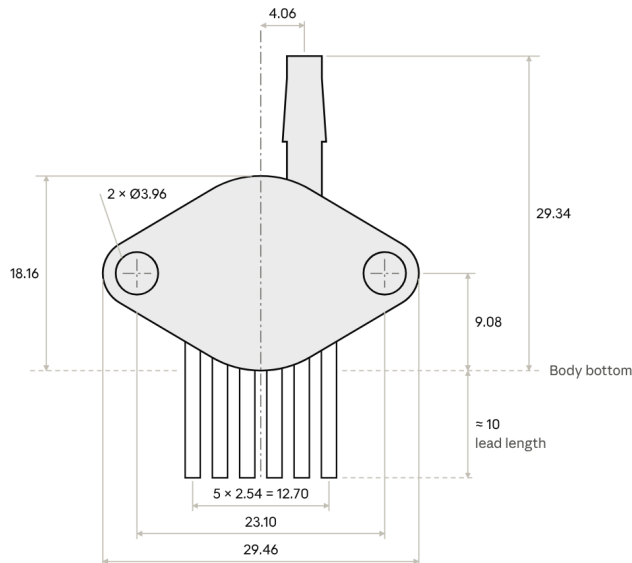
Temperature	Error factor	Pressure error	Output error at VS = 5.0 V
-40 °C	3.00	± 16.5 kPa	± 0.200 V (± 4.34 % VFSS)
0 to 85 °C	1.00	± 5.5 kPa	± 0.067 V (± 1.45 % VFSS)
+125 °C	1.75	± 9.6 kPa	± 0.117 V (± 2.53 % VFSS)

Package dimensions

The KD4400AP comes in a ported unibody package with an axial pressure port and two mounting holes. The drawing shows the label side; all values are nominal.

Ported unibody package, label side, with two mounting holes

Dimensions in millimetres, nominal values



Nominal values from the 3D model; no tolerances are specified. The lead length is approximate.

Figure 5 · Package outline, label side, dimensions in mm

Dimension	Value (mm)
Overall width across the mounting ears	29.46
Mounting hole spacing	23.10
Mounting hole diameter (2 holes)	3.96
Mounting hole centre above body bottom	9.08
Body height	18.16
Body thickness	8.0
Port axis offset from centre line	4.06
Port tip height above body bottom	29.34
Port outer diameter at tip	3.26
Port outer diameter at collar (maximum)	4.05
Port bore diameter	1.54
Lead pitch	2.54
Lead width	1.42
Lead thickness	0.39
Lead length below body (approximate)	10

Revision history and notes

Revision	Date	Description
1.0	September 2026	First release of the KD4400AP data sheet

Media compatibility. Operating characteristics and reliability tests are based on dry air as the pressure medium. Other media may have adverse effects on sensor performance and long-term reliability. Contact k-data for media compatibility in your application.

Application limits. The KD4400AP is not designed for use in life-support systems or surgical implants.

Manufacturer. k-data, Alte Poststrasse 5, 94036 Passau, Germany, www.k-data.org. Specifications are subject to change without notice.